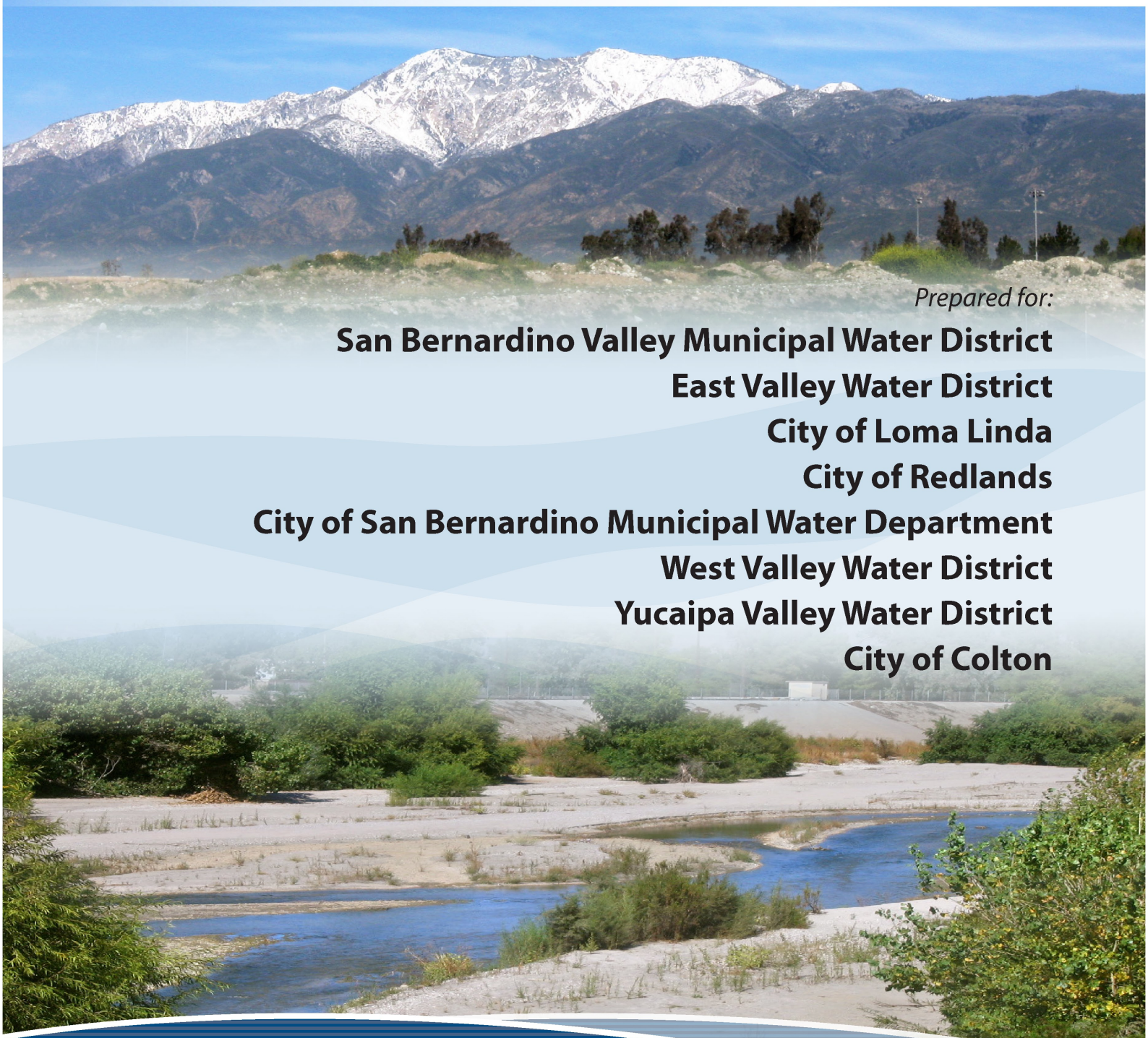
Final

2010 SAN BERNARDINO VALLEY REGIONAL URBAN WATER MANAGEMENT PLAN



Prepared for:

San Bernardino Valley Municipal Water District
East Valley Water District
City of Loma Linda
City of Redlands
City of San Bernardino Municipal Water Department
West Valley Water District
Yucaipa Valley Water District
City of Colton

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List of Acronyms

°C	degrees Celsius
°F	degrees Fahrenheit
AB	Assembly Bill
Accord	Seven Oaks Accord
Act	Urban Water Management Planning Act

AF	acre foot
AFY	acre feet per year
AHHA	Area Historic High Groundwater
AMR	Automatic Meter Reader
APA	Administrative Procedures Act
AWWA	American Waterworks Association
BDCP	Bay Delta Conservation Plan
Bear Valley	Bear Valley Mutual Water Company
Big Bear Municipal	Big Bear Municipal Water District
BMP	Best Management Practice
BTAC	Basin Technical Advisory Committee
CADHS	California Department of Health Services
CAL Green Code	2010 California Green Building Standards Code
CALWARN	California Water/Wastewater Agency Response Network
CAT	Climate Action Team
ccf	hundred cubic feet
CCR	California Code of Regulations
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CFS	cubic feet per second
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Irrigation System
Colton	City of Colton
Conservation District	San Bernardino Valley Water Conservation District
CUWCC	California Urban Water Conservation Council
CSUSB	California State University San Bernardino
CVP	Central Valley Project
Delta	Sacramento-San Joaquin River Delta
DFG	California Department of Fish and Game
DIP	Ductile Iron Pipe
DMM	Demand Management Measure

DRRs	Delivery Reliability Report
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
ERNIE	Emergency Response Network of the Inland Empire
ESA	Endangered Species Act
ET	Evapotranspirtation
ETo	Reference Evapotranspiration
EVWD	East Valley Water District
FWC	Fontana Water Company
GAC	granulated activated carbon
GIS	Geographic Information Science
GPCD	gallons per capita per day
gpm	gallons per minute
HECW	High Efficiency Clothes Washer
HET	High Efficiency Toilet
IERCD	Inland Empire Resources Conservation District
IRWMP	Integrated Regional Water Management Plan
IX	ion exchange
JPA	Joint Powers Authority
KAF	thousand acre feet
KAFY	thousand acre feet per year
LAFCO	Local Agency Formation Commission
Loma Linda	City of Loma Linda
MAF	million acre-feet
MCL	Maximum Contaminant Level
Metropolitan	The Metropolitan Water District of Southern California
MF	Multi-family
MG	million gallons
MGD	million gallons per day
MOU	Memorandum of Understanding

msl	mean seal level
MTBE	Methyl Tertiary Butyl Ether
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OCWD	Orange County Water District
PCE	perchloroethylene
Plan	Regional Urban Water Management Plan for San Bernardino Valley
PVC	polyvinyl chloride
QWEZ	Qualified Water Efficient Landscaper
Redlands	City of Redlands
RIX	Rapid Infiltration and Extraction
RPA	Reasonable and Prudent Alternative
RUWMP	Regional Urban Water Management Plan
RWQCB	Regional Water Quality Control Board
SAF	San Andres Fault
SANBAG	San Bernardino Association of Governments
SAR	Santa Ana River
SARI	Santa Ana Regional Interceptor
SARWQCB	Santa Ana Regional Water Quality Control Board
SAWPA	Santa Ana River Watershed Project Authority
SBBA	San Bernardino Basin Area
SBMWD	City of San Bernardino Municipal Water Department
SBMWD	San Bernardino Valley Municipal Water District
SBX7-7	Senate Bill 7 of Special Extended Session 7
SF	Single Family
SGPWA	San Gorgonio Pass Water Agency
SOI	sphere of influence
State Water	State Water Project Water
SWP	State Water Project
SWRCB	State Water Resources Control Board

TDS	total dissolved solids
TCE	trichloroethylene
ULFT	Ultr-Low Flush Toilet
USAWRA	Upper Santa Ana Water Resources Association
UV	ultraviolet
UWMP	Urban Water Management Plan
Valley District	San Bernardino Valley Municipal Water District
VOC	volatile organic compound
WBIC	Weather Based Irrigation Controller
Western	Western Municipal Water District of Riverside County
WMWD	Western Municipal Water District of Riverside County
WSCP	water shortage contingency plan
WVWD	West Valley Water District
WFF	Water Filtration Facility
WRCC	Western Regional Climate Center
WRWFF	Wocholz Regional Water Recycling Facility
WSS	Water Sense Specification
WTP	water treatment plant
WWTP	waste water treatment plant
YVRWFF	Yucaipa Valley Regional Water Filtration Facility
YVWD	Yucaipa Valley Water District

Executive Summary

This Regional Urban Water Management Plan (Plan) is a tool that provides a summary of anticipated supplies and demands for the years 2010 to 2035. This document was prepared for the following agencies within the San Bernardino Valley Municipal Water District service area:

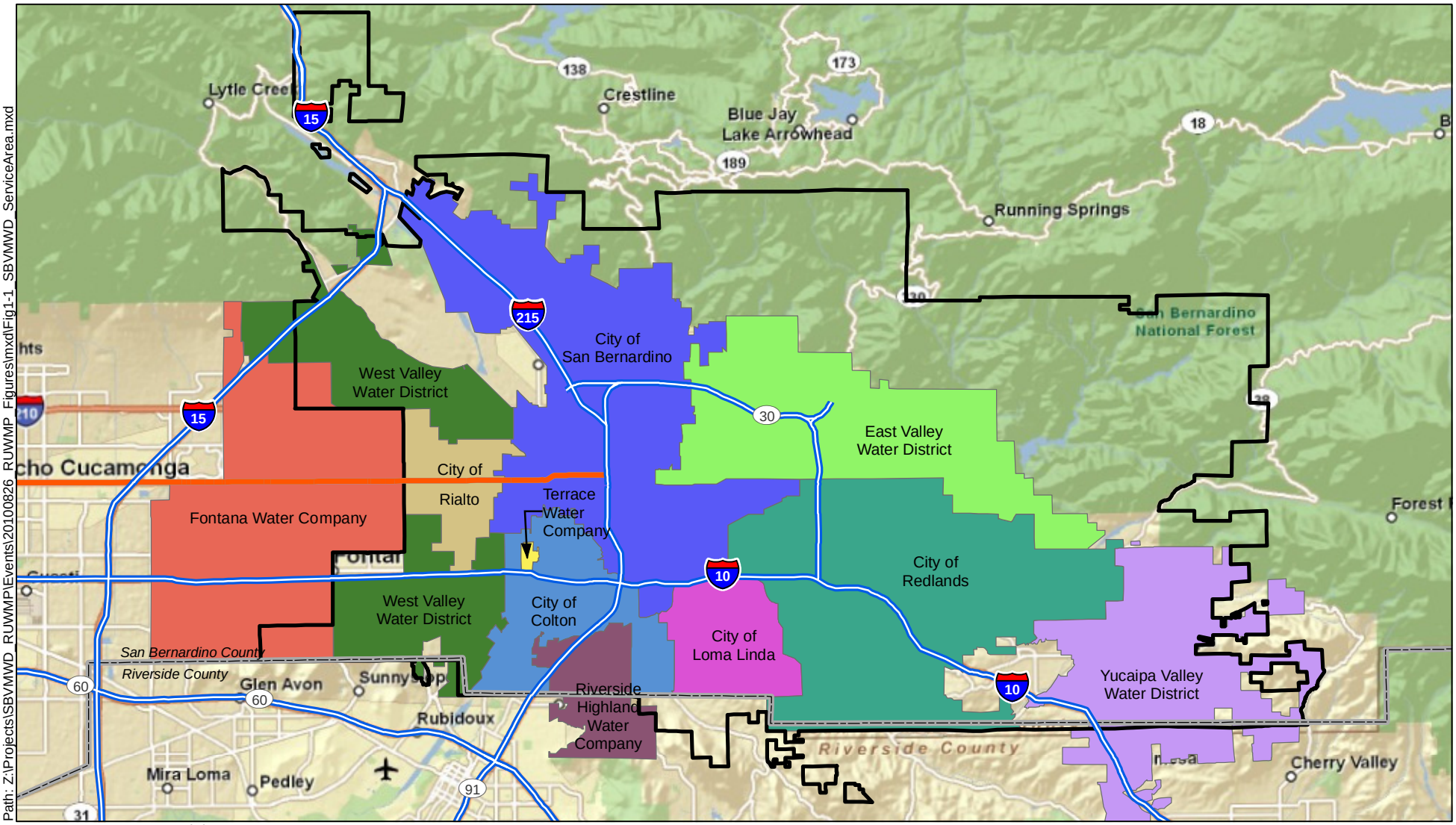
- San Bernardino Valley Municipal Water District (wholesale water agency)
- East Valley Water District
- City of Loma Linda
- City of Redlands
- City of San Bernardino Municipal Water Department
- West Valley Water District
- Yucaipa Valley Water District
- City of Colton

Figure ES-1 illustrates the geographic location of the agencies participating in this Regional Urban Water Management Plan (RUWMP). This Plan was prepared consistent with the Urban Water Management Plan Act (Act), the Water Conservation Act of 2009 (SBX7-7) and the Department of Water Resources (DWR) *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan* including the Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (DWR 2011). ***The 2010 Urban Water Management Plan Checklist is provided at the end of this Executive Summary.***

Urban Water Management Plan Requirements

The Urban Water Management Plan Act requires evaluation of the following:

- Whether supplies will be sufficient to meet demands during the following hydrologic year types
    - Normal/average year
    - Single dry year
    - Multiple dry year sequence;
- Existing baseline water use in terms of gallons per capita per day (GPCD) (applies only to retail water suppliers);
- Targets for future water use consistent with the Water Conservation Act of 2009 (SBX7-7) which seeks a 20 percent reduction in per capita water use by 2020;
- Demand Management Measures (DMMs) implemented or planned for implementation as well as the methods proposed for achieving future water use targets;



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Source: Basemap Copyright:© 2009 ESRI, AND, TANA, ESRI Japan, UNEP-WCMC.
Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

Legend

San Bernardino Valley Municipal Water District

N

0 4

Scale: Miles

Kennedy/Jenks Consultants

San Bernardino Valley Municipal Water District
Regional Urban Water Management Plan
San Bernardino, California

San Bernardino Valley Municipal Water District Service Area Including Retailer Service Areas

K/J 1089014*00

Figure ES-1

- Water shortage contingency planning; and
- Notification and coordination with other water agencies, land use entities, and the community.

Meeting Demands in Normal, Single-Dry, and Multiple Dry Period

Water Supplies

Presently, the participating agencies meet most of their demand with precipitation in the form of surface water and groundwater. Together these two supplies account for nearly 82 percent of current supplies (see Figure ES-2).

By 2035, groundwater and surface water will still account for 77 percent of supplies. However, the area will also depend upon recycled water. By year 2035, recycled water could make up 7 percent of the supply portfolio (see Figure ES-3).

An overview of water supplies is provided in Chapter 2, but the water sources available to each participating entity is described in the chapter for that water agency.

FIGURE ES-2
CURRENT WATER SUPPLIES

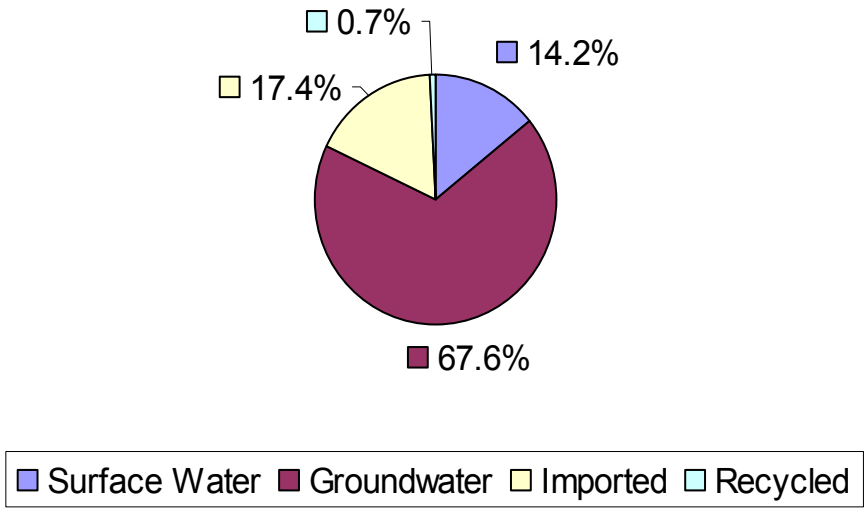
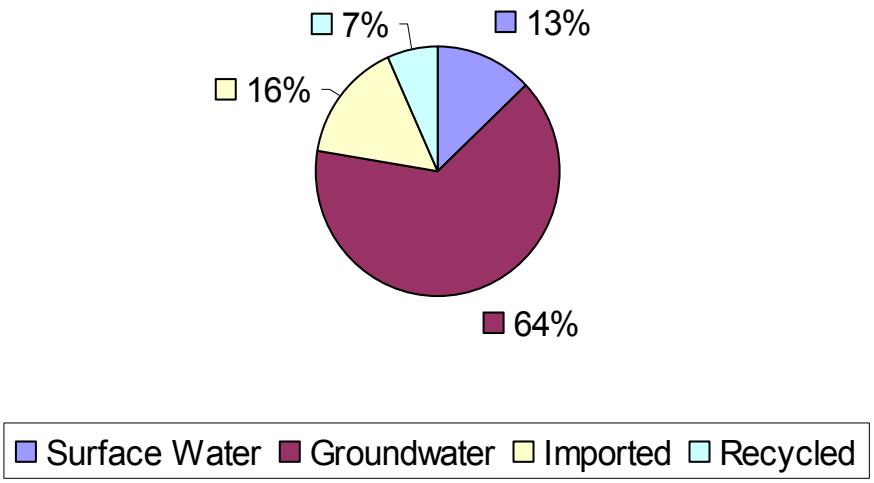


FIGURE ES-3
FUTURE (2035) WATER SUPPLIES



Water Demands

Residential uses account for approximately 60 percent of water demands for the participating agencies. Commercial and Institutional uses make up approximately 23 percent of current demand. Remaining uses include dedicated landscape (~9 percent) and system losses (~8 percent).

Even considering the effects of compliance with SBX7-7, it is anticipated that water demands in the San Bernardino Valley will increase by approximately 33% by the year 2035.

An overview of water demands is provided in Chapter 3, but the water demand estimates for each participating entity is described in the chapter for that water agency.

Supplies versus Demands

The UWMP Act requires urban water suppliers assess water supply reliability by comparing total projected water use with the expected water supply over the next twenty years in five year increments. The Act also requires an assessment of single-dry year and multiple-dry years. These comparisons are provided for each agency in the chapter for that agency. Figures ES-4, ES-5, and ES-6 show that supplies will meet, or exceed, demands in a normal year, a single dry year, and a multiple dry year period.

FIGURE ES-4
COMPARISON OF ESTIMATED SUPPLIES VS ESTIMATED DEMANDS
IN A NORMAL YEAR

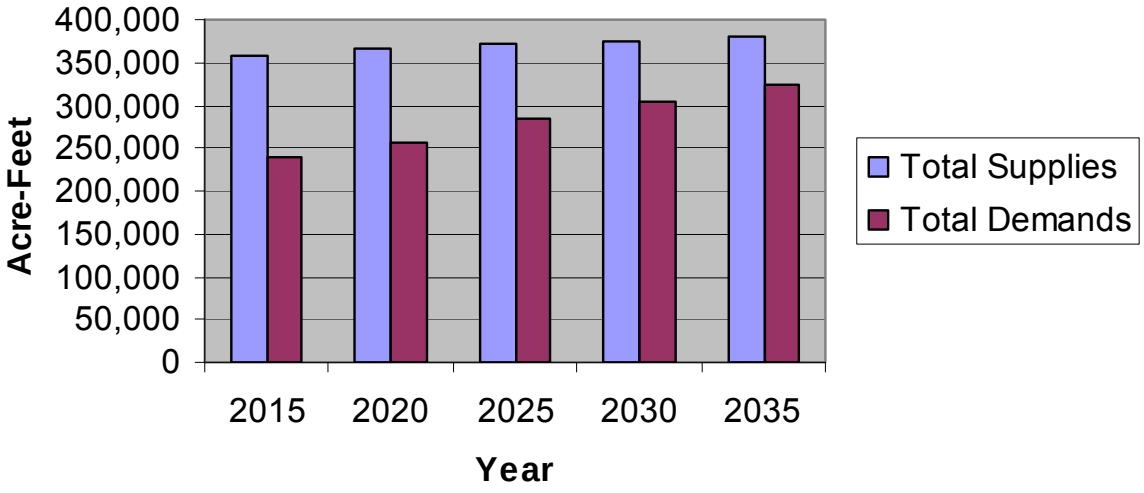


FIGURE ES-5
COMPARISON OF ESTIMATED SUPPLIES VS ESTIMATED DEMANDS
IN A SINGLE-DRY YEAR

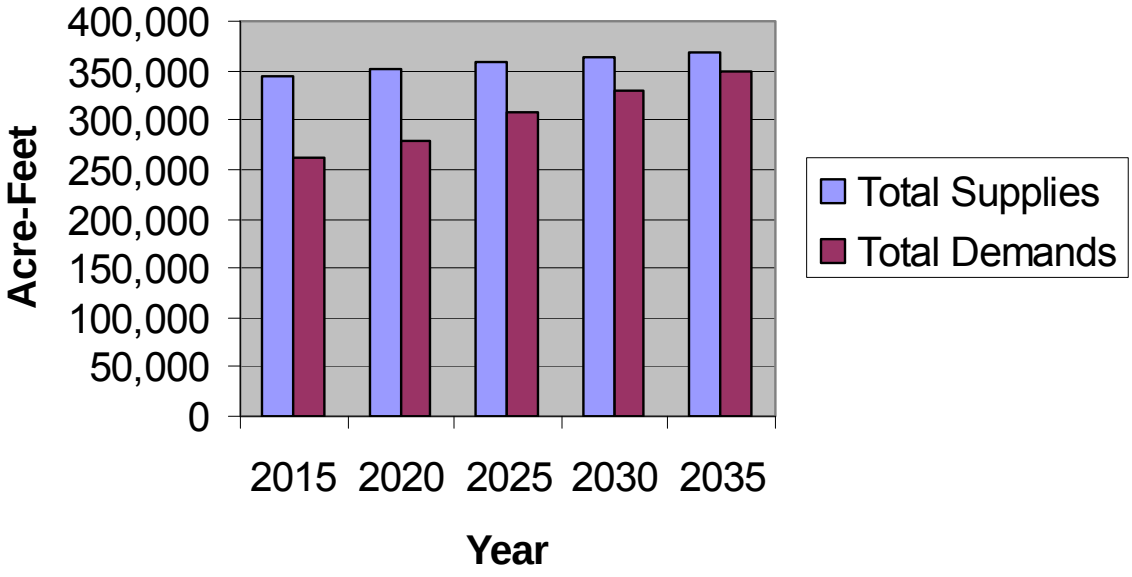
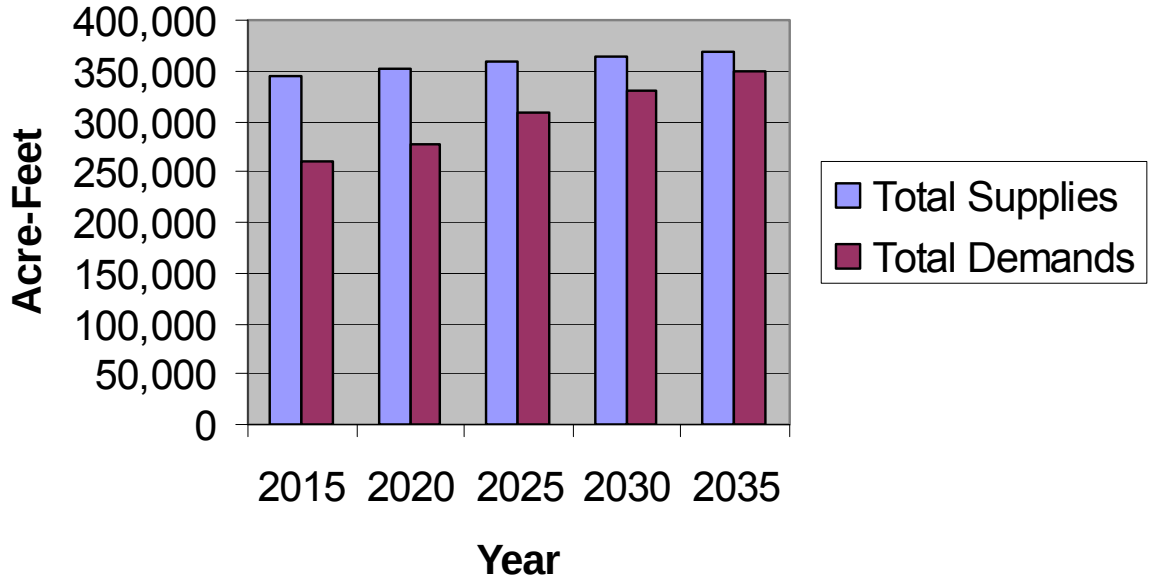


FIGURE ES-6
COMPARISON OF ESTIMATED SUPPLIES VS ESTIMATED DEMANDS IN A MULTIPLE-DRY YEAR PERIOD

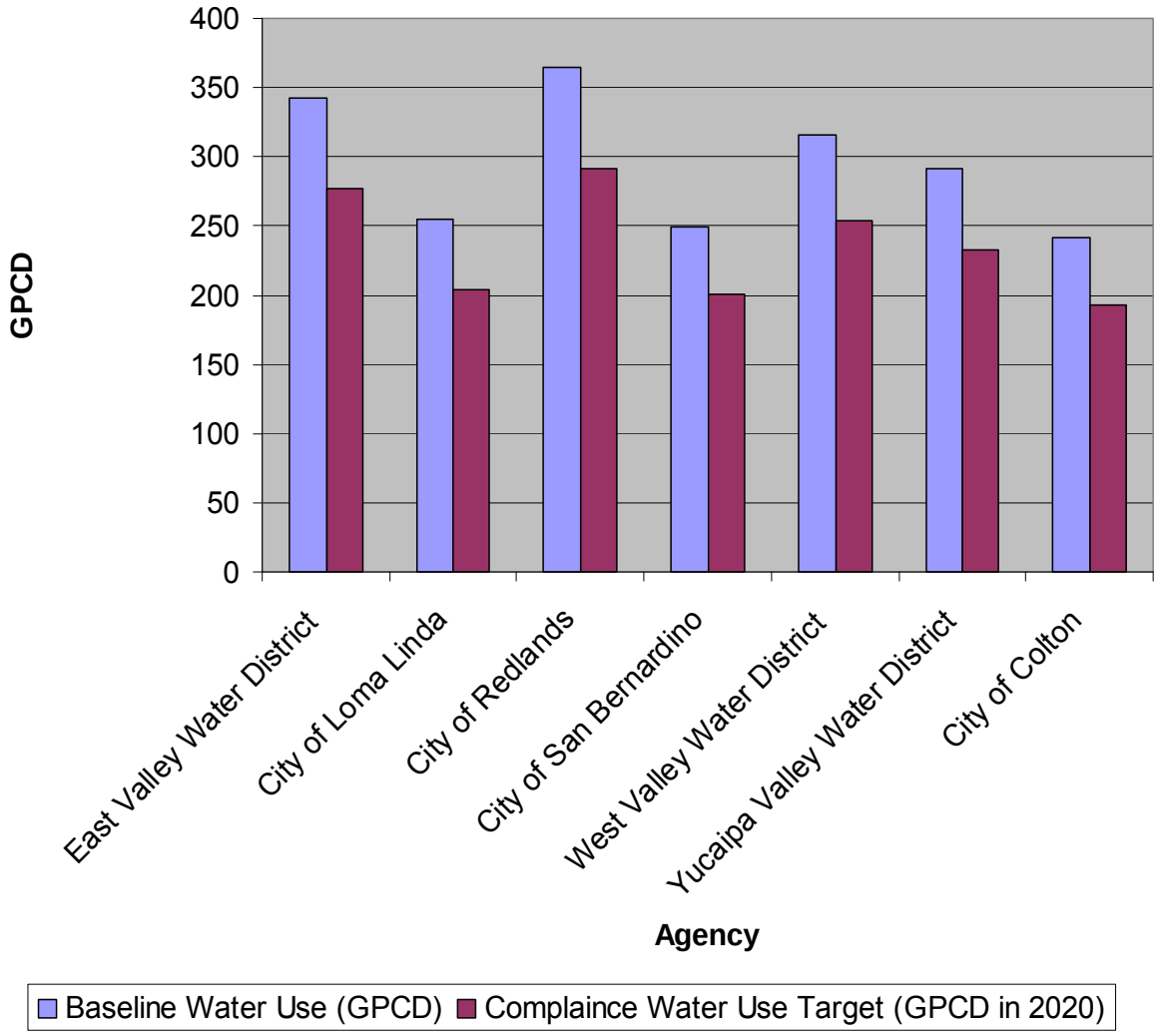


Compliance with the Water Conservation Act of 2009 (SBX7-7)

The Water Conservation Bill of 2009 (also referred to as SBX7-7) was enacted as part of the November 2009 Comprehensive Water Package. The Water Conservation Bill of 2009 provides the regulatory framework to support a statewide reduction in urban per capita water use. Each retail water supplier must demonstrate compliance with SBX7-7 by determining its existing baseline water consumption and then establish a future water use target in gallons per capita per day and report that information in its 2010 UWMP.

Figure ES-7 below shows the baseline water use and the water use targets for each retail agency in gallons per capita per day.

FIGURE ES-7
BASELINE AND TARGET GPCD BY RETAIL AGENCY



Demand Management Measures

The agencies will use Demand Management Measures (DMMs) to achieve their compliance with SBX7-7. Table ES-1 provides a listing of these strategies.

TABLE ES-1
CONSERVATION STRATEGIES PLANNED

	East Valley Water District	City of Loma Linda	City of Redlands	City of San Bernardino	West Valley Water District	Yucaipa Valley Water District	City of Colton	San Bernardino Valley Municipal Water District
Conservation Coordinator	X	X	X	X	X	X	X	X
Water Waste Prevention	X	X	X	X	X	X	X	X
Water Loss Control	X	X	X	X	X	X	X	X
Metering with Commodity Rates	X	X	X	X	X	X	X	X
Retail Conservation Pricing	X	X	X	X	X	X	X	X
Public Information Programs	X	X	X	X	X	X	X	X
School Education Programs	X	X	X	X	X	X	X	X
Residential Audits			X	X		X		
Landscape Water Surveys			X	X		X		
High-Efficiency Clothes Washer Rebates	+	+	X	X	+	X	+	+
WaterSense Toilet Rebates	+	+	X	X	X	X	+	+
Green Building Code	X	X	X	X	X	X	X	X
Commercial/Institutional/ Industrial Programs	+	+	X	X	X	X	+	+
Landscape Water Use Efficiency			X	X	X	X		
Other			X	X	X			X

Notes:
X - conservation measure planned for implementation
+ - conservation measure planned for implementation, seeking to implement conservation measure as part of multi-agency program

Water Shortage Contingency Planning

Water supplies may be interrupted or reduced significantly through drought, natural disaster such as earthquake, a regional power outage, or a toxic spill that prevents delivery due to poor water quality. All of the participating agencies adopted the *Upper Santa Ana River Watershed Integrated Regional Water Management Plan*[1] which includes strategies and projects to overcome water shortages during emergencies. In addition, all the agencies participate in the Emergency Response Network of the Inland Empire (ERNIE) which is a water/wastewater mutual aid network within San Bernardino and Riverside counties.

Each of the retail water agencies (as detailed in the chapters for each retail agency) has identified voluntary and mandatory conservation measures that will go into affect during different stages of water shortage.

Notification and Coordination Requirements

The UWMP Act encourages input to an UWMP. Specifically the UWMP Act requires:

- That each urban water supplier notify the planning departments of any city or county within which the supplier provides water, with at least 60 days notice of the public hearing on its UWMP.

- Prior to adopting a plan, an urban water supplier shall hold a public hearing. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier at least once 14 days prior to the hearing and again 7 days prior to the hearing.

- Prior to adopting a plan, a retail water supplier shall conduct at least one public hearing to allow community input regarding the urban retail water supplier's implementation plan for complying with SBX7-7, to consider the economic impacts of the urban retail water supplier's implementation plan for complying with SBX7-7, and to adopt a method for determining its urban water use target.

- Within 30 days of adoption, an urban water supplier shall file a copy of the plan with DWR, the California State Library, and any city or county within which the supplier provides water. No later than 30 days after filing a copy of a plan with DWR, an urban water supplier shall make the plan available for review during normal business hours.

Each agency participating in this RUWMP sent letters to cities and counties, as well as other water agencies notifying them of RUWMP preparation and soliciting input to the Plan. Notification letters were sent in February and March 2011. Each agency published hearing notices consistent with UWMP Act requirements. Hearings were conducted by each agency regarding the selection of water use targets, the implementation plan for complying with SBX7-7, and the potential economic impacts of complying with SBX7-7.

[1] *Upper Santa Ana River Watershed Integrated Regional Water Management Plan*, November 2007, pg. 4-77 – 4-88.

Following adoption, the Plan will be available during normal business hours at the administrative offices of each agency:

San Bernardino Valley Municipal Water District	380 E. Vanderbilt Way San Bernardino, CA
East Valley Water District	3654 E. Highland Ave., Ste 18 Highland, CA
City of Loma Linda	Department of Public Works 25541 Barton Road Loma Linda, CA
City of Redlands	Municipal Utilities Department and Engineering Department 35 Cajon Street Redlands, CA
City of San Bernardino Municipal Water Department	Water Department 300 N. D Street San Bernardino, CA
West Valley Water District	855 W. Baseline Road Rialto, CA
Yucaipa Valley Water District	12770 Second Street Yucaipa, CA
City of Colton	Public Works and Utility Services Department 160 S. 10th Street, Colton, CA

Furthermore, following adoption, the RUWMP will be submitted to DWR, the California State Library, and all the cities and counties within the service areas of the participating agencies.

No.	UWMP requirement [a]	Calif. Water Code Reference	Additional Clarification	UWMP Location by Retail Purveyor							
				San Bernardino Valley Municipal Water District	East Valley Water District	City of Loma Linda	City of Redlands	City of San Bernardino Municipal Water Department	West Valley Water District	Yucaipa Valley Water District	City of Colton
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)		NA, Wholesale District	§7.4.1, §7.4.2, pgs 7-9 to 7-12	§8.4.1, §8.4.2, pgs 8-9 to 8-11	§9.4.1, pgs 9-10 to 9-12	§10.4.1, §10.4.2, pgs 10-9 to 10-12	§11.4.1, §11.4.2, pgs 11-9 to 11-12	§12.4.1, §12.4.2, pgs 12-9 to 12-11	§13.4.1, §13.4.2, pgs 13-8 to 13-10
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailer and wholesalers have slightly different requirements	§6.3	§1.4.3, Table 1-2, Appendix H, pgs 1-4 to 1-8	§1.4.3, Table 1-2, Appendix H, pgs 1-4 to 1-8	§1.4.3, Table 1-2, Appendix H, pgs 1-4 to 1-8	§1.4.3, Table 1-2, Appendix H, pgs 1-4 to 1-8	§1.4.3, Table 1-2, Appendix H, pgs 1-4 to 1-8	§1.4.3, Table 1-2, Appendix H, pgs 1-4 to 1-8	§1.4.3, Table 1-2, Appendix H, pgs 1-4 to 1-8
3	Report progress in meeting urban water use targets using the standardized form.	10608.4	Standardized form not yet available	NA to Wholesaler	NA to 2010 UWMP	NA to 2010 UWMP	NA to 2010 UWMP	NA to 2010 UWMP	NA to 2010 UWMP	NA to 2010 UWMP	NA to 2010 UWMP
4	Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)		§1.4.1, §1.4.3, Table 1-1, pgs 1-4 to 1-8	§1.4.1, §1.4.3, Table 1-1, pgs 1-4 to 1-8	§1.4.1, §1.4.3, Table 1-1, pgs 1-4 to 1-8	§1.4.1, §1.4.3, Table 1-1, pgs 1-4 to 1-8	§1.4.1, §1.4.3, Table 1-1, pgs 1-4 to 1-8	§1.4.1, §1.4.3, Table 1-1, pgs 1-4 to 1-8	§1.4.1, §1.4.3, Table 1-1, pgs 1-4 to 1-8	§1.4.1, §1.4.3, Table 1-1, pgs 1-4 to 1-8
5	An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.	10620(f)		§2.10, pg 2-30	§2.10, pg 2-30	§2.10, pg 2-30	§2.10, pg 2-30	§2.10, pg 2-30	§2.10, pg 2-30	§2.10, pg 2-30	§2.10, pg 2-30
6	Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.	10621(b)		§1.4.3, pgs 1-4 to 1-8, notification letters in Appendix A	§1.4.3, pgs 1-4 to 1-8, notification letters in Appendix A	§1.4.3, pgs 1-4 to 1-8, notification letters in Appendix A	§1.4.3, pgs 1-4 to 1-8, notification letters in Appendix A	§1.4.3, pgs 1-4 to 1-8, notification letters in Appendix A	§1.4.3, pgs 1-4 to 1-8, notification letters in Appendix A	§1.4.3, pgs 1-4 to 1-8, notification letters in Appendix A	§1.4.3, pgs 1-4 to 1-8, notification letters in Appendix A
7	The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).	10621(c)		§1.4.2	§1.4.2	§1.4.2	§1.4.2	§1.4.2	§1.4.2	§1.4.2	§1.4.2
8	Describe the service area of the supplier	10631(a)		§6.1, Fig. 6-1, pgs 6-1 to 6-3	§7.1, Fig 7-1, pgs 7-1 to 7-3	§8.1, Fig 8-1, pgs 8-1 to 8-3	§9.1, Figs 9-1 and 9-2, pgs 9-1 to 9-6	§10.1, Fig 10-1, pgs 10-1 to 10-3	§11.1, Fig 11-1, pgs 11-1 to 11-3	§12.1, Figs 12-1 and 12-2, pgs 12-1 to 12-3	§13.1, Fig 13-1, pgs 13-1 to 13-3
9	(Describe the service area) climate	10631(a)		§6.2, Table 6-2, pg 6-2	§7.2, Table 7-3, pgs 7-2 to 7-5	§8.1, Table 8-3, pg 8-2	§9.2, Table 9-2, pgs 9-7 to 9-8	§10.2, Table 10-3, pg 10-2	§11.2, Table 11-2, pg 11-2	§12.2, Table 12-3, pg 12-4	§13.2, Table 13-3, pg 13-2
10	(Describe the service area) current and projected population . . . The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier . . .	10631(a)	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	§6.1, Table 6-1, pgs 6-1 to 6-2	§7.1, Tables 7-1 and 7-2, pgs 7-1 to 7-2	§8.1, Tables 8-1 and 8-2, pgs 8-1 to 8-2	§9.1.1, Table 9-1, pgs 9-1 to 9-7	§10.1, Tables 10-1 and 10-2, pgs 10-1 to 10-2	§11.1, Table 11-1, pgs 11-1 to 11-2	§12.1, Table 12-2, pgs 12-1 to 12-3	§13.1, Tables 13-1 and 13-2, pg 13-1
11	. . . (population projections) shall be in five-year increments to 20 years or as far as data is available.	10631(a)	2035 and 2040 can also be provided to support consistency with SB610/221 documents.	Table 6-1, pgs 6-1 to 6-2	Tables 7-1 and 7-2, pgs 7-1 to 7-2	Tables 8-1 and 8-2, 8-1 to 8-2	Table 9-1, pgs 9-1 to 9-7	Tables 10-1 and 10-2, pgs 10-1 to 10-2	Table 11-1, pgs 11-1 to 11-2	Table 12-1, pgs 12-1 to 12-3	Tables 13-1 and 13-2, pg 13-1
12	Describe . . . other demographic factors affecting the supplier's water management planning	10631(a)		§6.1, pg 6-1	§7.1, pgs 7-1 to 7-2	§8.1, pgs 8-1 to 8-2	§9.1.1, pgs 9-1 to 9-7	§10.1, pgs 10-1 to 10-2	§11.1, pgs 11-1 to 11-2	§12.1, pgs 12-1 to 12-3	§13.1, pg 13-1
13	Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided to support consistency with SB610/221 documents.	Table 2-8, pg 2-28	Table 7-33, pg 7-33	Table 8-29, pg 8-27	§9.7.6, Table 9-35, pg 9-30	§10.8.6, Table 10-35, pg 10-34	§11.8.7, Table 11-31, pg 11-32	Table 12-37, pg 12-60	§13.8.2, Table 13-27, pg 13-30
14	(Is) groundwater . . . identified as an existing or planned source of water available to the supplier . . .?	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated seawater, brackish groundwater, and other.	§2.2, pg 2-5 to 2-15	§7.8.2, pgs 7-27 to 7-29	§8.8.2, pgs 8-24 to 8-25	§9.7.2, pg 9-24	§10.8.2, pg 10-29	§11.8.2, pg 11-27	§12.7.2, pg 12-27	§13.8.2, pg 13-27
15	(Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management. Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		Appendix C, §2.2, pg 2-5	Appendix C, §2.2 and §7.8.2, pgs 2-5 and 7-27	Appendix C, §2.2 and §8.8.2, pgs 2-5 and 8-24	Appendix C, §2.2 and §9.7.2, pgs 2-5 and 9-24	Appendix C, §2.2 and §10.8.2, pgs 2-5 and 10-29	Appendix C, §2.2 and §11.8.2, pgs 2-5 nd 11-27	Appendix C, §2.2 and §12.7.2, pgs 2-5 nd 12-27	Appendix C, §2.2 and §13.8.2, pgs 2-5 and 13-27
16	(Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater.	10631(b)(2)		§2.2.1 to §2.2.6, pgs 2-5 to 2-13	§2.2.1 and §7.8.2, pgs 2-6 and 7-27	§2.2.1 and §8.8.2, pgs 2-5 and 8-24	§2.2.1, §2.2.4, §9.7.2, pgs 2-5 to 2-11 and 9-24	§2.2.1 and §10.8.2, pgs 2-5 and 10-29	§2.2.1 to §2.2.3 and §2.2.6 and §11.8.2, pgs 2-5, 2-13, and 11-27	§12.7.2.1 to 12.7.2.3, pgs 12-32	§2.2.1 to §2.2.3 and §13.8.2, pgs 2-5 and 13-27
17	For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board	10631(b)(2)		Appendix C	Appendix C	Appendix C	Appendix C	Appendix C	Appendix C	Appendix C	Appendix C
18	(Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.	10631(b)(2)		§2.2.1 to §2.2.6, pgs 2-5 to 2-13	§2.3, pg 2-14	§2.3, pg 2-14	§2.3, pg 2-14	§2.3, pg 2-14	§2.3, pg 2-14	§2.3, pg 2-14	§2.3, pg 2-14
19	For basins that have not been adjudicated, (provide) information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.	10631(b)(2)		NA	NA	NA	NA	NA	NA		NA
20	(Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(3)		NA	§7.8.2, Table 7-28, pg 7-27	§8.8.2, Table 8-25, pg 8-24	§9.7.2, Table 9-26, pg 9-24	§10.8.2, Table 10-28, pg 10-29	§11.8.2, Table 11-26, pg 11-27	§12.7.2.4, Table 12-33, pg 12-36	§13.8.2, Table 13-23, pg 13-27
21	(Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	See purveyor chapters	§7.8.2, Table 7-29, pg 7-27	§8.8.2, Table 8-26, pg 8-24	§9.7.2, Table 9-27, pg 9-24	§10.8.2, Table 10-29, pg 10-29	§11.8.2, Table 11-27, pg 11-27	§12.7.2.4, Table 12-33, pg 12-36	§13.8.2, Table 13-23, pg 13-27
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) An average water year, (B) A single dry water year, (C) Multiple dry water years.	10631(c)(1)		See purveyor chapters	§7.10, pg 7-38	§8.10, pg 8-32	Tables 9-42 to 9-44, §9.9.4, pg 9-36	§10.10, pg 10-39	§11.10, pg 11-38	§12.9, pg 12-58	§13.10, pg 13-35
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)	No agencies have inconsistent supplies.	No agencies have inconsistent supplies.	No agencies have inconsistent supplies.	No agencies have inconsistent supplies.	No agencies have inconsistent supplies.	No agencies have inconsistent supplies.	No agencies have inconsistent supplies.	No agencies have inconsistent supplies.	No agencies have inconsistent supplies.
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		See purveyor chapters	§7.8.5, pg 7-31	§8.8.5, pg 8-26	§9.7.5, Table 9-34, pg 9-29	§10.8.4, Table 10-34, pg 10-33	§11.8.5, pg 11-31	§12.7.6, pg 12-42	§13.8.5, pg 13-29
25	Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof;(I) Agricultural.	10631(e)(1)	Consider "past" to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	NA	§7.3, pg 7-5	§8.3, pg 8-5	§9.3, pg 9-8	§10.3, pg 10-5	§11.3, pg 11-5	§12.3, pg 12-5	§13.3, pg 13-2

No.	UWMP requirement [a]	Calif. Water Code Reference	Additional Clarification	UWMP Location by Retail Purveyor							
				San Bernardino Valley Municipal Water District	East Valley Water District	City of Loma Linda	City of Redlands	City of San Bernardino Municipal Water Department	West Valley Water District	Yucaipa Valley Water District	City of Colton
26	(Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following: (A) Water survey programs for single-family residential and multifamily residential customers; (B) Residential plumbing retrofit; (C) System water audits, leak detection, and repair; (D) Metering with commodity rates for all new connections and retrofit of existing connections; (E) Large landscape conservation programs and incentives; (F) High-efficiency washing machine rebate programs; (G) Public information programs; (H) School education programs; (I) Conservation programs for commercial, industrial, and institutional accounts; (J) Wholesale agency programs; (K) Conservation pricing; (L) Water conservation coordinator; (M) Water waste prohibition;(N) Residential ultra-low-flush toilet replacement programs.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	§6.3.1, pg 6-5	§7.7.1, pg 7-17	§8.7.1, pg 8-15	§9.6.1 to 9.6.3, pg 9-18	§10.7.1, pg 10-16	§11.7.1, pg 11-17	§12.6.1, pg 12-15	§13.7 and §13.7.1, pg 13-15
27	A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.	10631(f)(3)		§6.3.1, pg 6-6	§7.7.1, pg 7-18	§8.7.1, pg 8-16	§9.6.1 to 9.6.3, pg 9-19	§10.7.1, pg 10-17	§11.7.1, pg 11-18	§12.6.1, pg 12-16	§13.7 and §13.7.1, pg 13-16
28	An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.	10631(f)(4)		§6.3.1, pg 6-7	§7.7.2, pg 7-18	§8.7.1, pg 8-17	Table 9-25. pg 9-25	§10.7.1, pg 10-18	§11.7.1, pg 11-19	§12.6.1, pg 12-17	§13.7 and §13.7.1, pg 13-17
29	An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following: (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.	10631(g)	See 10631(g) for additional wording.	§6.3.2, pg 6-6	§7.7.3, pg 7-22	§8.7.2, pg 8-18	§9.6, pg 9-18	§10.7.4, pg 10-19	§11.7.4, pg 11-20	§12.6.2, pg 12-21	§13.7.3, pg 13-19
30	(Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.	10631(h)		§2.6, pg 2-25	§7.8.6, pg 7-31	§8.8.6, pg 8-27	§9.4.2, pg 9-13	§10.8.4.3, pg 10-34	§11.8.6, pg 11-31	§12.7.6, pg 12-42	§13.8.6, pg 13-30
31	Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.	10631(i)		§2.7.1 to §2.7.2, pg 2-26	§2.7.1 to §2.7.2, pg 2-26	§2.7.1 to §2.7.2, pg 2-26	§2.7.1 to §2.7.2, pg 2-26	§2.7.1 to §2.7.2, pg 2-26	§2.7.1 to §2.7.2, pg 2-26	§2.7.1 to §2.7.2, pg 2-26	§2.7.1 to §2.7.2, pg 2-26
32	Include the annual reports submitted to meet the Section 6.2 requirement (of the MOU), if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	NA	NA	NA	NA	NA	NA	NA	NA
33	Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Table 2-2, pg 2-4	§7.8.1, Tables 7-26, 7-27, pg 7-26	Loma Linda does not project future wholesale use	Table 9-24, pg 9-24	§10.8.1, Tables 10-26, 10-27, pg 10-28	§11.8.1, Tables 11-24, 11-25, pg 11-26	§12.7.1, Tables 12-26 and 12-27, pg 12-25	Colton does not project future wholesale use
34	The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		NA	§7.5.4, Table 7-19, pg 7-15	§8.5.4, Table 8-18, pg 8-13	§9.5.2, Table 9-19, pg 9-16	§10.5.4, Table 10-19, pg 10-14	§11.5.4, Table 11-18, pg 11-15	§12.5.4, pg 12-13	§13.5.4, Table 13-17, pg 13-12
35	Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.	10632(a)		Chapter 5	§7.9.3, pg 7-34	§8.9.3, pg 8-28	§9.8.1, pg 9-30	§10.9.3.1, pg 10-36	§11.9.2, pg 11-33	§12.8.3, pg 12-45	§13.9.2, pg 13-31
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)		See purveyor chapters	§7.9.6, Table 7-35, pg 7-38	§8.9.6, Table 8-30, pg 8-32	§9.8.2, Table 9-37, pg 9-31	§10.9.6, Table 10-36, pg 10-39	§11.9.9, Table 11-33, pg 11-36	§12.8.6, pg 12-58	§13.9.6, Table 13-30, pg 13-34\
37	(Identify) actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		§5.3, pg 5-1	§7.9.2, pg 7-34	§8.9.2, pg 8-28	§9.8.3, pg 9-31	§10.9.2, pg 10-35	§11.9.2, pg 11-33	§12.8.3, pg 12-45	§13.9.7, pg 13-35
38	(Identify) additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		NA	§7.9.3, pg 7-34	§8.9.3, pg 8-28	§9.8.4, Table 9-38, pg 9-32	§10.9.3, pg 10-36	§11.9, pg 11-32	§12.8.3, pg 12-45	§13.9.2, Table 13-29, pg 13-31
39	(Specify) consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)		NA	§7.9.3, pg 7-35	§8.9.3, pg 8-29	§9.8.4, Table 9-39, pg 9-33	§10.9.3, pg 10-37	§11.9, pg 11-33	§12.8.3, pg 12-46	§13.9.2, Table 13-29, pg 13-32
40	(Indicated) penalties or charges for excessive use, where applicable.	10632(f)		NA	§7.9.3, pg 7-35	§8.9.3.1, pg 8-31	§9.8.4.2, Table 9-38, pg 9-32	§10.9.3.2, pg 10-38	§11.9.8, pg 11-36	§12.8.3, pg 12-47	§13.9.3, pg 13-33
41	An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		NA	§7.9.4, pg 7-37	§8.9.4, pg 8-31	§9.8.5, pg 9-33	§10.9.4, pg 10-39	§11.9.10, pg 11-37	§12.8.4, pg 12-57	§13.9.4, pg 13-34
42	(Provide) a draft water shortage contingency resolution or ordinance.	10632(h)		NA	Appendix G	Appendix G	Appendix G	§10.9.3, Appendix G	Appendix G	Appendix G	Appendix G
43	(Indicate) a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		NA	§7.9.5, pg 7-38	§8.9.5, pg 8-32	§9.8.7, pg 9-33	§10.9.5, pg 10-39	§11.9.11, pg 11-38	§12.8.5, pg 12-58	§13.9.5, pg 13-34
44	Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area	10633	4.3.2	NA, See purveyor chapters	§7.8.4, pg 7-30	§8.8.4, pg 8-26	§9.7.4, pg 9-27	§10.8.3, pg 10-31	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, pg 13-28
45	(Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)	4.3.2	NA, See purveyor chapters	§7.8.4, pg 7-30	§8.8.4, pg 8-26	§9.7.4, Table 9-30, pg 9-27	10.8.3, Table 10-31, pg 10-31	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, Table 13-26, pg 13-28
46	(Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		NA, See purveyor chapters	§7.8.4, pg 7-30	§8.8.4, pg 8-26	§9.7.4, Table 9-31, pg 9-27	§10.8.3, pg 10-31	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, Table 13-26, pg 13-28
47	(Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		NA, See purveyor chapters	EVWD is not responsible for recycled water in its service area.	Loma Linda is not responsible for recycled water in its service area.	§9.7.4, Table 9-32, pg 9-27	§10.8.3, pg 10-31	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, pg 13-28
48	(Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)		NA, See purveyor chapters	EVWD is not responsible for recycled water in its service area.	Loma Linda is not responsible for recycled water in its service area.	§9.7.4, Table 9-32, pg 9-27	§10.8.3, pg 10-31	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, pg 13-28
49	(Describe) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.	10633(e)		NA, See purveyor chapters	EVWD is not responsible for recycled water in its service area.	Loma Linda is not responsible for recycled water in its service area.	§9.7.4, Table 9-33, pg 9-27	§10.8.3, Table 10-33, pg 10-31	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, Table 13-26, pg 13-28

No.	UWMP requirement [a]	Calif. Water Code Reference	Additional Clarification	UWMP Location by Retail Purveyor							
				San Bernardino Valley Municipal Water District	East Valley Water District	City of Loma Linda	City of Redlands	City of San Bernardino Municipal Water Department	West Valley Water District	Yucaipa Valley Water District	City of Colton
50	(Describe the) actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)		NA, See purveyor chapters	§7.8.4, pg 7-30	§8.8.4, pg 8-26	§9.7.4, Table 9-33, pg 9-27	§10.8.3, pg 10-31	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, pg 13-28
51	(Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		NA, See purveyor chapters	§7.8.4, pg 7-30	§8.8.4, pg 8-26	§9.7.4, pg 9-27	§10.8.3, pg 10-31	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, pg 13-28
52	The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.	10634	For years 2010, 2015, 2020, 2025, and 2030	§2.5.5, Table 2-6, pg 2-24	§2.5.5, Table 2-6, pg 2-24	§2.5.5, Table 2-6, pg 2-24	§2.5.5, Table 2-6, pg 2-24	§2.5.5, Table 2-6, pg 2-24	§2.5.5, Table 2-6, pg 2-24	§2.5.5, Table 2-6, pg 2-24	§2.5.5, Table 2-6, pg 2-24
53	Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		§2.9, Tables 2-7 to 2-9	§7.10.1 to 7.10.3, Tables 7-26, 7-37, 7-38, pg 7-39	§8.10.1 to 8.10.3, Tables 8-31 to 8-33, pg 8-33	§9.9.1 to 9.9.3, Tables 9-42, 9-43, 9-44, pg 9-33	§10.10.1 to 10.10.3, Tables 10-37 to 10-39, pg 10-40	§11.10, Tables 11-34 to 11-36, pg 11-38	§12.9, pg 12-58	§13.10, Tables 13-31 to 13-33, pg 13-35
54	The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.	10635(b)		This RUWMP submitted to all applicable cities, counties, and land use entities in July 2011.							
55	Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642		§1.4.1 and 1.4.3, Table 1-1, pg 1-4	§1.4.1 and 1.4.3, Table 1-1, pg 1-4	§1.4.1 and 1.4.3, Table 1-1, pg 1-4	§1.4.1 and 1.4.3, Table 1-1, pg 1-4	§1.4.1 and 1.4.3, Table 1-1, pg 1-4	§1.4.1 and 1.4.3, Table 1-1, pg 1-4	§1.4.1 and 1.4.3, Table 1-1, pg 1-4	§1.4.1 and 1.4.3, Table 1-1, pg 1-4
56	Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area.	10642		§1.4.2 and §1.4.3, Table 1-2, Appendix A	§1.4.2 and §1.4.3, Table 1-2, Appendix A	§1.4.2 and §1.4.3, Table 1-2, Appendix A	§1.4.2 and §1.4.3, Table 1-2, Appendix A	§1.4.2 and §1.4.3, Table 1-2, Appendix A	§1.4.2 and §1.4.3, Table 1-2, Appendix A	§1.4.2 and §1.4.3, Table 1-2, Appendix A	§1.4.2 and §1.4.3, Table 1-2, Appendix A
57	After the hearing, the plan shall be adopted as prepared or as modified after the hearing.	10642		§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A
58	An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.	10643		§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A	§1.4.2, Appendix A
59	An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.	10644(a)		This RUWMP submitted to DWR, the California State Library, and applicable cities and counties in July 2011.							
60	Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.	10645		This RUWMP to be made publically avialable by all participating agencies in August 2011.							

a) The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b) The Subject classification is provided for clarification only. It is aligned with the organization presented in Part 1 of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.

Chapter 1: Introduction

1.1 Overview

This volume presents the Regional Urban Water Management Plan 2010 (Plan) for the San Bernardino Valley area, represented by the San Bernardino Valley Municipal Water District (Valley District) service area, and seven participating retail water purveyors: East Valley Water District, City of Loma Linda, City of Redlands, City of San Bernardino Municipal Water Department, West Valley Water District, Yucaipa Valley Water District, and the City of Colton.

This chapter describes the general purpose of the Plan, discusses Plan implementation, and provides general information about Valley District, the retail purveyors, and service area characteristics.

1.2 Purpose

An Urban Water Management Plan (UWMP) is a planning tool that generally guides the actions of urban water suppliers. It provides managers and the public with a broad perspective on a number of water supply issues. It is not a substitute for project-specific planning documents, nor was it intended to be when mandated by the State Legislature. For example, the Legislature mandated that a plan include a section which "describes the opportunities for exchanges or water transfers on a short-term or long-term basis." (California Urban Water Planning Act, Article 2, Section 10630(d).) The identification of such opportunities, and the inclusion of those opportunities in a general water service reliability analysis, neither commit a water management agency to pursue a particular water exchange/transfer opportunity, nor precludes a water management agency from exploring exchange/transfer opportunities not identified in the plan. Nor is the preparation or adoption of an UWMP subject to review under the California Environmental Quality Act (Water Code section 10652). Before an urban water supplier is able to implement any potential future sources of water supply identified in a plan, detailed project plans are prepared and approved, financial and operational plans are developed and all required environmental analysis is completed.

A plan is intended to function as a planning tool to guide broad-perspective decision making by the management of water suppliers. It is important that this Plan be viewed as a long-term, general planning document, rather than as an exact blueprint for supply and demand management. Water management in California is not a matter of certainty, and planning projections may change in response to a number of factors. From this perspective, it is appropriate to look at the Plan as a general planning framework, not a specific action plan. It is an effort to generally answer a series of planning questions including:

- What are the potential sources of supply and what is the reasonable probable yield from them?
- What is the probable demand, given a reasonable set of assumptions about growth and implementation of good water management practices?

- How well do supply and demand figures match up, assuming that the various probable supplies will be pursued by the implementing agency?

Using these "framework" questions and resulting answers, the implementing agency will pursue feasible and cost-effective options and opportunities to meet demands. Valley District and the retail water purveyors will explore enhancing basic supplies from traditional sources such as the State Water Project (SWP) as well as other options. These include groundwater extraction, recycling, surface water capture, and water banking/conjunctive use. Specific planning efforts will be undertaken in regard to each option, involving detailed evaluations of how each option would fit into the overall supply/demand framework, how each option would impact the environment, and how each option would affect customers. The objective of these more detailed evaluations would be to find the optimum mix of conservation and supply programs that ensure that the needs of the customers are met.

The California Urban Water Management Planning Act (Act) requires preparation of a plan that:

- Accomplishes water supply planning over a minimum 20-year period in five year increments. (Valley District and the purveyors are going beyond the requirements of the Act by developing a plan which spans 25 years.)
- Identifies and quantifies adequate water supplies, including recycled water, for existing and future demands, in normal, single-dry, and multiple-dry years.
- Implements conservation and efficient use of urban water supplies.

This Plan is organized to act as the 2010 UWMP for Valley District as a wholesaler. This Plan also acts as the 2010 UWMP for the seven retail purveyors participating in the plan.

Additionally, Senate Bill 7 of Special Extended Session 7 (SBX7-7) was signed into law in November 2009, which calls for progress towards a 20 percent reduction in per capita water use statewide by 2020. As a result, the legislation now mandates each urban retail supplier to develop and report a water use target in the retailer's 2010 UWMP. The legislation further requires that retailers report an interim 2015 water use target, their baseline daily per capita use and 2020 compliance daily per capita use, along with the basis for determining those estimates.

SBX7-7 provides four possible methods for an urban retail water supplier to calculate its water use target. The California Department of Water Resources (DWR) has also developed methodologies for calculating base daily per capita water use, baseline commercial, industrial and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use and landscape area water use.

Also of importance is Assembly Bill (AB) 1420. AB 1420, in effect as of January 2009, changes the funding eligibility requirements of Section 10631.5 of the Water Code. For any urban water supplier to be eligible for grant or loan funding administered by DWR, the State Water Resources Control Board (SWRCB) or the Bay-Delta Authority (such as funding programs under Propositions 50 and 84), the supplier must show implementation of demand management measures/best management practices (DMMS/BMPs) listed and described in the Act and the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding Regarding Urban Water Conservation in California (MOU), or show the schedules and budgets by which the supplier will begin implementing the DMMs/BMPs. Any supplier not implementing

the measures based on cost-effectiveness must submit proof showing why the measures are not cost-effective.

Valley District and the retail water purveyors wish to deliver a sufficient, reliable, and high quality water supply for their customers, even during dry periods. Based on conservative water supply and demand assumptions over the next 25 years in combination with conservation of non-essential demand during certain dry years, the Plan successfully achieves this goal.

1.3 Organization of the Plan

Chapters 1 through 5 of the Plan focus on the regional analysis for the Valley District service area, serving as a "common base" on which the individual purveyor analyses rely. Regional data presented in Chapters 2 and 3 informs the individual retail purveyor analysis. Analysis of individual water agencies is provided in Chapters 6 through 13.

Each individual purveyor chapter provides Service Area Information with 25-year projections, a description of water sources and reliability of supply, transfer and exchange opportunities, water use by customer type and timeframe (past, present, and projected), as well an evaluation of demand management measures.

A checklist to ensure compliance of this Plan with the Act requirements is provided for each individual agency within the chapter for that agency (Chapters 6 through 13). Tables ensuring compliance with AB 1420 are provided in Appendix F.

1.4 Implementation of the Plan

This Plan has been prepared for Valley District, a wholesale water supplier, and for the following retail purveyors:

- East Valley Water District
- City of Loma Linda
- City of Redlands
- City of San Bernardino Municipal Water Department
- West Valley Water District
- Yucaipa Valley Water District
- City of Colton

This subsection provides the cooperative framework within which the Plan will be implemented including agency coordination, public outreach, and resources maximization.

Eight urban water suppliers have coordinated the preparation of this Plan. The purpose of jointly preparing the Plan was to facilitate a consistent evaluation of water sources common to the various agencies, to take advantage of group knowledge and experience, and to reduce preparation costs. However, each agency has reviewed, will adopt, and will implement the portions of this Plan relevant to their agency. Errors or omissions by any one participant in this

Plan should not invalidate the information put forward by the other agencies who participated in Plan preparation.

1.4.1 Joint Preparation of the Plan

Water purveyors are permitted by the State to work together to develop a cooperative regional plan. This approach has been adopted by the Valley District and the seven purveyors which are jointly sponsoring the current Plan. Agency coordination for this Plan is summarized in Table 1-1.

1.4.2 Plan Adoption

Valley District and the retail purveyors began preparation of this Plan in April 2010. Each retail purveyor's respective governing board's adopted the final Plan by Resolution (see Appendix H). The RUWMP was adopted by the Valley District Board in July 2011. The RVWMP was submitted to DWR, the California State Library, and any city or county within which the Valley District or the retail agencies provide water supplies within 30 days of approval.

This plan includes all information necessary to meet the requirements of Water Conservation Act of 2009 (Wat. Code, §§ 10608.12-10608.64) and the Urban Water Management Planning Act (Wat. Code, §§ 10610-10656).

1.4.3 Public Outreach

The water purveyors have encouraged community participation in water planning. For the current Plan, eight (8) public meeting sessions were held to discuss the requirements of the Act and SBX7-7 and to solicit input on the Draft Plan before its adoption. Interested groups were informed about the development of the Plan along with the schedule of public activities. Copies of the Draft Plan were made available at the water purveyors' offices and websites, and notices sent to the Cities, and the County of San Bernardino, as well as to interested parties as identified in Table 1-1. Water purveyors also convened meetings with various interests to gather data concerning planned development and the probable implementation of approved development. Such informed data gathering on important issues is a means of checking the short-term "reality" of official projections and understanding the concerns of various groups.

TABLE 1-1
AGENCY COORDINATION SUMMARY

	Participated in UWMP	Received Copy of Draft	Commented on Draft	Attended Public Meetings	Contacted for Assistance	Sent Notice of Intent to Adopt	Not Involved
San Bernardino Valley Municipal Water District	X	X	X	X		X	
City of Colton	X	X	X	X	X	X	
City of Loma Linda	X	X	X	X	X	X	
City of Redlands	X	X	X	X	X	X	
City of San Bernardino	X	X	X	X	X	X	
East Valley Water District	X	X	X	X	X		
West Valley Water District	X	X	X	X	X		
Yucaipa Valley Water District	X	X	X	X	X		
Riverside Highland Water Company	X	X			X		
Baseline Garden Mutual Water Company						X	
Bear Valley Mutual Water Company					X		
Beaumont-Cherry Valley Water District						X	
Big Bear Mutual Water District					X		
Cal. State San Bernardino/Water Resources Institute	X	X		X	X		
City of Beaumont					X	X	
City of Calimesa					X	X	
City of Fontana					X	X	
City of Grand Terrace						X	
City of Highland				X	X	X	
City of Rialto					X	X	
City of Riverside					X	X	
City of Yucaipa				X	X	X	

	Participated in UWMP	Received Copy of Draft	Commented on Draft	Attended Public Meetings	Contacted for Assistance	Sent Notice of Intent to Adopt	Not Involved
County of Riverside						X	
County of San Bernardino				X	X	X	
Fontana Water Company						X	
Fontana Union Water Company						X	
Inland Empire Resources Conservation District	X			X		X	
Muscoy Mutual Water Company						X	
San Bernardino County – Land Use Services Department						X	
San Bernardino County Local Agency Formation Commission (LAFCO)						X	
San Bernardino National Forest, US Forest Service						X	
San Bernardino Valley Water Conservation District	X				X		
San Gorgonio Pass Water Agency						X	
Santa Ana Watershed Project Authority						X	
South Mesa Water Company						X	
Terrace Water Company						X	
Western Heights Mutual Water Company						X	
Western Municipal Water District						X	
Yucaipa-Calimesa Joint Unified School District						X	

Table 1-2 presents a timeline for public participation during the development of the Plan. A copy of the public outreach materials, including paid advertisements, newsletter covers, website postings and invitation letters are included in Appendix A.

The components of public participation include:

Local Media

- Paid advertisements in local newspapers

Community-Based Outreach

- California State University San Bernardino Water Resources Institute
- San Bernardino Water Advisory Commission
- Crafton Hills College
- Yucaipa-Calimesa Joint Unified School District

City/County Outreach

- Meetings with local Cities' Planning Divisions
- Meeting with San Bernardino County Department of Regional Planning
- Meeting with San Bernardino County Department of Public Works

Public Availability of Documents

- Water purveyors' offices and websites

TABLE 1-2
PUBLIC PARTICIPATION TIMELINE

Date	Event	Purpose
April 21, 2010	1st Public Meeting	UWMP Requirements and Data Request
June 9, 2010	2nd Public Meeting	Update on UWMP Guidelines, Regional Water Supply Outlook, Individual Agency Data and Projections
July 21, 2010	3rd Public Meeting	SBX7-7 Demand Management Measures Workshop
November 5, 2010	4th Public Meeting	DMM Compliance, SBX7-7 Compliance, Approach to Regional UWMP
December 17, 2010	5th Public Meeting	Update on UWMP Guidebook, SBX7-7 Calculations, DMM Cost-Effectiveness Analysis, Growth and Water Demand Projections
January 26, 2011	6th Public Meeting	Update on UWMP Guidebook, Regional Water Supply Outlook, Water Quality Impacts on Supply Reliability, Water Demand Calculations, Public Outreach, Notices and Hearings, Schedule

Date	Event	Purpose
April 26, 2011	7th Public Meeting (San Bernardino Agencies)	Update on UWMP Guidebook, Water Demand Calculations, Low Income Demand Calculations, Notices and Hearings, Schedule
April 28, 2011	8th Public Meeting (City Highland)	Update on UWMP Guidebook, Regional Water Supply Outlook, Water Demand Calculations, Low Income Demand Calculations, Required Conservation, Schedule
June 2011	Purveyor Public Hearings	Discuss comments on Public Draft UWMP/Adopt Final UWMP
June 2011-July 2011	Purveyor Board Adoptions	Adoption Hearing or Board Meetings for Final UWMP
July 2011	Plan Submittal	File Final UWMP with DWR within 30 days of adoption

1.4.4 Resources Maximization

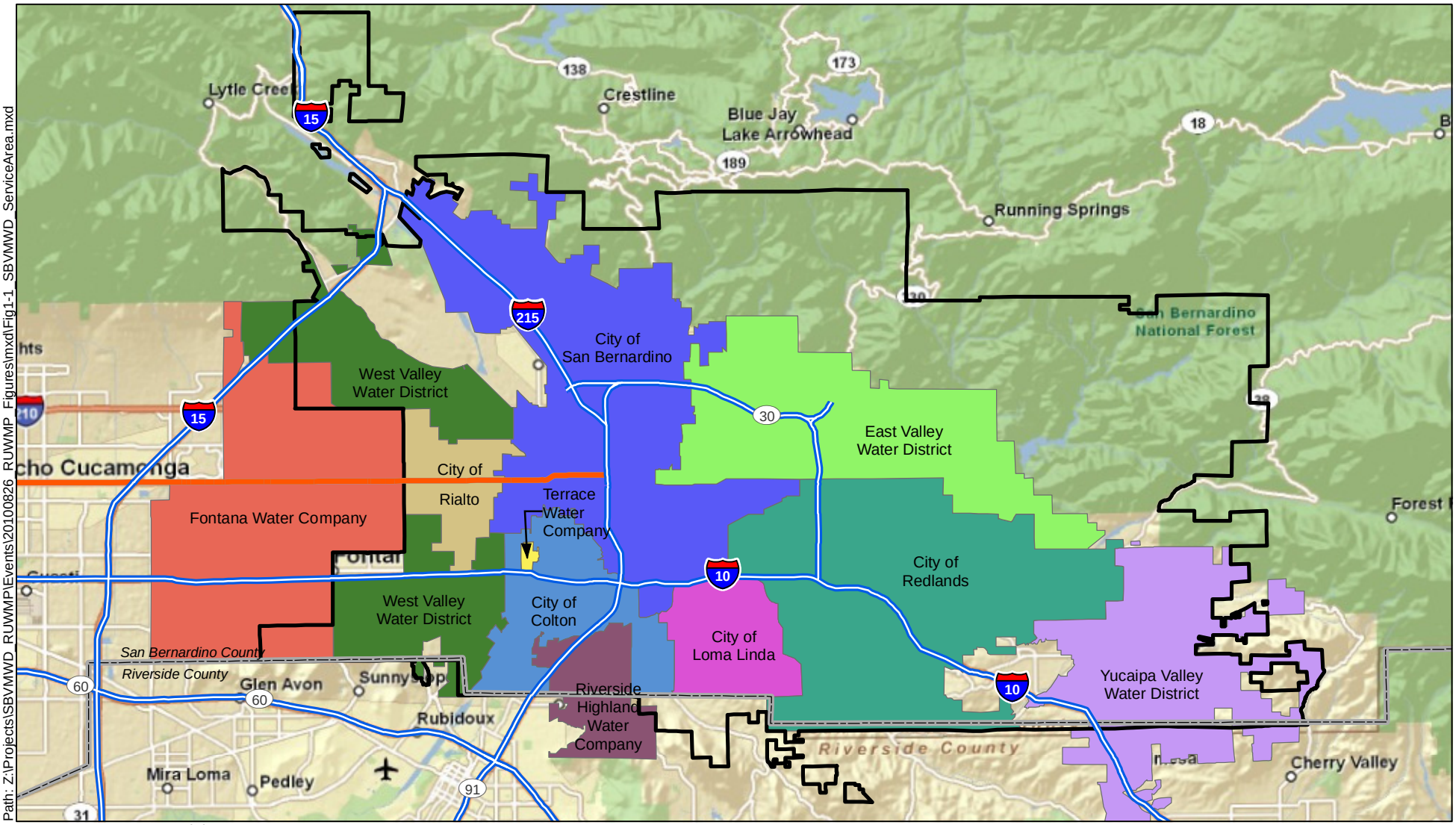
Several documents were developed to enable Valley District and the purveyors to maximize the use of available resources and minimize use of imported water, including the East Valley 2005 UWMP, Redlands 2005 UWMP, SBMWD 2005 UWMP, West Valley 2005 UWMP, YVWD 2005 UWMP, and the 2007 Integrated Regional Water Management Plan for the Upper Santa Ana River Watershed. Chapter 2 of this Plan describes in detail the water resources available to the Valley District and the retail purveyors for the 25-year period covered by the Plan.

1.5 Water Agencies of the San Bernardino Valley

1.5.1 San Bernardino Valley Municipal Water District

Valley District was formed in 1954, under the Municipal Water District Act of 1911 (California Water Code Section 71000 et seq.) as a regional agency to plan a long-range water supply for the San Bernardino Valley. Its enabling act includes a broad range of powers to provide water, wastewater and stormwater disposal, recreation, and fire protection services. Valley District does not deliver water directly to retail water customers.

Valley District covers about 325 square miles mainly in southwestern San Bernardino County, about 60 miles east of Los Angeles, and has a population of about 657,500. It spans the eastern two-thirds of the San Bernardino Valley, the Crafton Hills, and a portion of the Yucaipa Valley and includes the cities and communities of San Bernardino, Colton, Loma Linda, Redlands, Rialto, Fontana, Bloomington, Highland, East Highland, Grand Terrace, Mentone, and Yucaipa. A map illustrating Valley District's service area, along with the service areas of the retail water purveyors, is provided in Figure 1-1.



Source: Basemap Copyright:© 2009 ESRI, AND, TANA, ESRI Japan, UNEP-WCMC.
Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

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Legend

San Bernardino Valley Municipal Water District

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Scale: Miles

Kennedy/Jenks Consultants

San Bernardino Valley Municipal Water District
Regional Urban Water Management Plan
San Bernardino, California

San Bernardino Valley Municipal Water District Service Area Including Retailer Service Areas

K/J 1089014*00

Figure 1-1

Valley District provides wholesale imported water directly to retail suppliers and augments groundwater supplies by spreading imported water to recharge local groundwater basins so that water retailers can extract the recharged water. Valley District holds a contract for water from the SWP. Valley District's key role in providing for and managing groundwater and surface water supplies on a long-term regional basis was recognized by the Orange County Superior Court in *Orange County Water District v. City of Chino et al.*, Case No. 117628 (April 17, 1969) (*Orange County* Judgment) and the Riverside County Superior Court in *Western Municipal Water District of Riverside County v. East San Bernardino County Water District*, Case No. 78426 (April 17, 1969) (*Western* Judgment).

To settle water rights disputes on the Santa Ana River, the *Orange County* Judgment imposes a physical solution that requires entities in the upper watershed to deliver a minimum quantity of water to certain points downstream. In part to ensure these flow obligations are met, the *Western* Judgment aims to preserve the safe yield of the San Bernardino Basin Area (SBBA) by establishing entitlements to groundwater extractions by plaintiff parties and by requiring replenishment of the basin when extractions by non-plaintiff parties cause the aggregate safe yield to be exceeded. Court-appointed Watermaster committees administer both Judgments; as a member of the Watermaster committees, Valley District is directly responsible for ensuring that groundwater and surface water resources are effectively managed for the benefit of the region.

Valley District did not prepare an UWMP in 2005.

1.5.2 Retail Water Purveyors

1.5.2.1 East Valley Water District

East Valley Water District (EVWD) is a special district formed in 1954 through an election by local residents who wanted water service by a public water agency. Originally called the East San Bernardino County Water District, it was formed to provide domestic water service to the agriculturally based communities of Highland and East Highland. The name of the agency was changed from East San Bernardino County Water District to East Valley Water District in 1982. Now EVWD serves the generally urban areas of the City of Highland, a portion of the City of San Bernardino, and a small portion of the unincorporated County. The district has a service area of approximately 33.5 square miles, encompassing 63,000 persons. Today, EVWD uses a mix of surface water from the Santa Ana River, groundwater from the SBBA, and imported water purchased from Valley District. A map illustrating the EVWD service area is provided in Figure 1-2.

East Valley completed and adopted an Urban Water Management Plan in 2005.

1.5.2.2 City of Loma Linda

The City of Loma Linda (hereafter Loma Linda) was incorporated in 1970. The Public Works Department provides potable water service to an area of approximately 7.8 square miles that generally encompass approximately 12,200 residents, Veterans Administration Hospital, and the Loma Linda Community Hospital. Loma Linda does not provide water services to the Loma

Linda University Campus or Medical Center facilities, which operate on a separate self-contained system.

Loma Linda's primary water supply is groundwater from the Bunker Hill subbasin area. It is Loma Linda's policy to be self-reliant and avoid purchase of water when possible. However, due to perchlorate contamination, for a few years the city had to purchase a small percentage of its needed water from Valley District. A map illustrating Loma Linda's service area is provided in Figure 1-3.

The City of Loma Linda did not complete an UWMP in 2005.

1.5.2.3 City of Redlands

For more than 90 years, the City of Redlands (hereafter Redlands) has been providing high-quality drinking water to the Redlands and Mentone areas. The water utility service area generally coincides with the area designated by the Local Area Formation Commission (LAFCO) as the City and its sphere of influence. The service area encompasses 36 square miles inside the Redlands' corporate boundaries and approximately 5,000 persons outside the city boundaries but within the sphere of influence. Currently, Redlands provides water to a population of approximately 77,800 within its service area by approximately 23,000 water connections. Redlands supplies a blend of local groundwater, local surface water, and imported water purchased from Valley District. A map illustrating Redland's service area is provided in Figure 1-4.

Redlands completed and adopted an UWMP in 2005.

1.5.2.4 City of San Bernardino

The City of San Bernardino is served by a municipal utility, the San Bernardino Municipal Water Department (SBMWD). SBMWD was created as a municipal utility by Article 9 of the City of San Bernardino Charter. The SBMWD water service area is approximately 45 square miles, providing water to approximately 187,700 persons in the City of San Bernardino and unincorporated areas of San Bernardino County. SBMWD produces all of its own water from wells in the SBBA. In addition to potable water, SBMWD is developing a recycled water system for groundwater recharge and non-potable uses. A map illustrating the SBMWD service area is provided in Figure 1-5.

SBMWD completed and adopted an UWMP in 2005.

1.5.2.5 West Valley Water District

The origins of West Valley Water District (WVWD) lie in the formation of Bloomington County Water District in 1952, initially covering one square mile and serving 200 households using water secured through stock owned in the Citizens Land and Water Company. Over the ensuing years, the agency grew by annexation and acquisition of other agencies, including the Park Water Company's Bloomington Water System, the Inter County Water Company, Clover Mutual Water Company, Fontana Rancho Water Company, Southern California Water Company, and Crestmore Heights Mutual Water Company. The agency underwent several

name changes: Semi-Tropic County Water District in 1959, West San Bernardino County Water District in 1962, finally becoming West Valley Water District in 2003.

WVWD is located primarily within southwestern San Bernardino County and a small portion within northern Riverside County. It is part of the greater San Bernardino-Riverside-Ontario metropolitan area. The principal service area of WVWD is approximately 29.5 square miles, with an additional 5.2 square miles within its sphere of influence. The majority of WVWD's service area lies within Valley District's boundaries. West Valley currently serves a population of over 66,500 people through 18,000 water service connections.

WVWD supplies a blend of local groundwater, local surface water from Lytle Creek, and water imported from the SWP.

WVWD completed and adopted an UWMP in 2005. Figure 1-6 illustrates the WVWD service area.

1.5.2.6 Yucaipa Valley Water District

Yucaipa Valley Water District (YVWD) is a special district providing potable water, recycled water, and wastewater collection and treatment. Formed in 1971, it acquired many of the private water companies serving the Yucaipa Valley. Its most recent consolidations of water services occurred with the acquisition of the Harry V. Slack Water Company in 1987 and the Wildwood Canyon Mutual Water Company in 1992. The YVWD service area has an estimated population of 42,200 persons.

YVWD currently satisfies the majority of its water demands from groundwater supplied through district-owned wells located throughout the service area. The only supply of surface water is provided through the Oak Glen Water Filtration Plant. Additional water sources that are expected to be available in the near future include imported water through the SWP and recycled water from its wastewater treatment plant.

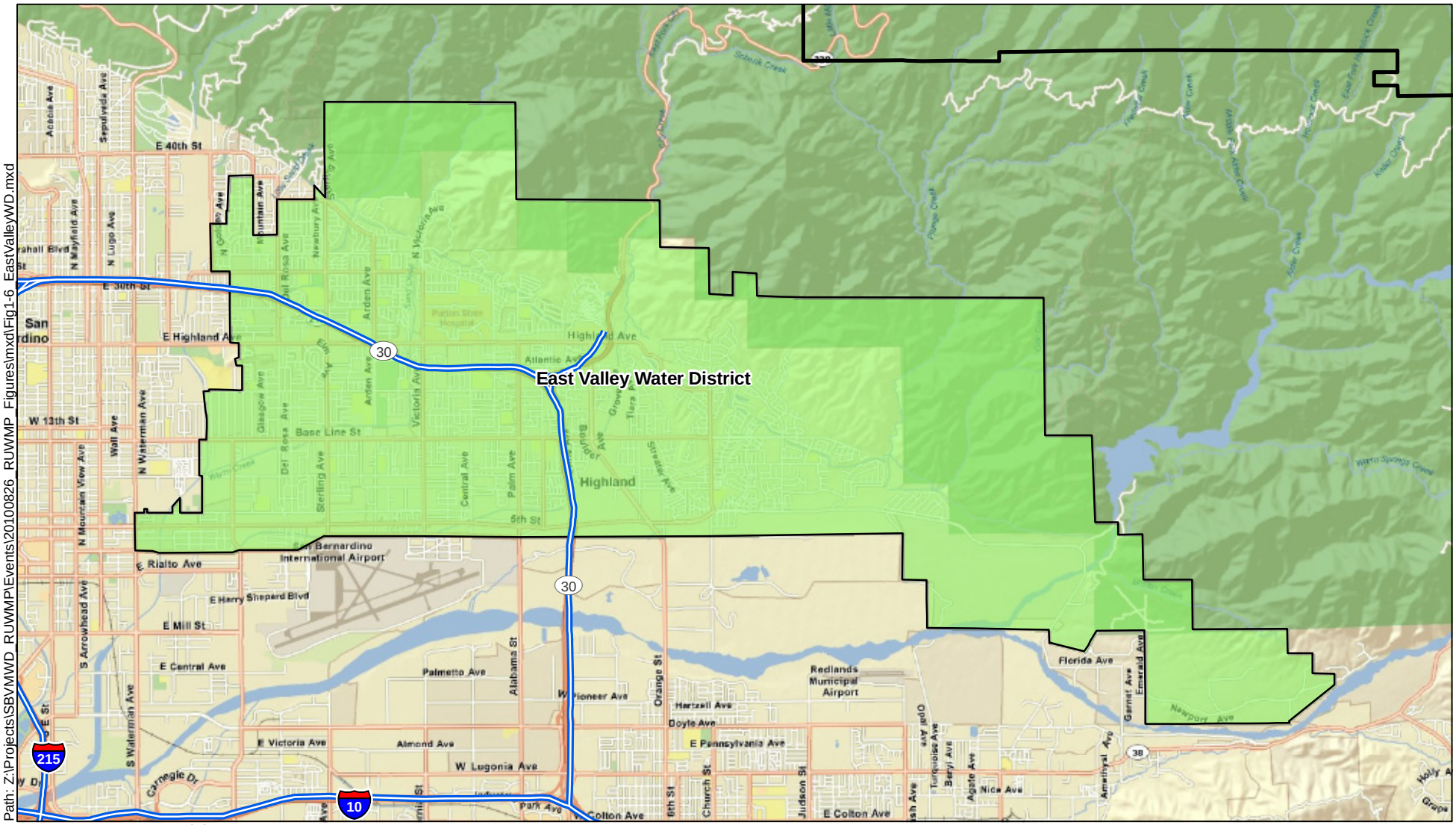
YVWD serves customers in the Cities of Calimesa and Yucaipa, and portions of Riverside and San Bernardino counties.

Figure 1-7 illustrates the YVWD service area. YVWD completed and adopted an UWMP in 2005.

1.5.2.7 City of Colton

The City of Colton is a community of over 51,800, formally founded in 1875 and incorporated in 1887 (Colton 2009). The City of Colton (hereinafter, Colton), through the Water and Wastewater Department of its Public Utilities Department, provides water service to a majority of the residents and businesses located within Colton's corporate boundary, as well as to those in certain adjacent unincorporated areas of San Bernardino County. All of Colton's water supply is local groundwater pumped from the SBBA, the Rialto-Colton subbasin, and the Riverside North subbasin. A map illustrating Colton's service area is provided in Figure 1-8.

Colton did not complete an UWMP in 2005.



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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

Legend

- San Bernardino Valley Municipal Water District
- East Valley Water District

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Scale: Miles

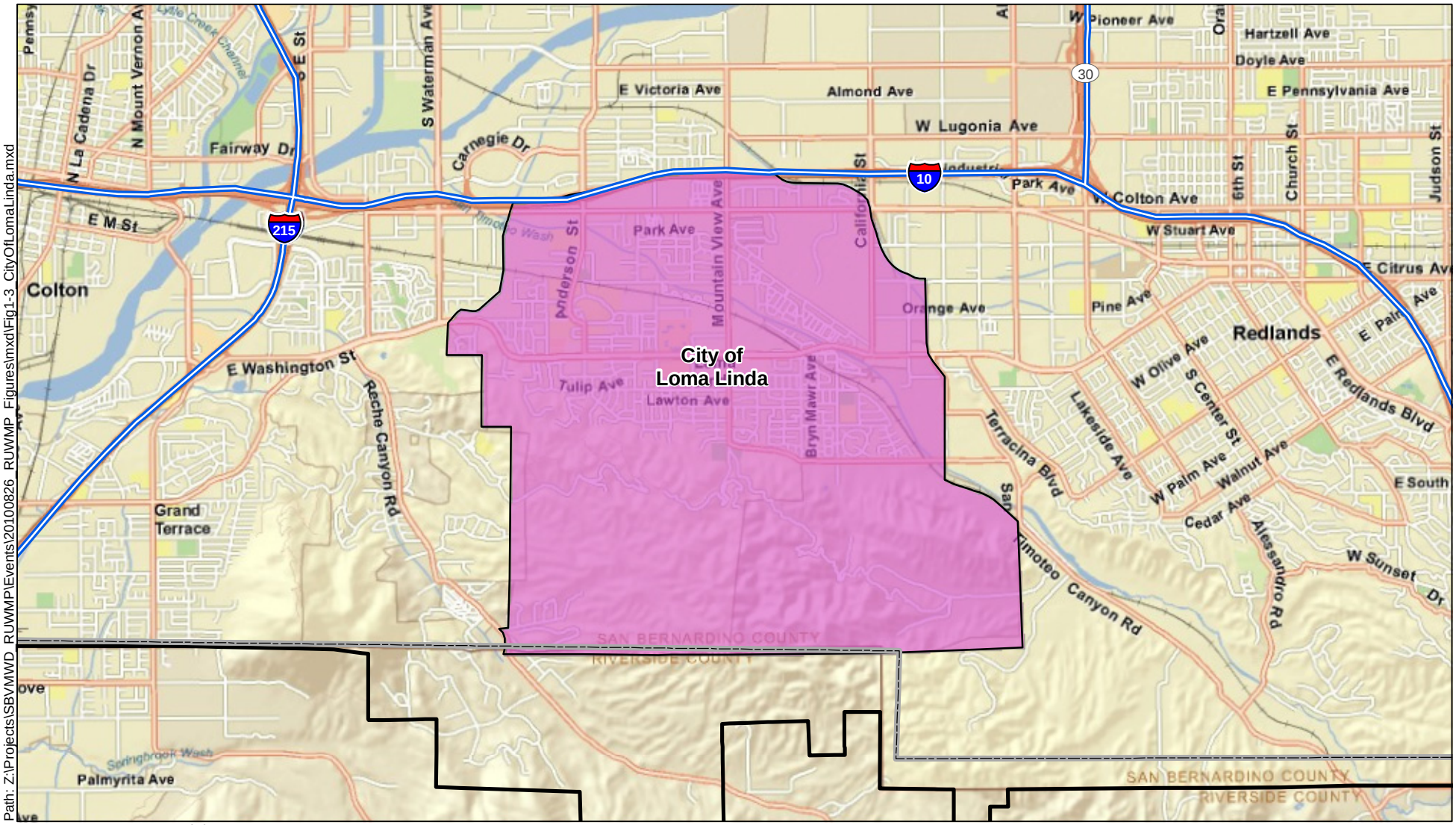
Kennedy/Jenks Consultants

San Bernardino Valley Municipal Water District
Regional Urban Water Management Plan
San Bernardino, California

East Valley Water District Service Area

K/J 1089014*00

Figure 1-2



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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

Legend

- San Bernardino Valley Municipal Water District
- City of Loma Linda Water Service Area

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Scale: Miles

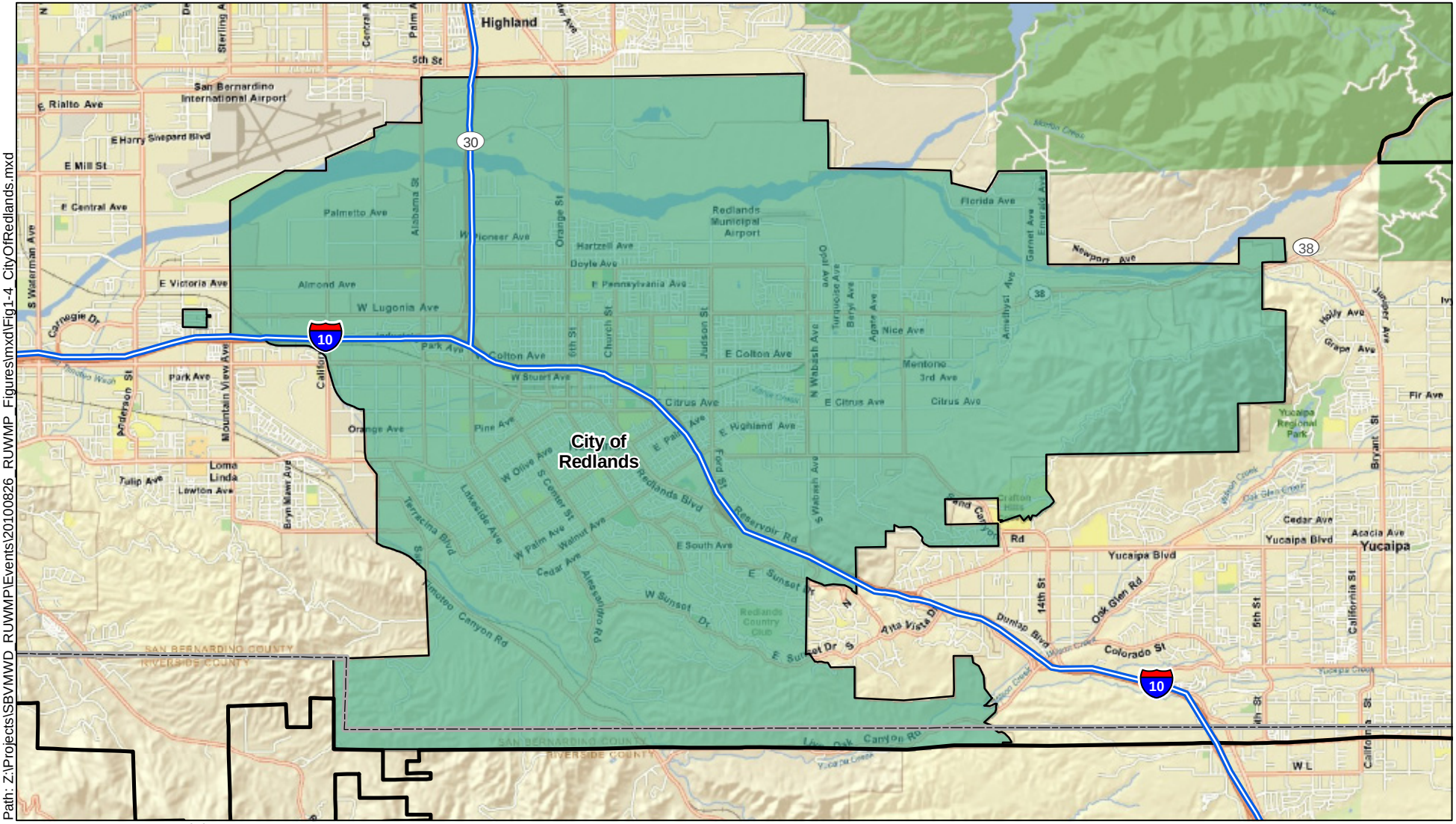
Kennedy/Jenks Consultants

San Bernardino Valley Municipal Water District
Regional Urban Water Management Plan
San Bernardino, California

City of Loma Linda
Water Service Area

K/J 1089014*00

Figure 1-3



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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

Legend

- San Bernardino Valley Municipal Water District
- City of Redlands Municipal Utilities Department

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Scale: Miles

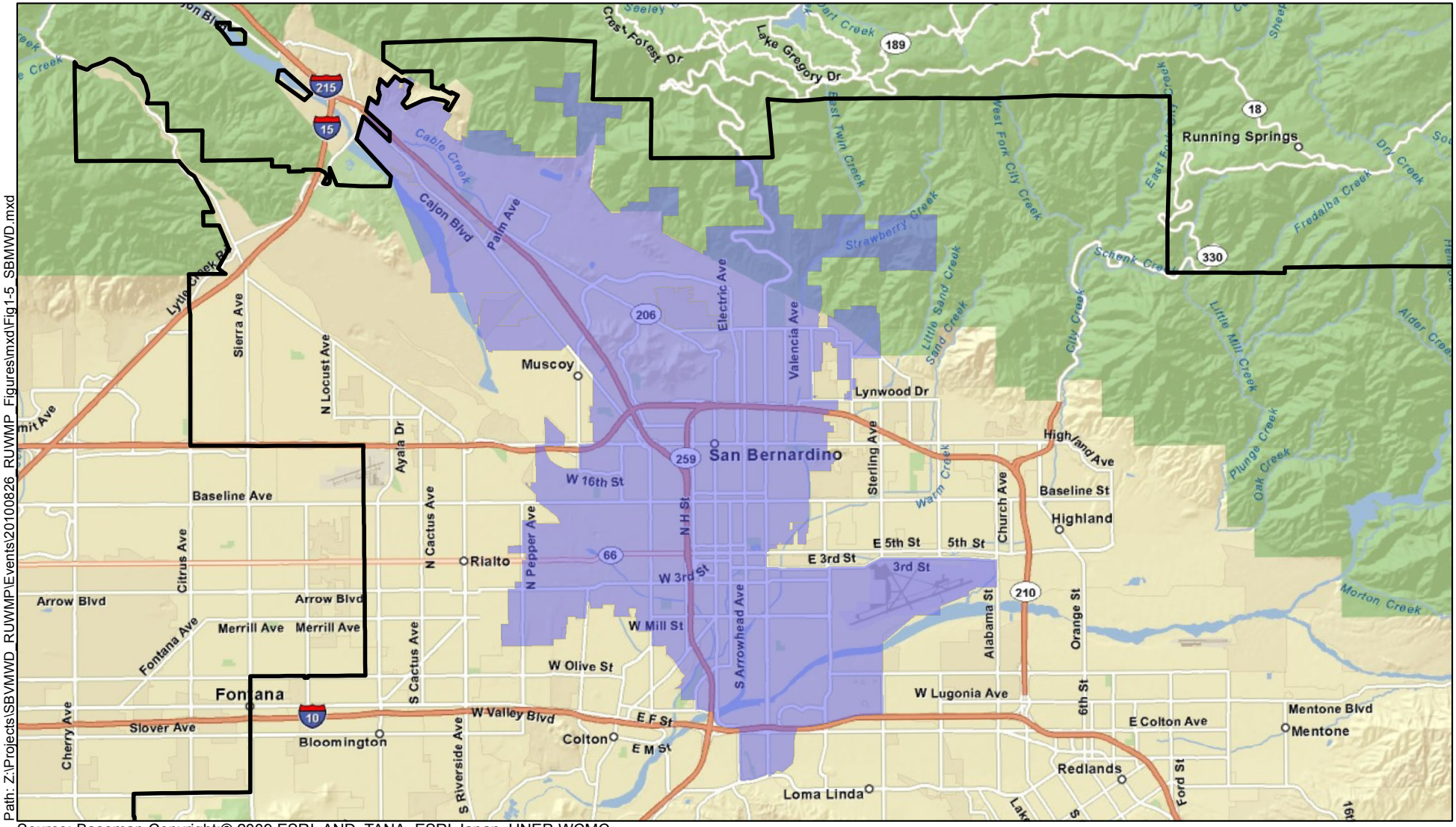
Kennedy/Jenks Consultants

San Bernardino Valley Municipal Water District
Regional Urban Water Management Plan
San Bernardino, California

City of Redlands
Municipal Utilities Department
Water Service Area

K/J 1089014*00

Figure 1-4



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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

Legend

- San Bernardino Valley Municipal Water District
- San Bernardino Municipal Water Department

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Scale: Miles

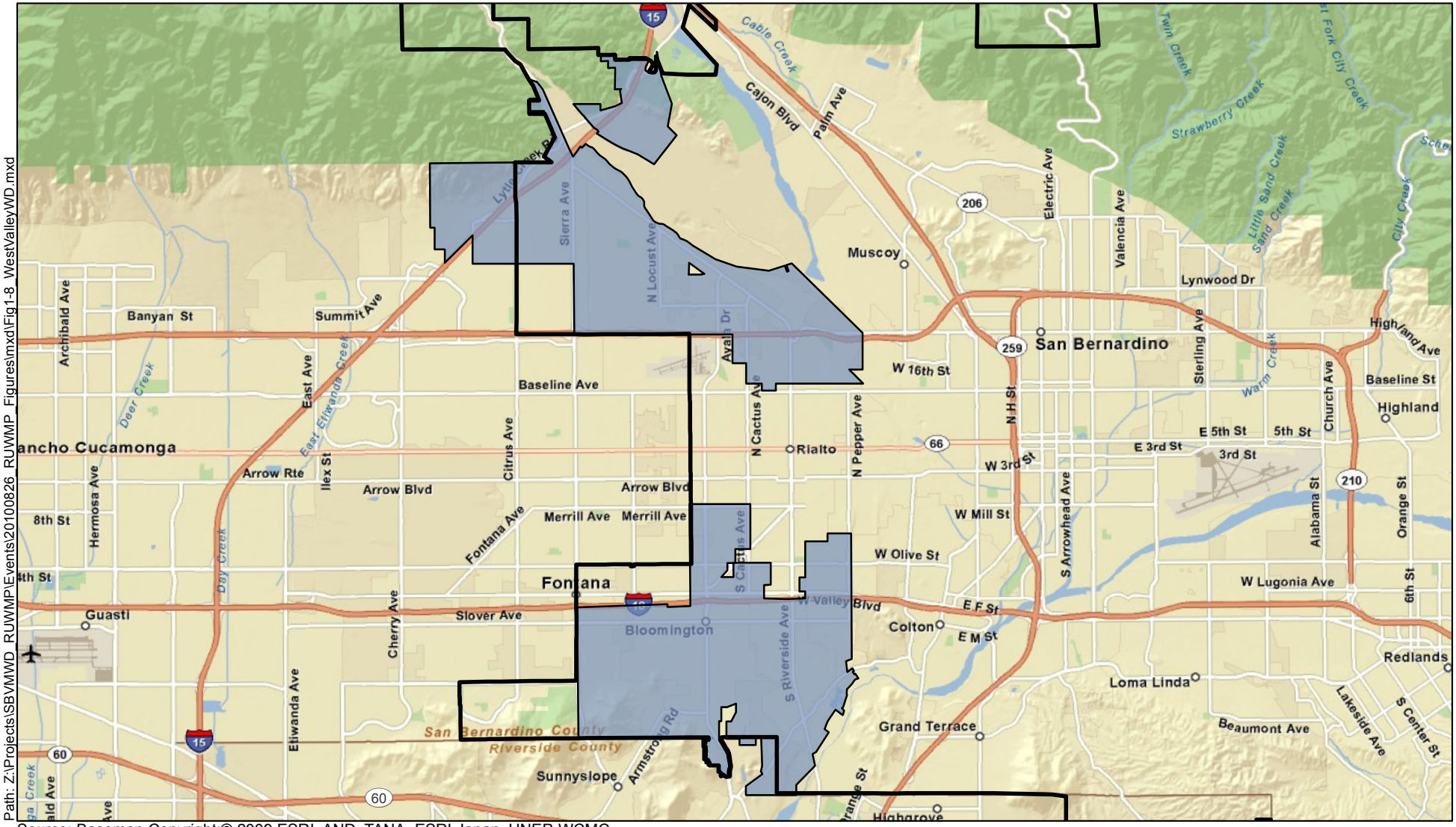
Kennedy/Jenks Consultants

San Bernardino Valley Municipal Water District
Regional Urban Water Management Plan
San Bernardino, California

San Bernardino Municipal Water Department Service Area

K/J 1089014*00

Figure 1-5



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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

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Legend

- San Bernardino Valley Municipal Water District
- West Valley Water District

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Scale: Miles

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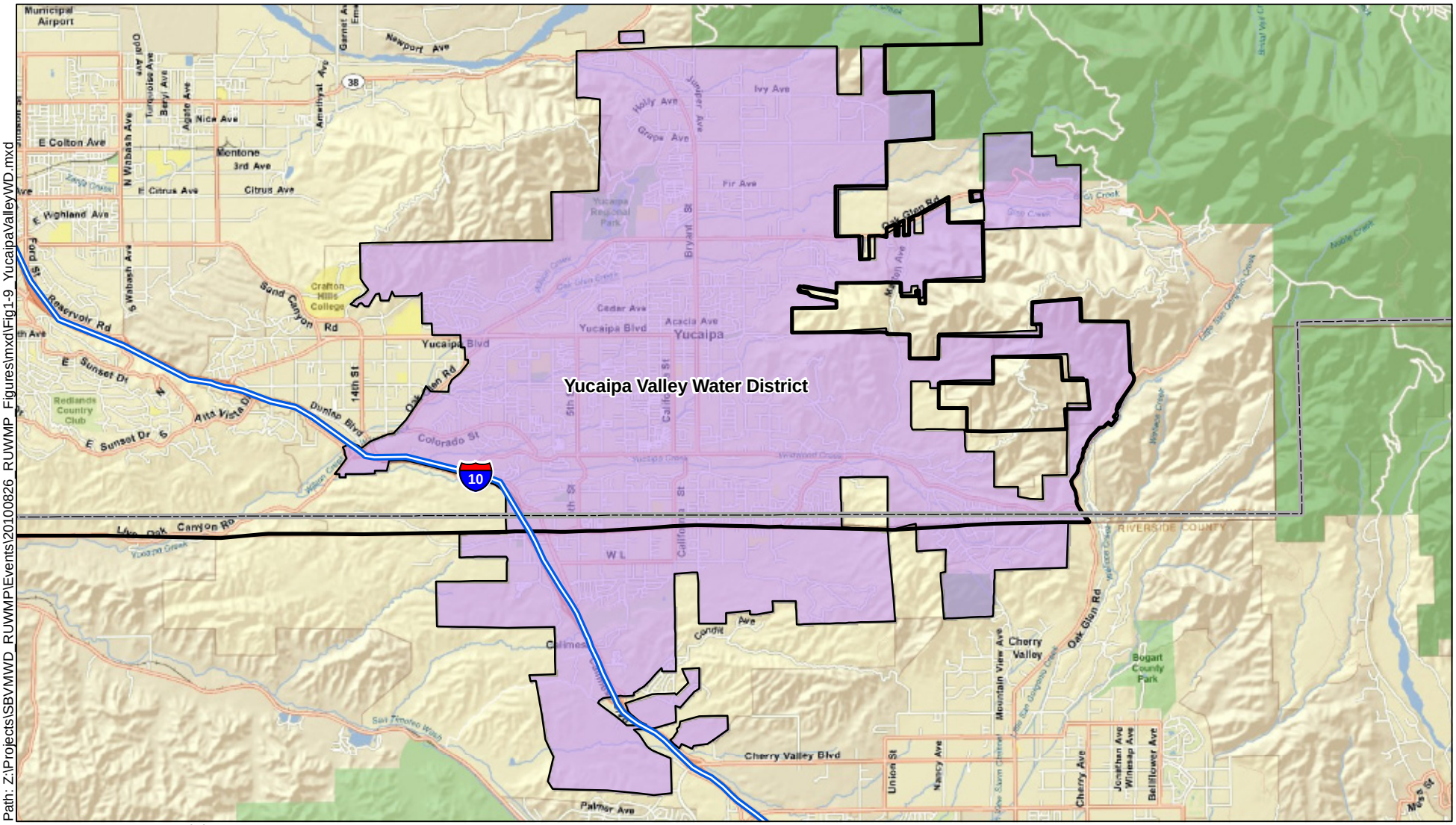
San Bernardino Valley Municipal Water District
Regional Urban Water Management Plan
San Bernardino, California

West Valley Water District Service Area

K/J 1089014*00

Figure 1-6



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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

Legend

- San Bernardino Valley Municipal Water District
- Yucaipa Valley Water District

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0 1.5

Scale: Miles

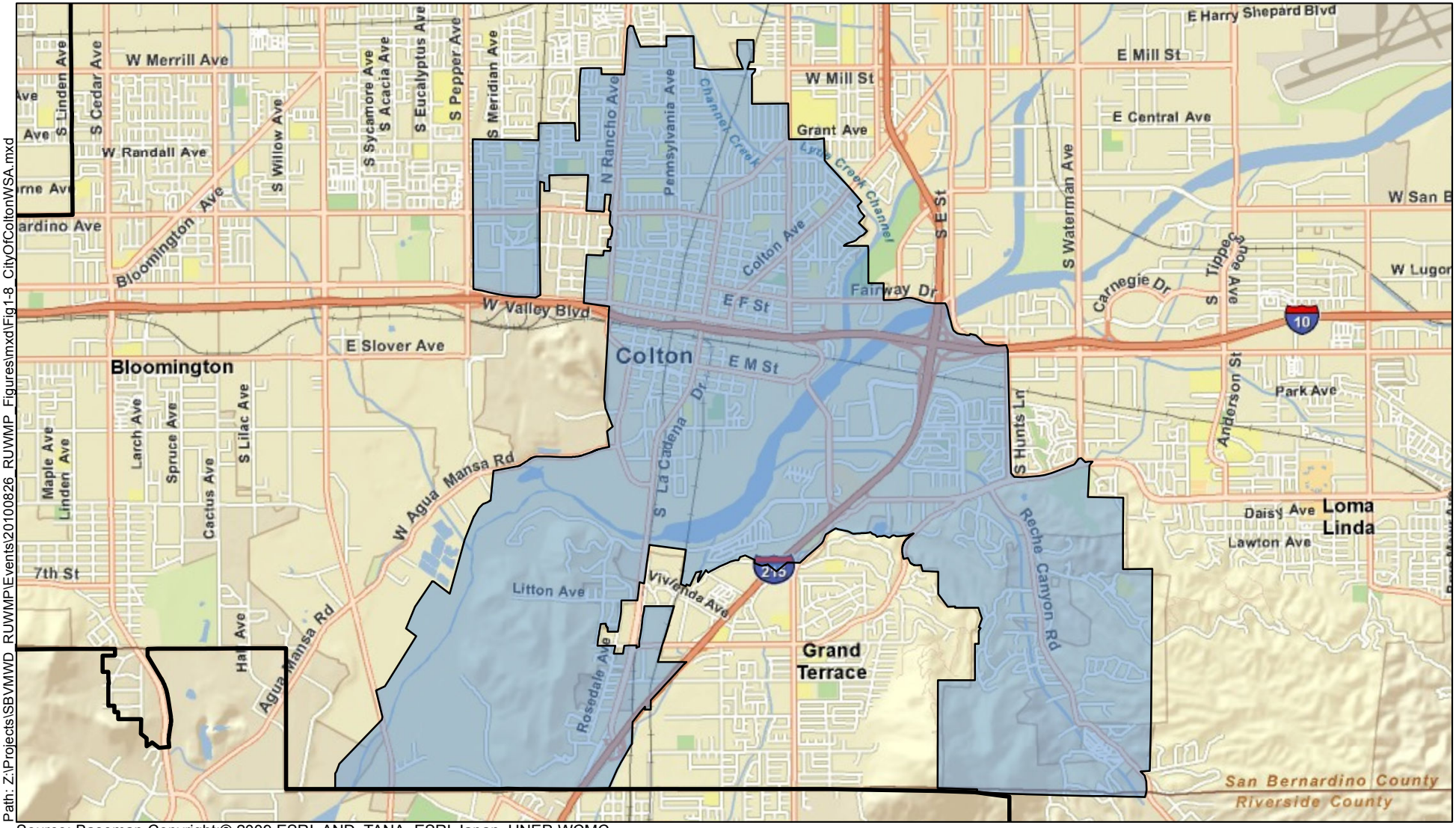
Kennedy/Jenks Consultants

San Bernardino Valley Municipal Water District
Regional Urban Water Management Plan
San Bernardino, California

Yucaipa Valley Water District Water Service Area

K/J 1089014*00

Figure 1-7



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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

Legend

- San Bernardino Valley Municipal Water District
- City of Colton Public Utilities Department

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Scale: Miles

Kennedy/Jenks Consultants

San Bernardino Valley Municipal Water District
Regional Urban Water Management Plan
San Bernardino, California

City of Colton
Public Utilities Department
Water Service Area

K/J 1089014*00

Figure 1-8

1.5.3 Other Retail Water Providers

Other retail water providers within the Valley District service area that provide water but which are not participants in this UWMP include: City of Riverside, San Gorgonio Pass Water Agency, Fontana Union Water Company, Big Bear Municipal Water District, Bear Valley Mutual Water Company, City of Rialto, Fontana Water Company, Muscoy Mutual Water Company, Regents of the University of California, Riverside Highland Water Company, South Mesa Water Company, Terrace Water Company, and Western Heights Mutual Water Company.

1.6 Climate

Climate is a primary factor affecting water management in the San Bernardino Valley.

1.6.1 Regional Climate

The climate in the San Bernardino Valley is characterized by relatively hot, dry summers and cool winters with intermittent precipitation. The largest portion (73 percent) of average annual precipitation occurs during December through March and rainless periods of several months are common in the summer. Precipitation is nearly always in the form of rain in the lower elevations and mostly in the form of snow above about 6,000 feet mean sea level (msl) in the San Bernardino Mountains (Valley District and Western 2007).

Mean annual precipitation ranges from about 12 inches in the vicinity of Riverside, to about 20 inches at the base of the San Bernardino Mountains, to more than 35 inches along the crest of the mountains. The historical record indicates that a period of above-average or below-average precipitation can last more than 30 years, such as the dry period that extended from 1947 to 1977.

Three types of storms produce precipitation in the Santa Ana River Basin: general winter storms, local storms, and general summer storms. General winter storms usually occur from December through March. They originate over the Pacific Ocean as a result of the interaction between polar Pacific and tropical Pacific air masses and move eastward over the basin. These storms, which often last for several days, reflect orographic (i.e., land elevation) influences and are accompanied by widespread precipitation in the form of rain and, at higher elevations, snow. Local storms cover small areas, but can result in high intensity precipitation for durations of approximately six hours. These storms can occur any time of the year, either as isolated events or as part of a general storm, and those occurring during the winter are generally associated with frontal systems (a “front” is the interface between air masses of different temperatures or densities). General summer storms can occur in the late summer and early fall months in the San Bernardino area, although they are infrequent. Table 1-3 shows average monthly climate data for the mountains and valley areas in the region.

TABLE 1-3
CLIMATE

	Jan	Feb	Mar	Apr	May	Jun
Mountains						
Standard Monthly Average ETo[a]	1.77	2.60	4.58	5.95	7.04	7.63
Average Rainfall (inches) [b]	4.63	4.15	3.16	1.31	0.48	0.14
Average Temperature (ºF) [b]	47.3	47.9	51.2	57.5	66.8	75.6
Valley						
Standard Monthly Average ETo[c]	2.49	2.91	4.16	5.27	5.94	6.56
Average Rainfall (inches)[d]	3.22	3.25	2.86	1.29	0.47	0.09
Average Temperature (ºF) [d]	66.2	68.1	70.4	75.6	80.4	88.6

	Jul	Aug	Sept	Oct	Nov	Dec
Mountains						
Standard Monthly Average ETo[a]	8.12	7.36	5.43	4.05	2.36	1.75
Average Rainfall (inches)[b]	0.70	0.97	0.54	0.78	2.01	2.97
Average Temperature (ºF) [b]	80.8	79.5	73.7	64.9	54.3	47.5
Valley						
Standard Monthly Average ETo[c]	7.22	6.92	5.35	4.05	2.94	2.56
Average Rainfall (inches)[d]	0.04	0.15	0.33	0.71	1.32	2.38
Average Temperature (ºF) [d]	96.2	96.2	92.1	83.2	74.6	67.7

Notes:
(a) Monthly ETo for Big Bear Lake (Station 199). Http://wwwcimis.water.ca.gov/cimis
(b) Precipitation and temperature data averaged for years 1960 to 2010, from NOAA weather station at Big Bear Lake, California (Station 040741). Http://www.wrcc.dri.edu
(c) Monthly ETo for Riverside Station (Station 44). Http://wwwcimis.water.ca.gov/cimis
(d) Precipitation and temperature data averaged for years 1893 to 2004, from NOAA weather station at San Bernardino, California (Station 047723). http://www.wrcc.dri.edu/

1.6.2 Potential Effects of Global Climate Change

A topic of growing concern for water planners and managers is climate change and the potential impacts it could have on California's future water supplies.

In June 2005, Governor Arnold Schwarzenegger issued Executive Order S-3-05, which requires biennial reports on climate change impacts in several areas, including water resources. The Climate Action Team (CAT) was formed in response to Executive Order S-3-05. To help unify analysis across topic areas, the CAT worked with scientists from the California Applications Program's California Climate Change Center to select a set of future climate projections to be used for analysis. For the 2008-2009 assessment of climate change impacts, the CAT selected six different global climate change models, assuming two different greenhouse gas emission levels (a high end and a low end), for a total of 12 scenarios. The results of the study indicated that climate change has already been observed, that in the last 100 years, air temperatures have risen about 1 degree Fahrenheit, and there has been a documented greater variance in precipitation, with greater extremes both in terms of heavy flooding and severe droughts.

In the 2009 update of the *DWR California Water Plan*, multiple scenarios of future climate conditions are evaluated. These changing hydrological conditions could affect future planning efforts, which are typically based on historic conditions. The *California Water Plan* identifies the following probable impacts due to changes in temperature and precipitation:

- Decrease in snowpack, which is a major part of annual water storage, due to increasing winter temperatures.
- More winter runoff and less spring/summer runoff due to warmer temperatures.
- Greater extremes in flooding and droughts.
- Greater water demand for irrigation and landscape water due to increased temperatures and their impacts on plant water needs.
- Increased sea level rise, further endangering the functions of the SWP, which can depend on movement of water through the low-lying channels of the low-lying Sacramento-San Joaquin Delta. Sea level rise could also require the SWP to release additional storage water to avoid seawater intrusion into the Delta.

The San Bernardino Valley utilizes a mix of water resources, including water imported from the SWP, local surface water, and groundwater; recycled water is a growing component of water supply. Many of these sources will be affected, directly and indirectly, by climate change.

Imported water supplies available for use in the San Bernardino Valley could be curtailed and those potential curtailments have been extensively analyzed. For instance, DWR has evaluated the potential affects of climate change on SWP supplies. Among other variables, DWR evaluated Delta salinity intrusion due to sea level rise and changes in reservoir operations to maintain Delta water quality. Shifts in both water supply and water demands were considered. In the *State Water Project Delivery Reliability Report 2009,* DWR projects that south of Delta exports (water available to Southern California) would be reduced seven to ten percent by mid-century.

Infrastructure for capturing and utilizing local surface water in the San Bernardino Valley may need to be modified to accommodate higher and lower flow regimes. An anticipated impact of climate change is greater variability in runoff and streamflow, which could create challenges for capturing and utilizing local surface water in the San Bernardino Valley. More precipitation is anticipated as rain rather than snow. The snowpack is anticipated to melt earlier in the year. This means greater storm water flows and potentially less surface water availability in spring and summer months (Water Education Foundation 2009).

A warmer, wetter winter could increase the amount of runoff available for groundwater recharge, but this additional runoff could occur when basins are already saturated. Less runoff in spring, coupled with higher evapotranspiration would reduce the amount of water available for recharge or surface storage in the spring and summer seasons (Water Education Foundation 2009).

Even without population changes, water demand could increase. Precipitation and temperature influence water demand for outdoor landscaping and irrigated agriculture. Outdoor water use is a large component of San Bernardino Valley water demands. Lower spring rainfall increases the need to apply irrigation water. Further, warmer temperatures increase crop

evapotranspiration, which increases water demand. All twelve climate change scenarios evaluated in the *State Water Project Delivery Reliability Report 2009*, anticipate higher annual water demands than would occur with a repeat of historical climate.

These effects and their potential to impact the supplies available to the Valley District and the retail purveyors have been evaluated indirectly in DWR's *2009 SWP Reliability Report*, and their potential to impact demand is considered in the assessment of demand and supply in Chapters 2 and 3 of this UWMP.

Chapter 2: Regional Water Sources

This chapter describes the water resources available to Valley District and the retail purveyors for the 25-year period covered by the Plan. Both currently available and planned supplies are discussed.

2.1 Wholesale Water Supplies

This section provides a description of wholesale water supplies, entitlements to those supplies and current and planned wholesale water supplies.

2.1.1 Imported Water Supplies

Imported water is available to Valley District from the SWP; Valley District is the fifth largest State Water Contractor, with an annual maximum entitlement of 102,600 acre-feet through 2035. The SWP is the largest state-built, multi-purpose water project in the country. It was authorized by the California State Legislature in 1959, with the construction of most initial facilities completed by 1973. Today, the SWP includes 34 storage facilities, reservoirs and lakes, 20 pumping plants, 4 pumping-generating plants, 5 hydro-electric plants and approximately 700 miles of aqueducts and pipelines. The primary water source for the SWP is the Feather River, a tributary of the Sacramento River. Storage released from Oroville Dam on the Feather River flows down natural river channels to the Sacramento-San Joaquin River Delta (Delta). While some SWP supplies are pumped from the northern Delta into the North Bay Aqueduct, the vast majority of SWP supplies are pumped from the southern Delta into the 444-mile-long California Aqueduct. The California Aqueduct conveys water along the west side of the San Joaquin Valley to Edmonston Pumping Plant, where water is pumped over the Tehachapi Mountains and the aqueduct then divides into the East and West Branches.

The San Bernardino Valley lies on the East Branch of the California Aqueduct and Valley District takes delivery of SWP water at the Devil Canyon Power Plant just northwest of California State University, San Bernardino. From this location, Valley District can deliver water to the west via the San Gabriel Valley Municipal Water District Pipeline (Valley District owns capacity in this pipeline) or to the east through the East Branch Extension of the SWP.

Each SWP contractor's SWP Water Supply Contract includes a "Table A," which lists the maximum amount of water an agency is entitled to throughout the life of the contract. The Table A amount is each contractor's proportionate share, or "allocation," of the SWP water supply. However, actual deliveries of SWP water each year vary, based mainly on the amount of precipitation (for other factors, see Section 2.1.2 below). Table 2-1 presents historical total SWP water deliveries to Valley District.

TABLE 2-1
HISTORICAL TOTAL SWP DELIVERIES TO VALLEY DISTRICT

Year	Deliveries (AFY)[(a)]	Year	Deliveries (AFY)[(a)]
1999	12,874	2005	31,550
2000	18,399	2006	35,329
2001	26,488	2007	57,116
2002	72,069	2008	31,006
2003	27,415	2009	35,433
2004	56,153	2010	49,406

Note:
(a) Deliveries from 1999 to 2007 as reported in The State Water Project Delivery Reliability Report 2009 (DWR August 2010). Deliveries for years 2008 to 2010 provided by Department of Water Resources.

2.1.2 Imported Water Supply Reliability

The amount of SWP water delivered to State Water Contractors in a given year depends on a number of factors, including the demand for the supply, amount of rainfall, snowpack, runoff, water in storage, pumping capacity from the Delta, and legal/regulatory constraints on SWP operation. Water delivery reliability depends on three general factors: the availability of water, the ability to convey water to the desired point of delivery, and the magnitude of demand for the water. Urban SWP contractors' requests for SWP water, which were low in the early years of the SWP, have been steadily increasing over time. Regulatory constraints have changed over time, becoming more restrictive.

Since the last round of UWMPs were prepared in 2005, the California Department of Water Resources has twice updated its State Water Project Delivery Reliability Report. The biennial Report assists SWP contractors in assessing the reliability of the SWP component of their overall supplies. The 2009 SWP Reliability Report updates DWR's estimate of the current (2009) and future (2029) water delivery reliability of the SWP. The updated analysis shows that the primary component of the annual SWP deliveries (referred to as Table A deliveries) will be less under current and future conditions, when compared to the preceding report (State Water Project Delivery Reliability Report 2007). The report discusses factors having the potential to affect SWP delivery reliability:

- Restrictions on SWP and Central Valley Project (CVP) operations due to State regulation and federal biological opinions to protect endangered fish such as Delta smelt and spring-run salmon;
- Climate change and sea level rise, which is altering the hydrologic conditions in the State;
- The vulnerability of Delta levees to failure due to floods and earthquakes.

"Water delivery reliability" is defined as the annual amount of water that can be expected to be delivered with a certain frequency. SWP delivery reliability is calculated using computer simulations based on 82 years of historical data.

The 2009 SWP Reliability Report recognizes continuing challenges to the ability of the SWP to deliver full contractual allotments of SWP water. For current conditions, the dominant factor for

these reductions is the restrictive operational requirements contained in the federal biological opinions. Deliveries estimated for the 2009 Report expressly account for the operational restrictions of the biological opinions issued by the U.S. Fish and Wildlife Service in December 2008 and the National Marine Fisheries Service in June 2009 governing the SWP and Central Valley Project operations.

For future conditions, the 2009 SWP Reliability Report conservatively assumes that the restrictions imposed by the biological opinions will still be in place, and includes the potential effects of climate change to estimate future deliveries. The changes in run-off patterns and amounts are included along with a potential rise in sea level. Sea level rise has the potential to require more water to be released to repel salinity from entering the Delta in order to meet the water quality objectives established for the Delta. The 2005 SWP Reliability Report did not include any of these potential effects. For the 2007 SWP Reliability Report, the changes in run-off patterns and amounts were incorporated into the analyses, but the potential rise in sea level was not.

These updated analyses in the 2009 SWP Reliability Report indicate that the SWP, using existing facilities operated under current regulatory and operational constraints and future anticipated conditions, and with all contractors requesting delivery of their full Table A amounts in most years, could deliver 60 percent of Table A amounts on a long-term average basis. A more detailed analysis of the factors affecting SWP reliability is provided in Appendix B.

An ongoing planning effort to increase long-term supply reliability for both the SWP and CVP is taking place through the Bay Delta Conservation Plan (BDCP). The co-equal goals of the BDCP are to improve water supply and restore habitat in the Delta. The BDCP is being prepared through a collaboration of state, federal, and local water agencies, state and federal fish agencies, environmental organizations, and other interested parties. Several “isolated conveyance system” alternatives are being considered in the BDCP which would divert water from North of the Delta and convey it “around” the Delta to a point where water is pumped for the SWP and CVP. The new conveyance facilities would allow for greater flexibility in balancing the needs of the estuary with reliable water supplies. In December 2010, DWR released a “Highlights of the BDCP” document which summarizes the activities and expected outcomes of the BDCP. The results of preliminary analysis included in the document indicate the proposed conveyance facilities may increase the combined average long-term water supply to the SWP and CVP from 4.7 million acre-feet (MAF) per year to 5.9 MAF/year. This would represent an increase in reliability for State Water Project contractors from 60 percent to 75 percent. Planned completion of the BDCP and corresponding environmental analysis is early 2013. However, for planning purposes, this RUWMP has assumed the more conservative supply reliability as described in the 2009 SWP Reliability Report.

In addition to the overall long-term average presented in the 2009 SWP Reliability Report, it also includes Delivery Reliability Reports (DRRs) for each of the individual SWP contractors based upon the unique conditions that impact each contractor. The DRR for Valley District indicated average reliability would be 62 percent in 2009 and will decrease slightly to 60 percent in 2029. Table 2-2 provides the projected SWP water available to Valley District over the next 25 years, based on the Valley District’s maximum Table A amounts from 2010 to 2035 and the supply reliability analyses provided in the 2009 SWP Report and associated DRR.

TABLE 2-2
CURRENT AND PLANNED WHOLESALE WATER SUPPLIES AVAILABLE
(LONG-TERM AVERAGE)

Wholesaler (Supply Source)	2010	2015	2020	2025	2030	2035[a]
California State Water Project						
% of Table A Amount Available	62%	62%	62%	62%	60%	60%
Anticipated Deliveries (AFY)	63,612	63,612	63,612	63,612	61,560	61,560

Note:
(a) The 2009 Reliability Report projects SWP supplies to 2029. This 2010 UWMP covers the period from 2010 to 2035. Therefore, the available supplies from 2030 to 2035 are projected to be the same as in 2029 particularly as DWR has not published any information of analyses to show that SWP deliveries will be lower at that time.

Table 2-3 summarizes estimated SWP supply availability to Valley District in a single-dry year (based on a repeat of the worst-case historic hydrologic conditions of 1977) and over a multiple-dry year period (based on a repeat of the worst-case historic four-year drought of 1931 to 1934). During a dry or critical year as defined by the Sacramento River Index, the SWP will be able to supply an average of 13,338 AF (year 2009) to 12,312 AF (year 2029) to Valley District. During a multiple dry year period (1931 to 1934), Valley District's SWP supply is estimated to be about 33,858 AFY (current year) to 35,910 AFY (year 2029).

The values shown in Tables 2-2 and 2-3 cover the period 2009 – 2029 based on the DWR estimates at the 2009 level for the current conditions and at the 2029 level for future conditions. They are the best information and best estimates available for use in developing water management plans for the period 2010 to 2035 for this Plan.

TABLE 2-3
WHOLESALE SUPPLY RELIABILITY:
SINGLE-DRY YEAR AND MULTIPLE-DRY YEAR CONDITIONS[a]

Wholesaler	Single-Dry Year[b]	Multiple-Dry Year[c]
California State Water Project (SWP)		
2009		
% of Table A Amount Available	13%	33%
Anticipated Deliveries (AFY)	13,338	33,858
2029		
% of Table A Amount Available	12%	35%
Anticipated Deliveries (AFY)	12,312	35,910

Notes:
(a) The percentages of Table A amount projected to be available are taken from Delivery Reliability Reports prepared for Valley District by DWR as part of the "The State Water Project Delivery Reliability Report 2009" (August 2010). Supplies are calculated by multiplying Valley District's Table A amount by these percentages.
(b) Based on the worst case historic single dry year of 1977.
(c) Supplies shown are annual averages over four consecutive dry years, based on the worst case historic four-year dry period of 1931-1924.

While the primary supply of water available from the SWP is allocated Table A supply, SWP supplies in addition to Table A water are periodically available, including "Article 56C" carryover water, "Article 21" water, "Turnback Pool" water, and DWR "Dry Year Purchase Programs". Pursuant to the long-term water supply contracts, SWP contractors have the opportunity to carry

over a portion of their allocated water approved for delivery in the current year for delivery during the next year. Valley District has exercised this option in the past. Contractors can also "carry over" water under Article 56C of the SWP long-term water supply contract with advance notice when they submit their initial request for Table A water, or within the last three months of the delivery year. The carryover program was designed to encourage the most efficient and beneficial use of water and to avoid obligating the contractors to "use or lose" the water by December 31 of each year. The water supply contracts state the criteria of carrying over Table A water from one year to the next. Normally, carryover water is water that has been exported during the year, has not been delivered to the contractor during that year, and has remained stored in the SWP share of San Luis Reservoir to be delivered during the following year. Storage for carryover water no longer becomes available to the contractors if it interferes with storage of SWP water for project needs (DWR 2010). In 2009, Valley District received 9,348 AF of "carryover" water.

Article 21 water (which refers to the SWP contract provision defining this supply) is water that may be made available by DWR when excess flows are available in the Delta (i.e., when Delta outflow requirements have been met, SWP storage south of the Delta is full, and conveyance capacity is available beyond that being used for SWP operations and delivery of allocated and scheduled Table A supplies). Article 21 water is made available on an unscheduled and interruptible basis and is typically available only in average to wet years, generally only for a limited time in the late winter. Since 1999, Valley District has taken 256 AF of Article 21 water.

The Turnback Pool is a program available to State Water Contractors who signed the "Monterey Amendment". The program helps facilitate the sale of excess Table A supplies and establishes a sale price for the water. Valley District did not sign the Monterey Amendment. However, Valley District is able to sell any excess water to other SWP contractors. Currently, Valley District has an agreement with the Metropolitan Water District of Southern California (MWDSC) which gives MWDSC "first right of refusal" to purchase Table A supplies deemed "excess" to Valley District's needs.

As urban contractor demands increase in the future, the amount of water turned back and available for purchase will likely diminish. In critical dry years, DWR has formed Dry Year Water Purchase Programs for contractors needing additional supplies. Through these programs, water is purchased by DWR from willing sellers in areas that have available supplies and is then sold by DWR to contractors willing to purchase those supplies.

Because the availability of these supplies is somewhat uncertain, they are not included as supplies to Valley District in this Plan. However, Valley District's access to these supplies when they are available may enable it to improve the reliability of its SWP supplies beyond the values used throughout this report.

2.2 Local Water Supplies

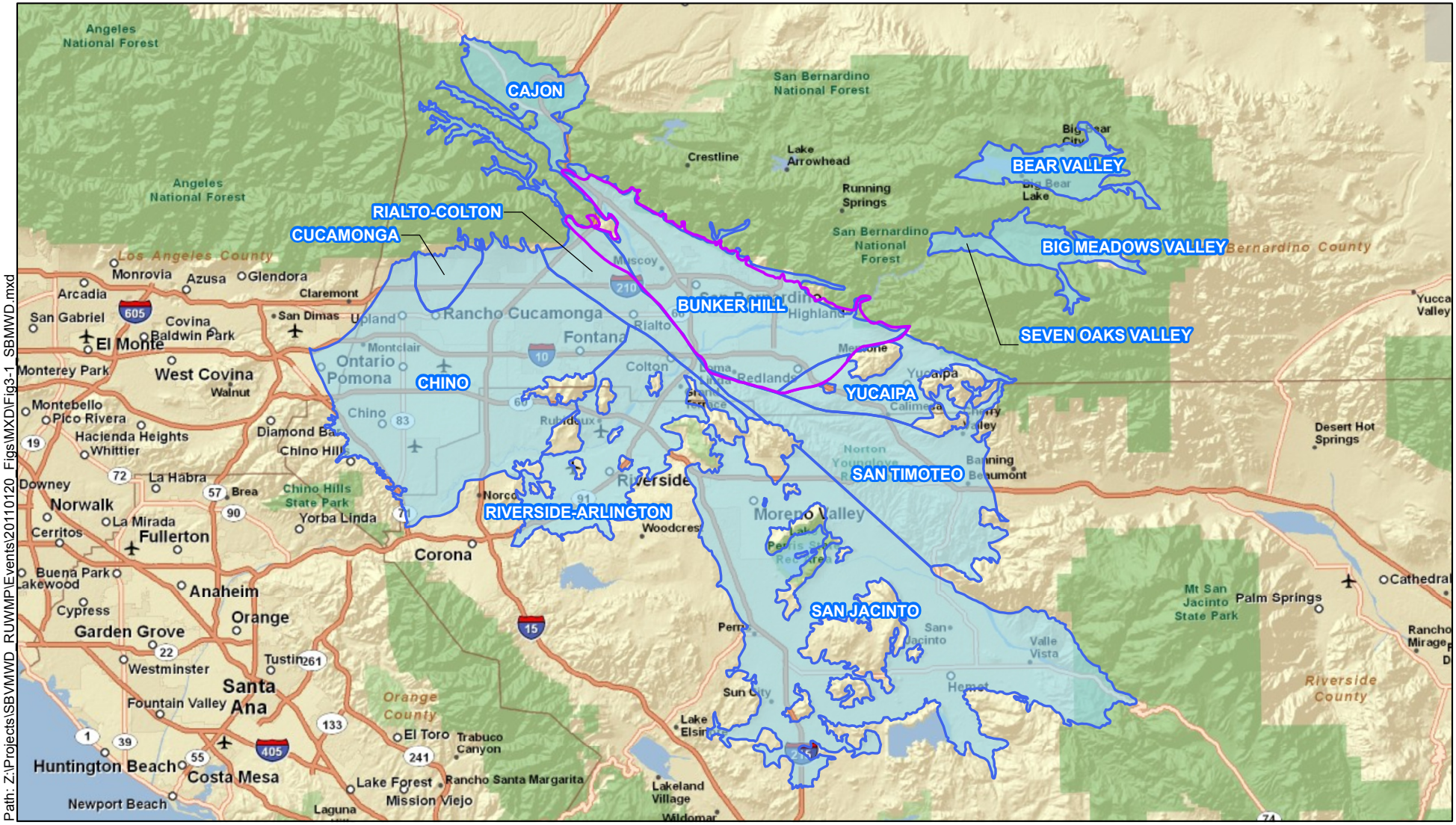
Groundwater is a major source of water supply for the San Bernardino Valley. This section provides a description of local surface water and groundwater management in the San Bernardino Valley, including court judgments, groundwater management plans, and groundwater pumping rights.

2.2.1 The San Bernardino Basin Area

The SBBA was defined by and adjudicated in gross by the *Western* Judgment in 1969. The SBBA has a surface area of approximately 140.6 square miles and lies between the San Andreas and San Jacinto faults. The basin is bordered on the northwest by the San Gabriel Mountains and Cucamonga fault zone; on the northeast by the San Bernardino Mountains and San Andreas fault zone; on the east by the Banning fault and Crafton Hills; and on the south by a low, east-facing escarpment of the San Jacinto fault and the San Timoteo Badlands. Alluvial fans extend from the base of the mountains and hills that surround the valley and coalesce to form a broad, sloping alluvial plain in the central part of the valley. The SBBA encompasses the Bunker Hill subbasin (8.02-06) defined by DWR and also includes a small portion of the Yucaipa Basin (8-02.07) and Rialto-Colton Basin (8-02.04) as defined by DWR. The SBBA also encompasses surface water.

The *Western* Judgment established the natural safe yield of the SBBA to be a total of 232,100 AF per year for both surface water diversions and groundwater extractions (a copy of the *Western* Judgment is provided in Appendix C). Of this amount, agencies within the Valley District service area are allocated 167,238 AFY; agencies in Riverside County are allocated 64,862 AFY (excluding any specific groundwater banking performed by Riverside county agencies). San Bernardino agencies are allowed to extract more than 167,238 AFY from the SBBA, but extractions over 167,238 AF require import and recharge by Valley District of a like amount of water. The Western-San Bernardino Watermaster provides an annual accounting of the total extractions as compared to the safe yield. In years when total extractions are less than the safe yield, a “credit” is given. In years when total extractions are greater than the safe yield, a “debit” is given. If the net result is a debit condition, the replenishment obligation is triggered. As of the accounting performed for the 2009 Annual Western-San Bernardino Watermaster Report, Valley District has 211,323 AF of credit accumulated in the SBBA. Table 2-4 details historical extractions from the SBBA for years 2004-2008; data for year 2009 is not yet available.

The SBBA and other groundwater basins utilized by RUWMP agencies are mapped in Figure 2-1.



Source: Basemap Copyright:© 2009 ESRI, AND, TANA, ESRI Japan, UNEP-WCMC.

Legend

- San Bernardino Basin Area
- Groundwater Basin

N

0 10

Scale: Miles

Kennedy/Jenks Consultants

Regional Urban Water Management Plan
San Bernardino Valley

Groundwater Basins of the San Bernardino Area

K/J 1089014*00

Figure 2-1

TABLE 2-4
HISTORIC EXTRACTIONS SBBA (AFY)

	2004	2005	2006	2007	2008
City of Colton[(a)]	5,845	5,615	6,394	6,696	6,917
East Valley Water District[(a)]	23,852	23,115	32,961	31,577	23,951
City of Loma Linda[(b)]	5,522	5,394	5,685	6,231	5,919
City of Redlands Water Utility[(a)]	33,694	36,361	36,650	33,635	32,313
San Bernardino Municipal Water Department[(b)]	49,543	48,955	57,391	59,594	57,237
West Valley Water District[(a)]	12,721	10,907	12,791	13,189	14,549
Yucaipa Valley Water District [(a)]	301	393	281	195	161
Other Agencies in San Bernardino and Private Entities[(c)]	183,810	191,533	202,524	196,767	189,747
Riverside-Highland Water Company[(d)]	1,754	3,377	4,149	3,633	2,730
Agencies in Riverside County[(e)]	57,814	51,123	57,520	60,167	58,962
Total	374,856	376,773	416,347	411,684	392,486

Notes:
(a) From *Thirty-Eighth Annual Report of the Santa Ana River Watermaster.*
(b) From agency records.
(c) Includes Fontana Water Company, Marygold Mutual Water Company, Muscoy Mutual Water Company, City of Rialto, Terrace Water Company, Devore Water Company, Crafton Water Company, Inland Valley Development company, Mount Vernon Water Company, Pioneer Mutual Water company, Pharaoh-Powell Mutual Water Company, Redlands Water Company, and Tennessee Water Company. Data from Volume 1 of Western-San Bernardino Watermaster Annual Report for 2009.
(d) Riverside-Highland Water Company's service area extends into both San Bernardino and Riverside counties. However, Riverside-Highland Water Company is a Plaintiff within the *Western Judgment* and therefore extractions for Riverside-Highland are typically included with those of Riverside County entities. Data from Table 11, Western-San Bernardino Watermaster Annual Report for 2009.
(e) Includes Meeks & Daley Water Company, Riverside Public Utilities, Regents of California.

2.2.1.1 Lytle Creek Subbasin

Lytle Creek subbasin is not mapped in DWR Bulletin 118-2003; however, the subbasin is an integral part of the Upper Santa Ana Valley Groundwater Basin and a major recharge area for both the Bunker Hill and Rialto-Colton subbasins. Historically, local agencies have recognized Lytle Creek subbasin as a distinct groundwater subbasin. For purposes of this report, the Bunker Hill and Lytle Creek subbasins are generally considered as one groundwater basin-the SBBA. However, the three separate water-bearing zones and intervening confining zones of the Bunker Hill subbasin are not observed in the Lytle subbasin. Sediments within the Lytle subbasin are, for the most part, highly permeable, and the aquifer has a high specific yield. High permeability and specific yield tend to result in an aquifer that responds rapidly to changes in inflow (precipitation and streamflow) and outflow (groundwater pumping, streamflow, and subsurface outflow).

Lytle Creek subbasin is adjoined on the west by the Rialto-Colton subbasin along the Lytle Creek fault, and on the east and southeast by the Bunker Hill subbasin along the Loma Linda fault and Barrier G. The northwestern border of the subbasin is delineated by the San Gabriel Mountains, and runoff from the mountains flows south/southeast through Lytle and Cajon Creeks into the basin.

Numerous groundwater barriers are present within Lytle Creek subbasin, resulting in six compartments within the subbasin. Barriers A through D divide the northwestern portion of the

subbasin into five sub-areas and the southeastern portion of the subbasin comprises the sixth sub-area. Barrier F divides the northwestern sub-areas from the southeastern sub-area. Studies have shown that the groundwater barriers are less permeable with depth (Dutcher and Garret 1963). When groundwater levels are high during wet years, more leakage occurs across the barriers than when groundwater levels are lower (i.e., during dry years). The amount of pumping in each sub-area, in large part, controls the movement of groundwater across the barrier within the older alluvium but not the younger alluvium (Dutcher and Garrett 1963).

It is important to note that the water rights in Lytle Creek are set forth in long-standing court judgments governing the rights of the parties in that basin. The Lytle Creek Basin was adjudicated under the 1924 Judgment No. 17,030 from the Superior Court of San Bernardino County and is managed by the Lytle Creek Water Conservation Association which is made up of the successors to the stipulated parties of the judgment (a copy of the 1924 judgment is provided in Appendix D)

2.2.2 Rialto-Colton Subbasin (DWR 8-02.04)

The Rialto-Colton subbasin underlies a portion of the upper Santa Ana Valley in southwestern San Bernardino County and northwestern Riverside County. This subbasin is about 10 miles long and varies in width from about 3.5 miles in the northwestern part to about 1.5 miles in the southeastern part (Figure 2-1). This subbasin is bounded by the San Gabriel Mountains on the northwest, the San Jacinto fault on the northeast, the Badlands on the southeast, and the Rialto-Colton fault on the southwest. The Santa Ana River cuts across the southeastern part of the basin. The basin generally drains to the southeast, toward the Santa Ana River. Warm and Lytle creeks join near the southeastern boundary of the basin and flow to meet the Santa Ana River near the center of the southeastern part of the subbasin.

The principal recharge areas are Lytle Creek, Reche Canyon in the southeastern part, and the Santa Ana River in the south-central part. Lesser amounts of recharge are provided by percolation of precipitation to the valley floor, underflow, and irrigation and septic returns (DWR 1970, Wildermuth 2000). Underflow occurs from fractured basement rock (DWR 1970, Wildermuth 2000) and through the San Jacinto fault in younger Santa Ana River deposits at the south end of the subbasin (Dutcher and Garrett 1958) and in the northern reaches of the San Jacinto fault system (Wildermuth 2000). Groundwater recharge has been augmented through the use of spreading basins.

The groundwater extractions in the Colton Basin Area are governed by the Rialto Basin Decree and the *Western* Judgment. The *Western* Judgment uses the terminology “Colton Basin Area”; however, this basin is also known as the Rialto-Colton Basin. Fontana Water Company (FWC), City of Rialto, City of Colton, and West Valley Water District are subject to the Rialto Basin Decree, entered on December 22, 1961, by the Superior Court for the County of San Bernardino. Entitlement extractions for any given water year (October 1 to September 30) are affected by groundwater elevations between March and May for three specific “index” wells (Duncan Well, Willow Street Well, and Boyd Well). Under specified conditions, groundwater extractions may be limited during certain months.

The *Western* Judgment requires Valley District to maintain the average lowest static water levels in three index wells in the Colton Basin Area and Riverside North Basins above

822.04 feet msl. If the water levels fall below 822.04 feet msl, Valley District is obligated to recharge the basin with imported water or reduce extractions. Extractions for use in Riverside County are limited to 3,381 AFY.

The safe yield for the Colton Basin Area was not defined by the *Western* Judgment or the Rialto Basin decree. Extractions during the five-year base period of the *Western* Judgment, 1959 to 1963, were, on average, 11,731 AFY. Extractions have averaged 17,675 AFY from 1996 to 2008. Since the safe yield has not been determined for the Colton Basin Area, the average extraction from 1996-2008 of 17,675 AFY was reported in the Integrated Regional Water Management Plan (IRWMP) as the sustainable supply from the Colton Basin Area.

2.2.3 Riverside-Arlington Subbasin (DWR 8-02.03)

The Riverside-Arlington subbasin underlies part of the Santa Ana River Valley in northwest Riverside County and southwest San Bernardino County. This subbasin is bounded by impermeable rocks of Box Springs Mountains on the southeast, Arlington Mountain on the south, La Sierra Heights and Mount Rubidoux on the northwest, and the Jurupa Mountains on the north. The northeast boundary is formed by the Rialto-Colton fault, and a portion of the northern boundary is a groundwater divide beneath the community of Bloomington. The Santa Ana River flows over the northern portion of the subbasin. Annual average precipitation ranges from about 10 to 14 inches. The Riverside-Arlington subbasin is replenished by infiltration from Santa Ana River flow, underflow past the Rialto-Colton fault, intermittent underflow from the Chino subbasin, return irrigation flow, and deep percolation of precipitation (DPW 1934, Wildermuth 2000).

Groundwater extractions in the Riverside North Groundwater Basin (the portion of the Riverside-Arlington Subbasin in San Bernardino County) are governed by the *Western* Judgment. Extractions for use in San Bernardino County are unlimited, provided that water levels at three index wells in the Rialto-Colton and Riverside North Basins stay above 822.04 feet msl. Extractions from the Riverside North Basin for use in Riverside County are limited to 21,085 AFY.

2.2.4 Yucaipa Subbasin (DWR 8-02.07)

The Yucaipa subbasin underlies the southeast part of San Bernardino Valley. It is bounded on the northeast by the San Andreas fault, on the northwest by the Crafton fault, on the west by the Redlands fault and the Crafton Hills, on the south by the Banning fault, and on the east by the Yucaipa Hills. The average annual precipitation ranges from 12 to 28 inches. This part of the San Bernardino Valley is drained by Oak Glen, Wilson, and Yucaipa Creeks south and west into San Timoteo Wash, a tributary to the Santa Ana River.

Dominant recharge to the subbasin is from percolation of precipitation and infiltration within the channels of overlying streams, particularly Yucaipa and Oak Glen Creeks; underflow from the fractures within the surrounding bedrock beneath the subbasin; and artificial recharge at spreading grounds.

The Yucaipa Basin is technically in an overdraft situation based on some estimates of basin yield. However, groundwater elevations overall have been relatively stable (YVWD 2005).

DWR treats the San Timoteo and Beaumont basins as a single basin, the San Timoteo Basin; locally these basins are

2.2.5 San Timoteo Subbasin (DWR 8-02.08)

The San Timoteo Subbasin is outside of the Valley District service area, but is one of the sources used by YVWD. The San Timoteo subbasin underlies Cherry Valley and the City of Beaumont in southwestern San Bernardino and northwestern Riverside counties. The subbasin is bounded to the north and northeast by the Banning fault and impermeable rocks of the San Bernardino Mountains, Crafton Hills, and Yucaipa Hills; on the south by the San Jacinto fault; on the west by the San Jacinto Mountains; and on the east by a topographic drainage divide with the Colorado River hydrologic region. The surface is drained by Little San Gorgonio Creek and San Timoteo Canyon to the Santa Ana River. Average annual precipitation ranges from 12 to 14 inches in the western part to 16 to 18 inches in the eastern part of the subbasin (DWR 2003).

Holocene-age alluvium, which consists of unconsolidated clay, silt, sand, and gravel, is the principal water-bearing unit in this subbasin. The alluvium, which is probably thickest near the City of Beaumont (DPW 1934), thins toward the southwest and is not present in the central part of the subbasin. The Pliocene-Pleistocene-age San Timoteo Formation consists of alluvial deposits that have been folded and eroded. These deposits are widely distributed and principally composed of gravel, silt, and clay, with comparatively small amounts of calcite-cemented conglomerate. The clasts are chiefly granitic, with lesser amounts of volcanic and metamorphic pebbles and cobbles (DWR 2003). The total thickness of the San Timoteo Formation is estimated to be between 1,500 and 2,000 feet, but logs of deep wells near the central part of the subbasin indicate water-bearing gravels to depths of only 700 to 1,000 feet (DWR 2003).

The Banning and Cherry Valley faults and two unnamed faults in the northeast part of the subbasin offset impermeable basement rocks, stepping down to the south (DWR 2003). Water levels change across the Banning fault, dropping 100 to 200 feet to the south (DWR 2003). In the western part of the subbasin, water levels drop to the south about 75 feet across the Loma Linda fault and about 50 feet across the San Timoteo barrier (DWR 2003). In the northeastern part of the subbasin, water levels drop to the south across two unnamed faults (DWR 2003). Each of these faults appears to disrupt groundwater movement in the subbasin.

DWR has not identified the San Timoteo Subbasin as in overdraft (DWR 2003).

2.2.5.1 Beaumont Groundwater Basin

DWR considers the Beaumont Groundwater Basin as composed of three other groundwater basin, primarily the San Timoteo subbasin, the Upper Santa Ana Valley Groundwater Basin (No. 8-2), and the San Gorgonio Pass Subbasin (No. 7-21.04). Locally the Beaumont is treated as a distinct basin. The Beaumont Basin is outside of the Valley District service area, but is one of the sources used by YVWD.

The Beaumont Basin is located in northwestern Riverside County, south of the Yucaipa Basin. While this basin is located outside of San Bernardino Valley Municipal Water District's jurisdiction, the basin eventually drains to San Timoteo Creek, a tributary of the Santa Ana River

and covers approximately 26 square miles. Groundwater elevations generally slope from the northeast to southwest in the basin.

Groundwater within the basin is predominantly found in Holocene age alluvium and in the San Timoteo Formation. While the San Timoteo Formation extends to depths in excess of 1500 feet, water bearing sediments within the Beaumont Basin exist to depths of 700 to 1000 feet. Estimates for total groundwater storage capacity within the basin vary. The Beaumont Basin storage capacity is estimated at approximately 1,000,000 AF (Beaumont Basin Watermaster, 2007).

In February 2004 the San Timoteo Watershed Management Authority filed a judgment adjudicating the groundwater rights in the Beaumont Basin and assigned the Beaumont Basin Watermaster with the authority to manage the groundwater basin. The Beaumont Basin Watermaster is comprised of managers from the Beaumont Cherry Valley Water District, City of Banning, City of Beaumont, South Mesa Mutual Water Company and Yucaipa Valley Water District. The Beaumont Basin Watermaster reports a long-term yield for the Beaumont Basin of 8,560 AFY. Extraction within the basin is limited to a long-term average of 16,000 AFY (160,000 AF over 10 years). During the past four years, the Watermaster reports annual groundwater extractions in the basin that range from 14,100 AFY to 19,300 AFY. Yucaipa Valley Water District pumping from the Beaumont basin was approximately 527 AFY during FY 2008/2009

The adjudication of the Beaumont Basin has defined overlying and appropriator pumping rights and also allows for supplemental water to be stored and recovered from the basin. The Beaumont Basin, under this adjudication, is considered to be in a condition of overdraft with assigned maximum annual overlying production rights of 8,650 acre-feet. The YVWD has a right to an operating yield of 2,552 AFY from the Beaumont Basin, which consists of 381 AF of appropriative right and 2,173 AF of Controlled Overdraft and Supplemental Water Recharge Allocation. YVWD can deliver amounts in addition to the 2,552 AF as supported from overlying water right holders.

2.2.6 Chino Subbasin (DWR 8-2.01)

The San Timoteo Subbasin is entirely outside of the Valley District service area, but is one of the sources used by WVWD. The Chino Subbasin lies in the southwest corner of San Bernardino County. The Chino Subbasin is bordered to the east by the Rialto-Colton fault. In the other three directions, the Chino Subbasin is ringed by impermeable mountain rock, the San Gabriel Mountains to the north, the Jurupa Mountains and Puente Hills to the south and southwest. Average annual precipitation across the basin is 17 inches. This part of the San Bernardino Valley is drained by San Antonio Creek and Cucamonga Creek southerly to the Santa Ana River (DWR 2003).

On January 2, 1975, several Chino Basin producers filed suit in California State Superior Court for San Bernardino County (the "Court") to settle the problem of allocating water rights in the Chino Basin. On January 27, 1978, the Court entered a judgment in *Chino Basin Municipal Water District v. City of Chino et. al*. adjudicating water rights in the Chino Basin and establishing the Chino Basin Watermaster. The Judgment adjudicated all groundwater rights in Chino Basin and contains a physical solution to meet the requirements of water users having

rights in or dependent upon the Chino Basin. The Judgment also appointed the Watermaster to account for and implement the management of the Chino Basin. The Judgment declared that the initial operating safe yield of the Chino Basin is 145,000 acre feet per year. The Basin is managed through implementation of the Chino Optimum Basin Management Plan (Appendix C). Per the Judgment, West Valley Water District has a minimum of approximately 1,000 AFY of extraction rights. Extractions above that amount must be replenished with SWP water through a program with the Chino Basin Watermaster.

2.3 Local Water Management

2.3.1 Western Judgment

The *Western* Judgment, entered simultaneously with the *Orange County* Judgment, settled rights within the upper Santa Ana River watershed to ensure that those resources would be sufficient to meet the flow obligations in the lower Santa Ana River watershed set by the *Orange County Judgment* (*Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Superior Court of Riverside County, Case No. 78426* [April 17, 1969]). Toward this end, the *Western* Judgment generally provides for:

- A determination of safe yield of the SBBA;
- Establishment of specific amounts 64,872 acre-feet of water that can be extracted from the SBBA by plaintiff parties (parties in Riverside County). This is equal to 27.95 percent of safe yield (safe yield is set at 232,100 AFY, 27.95 percent of this is 64,872 AF);
- An obligation of Valley District to provide replenishment for any extractions from the SBBA by non-plaintiffs (entities in the Valley District service area) in aggregate in excess of 72.05 percent of safe yield (safe yield is set at 232,100 AFY, 72.05 percent of this is 167,228 AF);
- An obligation of Western Municipal Water District of Riverside County (Western) to replenish the Colton and Riverside basins if extractions for use in Riverside County in aggregate exceed certain specific amounts; and
- An obligation of Valley District to replenish the Colton and Riverside basins if water levels are lower than certain specific water level elevations in specified wells.

The *Western* Judgment identifies regional representative agencies to be responsible, on behalf of the numerous parties bound thereby, for implementing the replenishment obligations and other requirements of the judgment. The representative entities for the *Western* Judgment are Valley District and Western. Valley District acts on behalf of all defendants dismissed from the *Western* Judgment, and similarly, Western acts on behalf of the Plaintiffs and other dismissed parties within the Western service area. Plaintiff parties with specific rights to produce 27.95 percent of the safe yield from the SBBA are the City of Riverside, Riverside Highland Water Company, Meeks & Daley Water Company, and the Regents of the University of California.

The *Western* Judgment contemplates that the parties will undertake “new conservation” which is defined as any increase in replenishment from natural precipitation which results from operation of works and facilities not in existence as of 1969, other than works installed to offset losses

from flood control channelization. The *Western* Judgment specifies that the parties to the Judgment have the right to participate in any new conservation projects, provided they pay the appropriate share of the cost. The net effect of new conservation is an increase in pumping rights by the Plaintiffs and "credits" for the non-Plaintiffs. A copy of the *Western* Judgment is provided in Appendix C.

2.3.2 Orange County Judgment

In 1963, the Orange County Water District (OCWD) filed suit against substantially all water users in the area tributary to Prado Dam seeking adjudication of water rights on the Santa Ana River. The litigation ultimately involved over 4,000 served water users and water agencies, the four largest of which were OCWD, Valley District, Western, and the Chino Basin Municipal Water District (now the Inland Empire Utilities Agency). Given the magnitude of the potential litigation, these four districts and other parties developed a settlement that was approved by the Orange County Superior Court in a stipulated judgment entered on April 17, 1969. *Orange County Water District v. City of Chino et. al*., Case No. 117628 (*Orange County Judgment*). The *Orange County Judgment* imposes a physical solution that requires parties in the upper Santa Ana River watershed to deliver a minimum quantity of water to points downstream including Riverside Narrows and Prado Dam. A provision of the *Orange County Judgment* related to conservation establishes that, once the flow requirements are met, the Upper Area parties "may engage in unlimited water conservation activities, including spreading, impounding, and other methods, in the area above Prado Reservoir." The *Orange County Judgment* is administered by the five member Sana Ana River Watermaster that reports annually to the court and the four representative agencies. Valley District, the Inland Empire Utilities Agency, and Western nominate one member each to the Watermaster, OCWD nominates two members, and members are appointed by the court. A copy of the *Orange County Judgment* is provided in Appendix C.

2.3.3 1961 Rialto Basin Decree

The Rialto Basin Decree was described previously in Section 2.2.2. A copy of the Rialto Basin Decree is provided in Appendix C.

2.3.4 Seven Oaks Accord

On July 21, 2004, Valley District, Western, the City of Redlands, East Valley Water District, Bear Valley Mutual Water Company, Lugonia Water Company, North Fork Water Company, and Redlands Water Company signed a settlement agreement known as the Seven Oaks Accord (Accord). The Accord calls for Valley District and Western to recognize the prior rights of the water users for a portion of the natural flow of the Santa Ana River. In exchange, the water users agree to withdraw their protests to the water right application submitted by Valley District on behalf of itself and Western. All the parties to the Accord have agreed to support the granting of other necessary permits to allow Valley District and Western to divert water from the Santa Ana River. By means of the Accord, Valley District agreed to modify its water right applications to incorporate implementation of the Accord. Additionally, the Accord requires Valley District and Western to develop a groundwater spreading program in cooperation with other parties, "That is intended to maintain groundwater levels at the specified wells at relatively constant levels, in spite of the inevitable fluctuations due to hydrologic variation." In response, local agencies included groundwater management in the *Upper Santa Ana River Integrated*

Regional Water Management Plan and have collectively prepared a Regional Water Management Plan annually since 2008.

2.3.5 Integrated Regional Water Management Plan

The 2007 Upper Santa Ana River Integrated Regional Water Management Plan (IRWMP) is consistent with the content and requirements of the Groundwater Management Planning Act of 2002. The IRWMP contains three Basin Management Objectives:

1. Maximize conjunctive use and increase ability collect and recharge storm and flood flows;
2. Reduce risk of liquefaction; and
3. Protect groundwater quality.

The IRWMP includes a multi-step process which results in an annual SBBA Management Plan:

1. Collect groundwater data (groundwater levels, water quality, storage)
2. Evaluate compliance with Judgments, accords, and agreements
3. Choose water spreading targets
4. Choose water extraction targets
5. Draft Annual management plan, entitled *Regional Water Management Plan,* for approval by the Valley District and Western Board of Directors
6. Recommend any new projects to help achieve objectives

The 2007 IRWMP is included in Appendix E.

2.3.6 Annual Regional Water Management Plan

The IRWMP stakeholders formed the Basin Technical Advisory Committee (known as the BTAC) to develop the annual water management plan. Participation in the BTAC is open to any interested agency. The agencies currently participating in the BTAC are:

Western	City of Loma Linda
City of Riverside	City of Redlands
Valley District	East Valley Water District
Bear Valley Mutual Water Company	West Valley Water District
San Bernardino Municipal Water Department	San Bernardino Valley Water Conservation District
Yucaipa Valley Water District	San Bernardino County Flood Control District

The BTAC works cooperatively and strives to make decisions by consensus. The 2010 Regional Water Management Plan is included in Appendix E.

2.3.7 Settlement Agreement with San Bernardino Valley Water Conservation District

Within the settlement agreement dated August 9, 2005, Valley District, Western, and the San Bernardino Valley Water Conservation District entered into a settlement agreement whereby the agencies will work cooperatively to develop an annual groundwater management plan. Since both parties are members of the BTAC, this requirement is being met by the BTAC's Regional Water Management Plan which largely emphasizes groundwater management.

2.4 Transfers, Exchanges, and Groundwater Banking Programs

2.4.1 Transfers and Exchanges

Transfers and exchanges are discussed in chapters for each individual agency.

2.4.2 Groundwater Banking Programs

Multiple agencies within the Valley District service area artificially recharge water for later use. Valley District and the San Bernardino Valley Water Conservation District are the primary recharge agencies for the SBBA.

Valley District cooperates in a program to help replenish groundwater, using both SWP water and local runoff. Valley District takes delivery of SWP supplies at the Devil Canyon Power Plant Afterbay. Water can then be conveyed westward and/or eastward to various spreading grounds. Valley District has been conducting groundwater recharge activities in the SBBA since 1972. The San Bernardino Valley Water Conservation District and its predecessors have

conducted water conservation (groundwater recharge) activities since 1912 in areas that overlie the SBBA.

The IRWMP explored conjunctive use scenarios and concluded that they were feasible, given the construction of additional facilities. However, it also states any future conjunctive use projects would need to be analyzed prior to implementation to ensure compliance with the terms and conditions of the various existing Judgments, decrees, and agreements.

2.5 Local Water Supply Reliability

2.5.1 Known Groundwater Contaminant Plumes

In the past, the SBBA was affected by four groundwater contaminant plumes. Plumes in the basin include (1 and 2) the Newmark and Muscoy plumes near the Shandin Hills, which are Superfund sites with Trichloroethylene (TCE) and Tetrachloroethylene (PCE); (3) the Norton TCE and PCE plume, and (4) the Crafton-Redlands plume, with TCE and lower levels of PCE and debromochloropropane (DBCP). The Rialto and Colton areas are currently affected by both perchlorate and Methyl Tertiary Butyl Ether (MTBE) contamination. Table 2-5 provides a summary of known contaminant plumes.

TABLE 2-5
SUMMARY OF KNOWN CONTAMINANT PLUMES

Name	Constituent(s)	Location
Newmark	TCE, PCE	Northwestern portion City of San Bernardino
Muscoy	TCE, PCE	Northwestern portion City of San Bernardino
Norton	TCE, PCE	Southwest of San Bernardino International Airport
Crafton-Redlands	TCE, Perchlorate	Cities of Redlands and Loma Linda
Rialto	Perchlorate	City of Rialto
North Riverside	MTBE	Cities of Rialto and Colton

2.5.1.1 Newmark and Muscoy Plumes

In 1980, the State of California Department of Health Services discovered and investigated dissolved-phase chlorinated volatile organic compounds (VOCs) contaminants in several municipal water supply wells within the northern San Bernardino/Muscoy region. Following this discovery, several investigations were conducted to identify potential sources of the VOC contamination. On March 30, 1989, the United States Environmental Protection Agency (EPA) placed this region on the National Priorities List, releasing federal funds to investigate and clean up the area, now identified as the Newmark Groundwater Contamination Superfund Site (Newmark Superfund Site). The EPA initiated the Remedial Investigation/Feasibility Study process for the Newmark Superfund Site in 1990, focusing entirely on the Newmark plume. Earlier investigations indicated the area contained a second groundwater contamination plume, referred to as the Muscoy plume. Further investigation indicated both plumes emanate from the same area northwest of the Shandin Hills, suggesting contaminants contributing to the Newmark and Muscoy plumes may have originated from the same source. In 1992, the EPA

expanded the Newmark Superfund Site Remedial Investigation to include the Muscoy plume after concluding the two plumes likely originated from the same source area. EPA has reported the primary suspected source of VOCs in the Newmark and Muscoy plumes is the former Camp Ono army base.

The principal contaminants identified in investigations since 1980, and the main contaminants of concern, are PCE and TCE.

Under the federal Superfund Program, the EPA has implemented cleanup of these plumes and facilities are operated by the City of San Bernardino. The Newmark treatment system consists of two separate extraction well networks: (1) the Newmark North facilities and (2) the Newmark Plume front. The Newmark North facilities are located in the northwestern portion of the Newmark plume to inhibit further downgradient migration of contaminated groundwater along the north side of the Shandin Hills through a narrow gap between bedrock outcroppings and the San Andreas Fault. Extracted groundwater is treated using seven, pairs of 20,000-pound granular activated carbon (GAC) vessels referred to as the Newmark North Treatment Plant. The Newmark North facilities also include five monitoring well clusters to monitor water levels and VOCs for evaluating the effectiveness of the Newmark North extraction well network.

The second network, referred to as the Newmark Plume Front, is located along the leading edge of the Newmark plume to protect uncontaminated portions of the aquifer. Water extracted from this network is treated using eight, pairs of 20,000-pound GAC vessels located at the Waterman Treatment Plant. The Newmark Plume Front facilities also include six monitoring well clusters used to monitor water levels and VOCs for evaluating the effectiveness of the Newmark Plume Front extraction well network (SBMWD 2010).

An extraction system consisting of six additional extraction wells, referred to as the Muscoy plume extraction well network, has been installed in the downgradient area of the Muscoy plume. Five of the extraction wells began preliminary operations in April 2005. An additional extraction well was installed to address capture deficiencies in the shallow aquifer and began operations in May 2007. The Muscoy plume extraction well network is located up gradient of the leading edge of dissolved VOCs in groundwater to inhibit further migration of VOCs to the south. Extracted water from the six extraction wells is treated using 12 pairs of 30,000-pound granular GAC vessels located at the 19th Street Treatment Plant. The Muscoy plume facilities also include eight monitoring well clusters to monitor water levels and VOCs for evaluating the effectiveness of the Muscoy plume extraction well network.

As described earlier, the City of San Bernardino operates and maintains the Newmark and Muscoy plume treatment networks. The City does so as party to a consent decree lodged with the United States District Court, Central District of California, Western Division (Court), on August 18, 2004. The Consent Decree requires the City of San Bernardino to implement an ordinance to ensure that activities occurring in the management zone do not interfere or cause pass-through of contaminants from the Newmark and Muscoy plumes. The City of San Bernardino Ordinance No. MC-1221, approved in March 2006, establishes the management zone boundaries within the City of San Bernardino for water spreading and water extraction activities. A permit from the City of San Bernardino pursuant to the provisions outlined in the ordinance must first be obtained for any spreading (artificial recharge) or extracting (well pumping) within the Management Zones, as defined in the ordinance.

Following treatment, water extracted by the plume treatment networks is used to supplement SBMWD's water supply. It appears the cleanup efforts will be adequate to protect 32 down gradient wells. Based on current conditions the Newmark and Muscoy plumes are not anticipated to affect SBBA water supply reliability. However, water quality issues are constantly evolving. Agencies of the San Bernardino Valley will continue to take action to protect and treat supply when needed, but it is well recognized water quality treatment can have significant costs.

2.5.1.2 Norton Plume

The Norton Plume, located just to the southwest of the San Bernardino International Airport (formerly Norton Air Force Base) consists primarily of TCE and PCE. In the past, the plume had impaired 10 wells owned by the City of Riverside and the City of San Bernardino. Cleanup efforts by the Air Force, consisting of soil removal, soil gas extraction, and groundwater treatment, have significantly reduced this plume. The treatment plant now operates in a standby mode (SAWPA 2002). Monitoring of contaminants continues, but the Santa Ana Regional Water Quality Control Board (RWQCB) has issued site closure, meaning the RWQCB believes the corrective action plan for the site has been satisfactorily implemented (personal communication K. Saremi, Santa Ana Regional Water Quality Control Board, 3/29/2011).

Based on current conditions the Norton Plume is not anticipated to affect SBBA water supply reliability. However, water quality issues are constantly evolving. Agencies of the San Bernardino Valley will continue to take action to protect and treat supply when needed, but it is well recognized water quality treatment can have significant costs.

2.5.1.3 Crafton-Redlands Plume

In the past, two commingled plumes, comprising the Crafton-Redlands plume, impacted water supply wells for the cities of Riverside, Redlands, and Loma Linda, including Loma Linda University wells. One plume contains TCE and the other perchlorate; both were in the upper 300 to 400 feet of groundwater. TCE had been measured in water supply wells at over 100 parts per billion (ppb), over 20 times the allowed maximum contaminant level (MCL) of 5 ppb. Currently, however, monitoring wells indicate concentrations are less than 1 micrograms per liter (µg/L) though, perchlorate has recently been observed as high as 70 parts per billion (ppb) near the former Lockheed site in one monitoring well. As required by the Santa Ana Regional Water Quality Control Board, the Lockheed Martin Corporation (Lockheed):

- Prepared a groundwater monitoring program. Lockheed currently samples wells and system compliance points in accordance with the groundwater monitoring program approved on March 3, 2006. Sampling for TCE and perchlorate is performed monthly and submitted to the Santa Ana RWQCB in monthly reports (Letter, Lockheed Martin to Santa Ana Regional Water Quality Control Board, March 11, 2011).
- Prepares TCE and perchlorate distribution maps based on a comprehensive sampling event conducted annually in mid-summer. The sampling event and other sampling events are used to calibrate the fate and transport hydraulic model.
- Maintains a three-dimensional groundwater flow and transport model for the plume area.
- Prepared a Remedial Action Plan.

- Installed liquid phase granulated activated carbon and/or ion exchange (IX) treatment at three City of Riverside Regional Treatment Facilities and two wellheads to facilitate plume containment and mass removal, to meet drinking water requirements, and maintain beneficial use of the water resource.
- Installed IX treatment for Loma Linda University's Anderson Wells No. 2 and 3. Treatment at Anderson Well No. 3 is no longer necessary because the perchlorate concentration is less than 4 µg/L.
- Installed an arsenic treatment system capable of treating up to 3,000 gallons per minute (gpm) from the City of Loma Linda's Mountain View #3 and/or #5 (wells drilled by Lockheed to replace capacity of wells that were impacted by perchlorate and TCE).
- Lockheed, along with the City of Loma Linda, have completed two new wells, Richardson #5 and Mountain View #6. A new treatment plant (Richardson Treatment Plant) consisting of liquid phase granulated activated carbon and IX treatment is under construction to treat the water produced from the newly installed Richardson #5 and Mountain View #6 wells. These wells will aid in plume containment and perchlorate and TCE mass removal.
- Lockheed and the City of Redlands recently installed IX treatment at the city's Rees well. Monitoring performed by Lockheed upgradient of the Rees well has indicated a small perchlorate plume.

Monitoring data for two wells operated by the City of Redlands has indicated increasing perchlorate concentrations; however, the water produced is below the MCL of 6 µg/L. A small perchlorate plume has also been identified near the City of Redlands Agate #2 well. Redlands and Lockheed are in the process of constructing additional treatment.

Based on current conditions and the fact that treatment is installed and other measures are being constructed, the Redlands-Crafton Plume is not anticipated to affect SBBA water supply reliability. However, water quality issues are constantly evolving. Agencies of the San Bernardino Valley will continue to take action to protect and treat water supplies when needed, but it is well recognized water quality treatment can have significant costs.

2.5.1.4 Rialto Area Perchlorate Plume

Since 2002, the Santa Ana RWQCB has been conducting an investigation of groundwater contamination in the area of the City of Rialto. The focus of the investigation has been facilities located on a 160-acre site in Rialto. The site has also been designated as a Superfund site by the US EPA. In 2005 the Santa Ana RWQCB Executive Officer issued a Cleanup and Abatement Order and subsequent amendments naming a number of responsible parties. Since that time, the Cleanup and Abatement Order has been the subject of challenges in petitions filed by entities named as parties responsible for the contamination. The ongoing legal wrangling and persistent chemical contamination by TCE, perchlorate, and nitrates has required both WVWD and the City of Rialto to avoid use of certain wells and certain water sources.

WVWD and the City of Rialto have planned and designed a wellhead treatment system to protect local groundwater supplies. The wellhead treatment system will use a fluidized bed biological treatment system to breakdown perchlorate to chloride, and nitrate to nitrogen gas.

The system will treat groundwater at a rate of about 2,000 gallons per minute. WVWD and the City plan to treat groundwater pumped from two existing wells: Rialto Well No. 6 and WVWD Well No. 11. The Groundwater Wellhead Treatment System Project represents a scientific first in California; utilizing a state-approved biological treatment process employing micro-organisms to destroy the perchlorate and other contaminants in drinking water and minimize the need for waste handling and disposal. Construction on the Groundwater Wellhead Treatment System Project is anticipated to start in May 2011.

The Groundwater Wellhead Treatment System Project will allow WVWD to restore a portion of its groundwater basin supply. Given the treatment to be provided by the Groundwater Wellhead Treatment System Project, the Rialto Area Perchlorate Plume is not anticipated to further negatively affect WVWD supply. However, water quality issues are constantly evolving. Agencies of the San Bernardino Valley will continue to take action to protect and treat supply when needed, but it is well recognized that water quality treatment can have significant costs.

2.5.1.5 North Riverside Basin MTBE Contamination

In 1988 the California Regional Water Quality Control Board, Santa Ana Region issued a Cleanup and Abatement Order to the SFPP Colton Fuel Terminal (owned by Kinder Morgan) located in Bloomington, California. The Terminal which is located just south of the I-10 freeway on the east side of Riverside Avenue is a bulk petroleum storage and distribution facility which was built in the 1950s. It currently occupies 82 acres and contains 32 refined petroleum product tanks and fuel-loading racks where transport tanker trucks are filled.

In response to the Cleanup and Abatement Order a monitoring and extraction well network for the Terminal was constructed. It consists of 131 wells in and around the Terminal as well as 14 soil vapor extraction wells. The site samples for Benzene, methyl tertiary butyl ether (MTBE) and tertiary butyl alcohol (TBA).

WVWD has identified that a few wells, located near the Terminal are vulnerable to MTBE contamination. Two WVWD wells are located south of the Terminal. Wells No. 40 and 41 are sampled monthly. No MTBE has been detected in these wells or any other WVWD Wells.

WVWD will continue to monitor MTBE in its wells. Existing technologies are available to treat groundwater affected by MTBE (air stripping, granulated activated carbon, biofiltration, advanced oxidation processes). For these reasons, MTBE is not anticipated to create a long-term effect on water supplies. It is recognized however, that treatment of supplies can have significant costs and delay the full use of a supply source.

2.5.2 Salinity Objectives - SBBA

The 1995 Water Quality Control Plan for the Santa Ana River Basin, as amended in 2004, contains water quality objectives for nitrogen and total dissolved solids (collectively called “Salinity Objectives”) in groundwater. These standards were set with the objective of protecting long-term conjunctive use of the basin. In June 2007, multiple water entities in the Upper Santa Ana River watershed and the Santa Ana Regional Water Quality Control Board entered into a Cooperative Agreement to “Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basins.” The Cooperative Agreement is intended to

allow parties that recharge imported water within the Santa Ana Region to continue recharge while monitoring and improving groundwater basin quality. Specifically the Cooperative Agreement requires parties that undertake groundwater recharge with imported water to:

- collect data on ambient water quality in each groundwater management zone;
- track the amount and quality of imported water recharged in each groundwater management zone;
- project ambient water quality in each groundwater management zone for the subsequent 20 years; and
- report the data described above every three years.

As part of the 2007 IRWMP, entities in the San Bernardino Area evaluated how and if nitrogen and total dissolved solids (TDS) levels could impact the ability to use imported water for recharge. Modeling performed for the 2007 IRWMP found that historic yearly and monthly SWP nitrogen levels were always lower than the lowest ambient level in any of the groundwater management zones. Thus nitrogen is not anticipated to limit the use of SWP water in the San Bernardino Valley. However, review of SWP water quality data indicates that in some dry-year and multiple dry-year periods, SWP water TDS levels could exceed ambient groundwater TDS levels. However, since SWP water project supplies would be limited in dry-periods to between 12,300 to 35,900 AFY, and since TDS levels would be much lower during other times, the long-term impacts are difficult to quantify. In January 2008 Valley District entered into an agreement with the Santa Ana Regional Water Quality Control Board which requires the development of a water quality report every three years. The intent of this report is to identify any potential water quality issues early on so they can be mitigated and to avoid any long-term impacts.

At the current time, water quality is not expected to limit the use of SWP water. However, water quality issues are constantly evolving. Agencies of the San Bernardino Valley will continue to take action to protect and treat supply when needed, but it is well recognized water quality treatment can have significant costs.

2.5.3 Inland Empire Brine Line

The Inland Empire Brine Line (formerly “Santa Ana Regional Interceptor, SARI”) was built over a period of 25 years (1975-2000) to collect and transport industrial brine that could not be treated at local (inland) wastewater treatment facilities. The Brine Line runs from the City of San Bernardino to a point just downstream of the Prado Dam. Another branch of the Brine Line runs from Lake Elsinore northwesterly until joining the Brine Line. The two branches combine into one branch and extend through Orange County to an ocean outfall. In all the SARI is 93 miles long. A thirteen mile connection to the Brine Line is being constructed by YVWD (SAWPA 2010). The Brine Line is a tremendous asset to the Valley District service area by enabling the transport of salts out of the area.

2.5.4 Chino and Yucaipa Basins Salts

The buildup of TDS in groundwater and nitrogen levels are on-going water quality challenges in the Chino and Yucaipa basins. Despite the construction and operation of the Inland Empire

Brine Line, a salt imbalance remains. Modeling performed by the Santa Ana Watershed Project Authority has indicated that water from the Chino and Yucaipa basins could consistently exceed the 500 mg/L secondary MCL in the future if mitigation measures are not taken.[2]

The Salinity Management Plan (SAWPA 2010) identifies potential long-term options to address the need for additional salt removal, including:

- Best management practices, source control measures aimed at reducing salt mass balances that would otherwise be discharged to ground or surface waters, or introduced into the wastewater stream. Examples include: eliminating salt-based domestic water softening devices, promoting the use of low-salt detergents, addressing salt runoff, and implementing pre-treatment programs.
- Desalters for water supply: Increase the amount of water desalted so as to create blended water with salinity less than 500 mg/L.
- Desalters for wastewater: Avoid adding salt to groundwater by adding desalination to all or a portion of the wastewater effluent stream. Providing advanced treatment to secondary effluent would also increase the possibility of reusing the effluent, including indirect potable water reuse via groundwater recharge or surface storage augmentation.
- Brine concentration. Increase the efficiency of desalters to limit the amount of liquid waste included in the brine stream entering the SARI.

WVWD can pump water from the Chino Basin. YVWD can pump water from the Yucaipa Basin. Both these agencies recognize that groundwater from these basins may require treatment for TDS and nitrates.

2.5.5 Summary of Water Quality Impacts on Supply Reliability

As described in the pages above, water quality is a concern in the San Bernardino Valley which the water agencies monitor, track, and implement treatment as necessary. In addition to the groundwater plumes described above, there are other contaminants in the basin, including but not limited to nitrate and DBCP, which can require costly treatment. There are also emerging contaminants and new water quality regulations which could impact the ability of water purveyors to meet customer demands without potentially expensive treatment. Based on current conditions and knowledge, water quality is not anticipated to affect regional water supply reliability (Table 2-6). However, water quality issues are constantly evolving. It is well recognized water quality treatment can have significant costs.

[2] EPA has established National Secondary Drinking Water Regulations. EPA does not enforce these "secondary MCLs." They are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. These contaminants are not considered to present a risk to human health at the secondary MCL.

TABLE 2-6
CURRENT AND PROJECTED WATER SUPPLY CHANGES DUE TO WATER QUALITY-PERCENTAGE CHANGE

Water Source	2010	2015	2020	2025	2030	2035
Groundwater	0%	0%	0%	0%	0%	0%
Imported	0%	0%	0%	0%	0%	0%
Recycled Water	0%	0%	0%	0%	0%	0%
Local Surface Water	0%	0%	0%	0%	0%	0%

2.6 Planned Water Supply Projects and Programs

2.6.1 Seven Oaks Supply

Valley District and Western jointly filed two applications with the State Water Resources Control Board to appropriate water from the Santa Ana River, made available through the construction of Seven Oaks Dam. Two permits to begin diversion were issued by the State Water Resources Control Board in July 2010 and Valley District and Western also diverted water under "temporary" permits issued by the State Water Resources Control Board in February 2008. It was estimated that up to 200,000 AF could be available in very wet years, with an annual average of between 10,800 and 27,000 AF. The proposed project has the following main components: (i) the direct diversion of water from the Santa Ana River, (ii) regulatory storage of water in Seven Oaks Reservoir, (iii) the use of existing facilities (generally pipelines and surface water storage facilities but including the use of underground storage basins), and (iv) the construction of various conveyance facilities (generally pipelines) to move water from the Santa Ana River and Seven Oaks Reservoir to retail purveyors or to underground storage basins and surface storage facilities. Table 2-7 reflects anticipated yield from the Seven Oaks Supply in an average, dry, and multiple dry year. Estimates of yield have been derived from modeling prepared as part of Valley District and Western's water rights application to the State Water Resources Control Board (Valley District/Western 2007).

2.6.2 Conjunctive Use Strategies

Building upon work performed as part of the 2007 IRWMP, agencies in the San Bernardino Valley are evaluating additional conjunctive use in the SBBA. As part of the 2007 IRWMP, the following activities were undertaken during the planning process to:

- Assess baseline groundwater conditions.
- Develop operational strategies for management of groundwater basins, including groundwater levels and quality considerations.
- Develop groundwater production and artificial recharge strategies.
- Develop a groundwater monitoring plan for collection, storage, and use of groundwater level and quality data, as well as assessment of the groundwater management strategies and their impacts on groundwater levels.

These efforts were enhanced by the development and refinement of a groundwater model for the SBBA. The key model outputs include groundwater levels, groundwater flow direction, and water quality. The model is a tool to design appropriate levels of groundwater conjunctive management while meeting the stated Basin Management Objectives.

Various conjunctive use strategies were evaluated including additional recharge of 40,000 AF, 90,000 AF, and 140,000 AF. Modeling studies have indicated that additional recharge is feasible, but will require additional recharge basins, new wells, and new pipeline facilities. Modeling studies have also indicated that:

- A 40,000 AF conjunctive use program could yield 40,000 AF in a single dry year and 100,000 AF during a 3-year drought.
- A 90,000 AF conjunctive use program could yield 120,000 AF in a single dry year and 320,000 AF over a 3-year drought.
- A 140,000 AF conjunctive use program could yield 160,000 AF in a single dry year and 420,000 AF over a 3-year drought.

Before undertaking these additional recharge programs it will be necessary to confirm model assumptions, confirm that operations will be consistent with all applicable groundwater management plans, judgments, decrees, and agreements. In addition, it will be necessary to plan, design, and build additional groundwater recharge facilities, wells, treatment facilities, and conveyance pipelines. Because these conjunctive use strategies are still in the planning stages, in Table 2-7, it is conservatively assumed in this Plan that there is no additional yield from these programs in the immediate future.

TABLE 2-7
PLANNED WATER SUPPLY PROJECTS (AFY)

Project Name	Wet-Year Yield	Normal-Year Yield	Single-Dry Year Yield	Multiple-Dry Water Year Yield			
				Year 1	Year 2	Year 3	Year 4
Seven Oaks Supply	200,000	10,800	0	0	0	0	0
Conjunctive Use Strategies	(a)	(a)	(a)	(a)	(a)	(a)	(a)

Note: (a) This program is currently in the planning stages.

2.7 Development of Desalination

2.7.1 Opportunities for Brackish Water and/or Groundwater Desalination

Desalination, or desalting, is a process to create fresh water from water containing higher salt levels. Desalination can use a thermal distillation process or a membrane process (such as electrodialysis or reverse osmosis). All desalination processes produce a brine waste stream that must be disposed. The need for brackish groundwater desalting is somewhat limited in the San Bernardino Valley. While elevated salts are a concern in the groundwater basins of the *Western* Judgment (SBBA, Rialto-Colton, Riverside), average TDS levels in all of these basins are currently below 500 mg/L (DWR 2003). However, elevated salts are an issue for retailers

that overlie the San Timoteo Groundwater Basin and agencies in this basin are considering implementing desalter operations. The area is fortunate to have a brine line which can transport non-reclaimable waste, by gravity, from the City of San Bernardino Wastewater Treatment Plant to the Orange County Sanitation District's treatment plant.

2.7.2 Opportunities for Seawater Desalination

Seawater desalination would require two major components:

(1) The development or financial contribution to a seawater desalination facility and associated facilities (e.g., brine disposal facility); and

(2) The exchange of a like amount of SWP water for the amount of water desalted.

The development of (or financial participation in) a new seawater desalination project, while costly, is being investigated by other wholesale and retail water agencies in southern California. Because the San Bernardino Valley is an inland area, in order for desalination to work it would be necessary for agencies in the San Bernardino Valley to join with other water purveyors in the development of a coastal desalination facility and then receive water from the SWP supplies of other participants via an exchange. It is not cost-effective for the San Bernardino Valley to receive direct delivery of desalted ocean water.

Seawater desalination is an alternative that is technically viable. However, production and treatment costs have historically been several times higher than those of SWP costs and conventional treatment.

The Municipal Water District of Orange County has estimated that ocean desalination will cost $1,300 per AF (May 2010), not including treatment, conveyance, and storage costs. This cost is several times greater than groundwater costs of the various agencies in the San Bernardino Valley ($150 to $330 per AF) and is higher than SWP costs (approximately $500 per AF in 2010). San Bernardino agencies will continue to evaluate the viability of desalinated water supplies.

2.8 Recycled Water

The potential for recycled water use for each retailer is described in their respective chapters. Recycled water is being developed by individual agencies in the San Bernardino Valley. Further, to be consistent with the provisions of *The Water Conservation Bill of 2009* (SBX7-7) use of recycled water must be tracked and accounted for by individual agency service area. For these reasons, recycled water is not being treated as a regional water source in this UWMP.

2.9 Anticipated Regional Water Supply Sources in Normal, Dry, and Multiple Dry Years

Tables 2-8, 2-9, and 2-10 provide details on anticipated regional water supply sources in normal, dry, and multiple dry year periods.

TABLE 2-8
REGIONAL WATER SUPPLY - NORMAL YEAR (AF)

	2010	2015	2020	2025	2030	2035
Surface Water						
SBBA Surface Water[a]	39,000	39,000	39,000	39,000	39,000	39,000
Seven Oaks Supply	10,800	10,800	10,800	10,800	10,800	10,800
Glen Oak	350	350	350	350	350	350
Sub-Total Surface Water	*50,150*	*50,150*	*50,150*	*50,150*	*50,150*	*50,150*
Groundwater						
SBBA Groundwater[a]	193,100	193,100	193,100	193,100	193,100	193,100
SBBA- Return Flows Extraction above the Safe Yield[b]	10,300	10,300	13,700	19,300	23,600	27,200
Rialto-Colton Groundwater	17,675	17,675	17,675	17,675	17,675	17,675
Riverside North Groundwater	9,000	9,000	9,000	9,000	9,000	9,000
Yucaipa, Beaumont, San Timoteo Groundwater Supplies	12,100	16,100	17,700	17,700	17,700	17,700
Chino	0	0	3,000	3,000	3,000	3,000
Sub-Total Groundwater	*242,175*	*246,175*	*254,175*	*259,775*	*264,075*	*267,675*
SWP Water						
Direct Deliveries	21,790	23,890	25,390	26,990	27,090	27,090
SWP Storage[c]	39,770	37,670	36,170	34,570	34,470	34,470
Sub-Total SWP Water[d]	*61,560*	*61,560*	*61,560*	*61,560*	*61,560*	*61,560*
Total All Supplies[e]	**353,885**	**357,885**	**365,885**	**371,485**	**375,785**	**379,385**

Notes:
(a) The San Bernardino Basin is managed whereby total safe yield is a combination of Surface Water and Groundwater totaling 232,100 AFY.
(b) Estimated based on demands.
(c) Assumes SWP Water is stored in wet years so that it can supplement lower deliveries of SWP water in dry years.
(d) Does not include SWP water from San Gorgonio Pass Water Agency from YVWD.
(e) Does not include recycled water as this is considered to be a local rather than regional source.

TABLE 2-9
REGIONAL WATER SUPPLY - SINGLE-DRY YEAR (AF)

	2010	2015	2020	2025	2030	2035
Surface Water						
SBBA Surface Water[(a)(b)]	21,500	21,500	21,500	21,500	21,500	21,500
Seven Oaks Supply[(c)]	0	0	0	0	0	0
Glen Oaks	175	175	175	175	175	175
Sub-Total Surface Water	*21,675*	*21,675*	*21,675*	*21,675*	*21,675*	*21,675*
Groundwater						
SBBA Groundwater[(a)]	210,600	210,600	210,600	210,600	210,600	210,600
SBBA- Return Flows Extraction above the Safe Yield[(d)]	11,300	11,300	15,100	21,200	26,000	29,900
Rialto-Colton Groundwater	17,675	17,675	17,675	17,675	17,675	17,675
Riverside North Groundwater	9,000	9,000	9,000	9,000	9,000	9,000
Yucaipa, Beaumont, San Timoteo Groundwater Supplies	11,500	11,500	13,100	14,700	14,700	14,700
Chino	0	0	3,000	3,000	3,000	3,000
Sub-Total Groundwater	*260,075*	*260,075*	*268,475*	*276,175*	*280,975*	*284,875*
SWP Water						
SWP Deliveries[(e)]	13,338	13,338	13,338	13,338	12,312	12,312
SWP from Storage[(f)]	48,222	48,222	48,222	48,222	49,248	49,248
Sub-Total SWP Water [(g)]	*61,560*	*61,560*	*61,560*	*61,560*	*61,560*	*61,560*
Total All Single-Dry Year Supplies[(h)]	**343,310**	**343,310**	**351,710**	**359,410**	**364,210**	**368,110**

Notes:

(a) The San Bernardino Basin is managed whereby total safe yield is a combination of Surface Water and Groundwater totaling 232,100 AFY. A decrease in available surface water in any given year does not change available yield from the basin.

(b) Based on runoff records for Lytle Creek, single-dry water year for SBBA surface water is assumed to be year 1990, with runoff 55% of normal.

(c) Based on runoff at USGS gage 11510500, single-dry water year for water in this portion of the Santa Ana River is assumed to be year 1990, with runoff 0% of normal.

(d) Estimated based on demands. Past demands have increased 6-12 percent during dry periods. For this analysis it is estimated that demands will increase 10% during dry periods.

(e) Single-Dry Year SWP supplies assumed to be 13% of Table A allocation in years 2010 to 2012 and 12% of Table A allocation in years 2030 to 2035.

(f) In a Normal Year, SWP water not used for direct deliveries is stored. Therefore, it is assumed that in any year Valley District will have its long-term SWP supply (61,560 AF) available through a combination of SWP deliveries and SWP from storage.

(g) Does not include SWP water from San Gorgonio Pass Water Agency for YVWD.

(h) Does not include recycled water as this is considered to be a local rather than regional source.

TABLE 2-10
REGIONAL WATER SUPPLY - MULTIPLE-DRY YEAR (AF)

	2010	2015	2020	2025	2030	2035
Surface Water						
SBBA Surface Water[(a)(b)]	23,400	23,400	23,400	23,400	23,400	23,400
Seven Oaks Supply[(c)]	0	0	0	0	0	0
Glen Oak	175	175	175	175	175	175
Sub-Total Surface Water	*23,575*	*23,575*	*23,575*	*23,575*	*23,575*	*23,575*
Groundwater						
SBBA Groundwater[(a)]	208,700	208,700	208,700	208,700	208,700	208,700
SBBA- Return Flows Extraction above the Safe Yield[(d)]	11,300	11,300	15,100	21,200	26,000	29,900
Rialto-Colton Groundwater	17,675	17,675	17,675	17,675	17,675	17,675
Riverside North Groundwater	9,000	9,000	9,000	9,000	9,000	9,000
Yucaipa, Beaumont, San Timoteo Groundwater Supplies	12,424	12,424	13,850	15,450	15,450	15,450
Chino	0	0	3,000	3,000	3,000	3,000
Sub-Total Groundwater	*259,099*	*259,099*	*267,325*	*275,025*	*279,825*	*283,725*
SWP Water						
SWP Deliveries[(e)]	33,858	33,858	33,858	33,858	35,910	35,910
SWP from Storage[(f)]	27,702	27,702	27,702	27,702	25,650	25,650
Sub-Total SWP Water[(g)]	*61,560*	*61,560*	*61,560*	*61,560*	*61,560*	*61,560*
Total All Multiple-Dry Year Supplies[(h)]	**344,234**	**344,234**	**352,460**	**360,160**	**364,960**	**368,860**

Notes:
(a) The San Bernardino Basin is managed whereby total safe yield is a combination of Surface Water and Groundwater totaling 232,100 AFY. A decrease in available surface water in any given year does not change available yield from the basin.
(b) Based on runoff records for Lytle Creek, multi-dry water year for SBBA surface water is assumed to be years 2002 to 2004, with lowest runoff in that period 60% of normal.
(c) Based on runoff at USGS gage 11510500, multi-dry water year for water in this portion of the Santa Ana River is assumed to be year 1988-1990, with lowest annual runoff during this period 0% of normal.
(d) Estimated based on demands. Past demands have increased 6-12 percent during dry periods. For this analysis it is estimated that demands will increase 10% during dry periods.
(e) Multi-Dry Year SWP supplies assumed to be 33% of Table A allocation in years 2010 to 2025 and 35% of Table A allocation in years 2030 to 2035.
(f) In a Normal Year, SWP water not used for direct deliveries is stored. Therefore, it is assumed that in any year Valley District will have its long-term SWP supply (61,560 AF) available through a combination of SWP deliveries and SWP from storage.
(g) Does not include SWP Water from San Gorgonio Pass Water Agency for YVWD.
(h) Does not include recycled water as this is considered to be a local rather than regional source.

2.10 Resource Maximization

For many years, water agencies of the San Bernardino Valley have cooperated to develop studies and plans so as to maximize the use of available resources. Studies and documents include the 2007 Integrated Regional Water Management Plan, the Annual Groundwater Management Plan as well as the development of extensive groundwater and surface water modeling tools. Further, agencies in the San Bernardino Valley area have formed a group to study and address conservation needs in the San Bernardino Valley. The group anticipates having a regional water conservation strategy developed by the end of 2011 and has already started regional conservation measures. Examples are the (1) water conservation education program, (2) Weather Based Irrigation Controllers Program, (3) “climate appropriate” plant promotion with Home Depot stores and other stores and nurseries, and (4) water conservation demonstration garden and California State University San Bernardino. These programs were developed by Valley District to help retailers with their conservation objectives.

Chapter 3: Regional Water Use

This chapter describes anticipated water demands in the Valley District service area, focusing on demands for regional water sources - including demands for imported water, groundwater, and surface water.

Water resources are detailed in Chapter 2. Specific water use by sector and demands for each of the retail water agencies participating in the RUWMP are detailed in the chapter for that agency.

3.1 Demands for SBBA Water

As detailed in Chapter 2, groundwater from the SBBA is a regional water sources. The following data sources were used to estimate non-plaintiff demands for SBBA water (Table 3-1).

TABLE 3-1
DATA SOURCES FOR SBBA DEMAND PROJECTIONS

Water Agency	Source of SBBA Demand Projections
East Valley Water District	Provided as part of this RUWMP, see Chapter 7
City of Loma Linda	Provided as part of this RUWMP, see Chapter 8
City of Redlands	Provided as part of this RUWMP, see Chapter 9
City of San Bernardino Municipal Water Department	Provided as part of this RUWMP, see Chapter 10
West Valley Water District	Provided as part of this RUWMP, see Chapter 11
Yucaipa Valley Water District	Provided as part of this RUWMP, see Chapter 12
City of Colton	Provided as part of this RUWMP, see Chapter 13
Fontana Water Company	From 2007 IRWMP
Marygold Mutual Water Company	From 2007 IRWMP
Muscoy Mutual Water Company	From 2007 IRWMP
City of Rialto	From 2007 IRWMP
Terrace Water Company	From 2007 IRWMP
Other/Private	From 2007 IRWMP

Anticipated demands for 2015 to 2035 for SBBA water are described in Table 3-2. Per the terms of the *Western Judgment*, Valley District is obligated to provide replenishment for any extractions from the SBBA by non-plaintiffs (entities in the Valley District service area) when these extractions in aggregate exceed 167,238 AFY.

Table 3-2 estimates Valley District's potential recharge obligation. The recharge obligation is calculated by the Watermaster as a rolling 5-year average of the difference between extractions from the SBBA, less any artificial recharge, less any return flows from imported water, and less any return flows from extractions over the safe yield. Further, if recharge credits as calculated by the Watermaster are greater than the potential recharge obligation it would not be necessary for Valley District to undertake additional recharge. The potential recharge obligation has been calculated here to provide a planning level estimate of potential demands for imported water.

TABLE 3-2
EXTRACTIONS FROM SBBA 2015 TO 2035 (AF)

	2015	2020	2025	2030	2035
East Valley Water District	22,925	24,721	29,235	33,814	38,461
City of Loma Linda	6,780	6,384	6,780	7,202	7,649
City of Redlands	29,952	32,782	36,660	38,724	39,598
City of San Bernardino	50,233	52,671	54,730	56,866	59,082
West Valley Water District	17,500	20,500	25,500	28,500	30,500
Yucaipa Valley Water District	0	0	0	0	0
City of Colton	8,070	8,070	8,070	8,070	8,070
Fontana Water Company	18,000	18,000	18,000	18,000	18,000
Marygold Mutual Water Company	1,500	1,500	1,500	1,500	1,500
Muscoy Mutual Water Company	2,100	2,100	2,100	2,100	2,100
City of Rialto	9,900	9,900	9,900	9,900	9,900
Terrace Water Company	900	900	900	900	900
Other/Private	28,000	27,700	27,400	27,100	27,100
Total Estimated Demands by Non-Plaintiffs	*195,860*	*205,227*	*220,775*	*232,675*	*242,860*
Return flow credits for over extraction	*10,304*	*13,676*	*19,273*	*23,557*	*27,224*
Return flow credits for imported water deliveries[(a)]	*22,162*	*22,162*	*22,162*	*22,162*	*22,162*
Potential Recharge Obligation/Credit	(3,844)	2,151	12,102	19,718	26,236

Notes:
(a) Assumes average long-term deliveries of SWP are 61,560 AFY.
(b) Recharge obligation to be met with SWP water.

3.2 Demands for Imported Water

In addition to recharge operations undertaken by Valley District, imported water is also used to make direct deliveries to several retail water producers and used in-lieu of releases from Big Bear Lake.

3.2.1 Demands for Direct Deliveries

Several retail water producers take direct deliveries of imported water for use at their water treatment plants. In the case of the City of San Bernardino, imported water is recharged to groundwater and immediately extracted using downstream wells. This operation is considered to be like a “treatment plant”. Table 3-3 provides information on estimates of demands for direct deliveries of imported water.

3.2.2 Other Obligations for Imported Water

Bear Valley Mutual Water Company (Mutual) constructed the original Bear Valley Dam in 1884 to create Big Bear Lake as a storage reservoir for their customers, downstream farmers. In 1964 the residents of Big Bear Lake formed the Big Bear Municipal Water District (District) in an effort to eliminate Lake releases to Mutual so that the lake would remain high for recreational use and tourism. After more than a decade of litigation, a Judgment was executed in 1977 which reduced the amount of Lake releases to Mutual. Under the terms of this Judgment, the District purchased from Mutual the Lake bottom, Bear Valley Dam and the right to utilize and manage the surface of Big Bear Lake for recreation and wildlife. In return, deliveries to Mutual

were capped at 65,000 AF in any ten year period. In addition, these deliveries can be made in the form of Lake releases or can be provided from other sources "in-lieu" of Lake releases. In-lieu deliveries to Mutual are preferable to the District since they do not result in water being removed from the lake.

TABLE 3-3
DEMANDS FOR DIRECT DELIVERIES OF IMPORTED WATER 2015 TO 2035 (AF)

	2015	2020	2025	2030	2035
East Valley Water District[(a)]	8,960	8,960	8,960	8,960	8,960
City of Redlands[(a)]	1,130	2,420	3,710	5,000	5,000
City of San Bernardino[(a)]	2,000	2,000	2,000	2,000	2,000
West Valley Water District[(a)]	7,000	7,000	7,000	7,000	7,000
Yucaipa Valley Water District[(a)]	7,927	8,284	8,713	8,975	9,369
Fontana Water Company[(b)]	5,000	5,000	5,000	5,000	5,000
Crestline- Lake Arrowhead Water Company[(b)]	100	100	100	100	100
Demands for Direct Deliveries	*32,117*	*33,764*	*35,483*	*37,035*	*37,429*

Notes:
(a) Demands provided as part of this RUWMP
(b) Demands provided as part of 2007 IRWMP

Over the years, the District has implemented several in lieu management strategies to maintain the level of the Lake. In 1996, the District entered into a water purchase agreement with Valley District. For an annual payment to Valley District, this agreement provides that when the Lake is at specified levels, no water will be released from the Lake to meet the downstream water needs. Instead, Valley District provides Mutual with in-lieu water from the SWP or any other available sources authorized under the Judgment. This historic agreement helped the District achieve its mission of Lake stabilization while providing Mutual with the water it needs for its customers. Under the terms of the Agreement, Mutual may request any amount of delivery for the year provided that the total of all their requested deliveries do not exceed 65,000 AF in any ten year period. Mutual's typical request each year has been the ten year average, or 6,500 AFY.

The Judgment directed the in-lieu water program be monitored through a series of accounts that are managed by the Big Bear Watermaster Committee. The three-member committee consists of one representative from each of the three member agencies: Big Bear Municipal Water District, Bear Valley Mutual Water Company and San Bernardino Valley Water Conservation District. This is a committee whose sole responsibility is to monitor the "physical solution" set forth in the Judgment. The basic premise behind the physical solution is the comparison of the District's actual Lake management versus Mutual's historic management. The District is then responsible for making up any net groundwater deficiency in the San Bernardino basin which may occur as a result of maintaining a higher Lake level than would have occurred under Mutual's historic operations. The amount of the deficiency or surplus is maintained in the basin make-up water account (commonly referred to as "basin compensation account"). A number of other accounting mechanisms are in place to calculate totals for Lake releases, inflow, spills, evaporation, wastewater export and other related data. An annual Watermaster report is prepared documenting the annual accounting procedures.

3.2.3 Total Anticipated Demands on Imported Water

Table 3-4 summarizes potential total demands for imported water during the period of this Plan.

TABLE 3-4
TOTAL DEMANDS IMPORTED WATER 2015 TO 2035 (AF)

	2015	2020	2025	2030	2035
Potential Recharge Obligation	0	2,151	12,102	19,718	26,236
Direct Deliveries	25,117	26,764	28,483	30,035	30,429
Big Bear Municipal Water District/Big Bear Lake	6,500	6,500	6,500	6,500	6,500
Total	**31,617**	**35,415**	**47,085**	**56,253**	**63,165**

3.3 Demands for Imported Water from San Gorgonio Pass Water Agency

Yucaipa Valley Water District, in addition to receiving imported water from Valley District, can also receive imported water from San Gorgonio Pass Water Agency (SGPWA). YVWD has provided the following imported demand projections to San Gorgonio Pass Water Agency (Table 3-5).

TABLE 3-5
DEMANDS FOR IMPORTED WATER FROM SAN GORGONIO PASS WATER AGENCY 2015 TO 2035 (AF)

Wholesale Source	2015	2020	2025	2030	2035
YVWD Purchase from SGPWA	1,765	2,263	2,826	3,589	4,460

3.4 Demands for Other Water Resources

The Rialto-Colton Subbasin, Riverside-Arlington Subbasin (including the Riverside North Basin) Chino Basin, and Yucapia Subbasin are within the Valley District service area and are important supplies for several agencies participating in this plan. The Beaumont and San Timeteo groundwater basins are not within the Valley District service area, but are utilized by YVWD. Table 3-6 provides an estimate of demands for supplies from these basins from the agencies participating in the UWMP.

TABLE 3-6
DEMANDS FOR GROUNDWATER RESOURCES OTHER THAN THE SBBA 2015 TO 2035 (AF)

	2015	2020	2025	2030	2035
East Valley Water District	0	0	0	0	0
City of Loma Linda	0	0	0	0	0
City of Redlands	256	248	265	281	281
City of San Bernardino	0	0	0	0	0
West Valley Water District	6,000	8,900	9,400	9,900	10,900
Yucaipa Valley Water District	6,338	6,338	6,338	6,338	6,338
Total Estimated Demands	**12,594**	**15,486**	**16,003**	**16,519**	**17,519**

3.5 Total Demands

Table 3-7 presents an estimate of total demands for agencies participating in this RUWMP.

TABLE 3-7
ESTIMATE OF TOTAL DEMANDS ALL AGENCIES OF THE RUWMP 2015 TO 2035 (AF)

	2015	2020	2025	2030	2035
Demands	240,071	256,129	283,863	305,447	323,544

3.6 Weather and Conservation Effects on Water Usage

Two major factors that affect water usage are weather and water conservation. Historically when the weather is hot and dry, water usage increases. The increases vary according to the number of consecutive years of hot, dry weather and the conservation activities imposed. During cool-wet years, historical water usage has decreased to reflect less water usage for external landscaping. Past studies have indicated that demands increase 6 to 12 percent during dry periods. For this analysis it is estimated that demands will increase ten (10) percent during dry periods.

In recent years, water conservation has become an increasingly important factor in water supply planning in California. Since 2005 there have been a number of regulatory changes related to conservation including new standards for plumbing fixtures, a new landscape ordinance, a state universal retrofit ordinance, metering and billing requirements, new Green Building standards, demand reduction goals and more. SBX7-7 requires a 20% reduction in urban per capital water use in California by December 31, 2020 (“20 by 2020”). The bill requires each urban retail water supplier to determine their “base daily per capita water use” and report it in their 2010 UWMP, develop an urban water use target for year 2020, and set an interim urban water use target. The individual agency chapters (Chapters 7 through 13) provide information on compliance with SBX7-7 for the retail agencies participating in this plan. For the purposes of estimating SBBA demands and imported water demands, it has been assumed that retail agencies will comply with SBX7-7.

Chapter 4: Comparison of Regional Supplies and Demands

The Act requires urban water suppliers to assess water supply reliability by comparing total projected water use with the projected water supply over the next twenty years or beyond in five year increments. The Act also requires an assessment for a single-dry year and multiple- dry year period.

This section compares available supplies for regional water supplies to demands for these sources. A discussion of the supplies and demands by retail agency are described in Chapters 7 to 13.

4.1 Normal/Average Water Year

Table 2-8 provides information on regional water supplies during a normal year. Table 3-7 provides information on total demands by the participants in this UWMP. Table 4-1, below, provides a comparison of regional water supplies and demands for these sources. Table 4-1 demonstrates that adequate regional supplies are anticipated for years 2015 to 2035 under normal/average conditions.

TABLE 4-1
PROJECTED NORMAL/AVERAGE WATER YEAR SUPPLIES AND DEMANDS (AF)

	2015	2020	2025	2030	2035
Normal Year Supplies (from Table 2-8)[(a)]	357,885	365,885	371,485	375,785	379,385
Total Demands (from Table 3-7)[(a)]	240,071	256,129	283,863	305,447	323,544
Surplus/Deficit in Normal Year	117,814	109,756	87,622	70,338	55,841
Difference as % of Supply	33%	30%	24%	19%	15%
Difference as % of Demand	49%	43%	31%	23%	17%

Note:
(a) Does not include supplies or demands for imported water to be supplied by San Gorgonio Pass Water Agency to YVWD. Does not include recycled water supplies or recycled water demand.

4.2 Single-Dry Year

The single-dry year is generally the lowest annual runoff for a water source in the record. The single-dry year may differ for various sources. This section summarizes regional water supplies available to meet demands over the 25-year planning period during a single-dry year and compares them to demands for the same period. In Table 4-2, below, total demands are conservatively assumed to be 10 percent greater in a single-dry year than during a normal year. The increase in demand is reflected in the demands for groundwater. Table 4-2 anticipates adequate regional water supplies for years 2015 to 2035 under single-dry year conditions. However, in later years the excess supply is small.

TABLE 4-2
PROJECTED SINGLE-DRY YEAR SUPPLIES AND DEMANDS (AF)

	2015	2020	2025	2030	2035
Single-Dry Year Supplies (from Table 2-9)[a]	343,310	351,710	359,410	364,210	368,110
Total Demands (from Table 3-7)[a],[b]	260,916	278,200	307,541	330,367	349,582
Surplus/Deficit in Single-Dry Year	82,394	73,510	51,869	33,843	18,528
Difference as % of Supply	24%	21%	14%	9%	5%
Difference as % of Demand	32%	26%	17%	10%	5%

Notes:
(a) Does not include supplies or demands for imported water to be supplied by San Gorgonio Pass Water Agency to YVWD. Does not include recycled water supplies or recycled water demand.
(b) Assumes 10% increase in demands for groundwater during a dry year.

4.3 Multiple-Dry Years

The multiple-dry year is generally the lowest annual runoff for a three year or more consecutive period. The multiple-dry year period may differ for various sources. This section summarizes regional water supplies available to meet demands over the 25-year planning period during a multiple-dry year period and compares them to demands for the same time frame. In Table 4-3 demands are conservatively assumed to be 10 percent greater in a multiple-dry year than during an average year. The increase in demand is reflected in the demands for groundwater. Table 4-3 anticipates adequate regional supplies for years 2015 to 2035 under multiple-dry year conditions.

TABLE 4-3
PROJECTED MULTIPLE-DRY YEAR SUPPLIES AND DEMANDS (AF)

	2015	2020	2025	2030	2035
Multiple-Dry Year Supplies (from Table 2-10)[a]	344,234	352,460	360,160	364,960	368,860
Total Demands (from Table 3-7)[a],[b]	260,916	278,200	307,541	330,367	349,582
Surplus/Deficit in Multiple-Dry Year	83,318	74,260	52,619	34,593	19,278
Difference as % of Supply	24%	21%	15%	9%	5%
Difference as % of Demand	32%	27%	17%	10%	6%

Notes:
(a) Does not include supplies or demands for imported water to be supplied by San Gorgonio Pass Water Agency to YVWD. Does not include recycled water supplies or recycled water demand.
(b) Assumes 10% increase in demands for groundwater during a dry year.

Chapter 5: Regional Water Shortage Contingency Planning

5.1 Overview

Water supplies may be interrupted or reduced significantly through drought, natural disaster such as earthquake, a regional power outage, or a toxic spill that prevents delivery due to poor water quality. This chapter describes regional planning for such emergencies. Specific water shortage contingency planning for each agency is discussed in Chapters 7 to 13.

5.2 Coordinated Planning

As part of the 2007 IRWMP, agencies in the region developed a water shortage contingency plan. The water shortage contingency plan provides a framework for implementing specific measures to deal with water shortages during emergencies. A water shortage contingency plan has been drafted for the region and should be adopted and implemented during severe water shortages. The plan provides specific actions that should be taken to ensure critical water needs of the region are met during a period in which water supplies are cut by 50 percent. A copy of the plan is presented in Appendix G.

Furthermore, nearly all of the retailers in the San Bernardino Valley participate in the Emergency Response Network of the Inland Empire (ERNIE). ERNIE is water/wastewater mutual aid network within San Bernardino and Riverside counties. ERNIE meets monthly and provides regular training for utilities in emergency response and long-term emergency planning.

5.3 Actions to Prepare for Catastrophic Interruption

This section addresses vulnerability of the region's water supply system to catastrophic events that may interrupt the water deliveries in the Region. Given the presence of the San Andreas Fault, San Jacinto Fault and many other faults, a large magnitude earthquake is generally considered the most likely and "worst case" natural disaster for the region. The other possible catastrophic interruptions such as regional power failure, terrorist attack, or other man-made or natural catastrophic event would cause similar conditions but would likely not be as severe. For purposes of this report, a major earthquake is defined as an earthquake on the San Andreas Fault (SAF) on the order of 8.0.

The San Bernardino Valley is a seismically active area of Southern California. Four major fault zones are found in the region, including the San Jacinto Fault, the Chino-Corona segment of the Elsinore Fault, the Cucamonga Fault, and the SAF. Numerous other minor faults associated with these larger fault structures may also present substantial hazards. In Southern California, the SAF runs along the southern base of the San Bernardino Mountains, crosses through Cajon Pass, and continues northwest along the northern base of the San Gabriel Mountains. Historical records indicate that massive earthquakes have occurred in the central section of the SAF in 1857 and in the northern section in 1906 (the San Francisco Earthquake). In 1857, an estimated magnitude 8+ earthquake occurred on the San Andreas Fault rupturing the ground for 200 to 275 miles, from near Cholame to Cajon Pass and possibly as far south as San Gorgonio Pass. The recurrence interval for a magnitude 8 earthquake along the total length of the fault is

estimated to be between 50 and 200 years. It has been 147 years since the 1857 rupture. A study completed by Yuri Fialko (2005) suggests that the SAF in Southern California has been stressed to a level sufficient for an earthquake of magnitude 7.0 or greater. These findings have been developed from a search of literature reporting the impacts of major earthquakes and limited work by water purveyors.

- **Reliability of Groundwater Wells**
  Review of post-earthquake lifeline performance reports reveals little discussion of groundwater well failure. However, loss of commercial power, damage to electrical equipment and above ground appurtenances, or damage to the distribution system may effectively put wells out of service. Liquefaction, especially in areas where there is high groundwater levels between depths of 5 to 50 feet, may cause ground settlement and interfere with continued well operation. No discussion of the performance of wellhead treatment systems during earthquakes was found. This may be due to the limited amount of well head treatment in place during prior earthquakes. As wellhead treatment typically includes purchased equipment installed in a field location, there is significant opportunity for lapses in the seismic design.

  The groundwater basin and the groundwater production wells are a reliable part of the water supply system for the San Bernardino area.

- **Reliability of Pipelines**
  Pipelines are generally the most fragile part of a water system. Generally, damage is a function of displacement rather than shaking. Empirical algorithms have been developed to predict seismic reliability of pipelines.

- **Reliability of Pump Stations**
  Past earthquakes indicate that the structural and mechanical elements of a pump station are highly resistant to earthquake damage. The most likely failures are to the electrical equipment and loss of commercial power. Most pump stations are either equipped with an automatic transfer switch to enable connection to a permanent standby generator or have an electrical outlet for connection to a mobile generator.

- **Reliability of Surface Water Treatment Facilities**
  The major elements of a surface water treatment system are typically concrete structures that are very resistant to damage. However, these facilities include a large variety of mechanical equipment, much of it long and lightweight and subject to damage not only from the direct force of an earthquake, but also from the wave action created by the earthquake. Similar to a pump station, power supply and electrical equipment are fragile. However, pump stations also are constructed with provisions for stand by power, either permanent or temporary.

- **Reliability of the State Water Project**
  While little specific information was found on anticipated damage to the SWP, the high susceptibility of the Santa Ana Valley Pipeline (California Aqueduct) is recognized. The California Division of Mines and Geology has stated that two of the aqueduct systems that import water to southern California (including the California Aqueduct) could be ruptured by displacement on the San Andreas Fault. The Santa Ana Valley Pipeline

crosses the San Andreas Fault at the Devil Canyon Powerplant. In the vicinity where the Pipeline crosses the fault, a "weak point" was intentionally designed to fail. So, the Pipeline will likely be out of service for at least the amount of time it takes to make repairs in this location. It is generally believed that imported water supplies may not be restored for a three to six week period. Should a major break occur along the California Aqueduct, DWR estimates that it could take approximately four months to repair. One of the SWP's important design engineering features is the ability to isolate parts of the system. The Aqueduct is divided into "pools." Thus, if one reservoir or portion of the California Aqueduct is damaged in some way, other portions of the system can still remain in operation.

- **Length of Outages**
  Length of water service outages vary by earthquake and by purveyor. The Loma Prieta earthquake affected a large number of separate systems. The San Jose Water Company serves most of San Jose and all of Los Gatos. Los Gatos was hard hit and half of the water customers lost water service. In San Francisco, the worst hit area was the Marina District. Both fires and liquefaction affected the district. East Bay Municipal Water District serves 1.1 million customers and suffered $3.7 million in damage. Damage included a break in a 60-inch raw water line. After the Northridge earthquake, the Los Angeles Aqueducts Nos. 1 and 2 were in and out of service for temporary and permanent repairs over several months; these facilities were not critical at that time. Alternate supplies were available and drought conditions limited supply to these aqueducts.

Valley District's Emergency Operations Plan includes estimates for repair of Valley District facilities. Electrical and pipe repairs are estimated to take 35 to 77 days. Pump repairs are estimated to take 168 to 273 days.

The Region should prepare for up to a four month outage.

5.3.1 Existing Strategies

Valley District and the purveyors recognize that water availability through the SWP is intermittent. As a result, Valley District's "Rules for Service" require that all of its customers have a 100 percent backup for any amount of water they order from the SWP.

The primary regional contingency strategy is groundwater storage. During an outage of the statewide system, agencies would rely primarily on local groundwater supplies. One of the primary management strategies in the IRWMP is to store water in wet years so that it is available in dry years. However, any additional stored water would also be available during a water shortage.

A second strategy for addressing water supply during an emergency is system redundancy and interconnections between purveyors. Table 5-1 lists the interties between purveyors in the San Bernardino Valley.

Finally, Valley District has identified alternative conveyance facilities which could be used in the event of a failure of one of Valley District's pipelines. For example, Valley District has an

agreement with Metropolitan Water District of Southern California which could allow the use of the Inland Feeder Pipeline to bypass a large portion of the District's primary delivery pipeline, the Foothill Pipeline.

TABLE 5-1
SYSTEM INTERTIES BETWEEN RETAIL AGENCIES

Agencies	Direction	Capacity (MGD)
City of San Bernardino/East Valley Water District	Either	4
City of San Bernardino/City of Riverside	To San Bernardino	2
City of San Bernardino/West Valley Water District	Either	3
City of San Bernardino/Loma Linda	To Loma Linda	5
City of San Bernardino/Colton	To Colton	3
City of San Bernardino/Rialto	Either	3.6
City of San Bernardino/Riverside Highland Water Company	To Riverside Highland Water Company	3
Fontana/Cucamonga Valley	Either	3.6
West Valley Water District/Fontana	Either	
West Valley Water District/Rialto	Either	
West Valley Water District/Colton	To Colton	
City of Redlands/City of Loma Linda	To Loma Linda	1

Source: 2007 IRWMP

All of the retail agencies that are included in this RUWMP are also members of the BTAC. The BTAC works together on an annual basis to review water supplies and evaluate how to prioritize and distribute any shortage of SWP supplies. During a shortage, it is anticipated that the first priority for any SWP water would be direct deliveries.

5.3.2 Strategies to Improve Regional Preparedness

Valley District is planning to implement seismic improvements for high priority facilities, including the Foothill Pipeline, Santa Ana River Connector, Morton Canyon Connector, and Greenspot pipeline. In addition, the following proposed facilities would create additional system redundancy once constructed:

- Central Feeder Pipeline. The Central Feeder Pipeline System parallels the Foothill Pipeline and could allow groundwater to be delivered to customers along the East Branch Extension of the State Aqueduct if the Foothill Pipeline was not available to deliver SWP water.
- 9th Street Feeder. This project would provide an interconnection between East Valley Water District and the Valley District's Baseline Feeder Extension South Pipeline.

Valley District is also developing a storage program to help meet direct delivery demands during a shortage on the SWP. The current storage program includes the DWR Carryover Storage Program, the Yuba Accord and the DWR Dry Year Water Transfer Program. Valley District is also evaluating "upstream" groundwater banks located along the California Aqueduct as well as Big Bear Lake.

The IRWMP also includes the following proposed reservoirs that could provide some additional emergency storage:

- San Bernardino Reservoir
- Citrus Reservoir (Mentone Reservoir)
- Sunrise Ranch Emergency Reservoir
- Zanja Emergency Storage
- Redlands Reservoir

Chapter 6

San Bernardino Valley Municipal Water District

Chapter 6: San Bernardino Valley Municipal Water District

6.1 Description of Agency

Valley District was formed in 1954, under the Municipal Water District Act of 1911 (California Water Code Section 71000 et seq.) as a regional agency to plan a long-range water supply for the San Bernardino Valley. It imports water into its service area through participation in the SWP and manages groundwater storage within its boundaries. Its enabling act includes a broad range of powers to provide water, wastewater and stormwater disposal, recreation, and fire protection services. Valley District is a wholesale water agency and does not deliver water directly to retail water customers.

Valley District covers about 325 square miles mainly in southwestern San Bernardino County, about 60 miles east of Los Angeles. It spans the eastern two-thirds of the San Bernardino Valley including the Crafton Hills and a portion of the Yucaipa Valley. The following cities and communities are within its boundary: Bloomington, Colton, East Highland, Fontana, Grand Terrace, Highland, Loma Linda, Mentone, Redlands, Rialto, San Bernardino, and Yucaipa.

Valley District is responsible for long-range water supply management, including importing supplemental water, and is responsible for managing the San Bernardino Basin Area, Colton Basin Area, and Riverside Basin Area per the *Western Judgment*. It also has responsibility for maintaining flows in the Santa Ana River (SAR) at the Riverside Narrows per the *Orange County Judgment*. It fulfills its responsibility in the SAR using treated wastewater and fulfills its responsibilities for managing local groundwater basins by working with the BTAC each year on an annual management plan. For more information, see Chapter 2.

Valley District cooperates in a program to help replenish groundwater basins, using both SWP water and local runoff. It takes delivery of SWP water at the Devil Canyon Power Plant Afterbay, which is located just within the northwestern corner of its boundary. Water can then be conveyed east or west to various treatment plants and spreading grounds. A map illustrating Valley District's service area is shown in Figure 6-1.

In 2000, the Valley District service area had a population of 585,000 of which approximately 583,482 lived in San Bernardino County. The remaining persons lived in Riverside County. At that time, Valley District accounted for about 34 percent of the population of San Bernardino County and less than 0.1 percent of Riverside County. Based on 2010 Census data, the current population in Valley District's service area is estimated to be 657,500. Valley District has prepared an estimate of future population for 2015 to 2035, based on the amount of San Bernardino County served (35%) and the amount of Riverside County served (0.01%). A population growth rate for each county being served by Valley District was defined based on the Southern California Association of Government's (SCAG) projected populations for 2008, 2020, and 2035 contained in the 2012 Integrated Growth Forecast. Population projections are shown in Table 6-1.

TABLE 6-1
POPULATION – CURRENT AND PROJECTED

	2010	2015	2020	2025	2030	2035
Valley District	657,500	717,785	783,598	832,578	884,620	939,915
San Bernardino County	1,986,635	2,168,586	2,367,202	2,514,842	2,671,690	2,838,320
Riverside County	2,036,304	2,337,266	2,682,710	2,908,481	3,153,252	3,418,623

Source: 2010 Data from American Community Survey, projections based on SCAG 2012 Integrated Growth Forecast.

6.2 Climate

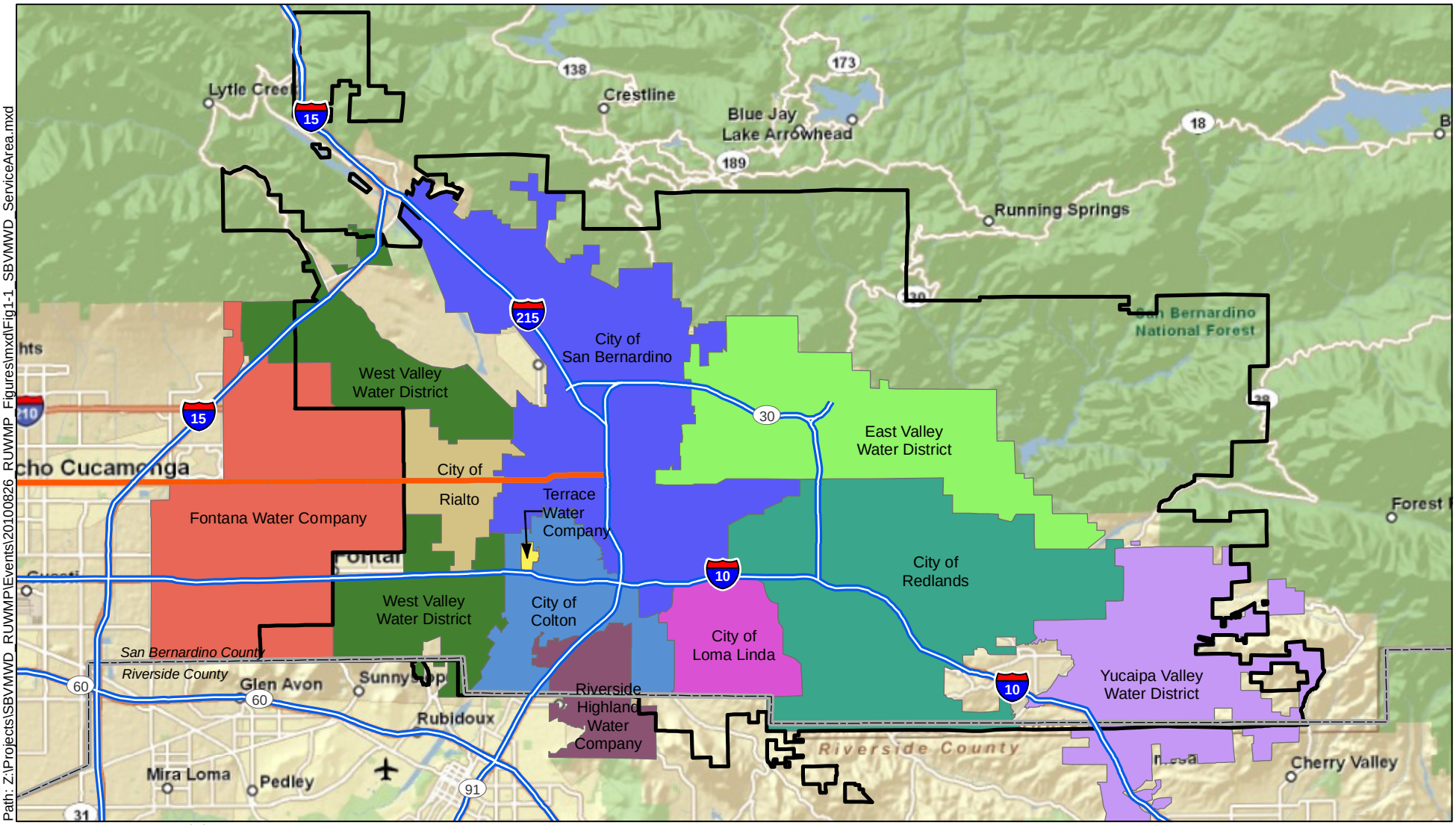
The climate within Valley District's service area is characterized by warm, dry summers and mild winters with moderate amounts of rainfall. Mean annual temperatures average 64.1°F, with summer high temperatures (June through September) in the low 80s and winter lows in the upper 30s. The average annual maximum monthly temperature is 79.9° F, based on weather data readings from San Bernardino Weather Station No. 047723 (latitude: 34:08:00, longitude: 117:15:00). The average annual precipitation recorded is 16.1 inches. Most of the precipitation occurs during the months of December through March. Table 6-2 presents average climate data for the service area, including temperature, rainfall and reference evapotranspiration (ETo).

TABLE 6-2
CLIMATE

	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo (inches)[a]	2.49	2.91	4.16	5.27	5.94	6.56
Average Rainfall (inches)[b]	3.22	3.25	2.86	1.29	0.47	0.09
Average Temperature (ºF)	52.4	54.5	56.7	61.0	65.5	71.5

	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average ETo	7.22	6.92	5.35	4.05	2.94	2.56	56.37
Average Rainfall (inches)	0.04	0.15	0.33	0.71	1.32	2.38	16.10
Average Temperature (ºF)	77.7	77.8	74.0	66.4	58.5	53.2	63.9

Notes:
(a) Evapotranspiration (ETo) data were obtained from the U.C. Riverside Station as provided on the California Irrigation Management Information System (CIMIS) website at http://wwwcimis.water.ca.gov, as of 17 December 2010.
(b) Rainfall and temperature data were obtained from the "San Bernardino 047723" station, as provided on the National Weather Service Western Regional Climate Center website at http://www.wrcc.dri.edu for the period of record 1 January 1893 to 22 October 2010.



Source: Basemap Copyright:© 2009 ESRI, AND, TANA, ESRI Japan, UNEP-WCMC.
Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

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Legend

San Bernardino Valley Municipal Water District

N

0 4

Scale: Miles

Kennedy/Jenks Consultants

San Bernardino Valley Municipal Water District
Regional Urban Water Management Plan
San Bernardino, California

San Bernardino Valley Municipal Water District Service Area Including Retailer Service Areas

K/J 1089014*00

Figure 6-1

6.3 Demand Management Measures

In recent years, water conservation has become an increasingly important factor in water supply planning in California. DMMs are programs and activities through which a water supplier can communicate with their customers and encourage, regulate or incentivize water conservation. The Urban Water Management Planning Act identities fourteen (14) DMMs that are to be evaluated in each UWMP. Within this document DMMs and BMPs are used interchangeably. The UWMP Act requires different information for DMMs that have been implemented or are scheduled for implementation and DMMs not implemented or not scheduled for implementation.

As part of the IRWMP and UWMP process, agencies in the San Bernardino Valley area have formed a group to study and address conservation needs in the San Bernardino Valley. The first step in this process was identifying the costs and benefits of various demand management measures. Special attention was given to those demand management measures that are not cost effective for an individual agency, but which could be cost effective if implemented on as part of a regional collaboration. The second step in the process was to identify the water conservation target, which was done as part of this UWMP. At the conclusion of Steps 1 and 2, the agencies participating in this UWMP met to coordinate regional implementation of selected conservation actions. The group intends to engage a Regional Conservation Coordinator. In addition to the programs listed above, the Regional Conservation Coordinator would lead public outreach programs and school education programs. The UWMP agencies, along with the Regional Conservation Coordinator will evaluate existing agency resources available to assist with conservation programs and then select conservation programs and processes to be implemented at the regional level. The UWMP agencies will utilize the Regional Conservation Coordinator to track conservation actions, conservation successes, and estimate water savings. The group anticipates having a regional water conservation strategy developed by the end of 2011 and start implementation in 2012. Valley District has played the primary role in coordinating the IRWMP and UWMP processes and is coordinating the ongoing work of the agencies to implement additional conservation.

The following is a summary and description of Valley District's status in implementing the requirements of the revised CUWCC MOU.

6.3.1.1 Information Required for DMMs Implemented or Scheduled for Implementation

For those DMMs being implemented or scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(f):

- Description of the DMM
- A description of the steps necessary to implement the measure
- An implementation schedule
- Estimate, if available, of conservation savings and the effect of the savings on the suppliers' ability to further reduce demand.

Methods to evaluate DMM effectiveness and estimates of potential conservation savings are detailed in Appendix F.

6.3.1.2 Information Required for DMMs Not Implemented or Scheduled for Implementation

For those DMMs not implemented or not scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(g):

- Economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors
- A cost-benefit analysis, identifying total benefits and total costs
- A description of funding available to implement any planned water supply project that would provide water at a higher unit cost
- A description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation

6.3.2 DMMs Currently Being Implemented or Scheduled for Implementation

This section describes DMMs currently being implemented or scheduled for implementation by Valley District.

6.3.2.1 Conservation Coordinator

Valley District is in compliance with this DMM. A part-time coordinator has been assigned to manage water conservation efforts. The position is filled by the Manager of Engineering and Planning. In addition, Valley District utilizes consultants to manage water conservation activities. Valley Soil assists with their Weather Based Irrigation Controller Program (WBIC) and the Inland Empire Resource Conservation District provides public education programs.

6.3.2.2 Water Waste Prevention

To be in compliance with this DMM, a water agency must do one or more of the following:

- Enact and enforce an ordinance or establish terms of service that prohibit water waste (single pass cooling, vehicle washing, commercial laundry systems and decorative fountains).
- Enact and enforce an ordinance or establish terms of service for water efficient design in new development (irrigation and landscape design).
- Support legislation or regulations that prohibit water waste.
- Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures.
- Support local ordinances that prohibit water waste.
- Support local ordinances that establish permits requirements for water efficient design in new development.

Valley District is in compliance with this DMM. Valley District is not a retail agency but does support water waste prohibition and water conservation. The District is actively involved in supporting its retailers through a variety of programs including: school education programs to four of its retail agencies: WVWD, EVWD, Redlands, and San Bernardino; allocating funding (over $430,000) towards WBIC incentives; and as the primary contributor ($500,000) to the Proposed San Bernardino Valley Water Conservation Demonstration Garden at California State University, San Bernardino.

In addition, Valley District started and has taken a leadership role in developing the Inland Empire Garden Friendly Program. This program seeks to save water by helping consumers implement "climate appropriate" plants and the installation of drip irrigation systems. This program has corporate sponsors the largest of which is Home Depot. During the spring of 2011, Home Depot is hosting parking lot sales at eleven (11) different Home Depot locations throughout the Inland Empire. Two of these sales will take place in the Valley District service area. The program generally consists of an educational component and a unique logo that helps consumers easily identify climate appropriate planting materials.

Valley District is also continuing to explore the ways in which it can expand its role in assisting its retailers and developing and administering regional conservation programs that would help them to meet their SBX7-7 conservation goals.

6.3.2.3 Water Loss Control

Implementation of this DMM consists of performing a water loss audit consistent with American Waterworks Association (AWWA) Manual 36 to quantify real and apparent losses. In addition, a water agency must also analyze the components of real and apparent loss, determine the economic value of recovering water loss, and develop a strategy to reduce loss to the extent actions are cost effective.

Valley District is in the process of implementing this DMM. It has no retail customers and its system consists of steel pipe that is welded internally and externally. Properly welded joints do not leak. So, the only likely place the pipeline could leak is at delivery points and these are inspected on a monthly basis and are dry. Valley District plans to perform a water loss audit consistent with AWWA Manual 36 in fiscal year 2011.

6.3.2.4 Public Information Programs

The intent of this DMM is to have customer contact through events, paid and public service advertising, mailers, billings as well as social marketing and other public information programs. To be in full compliance a water agency must have quarterly contact with the public and media, an actively maintained website, and a list of all activities.

Valley District is implementing this DMM. Valley District has provided $500,000 for a demonstration garden at California State University San Bernardino and releases newsletters approximately each quarter. In addition, Valley District will work with its retail agencies to develop a regional information program to ensure compliance with this DMM. Valley District presently works with its member agencies to market its water conservation programs and provide public education at a local level since the member agencies have a relationship with the retail customers. The District also has conservation-related information on its website.

6.3.2.5 School Education Programs

To be in compliance with this DMM, a water agency must have a conservation-related school education program and must provide support and educational materials to local school districts. Valley District is in compliance with this DMM. Valley District funds a consultant to provide school education programs to retail agencies in its service area. Currently, the program has focused on the agencies that have most of Valley District's population: West Valley Water District, East Valley Water District, the City of Redlands, and the City of San Bernardino. However, Valley District is in the process of expanding the outreach to the other retailers in its service area. Table 6-3 provides a summary of the outreach that was performed between 2007 and 2010.

TABLE 6-3
WATER CONSERVATION EDUCATION

Year	Programs Performed	Students Reached
2007	2	50
2008	24	585
2009	46	1,070
2010	14	330
Total	**86**	**2,035**

6.3.2.6 Wholesale Agency Assistance Programs

Compliance includes:

1. Providing cost-effectiveness assessments, including avoided cost per acre-foot, for each DMM the wholesale agency is potentially obligated to support.
2. Providing technical support, incentives, staff or consultant support, and equivalent resources to retail members to support the implementation of DMMs.
3. Offering program management and DMM reporting assistance and documenting the results of the offer.
4. Preparing water shortage allocations plans or policies that encourage and reward investments in long-term conservation.
5. Reporting on non-signatory DMM implementation, when possible.
6. Encouraging CUWCC membership and offer recruitment assistance.

Valley District is in compliance with this DMM. Valley District is actively involved in supporting its retailers through a variety of programs including:

- School education programs to all of its retail agencies.
- WBIC incentives: Valley District has allocated $430,000 in financial assistance.
- San Bernardino Valley Water Conservation Demonstration garden at California State University, San Bernardino ($500,000).

- Participation in the Inland Empire Garden Friendly promotion whereby water agencies and nurseries (including Home Depot) offer promotions on climate appropriate plants and make it easier for consumers to identify these plants.
- Participation in the Inland Empire Waterwise Landscaping Contest. Through this contest homeowners in the Valley District service area compete for cash and other prizes based on the quality of their climate appropriate landscaping. This contest essentially results in water conservation demonstration gardens in our neighborhoods.

Valley District because it is a wholesale agency, is not directly implementing water survey programs for single-family residential and multifamily residential customers, residential plumbing retrofits, metering with commodity rates, large landscape conservation programs, high efficiency washing machine rebate programs, or CII programs. Rather Valley District supports their retail agencies with their conservation programs. Valley District is currently exploring further expanding its role in assisting its retailers and developing and administering additional regional conservation programs that would help them meet their SBX7-7 goals.

6.4 Water Shortage Contingency Plan

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, a fire or earthquake which damage delivery or storage facilities, chemical spill, or a regional power outage. Section 5 of this UWMP describes water shortage contingency planning for regional water supply sources.

6.5 Supply and Demand Comparisons

The UWMP Act requires urban water suppliers assess water supply reliability by comparing total projected water use with the expected water supply over the next 20 years in 5-year increments. The Act also requires an assessment of single-dry year and multiple-dry years. These comparisons for the Valley District are presented in Chapter 4 of this UWMP.

Chapter 7

East Valley Water District

Chapter 7: East Valley Water District

7.1 Description of Agency

EVWD is a Special District, formed in 1954 through an election by local residents who wanted water service by a public water agency. Originally called the East San Bernardino County Water District, the name was changed to East Valley Water District in 1982. The District was originally formed to provide domestic water service to the then unincorporated and agriculturally-based communities of Highland and East Highland in southwestern San Bernardino County. Over the years, some of the EVWD's service area was annexed to the City of San Bernardino, but water service remained with the District, primarily due to logistics and cost. In 1987, the City of Highland incorporated. Now, EVWD's previously agriculturally dominated area is urbanized, and few orange groves remain.

EVWD's current service area encompasses approximately 17,750 acres, or 27.7 square miles, which includes all of the City of Highland and a portion of the City of San Bernardino, as well as some currently unincorporated areas within San Bernardino County. Figure 7-1 shows the EVWD service area.

EVWD's water supply consists primarily of groundwater from 20 wells in the western portion of the service area. These wells, in the SBBA, supply approximately 90 percent of the total water supply. In addition to groundwater, Plant 134, a 4.0 MGD water treatment plant, provides surface water from the Santa Ana River and the SWP.

EVWD has a current service population of approximately 63,000 persons. EVWD has prepared an estimate of future population for 2015 to 2035. A population growth rate for each jurisdiction being served by EVWD was defined based on the SCAG projected populations for 2008, 2020, and 2035 contained in the 2012 Integrated Growth Forecast. The percentage of the service area included in each jurisdiction was determined using geographic information system (GIS) data. As shown in Table 7-1, the projections for the various jurisdictions in the water service area (City of Highland, City of San Bernardino, unincorporated County), were weighted by the percentage of each area within the water service area to derive an overall growth rate. In addition to this growth rate, EVWD considered the development potential of an area known as Sunrise Ranch. Sunrise Ranch is one of the most significant areas of potential development within the District's service area. This area is located east of Greenspot Road in the eastern most portion of the EVWD service area and consists of approximately 1,900 acres of land that is zoned as a planned development. For the purposes of these projections, it has been assumed that Sunrise Ranch could be developed at a density of 5 single-family units per acre. It is assumed that Sunrise Ranch will result in new population starting in 2020 and be fully built-out by 2035. Population projections are shown in Table 7-2.

TABLE 7-1
POPULATION IN PROJECTIONS FOR JURISDICTIONS IN EAST VALLEY WATER DISTRICT

	2008	2020	2035	Growth Rate 2008-2020	Growth Rate 2021-2035	% Service Area	Data Source
Highland	52,274	61,024	70,923	0.013	0.010	49	SCAG *Integrated Growth Forecast for 2012*
San Bernardino	204,366	230,795	261,041	0.010	0.008	23	
Unincorporated	294,252	306,437	377,494	0.003	0.014	28	

TABLE 7-2
POPULATION - CURRENT AND PROJECTED

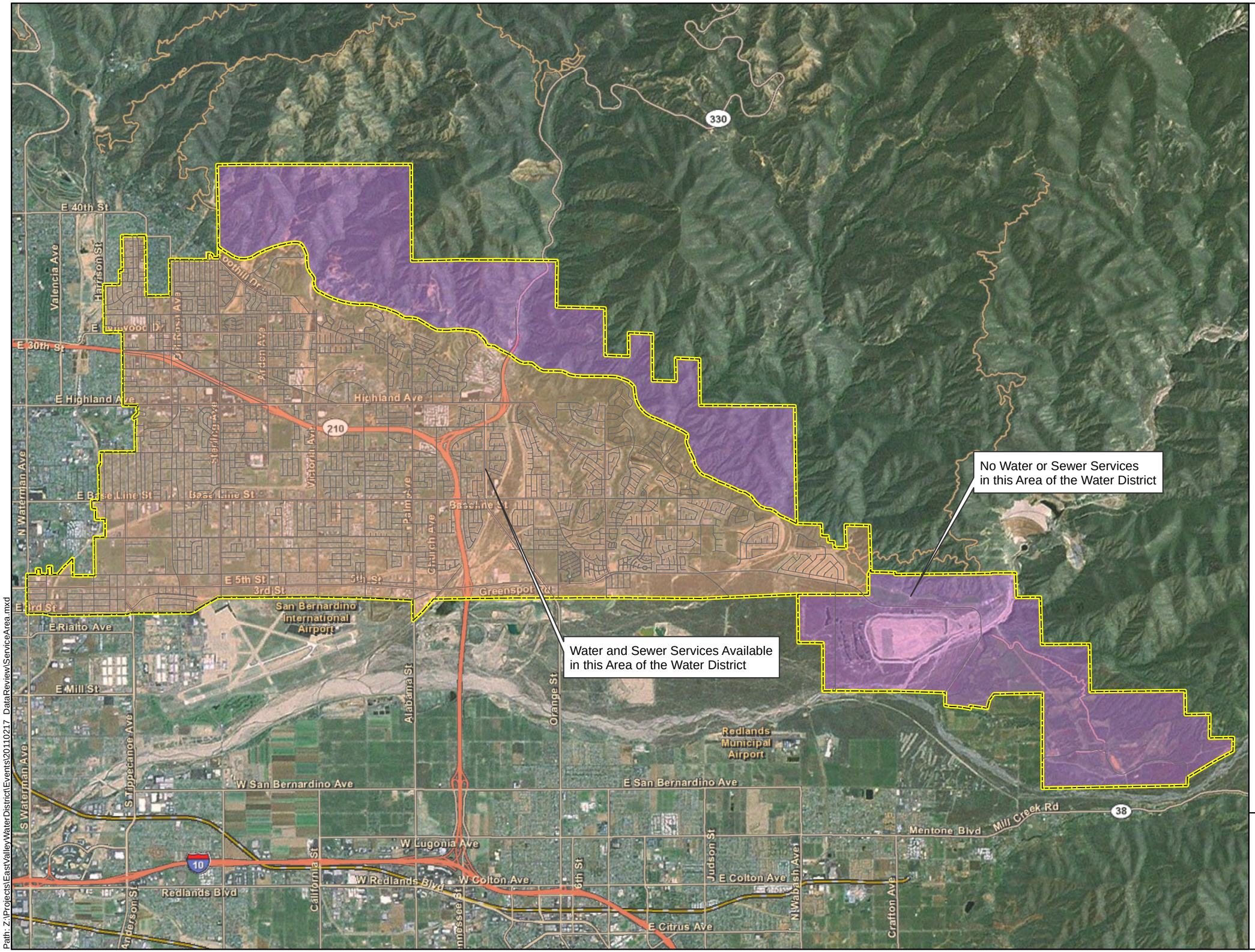
	2010	2015	2020	2025	2030	2035	Data Source
Service area population	63,055	66,157	80,212	106,218	121,666	137,369	Estimated from SCAG

Note: Assumes SCAG Integrated Forecast population growth rate, plus an additional 10,800 persons in year 2020 from the Sunrise Ranch development, an additional 21,600 persons in year 2025 from the Sunrise Ranch development, an additional 32,400 persons by year 2030, and 43,200 persons thereafter.

San Bernardino County, including that portion within the EVWD service area, has experienced many years of steady population growth. Since 2008, the EVWD service area, like most portions of California, has experienced a dramatic slowing in population growth. However, the EVWD service area still has great growth potential. The EVWD service area includes a mountainous area unlikely to be developed. Of the area conducive to urbanization, it is estimated that 70 percent of this land has been developed. EVWD currently serves water to an area encompassing approximately 6,550 acres; it is estimated that there are an additional 6,000 vacant, but developable acres in the service area (EVWD 2008). Currently served parcels consist predominantly of single family residential land uses (73 percent), several areas of significant commercial land use (10 percent) and the remaining 17 percent in other types of land uses. Undeveloped parcels consist primarily of single family residential parcels with one third acre or larger lot sizes (63 percent), smaller lot single family residential (17 percent), commercial (7 percent), multi-family residential (4 percent), with the remaining 9 percent in other types of land uses.

7.2 Climate

EVWD is located on the eastern side of the San Bernardino Valley and within the South Coast Hydrologic Region. The climate is a modified Mediterranean type, with hot, dry summers and cool, rainy winters. Average monthly temperature and rainfall recorded by the Western Regional Climate Center (WRCC) for the San Bernardino Station between 1893 and 2004 are shown in Table 7-3. Temperatures average 64 degrees Fahrenheit, with summer highs in the mid-90s and winter lows in the upper 30s. Table 7-3 also shows the ETo rate for EVWD's service area.



Legend

District Boundary

Service Areas

Served

Not Served

N

0 2,500 5,000 Feet

Kennedy/Jenks Consultants

Regional Urban Water Management Plan
San Bernardino Valley

EAST VALLEY WATER DISTRICT SERVICE AREA AND BOUNDARY

K/J 1089014.00
April 2011

Figure 7-1

Path: Z:\Projects\EastValleyWaterDistrict\Events\20110217_DataReview\ServiceArea.mxd

TABLE 7-3
CLIMATE

	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo	2.17	2.8	4.03	5.1	5.89	6.6
Average Rainfall (inches)	3.22	3.25	2.86	1.29	0.47	0.09
Average Temperature (ºF)	52.3	54.5	56.7	60.9	65.5	71.5

	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average ETo	7.44	6.82	5.7	4.03	2.7	1.86	55.14
Average Rainfall (inches)	0.04	0.15	0.33	0.71	1.32	2.38	16.12
Average Temperature (ºF)	77.7	77.8	74	66.4	58.5	53.2	64.1

Source: Reference Evapotranspiration Rate (in inches/month) for ETo Zone 9, http://www.cimis.water.ca.gov
NOAA webpage – San Bernardino Station Data (1893 - 2004), http://www.wrcc.dri.edu.

7.3 Historical Water Use

7.3.1 Historical Deliveries

EVWD categorizes its water use customers as follows: single family residential, multi-family residential, commercial, landscape, and "others." The few light industrial and governmental/institutional users are included within the commercial category. EVWD's Irrigation/Landscape customers represent approximately two percent of the current metered services and eight (8) percent of the consumptive water use. These customers include parks, large commercial, community and institutional landscape areas, and schools. The land use development trend within the EVWD's service area has historically been from agriculture to residential. In 2000, 86 percent of accounts were residential, growing to 93 percent in 2009. A continuing increase in residential customers is expected. While there are agricultural uses in the EVWD service area, these users do not receive water from EVWD. Actual water deliveries in 2005 and 2009 are provided in Tables 7-4 and 7-5.

TABLE 7-4
WATER DELIVERIES - ACTUAL 2005

	Metered		Not Metered		Total
Water Use Sectors	# of accounts	Volume (AFY)	# of accounts	Volume (AFY)	Volume (AFY)
Single family[a]	20,015	13,172			13,172
Multi-family[a]					
Commercial[b]	1,552	7,441			7,441
Industrial[b]					
Institutional/Governmental[b]					
Landscape	259	1,549			1,549
Agriculture					
Other	1	0			0
Total Deliveries in EVWD Service Area	**21,827**	**22,162**	**0**	**0**	**22,162**

Notes:
(a) In year 2005 Multi-Family residential uses and Single Family residential uses were accounted for together.
(b) EVWD combines Commercial, Industrial, and Institutional/Governmental.

TABLE 7-5
WATER DELIVERIES - ACTUAL 2009[a]

Water use sectors	Metered[c] # of accounts	Metered[c] Volume (AFY)	Not Metered # of accounts	Not Metered Volume (AFY)	Total Volume (AFY)
Single family[b]	20,098	12,771			12,771
Multi-family[b]					
Commercial/Institutional[c]	1,557	6,399			6,399
Industrial[c]					
Institutional/governmental[c]					
Landscape	309	1,923			1,923
Agriculture					
Other	1	0			0
Total Deliveries in EVWD Service Area	**21,965**	**21,093**	**0**	**0**	**21,093**

Notes:
(a) Year 2009 data used for year 2010.
(b) In year 2009 Multi-Family residential uses and Single Family residential uses were accounted for together.
(c) EVWD combines Commercial, Industrial, and Institutional/Governmental

7.3.2 Historic Sales

Historically, EVWD obtained a small portion of water through an exchange with SBMWD. The purpose of the exchange was to get water with low nitrates suitable for blending and treatment at EVWD's Plant 107. In exchange for the water received, EVWD provided two and a half times the amount received back to SBMWD to account for energy difference in cost. Due to operational difficulties with receiving water from SBMWD the exchange was ended, effective October 18, 2007. EVWD's historic water sales are summarized in Table 7-6.

TABLE 7-6
HISTORIC SALES TO OTHER WATER AGENCIES (AF)

Agency	2005	2006	2007	2008	2009	2010
City of San Bernardino	964	2,293	1,581	0	0	0
Total	**964**	**2,293**	**1,581**	**0**	**0**	**0**

7.3.3 Historical Other Water Uses

In the past, EVWD has not had water use related to saline barriers, groundwater recharge operations, or recycled water. However, EVWD, like many water agencies, does have some unaccounted-for water. Unaccounted-for water is the difference between the amount of water produced and the amount of water billed to customers. Over the last five years unaccounted for water has been approximately seven to eight percent of produced water within EVWD's system (system loss was determined by comparing overall production to overall sales for 2004 to 2009). Sources of unaccounted-for water include:

- Hydrant Testing and Flushing - Hydrant testing is performed by both EVWD and the Fire Departments. EVWD and the Fire Departments perform a comprehensive testing program to monitor the level of fire flows available throughout the service area.
- Fire Hydrant Operations by the Fire Department - This represents the use of water for emergencies.
- Customer Meter Inaccuracies - Customer meters represent one of the main sources of unaccounted-for water as they tend to under-represent actual consumption in the water system. EVWD has a replacement program to replace malfunctioning meters and a systematic program to replace meters on a 10-year basis.
- Reservoir overflows - This represents unrecorded water use when reservoirs overflow.
- Leaks from water lines - Leakage from water pipes is a common occurrence in water systems. A significant number of leaks remain undetected over long periods of time as they are very small; however these small leaks contribute to the overall unaccounted-for water.

Table 7-7 summarizes what the California Department of Water Resources refers to as "other" water uses, besides metered deliveries and sales to other agencies.

TABLE 7-7
HISTORIC "OTHER" WATER USES (AF)

Water Use[(a)]	2005	2010[(b)]
Saline Barriers	0	0
Groundwater Recharge	0	0
Conjunctive Use	0	0
Recycled Water	0	0
System Losses	443	1,477
Total	**443**	**1,477**

Notes:
(a) Any water accounted for in Tables 7-4, 7-5, and 7-6 is not included in this table.
(b) Year 2009 data used for year 2010.

7.3.4 Total Historical Water Use

Table 7-8 below presents information on all historic water uses for the years 2005 and 2010.

TABLE 7-8
HISTORIC TOTAL WATER USE (AF)

Water Use[(a)]	2005	2010[(a)]
Total Water Deliveries (from Tables 7-4 and 7-5)	22,162	21,093
Sales to Other Water Agencies (from Table 7-6)	964	
Additional water uses and losses (from Table 7-7)	449	1,477
Total	**23,569**	**22,570**

Note: (a) Year 2009 data used for year 2010.

7.4 Existing and Targeted Per Capita Water Use

The Water Conservation Bill of 2009 (SBX7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Bill of 2009 provides the regulatory framework to support the statewide reduction in urban per capita water use described in the *20 by 2020 Water Conservation Plan*. Consistent with SBX7-7, each water supplier must determine and report its existing baseline water consumption and establish future water use targets in gallons per capita per day (GPCD); reporting is to begin with the 2010 UWMP.

The two primary calculations required by SBX7-7 are:

1. Base Daily Water Use calculation (average GPCD used in past years)
2. Compliance Water Use Target (target GPCD in 2015 and 2020)

The Base Daily Water Use calculation is based on gross water use by an agency in each year and can be based on a ten-year average ending no earlier than 2004 and no later than 2010 or a 15-year average if ten percent of 2008 demand was met by recycled water. Base Daily Water Use must account for all water sent to retail customers, excluding:

- Recycled water
- Water sent to another water agency
- Water that went into storage

It is at an agency's discretion whether or not to exclude agricultural water use from the Base Daily Water Calculation. If agricultural water use is excluded from the Base Daily Water use calculation it must also be excluded from the calculation from actual water use in later Urban Water Management Plans. EVWD does not specifically account for agricultural water use in its service area. Any incidental agricultural water use is included in the Base Daily Waster use Calculation.

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). There are four methods for calculating the Compliance Water Use Target:

1. Eighty percent of the urban water supplier's baseline per capita daily water use
2. Per capita daily water use estimated using the sum of the following:
    a. For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of DWR's 2016 report to the Legislature reviewing progress toward achieving the statewide 20 percent reduction target, this standard may be adjusted by the Legislature by statute.
    b. For landscape irrigated through dedicated or residential meters or connections, water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Section 490 et seq. of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992.

c. For commercial, industrial, and institutional (CII) uses, a ten percent reduction in water use from the baseline CII water use by 2020.

3. Ninety-five percent of the applicable state hydrologic region target as stated in the state's April 30, 2009, draft *20 by 2020 Water Conservation Plan*. EVWD falls within the South Coast Hydrologic Region; the region target is 142 GPCD. The South Coast region encompasses several coastal counties (Ventura, Los Angeles, Orange, and San Diego) and also includes portions of inland areas such as San Bernardino and Riverside. This target is more appropriate for coastal, rather than inland, areas.
4. Reduce the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:
    a. Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "BMP Calculator".
    b. A 20 percent savings on all unmetered uses.
    c. A 10 percent savings on baseline CII use.
    d. A 21.6 percent savings on current landscape and water loss uses.

The Interim Water Use Target is set as a halfway point between the Base Daily Water Use GPCD and the 2020 Compliance Water Use Target GPCD.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95 percent of a 5-year average base gross water use ending no earlier than 2003 and no later than 2010. The Maximum Allowable GPCD use is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBX7-7 legislation. If an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as their target.

7.4.1 Base Daily Per Capita Water Use

Figure 7-1 illustrates both the overall EVWD service area and the portion of the service area currently served. For the purposes of this SBX7-7 calculation, the part of the service area designated as "Area Served" in Figure 7-1 is the distribution area used to estimate the Base Daily Per Capita Water Use. Tables 7-9 through 7-11 summarize the Base Daily Water Use calculation for EVWD. The period 1999 to 2008 has been selected for calculation of the 10-year base period while the period 2004 to 2008 has been selected for calculation of the 5-year base period. The 10-year average Base Daily Per Capita Water Use for EVWD is 342 GPCD; the 5-year is 334 GPCD.

TABLE 7-9
BASE PERIOD RANGES

Base	Parameter	Value
10- to 15- Year Base Period	2008 Total Water Deliveries (AF)	22,052
	2008 Total Volume of Delivered Recycled Water (AF)	0
	2008 Recycled Water as a Percent of Total Deliveries (%)	0
	Allowable Base Period (years)[(a)]	10
	Year Beginning Base Period Range	1999
	Year Ending Base Period Range[(b)]	2008
5-Year Base Period	Year Beginning Base Period Range	2004
	Year ending Base Period Range[(c)]	2008

Notes:
(a) If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first base period is a continuous 10- to 15-year period.
(b) The ending year must be between December 31, 2004 and December 31, 2010.
(c) The ending year must be between December 31, 2007 and December 31, 2010.

TABLE 7-10
BASE DAILY PER CAPITA WATER USE, SELECTED 10-YEAR PERIOD

Sequence Year	Calendar Year	Distribution System Population[(a)]	Daily System Gross Water Use (MGD)	Annual Daily Per Capita Water Use (GPCD)
1	1999	51,061	17	341
2	2000	50,146	18	359
3	2001	47,827	18	377
4	2002	55,452	19	342
5	2003	59,433	19	328
6	2004	61,389	20	330
7	2005	62,496	20	323
8	2006	62,833	21	341
9	2007	65,378	22	333
10	2008	61,855	21	344
Base Daily Per Capita Water Use, 10-Year Average				*342*

Note:
(a) EVWD's service area population estimated using the "Alternative Methodology for Service Area Population" as described in Appendix A of the Methodologies for Calculating Baseline and Compliance per Capita Urban Water Use (DWR 2010).

In order to calculate Base Daily Per Capita Water Use for past years, it was necessary to develop population estimates for past years. EVWD's service area population for the period 1994 to 2009 was estimated using the "Alternative Methodology for Service Area Population" as described in Appendix A of the Methodologies for Calculating Baseline and Compliance per Capita Urban Water Use (DWR 2010). First, the census blocks in the EVWD service area were identified using GIS software. Then, Census 2000 data was used to develop estimates of population residing in single-family structures and population residing in multi-family structures and this was used to estimate population per connection ratios for year 2000. The persons per connection ratios are as follows:

- 3.00 persons per single family household
- 2.42 persons per multi-family household

Persons per connection was then multiplied by connections data for 2001 to 2009 to estimate population in those years.

Table 7-11 provides the data on the Maximum Allowable GPCD. The Maximum Allowable GPCD is based on 95 percent of the 5-year average base gross water use. In this case 95 percent of the 5-year GPCD is 317 GPCD (95% of 334).

TABLE 7-11
BASE DAILY PER CAPITA WATER USE, 5-YEAR

Sequence Year	Calendar Year	Distribution System Population[(a)]	Daily System Gross Water Use (MGD)	Annual Daily Per Capita Water Use (GPCD)
1	2004	61,389	20	330
2	2005	62,496	20	323
3	2006	62,833	21	341
4	2007	65,378	22	333
5	2008	61,855	21	344
Base Daily Per Capita Water Use, 5-Year Average				*334*

Note:
(a) EVWD's service area population estimated using the "Alternative Methodology for Service Area Population" as described in Appendix A of the Methodologies for Calculating Baseline and Compliance per Capita Urban Water Use (DWR 2010)

7.4.2 Compliance Water Use Targets

In addition to calculating base gross water use, SBX7-7 requires that a retail water supplier identify its demand reduction targets. The methodologies for calculating demand reduction targets were described above. EVWD is choosing to meet SBX7-7 targets as an individual agency rather than as part of a regional alliance. EVWD has selected Method 4 to calculate its 2020 Compliance Water Use Target and Interim Water Use Target.

Compliance Water Use Target under Method 4 is Base Daily GPCD less:

- Indoor residential water savings of 15 GPCD or an amount determined by use of DWR's "BMP Calculator"
- 20 percent savings on all unmetered uses
- 10 percent savings on Baseline CII (expressed in GPCD)
- 21.6 percent savings on current landscape and water loss uses (expressed as GPCD)

EVWD is choosing to use the default value of 15 GPCD for the indoor residential water savings. EVWD has no unmetered uses. As shown in Table 7-12, baseline CII water use was estimated using the 10-year average of water sales to CII water uses in the EVWD service area for the years 1999 to 2008 (the same period as was used to calculate the Base Daily Per Capita Water Use). Baseline CII water use is 74 GPCD.

DWR has provided the following formula for calculating landscape and water loss uses:

= Base Daily Per Capita Water Use - Default Indoor Water Use (70 GPCD) - Baseline CII

Based on this formula, EVWD's landscape and water loss use is:

= 342 GPCD - 70 GPCD - 74 GPCD = 198 GPCD

TABLE 7-12
BASELINE COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL WATER USE

Sequence Year	Calendar Year	Distribution System Population[(a)]	CII Water Use (MG)[(b)]	Annual Daily Per Capita Water Use (GPCD)
1	1999	51,061	782	42
2	2000	50,146	698	38
3	2001	47,827	698	40
4	2002	55,452	1,354	67
5	2003	59,433	1,934	89
6	2004	61,389	2,086	93
7	2005	62,496	2,424	106
8	2006	62,833	1,855	81
9	2007	65,378	2,172	91
10	2008	61,855	2,172	96
		Baseline CII Water Use (10-year Average)		*74*

Notes:
(a) EVWD's service area population estimated using the "Alternative Methodology for Service Area Population" as described in Appendix A of the Methodologies for Calculating Baseline and Compliance per Capita Urban Water Use (DWR 2010)
(b) Public Water System Statistics for East Valley Water District.

The resulting Compliance Water Use Target is 277 GPCD, the full calculation is demonstrated in Table 7-13. The 2015 Interim Water Use Target is 309 GPCD, the halfway point between current and the 2020 target.

TABLE 7-13
METHOD 4 COMPLIANCE WATER USE TARGET CALCULATION

Baseline GPCD		342
less	indoor residential water savings (GPCD)	-15
less	20 percent unmetered water uses (GPCD)	0
less	10 percent savings on CII water use (GPCD)	-7
less	21.6 percent savings on landscape and water loss uses (GPCD)	-43
	Compliance Water Use Target	*277*
	Interim Water Use Target	*309*

As described earlier, the Maximum Allowable GPCD is 317. The Compliance Water Use Target, under Method 4 (277 GPCD) is less than the Maximum Allowable GPCD, so no adjustments to the Compliance Water Use Target are necessary. In order to meet the water use targets prescribed by SBX7-7, EVWD will have to reduce current water use by approximately 10 percent by 2015 and by approximately 20 percent by 2020. The programs which EVWD intends to use to achieve these conservation goals are described in Section 7.7.3.

7.5 Projected Water Use

7.5.1 EVWD Projections

Based on the SCAG population projections for 2008, 2020, and 2035 contained in their 2012 Integrated Growth Forecast, EVWD derived a population growth rate for each jurisdiction served by EVWD. The percentage of the service area included in each jurisdiction was determined using GIS. As shown in Tables 7-1 and 7-2, the projections for the various jurisdictions in the water service area (City of Highland, City of San Bernardino, unincorporated County), were weighted by the percentage of each area within the water service area to derive an overall growth rate. This growth rate was applied to SCAG's base year (2008) water demands to derive estimates of water demands as shown in Tables 7-14 to 7-16.

TABLE 7-14
WATER DELIVERIES - PROJECTED, 2015

	Metered		Not Metered		Total
Water Use Sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**Volume (AFY)**
Single family	21,325	16,213			16,213
Multi-family					
Commercial/Institutional	1,694	7,322			7,322
Industrial					
Institutional/governmental					
Landscape	293	1,937			1,937
Agriculture					
Other	1	0			0
Total without Conservation	*23,313*	*25,472*	*0*	*0*	*25,472*
Total with Conservation (assumed 10% by year 2015)	*23,313*	*22,925*	*0*	*0*	*22,925*

TABLE 7-15
WATER DELIVERIES - PROJECTED, 2020

Water Use Sectors	Metered # of accounts	Metered Volume (AFY)	Not Metered # of accounts	Not Metered Volume (AFY)	Total Volume (AFY)
Single family	22,374	19,668			19,668
Multi-family					
Commercial/Institutional	1,778	8,882			8,882
Industrial					
Institutional/governmental					
Landscape	307	2,350			2,350
Agriculture					
Other	1	0			0
Total without Conservation	*24,460*	*30,901*	*0*	*0*	*30,901*
Total with Conservation (assumed 20% by year 2020)	*24,460*	*24,721*	*0*	*0*	*24,721*

TABLE 7-16
WATER DELIVERIES - PROJECTED 2025, 2030, AND 2035

Water Use Sectors	2025 Metered # of accounts	2025 Metered Volume (AFY)	2030 Metered # of accounts	2030 Metered Volume (AFY)	2035 Metered # of accounts	2035 Metered Volume (AFY)
Single family	23,603	23,260	24,899	26,903	26,267	30,600
Multi-family						
Commercial/Institutional	1,875	10,504	1,978	12,150	2,087	13,819
Industrial						
Institutional/governmental						
Landscape	324	2,779	342	3,215	361	3,656
Agriculture						
Other	1	0	1	0	1	0
Total without Conservation	*25,803*	*36,544*	*27,221*	*42,267*	*28,716*	*48,076*
Total with Conservation (assumed 20% year 2020 and thereafter)	*25,803*	*29,235*	*27,221*	*33,814*	*28,716*	*38,461*

7.5.2 Projected Sales and Other Water Uses

EVWD does not anticipate any regular or single large sales to other agencies in the future. As in the past, EVWD does not anticipate future water use related to saline barriers, groundwater recharge operations, or recycled water. For the purpose of projections, unaccounted-for water is assumed to be eight percent; this is conservative for planning purposes. EVWD will continue efforts to decrease water loss and thereby reduce gallons per capita per day water use.

TABLE 7-17
FUTURE SALES AND "OTHER" WATER USES (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Sales to Other Agencies	0	0	0	0	0
Saline Barriers	0	0	0	0	0
Groundwater Recharge	0	0	0	0	0
Conjunctive Use	0	0	0	0	0
Recycled Water	0	0	0	0	0
System Losses (8%)	1,834	1,978	2,339	2,705	3,077
Total	1,834	1,978	2,339	2,705	3,077

Note:
(a) Any water accounted for in Tables 7-14, 7-15, and 7-16 is not included in this table.

7.5.3 Total Projected Water Use

Table 7-18 below presents information on all projected water uses for the years 2015 to 2035.

TABLE 7-18
TOTAL PROJECTED WATER USE (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Total Water Deliveries (from Tables 7-14, 7-15, and 7-16)[(a)]	22,925	24,721	29,235	33,814	38,461
Sales to Other Water Agencies (from Table 7-17)	0	0	0	0	0
Additional water uses and losses (from Table 7-17)	1,834	1,978	2,339	2,705	3,077
Total[(a)]	**24,759**	**26,698**	**31,574**	**36,519**	**41,537**

Note:
(a) Assumes conservation.

7.5.4 Water Use Projections for Lower Income Households

Senate Bill 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier. The EVWD contains three jurisdictions, the City of Highland, the City of San Bernardino, and unincorporated County of San Bernardino.

The City of Highland updated its housing element in January 2011. Highland estimates that approximately 40 percent of its households qualify as very-low or low-income. The City of San Bernardino is in the process of updating its housing element; a draft housing element is available for public review. The City estimates that more than half of its households (61 percent) qualify as very low or low-income. The County of San Bernardino updated its housing element in May 2007. The Housing Element provides information on regional housing needs and states goals for new housing to accommodate very-low and low-income households, these households make up approximately 42 percent of all households in the unincorporated county.

Based on the percentages of Highland, San Bernardino, and the unincorporated County that comprise the EVWD service area (see Table 7-1), it is estimated that approximately 45 percent of households in EVWD qualify as very-low or low-income. Using this percentage, Table 7-19 shows an estimate of future low-income water demands. These demands are included within the water demands described in Table 7-18 and assume conservation.

TABLE 7-19
PROJECTIONS OF FUTURE LOW INCOME HOUSING WATER USE (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Estimated Very Low and Low-Income Household Water Use	6,566	7,081	8,374	9,685	11,016

Note:
(a) Assumes 45% all future households in EVWD water service area qualify as "very-low" or "low" income per the definition provided in Senate Bill 1087. Assumes conservation.

Further, EVWD will not deny or put unreasonable conditions for water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households unless one of the following occurs:

- EVWD specifically finds that it does not have sufficient water supply
- EVWD is subject to a compliance order issued by the State Department of Public Health that prohibits new water connections
- the applicant has failed to agree to reasonable terms and conditions relating to the provision of services

The conditions above apply to all applicants and developers.

7.6 Other Factors Affecting Water Usage

Two major factors that affect water usage are weather and water conservation. Historically, when the weather is hot and dry, water use increases. The amount of increase varies according to the number of consecutive years of hot, dry weather and the conservation activities imposed. During cool and wet years, historical water usage decreases to reflect less water usage for exterior landscaping. Both weather effects and conservation effects are discussed below.

7.6.1 Weather Effects on Water Usage

As described in Section 7.2, EVWD experiences cool winters and dry hot summers. In 2009, during the winter months (November, December, January) EVWD customers used only about 246 GPCD; while in the summer months customers used about 386 GPCD. This variation gives some indication about how weather affects water demands in the EVWD service area. Past studies have indicated that demands increase 6 to 12 percent during dry periods. For this analysis it is estimated that demands will increase ten percent during dry periods.

7.7 Demand Management Measures

In recent years, water conservation has become an increasingly important factor in water supply planning in California. DMMs are programs and activities through which a water supplier can communicate with their customers and encourage, regulate or incentivize water conservation. The Urban Water Management Planning Act identities 14 DMMs that are to be evaluated in each UWMP. Within this document, DMMs and BMPs are used interchangeably. Although EVWD is not a signatory to the CUWCC Memorandum of Understanding Regarding Urban Water Conservation in California, the UWMP Act requires compliance with DMMs. The UWMP Act requires different information for DMMs that have been implemented or are scheduled for implementation and DMMS not implemented or not scheduled for implementation.

7.7.1.1 Information Required for DMMs Implemented or Scheduled for Implementation

For those DMMs being implemented or scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(f):

- Description of the DMM
- A description of the steps necessary to implement the measure
- An implementation schedule
- Estimate, if available, of conservation savings and the effect of the savings on the suppliers' ability to further reduce demand.

Methods to evaluate DMM effectiveness and estimates of potential conservation savings are detailed in Appendix F. EVWD is now expanding its conservation programs and currently the potential for demand hardening is considered to be very low. However, as conservation devices and practices are more widely adopted in the service area, EVWD will evaluate the potential for demand hardening.

7.7.1.2 Information Required for DMMs Not Implemented or Scheduled for Implementation

For those DMMs not implemented or not scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(g):

- Economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors
- A cost-benefit analysis, identifying total benefits and total costs
- A description of funding available to implement any planned water supply project that would provide water at a higher unit cost
- A description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation

7.7.2 DMMs Currently Being Implemented or Scheduled for Implementation

This section describes DMMs currently being implemented or scheduled for implementation by EVWD.

7.7.2.1 Conservation Coordinator

To be in compliance with this DMM, EVWD must designate a water conservation coordinator. EVWD has a staff person designated as the Conservation Coordinator. EVWD also uses a consultant to manage its public outreach activities and staff to manage other aspects of water conservation. There are no available estimates on the conservation savings resulting from the DMM or the effects of this DMM on EVWD's ability to further reduce demand.

7.7.2.2 Water Waste Prevention

To be in compliance with this DMM, a water agency must do one or more of the following:

- Enact and enforce an ordinance or establish terms of service that prohibit water waste (single pass cooling, vehicle washing, commercial laundry systems and decorative fountains).
- Enact and enforce an ordinance or establish terms of service for water efficient design in new development (irrigation and landscape design).
- Support legislation or regulations that prohibit water waste.
- Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures.
- Support local ordinances that prohibit water waste.
- Support local ordinances that establish permits requirements for water efficient design in new development.

EVWD has a water shortage contingency plan that identifies the level of shortage, prohibitions and associated consumption reduction, penalties and charges. The Water Shortage Contingency Plan was again addressed in Ordinance 375, adopted in 2010, which prohibits gutter flooding, non-recirculating fountains, customer plumbing leaks, hosing of hard surfaces, and automatic water serving in restaurants during times of stage 2 and 3 water shortages (Ordinance 375 is included in Appendix F). District Ordinance No. 375 meets five of this DMM's elements. There are no available estimates on the conservation savings resulting from this DMM or the effects of this DMM on EVWD's ability to further reduce demand.

7.7.2.3 Water Loss Control

Implementation of this DMM consists of performing a water loss audit consistent with AWWA Manual 36 to quantify real and apparent losses. In addition, a water agency must also analyze the components of real and apparent loss, determine the economic value of recovering water loss, and develop a strategy to reduce loss to the extent actions are cost effective.

EVWD is in the process of implementing this DMM. EVWD has an active water loss control program and has performed a water loss audit using the AWWA Manual 36 for FY 2010. The results of the audit indicate that EVWD has an Infrastructure Leakage Indicator of 2.49 with a confidence score of 77. In the near term EVWD will focus on refining its information and identifying categories of real losses. In addition, EVWD will continue its leak detection and water main replacement program.

The AWWA water audit methodology will be performed annually and losses carefully monitored. Continued implementation of water loss control practices and procedures is not anticipated to have an effect on EVWD's ability to further reduce demand.

7.7.2.4 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

This DMM requires meters for all new service connections, establishing a program for retrofit of exiting but unmetered connections, and billing customers by volume of use. This DMM also requires that a water agency have a meter maintenance and replacement plan. All of EVWD's customers are metered as are all new connections. EVWD has a meter maintenance and replacement plan. All meters are replaced on a 10 year rolling cycle or when no longer functioning.

7.7.2.5 Retail Conservation Pricing

There are multiple aspects related to compliance with this DMM. This DMM requires a volumetric rate structure, which can be uniform, tiered, allocation-based or seasonal rates as long as the volumetric portion meets minimum levels as defined (70 percent of the rate must be variable/volumetric, as opposed to fixed charges).

EVWD is in compliance with this DMM. The volumetric portion of EVWD's water revenue accounts for about 77 percent of total. For sewer, commercial customers are billed volumetrically and residential customers are billed a flat rate. However EVWD only performs the collection services while treatment is the purview of the San Bernardino Municipal Water Department. Typically it is the treatment costs that are more sensitive to volume. Furthermore, in charging the commercial and residential different structures, EVWD is mimicking San Bernardino Municipal Water Department's sewer treatment rate structure.

7.7.2.6 Public Information Programs

The intent of this DMM is to have customer contact through events, paid and public service advertising, mailers, billings as well as social marketing and other public information programs. To be in full compliance a water agency must have quarterly contact with the public and media, an actively maintained website, and a list of all activities.

EVWD is implementing this DMM. EVWD retains an outside consultant for its public outreach program, provides tours, information packets with conservation information to new customers, and has published an annual newsletter since 1994 reporting current issues. Additional tours and presentations are given upon request. In addition to published materials, EVWD provides a link on their website to the State of California's water conservation website.

There are no available estimates on the conservation savings resulting from this DMM. However, it is not anticipated that any savings resulting from this DMM affect EVWD's ability to further reduce demand.

7.7.2.7 School Education Programs

To be in compliance with this DMM, a water agency must have a conservation-related school education program and must provide support and educational materials to local school districts. EVWD will implement this DMM at compliance levels. EVWD's program consists of a Water Awareness Month which involves an elementary school art contest that is published in a Conservation Calendar. In addition, occasional school presentations are given upon request. There are no available estimates on the conservation savings resulting from this DMM. However, it is not anticipated that any savings resulting from this DMM affect EVWD's ability to further reduce demand.

7.7.2.8 Water Sense Specification for New Residential Development

This DMM encourages replacement of old plumbing fixtures with plumbing fixtures with Water Sense Specification[3] (WSS) fixtures. To be in compliance with this DMM a water agency must provide incentives such as rebates, recognition programs, reduced connection fees, or have ordinances requiring residential construction meeting WSS for single and multi-family housing. These incentives are to be offered until the California universal retrofit on resale statute[4] goes into effect (year 2014) or until all new residential construction meets WSS standards.

EVWD does not have direct regulatory jurisdiction to develop local ordinances but will support local jurisdictions in implementing and promoting codes that support efficiency. EVWD will, in coordination with the land use jurisdictions, participate in implementation of the 2010 CAL Green Code which was adopted by the Building Standards Commission in January 2010 and went into effect January 2011. The Code sets mandatory green building measures, including a 20 percent reduction in indoor water use, as well as dedicated meter requirements and regulations addressing landscape irrigation and design; the Code also identifies voluntary measures that set a higher standard of efficiency, which can also be adopted.

It is anticipated that indoor water use in WSS homes will be 20 percent lower than in older homes that do not have WSS plumbing fixtures. The amount of water savings however, will depend on the extent of future residential development.

[3] WaterSense is an Environmental Protection Agency sponsored program that promotes water-efficient products, programs, and practices. In order to carry the WSS label a product must be independently certified as using 20 percent less water than average products in that category.

[4] Effective January 1, 2014, Senate Bill 407 requires that all pre-1994 residential, multi-family and commercial customers replace non-compliant plumbing fixtures (including toilets, faucets, and shower heads) with water-conserving fixtures when making certain improvements or alterations to a building. By 2017, all single family homes must replace non-compliant plumbing fixtures, and by 2019, all multifamily and commercial buildings must have compliant water-conserving plumbing fixtures in place.

7.7.2.9 Commercial, Industrial, and Institutional (CII)

To be in compliance with this DMM an agency must reduce CII water use by 10 percent of the baseline over a 10-year period. Implementation can be achieved through one or both of the following ways:

- Implementing measures on the CUWCC CII list with well-documented savings. These measures target commercial water use that include: toilets, urinals, clothes washers, cooling towers, food steamers, ice machines, steam sterilizers, water brooms and dry vacuum pumps.
- Implementing unique conservation measures whose water savings are calculated on a case-by-case basis. Sample measures include: industrial process water use reduction, industrial laundry retrofits, car wash recycling systems, water-efficient commercial dishwashers, and wet cleaning.

About 27 percent of EVWD's water is used by commercial customers. To be in compliance with the DMM, EVWD needs to reduce CII use by 67 AFY for 10 years, or 670 AF by 2020.

EVWD provides recommendations for identifying and addressing leaks for customers with high bill complaints but otherwise has no formal programs established. EVWD has examined the cost effectiveness from a mix of CII programs recommended by the CUWCC (Table 7-20). These include both indoor and landscape program options because both can be used to meet the 10 percent reduction requirements. The results indicate there are some programs that are clearly cost-effective such as WBIC and washer rebates; other programs like CII surveys and nozzle distribution are not.

EVWD has hired a consultant to prepare a strategy for reducing water use by CII customers. EVWD anticipates that it will implement those CII programs that are cost-effective, no later than December 2012.

A comparison of the year to year trend of water use by CII customers will be used to evaluate the effectiveness of this DMM. EVWD has ranked its top CII customers and will be prioritizing these customers for program participation. EVWD is currently working on developing a marketing plan and approach. Program participation will be tracked through the billing system.

TABLE 7-20
COST EFFECTIVENESS OF CII PROGRAMS

Program	Lifetime Water Savings (AF)	Cumulative Value of Saved Water ($)	Annual Costs ($)	Benefit/ Cost Ratio	$/AF
CII Weather Based Irrigation Controllers Rebates	**318**	**$72,218**	**$37,500**	**1.93**	**$118**
CII Weather Based Irrigation Controllers Direct Install	79	$18,055	$31,250	0.58	$393
CII Precision Nozzles Distribution	1	$246	$500	0.49	$502
Dedicated Irrigation Surveys	73	$17,728	$18,750	0.95	$255
CII Indoor Surveys	14	$3,250	$75,000	0.04	$5,243
CII Performance Based Program	**619**	**$140,555**	**$81,230**	**1.73**	**$131**
CII High Efficiency Washer Rebates	**184**	**$36,569**	**$18,750**	**1.95**	**$102**
CII High Efficiency Toilet Rebates	34	$7,163	$10,156	0.71	$298
CII High Efficiency Urinal Rebates	62	$12,803	$28,125	0.46	$456
CII Ultra Low Volume Urinal Rebates	72	$14,868	$28,125	0.53	$393
CII Zero Consumption Urinal Rebates	82	$16,933	$28,125	0.60	$345

7.7.3 Evaluation of DMMS Not Implemented

This section describes DMMs not being implemented or not being implemented at compliance levels. For each DMM not being implemented, an explanation and cost-effectiveness analysis is provided. For the purpose of calculating the cost-effectiveness of DMMs, EVWD's avoided cost of water (the cost of acquiring another unit of water) is estimated as $274 per AF.

7.7.3.1 Residential Assistance Program and Landscape Water Surveys

Implementation of this DMM consists of providing leak detection assistance and landscape water surveys to an average of 1.5 percent of single family and 1.5 percent of multi-family units per year for 10 years. Once that target is met, this DMM requires that a water agency maintain a program whereby surveys are performed in response to high-bill complaints or surveys are performed for at least 0.75 percent of single-family and multi-family units each year.

EVWD is not implementing either the Residential Assistance Program DMM or the Landscape Water Survey DMM as neither of these programs is cost-effective. The cost-effectiveness analysis for these programs was combined, because from a programmatic perspective, they would likely be implemented together as a single indoor and outdoor audit. To be in compliance with the DMM, EVWD would need to complete 306 single family and 20 multi-family (indoor only) audits. Implementing and managing a program that would meet these requirements would cost the EVWD $940 per AF of water saved, a benefit to cost ratio of 0.24 (see Table 7-21). Details on the cost-effectiveness calculations are provided in Appendix F.

TABLE 7-21
COST EFFECTIVENESS OF RESIDENTIAL LANDSCAPE SURVEY PROGRAMS

Total Costs	$127,471
Total Benefits	$30,803
Benefit/Cost	0.24
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$940
Water Savings (AFY)	136

7.7.3.2 High-Efficiency Clothes Washers (HECWs)

The intent of this DMM is to encourage replacement of old clothes washers with HECWs using financial incentives. Qualifying HECWs must meet an average water factor value of 5.0 or the WaterSense Specification, whichever is lower. The annual target is one percent of current single-family accounts or 1.4 percent per year of the market penetration during the first ten years of the program.

EVWD is not implementing a HECW rebate program and is filing a cost-effectiveness exemption. To be in compliance with the DMM, EVWD would need to provide 204 rebates. Implementing and managing a program that would meet these requirements would cost the District about $546 per AF of water saved, a benefit to cost ratio of 0.41 (Table 7-22). Details on the cost-effectiveness calculations are provided in Appendix F.

TABLE 7-22
COST EFFECTIVENESS OF HECW PROGRAMS

Total Costs	$38,291
Total Benefits	$15,561
Benefit/Cost	0.41
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$546
Water Savings (AFY)	70

7.7.3.3 WaterSense Specification Toilets

To be in compliance with this DMM an agency must offer incentives for toilets meeting the current WSS standard. Compliance entails demonstrating replacement of a number of toilets of 3.5 gallons per flush (or greater) with: (a) at least as many toilets as would be replaced should a retrofit upon resale ordinance be in effect, or (b) demonstration of 75 percent market saturation with WSS standard toilets.

EVWD is not implementing a WSS toilet rebate program and is filing a cost-effectiveness exemption. To be in compliance with the DMM, EVWD would need to provide 440 single family and 28 multi-family rebates. Implementing and managing a program that would meet these requirements would cost $330 and $260 per AF of water saved, a benefit to cost ratio of 0.6 and 0.8 for single family and multi-family respectively (Tables 7-23 and 7-24 below). Details on the cost-effectiveness calculations are provided in Appendix F.

TABLE 7-23
COST EFFECTIVENESS OF WSS TOILETS FOR SINGLE-FAMILY RESIDENTIAL CUSTOMERS

Total Costs[(a)]	$55,139
Total Benefits[(a)]	$35,091
Benefit/Cost	0.64
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$331
Water Savings (AFY)	167

Note:
(a) The analysis was only performed on high efficiency toilets and not ultra-low flow toilets since ultra-low flow toilets are being phased out.

TABLE 7-24
COST EFFECTIVENESS OF WSS TOILETS FOR MULTI-FAMILY RESIDENTIAL CUSTOMERS

Total Costs[(a)]	$3,537
Total Benefits[(a)]	$2,838
Benefit/Cost	0.80
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$262
Water Savings (AFY)	13

Note:
(a) The analysis was only performed on high efficiency toilets and not ultra-low flow toilets since ultra-low flow toilets are being phased out.

7.7.3.4 Large Landscape

There are multiple elements related to this DMM all related to providing non-residential customers with support and incentives to improve their landscape water use efficiency. Specific activities include:

- Developing water use budgets at 70 percent ETo (100 percent for dedicated recreational areas) for 90 percent of accounts with dedicated irrigation meters in 10 years.
- Assisting all accounts that are 20 percent over budget within 6 years.
- Performing surveys on 15 percent of un-metered and mixed use meter accounts in 10 years (CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both the Landscape and CII DMMs).

- Providing an incentive program for irrigation equipment retrofits.
- Provide notices each billing cycle with water use budgets.
- Accounts without Meters or with Mixed-Use Meters:
    - Develop and implement a strategy for marketing surveys.
    - Offer financial incentives.

EVWD is not implementing the Landscape DMM and is filing a cost-effectiveness exemption. To meet the requirements of the Large Landscape DMM, EVWD would have to conduct about 21 surveys per year. The cost-effectiveness evaluation indicates that the large landscape surveys would not be cost-effective, with a benefit to cost ratio of 0.95 (Table 7-25).

TABLE 7-25
COST EFFECTIVENESS OF LARGE LANDSCAPE DMM

Total Costs	$18,750
Total Benefits	$17,728
Benefit/Cost	0.95
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$255
Water Savings (AFY)	73

7.7.4 DMM Implementation and Urban Water Use Targets of the 20x2020 Plan

As part of the IRWMP and UWMP process, agencies in the San Bernardino Valley area have formed a group to study and address conservation needs in the San Bernardino Valley. The first step in this process was identifying the costs and benefits of various demand management measures. Special attention was given to those demand management measures that are not cost effective for an individual agency, but which could be cost effective if implemented as part of a regional collaboration. The following demand management measures were identified as potentially cost effective if costs could be shared among multiple entities:

- High Efficiency Clothes Washers Rebates
- Water Sense Specification Toilet Rebates
- Support and incentives to non-residential customers to improve landscape water use efficiency
- Targeted programs at large CII customers

The second step in the process was to identify the water conservation target, which was done as part of this UWMP. At the conclusion of Steps 1 and 2, the agencies participating in this UWMP met to coordinate regional implementation of selected conservation actions. The group

intends to engage a Regional Conservation Coordinator. In addition to the programs listed above, the Regional Conservation Coordinator would lead public outreach programs and school education programs. The UWMP agencies, along with the Regional Conservation Coordinator will evaluate existing agency resources available to assist with conservation programs and then select conservation programs and processes to be implemented at the regional level. The UWMP agencies will utilize the Regional Conservation Coordinator to track conservation actions, conservation successes, and estimate water savings. The group anticipates having a regional water conservation strategy developed by the end of 2011 and start implementation in 2012.

EVWD will continue with its existing conservation programs, will participate in the region-wide conservation programs, and will work with its land use partners to implement both the Landscape Model Ordinance and 2010 California Green Building Standards Code.

As part of its annual reporting of public water system statistics to the California Department of Public Health, EVWD will evaluate progress toward reducing water use in terms of gallons per capita per day.

7.8 Water Resources

Chapter 2 of this UWMP provides a description of imported water supplies and groundwater supplies available in the San Bernardino Valley. Chapter 2 also provides a description of supply reliability for imported water and groundwater. The paragraphs below provide information on the current and projected use of these supplies by EVWD.

EVWD utilizes a mix of groundwater, local surface water, and a small amount of imported water. Since 2005 groundwater has made up 85 to 89 percent of EVWD's supply in any given year. Surface water from the Santa Ana River has made up the next largest share of EVWD's supply portfolio, in any year comprising between 9 to 15 percent. Imported water, purchased from Valley District, is a minor supply, no more than 3 percent in any year.

7.8.1 Imported Water Supplies

Imported water available to EVWD is SWP purchased from Valley District. A description of this supply and its reliability is provided in Chapter 2. EVWD currently supplements its local supply with SWP deliveries from Valley District and in the past this SWP has made up a small amount of EVWD's water supply. EVWD anticipates seeking regular SWP supplies to supplement Santa Ana River water to run Surface Water Treatment Plant 134. Plant 134 was designed to treat Santa Ana River water and SWP and was completed in 1996. Since its construction, the plant has averaged approximately 2,700 AFY in production. Plant 134 has a nameplate capacity of 4 MGD, but production has been approximately only 60 percent of its annual capacity due to a number of issues related to reduced winter time demand and scheduled maintenance. EVWD is planning to replace the existing filters and expand the plant to 8.0 MGD by installing microfiltration treatment. The expansion will not only add capacity, but the plant reliability is anticipated to be much higher. This expansion will allow EVWD to increase its use of SWP. The estimated amount of imported water supply shown in Table 7-26 has been estimated by EVWD and provided to Valley District. Table 7-26 represents the supplies which

are anticipated to be available to EVWD in a normal year; Table 7-26 does not represent how much water EVWD may actually need or use in a given year.

TABLE 7-26
WHOLESALE SUPPLIES - EXISTING AND PLANNED SOURCES OF WATER[(a)] (AF)

Wholesale Source	2010	2015	2020	2025	2030	2035
Purchase from Valley District[(b)]	0	8,960	8,960	8,960	8,960	8,960

Notes:
(a) This table represents the supplies anticipated to be available to EVWD, not necessarily the amount of a given supply that will be utilized by EVWD.
(b) East Valley Water District Water Master Plan 2008.

7.8.1.1 Imported Supply Reliability

SWP deliveries available to EVWD in a normal year are provided in Table 7-26. During times of State-wide drought conditions, the availability of SWP may be reduced. These conditions are normally known in advance, providing EVWD with the opportunity to plan for the reduced supply. During a drought period, it is Valley District's priority to make direct deliveries to the water treatment plants operated by Redlands, WVWD, YVWD, SBMWD, and EVWD and to maintain lake levels at Big Bear Lake (Big Bear Lake water also feeds the water treatment plants of Redlands and EVWD). Because EVWD's water treatment plant can use local surface water and imported water, during a single-dry year EVWD may elect to take a small amount of imported water, making more imported water available to other agencies. In this case, EVWD would utilize additional groundwater through groundwater well production from the SBBA. In a multiple dry year Valley District expects between 44,858 AF and 45,910 AF of water to be available, meaning Valley District could fulfill normal direct deliveries to water treatment plants in a multiple-dry year, including the EVWD treatment plant.

Table 7-27 estimates how imported water supplies available to EVWD may be reduced during drought conditions.

TABLE 7-27
WHOLESALE SUPPLIES - SINGLE DRY AND MULTIPLE DRY YEARS (AF)

Wholesale Supply	2015	2020	2025	2030	2035
Single-Dry Year	500	500	500	500	500
Multiple-Dry Year	8,960	8,960	8,960	8,960	8,960

7.8.2 Groundwater

Over the last five years, EVWD has drawn approximately 85 percent of its water supply from wells located within the San Bernardino Basin Area. Currently, 20 wells provide a rated capacity of 25,900 GPM. Historic groundwater production by EVWD is shown in Table 7-28. Anticipated groundwater production, from the SBBA for future years is detailed in Table 7-29.

TABLE 7-28
GROUNDWATER VOLUME PUMPED (AF)

Basin Name	Metered or Unmetered?	2005	2006	2007	2008	2009
SBBA	Metered	20,942	23,120	20,059	20,813	19,421
Groundwater as Percent of Total Water Supply		*89%*	*85%*	*82%*	*87%*	*85%*

TABLE 7-29
GROUNDWATER - VOLUME PROJECTED TO BE PUMPED (AF)

Basin Name	Metered or Unmetered?	2015	2020	2025	2030	2035
SBBA	Metered	19,486	21,012	24,850	28,742	32,692
Groundwater as Percent of Total Water Supply		*85%*	*85%*	*85%*	*85%*	*85%*

7.8.2.1 Groundwater Supply Reliability

Some of the EVWD's wells are impacted by nitrate, perchlorate, fluoride, uranium, and/or VOCs. EVWD has suspended operation at two wells, Wells 12A and 146A. As described below, EVWD has plans in place that will allow these wells to come back on-line. EVWD continues to monitor groundwater contamination and the movement of groundwater contaminant plumes. In response to water quality concerns EVWD has altered operations at other wells to compensate for the reduced capacity and the following actions have been put into place to protect EVWD supply:

- A wellhead treatment facility has been implemented to treat VOCs from Well 28A using granulated activated carbon.
- A wellhead treatment facility has been implemented to treat nitrate and uranium from Well 40A using ion exchange.
- At Plant 27 and Plant 107, wellhead nitrate and perchlorate treatment facility has been put into operation.
- A centralized treatment plant is under construction at Plant 150 to treat perchlorate from a blend of wells in the southwestern part of the service area including Wells 11A, 12A, and 28A as well as future wells. This plant is scheduled for completion in 2012.
- EVWD blends water from Well 39 to deal with high fluoride levels.
- EVWD continues to monitor for nitrates in Wells 25A, 28A, and 9.
- EVWD plans to blend Wells 147, 146A, 146, and 143 to reduce uranium in Well 146A.

These past and ongoing groundwater treatment projects have demonstrated that treatment is an economically viable alternative for handling volatile organic compounds, perchlorate, nitrates,

and uranium. To manage the long-term potential for continued groundwater contamination, EVWD has an on-going land acquisition program. EVWD has vacant land available for future facilities. Sites are selected for the development of new wells based on knowledge of the plumes' movement, land availability and engineering feasibility.

Based on current conditions water quality is not anticipated to affect EVWD supply reliability. However, water quality issues are constantly evolving. EVWD will take action to protect and treat supplies when needed, but it is well recognized water quality treatment can have significant costs.

As described in Chapter 2, the SBBA is adjudicated on a safe yield basis. EVWD therefore has the opportunity to develop additional wells and over-extract groundwater under specified conditions contained in the stipulated judgment. The wells in general have provided a stable source of water supply. Past records show that EVWD has not removed any well from its supply source during drought conditions, although, some wells had to be lowered to continue extraction of groundwater. During 1990, the driest year on record for the Southern California, EVWD was impacted only by lowered groundwater levels and increased pumping costs. EVWD maintained full capability to use all wells within its system. As described in Chapter 2, extensive modeling has been used to examine groundwater recharge, groundwater pumping, basin storage, groundwater flow, and groundwater plume location and plume migration. Based on these studies it is anticipated that groundwater pumping by EVWD and other SBBA users in the Valley District service area will not be reduced or curtailed during a single-dry or multi-dry year.

TABLE 7-30
GROUNDWATER SUPPLIES - SINGLE DRY AND MULTIPLE DRY YEARS (AF)

Groundwater Supply	2015	2020	2025	2030	2035
Single-Dry Year[(a)]	27,500	33,750	40,000	46,250	52,500
Multiple-Dry Year	24,000	30,250	36,500	42,750	49,000

Note:
(a) Assumes EVWD is allowed to extract an additional 3,500 AFY groundwater in-lieu of receiving an full share of available SWP supplies during a single-dry year.

7.8.3 Local Surface Water Supplies

EVWD has current water rights of 4 MGD (4,500 AFY) of Santa Ana River water through stock ownership in the North Fork Mutual Water Company. EVWD is currently the major shareholder in the company and continues to pursue the purchase of additional stock. EVWD has the ability to expand to about 6.5 MGD (7,300 AFY) with the conversion of remaining agricultural properties and water shares of stock. This is expected to occur by 2015.

TABLE 7-31
SURFACE WATER SUPPLIES - EXISTING AND PLANNED SOURCES OF WATER[(a)] (AF)

Source	2010	2015	2020	2025	2030	2035
Santa Ana River	3,301	7,300	7,300	7,300	7,300	7,300

Note:
(a) EVWD has current water rights of 4 MGD of Santa Ana River water with the ability to expand to about 6.5 MGD with the conversion of remaining agricultural properties and water shares of stock.

7.8.3.1 Local Surface Water Reliability

Currently, no water quality issues have been identified that affect EVWD's surface water supplies from the Santa Ana River. However, water quality issues are constantly evolving. EVWD will take action to protect and treat the supply when needed, but it is well recognized water quality treatment can have significant costs.

Supplies from the Santa Ana River are affected by seasonal and annual variations. Records from multiple precipitation gauges were reviewed and in the Santa Ana Watershed were reviewed (EVWD 2005). Year 2003 was selected as the year in the historical sequence that most closely represents median runoff levels and patterns. From the same data, year 2002 was selected as the single-dry year; this year had only 25 percent of normal precipitation. Years 2000 through 2002 were the selected as the period for the multiple-dry period. This three year period had the lowest average runoff for a consecutive multiple year period. Anticipated local surface supplies are detailed in Table 7-32.

TABLE 7-32
SURFACE WATER SUPPLIES - SINGLE DRY AND MULTIPLE DRY YEARS[(a)] (AF)

Anticipated Supply	Normal	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	*Year 2*	*Year 3*
Santa Ana River	4,480	1,120	2,867	3,091	1,120
% of Normal	NA	25	64	69	25
Basis of Water Year Data (year or year sequence)	2003	2002	2000	2001	2002

7.8.4 Recycled Water

EVWD provides sewage collection service to its customers. Wastewater treatment is provided by a regional wastewater treatment plant, located downstream and outside of EVWD's sphere of influence. A Joint Powers Agreement (JPA) was formed in 1957 between EVWD and the neighboring City of San Bernardino whereby the City treats all sewage generated within the EVWD service area. Consequently, EVWD is not responsible for the disposal of treated wastewater and cannot implement a Water Reclamation Plan.

Wastewater from the EVWD service area is treated to secondary levels at the San Bernardino Regional Wastewater Treatment Plant and to tertiary levels at the Rapid Infiltration/Extraction (RIX) Plant. An average day demand of approximately 7.3 MGD of sewage is collected by EVWD and treated at the regional plant. In 1995, the City of San Bernardino began operation of RIX to provide treatment of up to 41.0 MGD of secondary effluent from the existing plants of the City of San Bernardino and the City of Colton. The RIX plant is located approximately six miles southwesterly and downstream of EVWD's southwesterly boundary. The JPA responsible for the RIX plant actively pursues markets for the tertiary water as a means of reducing the demand for local groundwater supply. EVWD is helping to finance the City of San Bernardino's recycled water project and intends to take advantage of the enhanced SBBA groundwater storage which will result. Currently the location of RIX makes providing water to customers upstream of the plant (e.g., East Valley Water District) cost-prohibitive. However, depending on how the City of San Bernardino's recycled water infrastructure develops, it may be feasible for EVWD to serve recycled water to the western-most portions of its service area in the future.

7.8.5 Transfers, Exchanges, and Groundwater Banking Programs

7.8.5.1 Transfers and Exchanges

EVWD has emergency water supply interties to two adjacent water purveyors (SBMWD and the City of Riverside) to meet needs during periods of lowered groundwater levels, but these are short-term, as needed purchases and are not accounted for as additional water supply. In the past, EVWD obtained a small portion of water through an exchange with SBMWD. Due to operational difficulties the exchange was ended, effective October 18, 2007.

7.8.5.2 Groundwater Banking Programs

Artificial recharge is undertaken by both San Bernardino Valley Water Conservation District and Valley District. Since 2008, Valley District has offered a Cooperative Recharge Program for any remaining SWP entitlement water after direct deliveries are satisfied. In 2009, the Cooperative Recharge Program resulted in 17,000 AF of SWP water being recharged into local groundwater basins. In 2010, 21,750 was recharged through the program. San Bernardino Municipal Water Department, City of Redlands, WVWD, EVWD, SBMWD, and YVWD have participated in the Cooperative Recharge Program.

7.8.6 Planned Water Supply Projects and Programs

EVWD is currently enhancing its ability to utilize its existing water supply sources through several projects that are in various phases of implementation, from planning to preliminary design to construction. All projects described below are anticipated to be complete by 2015.

- Plant 134 Expansion. EVWD is currently expanding this plant from 4 to 8 MGD by removing the existing Roberts filters and installing membrane microfiltration. The expansion of this plant will not only add 2,700 GPM (4.0 MGD) of capacity, but the plant reliability is anticipated to be much higher as the membrane microfiltration modules would be able to treat water that could not be treated before due to high turbidity levels.

- As described in Section 7.8.2, construction of a new Plant 150. The purpose of this plant is to serve as a production and groundwater treatment hub in EVWD's lower pressure zone. It is located in a portion of the groundwater basin where well yields are high; however, groundwater quality is impaired with perchlorate concentrations exceeding the pending MCL of 6 parts per billion in one well. Concentrations of nitrate and PCE in the Plant 150 feed water currently do not exceed MCLs. However, elevated concentrations of these two contaminants require EVWD to closely monitor water quality changes and to implement treatment if it becomes necessary. Phase 1 of this plant will produce 7,000 GPM by treating water from wells 11A, 12A, and 28A for perchlorate and blending for nitrates. Later phases will make it possible for this plant to treat up to 17,000 GPM.

When added together, these water supply development projects will add an estimated 5,200 GPM of water supply capacity to EVWD over the next five years.

In addition to the near-term additional supplies discussed in the previous section that will meet near-term water demand through year 2015, EVWD is evaluating additional projects to meet water demand at build-out conditions. These projects will be implemented as required by development in the service area. Supply sources potentially available to EVWD include:

- New groundwater wells
- Increasing groundwater production and treatment at Plant 150 to a capacity of 17,000 GPM
- New 10 MGD surface water treatment plant in the Sunrise Ranch area
- Regional supply sources from San Bernardino Valley Municipal Water District (SBVMWD)

These projects do not increase water supplies available to EVWD, but rather allow EVWD to increase utilization of existing supplies and to make deliveries to the different portions of the service area.

EVWD has current water rights of 4 MGD (4,500 AFY) of Santa Ana River water with the ability to expand to about 6.5 MGD (7,300 AFY) through the conversion of remaining agricultural properties and water shares of stock. EVWD holds rights to direct delivery of native surface water, through stock ownership in the North Fork Mutual Water Company. EVWD is currently the major shareholder in the company and continues to pursue the purchase of additional shares. As agricultural land converts to urban uses, EVWD gains not only the new urban demand but the associated water stock shares. These additional supplies are included in the anticipated water supplies previously shown in Tables 7-31 and 7-32.

7.8.7 Total Anticipated Water Supply

Table 7-33 summarizes the water resources available to EVWD for the 30-year period covered by this plan.

TABLE 7-33
SUMMARY OF CURRENT AND PLANNED WATER SUPPLIES (AF)

Water Supply Source	2010	2015	2020	2025	2030	2035
Existing						
Wholesale/Imported	0	8,960	8,960	8,960	8,960	8,960
Groundwater	19,421	24,000	30,250	36,500	42,750	49,000
Local Surface Water	3,301	4,480	4,480	4,480	4,480	4,480
Recycled Water	0	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0	0
Groundwater Banking	0	0	0	0	0	0
Total Existing Supplies	*22,722*	*37,440*	*43,690*	*49,940*	*56,160*	*62,440*
Planned						
Wholesale/Imported	0	0	0	0	0	0
Groundwater	0	0	0	0	0	0
Local Surface Water	0	2,820	2,820	2,820	2,820	2,820
Recycled Water	0	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0	0
Groundwater Banking	0	0	0	0	0	0
Total Planned Supplies	*0*	2,820	2,820	2,820	2,820	2,820
Total Existing & Planned Supplies	*22,722*	*40.260*	*46,510*	*52,760*	*59,010*	*65,260*

7.9 Water Shortage Contingency Plan

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, an earthquake which damages delivery or storage facilities, or a regional power outage. Chapter 5 of this UWMP describes water shortage contingency planning for regional water supply sources (imported water, groundwater). This section focuses on water shortage contingency planning for EVWD.

7.9.1 Coordinated Planning

EVWD is a participant within ERNIE a water/wastewater mutual aid network within San Bernardino and Riverside Counties. ERNIE is the first aid network that would be activated in the event of a disaster affecting water/wastewater services in the San Bernardino Valley. If the disaster overwhelms the local resources, EVWD will activate the California Water/Wastewater Agency Response Network (CalWARN) system for statewide mutual aid. EVWD will immediately contact the California Department of Public Health (CDPH), San Bernardino County Fire, Operations of Emergency Services, and the California Utilities Emergency Association to coordinate mutual aid and assistance. If local resources are overwhelmed by the disaster, the County of San Bernardino Fire Operations of Emergency Services will contact the State of California Governor's Office of Emergency Services for assistance.

7.9.2 Actions to Prepare for Catastrophic Interruption

EVWD has identified system vulnerabilities due to fire, earthquake, and power outages. EVWD has developed an Emergency Response Plan. EVWD has in place back-up power supplies at critical locations within the distribution system. Due to South Coast Air Quality Management Board rules and economic restraints, a back-up power supply source at every plant within EVWD's system is not feasible. EVWD maintains portable pumps that can be used to transfer water interzonally, but cannot be used for production. Currently, EVWD's storage capacity of 25.5 million gallons would provide a potable supply for customers' non-irrigation uses (assumes implementation of Water Shortage Contingency Plan) for an estimated two to three days. As described above, EVWD participates in multiple mutual aid agreements and has agreements in place for the provision of water supply and/or manpower.

In the event of a natural or man-made disaster that could affect the EVWD's ability to provide a potable water supply for up to thirty days, the following measures will be implemented as required:

1. The Boil Water notification program will be activated. The notice will be provided to local radio stations and newspapers. EVWD will contact the media and City and County agencies. Customers will be notified of supplemental sources of water for cooking and drinking (e.g. swimming pools, water heaters, and bottled water).
2. Irrigation uses of water will immediately be prohibited. Enforcement will occur through a cooperative effort with the Sheriff's Department and City of San Bernardino Police Department and the media.
3. The Mutual Aid Agreement with ERNIE will be implemented. The General Manager will contact general managers from surrounding agencies to obtain assistance in providing manpower for repairs and/or a supplemental supply of water.
4. Arrowhead Drinking Water Company will be contacted to begin delivery of potable water tanks to selected sites within the EVWD's service area. The trucks will be manned by EVWD personnel to distribute water to customers for drinking purposes.
5. A public information program will be initiated. The General Manager will appear on local television and provide daily reports to the local newspaper and radio stations. Members of the Board of Directors will speak to local service clubs and chambers of commerce.

7.9.3 Stages of Action to Respond to Water Shortages

A Water Shortage Contingency Plan was originally prepared by EVWD in 1992, in response to Assembly Bill 11X (AB 11X) signed into law on October 14, 1991. The bill requires urban water suppliers providing municipal water directly or indirectly to more than 3,000 customers, or supplying more than 3,000 acre-feet of water annually, to draft a water shortage contingency plan in case of a drought for the sixth consecutive year. Plan elements mandated by AB 11X are addressed therein. The Plan was subsequently incorporated into the EVWD Ordinance No. 375 Section 15 – Water Conservation (this is included in Appendix G). This section of the Ordinance addresses water conservation measures the District has adopted for (1) normal conditions, (2) threatened water supply conditions, and (3) emergency water shortage conditions. The ordinance sets forth a three-stage water shortage contingency plan for the

conservation of water. This plan includes voluntary and mandatory conservation measures; key elements are included herein.

- Stage 1 – Normal Conditions: Normal conditions shall be in effect when EVWD is able to meet all the water demands of its customers in the immediate future. During normal conditions, all water users should continue to use water wisely, to prevent the waste or unreasonable use of water, and to reduce water consumption to that necessary for ordinary domestic and commercial purposes.
- Stage 2 – Threatened Water Supply Condition: In the event of a threatened water supply shortage which could affect EVWD's ability to provide water for ordinary domestic and commercial uses, the Board of Directors shall hold a public hearing at which consumers of the water supply shall have the opportunity to protest and to present their respective needs to the District. The Board may then, by resolution, declare a water shortage condition to prevail, and the following conservation measures shall be in effect:
    - Exterior Landscape Plans – Exterior landscape plans for all new commercial and industrial development shall provide for timed irrigation and shall consider the use of drought resistance varieties of flora. Such plans shall be presented to and approved by EVWD prior to issuance of a water service letter.
    - Excessive Irrigation and Related Waste – No customer of EVWD or other person acting on behalf of or under the direction of a customer shall cause or permit the use of water for irrigation of landscaping or other outdoor vegetation, plantings, lawns or other growth, to exceed the amount required to provide reasonable irrigation of same, and shall not cause or permit any unreasonable or excessive waste of water from said irrigation activities or from watering devices or systems. The free flow of water away from an irrigated site shall be presumptively considered excessive irrigation and waste as defined in Section 3 herein (of Ordinance No. 375).
    - Agricultural Irrigation – Persons receiving water from EVWD who are engaged in commercial agricultural practices, whether for the purpose of crop production or growing of ornamental plants shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. Upon the request of the General Manager, these persons may be required to prepare a plan describing their irrigation practices and equipment, including but not limited to, an estimate of the efficiency of the use of water on their properties.
    - Commercial Facilities – Commercial and industrial facilities shall, upon request of the General Manager, provide EVWD with a plan to conserve water at their facilities. EVWD will provide these facilities with information regarding the average monthly water use by the facility for the last two year period. The facility will be expected to provide EVWD with a plan to conserve or reduce the amount of water used by that percentage deemed by the Board of Director to be necessary under the circumstances. After review and approval by the General Manager, the water conservation plan shall be considered subject to inspection and enforcement by EVWD.
    - Parks, Golf Courses, Swimming Pools, and School Grounds – Public and private parks, golf courses, swimming pools and school grounds which use water

provided by EVWD shall use water for irrigation and pool filling between the hours of 10:00 P.M. and 6:00 A.M.

- Domestic Irrigation – Upon notice and public hearing, EVWD may determine that the irrigation of exterior vegetation shall be conducted only during specified hours and/or days, and may impose other restrictions on the use of water for such irrigation. The irrigation of exterior vegetation at other than these times shall be considered to be a waste of water.
- Swimming Pools – All residential, public and recreational swimming pools, of all size, shall use evaporation resistant covers and shall re-circulate water. Any swimming pool which does not have a cover installed during periods of non-use shall be considered a waste of water.
- Run-off and Wash-down – No water provided by EVWD shall be used for the purposes of wash-down of impervious areas, without specific written authorization of the General Manager. Any water used on premises that is allowed to escape the premises and run off into gutters or storm drains shall be considered a waste of water.
- Vehicle Washing – The washing of cars, trucks or other vehicles is not permitted, except with a hose equipped with an automatic shut-off device, or a commercial facility so designated on EVWD's billing records.
- Drinking Water Provided by Restaurants – Restaurants are not to provide drinking water to patrons except by request.

- Stage 3 – Water Shortage Emergency: Mandatory Conservation Measures – In the event of a water shortage emergency in which EVWD may be prevented from meeting the water demands of its customers, the Board of Directors shall, if possible, given the time and circumstances, immediately hold a public hearing at which customers of EVWD shall have the opportunity to protest and to present their respective needs to the Board. No public hearing shall be required in the event of a breakage or failure of a pump, pipeline, or conduit causing an immediate emergency. The General Manager is empowered to declare a water shortage emergency, subject to the ratification of the Board of Directors within 72 hours of such declaration, and the following rules and regulations shall be in effect immediately following such declarations:
    - Prohibition – Watering of parks, school grounds, golf courses, lawns, landscape irrigation, washing down of driveways, parking lots or other impervious surfaces, washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water, filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes are prohibited.
    - Restaurants – Restaurants shall not serve drinking water to patrons except by request.
    - Construction Meters – No new construction meter permits shall be issued by EVWD. All existing construction meters shall be removed and/or locked.
    - Commercial Nurseries and Livestock – Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.

The Ordinance provides for exceptions under certain circumstances, establishes enforcement provisions, defines the methods for declaring and terminating water conservation stages, and provides for the form of notices and decisions of the Board of Directors. The specific water supply conditions for triggering EVWD's mandated conservation measures and the expected reduction in water use are summarized below in Table 7-34.

TABLE 7-34
WATER SHORTAGE CONTINGENCY PLAN IMPLEMENTATION PLAN

Stage	Percent Shortage	Conservation Measures	Expected Overall Reduction
1	Normal Conditions	Voluntary prevention of waste and reduce consumption	NA
2	Up to 15% Supply Reduction	Declaration of water shortage condition; implementation of water conservation measures	10%
3	15% to 50% Supply Reduction	Declaration of water shortage emergency; mandatory conservation measures	Up to 50%

7.9.3.1 Penalties

In the implementation of the water shortage contingency plan, the California Water Code Section 31029 makes any violation of the EVWD's Ordinance a criminal misdemeanor and upon conviction thereof, the violator will be subject to punishment by fine, imprisonment or both as may be allowed by law. In addition to criminal penalties, violators of the mandatory provisions of the ordinance will be subject to civil action initiated by EVWD, as summarized below:

- First Violation -- Issuance of written notice of violation of water user.
- Second Violation -- A $100 surcharge is imposed on the water meter.
- Third Violation -- A $200 surcharge and/or installation of a flow restrictor on the water meter.
- Subsequent Violations -- Discontinuance of service.

In the unlikely event of a severe and extended shortage, EVWD would have to implement other alternatives to provide enough water to its constituents. The primary and most desirable alternative would be to develop its surface water supply to make the most use of entitlements to the local surface waters. Factors that affect the feasibility of surface water development include growth of future water demands (after holding rights to surface waters, and the investment in treatment facilities). EVWD could also undertake well drilling to accommodate any long-term system repairs or outages.

7.9.4 Financial Impacts of Actions During Shortages

EVWD's 2010-11 water budget projects total revenue of $15,795,000 and total expenses (inclusive of debt service and capital outlay) of $15,335,634. The budget also includes an

anticipated contribution to a rate stabilization fund of $229,941. The rate stabilization fund contribution is in accordance with a District Designated Fund Policy established in July of 2010. Funds discussed in the policy include the Rate Stabilization Fund and the Capital Replacement Fund. The EVWD water department currently has no designated fund balances, and, between 2004 and 2009, borrowed from EVWD's sewer department to accomplish significant capital projects. Assuming tight controls on expenses, rate increases effective October 1, 2010, 2011, and 2012 will allow EVWD to meet debt service payments, fund capital projects, and begin to build designated funds in accordance with the Designated Funds Policy.

In the event of a water shortage, a two-point program will be utilized to meet the fiscal shortfall of reduced water revenues:

- Reduce operation and maintenance expenses
- Defer selected capital improvement projects until water shortage situation improves

Rate Stabilization Funds, once accumulated, will serve as a third means of meeting fiscal shortfalls.

7.9.5 Mechanism to Determine Reductions in Water Use

Under normal conditions, EVWD prepares monthly production reports which are reviewed and compared to production reports and pumping statistics from prior months and the same period of the prior year. Under shortage conditions, these production reports could be prepared as often as daily. In addition billing reports could be reviewed to identify users who are not abiding by the water shortage contingency plan.

7.9.6 Minimum Water Supply Available During Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the next three year period, assuming 2011 to 2013 repeat the driest three-year historic sequence for each water supply source. As shown in Table 7-35, total supplies, given a repeat of historically low conditions on all water supplies, would be approximately 29,100 AFY. Comparing these supplies to the demand projections provided in Section 7.5, EVWD has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

TABLE 7-35
MINIMUM WATER SUPPLY AVAILABLE DURING NEXT THREE WATER YEARS (AFY)[(a)]

	2011	2012	2013
Purchased Imported Water	500	500	500
EVWD Produced Groundwater	27,500	27,500	27,500
EVWD Produced Surface Water	1,120	1,120	1,120
Transfers/Exchanges	0	0	0
Recycled Water	0	0	0
Banked Water	0	0	0
Total Supply	**29,120**	**29,120**	**29,120**

Note: (a) From Tables 7-27, 7-30, 7-32.

7.10 Supply And Demand Comparisons

The UWMP Act requires urban water suppliers assess water supply reliability by comparing total projected water use with the expected water supply over the next twenty years in five year increments. The Act also requires an assessment of single-dry year and multiple-dry years. This section presents the reliability assessment for EVWD's service area.

7.10.1 Normal Water Year

The Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. This section summarizes EVWD's water supplies available to meet demands over the 20-year planning period during an average/normal year and compares them to demands for the same period. In Table 7-36, below, demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Assumptions about supplies and demands are provided in Sections 7.5 and 7.8. Table 7-36 demonstrates the EVWD anticipates adequate supplies for years 2015 to 2035 under Normal conditions.

7.10.2 Single-Dry Year

The single-dry year is generally the lowest annual runoff for a water source in the record. The single-dry year may differ for various sources. This section summarizes EVWD's water supplies available to meet demands over the 20-year planning period during a single-dry year and compares them to demands for the same period. In Table 7-37, below, demands are assumed to be 10 percent greater in a single-dry year than during a normal year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Table 7-37 demonstrates the EVWD anticipates adequate supplies for years 2015 to 2035 under single-dry year conditions.

7.10.3 Multiple-Dry Years

The multiple-dry year is generally the lowest annual runoff for a three year or more consecutive period. The multiple-dry year period may differ for various sources. This section summarizes

EVWD's water supplies available to meet demands over the 20-year planning period during a multiple-dry year period and compares them to demands for the same time frame. In Table 7-38, below, demands are assumed to be 10 percent greater in a multiple-dry year than during an average year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Table 7-38 demonstrates the EVWD anticipates adequate supplies for years 2015 to 2035 under multiple-dry year conditions.

TABLE 7-36
PROJECTED AVERAGE/NORMAL YEAR SUPPLIES AND DEMANDS (AF)

	2015	2020	2025	2030	2035
Existing Supplies[a]					
Wholesale/Imported	8,960	8,960	8,960	8,960	8,960
Groundwater	24,000	30,250	36,500	42,750	49,000
Local Surface Water	4,480	4,480	4,480	4,480	4,480
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Existing Supplies	**37,440**	**43,690**	**49,940**	**56,190**	**62,440**
Planned Supplies[a]					
Wholesale/Imported	0	0	0	0	0
Groundwater	0	0	0	0	0
Local Surface Water	2,820	2,820	2,820	2,820	2,820
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Planned Supplies	**2,820**	**2,820**	**2,820**	**2,820**	**2,820**
Total Existing and Planned Supplies	***40,260***	***46,510***	***52,760***	***59,010***	***65,260***
Demands without Additional Conservation[b]	25,472	30,901	36,544	42,267	48,076
Conservation	2,547	6,180	7,309	8,453	9,615
Total Adjusted Demands	22,925	24,721	29,235	33,814	38,461
Surplus/Deficit in Normal Year	**17,335**	**21,789**	**23,525**	**25,196**	**26,799**
Difference as % of Supply	**43%**	**47%**	**45%**	**43%**	**41%**
Difference as % of Demand	**76%**	**88%**	**80%**	**75%**	**70%**

Notes:
(a) From Tables 7-25, 7-28, and 7-30.
(b) From Table 7-13, 7-14, and 7-15.

TABLE 7-37
PROJECTED SINGLE-DRY YEAR SUPPLIES AND DEMANDS (AF)

	2015	2020	2025	2030	2035
Existing Supplies[a]					
Wholesale/Imported	500	500	500	500	500
Groundwater	27,500	33,750	40,000	46,250	52,500
Local Surface Water	1,120	1,120	1,120	1,120	1,120
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Existing Supplies	**29,120**	**35,370**	**41,620**	**47,870**	**54,120**
Planned Supplies[a]					
Wholesale/Imported	0	0	0	0	0
Groundwater	0	0	0	0	0
Local Surface Water	705	705	705	705	705
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Planned Supplies	**705**	**705**	**705**	**705**	**705**
Total Existing and Planned Supplies	***29,825***	***36,075***	***42,325***	***48,575***	***54,825***
Demands without Additional Conservation[b]	28,020	33,991	40,198	46,494	52,883
Conservation	2,802	6,798	8,040	9,299	10,577
Total Adjusted Demands	25,218	27,193	32,158	37,195	42,307
Surplus/Deficit in Normal Year	**4,607**	**8,882**	**10,167**	**11,380**	**12,518**
Difference as % of Supply	**15%**	**25%**	**24%**	**23%**	**23%**
Difference as % of Demand	**18%**	**33%**	**32%**	**31%**	**30%**

Notes:
(a) From Tables 7-27, 7-30, and 7-32.
(b) From Table 7-13, 7-14, and 7-15. In dry periods demands assume to increase 10% above Normal Year demands.

TABLE 7-38
PROJECTED MULTIPLE-DRY YEAR SUPPLIES AND DEMANDS (AF)

		2015	2020	2025	2030	2035
Multiple-Dry Year First Year Supply	Supply Totals[a]	37,632	43,882	50,132	56,382	62,632
	Demand Totals[b]	25,218	27,193	32,158	37,195	42,307
	Difference	12,414	16,689	17,974	19,187	20,325
	Difference as % of Supply	33%	38%	36%	34%	32%
	Difference as % of Demand	49%	61%	56%	52%	48%
Multiple-Dry Year Second Year Supply	Supply Totals[a]	37,997	44,247	50,497	56,747	62,997
	Demand Totals[b]	25,218	27,193	32,158	37,195	42,307
	Difference	12,779	17,054	18,339	19,552	20,690
	Difference as % of Supply	34%	39%	36%	34%	33%
	Difference as % of Demand	51%	63%	57%	53%	49%
Multiple-Dry Year Third Year Supply	Supply Totals[a]	34,785	41,035	47,285	53,535	59,785
	Demand Totals[b]	25,218	27,193	32,158	37,195	42,307
	Difference	9,567	13,842	15,127	16,340	17,478
	Difference as % of Supply	28%	34%	32%	31%	29%
	Difference as % of Demand	38%	51%	47%	44%	41%

Notes:
(a) From Tables 7-27, 7-30, and 7-32.
(b) From Table 7-13, 7-14, and 7-15. Assumes conservation. In dry periods demands assume to increase 10% above Normal Year demands.

Chapter 8

City of Loma Linda

Chapter 8: City of Loma Linda

8.1 Description of Agency

Loma Linda, incorporated in 1970, is a municipally-owned retail water utility that provides potable water within the City boundaries. Loma Linda's service area, an area approximately 6,784 acres, or 10.6 square miles in size, is part of the greater San Bernardino-Ontario metropolitan area and also within the boundaries of the Valley District service area. Figure 8-1 shows the Loma Linda service area. Loma Linda's water supply consists primarily of groundwater from six (6) production wells. These wells, in the SBBA, supply nearly 100 percent of the total water supply.

Loma Linda has a current service population of approximately 12,200 persons. Loma Linda has prepared an estimate of future population for 2015 to 2035. A population growth rate for each jurisdiction (the City and the unincorporated area), being served by Loma Linda was defined based on the SCAG projected populations for 2008, 2020, and 2035 contained in the 2012 Integrated Growth Forecast. The percentage of the service area included in each jurisdiction was determined using GIS data. As shown in Table 8-1, the projections for the various jurisdictions in the water service area (City of Loma Linda, unincorporated County), were weighted by the percentage of each area within the water service area to derive an overall growth rate. Population projections are shown in Table 8-2.

TABLE 8-1
POPULATION – GROWTH RATE

	2008	2020	2035	Growth Rate 2008-2020	Growth Rate 2020-2035	% of Service Area
Loma Linda	22,559	26,898	31,886	0.0148	0.0114	72
Unincorporated	294,252	306,437	377,494	0.0034	0.0140	28
		Applied Growth Rate		0.0116	0.0121	

TABLE 8-2
POPULATION - CURRENT AND PROJECTED

	2010	2015	2020	2025	2030	2035	Data Source
Service Area Population	12,206	13,079	13,854	14,715	15,630	16,601	Estimated from SCAG

Note: Based on SCAG 2012 Integrated Growth Forecast data.

Loma Linda, like many cities in the state, has experienced the impacts of economic downturn after years of minimal, but steady growth. As in previous years Loma Linda has seen, and is projected to continue seeing, minimal increases in population and job growth; and similar to the nation and state is seeing slight recovery in overall economic activities. Also, like most cities, Loma Linda is faced with the challenges of increasing demands on city services, maintenance efforts (parks, police, fire and general community services), and infrastructure expansion that

growth has brought to the community. Loma Linda estimates that it could grow by an additional 50 percent or about 11,000 persons.

Residential land uses form the largest percentage of developed uses (24 percent), followed by land uses that are categorized as Institutional which make up 9 percent. These uses include medical uses, churches, public facilities, and utilities. Commercial/Industrial makes up the smallest percentage of developed use with just 3.5 percent.

Loma Linda University and Loma Linda University Medical Center are located within the limits of the City, but have their own water production and distribution system. With the exception of fire flow, the City does not provide water service to the University on a normal basis. However, the City is the provider for other large institutional users including the 205-bed Veterans Administration Hospital and the Loma Linda Community Hospital.

8.2 Climate

Loma Linda is located on the southeastern side of the San Bernardino Valley and within the South Coast Hydrologic Region. The climate is a modified Mediterranean type, with hot dry summers and cool, rainy, winters. Average monthly temperature and rainfall recorded by the WRCC for the San Bernardino Station between 1893 and 2004 is shown in Table 9-3. Temperatures average 64 degrees Fahrenheit, with summer highs in the mid-90's and winter lows in the upper 30's. Table 8-3 also shows the reference ETo rate for Loma Linda's service area.

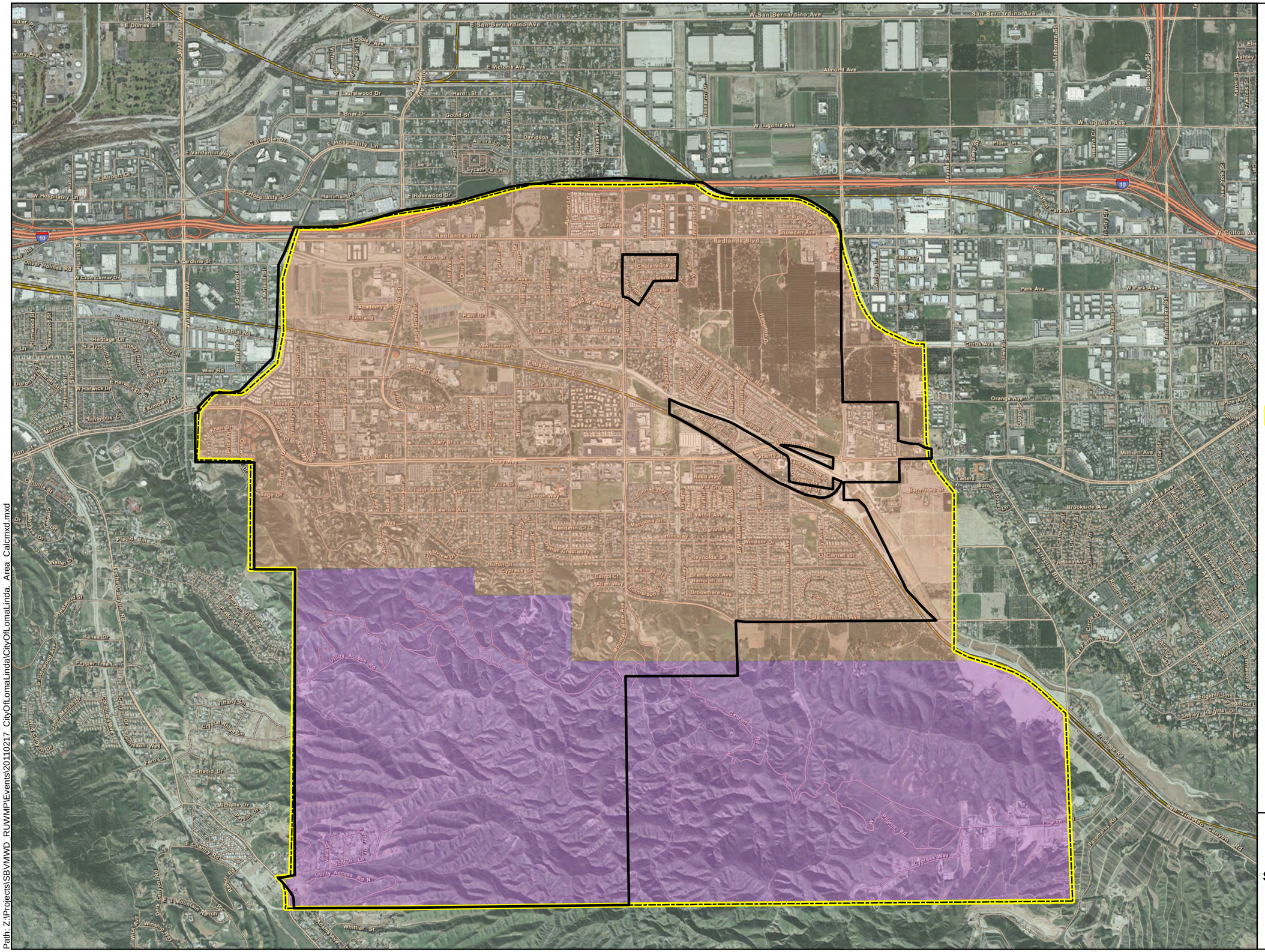
The climate in the San Bernardino Valley is modified by the cold California Current in the Pacific Ocean, the mountain ranges that outline the Los Angeles Basin and interior valleys, and the deserts to the north and east. From fall through spring, Santa Ana winds affect the region. When high pressure exists in the Great Basin and the winds at altitude are oriented north to south, the combination produces strong northerly winds in the San Bernardino Valley. These winds are typically stronger close to the base of the mountains and can reach hurricane strength where they are funneled through canyons. Below the Cajon Pass, maximum winds over 70 miles an hour can be expected during strong Santa Ana conditions.

TABLE 8-3
CLIMATE

	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo	2.17	2.8	4.03	5.1	5.89	6.6
Average Rainfall (inches)	3.22	3.25	2.86	1.29	0.47	0.09
Average Temperature (ºF)	52.3	54.5	56.7	60.9	65.5	71.5

	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average ETo	7.44	6.82	5.7	4.03	2.7	1.86	55.14
Average Rainfall (inches)	0.04	0.15	0.33	0.71	1.32	2.38	16.12
Average Temperature (ºF)	77.7	77.8	74	66.4	58.5	53.2	64.1

Source: Reference Evapotranspiration Rate (in inches/month) for ETo Zone 9, http://www.cimis.water.ca.gov, NOAA webpage – San Bernardino Station Data (1893 - 2004), http://www.wrcc.dri.edu.



Kennedy/Jenks Consultants

Regional Urban Water Management Plan
San Bernardino Valley

CITY OF LOMA LINDA SERVICE AREA AND BOUNDARY

K/J 1089014.00
April 2011
Figure 8-1

Path: Z:\Projects\SBVMWD_RUWMP\Events\20110217_CityOfLomaLinda\CityOfLomaLinda._Area_Calc.mxd

8.3 Historical Water Use

8.3.1 Historical Deliveries

Loma Linda categorizes its water use customers into the following: Single family residential, multi-family residential, commercial/industrial, and landscape. Loma Linda's landscape customers represent approximately four (4) percent of the current metered services and 15 percent of the consumptive water use. These customers include parks, large commercial, community and institutional landscape areas, and schools. Over 90 percent of the Loma Linda's metered customers are residential. The land use development trend within Loma Linda over the past 25 years has historically been from agriculture to residential. Actual water deliveries in 2005 and 2010 are provided in Tables 8-4 and 8-5.

TABLE 8-4
WATER DELIVERIES - ACTUAL 2005

	Metered		Not Metered		Total
Water Use Sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**Volume (AFY)**
Single family	4,119	2,601			2,601
Multi-family	377	860			860
Commercial/Industrial	244	524			524
Industrial					
Institutional/governmental					
Landscape	171	585			585
Agriculture					
Other					
Total	**4,911**	**4,570**	**0**	**0**	**4,570**

TABLE 8-5
WATER DELIVERIES - ACTUAL, 2010[(a)]

	Metered		Not metered		Total
Water Use Sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**Volume (AFY)**
Single family	4,425	2,531			2,531
Multi-family	378	725			725
Commercial/Industrial	257	491			491
Industrial					
Institutional/governmental					
Landscape	202	747			747
Agriculture					
Other					
Total	**5,262**	**4,494**	**0**	**0**	**4,494**

Note:
(a) 2009 data used for 2010

8.3.2 Historic Sales

In the past Loma Linda has not sold any water to other water agencies as shown in Table 8-6.

TABLE 8-6
HISTORIC SALES TO OTHER WATER AGENCIES (AF)

Agency	2005	2006	2007	2008	2009	2010
	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**0**

8.3.3 Historical Other Water Uses

In the past, Loma Linda has not had water use related to saline barriers, groundwater recharge operations, or recycled water. However, Loma Linda, like all water agencies does have some unaccounted-for water. Unaccounted-for water is the difference between the amount of water produced and the amount of water billed to customers. Over the last five years unaccounted for water has been approximately seventeen percent of produced water within Loma Linda's system. However, investigation by the City into this loss rate has shown that a large portion of the loss is a paper loss due to reading and reporting anomalies.

The percentage of unaccounted for water was estimated by comparing water production statistics to water sales statistics. Sources of unaccounted-for water include:

- Hydrant Testing and Flushing - Hydrant testing is performed by both Loma Linda and the Fire Departments. Loma Linda and the Fire Departments perform a comprehensive testing program to monitor the level of fire flows available throughout the service area.
- Fire Hydrant Operations by the Fire Department - This represents the use of water for emergencies.
- Customer Meter Inaccuracies - Customer meters represent one of the main sources of unaccounted-for water as they tend to under-represent actual consumption in the water system.
- Reservoir overflows - This represents unrecorded water use when reservoirs overflow.
- Leaky water lines - Leakage from water pipes is a common occurrence in water systems. A significant number of leaks remain undetected over long periods of time as they are very small; however these small leaks contribute to the overall unaccounted-for water.

Table 8-7 summarizes what the California Department of Water Resources refers to as "other" water uses, besides metered deliveries and sales to other agencies.

TABLE 8-7
HISTORIC "OTHER" WATER USES (AF)

Water Use[(a)]	2005	2010
Saline Barriers	0	0
Groundwater Recharge	0	0
Conjunctive Use	0	0
Recycled Water	0	0
System Losses	823	996
Total	**823**	**996**

Note:
(a) Any water accounted for in Tables 8-4, 8-5, and 8-6 is not included in this table.

8.3.4 Total Historical Water Use

Table 8-8 below presents information on all historic water uses for the years 2005 and 2010.

TABLE 8-8
HISTORIC TOTAL WATER USE (AF)

Water Use	2005	2010[(a)]
Total Water Deliveries (from Tables 8-4 and 8-5)	4,570	4,494
Sales to Other Water Agencies (from Table 8-6)	0	0
Additional water uses and losses (from Table 8-7)	823	996
Total	**5,393**	**5,490**

Note:
(a) 2009 data used for 2010.

8.4 Existing and Targeted Per Capita Water Use

The Water Conservation Bill of 2009 (SBX7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Bill of 2009 provides the regulatory framework to support the statewide reduction in urban per capita water use described in the *20 by 2020 Water Conservation Plan*. Consistent with SBX7-7, each water supplier must determine and report its existing baseline water consumption and establish future water use targets in GPCD; reporting is to begin with the 2010 UWMP.

The two primary calculations required by SBX7-7 are:

1. Base Daily Water Use calculation (average GPCD used in past years)
2. Compliance Water Use Target (target gallons per capita per day in 2015 and 2020)

The Base Daily Water Use calculation is based on gross water use by an agency in each year and can be based on a ten-year average ending no earlier than 2004 and no later than 2010 or a 15-year average if ten percent of 2008 demand was met by recycled water. Base Daily Water Use must account for all water sent to retail customers, excluding:

- Recycled water
- Water sent to another water agency
- Water that went into storage

It is at an agency's discretion whether or not to exclude agricultural water use from the Base Daily Water Use calculation. If agricultural water use is excluded from the Base Daily Water Use calculation it must also be excluded from the calculation of actual water use in later urban water management plans. Loma Linda does not specifically account for agricultural water use in its service area. Any incidental agricultural water has been included in the Base Daily Water Use Calculation.

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). There are four methods for calculating the Compliance Water Use Target:

1. Eighty percent of the urban water supplier's baseline per capita daily water use
2. Per capita daily water use estimated using the sum of the following:
    a. For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of DWR's 2016 report to the Legislature reviewing progress toward achieving the statewide 20 percent reduction target, this standard may be adjusted by the Legislature by statute.
    b. For landscape irrigated through dedicated or residential meters or connections, water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in section 490 et seq. of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992.
    c. For CII uses, a ten percent reduction in water use from the baseline CII water use by 2020.
3. Ninety-five percent of the applicable state hydrologic region target as stated in the state's April 30, 2009, draft 20 by 2020 Water Conservation Plan. Loma Linda falls within the South Coast Hydrologic Region; the region target is 142 GPCD.
4. Reduce the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:
    a. Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "BMP Calculator".
    b. A 20 percent savings on all unmetered uses.
    c. A 10 percent savings on baseline CII use.
    d. A 21.6 percent savings on current landscape and water loss uses.

The Interim Water Use Target is set as a halfway point between the Base Daily Water Use GPCD and the 2020 Compliance Water Use Target GPCD.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95 percent of a 5-year average base gross water use ending no earlier than 2003 and no later than 2010. The Maximum Allowable GPCD use is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBX7-7 legislation. If an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as their target.

8.4.1 Base Daily Per Capita Water Use

Figure 8-1 illustrates both the overall Loma Linda service area and the portion of the service area currently served. For the purposes of this SBX7-7 calculation, the part of the service area designated as "Area Served" in Figure 8-1 is the distribution area used to estimate the Base Daily Per Capita Water Use. Tables 8-9 through 8-11 summarize the Base Daily Water Use calculation for Loma Linda. As is shown in these tables, Loma Linda is not eligible to use a 15-year base period. Years 1999 to 2008 have been selected for calculation of the 10-year base period while years 2004 to 2008 have been selected for calculation of the 5-year base period.

TABLE 8-9
BASE PERIOD RANGES

Base	Parameter	Value
10- to 15- Year Base Period	2008 Total Water Deliveries (AF)	5,209
	2008 Total Volume of Delivered Recycled Water (AF)	0
	2008 Recycled Water as a Percent of Total Deliveries (%)	0
	Allowable Base Period (years) [(a)]	10
	Year Beginning Base Period Range	1999
	Year Ending Base Period Range [(b)]	2008
5-Year Base Period	Year Beginning Base Period Range	2004
	Year ending Base Period Range [(c)]	2008

Notes:
(a) If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater the base period can be a continuous 10- to 15-year period.
(b) The ending year must be between December 31, 2004 and December 31, 2010.
(c) The ending year must be between December 31, 2007 and December 31, 2010.

In order to calculate Base Daily Per Capita Water Use for past years, it was necessary to develop population estimates for past years. Though the City water service area includes a portion of unincorporated county, as shown in Figure 8-1, the actual area served is limited to the City of Loma Linda. Loma Linda's service area population for years 1995 to 2004 was estimated based on Census Data for years 1990, 2000, and 2010 for the City of Loma Linda. The Loma Linda Water Department serves all residential uses in the City of Loma Linda, with the exception of dormitories served by Loma Linda University. The population for the City of Loma Linda was taken from the 1990, 2000, and 2010 Census and the intervening years estimated. Population in dormitories was also estimated using Census data ("population in group quarters"). After establishing the annual population, the dormitory population was subtracted.

TABLE 8-10
BASE DAILY PER CAPITA WATER USE, 10-YEAR

Sequence Year	Calendar Year	Distribution System Population[(a)]	Daily System Gross Water Use (MGD)	Annual Daily Per Capita Water Use (GPCD)
1	1999	18,094	5	257
2	2000	18,082	5	268
3	2001	18,453	5	257
4	2002	18,824	5	260
5	2003	19,195	5	242
6	2004	19,566	5	252
7	2005	19,938	5	242
8	2006	20,309	5	250
9	2007	20,680	6	269
10	2008	21,051	5	251
Base Daily Per Capita Water Use, 10-Year Average				*255*

Note:
(a) Distribution system population based on census data for the City of Loma Linda.

TABLE 8-11
BASE DAILY PER CAPITA WATER USE, 5-YEAR

Sequence Year	Calendar Year	Distribution System Population[(a)]	Daily System Gross Water Use (MGD)	Annual Daily Per Capita Water Use (GPCD)
1	2004	19,566	5	252
2	2005	19,938	5	242
3	2006	20,309	5	250
4	2007	20,680	6	269
5	2008	21,051	5	251
Base Daily Per Capita Water Use, 5-Year Average				*253*

Note:
(a) Distribution system population based on census data for the City of Loma Linda.

Table 8-11 provides the data on the Maximum Allowable GPCD. The Maximum Allowable GPCD is based on 95 percent of the 5-year average base gross water use. In this case 95 percent of the 5-year GPCD is 240 GPCD.

8.4.2 Compliance Water Use Targets

In addition to calculating base gross water use, the “20 by 2020” legislation requires that a retail water supplier identify its demand reduction targets. The methodologies for calculating demand reduction targets were described above. Loma Linda is choosing to meet SBX7-7 targets as an individual agency rather than as part of a regional alliance. Loma Linda has selected Method 1, 80 percent of Base Daily Per Capita Water Use, to calculate the agency’s 2020 Compliance Water Use Target and Interim Water Use Target. The 2020 Compliance Water Use Target, under Method 1 is therefore, 204 GPCD. The Interim Water Use Target is 230 GPCD. These calculations are summarized in Table 8-12.

As described earlier, the Maximum Allowable GPCD is 240. The Compliance Water Use Target, under Method 1 (204 GPCD) is less than the Maximum Allowable GPCD, so no adjustments to the Compliance Water Use Target are necessary.

In order to meet the water use targets prescribed by SBX7-7, Loma Linda will have to reduce current water use by approximately 9 percent by the year 2015 and by approximately 19 percent by year 2020. The programs which Loma Linda intends to use to achieve these conservation goals are described in Section 8.7.3.

TABLE 8-12
WATER USE TARGET CALCULATION - METHOD 1

Selected 10-year Average Base Daily Water Use	255	GPCD
Selected 5-year Average Base Daily Water Use	253	GPCD
Compliance Water Use Target (20% Reduction on 10-yr)	204	GPCD
Maximum Allowable Water Use Target (5% Reduction on 5-yr)	240	GPCD
2020 Target	204	GPCD
2015 Target	230	GPCD

8.5 Projected Water Use

8.5.1 Purveyor Projections

Based on the SCAG population projections for years 2008, 2020, and 2035 contained in their 2012 Integrated Growth Forecast, Loma Linda derived a population growth rate for each jurisdiction served by the City of Loma Linda. The percentage of the service area included in each jurisdiction was determined using GIS. As shown in Table 8-1 above, the projections for the various jurisdictions in the water service area (City of Loma Linda, unincorporated County), were weighted by the percentage of each area within the water service area to derive an overall growth rate. This growth rate was applied to base year (2008) water demands to derive estimates of water demands as shown in Tables 8-13 to 8-15.

TABLE 8-13
WATER DELIVERIES - PROJECTED, 2015

	Metered		Not metered		Total
Water Use Sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**Volume (AFY)**
Single family	4,835	3,480			3,480
Multi-family	400	1,177			1,177
Commercial/Industrial	276	785			785
Industrial					
Institutional/Governmental					
Landscape	218	944			944
Agriculture					
Other					
Total without Conservation	*5,729*	*6,385*	*0*	*0*	*6,385*
Total with Conservation (assumed 9% by year 2015)	*5,729*	*5,811*	*0*	*0*	*5,811*

TABLE 8-14
WATER DELIVERIES - PROJECTED, 2020

Water Use Sectors	Metered # of accounts	Metered Volume (AFY)	Not metered # of accounts	Not metered Volume (AFY)	Total Volume (AFY)
Single-family	5,121	3,686			3,686
Multi-family	423	1,246			1,246
Commercial/Industrial	293	832			832
Industrial					
Institutional/Governmental					
Landscape	230	1,000			1,000
Agriculture					
Other					
Total without Conservation	*6,068*	*6,764*	*0*	*0*	*6,764*
Total with Conservation (assumed 19% year 2020 and thereafter)	*6,068*	*5,478*	*0*	*0*	*5,478*

TABLE 8-15
WATER DELIVERIES - PROJECTED 2025, 2030, AND 2035

Water Use Sectors	2025 Metered # of accounts	2025 Metered Volume (AFY)	2030 Metered # of accounts	2030 Metered Volume (AFY)	2035 Metered # of accounts	2035 Metered Volume (AFY)
Single family	5,425	3,915	5,746	4,158	6,087	4,417
Multi-family	448	1,324	475	1,406	503	1,494
Commercial/Industrial	310	883	329	938	348	996
Industrial						
Institutional/governmental						
Landscape	244	1,062	259	1,128	274	1,198
Agriculture						
Other						
Total without Conservation	*6,428*	*7,184*	*6,809*	*7,630*	*7,212*	*8,105*
Total with Conservation (assumed 19% year 2020 and thereafter)	*6,428*	*5819*	*6,809*	*6,180*	*7,212*	*6,565*

8.5.2 Projected Sales and Other Water Uses

Loma Linda does not anticipate any regular or single large sales to other agencies in the future. As in the past, Loma Linda does not anticipate future water use related to saline barriers, groundwater recharge operations, or recycled water. For the purpose of projections, unaccounted-for water is assumed to be 17 percent as shown in Table 8-16 as ‘system losses’. The estimate of 17 percent loss is very conservative; Loma Linda has been aggressively addressing meter errors which are believed responsible for a large portion of unaccounted water.

TABLE 8-16
FUTURE SALES AND "OTHER" WATER USES (AF)

Water Use[a]	2015	2020	2025	2030	2035
Sales to Other Agencies	0	0	0	0	0
Saline Barriers	0	0	0	0	0
Groundwater Recharge	0	0	0	0	0
Conjunctive Use	0	0	0	0	0
Recycled Water	0	0	0	0	0
System Losses	985	928	985	1,046	1,111
Total	**985**	**928**	**985**	**1,046**	**1,111**

Note:
(a) Any water accounted for in Tables 8-13, 8-14, and 8-15 is not included in this table.

8.5.3 Total Projected Water Use

Table 8-17 presents information on all projected water uses for the years 2015 to 2035.

TABLE 8-17
TOTAL PROJECTED WATER USE (AF)

Water Use[a]	2015	2020	2025	2030	2035
Total Water Deliveries (from Tables 8-13, 8-14, and 8-15)[a]	5,810	5,479	5,819	6,180	6,565
Sales to Other Water Agencies (from Table 8-16)	0	0	0	0	0
Additional water uses and losses (from Table 8-16)	985	931	989	1,050	1,116
Total	**6,795**	**6,410**	**6,808**	**7,230**	**7,681**

Note: (a) Assumes conservation.

8.5.4 Water Use Projections for Lower Income Households

Senate Bill 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier. Loma Linda contains two jurisdictions, the City of Loma Linda and the unincorporated County of San Bernardino.

The City of Loma Linda updated its housing element in May 2009. The housing element estimates that approximately 37.5 percent of all households in the City are "very-low" or "low" income. The County of San Bernardino updated its housing element in May 2007. The County Housing Element provides information on regional housing needs and states goals for new housing to accommodate very-low and low-income households. Despite this, the County of San Bernardino housing element does not provide any information that can be used to develop trends to calculate the future number of low-income household units or associated water demand specific to the Loma Linda water service area.

Table 8-18 makes an estimate of future low-income water demands. Table 8-18 assumes a similar occurrence of low-income households in that portion of the Loma Linda service area in

the County of San Bernardino as in the City of Loma Linda (i.e., 37.5 percent). These demands are included within the water demands described in Table 8-17 and assumes conservation.

TABLE 8-18
PROJECTIONS OF FUTURE LOW-INCOME HOUSEHOLD WATER USE (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Estimated Very Low and Low-Income Household Water Use	1,589	1,498	1,591	1,899	2,017

Note:
(a) Assumes 37.5 all future households in Loma Linda water service area qualify as "very-low" or "low" income per the definition provided in Senate Bill 1087.

Further, Loma Linda will not deny or condition approval of water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households unless one of the following occurs:

- Loma Linda specifically finds that it does not have sufficient water supply;
- Loma Linda is subject to a compliance order issued by the State Department of Public Services that prohibits new water connections; or
- the applicant has failed to agree to reasonable terms and conditions relating to the provision of services.

8.6 Other Factors Affecting Water Usage

Two major factors that affect water usage are weather and water conservation. Historically, when the weather is hot and dry, water use increases. The amount of increase varies according to the number of consecutive years of hot, dry weather and the conservation activities imposed. During cool and wet years, historical water usage decreases to reflect less water usage for exterior landscaping. Both weather effects and conservation effects are discussed below.

8.6.1 Weather Effects on Water Usage

As described in Section 8.2, Loma Linda experiences cool winters and dry hot summers. In 2009, during the winter months (November, December, January) Loma Linda customers used only about 217 GPCD; while in the summer months customers used about 233 GPCD. This variation gives some indication about how weather affects water demands in the Loma Linda service area. Past studies have indicated that demands on average increase about 7 to 12 percent during dry periods. For this analysis it is estimated that demands will increase ten percent during dry periods.

8.7 Demand Management Measures

In recent years, water conservation has become an increasingly important factor in water supply planning in California. DMMs are programs and activities through which a water supplier can communicate with their customers and encourage and incentivize water conservation. The Urban Water Management Plan Act identities 14 DMMs that are to be evaluated in each UWMP. Although Loma Linda is not a signatory to the California Urban Water Conservation

Council Memorandum of Understanding Regarding Urban Water Conservation in California, the UWMP Act requires compliance with DMMs. The UWMP Act required different information for DMMs that have been implemented or are scheduled for implementation and DMMS not implemented or not scheduled for implementation.

For those DMMs being implemented or scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(f):

- Description of the DMM
- A description of the steps necessary to implement the measure
- An implementation schedule
- Estimated if available of conservation savings and the effect of the savings on the suppliers' ability to further reduce demand

Methods to evaluate DMM effectiveness and estimates of potential conservation savings are detailed in Appendix F. Loma Linda is now expanding its conservation programs and currently the potential for demand hardening is considered to be very low. However, as conservation devices and practices are more widely adopted in the service area, Loma Linda will evaluate the potential for demand hardening.

For those DMMs not implemented or not scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(g):

- Economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors
- A cost-benefit analysis, identifying total benefits and total costs
- A description of funding available to implement any planned water supply project that would provide water at a higher unit cost
- A description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation

8.7.1 DMMs Currently Being Implemented or Scheduled for Implementation

This section describes DMMs currently being implemented or scheduled for implementation by Loma Linda.

8.7.1.1 Conservation Coordinator

To be in compliance with this DMM, Loma Linda must establish a conservation coordinator position and employ (either staff or consultant) a water conservation coordinator. Conservation program tasks are assigned to a number of Loma Linda employees.

By December 2011 Loma Linda will clarify the tasks and roles of staff involved in conservation and establish a single individual at the City to maintain conservation records and to act as the conservation contact person.

8.7.1.2 Water Waste Prevention

To be in compliance with this DMM, a water agency must do one or more of the following:

- Enact and enforce an ordinance or establish terms of service that prohibit water waste (single pass cooling, vehicle washing, commercial laundry systems and decorative fountains).
- Enact and enforce an ordinance or establish terms of service for water efficient design in new development (irrigation and landscape design).
- Support legislation or regulations that prohibit water waste.
- Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures.
- Support local ordinances that prohibit water waste.
- Support local ordinances that establish permits requirements for water efficient design in new development.

Loma Linda has enacted Municipal Code Title 13 in Chapter 13.32 Water-efficient Landscape. The code covers new and rehabilitated landscaping for public agencies and private developments requiring permits. The projects must document the following for approval: maximum applied water allowance, estimated applied water use, estimated water use, design plan, irrigation design, irrigation schedule, maintenance schedule, landscape audit, and provision for existing landscape. Decorative water should be recirculated.

Additionally, Ordinance 443 (Municipal Code Title 13 in Chapter 13.04.940 to 13.04.1070) prohibits excessive use of water specifically targeting water wash downs, runoff, irrigation, and malfunctioning equipment. Service can be discontinued with excessive use. Both these ordinances support the criteria of this DMM; copies of these ordinances are provided in Appendix F.

8.7.1.3 Water Loss Control

Implementation of this DMM consists of performing a water loss audit consistent with AWWA Manual 36 to quantify real and apparent losses. In addition, a water agency must also analyze the components of real and apparent loss, determine the economic value of recovering water loss, and develop a strategy to reduce loss to the extent actions are cost effective.

Currently Loma Linda is not in compliance with this DMM but is in the process of implementing this DMM. The City monitors annually its unaccounted for water and runs a leak detection program. The program addresses customer requested reviews, unaccounted-for water in the City system, and a valve exercise program to identify valves needing repair. The City estimated unaccounted-for water to be at about 18 percent in 2009, which is a high loss rate. The issue seems to have been a paper loss and since then some reading and reporting anomalies have

been addressed and corrected. By October 2011 Loma Linda will determine the economic value of recovering the water loss, based on the avoided cost of water. By the end of 2011, Loma Linda will perform an analysis of components of apparent and real losses and will identify actions to reduce loss where cost-effective. Loma Linda will continue its leak detection and main replacement program.

8.7.1.4 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

This DMM requires meters for all new service connections, establishing a program for retrofit of existing but unmetered connections, and billing customers by volume of use. This DMM also requires that a water agency have a meter maintenance and replacement plan. Loma Linda is in the process of coming into compliance with this DMM. All of the City's residential, commercial and industrial customers are metered and billed bi-monthly with tiered rates. Municipal customers are metered but not billed; the meter reading began for these customers in July 2009. The City has a meter maintenance and replacement program with replacements occurring every 10 years, larger meters every five years and annual calibration of the meters at the Veterans Administration Hospital.

The City is currently in the process of updating its meters to Automatic Meter Readers (AMR).

8.7.1.5 Retail Conservation Pricing

There are multiple aspects related to compliance with this DMM. This DMM requires a volumetric rate structure, which can be uniform, tiered, allocation-based or seasonal rates as long as the volumetric portion meets minimum levels (70 percent of the revenues must come from the variable rate). Those agencies that provide retail sewer service also have to comply with conservation pricing but the requirements do not include the 70 percent threshold. The requirements are any rate designed to recover the cost of providing service and billing for sewer service based on metered water use; these can be uniform rates, increasing block rates or long-run marginal cost rates. Rates that charge customers a fixed amount per billing cycle or rates defined by high fixed and low commodity charges do not satisfy the definition of conservation pricing of sewer service.

All of Loma Linda's retail customers are metered and billed with tiered rates bimonthly. In FY 2012 the City will evaluate implementing a water rate structure whereby volumetric rates account for at least 70 percent of the water revenue.

8.7.1.6 Public Information Programs

The intent of this DMM is to have customer contact through events, paid and public service advertising, mailers, billings as well as social marketing and other public information programs. To be in full compliance a water agency must have quarterly contact with the public and media.

Loma Linda is in compliance with this DMM. The City provides informational materials to customers through paid advertising, bill inserts, public service announcements, media events, and other activities.

8.7.1.7 School Education Programs

To be in compliance with this DMM, a water agency must have a conservation-related school education program and must provide support and educational materials to local school districts. Loma Linda does not maintain an active school education program but educational materials and speakers are available upon request.

By December 2011, Loma Linda will establish a formal education program and track the frequency of school contact to fully assess compliance with this DMM. The City will include water conservation in its stormwater and solid waste education programs in fiscal year 2011.

8.7.1.8 Water Sense Specification for New Residential Development

This DMM encourages replacement of old plumbing fixtures with plumbing fixtures with WSS [5] fixtures. To be in compliance with this DMM a water agency must provide incentives such as rebates, recognition programs, reduced connection fees, or have ordinances requiring residential construction meeting WSS for single and multi-family housing. These incentives are to be offered until the California universal retrofit on resale statute[6] goes into effect (year 2014) or until all new residential construction meets WSS standards.

Loma Linda will participate in implementation of the 2010 CAL Green Code which was adopted by the Building Standards Commission in January 2010 and will go into effect January 2011. The Code sets mandatory green building measures, including a 20 percent reduction in indoor water use, as well as dedicated meter requirements and regulations addressing landscape irrigation and design; the Code also identifies voluntary measures that set a higher standard of efficiency, which can also be adopted.

It is anticipated that indoor water use in WSS homes will be 20 percent lower than in older homes that do not have WSS plumbing fixtures. The amount of water savings however will depend on the extent of future residential development.

8.7.2 Evaluation of DMMS Not Implemented

This section describes DMMs not being implemented. For each DMM not being implemented, an explanation is provided.

8.7.2.1 Residential Assistance Program and Landscape Water Surveys

About 58 percent of the Loma Linda's water use is residential; three-quarters of this is single family and one-quarter is multi-family. Also, about 85 percent of the City's housing stock is pre-1992 which is when the Federal plumbing standards took effect.

[5] WaterSense is an Environmental Protection Agency sponsored program that promotes water-efficient products, programs, and practices. In order to carry the WSS label a product must be independently certified as using 20 percent less water than average products in that category.

[6] Effective January 1, 2014, Senate Bill 407 requires that all pre-1994 residential, multi-family and commercial customers replace non-compliant plumbing fixtures (including toilets, faucets, and shower heads) with water-conserving fixtures when making certain improvements or alterations to a building. By 2017, all single family homes must replace non-compliant plumbing fixtures, and by 2019, all multifamily and commercial buildings must have compliant water-conserving plumbing fixtures in place.

Implementation of this DMM consists of providing leak detection assistance and landscape water surveys to an average of 1.5 percent of single family and 1.5 percent of multi-family units per year for 10 years. Once that target is met, this DMM requires that a water agency maintain a program whereby surveys are performed in response to high-bill complaints or surveys are performed for at least 0.75 percent of single-family and multi-family units each year.

Loma Linda is not implementing either the Residential Assistance Program DMM or the Landscape Water Survey DMM and is filing a cost-effectiveness exemption. The cost-effectiveness analysis for these programs was combined, because, from a programmatic perspective, they would likely be implemented together as an indoor and outdoor audit. To be in compliance with the DMM, Loma Linda would need to complete 66 single family and seven multi-family (indoor only) audits. Implementing and managing a program that would meet these requirements would cost Loma Linda about $28,000 per year and yield a benefit to cost ratio of 0.13 (Table 8-19). Details on the cost-effectiveness calculations are provided in Appendix F.

TABLE 8-19
COST EFFECTIVENESS OF RESIDENTIAL LANDSCAPE SURVEY PROGRAMS

Annual Costs	$27,991
Annual Benefits	$3,774
Benefit/Cost	0.13
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$940
Water Savings (AFY)	40

8.7.2.2 High-Efficiency Clothes Washers (HECWs)

The intent of this DMM is to encourage replacement of old clothes washers with HECW using financial incentives. Qualifying HECWs must meet an average water factor value of 5.0 or the WaterSense Specification, whichever is lower. The annual target is one percent of current single-family accounts or 1.4 percent per year of the market penetration during the first ten years of the program.

Loma Linda is not implementing a HECW rebate and is filing a cost-effectiveness exemption. To be in compliance with the DMM, Loma Linda would need to provide 44 rebates per year. Implementing and managing a program that would meet these requirements would cost Loma Linda about $8,300 per year and yield a benefit to cost ratio of 0.46 (Table 8-20). Details on the cost-effectiveness calculations are provided in Appendix F.

TABLE 8-20
COST EFFECTIVENESS OF HECW REBATE PROGRAMS

Total Costs	$8,235
Total Benefits	$3,816
Benefit/Cost	0.46
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$239
Water Savings (AFY)	34

8.7.2.3 WaterSense Specification Toilets

To be in compliance with this DMM an agency must offer incentives for toilets meeting the current WSS standard. Compliance entails demonstrating replacement of a number of toilets of 3.5 gallons per flush (or greater) with: (a) at least as many toilets as would be replaced should a retrofit upon resale ordinance be in effect, or (b) demonstration of 75 percent market saturation with WSS standard toilets.

Loma Linda is not currently implementing a WSS toilet rebate program, nor has it estimated saturation and is going to file a cost-effectiveness exemption.

To be in compliance with the DMM, the City needs to provide 95 single family and 8 multi-family rebates per year. Implementing and managing a program that would meet these requirements would cost Loma Linda about $12,000 per year and yield a benefit to cost ratio of 0.36 (Table 8-21).

TABLE 8-21
COST EFFECTIVENESS OF WSS TOILET PROGRAMS

Total Costs	$11,858
Total Benefits	$4,211
Benefit/Cost	0.36
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$331
Water Savings (AFY)	36

Important to note is that effective January 1, 2014, SB407 requires that all pre-1994 residential, multi-family and commercial customers replace non-compliant plumbing fixtures (including toilets, faucets, and shower heads) with water-conserving fixtures when making certain improvements or alterations to a building. By 2017, all single family homes must replace non-compliant plumbing fixtures, and by 2019, all multifamily and commercial buildings must have compliant water-conserving plumbing fixtures in place. This seems to imply that as of January 1, 2014 all suppliers will be meeting their requirements which by definition must be at least as effective as a retrofit on resale.

8.7.2.4 Commercial, Industrial, and Institutional (CII)

To be in compliance with this DMM an agency must reduce CII water use by 10 percent of the baseline over a 10-year period. Implementation can be achieved through one or both of the following:

- Implementing measures on the CUWCC CII list with well-documented savings. These measures target commercial water use that include: toilets, urinals, clothes washers, cooling towers, food steamers, ice machines, steam sterilizers, water brooms and dry vacuum pumps.
- Implementing unique conservation measures whose water savings are calculated on a case-by-case basis. Sample measures include: industrial process water use reduction, industrial laundry retrofits, car wash recycling systems, water-efficient commercial dishwashers, and wet cleaning.

About 10 percent of Loma Linda's water use is by CII customers. Loma Linda does not currently have any formal CII water use efficiency program established. There are few CII accounts; the largest customer is the Veteran's Administration Hospital. To be in compliance with the DMM, Loma Linda needs to reduce CII use by 7 AFY by 2020. Loma Linda has examined the cost effectiveness from a mix of CII programs recommended by the CUWCC (Table 8-22). These include both indoor and landscape program options because both can be used to meet the 10 percent reduction requirements. The results indicate that most programs are not cost-effective, with possible exception of washer rebates and therefore Loma Linda is filing a cost-effectiveness exemption.

TABLE 8-22
COST EFFECTIVENESS OF CII PROGRAMS

	Lifetime Water Savings (AF)	Cumulative Value of Saved Water ($)	Annual Costs ($)	B/C	$/AF
CII WBICs Rebate	8	$1,000	$1,468	0.7	$186
CII WBICs Direct Install	8	$1,000	$ 4,894	0.2	$621
CII Precision Nozzles Distribution.	6	$805	$2,936	0.3	$502
Dedicated Irrigation Surveys	52	$6,943	$15,428	0.5	$299
CII Indoor Surveys	66	$8,331	$ 543,750	0.0	$8,274
CII Performance Based Program	66	$ 8,331	$8,629	1.0	$131
CII HE Washer Rebates	177	$ 19,612	$ 18,022	1.1	$ 102
CII HET Rebates	113	$ 13,295	$ 33,784	0.4	$298
CII HE Urinal Rebates	126	$14,564	$ 57,340	0.3	$456
CII ULV Urinal Rebates	126	$14,564	$49,376	0.3	$393
CII Zero Consumption Urinal Rebates	126	$14,564	$43,355	0.3	$345

8.7.2.5 Large Landscape

There are multiple elements related to this DMM, all related to providing non-residential customers with support and incentives to improve their landscape water use efficiency. Specific activities include:

- Developing water use budgets at 70 percent ETo (100 percent for dedicated recreational areas) for 90 percent of accounts with dedicated irrigation meters in 10 years.
- Assisting all accounts that are 20 percent over budget within 6 years.
- Performing surveys on 15 percent of un-metered and mixed use meter accounts in 10 years (CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both the Landscape and CII DMMs).
- Providing an incentive program for irrigation equipment retrofits.
- Providing notices each billing cycle with water use budgets.
- Accounts without Meters or with Mixed-Use Meters:
    - Developing and implementing a strategy for marketing surveys.
    - Offer financial incentives.

Loma Linda is not implementing the Landscape DMM because it is not cost-effective, there are jurisdictional challenges, and because any savings are likely insignificant given that the service area is largely residential. To meet the requirements of the Large Landscape DMM Loma Linda would have to conduct about 16 surveys per year which would not be cost-effective, with a benefit to cost ratio of 0.20 (Table 8-23). This result is based on a survey cost of $3,200 each.

TABLE 8-23
COST EFFECTIVENESS OF LARGE LANDSCAPE PROGRAM

Total Costs	$4,894
Total Benefits	$1,000
Benefit/Cost	0.20
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$621
Water Savings (AFY)	8

8.7.3 DMM Implementation and Urban Water Use Targets of the 20x2020 Plan

As part of the IRWMP and UWMP process, agencies in the San Bernardino Valley area have formed a group to study and address conservation needs in the San Bernardino Valley. The first step in this process was identifying the costs and benefits of various demand management measures. Special attention was given to those demand management measures that are not cost effective for an individual agency, but which could be cost effective if implemented as part of a regional collaboration. The following demand management measures were identified as potentially cost effective if costs could be shared among multiple entities:

- High Efficiency Clothes Washers Rebates
- Water Sense Specification Toilet Rebates
- Large Landscape support and incentive programs
- Programs Targeted at large CII customers

The second step in the process was to identify the water conservation target, which was done as part of this UWMP. At the conclusion of Steps 1 and 2, the agencies participating in this UWMP met to coordinate regional implementation of selected conservation actions. The group intends to engage a Regional Conservation Coordinator. In addition to the programs listed above, the Regional Conservation Coordinator would lead public outreach programs and school education programs. The UWMP agencies, along with the Regional Conservation Coordinator will evaluate existing agency resources available to assist with conservation programs and then select conservation programs and processes to be implemented at the regional level. The UWMP agencies will utilize the Regional Conservation Coordinator to track conservation actions, conservation successes, and estimate water savings. The group anticipates having a regional water conservation strategy developed by the end of 2011 and start implementation in 2012.

Loma Linda will track its conservation actions. Loma Linda will continue with its existing conservation programs, will participate in the region-wide conservation programs, and will work with its land use partners to implement both the Landscape Model Ordinance and 2010 California Green Building Standards Code.

As part of its annual reporting of public water system statistics to the California Department of Public Health, Loma Linda will evaluate progress toward reducing water use in terms of gallons per capita per day.

8.8 Water Resources

Chapter 2 of this UWMP provides a description of imported water supplies and groundwater supplies available in the San Bernardino Valley. Chapter 2 also provides a description of supply reliability for imported water and groundwater. The paragraphs below provide information on the current and projected use of these supplies by Loma Linda.

8.8.1 Imported Water Supplies

Loma Linda has not imported water since 2002 and as part of their water planning activities does not intend to import water (see Table 8-24).

TABLE 8-24
WHOLESALE SUPPLIES - EXISTING AND PLANNED SOURCES OF WATER (AF)

Wholesale Source	Contracted Volume	2010	2015	2020	2025	2030	2035
Purchase from Valley District	0	0	0	0	0	0	0

8.8.2 Groundwater

Loma Linda's primary source of water is groundwater wells within the upper Santa Ana River Basin. The City's six groundwater wells are located within the SBBA. Replenishment of the basin is from rainfall and snow melt from the surrounding mountains and imported water. Loma Linda current operates five wells, ranging in capacity from 1,000 to 3,300 gallons per minute (gpm), having a total effective production capacity of 9,050 gpm. A sixth well which yields 1,500 gpm is not utilized due to high levels of fluoride. Historic groundwater production by Loma Linda is shown in Table 8-25. In addition, for approximately the last 10 years, Loma Linda has purchased groundwater produced by SBMWD. Loma Linda anticipates discontinuing purchases from SBMWD in the next few years. Anticipated groundwater production from the SBBA for future years is detailed in Table 8-26.

TABLE 8-25
GROUNDWATER VOLUME PUMPED (AF)

Basin Name	*Metered or Unmetered?*	2005	2006	2007	2008	2009
SBBA	Metered	5,394	5,685	6,231	5,919	5,492
SBBA Water Purchased from SBMWD	Metered	0	1,121	1,587	1,208	1,159
Groundwater as Percent of Total Water Supply		*100%*	*100%*	*100%*	*100%*	*100%*

TABLE 8-26
GROUNDWATER - VOLUME PROJECTED TO BE PUMPED (AF)

Basin Name	*Metered or Unmetered?*	2015	2020	2025	2030	2035
SBBA	Metered	6,780	6,384	6,780	7,202	7,649
Groundwater as Percent of Total Water Supply		*100%*	*100%*	*100%*	*100%*	*100%*

8.8.2.1 Groundwater Supply Reliability

In the past Loma Linda's groundwater supply was impacted by perchlorate from the Redlands-Crafton Plume. As described in Chapter 2, the Lockheed Martin Corporation replaced the two Loma Linda wells impaired by perchlorate with two new wells that include wellhead treatment (Loma Linda 2005). The City has also had to carefully monitor high arsenic, fluoride, and DBCP

in well water. To address arsenic in City water, an arsenic removal facility was installed, providing treatment to two wells. Water from the various wells is blended to further dilute any contaminants and to achieve all applicable health and safety standards.

In addition to groundwater wells, Loma Linda also has various interconnections with adjacent water systems such as the University of Loma Linda, the City of San Bernardino and the City of Redlands, to assist in alleviating localized problems should they arise.

Based on current conditions water quality is not anticipated to affect Loma Linda's supply reliability. However, water quality issues are constantly evolving. Loma Linda will take action to protect and treat supply when needed, but it is well recognized water quality treatment can have significant costs.

As described in Chapter 2, the SBBA is adjudicated on a safe yield basis. Loma Linda therefore has the opportunity to develop additional wells and over-extract groundwater under specified conditions contained in the stipulated judgment. The wells in general have provided a stable source of water supply. As described in Chapter 2, extensive modeling has been used to examine groundwater recharge, groundwater pumping, basin storage, groundwater flow, and groundwater plume location and plume migration. Based on these studies it is anticipated that groundwater pumping by Loma Linda and other SBBA users in the Valley District service area will not be reduced or curtailed during a single-dry or multi-dry year.

TABLE 8-27
GROUNDWATER SUPPLIES - SINGLE DRY AND MULTIPLE DRY YEARS (AF)

Wholesale Source	2015	2020	2025	2030	2035
Single-Dry Year	8,800	9,400	9,900	10,200	10,600
Multiple-Dry Year	8,800	9,400	9,900	10,200	10,600

8.8.3 Local Surface Water Supplies

Loma Linda owns 1,020 shares of Bear Valley Mutual Water Company. In 2010, Loma Linda utilized 33.75 AF of water from Bear Valley and 34 AFY is the normal supplies Loma Linda anticipates being available from Bear Valley Mutual Water Company.

Bear Valley Mutual Water Company supplies come from the Santa Ana River and are affected by seasonal and annual variations. To estimate reliability, records from multiple precipitation gauges were reviewed. Year 2002 was selected as the single-dry year, this year had only 25 percent of normal precipitation. Years 2000 through 2002 were selected as the period for the multiple-dry period. This three year period had the lowest average runoff for a consecutive multiple year period. Anticipated local surface supplies are detailed in Table 8-28.

TABLE 8-28
SURFACE WATER SUPPLIES - SINGLE DRY AND MULTIPLE DRY YEARS[(a)] (AF)

Anticipated Supply	Normal	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	*Year 2*	*Year 3*
Santa Ana River/Bear Valley Mutual Water Company	34	8.5	21.75	23.5	8.5
% of Normal	NA	25	64	69	25
Basis of Water Year Data (year or year sequence)	2003	2002	2000	2001	2002

8.8.4 Recycled Water

Loma Linda provides sewer line maintenance and collection services to its customers, while wastewater treatment services are provided under provisions outlined in a JPA with the City of San Bernardino. Wastewater from the Loma Linda service area is treated to secondary levels at the San Bernardino Regional Wastewater Treatment Plant and to tertiary levels at the RIX Plant. An average day demand of approximately 7 MGD of sewage is collected by Loma Linda and treated at the regional plant. In 1995, the City of San Bernardino began operation of RIX to provide treatment of up to 41.0 MGD of secondary effluent from the existing plants of the City of San Bernardino and the City of Colton. Currently the RIX plant discharges approximately 33 MGD for recharge to the Santa Ana River. However, as described in Chapter 11, there is an active planning process to use RIX discharge for direct groundwater recharge and non-potable demands. However, the location of the plant makes providing water to customers upstream of the plant (e.g., Loma Linda) cost-prohibitive.

As described in Chapter 9, the City of Redlands Wastewater Treatment Facility, to the east of Loma Linda can produce up to 6 MGD of high quality tertiary effluent. The City of Redlands and Loma Linda are examining the potential price of providing recycled water to Loma Linda. If recycled water is cost effective, Loma Linda would encourage the use of non-potable water at facilities such as schools, parks, community centers, car washes and churches. However, use of recycled water in Loma Linda is still in the evaluation stage and at this time recycled water is not accounted for as a potential future supply for Loma Linda.

8.8.5 Transfers, Exchanges, and Groundwater Banking Programs

8.8.5.1 Transfers and Exchanges

Loma Linda has several connections to local water systems, including the City of San Bernardino, the City of Redlands and the Loma Linda University which could provide short-term water supplies. The emergency connection with the City of Redlands can yield approximately 507 AFY (314 gpm) to Loma Linda. Loma Linda has two emergency supply connections with the City of San Bernardino, to receive up to 4,033 AFY of water. These connections are available only on an as-needed basis if the water supply is available, and cannot be counted as firm supply capacity. Loma Linda has also installed an interconnection with the Loma Linda University water system as an emergency connection only. There exists no formal agreement

for the exchange of water between the City to the University; however, the connection is metered to monitor any exchange of water.

8.8.5.2 Groundwater Banking Programs

Loma Linda benefits from groundwater banking undertaken by other agencies in the SBBA. For details see Chapter 2.

8.8.6 Planned Water Supply Projects and Programs

Projects currently planned in the 2010/2011 Fiscal Year Budget and CIP (City of Loma Linda and the Loma Linda Redevelopment Agency 2010/2011) include the rehabilitation of a 100,000 gallon tank, a 3.2 MG reservoir, an 8 MG reservoir, and associated water valve replacements and water meter replacements. These projects will improve system efficiency and reduce unaccounted water, but not increase the water supply available to Loma Linda in an average, single-dry, or multiple-dry year.

8.8.7 Total Anticipated Water Supply

Table 8-29 summarizes the water resources available to Loma Linda for the 25-year period covered by this plan.

TABLE 8-29
WATER SUPPLIES - CURRENT AND PROJECTED[(a)] (AF)

Water Supply Source	2010	2015	2020	2025	2030	2035
Purchased Imported Water	0	0	0	0	0	0
Loma Linda Produced Groundwater[(b)]	4,496	8,800	9,400	9,900	10,200	10,600
Surface Water	34	34	34	34	34	34
Transfers/Exchanges	0	0	0	0	0	0
Recycled Water	0	0	0	0	0	0
Total	**4,530**	**8,834**	**9,434**	**9,934**	**10,234**	**10,634**

Notes:
(a) This table represent the supplies anticipated to be available to Loma Linda.
(b) Groundwater Production as Projected in 2007 IRWMP. Near-Term production limited to capacity of existing wells, approximately 12,000 AFY.

8.9 Water Shortage Contingency Plan

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, an earthquake which damages delivery or storage facilities, or a regional power outage. Section 5 of this UWMP describes water shortage contingency planning for regional water supply sources (imported water, groundwater). This section focuses on water shortage contingency planning for Loma Linda.

8.9.1 Coordinated Planning

Loma Linda has a system in place to coordinate local resources for shortage preparation conditions. If a disaster shortage occurs, the City Administrator will report continuously to the City Council and inform the San Bernardino County Office of Emergency Services, and Special Council meetings can be convened should authorization for special action be needed. If local resources are overwhelmed by the disaster, the County of San Bernardino Fire Operations of Emergency Services will contact the State of California Governor's Office of Emergency Services for assistance.

8.9.2 Actions to Prepare for Catastrophic Interruption

Extended multi-week supply shortages due to natural disasters or accidents which damage all water sources are unlikely, but would be severe if more than one of Linda Loma's wells were out of service. The City's storage reservoirs hold 14.9 mg, which is sufficient treated water to meet the health and safety requirements of fifty gallons per person for 23,000 people for 12 days. This assumes zero non-residential use.

In the event of a power shortage, Loma Linda has two portable backup generators at their disposal they can utilize to provide supply from one well and boosting within the distribution system. The City also has interconnections with the City of San Bernardino and the City of Redlands for emergency supplies as well as the Loma Linda University water system as an emergency connection. There is no formal agreement for the exchange of water between the City and the University; however, the connection is metered to monitor any exchange of water between the two entities.

8.9.3 Stages of Action to Respond to Water Shortages

Loma Linda's municipal Chapter 13.04 along with Ordinance 443 outlines a three-stage action plan that includes voluntary and mandatory stages of action to be implemented during a water shortage. The key elements are described below along with an outline of specific water supply conditions which are applicable to each stage and the various restrictions and prohibitions included in the ordinance.

Stage 1 - Normal Conditions - Voluntary Conservation Measures: Normal conditions shall be in effect when Loma Linda is able to meet all the water demands of its customers in the immediate future. During normal conditions all water users should continue to use water wisely, to prevent the waste or unreasonable use of water, and to reduce water consumption to that necessary for ordinary domestic and commercial purposes.

Stage 2 - Threatened Water Supply Shortage: In the event of a threatened water supply shortage which could affect Loma Linda's ability to provide water for ordinary domestic and commercial uses, the City Council shall hold a public hearing at which consumers of the water supply shall have the opportunity to protest and to present their respective needs to Loma Linda. The City Council may then, by resolution, declare a water shortage condition to prevail, and the following conservation measures shall be in effect.

- Exterior Landscape Plans - Landscape plans for all new commercial and industrial developments shall provide for timed irrigation and shall consider the use of drought resistant plants. Such plans shall be presented and approved by Loma Linda prior to issuance of a water service letter.
- Excessive Irrigation and Related Waste - No customer of the Loma Linda or other person acting on behalf of or under the direction of a customer shall cause or permit the use of water for irrigation of landscaping or other outdoor vegetation, plantings, lawns or other growth, to exceed the amount required to provide reasonable or excessive waste of water from such irrigation activities or from watering devices or systems. The free flow of water away from an irrigated site shall be presumptively considered excessive irrigation and waste as defined.
- Agricultural Irrigation - Persons receiving water from the Loma Linda who are engaged in commercial agricultural practices, whether for the purpose of crop production or growing of ornamental plants shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. Upon the request of the director of public services, these persons may be required to prepare a plan describing their irrigation practices and equipment, including but not limited to, an estimate of the efficiency of the use of water on their properties.
- Commercial Facilities - Commercial and industrial facilities shall, upon request of the director of public services, provide Loma Linda with a plan to conserve water at their facilities. Loma Linda will provide these facilities with information regarding the average monthly water use by the facility for the last two-year period. The facility will be expected to provide Loma Linda with a plan to conserve or reduce the amount of water used by that percentage deemed by the City Council to be necessary under the circumstances. After review and approval by the director of public services, the water conservation plan shall be considered subject to inspection and enforcement by Loma Linda.
- Parks, Golf Courses, Swimming Pools and School Grounds - Public and private parks, golf courses, swimming pools and school grounds which use water provided by Loma Linda shall use water for irrigation and pool filling between the hours of 6 P.M. and 6 A.M.
- Domestic Irrigation - Upon notice and public hearing, Loma Linda may determine that the irrigation of exterior vegetation shall be conducted only during specified hours and/or days, and may impose other restrictions on the use of water for such irrigation. The irrigation of exterior vegetation at other than these times shall be considered to be a waste of water.
- Swimming Pool - All residential, public and recreational swimming pools, of all sizes, shall use evaporation resistant covers and shall re-circulate water. Any swimming pool which does not have a cover installed during periods of non-use shall be considered a waste of water.
- Runoff and wash down - No water provided by Loma Linda shall he used for the purposes of Wash down of impervious areas without specific written authorization of the director of public services. Any water used on all premises that is allowed to escape the premises and run off into gutters or storm drains shall be considered a waste of water.

- Vehicle Washing - The washing of cars, trucks or other vehicles is not permitted, except with a hose equipped with an automatic shut-off device, or at a commercial facility designated and so designated on Loma Linda's billing records.
- Drinking Water Provided by Restaurants - Restaurants are requested not to provide drinking water to patrons except by request.

Stage 3 - Water Shortage Emergency - Mandatory Conservation Measures: In the event of a water shortage emergency in which Loma Linda may be prevented from meeting the water demands of its customers, the City Council shall, if possible given the time and circumstances, immediately hold a public hearing at which customers of Loma Linda shall have the opportunity to protest and to present their respective needs to the City Council. No public hearing shall be required in the event of a breakage or failure of a pump, pipeline, or conduit causing an immediate emergency. The director of public services is empowered to declare a water shortage emergency, subject to the ratification of the City Council within seventy-two hours of such declaration, and the following rules and regulations shall be in effect immediately following such declarations:

- Prohibition - Watering of parks, school grounds, golf courses, lawn watering, landscape irrigation, wash down of driveways, parking lots or other impervious surfaces, washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water, filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes are prohibited.
- Restaurants - Restaurants shall not serve drinking water to patrons except by request.
- Construction Meters - No new construction meter permits shall be issued by Loma Linda. All existing construction meters shall be removed and/or locked.
- Commercial Nurseries and Livestock - Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.

The Ordinance provides for exceptions under certain circumstances, establishes enforcement provisions, defines the methods for declaring and terminating water conservation stages, and provides for the form of notices and decisions of the City Council. The specific water supply conditions for triggering Loma Linda's mandated conservation measures and the expected reduction in water use are summarized in Table 8-30.

TABLE 8-30
WATER SHORTAGE CONTINGENCY PLAN IMPLEMENTATION PLAN

Stage	Percent Shortage	Conservation Measure	Expected Overall Result
1	Normal Conditions	Voluntary prevention of waste and reduce consumption	NA
2	Up to 25% Supply Reduction	Declaration of water shortage condition; implementation of water conservation measures	10%
3	Up to 50% Supply Reduction	Declaration of water shortage emergency; mandatory conservation measures	Up to 50%

8.9.3.1 Penalties

Provisions of Ordinance No. 443, Section 16 Water Conservation, prohibit the watering of parks, school grounds, golf courses, lawn washing, landscape irrigation, wash-down of driveways, parking lots or other impervious surfaces, washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water, filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes.

Penalties and charges for excessive use are the heart of Ordinance 443 and the strongest incentive for conservation among the users. Service may be terminated to any customer who knowingly and willfully violates any provision of the Water Shortage Plan and Ordinance 443. In addition, civil action penalties by Loma Linda can be enacted as summarized below:

- First Violation – Issuance of written notice of violation of water user.
- Second Violation – A $100 surcharge is imposed on the water meter.
- Third Violation – A $200 surcharge and/or installation of a flow restrictor on the water meter.
- Subsequent Violations – Discontinuance of service.

8.9.4 Financial Impacts of Actions During Shortages

Revenues will be impacted when reduced water sales during the various stages as set forth in Loma Linda's Water Shortage Contingency Plan are initiated. In order to minimize the financial impact this would have on Loma Linda, the monthly fixed revenues (monthly meter charges) need to cover the majority of the fixed costs of the Loma Linda's water system during such an event.

The fixed costs are incurred by Loma Linda regardless of how much or when it delivers water to the customer. These costs generally include administration, personnel, billing, testing, maintenance, meter maintenance, pipeline and facility replacements.

Expenditures during periods of drought may be impacted by additional staffing or advertising costs. Expenses such as capital improvements should be deferred during this reduction in sales when feasible. Loma Linda, which produces all of the water consumed by its customers, will not have the added cost of a more expensive purchased water source.

In order to mitigate the financial impacts of a water shortage, Loma Linda maintains excess funds in the Water Enterprise Fund (Fund). This Fund is used for all operations associated with the running of the water system. Part of the Fund can be used to stabilize rates during periods of water shortage or disasters affecting the water supply. Loma Linda has a current balance of $4.8 million dollars in the Fund (City of Loma Linda and Redevelopment Agency 2010-2011).

Even with the additional monies in the Fund, rate increases may be necessary during a prolonged water shortage. Loma Linda may wish to increase the fixed monthly meter service charge to cover the shortfall in revenue resulting from the decrease in water sales during a water shortage. The additional revenues would also help to cover any increased operating and water expenses that occur.

After an extended water shortage, water revenues are expected to fall below pre-shortage levels. The water use is projected at 90 percent of the pre-shortage use, which could result in a reduction of revenue during the twelve month period after the end of a water supply shortage.

8.9.5 Mechanism to Determine Reductions in Water Use

During water shortage, Loma Linda's Director of Public Services will monitor the supply and demand for water on a daily basis to determine the level of conservation required by the implementation or termination of the water conservation plan stages and will notify the City Council of the necessity for the implementation or termination of each stage if a shortage condition occurs. Each declaration of the City Council implementing or terminating a water conservation stage shall be published at least once in a newspaper of general circulation, and shall be posted at the City's offices.

In normal water supply conditions, production figures are recorded daily. Totals are recorded daily on a continuous computerized monitoring system to the Water Department Supervisor. Totals are reported monthly to the City Administrator and incorporated into the water supply report to the Utilities Commission.

During a Stage 2 and Stage 3 water shortage, daily production figures will be reported to the Water Department Supervisor. The Supervisor compares the daily production to the target daily production to verify that the reduction goal is being met. Reports are forwarded to the City Administration on an as-needed basis, continuously if appropriate. Monthly reports are sent to the Utility Commission. If reduction goals are not met, the Administrator will notify the City Council so that additional action can be taken.

8.9.6 Minimum Water Supply Available During Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the years 2011 to 2013, assuming years 2011 to 2013 repeat the driest three-year historic sequence for each water supply source. As shown in Table 8-31, the total supplies, given a repeat of historically low conditions on all water supplies would be approximately 26,400 AFY. Comparing these supplies to the demand projections provided in Section 8.5, Loma Linda has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

TABLE 8-31
MINIMUM WATER SUPPLY AVAILABLE DURING NEXT THREE WATER YEARS (AFY)

	2011	2012	2013
Purchased Imported Water	0	0	0
Loma Linda Produced Groundwater	8,800	8,800	8,800
Loma Linda Produced Surface Water	9	9	9
Transfers/Exchanges	0	0	0
Recycled Water	0	0	0
Total Supply	**8,809**	**8,809**	**8,809**

8.10 Supply And Demand Comparisons

The UWMP Act requires urban water suppliers assess water supply reliability by comparing total projected water use with the expected water supply over the next twenty years in five year increments. The Act also requires an assessment of single-dry year and multiple-dry years. This section presents the reliability assessment for Loma Linda's service area.

Loma Linda's current water resources are sufficient to meet build out demand based on existing resources and anticipated increases from new development. However, new development will require the installation of additional transmission and distribution lines and possibly new wells.

8.10.1 Normal Water Year

The Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. This section summarizes Loma Linda's water supplies available to meet demands over the 25-year planning period during an average/normal year and compares them to demands for the same period. In Table 8-32 demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Assumptions about supplies and demands are provided in Section 8.5 and 8.8. Table 8-32 demonstrates the Loma Linda anticipates adequate supplies for years 2015 to 2035 under Normal conditions.

8.10.2 Single-Dry Year

The single-dry year is generally the lowest annual runoff for a water source in the record. The single-dry year may differ for various sources. This section summarizes Loma Linda's water supplies available to meet demands over the 25-year planning period during a single-dry year and compares them to demands for the same period. In Table 8-33 demands are assumed to be 10 percent greater in a single-dry year than during a normal year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Table 8-33 demonstrates the Loma Linda anticipates adequate supplies for years 2015 to 2035 under single-dry year conditions.

8.10.3 Multiple-Dry Years

The multiple-dry year is generally the lowest annual runoff for a three year or more consecutive period. The multiple-dry year period may differ for various sources. This section summarizes Loma Linda's water supplies available to meet demands over the 20-year planning period during a multiple-dry year period and compares them to demands for the same time frame. In Table 8-34 demands are assumed to be 10 percent greater in a multiple-dry year than during an average year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Table 8-34 demonstrates the Loma Linda anticipates adequate supplies for years 2015 to 2035 under multiple-dry year conditions.

TABLE 8-32
PROJECTED AVERAGE/NORMAL YEAR SUPPLIES AND DEMANDS (AFY)

	2015	2020	2025	2030	2035
Existing Supplies					
Wholesale/Imported	0	0	0	0	0
Groundwater[(a)]	8,800	9,400	9,900	10,200	10,600
Local Surface Water	34	34	34	34	34
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Existing Supplies	*8,834*	*9,434*	*9,934*	*10,234*	*10,634*
Planned Supplies					
Wholesale/Imported	0	0	0	0	0
Groundwater	0	0	0	0	0
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Planned Supplies	*0*	*0*	*0*	*0*	*0*
Total Existing and Planned Supplies	***8,834***	***9,434***	***9,934***	***10,234***	***10,634***
Demands without Additional Conservation[(b)]	6,385	6,764	7,184	7,630	8,105
Conservation	575	1,285	1,365	1,450	1,540
Total Adjusted Demands	5,811	5,478	5,819	6,181	6,565
Surplus/Deficit in Normal Year	**3,023**	**3,956**	**4,115**	**4,053**	**4,069**
Difference as % of Supply	**34%**	**42%**	**41%**	**40%**	**38%**
Difference as % of Demand	**52%**	**72%**	**71%**	**66%**	**62%**

Notes:
(a) From Table 8-26
(b) From Table 8-13, 8-14, 8-15, 8-16, and 8-17.

TABLE 8-33
PROJECTED SINGLE-DRY YEAR SUPPLIES AND DEMANDS (AFY)

	2015	2020	2025	2030	2035
Existing Supplies					
Wholesale/Imported	0	0	0	0	0
Groundwater[(a)]	8,800	9,400	9,900	10,200	10,600
Local Surface Water	9	9	9	9	9
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Existing Supplies	*8,809*	*9,409*	*9,909*	*10,209*	*10,609*
Planned Supplies					
Wholesale/Imported	0	0	0	0	0
Groundwater	0	0	0	0	0
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Planned Supplies	*0*	*0*	*0*	*0*	*0*
Total Existing and Planned Supplies	***8,809***	***9,409***	***9,909***	***10,209***	***10,609***
Demands without Additional Conservation[(b)]	7,024	7,440	7,902	8,393	8,915
Conservation	632	1,414	1,501	1,595	1,694
Total Adjusted Demands	6,392	6,026	6,401	6,799	7,221
Surplus/Deficit in Normal Year	**2,417**	**3,382**	**3,508**	**3,410**	**3,387**
Difference as % of Supply	**27%**	**36%**	**35%**	**33%**	**32%**
Difference as % of Demand	**38%**	**56%**	**55%**	**50%**	**47%**

Notes:
(a) From Table 8-27
(b) From Table 8-13, 8-14, 8-15, 8-16, and 8-17. Assumes 10 percent increase in demands in dry years.

TABLE 8-34
PROJECTED MULTIPLE-DRY YEAR SUPPLIES AND DEMANDS (AFY)

		2015	2020	2025	2030	2035
Multiple-Dry Year First Year Supply	Supply Totals [(a)]	8,822	9,422	9,922	10,222	10,622
	Demand Totals [(b)]	6,392	6,026	6,401	6,799	7,221
	Difference	2,430	3,395	3,521	3,423	3,401
	Difference as % of Supply	28%	36%	35%	33%	32%
	Difference as % of Demand	38%	56%	55%	50%	47%
Multiple-Dry Year Second Year Supply	Supply Totals [(a)]	8,823	9,423	9,923	10,223	10,623
	Demand Totals [(b)]	6,392	6,026	6,401	6,799	7,221
	Difference	2,432	3,397	3,523	3,425	3,402
	Difference as % of Supply	28%	36%	35%	33%	32%
	Difference as % of Demand	38%	56%	55%	50%	47%
Multiple-Dry Year Third Year Supply	Supply Totals [(a)]	8,809	9,409	9,909	10,209	10,609
	Demand Totals [(b)]	6,392	6,026	6,401	6,799	7,221
	Difference	2,417	3,382	3,508	3,410	3,387
	Difference as % of Supply	27%	36%	35%	33%	32%
	Difference as % of Demand	38%	56%	55%	50%	47%

Notes:
(a) From Tables 8-27.
(b) From Table 8-13, 8-14, 8-15, 8-16, and 8-17. Assume conservation. In dry periods demands assume to increase 10% above Normal Year demands.

Chapter 9

City of Redlands

Chapter 9: City of Redlands

9.1 Description of Agency

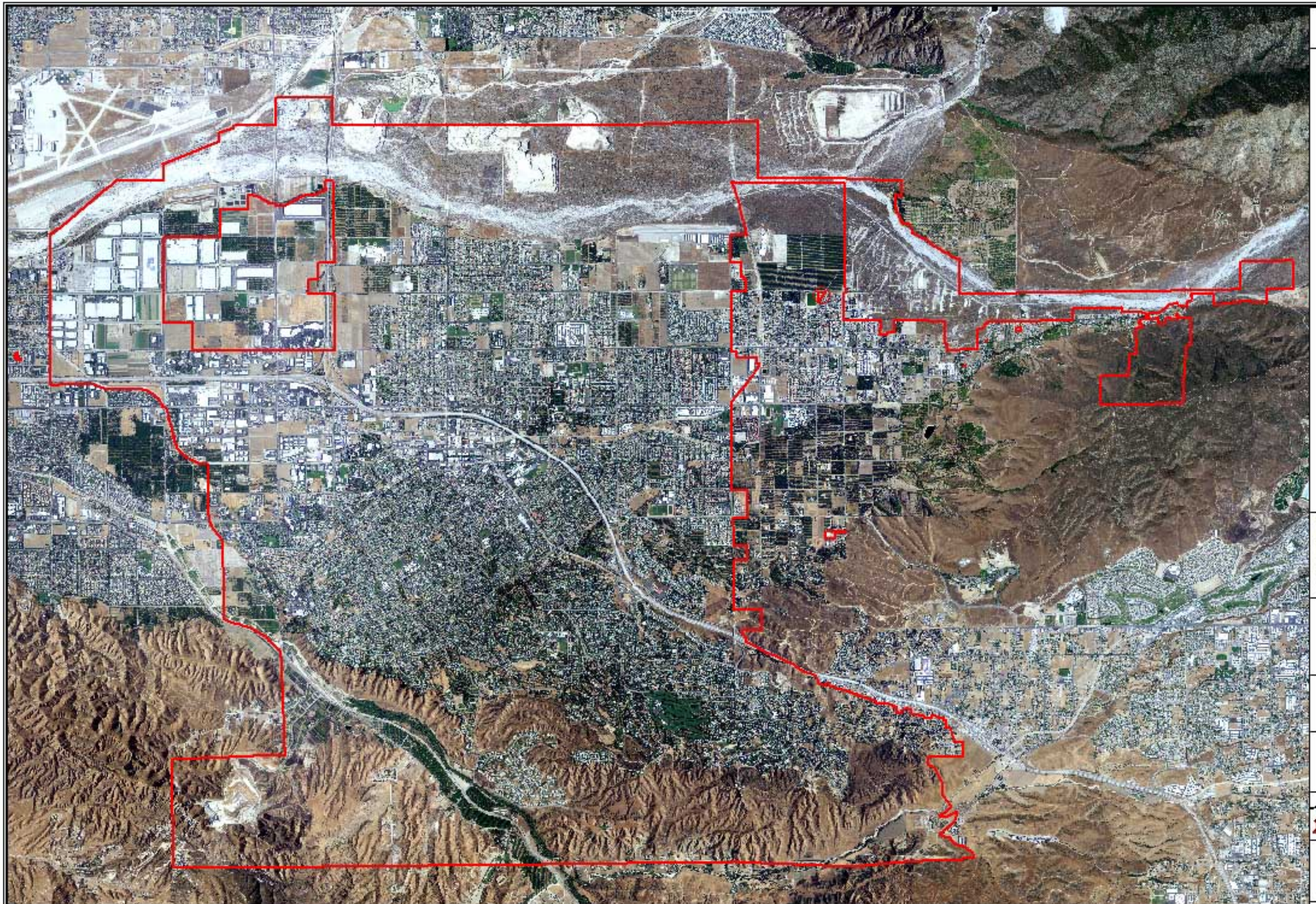
The City of Redlands has provided water services to the community since 1910. Currently, Redlands provides water to a population of approximately 78,000 within its service area via approximately 23,000 water connections. The water utility service area generally coincides with the area designated by LAFCO as the sphere of influence for Redlands. The service area encompasses 36 square miles inside Redlands's corporate boundaries and approximately 5,000 persons outside Redlands boundaries but within the sphere of influence also receive services from Redlands. Figure 9-1 shows the city boundary and planning limits. A small part in the southeastern section of Redlands is currently served by Western Heights Mutual Water Company and is not part of this UWMP. Figure 9-2 shows Redlands's water service area.

By 1910, Redlands fully established a water system to serve its population. Currently, the majority of water is obtained from the Santa Ana River, Mill Creek, and groundwater. Redlands operates two surface water treatment plants and uses 20 wells, 37 booster pumps, 18 reservoirs, and 400 miles of transmission and distribution lines to provide water to its customers. Redlands also owns other facilities that are currently not in use due to age, contamination, or other factors. Water used in the service area is metered and billed bimonthly.

9.1.1 Population Information

The City of Redlands was incorporated in 1888 and developed from its origin as an agricultural area. The early 1900s saw a doubling of the population. Between 1910 and 1920, the population of Redlands actually decreased by 5 percent; however, from 1950 to 1990, Redlands has steadily grown with population increases at or above 20 percent in each decade. In recent years, that rate of growth has slowed.

Redlands manages growth through three measures: R, N, and U. In November 1987, Measure N, a local ballot measure, was approved to establish the annual maximum number of dwelling units that can be added each year both inside and outside of Redlands limits. Measure N amended a previous initiative, Proposition R, which was approved in November 1978. As amended by Measure N, Proposition R, a zoning ordinance, allows a maximum of 400 dwelling units to be added to Redlands each year. Up to 50 of the units are to be single-family homes on existing lots, with the remainder to be allocated according to a point system. Additionally, Measure N provides that sewer or water service may be extended to an additional 150 units per year within the Sphere of Influence (SOI). In any given year, if fewer units are approved or constructed, the unused number is not carried forward to any future year.



City Political Boundary

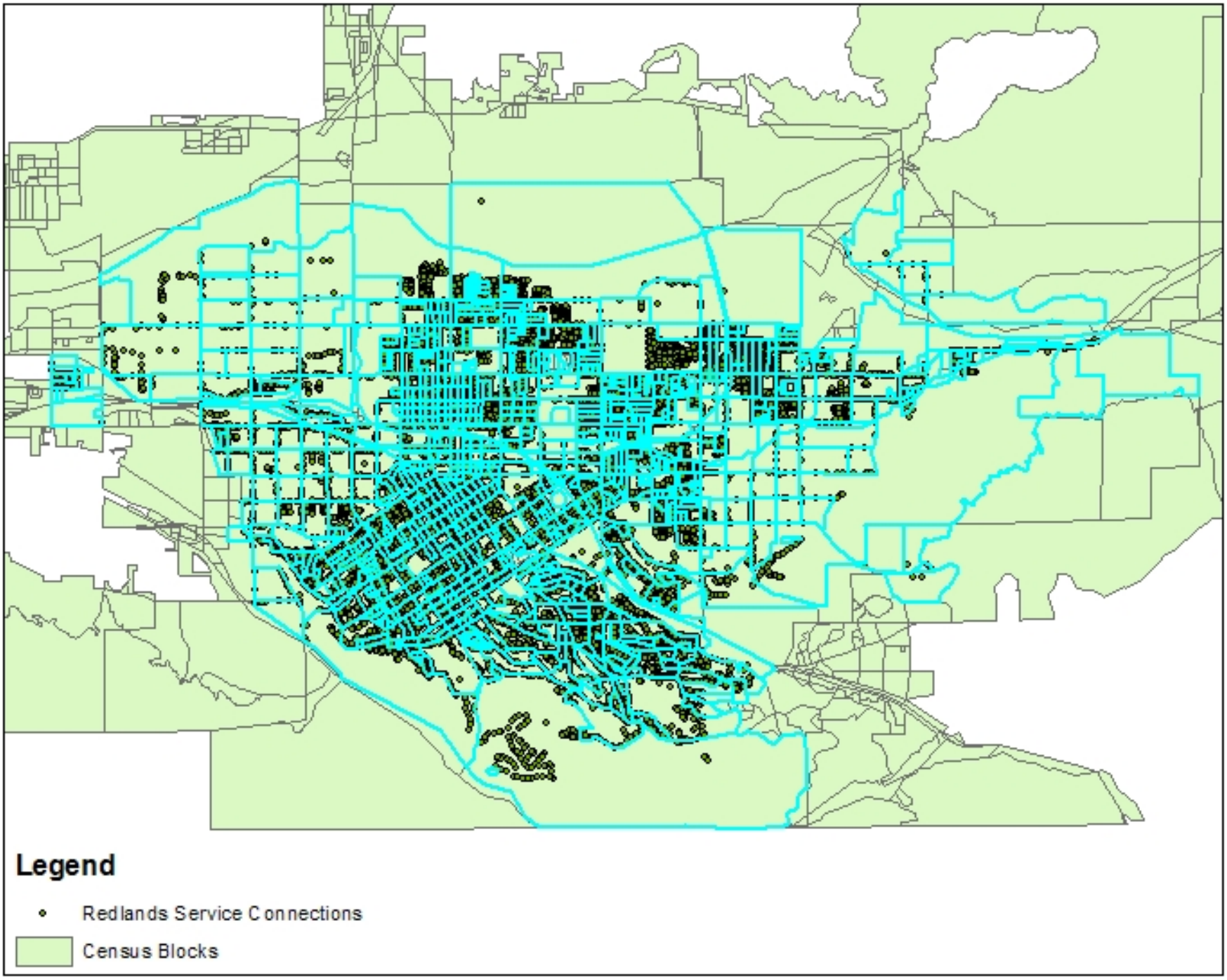
This map was produced by the City of Redlands Geographic Information System.
The City of Redlands assumes no warranty or legal responsibility for the information contained on this map.
The data used to generate this map is dynamic in nature, therefore the information shown may or may not be the most current.

Scale

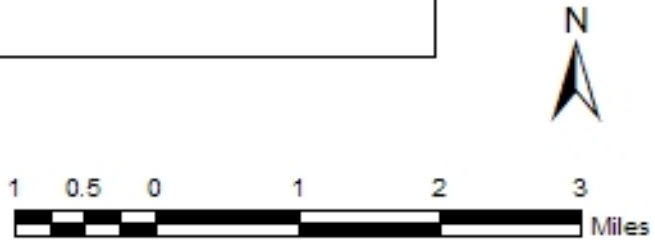
0 0.3 0.6 0.9

Miles

OneStop.mxd



The areas outlined in blue are the census blocks that are included in the City of Redlands' service area.



Measure U, approved in December 1997, further manages growth through such policies as fixing the number of land use categories, prohibiting transfers of density, development fee policy, preservation of non-urban lands, and others. Table 9-1 shows current and projected population over the next 20 years using the General Plan build out estimate for 2030. The 2010 service area population was determined using the methodology provided by the California Department of Water Resources found in the Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use Guidebook referred to as the Alternative Methodology for Service Area Population.

TABLE 9-1
POPULATION — CURRENT AND PROJECTED

	2010	2015	2020	2025	2030	Data source
Service Area Population[(a)]	77,852	83,800	89,748	95,696	101,644	Census; Redlands General Plan

Note:
(a) Service area population is defined as the population served by the distribution system.

9.1.1.1 Demographic Information

Redlands is a university town surrounded by agricultural and citrus producing lands. Approximately one third of the land within Redlands's limits and area of influence is classified for existing land use as vacant land. The second largest existing land-use category is agriculture at about 6,000 acres. Low, very low, and rural density residential land uses encompass a combined acreage of about 6,200 acres. Redlands seeks to actively manage growth with a priority given to urban infill.

As of the latest census data, the racial make-up of Redlands is 73.69 percent White, 5.12 percent Asian, 4.31 percent African American, 0.94 percent Native American, 0.23 Pacific Islander, 11.33 percent from other races, and 4.39 percent from two or more races. Of these 24.07 percent were Hispanic or Latino origin.

The median income for a household in Redlands is $48,155, and the median income for a family is $56,254. About 10.5 percent of the population and 7.7 percent of the families are below the poverty line.

9.2 Climate

The climate of Redlands and the surrounding areas of the San Bernardino Mountains and foothills are characterized by cool, wet winters and warm, dry summers. Occasional thunderstorms occur in the surrounding mountains during the summer. Annual rainfall precipitation varies from an average of about 16 inches in the lower elevation areas, where Redlands is located, to an average of about 30 inches in the upper elevations. Precipitation in the mountain areas can range from 16 to 90 inches per year. Snowfall is common above an elevation of 5,000 feet during the winter months. Table 9-2 summarizes the climate conditions in the service area. These data were collected from the Western Regional Climate Center and the California Irrigation Management Information System. The weather station used is NCDC COOP # 047306 and the reference evapotranspiration information can be found in Appendix A of the Redlands Water Efficient Landscape Requirements (ORD 2724).

TABLE 9-2
CLIMATE

	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo	2	2.7	3.8	4.6	5.7	6.9
Average Rainfall (in.)	2.67	2.65	2.31	1.18	0.48	0.11
Average Temperature (F)	52	53.7	56.35	60.25	64.8	70.95

	Jul	Aug	Sept	Oct	Nov	Dec
Standard Monthly Average ETo	7.9	7.4	5.9	4.2	2.6	2
Average Rainfall (in.)	0.06	0.15	0.29	0.69	1.13	1.80
Average Temperature (F)	77.4	77.4	73.85	66.1	58.35	52.7

ETo = Reference evapotranspiration

9.3 Historical Water Use

Actual and anticipated water deliveries by the City of Redlands in 2005 and 2010 are provided in Tables 9-3 through 9-11.

TABLE 9-3
WATER DELIVERIES — ACTUAL, 2005

	2005				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	19,459	15,428.03	None	0	15,428
Multi-family	966	3,765.18	None	0	3,765
Commercial/Industrial	1,447	2,835.44	None	0	2,835
Institutional/governmental	91	1,091.83	None	0	1,092
Landscape	403	2,499.91	None	0	2,500
Agriculture*	44	164.11	None	0	164
Other			None	0	0
Total	**22,410**	**25,785**	**0**	**0**	**25,785**

Units (volume): ***acre-feet per year***

TABLE 9-4
WATER DELIVERIES — ACTUAL, 2010

	2010				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	19,411	13,747.56	None	0	13,748
Multi-family	948	2,523.42	None	0	2,523
Commercial/Industrial	1,762	4,267.20	None	0	4,267
Institutional/governmental	92	939.24	None	0	939
Landscape	483	2,216.10	None	0	2,216
Agriculture[(a)]	31	346.76	None	0	347
Other			None	0	0
Total	**22,727**	**24,040**	**0**	**0**	**24,040**
Units (volume): ***acre-feet per year***					

Note: (a) Not all water used for agriculture within the service area is provided by Redlands.

TABLE 9-5
SALES TO OTHER WATER AGENCIES

Water Distributed	2005	2010	2015	2020	2025	2030
Bear Valley Mutual Water Company	106	77	83	89	95	100
Rocky Comfort Mutual Water Company	111	84	100	100	100	100
Total	**217**	**161**	**183**	**189**	**195**	**200**
Units (volume): ***acre-feet per year***						

TABLE 9-6
ADDITIONAL WATER USES AND LOSSES

Water Use	2005	2010	2015	2020	2025	2030
Saline barriers	0	0	0	0	0	0
Groundwater recharge	0	0	0	0	0	0
Conjunctive use	0	0	0	0	0	0
Raw water	0	0	0	0	0	0
Recycled water	0	2,214	2,214	3,040	3,290	3,290
System losses	2,448	1,487	1,845	1,995	2,127	2,259
Other (define)	0	0	0	0	0	0
Total	**2,448**	**3,701**	**4,059**	**5,053**	**5,417**	**5,549**
Units (volume): ***acre-feet per year***						

TABLE 9-7
TOTAL WATER USE

Water Use	2005	2010	2015	2020	2025	2030
Total water deliveries	25,785	24,040	25,966	27,806	31,313	33,258
Sales to other water agencies	217	161	183	189	195	200
Additional water uses and losses	2,448	3,701	4,059	5,035	5,417	5,547
Total	**28,450**	**27,902**	**30,208**	**33,030**	**36,925**	**39,005**
Units (volume): ***acre-feet per year***						

9.4 Existing and Targeted Per Capita Water Use

9.4.1 Base Daily Per Capita Water Use and Urban Water Use Targets

To determine Redlands's baseline water usage a 10-year average customer use of gallons per capita daily (GPCD) ending in 2004-2010 was developed as required by DWR's SBX7-7 guidebook Methodologies for Calculating Baseline and Compliance Urban Per Capita Use Methodology 3. Included in this average was all water delivered through the potable and non-potable water distribution systems. All recycled water and water used for farming was subtracted from the total production as required. The GCPD is identified in the tables below. Based on this calculation and the choice to use California DWR reduction target Method 1 (20 percent) Redlands will need to reduce its 10-year average GPCD of 364.8 to 291.8. However, in order to make necessary reductions and account for seasonal fluctuations in water demand, a 5-year average has been used for calculating the necessary reductions as guidance is not yet available from DWR. Using these assumptions Redlands will need to reduce its demand 1,555 AF by 2015 and 3,110 AF by 2020.

Currently there are four methods for calculating water use reductions developed by DWR. Of these methods one must be selected. These methods state the utility shall adopt one of the following "targets":

1. Eighty percent of the urban retail water supplier's baseline per capita daily water use.
2. The per capita daily water use that is estimated using the sum of the following performance standards:

   (A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard.

   (B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance located in Title 23.

   (C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.
3. Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan.
4. Similar to Method 1 there must be a 20 percent reduction from the urban retail water supplier's baseline per capita daily water use, however these reductions

are broken into three sectors, 1) residential indoor usage, 2) commercial industrial and institutional, 3) landscape use and water loss; all of which must result in a 20 percent reduction.

Based on available data and the criteria for meeting Methods 2 and 3 they will not be pursued. Method 4 is similar to method one as it requires utilities to reduce consumption by 20 percent from the baseline calculation; however method four delineates where these reductions can be applied. Regardless of the success in each area the utility is still required to achieve a 20 percent reduction and because of this Method 4 will not be pursued as there is no additional benefit to Redlands. Based on an analysis of the methods, Method 1 has been chosen to calculate Redlands's compliance with the Legislation.

TABLE 9-8
BASE PERIOD RANGES

Base	Parameter	Value	Units
10- to 15-year base period	2008 total water deliveries	29,837	*AFY*
	2008 total volume of delivered recycled water	2,094	*AFY*
	2008 recycled water as a percent of total deliveries	7	percent
	Number of years in base period	10	years
	Year beginning base period range	1998	
	Year ending base period range	2007	
5-year base period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range	2007	

TABLE 9-9
BASE DAILY PER CAPITA WATER USE — 10- TO 15-YEAR RANGE

Base Period Year		Distribution	Daily System Gross	Annual Daily per Capita
Sequence Year	Calendar Year	System Population	Water Use (mgd)	Water Use (gpcd)
1	1997	67,938	24.76	364.56
2	1998	68,081	22.62	332.26
3	1999	68,617	24.04	350.48
4	2000	69,209	27.19	392.87
5	2001	69,769	26.20	375.53
6	2002	70,346	28.04	398.64
7	2003	70,991	27.73	390.74
8	2004	74,712	27.59	369.37
9	2005	79,986	26.40	330.14
10	2006	78,598	27.00	343.60
11	2007	77,853	28.36	364.40
12	2008	82,736	26.68	322.48
13	2009	81,251	25.30	311.65
14	2010	77,852	22.99	295.39
		Base Daily Per Capita Water Use[(a)]		364.8

Note: (a) Average of years 1998 through 2007

TABLE 9-10
ANNUAL AVERAGES FOR GALLONS PER CAPITA DAILY

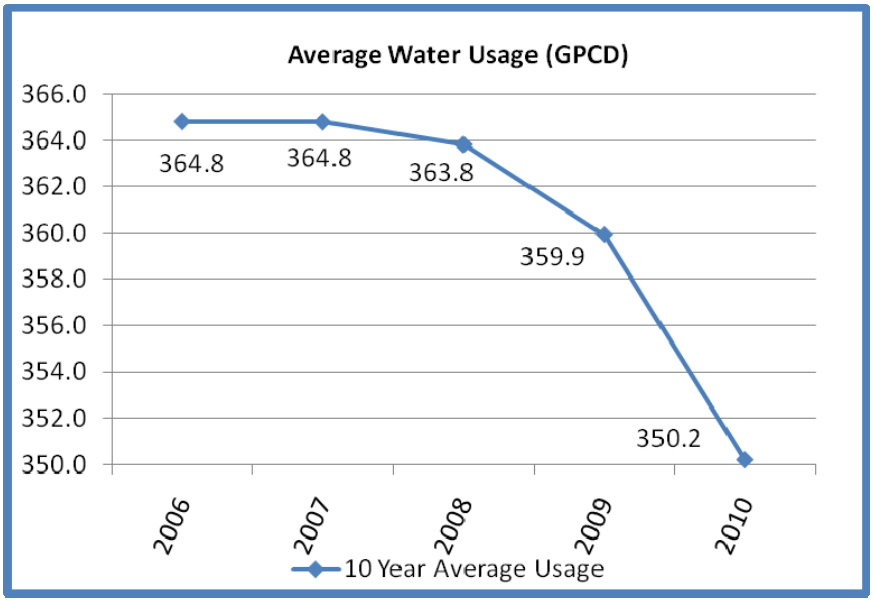


Table 9-11 provides the data on the Maximum Allowable GPCD. The Maximum Allowable GPCD is based on 95 percent of the 5-year average base gross water use. In this case 95 percent of the 5-year GPCD is 341.7 GPCD. The Compliance Water Use Target, under Method 1 is 291.8 GPCD and is less than the Maximum Allowable GPCD, so no adjustments to the Compliance Water Use Target are necessary.

TABLE 9-11
BASE DAILY PER CAPITA WATER USE — 5-YEAR RANGE

Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	70,991	27.73	390.74
Year 2	2004	74,712	27.59	369.37
Year 3	2005	79,986	26.40	330.14
Year 4	2006	78,598	27.00	343.60
Year 5	2007	77,853	28.36	364.40
		Base Daily Per Capita Water Use		359.7

TABLE 9-12
TARGET DAILY PER CAPITA WATER USE
FOR CITY OF REDLANDS

Year 2015 GPCD Target	328.3 GPCD
Year 2020 GPCD Target	291.8 GPCD
Methodology Used	Method 1

9.4.2 Implementation of Water Conservation/Achieving Water Use Reduction Targets

The above reduction target can be achieved by reduced water usage and/or increasing the use of recycled water. Reducing potable water usage has benefits and drawbacks. First, the reduction in potable water usage reduces revenues, revenues necessary to meet the fixed costs of the utility. The impact of a 20 percent reduction in sales is not equivalent to a 20 percent reduction in revenues. This is because the baseline year is significantly higher than observed in 2010. Additionally, water being reduced is not likely the first tier water rate which costs $0.74 per hundred cubic feet. The reduction is likely to come from the second tier, $1.24/ccf, and most likely the third tier, $1.31/ccf. Assuming 75 percent of the reduction will come from the third tier and 25 percent from the second tier, the utility could anticipate an annual reduction in revenues of $795,000 by 2020 (using 2011 rates).

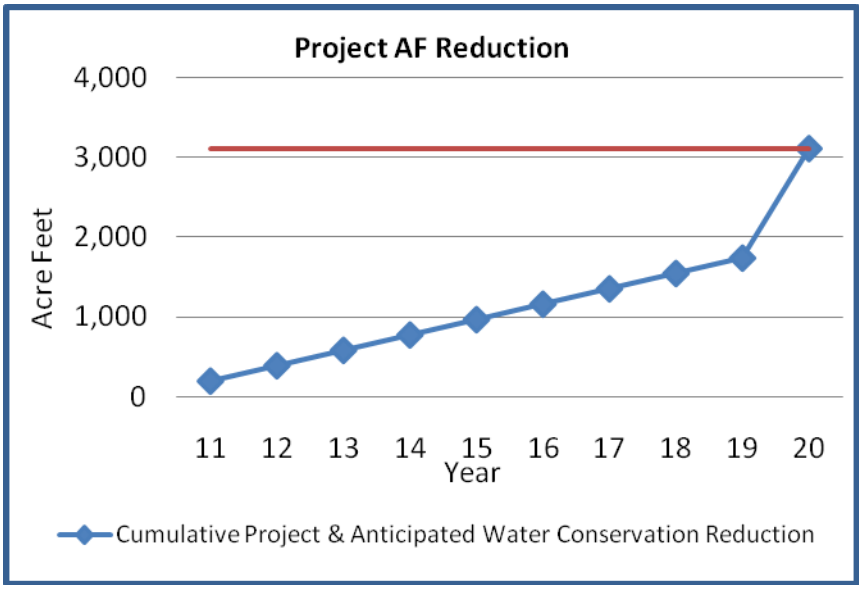
The impact of the revenue reduction is partly offset by the marginal cost to provide and deliver the water. Based on an average marginal power cost to provide and boost groundwater the revenue impact is reduced approximately $136 per acre foot. With this reduction the impact to the utility is estimated to be $620,000 per year by 2020 (using 2011 rates).

Also needing to be included is the offset for the sale of recycled water. This is necessary as sales of recycled water are anticipated as part of the conservation program. Based on the anticipated sales, the non-potable utility can recover $355,000 per year, which can be used to fund projects and programs necessary for compliance. With this, the impact to the utility is estimated to be $265,000 reduction per year by 2020 (using 2010 rates).

In addition to the revenue reductions identified above there will be additional revenue reductions due to the ongoing conservation efforts by the community. These reductions are estimated to be $830,000 annually by the year 2020.

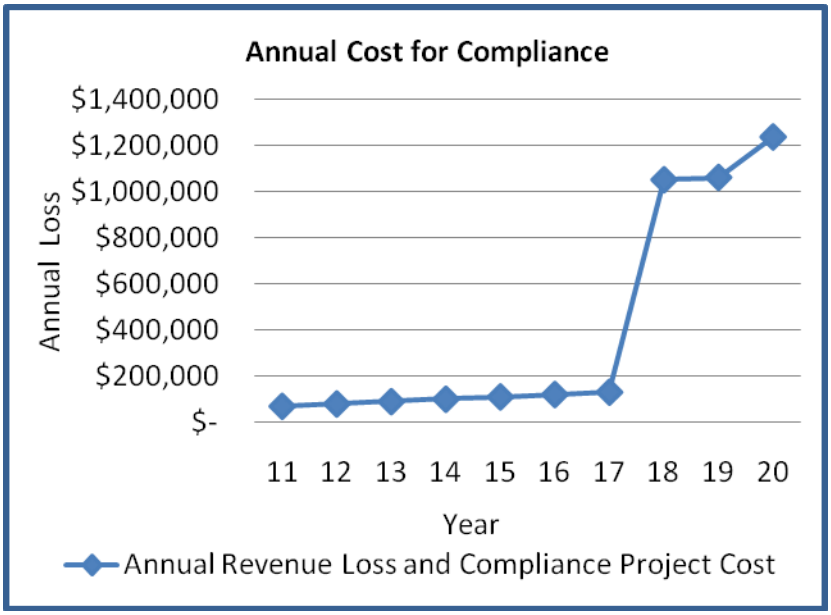
Table 9-13 shows the scheduled water production reductions based on a schedule of programs that are identified in Chapter 9.6. Each year additional savings are achieved as new customers reduce their consumption. Based on estimated implementation by 2015 Redlands will achieve the full required reduction.

TABLE 9-13
PROJECT IMPLEMENTATION IMPACTS



When consumption is reduced revenues are also impacted. Table 9-14 shows the impact Redlands could anticipate. These reductions represent the revenue loss and incorporate the reduced variable costs associated with the production of water in addition to the cost to implement conservation programs.

TABLE 9-14
NET REDUCTION IN REVENUES



9.5 Projected Water Use

9.5.1 Purveyor Projections

In order to determine the projected water use for Redlands, the projected population growth rates, according to the anticipated service area build-out population number, were multiplied by a 5 year average of current water deliveries. The year 2015 is anticipated to have 7.64 percent growth from 2010. The year 2020 is anticipated to have 7.09 percent growth from 2015. The year 2025 is anticipated to have 6.62 percent growth from 2020 and 2030 is anticipated to have 6.21 percent growth from 2025.

In order to take into account the projected reduction in deliveries due to compliance with SBX7-7, a 10 percent reduction was determined to take place between 2010 and 2015 and an additional 10 percent reduction by 2020 for an overall reduction of 20%.

See Tables 9-15 through 9-18.

TABLE 9-15
WATER DELIVERIES — ACTUAL, 2010

	2010				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	19,411	13,748	None	0	13,748
Multi-family	948	2,523	None	0	2,523
Commercial/Industrial	1,762	4,267	None	0	4,267
Institutional/governmental	92	939	None	0	939
Landscape	483	2,216	None	0	2,216
Agriculture[(a)]	31	347	None	0	347
Other			None	0	0
Total	**22,727**	**24,040**	**0**	**0**	**24,040**
Units (volume): ***acre-feet per year***					

Note: (a) Not all water used for agriculture within the service area is provided by Redlands.

TABLE 9-16
WATER DELIVERIES — PROJECTED, 2015

	2015				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	20,894	17,639	None	0	17,639
Multi-family	1,020	3,322	None	0	3,322
Commercial/Industrial	1,897	3,397	None	0	3,397
Institutional/governmental	99	1,176	None	0	1,176
Landscape	520	3,000	None	0	3,000
Agriculture	33	317	None	0	317
Other			None	0	0
Total without conservation	*24,463*	*28,851*	*0*	*0*	*28,851*
Total with SBX7-7 reduction	*24,463*	*25,966*			*25,966*
Units (volume): ***acre-feet per year***					

TABLE 9-17
WATER DELIVERIES — PROJECTED, 2020

	2020				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	22,375	18,889	None	0	18,889
Multi-family	1,093	3,558	None	0	3,558
Commercial/Industrial	2,031	3,638	None	0	3,638
			None	0	0
Institutional/governmental	106	1,259	None	0	1,259
Landscape	557	3,212	None	0	3,212
Agriculture	36	340	None	0	340
Other			None	0	0
Total without conservation	*26,198*	*30,896*	*0*	*0*	*30,896*
Total with SBX7-7 reduction	*26,198*	*27,806*			*27,806*
Units (volume): ***acre-feet per year***					

TABLE 9-18
WATER DELIVERIES — PROJECTED 2025 AND 2030

	2025		2030	
	Metered		Metered	
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume
Single family	23,857	19,144	25,338	20,333
Multi-family	1,165	3,606	1,237	3,830
Commercial/Industrial	2,166	3,687	2,300	3,916
Institutional/governmental	113	1,276	120	1,355
Landscape	594	3,256	630	3,458
Agriculture	38	344	40	366
Other				
Total	**27,933**	**31,313**	**29,665**	**33,258**
Units (volume): ***acre-feet per year***				

9.5.2 Water Use Projections for Lower Income Households

Senate Bill 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier. Using census data, Redlands estimates that 7.7 percent of current and future demand will come from lower income households. Table 9-16 shows the projected demands from lower income households.

TABLE 9-19
LOW INCOME WATER DEMANDS

Low Income Water Demands[(a)]	2015	2020	2025	2030
Single-family residential	1,358	1,454	1,474	1,566
Multi-family residential	256	274	278	295
Total without conservation	1,614	1,728	1,752	1,861
Total with conservation	1,453	1,556	1,577	1,674
Units (volume): ***acre-feet per year***				

Note: (a) Using census data, demands were calculated as 7.7 percent of demand.

9.5.3 Projected Sales and Other Water Uses

As in the past, Redlands does not anticipate future water use related to saline barriers, or groundwater recharge operations. For the purpose of projections, unaccounted-for water is assumed to be eight percent.

TABLE 9-20
SALES TO OTHER WATER AGENCIES

Water Distributed	2005	2010	2015	2020	2025	2030
Bear Valley Mutual Water Company	106	77	83	89	95	100
Rocky Comfort Mutual Water Company	111	84	100	100	100	100
Total	**217**	**161**	**183**	**189**	**195**	**200**
Units (volume): ***acre-feet per year***						

TABLE 9-21
ADDITIONAL WATER USES AND LOSSES

Water Use	2005	2010	2015	2020	2025	2030
Saline barriers	0	0	0	0	0	0
Groundwater recharge	0	0	0	0	0	0
Conjunctive use	0	0	0	0	0	0
Raw water	0	0	0	0	0	0
Recycled water	0	2,214	2,214	3,040	3,290	3,290
System losses	2,448	1,487	1,845	1,995	2,127	2,259
Other (define)	0	0	0	0	0	0
Total	**2,448**	**3,701**	**4,051**	**5,053**	**5,417**	**5,549**
Units (volume): ***acre-feet per year***						

9.5.4 Total Projected Water Use

Table 9-22 below presents information on all projected water uses up to the year 2030.

TABLE 9-22
TOTAL WATER USE

Water Use	2005	2010	2015	2020	2025	2030
Total water deliveries	25,785	24,040	25,966	27,806	31,313	33,258
Sales to other water agencies	217	161	183	189	195	200
Additional water uses and losses	2,448	3,701	4,059	5,035	5,417	5,547
Total	**28,450**	**27,902**	**30,208**	**33,030**	**36,925**	**39,005**
Units (volume): ***acre-feet per year***						

9.6 Demand Management Measures

9.6.1 Foundational Demand Management Measures

Currently, Redlands utilizes all foundational demand management measures, and will continue to utilize these measures in the future. These measures are described below.

9.6.1.1 Conservation Coordinator and Waste Prohibition

Redlands has established and staffed a conservation coordinator position and a water waste prevention ordinance is in place (see Appendix F). This ordinance includes the water shortage contingency plan and the recent landscape ordinance.

9.6.1.2 Water Loss Measurement

Water loss is measured using the AWWA M36 manual and loss calculation software. Systems leaks are repaired when identified and customers are notified of any possible leaks they may have.

9.6.1.3 Metered Accounts

All service connections are metered and billed accordingly throughout Redlands's service area. Redlands also requires separate meters for building and non-building domestic water use for all new development. The water usage charge to all building water meters consists of one block rate for the first 10 units (unit = 100 cubic feet) of water usage every 2 months and an increased block rate for any water utilized beyond 10 units. This water rate was implemented to provide for basic building water use for residential customers and it also serves to encourage water conservation. Another method used to encourage water conservation is a service charge for each water meter with increasing rates for larger meters.

Redlands has had a meter replacement and maintenance plan in place since 2008 and replaces 1,500 meters each year. Redlands also has a contract in place for large meter testing and calibration and plans to continue to test and calibrate all of its large meters.

9.6.1.4 Tiered Rates/Conservation Pricing

A tiered pricing system is in place that promotes an accurate price for the service delivered and water conservation.

9.6.1.5 Public Information and School Education

Redlands utilizes a variety of public education and outreach programs designed to educate the public about water conservation and the importance of reducing wasteful water consumption.

Redlands's public outreach and education program is one of the most important water conservation programs available as it is intended to reach individual customers, assist them in reducing their wasteful uses and inform them of how to save water and reduce their water bill. Redlands's public outreach includes advertisements that run in local newspapers, water conservation banners that are displayed across major streets in Redlands multiple times each year and television messages that are displayed on Redlands operated television channel. Water conservation banners and material are also displayed in the utility lobby. Local events are attended by water conservation staff or are supplied with water conservation material that is provided to the public. Redlands has created its own water conservation logo and brand that is easily recognizable to the public.

Included on every utility bill is a water conservation message printed directly on the utility bills as well as occasional custom-designed bill inserts that offer water conservation tips and advertise Redlands's water survey program. In addition, each customer bill shows a graphical chart of the customer's historical water use and a textual explanation of the data shown on the bill. This information is intended to display the usage patterns to signal to customers the effectiveness of their efforts to reduce water waste.

Redlands also has two demonstration gardens within Redlands limits and is planning to construct a third located at City Hall. The City Hall garden is being funded using utility resources to display the possibilities of using California native and other drought tolerant planting materials. The project will include specie names, watering requirements, and other information to assist residents in using planting materials that are beautiful, colorful, and have minimal watering needs.

Redlands maintains a website that contains a large amount of information dedicated to water conservation and offers educational material and informational links to the public. The information on the website is regularly updated and community members are encouraged to submit their own water conservation ideas and success stories to share with the public.

Visits to local classrooms take place throughout the year to present the issues faced by city staff to supply safe reliable drinking water to their homes. These presentations allow for additional opportunities to impress upon students the need to conserve.

For the past three years Redlands has sponsored a water conservation poster art contest that includes all local elementary school students. Each classroom is invited to participate and all schools are visited. Each year there are over 150 entries. Winners are chosen by the city council and water conservation awards are given to the students by the Mayor. Each participating classroom receives water conservation workbooks and school supplies that include water conservation messages.

Redlands also assists local high school clubs with water conservation projects and provides facility tours to various groups and university classes when requested. Redlands maintains a college intern program and the Municipal Utilities and Engineering Department and currently has two interns, one of whom assists in Redlands's water conservation programs.

9.6.2 Programmatic Demand Management Measures

Currently Redlands offers free landscape water surveys and leak detection services to customers. Redlands conducts between fifty to sixty visits to customers' homes and businesses each year. Customers are given hands-on instruction on water conservation techniques and tips on how to become more water efficient throughout their home and business. Prompt leak detection and repair and the customer's familiarity with proper irrigation techniques are the main source of water waste reduction with this service. The service is advertised in various ways throughout the year through bill stuffers, bill messages, news articles, and customer recommendation. All high water users are advised to have a water survey completed when they call or visit the customer service center by the customer service staff.

Since 1995 Redlands has offered water audits, surveys, meter calibrations, and water conservation information to its CII accounts upon request. Redlands also provides water conservation information for customers on its website. Furthermore, since 2001, Redlands has provided each of these accounts with water use histories printed on their billing statements each billing cycle for comparison.

In addition to providing these services, Redlands actively works with CII accounts to develop economically viable alternative water resource programs that use recycled water or non-potable water resources, wherever possible, as a means to reduce their potable water consumption.

Redlands will continue to provide water conservation information, audits, surveys and meter calibrations to its CII customers as well as maintain active water conservation and alternative water resource programs to help provide existing and new CII customers with recycled water and non-potable water resources that will provide both fiscal savings and further reduced demands on potable water resources.

Redlands requires separate metering for building and non-building water use and, if available, non-potable irrigation water use to all of its new non-residential customers. Currently, Redlands serves 483 dedicated irrigation metered accounts. Redlands also has worked to construct and efficiently offer a variety of non-potable and recycled water options for its customers.

Redlands has also implemented a variety of non-potable water options for customers that utilize non-potable wells that meet large landscape customer needs, while reducing demand on potable water supplies. These options include a non-potable irrigation system for the Hillside Memorial Park Cemetery and the Redlands Country Club. Redlands plans to continue and expand its programs to provide large landscape users with recycled and/or non-potable water as well as provide water use, audit informational services, and maintain its billing structure to encourage water conservation by its customers.

9.6.3 Implementation of Additional Programmatic Demand Management Measures and Other Demand Management Opportunities

Below is a list of programs and projects aimed at reducing Redlands's water consumption. All of these programs will require staff time for administration, tracking, and promotion, however Valley District has expressed an interest in participating in this effort so future staff efforts could be minimized. This effort could also vary considerably depending on the interest in each program and validation requirements of the individual program. In addition to these efforts, staff will need to track all rebates and expenditures to ensure the conservation budget is fully utilized within its budgetary guidelines. Each program is scheduled to begin in the summer of 2011 and will be reevaluated each fiscal year for effectiveness until a maximum saturation point has been achieved.

9.6.3.1 Large Landscape Irrigation Timers

Redlands will take full advantage of and promote Valley District's large landscape Smart Timer rebate program. This program targets large landscape water users, such as city parks, and can be utilized at no cost to Redlands. Based on the observed water reduction at the city of San Bernardino of 6 percent, Redlands could save 39 AF of water each year.

9.6.3.2 Reclaimed Water System Improvements

The installation of the non-potable water improvements will facilitate the use of recycled water within the system. Based on the analysis performed it is estimated Redlands will be able to immediately utilize 826 AF of recycled water. These improvements will allow Redlands to achieve 26.6 percent of the 3,110 AF reduction required. Based on estimates, the construction cost for these improvements is $2.59 million. Based on a 50-year life of the project the cost per acre foot reduction is $62.70 per year.

9.6.3.3 Reclaimed Water Conversions

This program entails offering customers a reduced rate when they convert their irrigation systems and install the necessary pipelines for use of non-potable water. The reduction would be based on the volume of water used as this provides for equal benefit to all customers participating in the program. Additionally there is a benefit to the program as it requires customers to continue to utilize non-potable water if they intent to continue to receive benefit. To effectuate this program staff will contact customers in the vicinity of the non-potable water system and inform them of the benefits of the program. High volume users, such as the Redlands Unified School District, will be contacted first as their benefit will provide the most reduction to the potable water system. According to Redlands's non-potable report, conversions of large users in the non-potable water system in the 1570 zone alone could achieve a 210 AFY savings. Because of this, staff estimates a reduction of 250 AF is achievable. Based on a $0.35 per unit reduction from the non-potable water rate this program would cost $152 per AF and should provide enough incentive to attract customers to participate.

9.6.3.4 Rotary Irrigation Nozzles

Upon purchase and installation of an approved rotating irrigation nozzle, Redlands customers would receive a rebate. Rotating irrigation nozzles eliminate wasteful runoff by applying directed and uniform water distribution to a landscape area. This program will also reduce the

amount of water waste from over-irrigation, irrigation runoff, and non-point pollution throughout Redlands. It is estimated this program will result in an annual water savings of approximately 1,320 gallons per nozzle installed. With a rebate of $4 per nozzle installation and based on a 10-year life this program yields a water conservation cost of $100 per AFY.

9.6.3.5 Water Saving Kits

Redlands will create and distribute additional home water conservation kits that include water saving tips, low flow showerheads, faucet aerators, toilet tank banks, toilet leak detection tablets, and literature related to other city water conservation programs. By providing water saving kits Redlands will be directly promoting water conservation into the homes of city water customers while offering simple ways to save. By tracking and monitoring the water usage of customers that are given the kits Redlands can determine the program's effectiveness. Redlands can anticipate an annual water savings of approximately 5,475 gallons per kit installed.

This program also offers Redlands the opportunity to meet with individual customers who are interested in conserving water. During these meetings Redlands is able to educate customers regarding additional methods of saving water and let them know about the other rebate programs offered by Redlands. At a cost of only $16 per kit, this program should be continued as it has a significant benefit to the customer through a reduced water bill and good customer service.

9.6.3.6 Synthetic Turf Rebate

There have been numerous calls for customers wanting rebates for the installation of synthetic turf. Upon purchase and installation of an approved synthetic turf, Redlands water customers would receive a rebate. By providing incentives for the installation of synthetic turf, Redlands will encourage water customers to save a substantial amount of money on watering and turf maintenance. This program will also reduce the amount of irrigation runoff and non-point pollution throughout Redlands. Redlands can anticipate an annual water savings of approximately 37,500 gallons per plot installed. With a rebate of $300 per installation and a projected life of 15 years this equates to a water conservation cost of $173 per AFY.

9.6.3.7 Water Smart Timer Rebate

Upon purchase and installation of an approved water smart timer, Redlands water customers would receive a rebate. By providing incentives for the installation of water smart timers Redlands will encourage water customers to purchase these devices therefore enabling irrigation efficiency, reducing the amount of over-irrigation, reducing the amount of landscape runoff, and non-point pollution throughout Redlands. By establishing this program Redlands should anticipate an annual water savings of approximately 11,404 gallons per timer installed. With a rebate of $80 per installation and a projected life of 15 years this equates to a water conservation cost of $154 per AFY.

9.6.3.8 High Efficiency Washer Rebate

Upon purchase and installation of an approved high efficiency washer, Redlands customers would receive a rebate. By offering incentives for the purchase and installation of high efficiency washing machines Redlands will encourage customers to purchase these appliances, therefore reducing water consumption. By establishing this program Redlands should anticipate

an annual water savings of approximately 10,220 gallons per washer installed. With a rebate of $100 per installation and a life of 15 years, this equates to a water conservation cost of $213 per AFY.

9.6.3.9 WaterSense Toilet Rebate

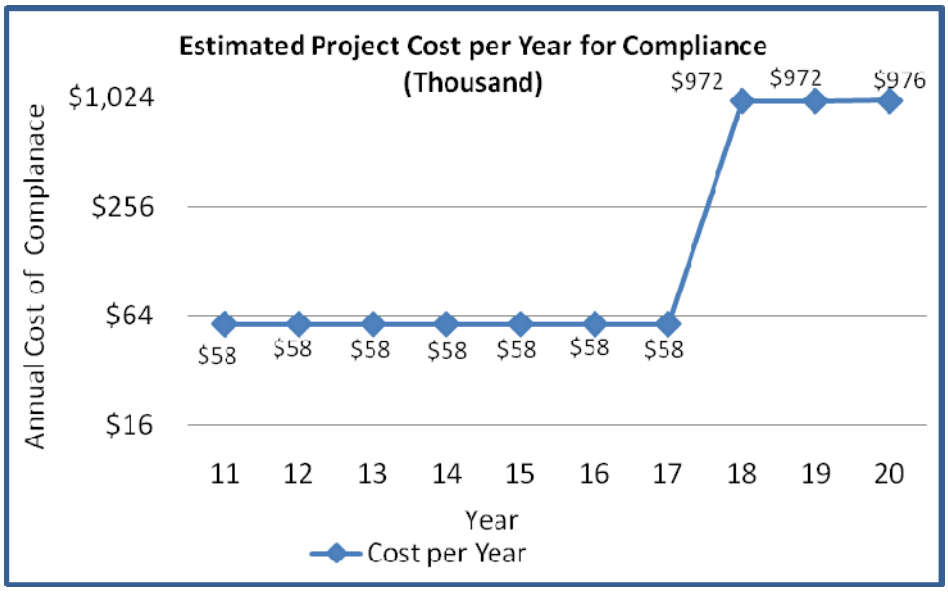
Upon purchase and installation of an approved WaterSense toilet, city customers would receive a rebate. By offering incentives for the purchase and installation of WaterSense toilets Redlands will encourage customers to purchase these toilets, therefore reducing water consumption. By establishing this program Redlands should anticipate an annual water savings of approximately 6,191 gallons per toilet installed. With a rebate of $100 per installation and a life of 15 years, this equates to a water conservation cost of $350 per AFY.

Using the programs described above including the increased production and delivery of reclaimed water, Redlands will achieve the water use savings required by SBX7-7.

9.6.4 Cost of Compliance

Based on the programs identified and the anticipated customer participation Redlands will need to establish an annual budget for the selected programs. These funds will be in the various programs that offer the biggest reduction in water usage. Based on the desires of customers to participate in the identified programs, budgeted funds should be shifted to the most desired by customers. Table 9-23 shows the cost per year for Redlands to meet the planned reductions.

TABLE 9-23
COMPLIANCE SCHEDULE



9.7 Water Resources

9.7.1 Imported Water Supplies

Valley District is a state water contractor with annual entitlement to SWP water of 102,600 AF. Redlands has purchased supplemental SWP water only in years when surface flows have not been available to meet demands. Redlands will continue to request SWP in these situations, but fully understands its obligation to have backup capacity available during state project outages or extended dry periods. Further, Redlands has been informed the SWP could incur as much as 93 percent deficits (7 percent deliveries) in extremely dry periods. If this critical condition occurs during a future year when Redlands desires SWP water, groundwater reserves will be utilized in addition to aggressive conservation measures to satisfy demands. It is expected that the groundwater basin will be subsequently recharged with SWP water or native water as available.

TABLE 9-24
CURRENT AND PLANNED IMPORTED WATER SUPPLIES (AF)

Wholesaler	Contracted Volume	2010	2015	2020	2025	2030
San Bernardino Valley Municipal Water District	NA	236	1,130	2,420	3,710	5,000

9.7.2 Groundwater

Redlands produces water from the Bunker Hill (also known as San Bernardino Basin) and Yucaipa Basins. The San Bernardino groundwater basin is governed by a court action from 1969 called the *Western* Judgment, to which Redlands stipulated. Provisions of the physical solution set forth in the Judgment Case No. 78426, *Western Municipal Water District of Riverside County et al., vs. East San Bernardino County Water District et al.*, entered April 17, 1969, in the superior Court of the State of California in and for the County of Riverside, established the entitlements and obligations of the Valley District and the Western Municipal Water District (WMWD) with regard to the Bunker Hill Basin area to be 232,000 AFY. The adjusted right for use within Valley District is 167,238 AFY. The adjusted right for use within WMWD is 64,862 AFY. Should the extraction, or the withdrawal, or groundwater from the San Bernardino Basin Area exceed the safe yield, Valley District is obligated to recharge an amount equal to the amount the safe yield has been exceeded from an outside source of water. The outside source of water is typically SWP water. This judgment is administered by a Watermaster who prepares an annual report that is submitted to the court.

Redlands produces between 15,000 to 22,000 AFY from the Bunker Hill Basin. As many as 20 potable groundwater wells located throughout the eastern and central areas of the Basin along with 2 wells in the area of Yucaipa are utilized to meet approximately 50 percent of the annual demand. Redlands currently has approximately 3.5 to 6.5 mgd of groundwater capacity in reserve and can meet current peak demands. However, depending on customer demand and sources available for blending, this reserve capacity can vary significantly.

TABLE 9-25
PROJECT COSTS AND SAVINGS

Project	Rebate Amount	Total Project Cost	Device Units	Expected Unit Life (years)	Unit Savings (gpd)	Unit Savings (AFY)	Project Savings (AF)	Cost per AFY ($)	Cost per AF for life ($)	AF Savings per year
Nonpotable system updated	NA	2,741,000		50	100%		826		66.37	
Water savings kits	16	400	25	10	15	0.0168	4	952.26	95.23	0.4201
Rotary irrigation nozzle rebates	4	100	25	10	4	0.0040	1	991.94	99.19	0.1008
Nonpotable water conversions	0.35	38,000		50	100%		250	152.00	152.00	
Weather Based Irrigation Controllers	80	2,400	30	15	31	0.0347	16	2,303.85	153.59	1.0417
Synthetic Turf Rebates	300	45,000	150	15	103	0.1154	260	2,600.22	173.35	17.3062
HE Washer Rebates	100	5,000	50	15	28	0.0314	24	3,188.37	212.56	1.5682
ULFT rebate	100	5,000	50	15	17	0.0190	14	5,251.43	350.10	0.9521

Redlands will continue to fully utilize the surface water sources available which account for approximately 50 percent of annual potable water demand. The remaining demands are met with groundwater sources. In addition Redlands continues to expand its non-potable water systems throughout Redlands, further reducing demands for potable water. This program serves to protect the more valuable potable sources for demands in the future. Table 9-26 shows historic groundwater production by Redlands from 2006 to 2010.

TABLE 9-26
HISTORIC GROUNDWATER PRODUCTION

Basin Name(s)	Metered or Not Metered	2006	2007	2008	2009	2010
Bunker Hill/SBBA	Metered	18,044	21,234	17,880	18,443	15,267
Yucaipa	Metered	0	0	0	0	0
		18,044	21,234	17,880	18,443	15,267
		50%	53%	48%	52%	53%
Units (volume): ***acre-feet per year***						

Projected groundwater production was calculated using the anticipated population growth rates for each time period and the calculated annual water use, which include reductions to be achieved as a result of the SBX7-7 legislation. Table 9-27 shows projected groundwater production.

TABLE 9-27
GROUNDWATER — VOLUME PROJECTED TO BE PUMPED

Basin Name(s)	2015	2020	2025	2030
Bunker Hill	18,209	17,109	18,266	19,549
Yucaipa	256	248	265	281
Total groundwater pumped	18,465	17,357	18,531	19,830
Percent of total water supply	53%	50%	50%	50%
Units (volume): ***acre-feet per year***				

9.7.2.1 Groundwater Supply Reliability

Groundwater supply can be limited by pumping capacity and contamination. The yield to Redlands will greatly depend on the extent of groundwater contamination and the available technologies to treat water contaminated with nitrate, TCE, DBCP, ammonium perchlorate, fluoride, and future regulations for chemicals such as 1,2,3 TCP and others. In order to avoid future potential shortages in reliable water supply, Redlands is actively evaluating other sources of water and working on establishing cost-effective treatment processes to maintain and increase supplies using contaminated groundwater as a source. Climatic and seasonal patterns have a lesser immediate effect on the availability of groundwater supply than on surface water supplies.

9.7.3 Local Surface Water Supplies

Redlands receives its surface water from the following sources:

- Mill Creek Watershed: Water from the Mill Creek watershed is treated at the Henry Tate (Tate) Surface Water Treatment Plant (SWTP) located on Highway 38 east of Mentone.
- Santa Ana River Watershed: Water from the Santa Ana River watershed is treated at the Hinckley SWTP located on Crafton Avenue.
- SWP Water: When required, SWP water is treated at the Hinckley SWTP and Tate SWTP.

The Horace Hinckley SWTP has a rated capacity of 14.5 mgd and can treat up to 12 mgd. The Tate SWTP has a rated capacity of 20 mgd per day; however, due to hydraulic restrictions, can treat approximately 12 mgd.

Redlands can obtain new potable water sources using the following methods: (1) increased use of existing surface water sources through purchase of additional water rights, however, flows are limited to plant capacities and available stock and given Redlands's current ownership of water rights there is currently little ability to increase either plant's production; (2) increased conservation practices; (3) continued expansion of reclaimed water usage; or (4) purchase of additional water from the SWP, which similar to option 1, will not likely yield additional production as plant capacities dictate the amount that can be produced and this is a practice currently utilized. In addition SWP water is not always available. Table 9-28 shows the current and projected surface water supplies.

TABLE 9-28
SURFACE WATER SUPPLIES — CURRENT AND PROJECTED

Water Supply Sources	2010	2015	2020	2025	2030
Wholesale (Valley District)	236	1,130	2,420	3,710	5,000
Supplier-produced surface water	13,762	15,000	15,000	15,000	15,000
Total	**13,998**	**16,130**	**17,420**	**18,710**	**20,000**
Units (volume): ***acre-feet per year***					

9.7.3.1 Local Surface Water Reliability

Of all sources, surface water sources are most vulnerable to climatic and seasonal shortages. Redlands depends significantly on local surface supplies. It is estimated up to 50 percent of local surface supply capacities could be lost by a three-year drought. Since this supply is more susceptible to reductions caused by droughts, Redlands must continue to pursue development of facilities to replace diminished local surface supplies such as through expanded groundwater production wells. SWP water is provided to Redlands by Valley District, the local SWP water wholesaler. Valley District does not guarantee deliveries of SWP water and indicates that during drought conditions, water supply from this source could be significantly diminished.

9.7.4 Recycled Water

9.7.4.1 Recycled Water Planning

The agencies shown in Table 9-29 are involved in the expansion of the Redlands reclaimed water system.

TABLE 9-29
RECYCLED WATER PLAN PARTICIPATING AGENCIES

Participating Agencies	Role in Plan Development
Regional Water Quality Control Board	Permitting
California Department of Health	Permitting

9.7.4.2 Potential Sources of Recycled Water - Wastewater Treatment Facilities

Currently, Redlands produces recycled water capable of being used for irrigation and industrial uses. Redlands' wastewater treatment plant (WWTP) has the capability of treating 7.2 MGD of wastewater to the recycled water level each day, which is greater than the average flow of approximately 5.4 MGD. Currently Redlands supplies recycled water to Southern California Edison Company (SCE), which it uses for cooling water at its Mountain View power plant.

TABLE 9-30
RECYCLED WATER — WASTEWATER COLLECTION AND TREATMENT

Type of Wastewater	2010	2015	2020	2025	2030
Wastewater collected & treated in service area	6,251	6,697	7,133	7,573	8,015
Volume that meets recycled water standard	5,459	6,697	7,133	7,573	8,015
Units : ***acre feet per year***					

TABLE 9-31
DISPOSAL OF WASTEWATER

Method of Disposal	Treatment Level	2010	2015	2020	2025	2030
Percolation Pond	Conventional Treatment / MBR Treatment	3,219	4,483	4,093	4,283	4,725
Reclaimed Water	MBR Treatment	2,240	2,214	3,040	3,290	3,290
	Total	**5,459**	**6,697**	**7,133**	**7,573**	**8,015**
Units (volume): ***acre-feet per year***						

9.7.4.3 Current Recycled Water Demand and Potential Users

Because the vast majority of the existing non-potable water customer base is located in the 1350 and 1570 hydraulic zones, and these zones are located in the vicinity of the WWTP, these zones will be the first to utilize recycled water. Recently a connection was made between an existing recycled water pipeline and the 1350 non-potable water zone which will allow recycled water to be utilized in the non-potable water system. Staff is currently working with the Regional Water Quality Control Board and Department of Public Health to receive approval to activate this connection.

TABLE 9-32
CURRENT AND FUTURE USE OF RECYCLED WATER IN SERVICE AREA (AF)

Type of Use	2010	2015	2020	2025	2030
Agriculture	0	0	0	0	0
Landscape	0	0	826	1,076	1,076
Wildlife Habitat					
Wetlands					
Industrial	2,214	2,214	2,214	2,214	2,214
Groundwater Recharge					
Other					
Total	**2,214**	**2,214**	**3,040**	**3,290**	**3,290**

Within the 2005 UWMP Redlands anticipated 6,000 AF of recycled water use by the year 2010. In 2010 Redlands utilized 2,214 AF recycled water.

Redlands requires new commercial development to provide dual plumbing for irrigation systems to accommodate the use of non-potable/recycled water as it becomes available. Table 9-33 estimates how much additional recycled water use will result from Redland's methods to encourage recycled water use.

TABLE 9-33
AF OF USE PROJECTED TO RESULT FROM RECYCLED WATER INCENTIVES

2015	2020	2025	2030
200	251	250	125

9.7.5 Transfers, Exchanges, and Groundwater Banking Programs

9.7.5.1 Transfers and Exchanges

Redlands is a member of the "Exchange Agreement," which allows for the exchange of surface water with nine other agencies in the area. Under the agreement, the entities have agreed to the exchange of water from the State Water Project, the Santa Ana River, and Mill Creek through simultaneous and deferred exchange to the benefit of each party. One party to the "Exchange Agreement" is Valley District.

TABLE 9-34
TRANSFER AND EXCHANGE OPPORTUNITIES

Transfer Agency	Transfer or Exchange	Short Term or Long Term	Proposed Volume
Participating Agencies	Exchange	Short	6,000
Total			**6,000**
Units (volume): ***acre-feet per year***			

9.7.6 Total Anticipated Water Supply

Table 9-35 shows current and projected water supply from all sources for Redlands.

TABLE 9-35
WATER SUPPLIES — CURRENT AND PROJECTED

Water Supply Sources	2010	2015	2020	2025	2030
Wholesaler 1 (Valley District)	236	1,130	2,420	3,710	5,000
Supplier-produced groundwater	15,267	18,464	17,357	18,531	19,830
Supplier-produced surface water	13,762	15,000	15,000	15,000	15,000
Transfers in	0	0	0	0	0
Exchanges In	0	0	0	0	0
Recycled Water	2,214	2,214	3,040	3,290	3,290
Desalinated Water					
Total	**31,479**	**36,808**	**37,817**	**40,531**	**43,120**
Units (volume): ***acre-feet per year***					

9.8 Water Shortage Contingency Plan

9.8.1 Stages of Action to Respond to Water Shortages

Water supply shortages can occur due to droughts or emergency conditions. In such cases, Redlands has ordinances to help reduce water demands. These ordinances provide for mandatory cutbacks in water use so as not to endanger health, safety, and welfare of the citizens and property owners in Redlands. The conservation program is composed of four stages. Upon determination of the severity of the situation, the City Manager will recommend the appropriate stage to enact.

9.8.1.1 Action Stages

The stages and approximate severity of supply shortage are as follows:

- Stage I – Voluntary Compliance – Water Conservation. A small decrease in water supply is expected.
- Stage II – Mandatory Compliance – Water Alert. A medium decrease in water supply is expected.
- Stage III – Mandatory Compliance – Water Warning. A significant decrease in water supply is expected.
- Stage IV – Mandatory Compliance – Water Emergency. Water supplies are in danger of being depleted where such uses as human consumption, sanitation, and fire protection would be endangered. This would be a decrease in supply of more than 50 percent, most likely associated with a natural disaster.

TABLE 9-36
RATIONING STAGES TO ADDRESS WATER SUPPLY SHORTAGES

Stage No.	Water Supply Conditions	% Shortage
1	Total supply is 85-90% of normal	Up to 15
2	Total supply is 75-84% of normal	16-25%
3	Total supply is 65-74% of normal	26-35%
4	Total supply is less than 64% of normal	36-50%

9.8.2 Minimum Water Supply Available During Next Three Years

In order to determine an estimate for the minimum supply for the next three years (Table 9-37), data from 2010 were used as 2010 being a year with low production levels.

TABLE 9-37
ESTIMATE OF MINIMUM SUPPLY FOR NEXT THREE YEARS

	Supply (AF)		
Water Supply Source	**2011**	**2012**	**2013**
Wholesale/Imported	500	500	500
Groundwater	13,761	13,761	13,761
Local Surface Water	12,000	15,000	15,000
Recycled Water	2,094	2,094	2,094
Transfers/Exchanges	0	0	0
Groundwater Banking	0	0	0
Total Anticipated Supplies	**28,355**	**31,355**	**31,355**

9.8.3 Actions to Prepare for Catastrophic Interruption

Disasters, such as earthquakes, can and will occur without notice. In order to minimize confusion and service interruptions, Redlands's Municipal Utilities and Engineering Department has developed an emergency plan. This emergency plan is to be used as a supplement to the latest revision of the Citywide Emergency Plan and provides guidelines for actions to be undertaken by city personnel during an emergency.

In an emergency, city personnel are required to meet at a reporting location for the assignment duties. Those personnel who are unable to go to Redlands because of downed structures or other obstacles are authorized by Redlands to offer their services to local water providers if these providers are also experiencing an emergency. Redlands has been divided into sections. Employees have been assigned to inspect the facilities in these sections. Once damages have been identified, the plan provides for the dispatch of repair personnel. In cases where water service is diminished due to such emergencies, Redlands has the option of notifying the public through press releases, Redlands web site, flyers, and loud speakers depending on the severity of the emergency.

9.8.4 Consumption Reduction Methods During Shortage

9.8.4.1 Mandatory Prohibitions During Shortages

The plan, depending on the severity of the water shortage, provides for prohibition of wasteful practices, constraints on consumptive uses, and penalties for noncompliance. Practices such as washing of paved areas or operation of ornamental fountains are some uses that are prohibited under the Water Conservation Plan.

TABLE 9-38
MANDATORY PROHIBITIONS

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
Using potable water for street washing	2
Prevent runoff from irrigation activities	2
Restaurants shall not serve water to customers except upon specific request	2
Washing of automobiles, trucks, trailers, boats and other types of mobile equipment	4
Filling, refilling or adding water to uncovered swimming or wading pools and spas	4
Issuance of new service connections and water meters	4

9.8.4.2 Penalties for Excessive Use

Penalties for noncompliance can range from warning notices to monetary surcharges to placement of flow-restricting devices or shutoff of service depending on the conservation stage and number of violations. Violation by any customer of water use prohibitions shall be penalized as follows:

- First Violation – Notice of Noncompliance Sent. Notice shall specify the time, place, and manner of noncompliance, and shall specify a reasonable period of time to achieve compliance.
- Second Violation – Warning of Penalties. For a second violation, a written warning notice of the future imposition of penalties on the customer's water bill shall be issued, and shall require compliance within 2 days.
- Third Violation – Imposition of Penalties. For a third violation, a citation shall be issued and a surcharge imposed on the customer's next bill. The surcharge shall consist of a percentage of the customer's commodity charge as shown on the most recent water bill, based upon the water conservation stage in effect at the time of the most recent violation. The penalty surcharge is 25 percent for Stage 2, 50 percent for Stage 3, and 75 percent for Stage 4. If a water customer who is cited for a third violation fails or refuses to comply with the conservation requirements or to pay any outstanding water bill including surcharges, the City Manager is granted discretionary authority to cause a flow restriction device to be installed on the customer's water meter. If installation of a flow restrictor is infeasible, impractical, or unlikely to induce compliance with the ordinance, the City Manager may authorize a shutoff of service to the premises involved.

TABLE 9-39
WATER SHORTAGE CONTINGENCY — PENALTIES AND CHARGES

Penalties or Charges	Stage When Penalty Takes Effect	
Notice of noncompliance	1,2,3,4	First Violation
Warning of penalties	1,2,3,4	Second Violation
Imposition of penalties	1,2,3,4	Third Violation
Shutoff of service	1,2,3,4	Fourth Violation

9.8.5 Financial Impacts of Actions During Shortages

The drought management plan will most likely impact Redlands by reducing water sales revenues during the drought. In addition, past experience indicates increased capital needs and operating expenses occur during a drought; therefore, adequate reserves for capital and operations provide temporary relief in these circumstances. Redlands maintains an operating reserve, which would be accessed in times of reduced revenue, avoiding any rate increases. In addition, Redlands can levy penalties for excessive water use.

9.8.6 Water Shortage Contingency Resolution

The Water Shortage Contingency Plan, as adopted by Redlands, is presented in Appendix G.

9.8.7 Mechanism to Determine Reductions in Water Use

Potable water production totals are recorded daily. Totals are reported daily to the Assistant Utilities Director and the Water Operations Manager.

During a Stage 1 or Stage 2 water shortage, daily production totals are reported to the Water Operations Manager. The Water Operations Manager compares weekly production totals to the target weekly production totals to verify that the reduction goal is being met. Weekly reports are sent to the Assistant Utilities Director and the Director of Municipal Utilities and Engineering. If the goals are not being met, the Director of Municipal Utilities and Engineering will notify the City Manager so corrective actions can be taken.

During a Stage 3 or Stage 4 water shortage, the procedures listed above would be followed, with the addition of a daily production report to the Assistant Utilities Director and the Director of Municipal Utilities and Engineering.

9.9 Supply and Demand Comparisons

The following sections present the normal water year, single-dry year, multiple-dry year water supply and demand assessment. The supply totals included in these analyses include projected reclaimed water supply and should not be considered total projected potable supply.

For the various analyses, 2008 was chosen as the base average (normal) water year due to having 12 inches of rainfall and being the closest year in recent history to the average rainfall amount.

The year 2007 was chosen as the base single-dry water year due to having 7 inches of rainfall as well as being the year with the largest amount of water production due to high levels of demand. During this year an increase in groundwater pumping was needed to meet demand.

The time span of 2000-2003 was chosen as the base multiple-dry water year due to the low amount of rainfall and high amount of water production due to high levels of demand during that time period.

9.9.1 Normal Water Year

TABLE 9-40
BASIS OF WATER YEAR DATA

Water Year Type	Base Year(s)
Average Water Year	2008
Single-Dry Water Year	2007
Multiple-Dry Water Years	2000-2003

Table 9-41 shows the production volumes for the chosen basis years and demonstrates an increase in production due to the increase in demand during dry weather conditions. For these comparisons, this increase in demand is assumed to take place during a single dry year and multiple dry year events (i.e., 106% of average equates to a 6% increase in demand for a single dry year).

TABLE 9-41
SUPPLY RELIABILITY HISTORIC CONDITIONS (AF)

Average / Normal Water Year	Single Dry Water Year	Multiple Dry Water Years		
		Year 1	Year 3	Year 4
30,015	31,814	30,459	31,414	31,074
Percent of Average/Normal Year:	106.0%	101.5%	104.7%	103.5%

Table 9-42 is a projection assuming normal conditions.

TABLE 9-42
PROJECTED NORMAL YEAR SUPPLY AND DEMAND COMPARISON

	2015	2020	2025	2030
Supply totals (from Table 9-35)	36,808	37,817	40,531	43,120
Demand totals (From Table 9-7)	30,208	33,030	36,925	39,005
Difference	*6,600*	*4,787*	*3,606*	*4,115*
Difference as % of Supply	17.9%	12.7%	8.9%	9.5%
Difference as % of Demand	21.8%	14.5%	9.8%	10.5%
Units are in acre-feet per year.				

9.9.2 Single-Dry Year

For the single-dry year projections the percent change from the base average water year (2008) to the base single-dry year (2007) production was used to project an increase in future demand as compared to the previously projected supply needs. The projected supplies were taken from the previous projections and are based on a linear trend analysis of historic supplies and projected increases in recycled water use. A single dry year event in future years is expected to increase normal demand by 6 percent within that year. Table 9-43 demonstrates this increase.

TABLE 9-43
PROJECTED SINGLE-DRY YEAR SUPPLY AND DEMAND COMPARISON

	2015	2020	2025	2030
Supply totals	36,808	37,817	40,531	43,120
Demand totals	32,020	35,012	39,140	41,345
Difference	4,788	2,805	1,391	1,775
Difference as % of Supply	13.0%	7.4%	3.4%	4.1%
Difference as % of Demand	15.0%	8.0%	3.6%	4.3%
Units are in acre-feet per year.				

9.9.3 Multiple-Dry Years

For the multiple-dry year projections the percent change from the base average water year (2008) to the base multiple-dry years (2000-2002) production was used to project an increase in future demand as compared to the previously projected supply needs. As with the single-dry year projections the projected supplies were based on a linear trend analysis of historical supplies and projected increases in recycled water use. According to the basis years, an increase to normal demand of 1.5% should take place in the first year, a decrease of 2.2% in the second and an increase of 4.7% in the third. Table 9-44 demonstrates these changes.

TABLE 9-44
PROJECTED MULTIPLE-DRY YEARS SUPPLY AND DEMAND COMPARISON

		2015	2020	2025	2030
Multiple-dry year - first year supply	**Supply totals**	36,808	37,817	40,531	43,120
	Demand totals	30,661	33,525	37,479	39,590
	Difference	6,147	4,292	3,052	3,530
	Difference as % of Supply	16.7%	11.3%	7.5%	8.2%
	Difference as % of Demand	20.0%	12.8%	8.1%	8.9%
Multiple-dry year - second year supply	**Supply totals**	36,808	37,817	40,531	43,120
	Demand totals	29,543	32,303	36,113	38,147
	Difference	7,264	5,514	4,418	4,973
	Difference as % of Supply	19.7%	14.6%	10.9%	11.5%
	Difference as % of Demand	24.6%	17.1%	12.2%	13.0%
Multiple-dry year - third year supply	**Supply totals**	36,808	37,817	40,531	43,120
	Demand totals	31,628	34,582	38,660	40,838
	Difference	5,180	3,235	1,871	2,282
	Difference as % of Supply	14.1%	8.6%	4.6%	5.3%
	Difference as % of Demand	16.4%	9.4%	4.8%	5.6%

Units are in acre-feet per year.

9.9.4 Summary of Comparisons

Redlands' water supply is derived from local surface water, groundwater, SWP water, and recycled water. Imported water makes up a very small percentage of the overall water supply. Because of the local nature of most of the sources, local conditions impact the reliability of the sources. In general, Redlands' reliability is expected to be 100 percent through 2030. This reliability is based on current understanding of the climatic condition and significant capacity that is available to Redlands that currently exceeds the predicted water demand. This availability does not mean that water needed to meet future demands will not require additional treatment; however, with effective and likely costly treatment most of the water available to Redlands can be utilized.

Demand generally increases with drought conditions primarily because of increase water use for irrigation. However, during a drought situation Redlands plans to engage its Water Conservation Plan which will decrease outdoor use demands. With this plan, along with the additional demand management measures planned to be implemented and additional infrastructure that can be constructed to reduce potable water demands, potable demands can be decreased to levels that the Redlands can supply. This expectation is based on the premise Redlands has access to water supplies and if necessary treatment can be installed. If supply or demand conditions change, Redlands will re-evaluate its mix of available supplies as needed.

Chapter 10

City of San Bernardino Municipal Water Department

Chapter 10: San Bernardino Municipal Water Department

10.1 Description of Agency

SBMWD was created as a municipal utility by Article 9 of the City of San Bernardino Charter, as adopted on 6 January 1905. SBMWD is governed by a Board of Water Commissioners appointed by the Mayor and subject to confirmation by the Common Council. The first Board of Water Commissioners was appointed May 1905, the initial water distribution system, valued at $160,000 in 1905, covered just one square mile and served a population of only 6,000 people.

The SBMWD service area has expanded to include portions of the City of San Bernardino and portions of unincorporated areas of the County of San Bernardino. The area is bounded on the north by the San Bernardino National Forest, on the east by the East Valley Water District and Redlands Municipal Utilities Department, on the south by the cities of Loma Linda and Colton, and on the west by the West Valley Water District, the city of Rialto, and the Muscoy Mutual Water Company. Elevations of the valley floor range from approximately 1,000 feet above sea level at the southern boundary, to an elevation in excess of 2,100 feet above sea level at its northern-most boundary. Figure 10-1 shows the SBMWD service area.

SBMWD obtains 100 percent of its water from the Bunker Hill Groundwater Basin, a portion of the SBBA. Management of this groundwater basin is coordinated through Valley District.

Today, SBMWD delivers water to over 40,000 residential, commercial, and industrial accounts. SBMWD has prepared an estimate of future population for the years 2015 to 2035. A population growth rate for the area served by SBMWD was defined based on SCAG projected populations for years 2008, 2020, and 2035, as contained in their 2012 Integrated Growth Forecast. Based on GIS data, SBMWD serves 90 percent of the City of San Bernardino. The population growth rate provided by SCAG (as shown in Table 10-1) was applied to existing population in the City of San Bernardino to project population through year 2035. As shown in Table 10-2, because SBMWD serves 90 percent of this City, it is assumed that the population served by SBMWD will be 90 percent of the City's population projection.

TABLE 10-1
POPULATION PROJECTIONS FOR JURISDICTIONS IN SBMWD BY SCAG

	2008	2020	2035	Growth Rate 2008-2020	Growth Rate 2020-2035	% of area served
City of San Bernardino	204,366	230,795	261,041	0.0102	0.0082	90

TABLE 10-2
POPULATION – CURRENT AND PROJECTED

	2010	2015	2020	2025	2030	2035
Service Area Population	187,690	196,453	207,715	213,366	221,400	234,937

San Bernardino County, including the SBWMD service area, experienced many years of steady population growth. However, starting in 2006, SBMWD saw a decrease in the number of active services.

10.2 Climate

The climate within SBMWD's service area is characterized by warm, dry summers and mild winters with moderate amounts of rainfall. Mean annual temperatures average 64.1° F, with summer high temperatures (June through September) in the low-80s and winter lows in the upper 30s. The average annual maximum monthly temperature is 79.9° F, based on weather data readings from San Bernardino Weather Station No. 047723 (latitude: 34:08:00, longitude: 117:15:00). The average annual precipitation recorded is 16.1 inches. Most of the precipitation occurs during the months of December through March. Table 10-3 presents average climate data for the service area, including temperature, rainfall and reference ETo.

TABLE 10-3
CLIMATE

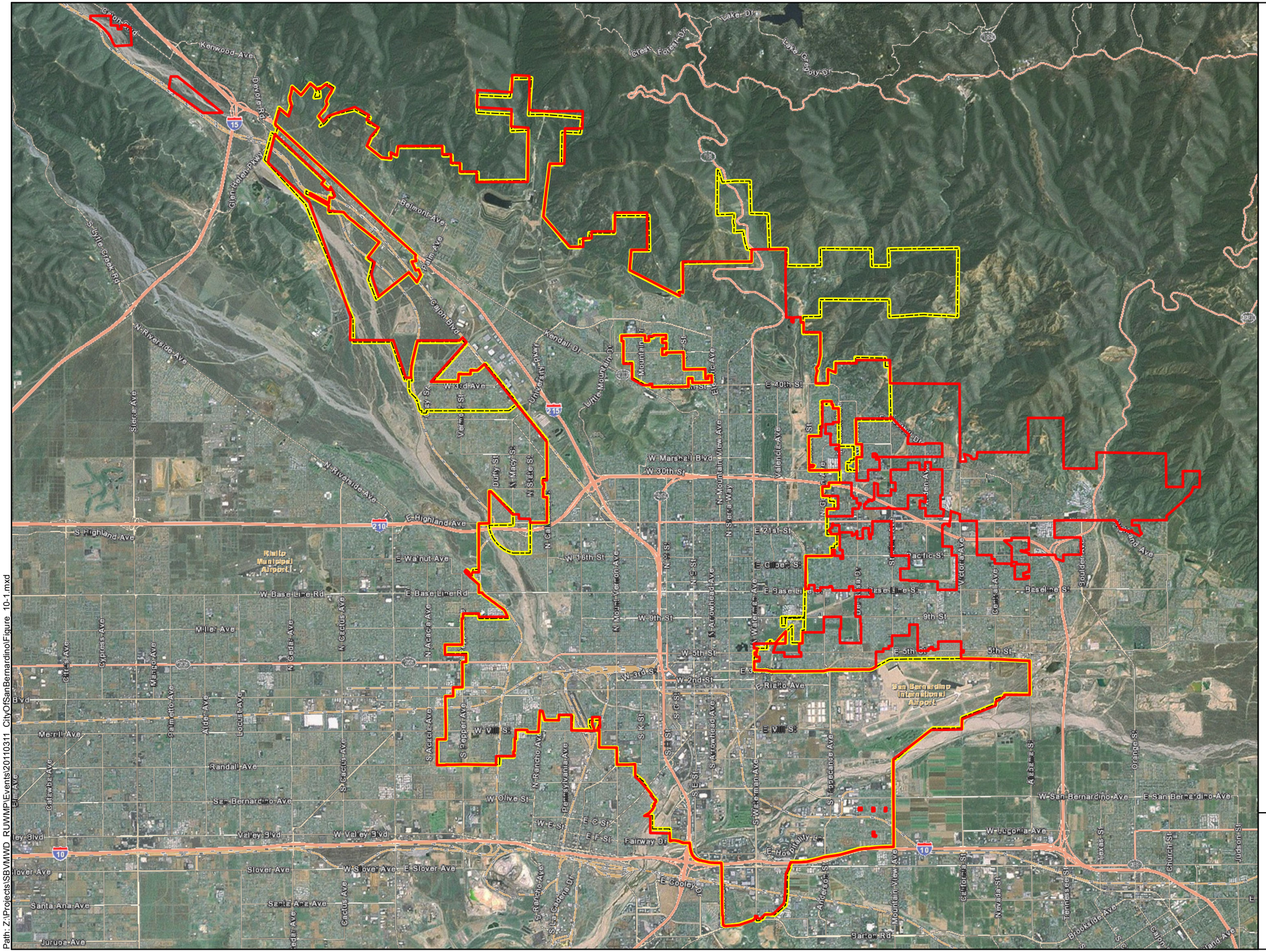
	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo (inches)[(a)]	2.49	2.91	4.16	5.27	5.94	6.56
Average Rainfall (inches)[(b)]	3.22	3.25	2.86	1.29	0.47	0.09
Average Temperature (ºF)	52.4	54.5	56.7	61.0	65.5	71.5

	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average ETo	7.22	6.92	5.35	4.05	2.94	2.56	**56.37**
Average Rainfall (inches)	0.04	0.15	0.33	0.71	1.32	2.38	**16.10**
Average Temperature (ºF)	77.7	77.8	74.0	66.4	58.5	53.2	**63.9**

Notes:

(a) Evapotranspiration (ETo) data were obtained from the U.C. Riverside Station as provided on the California Irrigation Management Information System (CIMIS) website at http://wwwcimis.water.ca.gov, as of 17 December 2010.

(b) Rainfall and temperature data were obtained from the "San Bernardino 047723" station, as provided on the National Weather Service Western Regional Climate Center website at http://www.wrcc.dri.edu for the period of record 1 January 1893 to 22 October 2010.



Path: Z:\Projects\SBVMWD_RUWMP\Events\20110311_CityOfSanBernardino\Figure_10-1.mxd

Kennedy/Jenks Consultants

Regional Urban Water Management Plan
San Bernardino Valley

City of San Bernardino Boundary and Water Service Area

K/J 1089014.00
June 2011
Figure 10-1

10.3 Historical Water Use

10.3.1 Historical Deliveries

SBWMD categorizes water use customers into the following: single-family residential, multi-family residential, commercial/industrial, municipal/government, and landscape. Single-family residential is the largest category, historically accounting for an average of about 51 percent of water deliveries. Multi-family residential and commercial/industrial uses constitute about 16 and 17 percent, respectively. Large landscape use has averaged 12 percent of the supply, and the remaining 4 percent is attributed to municipal/government uses. Actual water deliveries in 2005 and 2009 are provided in Tables 10-4 and 10-5.

TABLE 10-4
WATER DELIVERIES – ACTUAL, 2005

	Metered		Not Metered		Total
Water Use Sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**Volume (AFY)**
Single family	34,697	22,621			22,621
Multi-family	2,927	7,222			7,222
Commercial/Industrial[(a)]	3,938	8,500			8,500
Industrial					
Institutional/governmental	112	1,404			1,404
Landscape	1,054	4,479			4,479
Agriculture					
Other					
Total	**42,728**	**44,226**	**0**	**0**	**44,226**

Note:
(a) SBMWD combines commercial and industrial sectors

TABLE 10-5
WATER DELIVERIES - ACTUAL, 2009

	Metered		Not Metered		Total
Water Use Sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**Volume (AFY)**
Single family	35,077	21,698			21,698
Multi-family	2,855	6,450			6,450
Commercial/Industrial	4,704	7,143			7,143
Industrial					
Institutional/governmental	11	1,554			1,554
Landscape	1,162	5,432			5,432
Agriculture					
Other					
Total	**43,809**	**42,277**	**0**	**0**	**42,277**

10.3.2 Historic Sales

Historically, SBMWD obtained water through an exchange with EVWD. The purpose of the exchange was to get water with low nitrates suitable for blending and treatment at EVWD's Plant 107. In exchange for the water received, EVWD provided two and a half times the amount received back to SBMWD. Due to operational difficulties, sales to EVWD ceased effective October 18, 2007. In addition, SBMWD has sold water to Valley District, the City of Loma Linda, and Baseline Gardens Mutual Water Company. SBMWD's historical water sales are summarized in Table 10-6.

TABLE 10-6
HISTORIC SALES TO OTHER WATER AGENCIES (AFY)

Agency	2005	2006	2007	2008	2009
EVWD	387	917	632	0	0
Valley District (for use by WVWD/City of Rialto)	216	6,374	6,040	6,150	6,179
Loma Linda	0	1,120	1,587	1,208	1,159
Baseline Gardens Mutual Water Co. [(a)(b)]	148	175	27	27	53
Total	*751*	*8,586*	*8,286*	*7,385*	*7,391*

Notes:
(a) Deliveries to Baseline Gardens Mutual Water Co. are an average of deliveries for 2007 and 2008.
(b) For planning purposes, SBMWD does anticipate sales to Baseline Gardens Mutual to continue through at least 2012 at approximately 170 AFY.

10.3.3 Historical Other Water Uses

In the past, SBMWD has not had water use related to saline barriers, groundwater recharge operations, or recycled water. However, SBMWD does have unaccounted-for water. Unaccounted-for water is the difference between the amount of water produced and the amount of water billed to customers. Over the last five years unaccounted for water has been approximately eight percent of produced water within SBMWD system (system loss was determined by comparing overall production to overall sales for 2005 to 2009). Sources of unaccounted-for water include:

- Hydrant Testing and Flushing
- Fire Hydrant Operations by the Fire Department - This represents the use of water for emergencies
- Meter Inaccuracies
- Leaks from water lines

Table 10-7 summarizes what the California Department of Water Resources refers to as "other" water uses, besides metered deliveries and sales to other agencies.

TABLE 10-7
HISTORIC "OTHER" WATER USES (AF)

Water Use[(a)]	2005	2009
Saline Barriers	0	0
Groundwater Recharge	0	0
Conjunctive Use	0	0
Recycled Water	0	0
System Losses	3,538	2,959
Total	**3,538**	**2,959**

Note:
(a) Any water accounted for in Tables 10-4, 10-5, and 10-6 is not included in this table.

10.3.4 Total Historical Water Use

Table 10-8 below presents information on all historic water uses for the years 2005 and 2009.

TABLE 10-8
TOTAL HISTORIC WATER USES (AF)

Water Use	2005	2009
Total Water Deliveries (from Tables 10-4 and 10-5)	44,226	42,277
Sales to Other Water Agencies (from Table 10-6)	751	7,391
Additional water uses and losses (from Table 10-7)	3,538	2,959
Total	**48,515**	**52,627**

10.4 Existing and Targeted Per Capita Water Use

The Water Conservation Bill of 2009 (SBX7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Bill of 2009 provides the regulatory framework to support the statewide reduction in urban per capita water use described in the 20 by 2020 Water Conservation Plan. Consistent with SBX7-7, each water supplier must determine and report its existing baseline water consumption and establish future water use targets in GPCD; reporting is to begin with the 2010 UWMP.

The two primary calculations required by SBX7-7 are:

1. Base Daily Water Use calculation (average GPCD used in past years)
2. Compliance Water Use Target (target gallons per capita per day in 2015 and 2020)

The Base Daily Water Use calculation is based on gross water use by an agency in each year and can be based on a ten-year average ending no earlier than 2004 and no later than 2010 (or a 15-year average if ten percent of 2008 demand was met by recycled water). Base Daily Water Use must account for all water sent to retail customers, excluding:

- Recycled water

- Water sent to another water agency
- Water that went into storage

It is at an agency's discretion whether or not to exclude agricultural water use from the Base Daily Water Use calculation. If agricultural water use is excluded from the Base Daily Water Use calculation it must also be excluded from the calculation of actual water use in later urban water management plans. SBMWD does not specifically account for agricultural water use in its service area. Any incidental agricultural water use has been included in the Base Daily Water Use Calculation.

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). There are four methods for calculating the Compliance Water Use Target:

1. Eighty percent of the urban water supplier's baseline GPCD.
2. GPCD water use estimated using the sum of the following:
    a. For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of DWR's 2016 report to the Legislature reviewing progress toward achieving the statewide 20 percent reduction target, this standard may be adjusted by the Legislature by statute.
    b. For landscape irrigated through dedicated or residential meters or connections, water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in section 490 et seq. of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992.
    c. For CII uses, a 10 percent reduction in water use from the baseline CII water use by 2020.
3. Ninety-five percent of the applicable state hydrologic region target as stated in the state's April 30, 2009, draft *20 by 2020 Water Conservation Plan*. SBMWD falls within the South Coast Hydrologic Region; the region target is 142 GPCD.
4. Reduce the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:
    a. Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "BMP Calculator".
    b. A 20 percent savings on all unmetered uses.
    c. A 10 percent savings on baseline CII use.
    d. A 21.6 percent savings on current landscape and water loss uses.

The Interim Water Use Target is set as a halfway point between the Base Daily Water Use GPCD and the 2020 Compliance Water Use Target GPCD.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95 percent of a

5-year average base gross water use from 2003 to 2010. The Maximum Allowable GPCD is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBX7-7 legislation. Specifically, if an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as their target.

10.4.1 Base Daily Per Capita Water Use

Tables 10-9 through 10-11 summarize the Base Daily Water Use calculation for SBMWD. As is shown in these tables, SBMWD is not eligible to use a 15-year base period. Years 1999 to 2008 have been selected for calculation of the 10-year base period while years 2003 to 2007 have been selected for calculation of the 5-year base period. The 10-year average Base Daily Per Capita Water Use for SBMWD is 249 GPCD; the 5-year is 252 GPCD.

TABLE 10-9
BASE PERIOD RANGES

Base	Parameter	Value
10- to 15- Year Base Period	2008 Total Water Deliveries (AF)	49,954
	2008 Total Volume of Delivered Recycled Water (AF)	0
	2008 Recycled Water as a Percent of Total Deliveries (%)	0
	Allowable Base Period (years)[(a)]	10
	Year Beginning Base Period Range	1999
	Year Ending Base Period Range[(b)]	2008
5-Year Base Period	Year Beginning Base Period Range	2003
	Year Ending Base Period Range[(c)]	2007

Notes:
(a) If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater the first base period is a continuous 10- to 15-year period.
(b) The ending year must be between December 31, 2004 and December 31, 2010.
(c) The ending year must be between December 31, 2007 and December 31, 2010.

TABLE 10-10
BASE DAILY PER CAPITA WATER USE, 10-YEAR

Sequence Year	Calendar Year	Distribution System Population[(a)]	Daily System Gross Water Use (MGD)	Annual Daily Per Capita Water Use (GPCD)
1	1999	164,843	44	265
2	2000	166,861	41	247
3	2001	168,947	39	234
4	2002	171,058	42	245
5	2003	173,197	42	244
6	2004	175,362	44	252
7	2005	177,554	43	240
8	2006	179,773	49	274
9	2007	182,020	46	251
10	2008	184,295	44	237
Base Daily Per Capita Water Use, 10-Year Average				*249*

Note:
(a) SBMWD's service area population estimated using City of San Bernardino 2000 and 2010 Census data. SBMWD estimated to have 90% of the population of the City of San Bernardino.

In order to calculate Base Daily Per Capita Water Use for past years, it was necessary to develop population estimates for past years. First the City of San Bernardino population was established for years 2000 and 2010 using Census data, with in between years extrapolated. Based on GIS data, SBMWD's service area is assumed to have 90% of the population of the City.

Table 10-11 provides the data on the Maximum Allowable GPCD. The Maximum Allowable GPCD is based on 95 percent of the 5-year average base gross water use. In this case 95 percent of the 5-year GPCD is 239 GPCD (95% of 252).

TABLE 10-11
BASE DAILY PER CAPITA WATER USE, 5-YEAR

Sequence Year	Calendar Year	Distribution System Population[(a)]	Daily System Gross Water Use (MGD)	Annual Daily Per Capita Water Use (GPCD)
1	2003	173,197	42	244
2	2004	175,362	44	252
3	2005	177,554	43	240
4	2006	179,773	49	274
5	2007	182,020	46	251
		Base Daily Per Capita Water Use, 5-Year Average		*252*

Note:
(a) SBMWD's service area population estimated using City of San Bernardino 2000 and 2010 Census data. SBMWD estimated to have 90% of the population of the City of San Bernardino.

10.4.2 Compliance Water Use Targets

In addition to calculating base gross water use, the "20 by 2020" legislation requires that a retail water supplier identify its demand reduction targets. The methodologies for calculating demand reduction targets were described above. SBMWD is choosing to meet SBX7-7 targets as an individual agency rather than as part of a regional alliance. SBMWD has selected Method 4 to calculate the agency's 2020 Compliance Water Use Target and Interim Water Use Target.

The Compliance Water Use Target under Method 4 is the Base Daily GPCD, less each of the following:

- Indoor residential water savings of 15 GPCD or an amount determined by use of DWR's "BMP Calculator"
- 20 percent savings on all unmetered uses
- 10 percent savings on Baseline CII (expressed in GPCD)
- 21.6 percent savings on current landscape and water loss uses (expressed as GPCD)

SBMWD is choosing to use the default value of 15 GPCD for the indoor residential water savings, and has no unmetered uses. As shown in Table 10-12, baseline CII water use was estimated using the 10-year average of water sales to CII water users in the SBMWD service

area for the years 1999 to 2008 (the same period as was used to calculate the Base Daily Per Capita Water Use). Baseline CII water use is 50 GPCD.

For calculating landscape and water loss uses, DWR has provided the following formula:

= Base Daily Per Capita Water Use - Default Indoor Water Use (70 GPCD) - Baseline CII

Based on this formula, SBMWD's landscape and water loss value is:

= 249 GPCD - 70 GPCD - 50 GPCD = 129 GPCD

TABLE 10-12
BASELINE COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL WATER USE

Sequence Year	Calendar Year	Distribution System Population[(a)]	CII Water Use (MG)[(b)]	Annual Daily Per Capita Water Use (GPCD)
1	1999	164,843	3,397	56
2	2000	166,861	2,793	46
3	2001	168,947	2,791	45
4	2002	171,058	3,288	53
5	2003	173,197	3,079	49
6	2004	175,362	3,229	50
7	2005	177,554	3,227	50
8	2006	179,773	3,314	51
9	2007	182,020	3,515	53
10	2008	184,295	3,166	47
		Baseline CII Water Use (10-year Average)		*50*

Notes:
(a) SBMWD's service area population estimated using City of San Bernardino 2000 and 2010 Census data. SBMWD estimated to have 90% of the population of the City of San Bernardino.
(b) Public Water System Statistics for City of San Bernardino.

The resulting Compliance Water Use Target is 201 GPCD. The full calculation is shown in Table 10-13. The Interim Water Use Target is 225 GPCD.

TABLE 10-13
METHOD 4 COMPLIANCE WATER USE TARGET CALCULATION

Baseline GPCD		249
less	indoor residential water savings (GPCD) (default of 15 GPCD)	-15
less	20 percent unmetered water uses (GPCD) (0.20*0 GPCD)	0
less	10 percent savings on CII water use (GPCD) (0.10*50 GPCD)	-5
less	21.6 percent savings on landscape and water loss uses (GPCD) (0.216*129)	-28
	Compliance Water Use Target	*201*
	Interim Water Use Target	*225*

As described earlier, the Maximum Allowable GPCD is 239. The Compliance Water Use Target, under Method 4 (201 GPCD) is less than the Maximum Allowable GPCD, so no adjustments to the Compliance Water Use Target are necessary.

In order to meet the water use targets prescribed by SBX7-7, SBMWD will have to reduce current water use by approximately 10 percent by the year 2015 and by approximately 20 percent by year 2020. The programs which SBMWD intends to use to achieve these conservation goals are described in Section 10.7.3. As described in Section 10.7.3, should SBMWD's recycled water program develop on the schedule anticipated in this UWMP and with the volumes described in the UWMP, SBMWD would achieve its SBX7-7 targets without any additional conservation actions. However, because the recycled water program is in the planning stages, SMBWD is still planning to undertake additional conservation.

10.5 Projected Water Use

10.5.1 Purveyor Projections

Based on the SCAG population projections for years 2008, 2020, and 2035 contained in their 2012 Integrated Growth Forecast, SBMWD derived a population growth rate for its service area. This growth rate was applied to base year (2008) water demands to derive estimates of water demands as shown in Tables 10-14 and 10-15.

TABLE 10-14
WATER DELIVERIES - PROJECTED 2015 AND 2020

	2015		2020	
	Metered[(a)]		Metered[(a)]	
Water use sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**
Single family	37,885	26,477	39,654	27,714
Multi-family	3,194	8,532	3,343	8,930
Commercial/Industrial	4,464	8,717	4,672	9,124
Industrial				
Institutional/governmental	87	2,328	91	2,437
Landscape	1,170	6,178	1,225	6,466
Agriculture				0
Other				0
Total without Conservation	46,800	52,233	48,985	54,671
Total with Conservation (assumed 10% by year 2015, 20% by 2020)	46,800	47,009	48,985	43,737

Note: (a) All water uses metered.

TABLE 10-15
WATER DELIVERIES - PROJECTED 2025, 2030, AND 2035

	2025		2030		2035	
	Metered		Metered		Metered	
Water use sectors	# of accounts	Volume (AFY)	# of accounts	Volume (AFY)	# of accounts	Volume (AFY)
Single family	41,147	28,757	42,697	29,840	44,304	30,963
Multi-family	3,469	9,266	3,599	9,615	3,735	9,977
Commercial/Industrial	4,848	9,468	5,030	9,824	5,220	10,194
Industrial						
Institutional/governmental	95	2,529	98	2,624	102	2,723
Landscape	1,271	6,710	1,319	6,962	1,368	7,224
Agriculture						
Other						
Total without Conservation	50,830	56,730	52,743	58,866	54,729	61,082
Total with Conservation (assumed 20% year 2020 and thereafter)	50,830	45,384	52,743	47,093	54,729	48,886

In addition to the demands anticipated in the SCAG growth rate, SBMWD has evaluated known potential developments. It is assumed all water demand from these known developments will be realized by year 2020. Total demands from known developments are shown in Table 10-16.

TABLE 10-16
ESTIMATED DEMANDS FROM KNOWN FUTURE DEVELOPMENTS (AFY)
2015 TO 2035

Development Name	2015	2020	2025	2030	2035
Spring Trails[(a)]	159	530	530	530	530
University Hills[(b)]	190	635	635	635	635
Shandin Ranch[(c)]	160	532	532	532	532
University Shops and Promenade[(d)]	25	83	83	83	83
Palm Meadows Drive/Southgate[(e)]	77	255	255	255	255
IDS Real Estate Group Distribution Warehouse[(f)]	14	48	48	48	48
Total	**625**	**2,083**	**2,083**	**2,083**	**2,083**

Notes:
(a) This development was formerly known as Martin Ranch, assumes maximum day demand of 568 gpm.
(b) This development was formerly known as Paradise Hills, assumes maximum day demand of 681 gpm.
(c) Assumes maximum day demand of 571 gpm.
(d) Assumes maximum day demand of 89 gpm.
(e) This development is also known as Southgate, assumes maximum day demand of 274 gpm.
(f) Assumes maximum day demand of 51 gpm.

10.5.2 Projected Sales and Other Water Uses

As in the past, SBMWD does not anticipate future water use related to saline barriers, groundwater recharge operations, or recycled water. For the purpose of projections, unaccounted-for water is assumed to be eight percent (Table 10-17).

TABLE 10-17
FUTURE SALES AND "OTHER" WATER USES (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Sales to Other Agencies	1,029	629	629	629	629
Saline Barriers	0	0	0	0	0
Groundwater Recharge	0	0	0	0	0
Conjunctive Use	0	0	0	0	0
Recycled Water	0	0	0	0	0
System Losses	3,811	3,666	3,797	3,934	4,076
Total	**4,840**	**4,295**	**4,426**	**4,563**	**4,705**

Note: (a) Any water accounted for in Tables 10-14, 10-15, and 10-16 is not included in this table.

10.5.3 Total Projected Water Use

Table 10-18 presents information on all projected water uses for the years 2015 to 2035.

TABLE 10-18
FUTURE TOTAL WATER USE (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Total Projected Deliveries (from Tables 10-14 and 10-15)[(a)]	47,009	43,737	45,384	47,093	48,866
Projected Water Use Known Developments (from Table 10-16)	625	2,083	2,083	2,083	2,083
Sales to Other Water Agencies (from Table 10-17)	1,029	629	629	629	629
Additional water uses and losses (from Table 10-17)	3,811	3,666	3,797	3,934	4,076
Total	**52,474**	**50,114**	**51,893**	**53,738**	**55,653**

Note: (a) Assumes conservation.

10.5.4 Water Use Projections for Lower Income Households

Senate Bill 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier. The SBMWD contains two jurisdictions; 1) the City of San Bernardino and 2) unincorporated County of San Bernardino.

The City of San Bernardino is in the process of updating its housing element; a draft housing element is available for public review. The City estimates that more than half of its households (61 percent) qualify as low-income. Table 10-19 makes an estimate of future low-income water demands. Table 10-19 assumes a similar occurrence of low-income households in the SBMWD

service area as in the City of San Bernardino. These demands are included within the water demands described in Table 10-18 and assume conservation.

TABLE 10-19
PROJECTIONS OF FUTURE LOW-INCOME HOUSEHOLD WATER USE (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Estimated Very Low and Low-Income Household Water Use	19,315	17,970	18,674	19,349	20,077

Note:
(a) Assumes 61.3% all future households in SBMWD water service area qualify as "very-low" or "low" income per the definition provided in Senate Bill 1087. Assumes conservation.

Further, SBMWD will not deny or put unreasonable conditions for water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households unless one of the following occurs:

- SBMWD specifically finds that it does not have sufficient water supply
- SBMWD is subject to a compliance order issued by the State Department of Public Health that prohibits new water connections
- The applicant has failed to agree to reasonable terms and conditions relating to the provision of services

10.6 Other Factors Affecting Water Usage

Two major factors that affect water usage are weather and water conservation. Historically, when the weather is hot and dry, water usage increases. The amount of increase varies according to the number of consecutive years of hot, dry weather and the conservation activities imposed. During cool and wet years, historical water usage decreases to reflect less water usage for exterior landscaping. Both weather effects and conservation effects are discussed below.

10.6.1 Weather Effects on Water Usage

SBMWD experiences variations in GPCD throughout the year. During the winter months (December to February) the GPCD is lower than any other time of the year, and during the summer months (June to August), the GPCD is at its highest. From the month of June to the month of August, the GPCD increases by approximately 40 percent, relative to the annual average; from the month of December to the month of February, it decreases by 35 percent from the annual average. During hot, dry years the annual average GPCD has been approximately 11 percent higher than a normal year; during cool wet years, it has been approximately 7 percent lower than a normal year. This variation gives some indication about how weather affects water demands in the SBMWD service area.

10.6.2 Demand Management Measures

Specific conservation actions that have been implemented or are planned by SBMWD are described in Section 10.7 below.

10.7 Demand Management Measures

In recent years, water conservation has become an increasingly important factor in water supply planning in California. DMMs are programs and activities through which a water supplier can communicate with their customers to encourage and incentivize water conservation.

The Urban Water Management Plan Act identities 14 DMMs that are to be evaluated in each UWMP. The UWMP Act describes the information that must be provided to demonstrate that DMMs that have been implemented, or are scheduled for implementation. It contains different requirements for the case when DMMs have not been implemented or scheduled for implementation. These requirements are summarized below.

10.7.1 Information Required for DMMs Implemented or Scheduled for Implementation

For DMMs being implemented or scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(f):

- Description of the DMM
- A description of the steps necessary to implement the measure
- An implementation schedule
- Estimate, if available, of conservation savings and the effect of the savings on the suppliers' ability to further reduce demand.

10.7.2 Information Required for DMMs Not Implemented or Scheduled for Implementation

For DMMs that are not being implemented or scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(g):

- Economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors
- A cost-benefit analysis, identifying total benefits and total costs
- A description of funding available to implement any planned water supply project that would provide water at a higher unit cost
- A description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

10.7.3 DMMs Currently Being Implemented or Scheduled for Implementation

10.7.3.1 Conservation Coordinator

To be in compliance with this DMM, SBMWD must employ (either as staff or consultant) a water conservation coordinator. SBMWD currently utilizes the community liaison as the conservation coordinator. SBMWD is evaluating the staff resources necessary to establish a dedicated coordinator position. There are no available estimates on the conservation savings resulting from the DMM or the effects of this DMM on SBMWD's ability to further reduce demand.

10.7.3.2 Water Waste Prevention

To be in compliance with this DMM, a water agency must do one or more of the following:

- Enact and enforce an ordinance or establish terms of service that prohibit water waste (single pass cooling, vehicle washing, commercial laundry systems and decorative fountains).
- Enact and enforce an ordinance or establish terms of service for water efficient design in new development (irrigation and landscape design).
- Support legislation or regulations that prohibit water waste.
- Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures.
- Support local ordinances that prohibit water waste.
- Support local ordinances that establish permits requirements for water efficient design in new development.

SBMWD has a drought contingency plan that meets the terms of the DMM, and they have adopted an ordinance that prevents water waste. There are no available estimates on the conservation savings resulting from this DMM or the effects it may have on SBMWD's ability to further reduce demand.

10.7.3.3 Water Loss Control

Implementation of this DMM consists of performing a water loss audit consistent with AWWA Manual 36 to quantify real and apparent losses. In addition, a water agency must also analyze the components of real and apparent loss, determine the economic value of recovering water loss, and develop a strategy to reduce loss to the extent actions are cost effective.

SBMWD is currently not in compliance with this DMM. SBMWD operates a meter replacement program which includes replacing meters on a 19-year rotation. Source meters are tested annually. About half of the system has older water mains which the City is aggressively replacing. Additionally, SBMWD operates a leak detection program.

To achieve full compliance with the DMM, SBMWD will perform a water loss audit using the AWWA Manual 36. Specifically, by FY 2013 SBMWD will determine the economic value of

recovering the water loss, based on the avoided cost of water. By the end of the calendar year, SBMWD will perform an analysis of components of apparent and real losses identified per AWWA Manual 36 model, and will determine actions to reduce loss where cost-effective.

A comparison of the year-to-year trend of unaccounted for water loss will be used to evaluate the effectiveness of this DMM. If SBMWD were to reduce unaccounted for losses by even one (1) percent this would result in a water savings of 500 AF or more each year. Continued implementation of water loss control practices and procedures is not anticipated to have an effect on SBMWD's ability to further reduce demand.

10.7.3.4 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

This DMM, as its name implies, requires meters for all new service connections, establishing a program for retrofit of exiting but unmetered connections, and billing customers by volume of use. This DMM also requires that a water agency have a meter maintenance and replacement plan. SBMWD is in compliance with this DMM. One-hundred (100) percent of SBMWD's retail customers are metered and billed with commodity rates. SBMWD has a meter maintenance and replacement plan. SBMWD encourages the use of dedicated landscape meters during development review and through water rates.

10.7.3.5 Retail Conservation Pricing

There are multiple aspects related to compliance with this DMM. This DMM requires a volumetric rate structure, which can be uniform, tiered, allocation-based or seasonal rates as long as the volumetric portion meets minimum levels as defined (70 percent of the rate must be variable).

SBMWD is in compliance with this DMM. One-hundred (100) percent of SBMWD's retail customers are metered and billed with commodity rates with conservation tiers established per SBMWD Rule and Regulation 21 (provided in Appendix G).

10.7.3.6 Public Information Programs

The intent of this DMM is to have customer contact through events, paid and public service advertising, mailers, billings as well as social marketing and other public information programs. To be in full compliance a water agency must have quarterly contact with the public and media, an actively maintained website, and a list of all activities.

SBMWD is in compliance with this DMM. SBMWD provides informational materials to customers through paid advertising, bill inserts, Consumer Confidence Reports, tours, and other activities as well as information on its web site. There are no available estimates on the conservation savings resulting from this DMM. However, it is not anticipated that savings resulting from this DMM will affect SBMWD's ability to further reduce demand.

10.7.3.7 School Education Programs

To be in compliance with this DMM, a water agency must have a conservation-related school education program and must provide support and educational materials to local school districts.

SBMWD is in compliance with this DMM. The program is implemented by the community liaison. SBMWD provides water conservation presentations at elementary schools and local colleges several times throughout the year. There are no available estimates on the conservation savings resulting from this DMM. However, it is not anticipated that any savings resulting from this DMM will affect SBMWD's ability to further reduce demand.

10.7.3.8 Water Sense Specification for New Residential Development

This DMM encourages replacement of old plumbing fixtures with plumbing fixtures with WSS[7] fixtures. To be in compliance with this DMM a water agency must provide incentives such as rebates, recognition programs, reduced connection fees, or have ordinances requiring residential construction meeting WSS for single and multi-family housing. These incentives are to be offered until the California universal retrofit on resale statute[8] goes into effect (year 2014) or until all new residential construction meets WSS standards.

SBMWD does not have direct regulatory jurisdiction to develop local ordinances but will support local jurisdictions in implementing and promoting codes that support efficiency. SBMWD will participate in implementation of the 2010 CAL Green Code which was adopted by the Building Standards Commission in January 2010 and will go into effect January 2011. The Code sets mandatory green building measures, including a 20 percent reduction in indoor water use, as well as dedicated meter requirements and regulations addressing landscape irrigation and design; the Code also identifies voluntary measures that set a higher standard of efficiency, which can also be adopted.

It is anticipated that indoor water use in WSS homes will be 20 percent lower than in older homes that do not have WSS plumbing fixtures. The amount of water savings, however, will depend on the extent of future residential development.

10.7.4 Evaluation of DMMs Not Implemented

This section describes DMMs not being implemented or not being implemented at compliance levels. For each DMM not being implemented, an explanation and cost-effectiveness analysis is provided. For the purpose of calculating the cost-effectiveness of DMMs, SBMWD's avoided cost of water (the cost of acquiring another unit of water) is estimated at $188.00 per AF.

10.7.4.1 Residential Assistance Program and Landscape Water Surveys

Implementation of this DMM consists of providing leak detection assistance and landscape water surveys to an average of 1.5 percent of single family and 1.5 percent of multi-family units per year for 10 years. Once that target is met, this DMM requires that a water agency maintain

[7] WaterSense is an Environmental Protection Agency sponsored program that promotes water-efficient products, programs, and practices. In order to carry the WSS label a product must be independently certified as using 20 percent less water that average products in that category.

[8] Effective January 1, 2014, Senate Bill 407 requires that all pre-1994 residential, multi-family and commercial customers replace non-compliant plumbing fixtures (including toilets, faucets, and shower heads) with water-conserving fixtures when making certain improvements or alterations to a building. By 2017, all single family homes must replace non-compliant plumbing fixtures, and by 2019, all multifamily and commercial buildings must have compliant water-conserving plumbing fixtures in place.

a program whereby surveys are performed in response to high-bill complaints or surveys are performed for at least 0.75 percent of single-family and multi-family units each year.

Although SBMWD responds to requests for water audits, the number of audits conducted per year was not available. Since 2008, the City has also provided residential conservation kits to customers that include a showerhead and two aerators. However, the Residential Assistance Program and Landscape Water Surveys DMMs were not fully implemented because they are not cost-effective at the levels required for compliance (i.e., 1.5 percent of single-family and 1.5 percent of multi-family units each year). *SBMWD does consider water audits useful and effective for those customers requesting audits (i.e., customers motivated to reduce water use).*

The cost-effectiveness analysis for the Residential Assistance Program DMM and Landscape Water Surveys DMM was combined, because, from a programmatic perspective, they would likely be implemented together as a single indoor and outdoor audit. To be in compliance with the DMM, SBMWD would need to complete 534 single family and 43 multifamily (indoor only) audits. Implementing and managing a program that would meet these requirements would cost SBMWD about $225,000 per year, and would yield a benefit to cost ratio of 0.17 (Table 10-20). Details on the cost-effectiveness calculations are provided in Appendix F.

TABLE 10-20
COST EFFECTIVENESS OF RESIDENTIAL SURVEY PROGRAMS

Total Costs	$225,896
Total Benefits	$37,454
Benefit/Cost	0.17
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$940
Water Savings (AFY)	240

10.7.4.2 High-Efficiency Clothes Washers (HECWs)

The intent of this DMM is to encourage replacement of old clothes washers with HECWs using financial incentives. Qualifying HECWs must meet an average water factor value of 5.0 or the WaterSense Specification, whichever is lower. The annual target is one percent of current single-family accounts or 1.4 percent per year of the market penetration during the first ten years of the program.

SBMWD plans to implement a HECW rebate program, but not at the levels required to be considered in compliance with this DMM (e.g., 1 percent of single-family accounts). Based on the SBMWD customer profile, SBMWD feels an extensive HECW rebate program would not be fully utilized.

To be in compliance with the DMM, SBMWD would need to provide 333 rebates per year. Implementing and managing a program that would meet these requirements would cost the SBMWD $67,000 per year and would yield a benefit to cost ratio of 0.57 (Table 10-21). Details on the cost-effectiveness calculations are provided in Appendix F.

TABLE 10-21
COST EFFECTIVENESS OF HECW REBATE PROGRAMS

Total Costs	$66,853
Total Benefits	$38,096
Benefit/Cost	0.57
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$239
Water Savings (AFY)	280

10.7.4.3 WaterSense Specification (WSS) Toilets

To be in compliance with this DMM an agency must offer incentive for toilets meeting the current WSS standard. Compliance entails demonstrating replacement of a number of toilets of 3.5 gallons per flush (or greater) with: (a) at least as many toilets as would be replaced should a retrofit upon resale ordinance be in effect, or (b) demonstration of 75 percent market saturation with WSS standard toilets.

SBMWD plans on implementing a WSS toilet rebate program, but not at the levels required to be considered in compliance. Based on the SBMWD customer profile, SBMWD feels an extensive WSS rebate program would not be fully utilized.

To be in compliance with the DMM, SBMWD would need to provide 770 single-family and 62 multi-family rebates. Implementing and managing a program that would meet these requirements would cost SBMWD $104,000, with benefit to cost ratios of 0.64 and 0.80 for single family and multi-family, respectively (Tables 10-22 and 10-23). Details on the cost-effectiveness calculations are provided in Appendix F.

With careful program design or through partnership with other agencies, it may be possible to reduce program costs and still achieve the water savings of this rebate program.

TABLE 10-22
COST EFFECTIVENESS OF WSS TOILETS FOR SINGLE-FAMILY RESIDENTIAL CUSTOMERS

Total Costs[(a)]	$55,139
Total Benefits[(a)]	$35,091
Benefit/Cost	0.64
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$331
Water Savings (AFY)	167

Note:
(a) The analysis was only performed on high efficiency toilets and not ultra-low flow toilets since ultra-low flow toilets are being phased out.

TABLE 10-23
COST EFFECTIVENESS OF WSS TOILETS FOR MULTI-FAMILY RESIDENTIAL CUSTOMERS

Total Costs[(a)]	$3,537
Total Benefits[(a)]	$2,838
Benefit/Cost	0.80
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$262
Water Savings (AFY)	13

Note:
(a) The analysis was only performed on high efficiency toilets and not ultra-low flow toilets since ultra-low flow toilets are being phased out.

10.7.4.4 Commercial, Industrial, and Institutional (CII) DMMs

To be in compliance with this DMM an agency must reduce CII water use by 10 percent of the baseline over a 10-year period. Implementation can be achieved through one or both of the following:

- Implementing measures on the CUWCC CII list with well-documented savings. These measures target commercial water use include: toilets, urinals, clothes washers, cooling towers, food steamers, ice machines, steam sterilizers, water brooms and dry vacuum pumps.

- Implementing unique conservation measures whose water savings are calculated on a case-by-case basis. Sample measures include: industrial process water use reduction, industrial laundry retrofits, car wash recycling systems, water-efficient commercial.

SBMWD is not implementing the CII DMMs because they are not cost-effective. To be in compliance with the DMMs, SBMWD would need to reduce water use by 82 AFY. Costs and benefits of implementing and managing programs to meet this objective are summarized in Table 10-24. A mix of CII programs from the CUWCC list were considered, including both indoor and landscape program options. The results show that most programs are not strongly cost-effective, with possible exception of washer rebates (as described in Section 10.7.3 washer rebates are available to SBMWD CII customers).

TABLE 10-24
COST EFFECTIVENESS OF CII PROGRAMS

	Lifetime Water Savings (AF)	Cumulative Value of Saved Water ($)	Annual Costs ($)	Benefit/ Cost	Cost for Water Saved ($/AF)
BMP5: CII WBICs Rebates	92	14,289	23,816	0.6	260
BMP5: CII WBICs Direct Install	92	14,289	79,388	0.2	866
BMP5: CII Precision Nozzles Distr.	95	16,066	47,633	0.3	502
BMP5: Dedicated Irrigation Surveys	411	68,125	94,793	0.7	231
BMP9: CII Indoor Surveys	764	119,074	8,820,833	0.0	11,548
BMP9: CII HET Rebates	1,316	190,032	392,682	0.5	298
BMP9: CII HE Urinal Rebates	1,462	208,168	666,488	0.3	456
BMP9: CII ULV Urinal Rebates	1,462	208,168	573,920	0.4	393
BMP9: CII Zero Consumption Urinal Rebates	1,462	208,168	503,930	0.4	345

10.7.4.5 Large Landscape

There are multiple elements related to this DMM all related to providing non-residential customers with support and incentives to improve their landscape water use efficiency. Specific activities include:

- Developing water use budgets at 70 percent ETo (100 percent for dedicated recreational areas) for 90 percent of accounts with dedicated irrigation meters in 10 years.
- Assisting all accounts that are 20 percent over budget within 6 years.
- Performing surveys on 15 percent of un-metered and mixed use meter accounts in 10 years (CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both the Landscape and CII DMMs).
- Providing an incentive program for irrigation equipment retrofits.
- Provide notices each billing cycle with water use budgets.
- Accounts without Meters or with Mixed-Use Meters:
  - Develop and implement a strategy for marketing surveys.
  - Offer financial incentives.

SBMWD is not implementing the Landscape DMM because it is not cost-effective. To meet the requirements of the Large Landscape DMM, SBMWD would have to conduct about 64 surveys per year. An exemption can be filed because the cost-effectiveness evaluation indicates that the large landscape surveys would not be cost-effective. Implementing and managing a program that would meet these requirements would cost the City almost $95,000 per year, and would yield a benefit to cost ratio of 0.72 (Table 10-25). This result is based on a survey cost of $1,500 each.

TABLE 10-25
COST EFFECTIVENESS OF LARGE LANDSCAPE PROGRAM

Total Costs	$94,793
Total Benefits	$68,125
Benefit/Cost	0.72
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$231
Water Savings (AFY)	411

10.7.5 DMM Implementation and Urban Water Use Targets of the 20x2020 Plan

In order to meet the water use targets prescribed by SBX7-7, SBMWD will have to reduce current water use by approximately 10 percent by the year 2015 and by approximately 20 percent by year 2020. Should SBMWD's recycled water program develop on the schedule anticipated in this UWMP and with the volumes described in the UWMP, SBMWD would achieve its interim and compliance water use SBX7-7 targets without any additional conservation actions. However, because the recycled water program is in the planning stages, as described below, SMBWD is still planning to undertake additional conservation actions to ensure compliance with SBX7-7.

Additional conservation actions will focus on indoor and outdoor water conservation measures for residential and CII consumers. Components of the plan include DMM, consumer education programs, and advertising efforts.

10.7.5.1 Additional Demand Management Measures

10.7.5.1.1 Rebates

SBMWD offers rebates to both residential and CII customers, though the application process is different for the two groups of customers. Rebates are for indoor and outdoor appliances and fixtures that will help consumers use less water while maintaining their standard of living or operations. For applicants from either group to qualify, the applicant must be a SBMWD water customer or property owner and install the rebated appliance or fixture in the SBMWD service area. SBMWD randomly visits each customer location to confirm the installation of the rebated appliances.

10.7.5.1.2 Residential Rebates for Fiscal Year 2011-2012

The rebates listed below are for residential customers only and are contingent upon budget approval. SBMWD has budgeted $25,000 for rebates; this amount is assigned to the rebate program collectively so that no one rebate category may go unfunded while another category is under utilized. The steps to receive the residential rebates are:

1. Submit the rebate application for approval prior to purchase.

2. SBMWD determines the applicant's eligibility and returns the approved application with a rebate number.

3. After receiving SBMWD's rebate approval, the customer can purchase and install the rebated items.

4. After installation, the customer submits the Department's rebate form with the rebate number, original receipts for the items purchased, and UPC code (bar code) from the label.

5. Rebates are issued as a check to the applicant only.

6. By applying for and accepting the rebate, the customer agrees to a one-time random visit to ensure that the rebated items were installed at the residence on the application.

- **High-efficiency toilets: (This measure supersedes the ULFT Rebate, effective July 1, 2011, pending budget approval.)**
  SBMWD offers an $85 rebate for the purchase and installation of toilets that use 1.2 gallons per flush. Residential customers can receive a rebate for up to two toilets. Low-flow toilets, or toilets that use 1.6 gallons per flush, no longer qualify for a rebate.

- **High-efficiency washing machine: (Effective July 1, 2011, pending Board approval of FY 2011-2012 budget.)**
  SBMWD offers residential customers a $200 rebate for the purchase and installation of a single high-efficiency washing machine. This incentive reduces the cost of such an appliance by an average of 10 percent.

- **High-efficiency dishwasher: (Effective July 1, 2011, pending Board approval of FY 2011-2012 budget.)**
  Residential customers are eligible for an $85 rebate for the purchase and installation of a single high-efficiency dishwasher using no more than 5.0 gallons per cycle.

- **Low-flow showerhead: (Effective July 1, 2011, pending Board approval of FY 2011-2012 budget.)**
  Residential customers can qualify for a $15 rebate for up to two low-flow shower heads.

- **Evaporative Cooler Repair Kits: (Effective August 1, 2011.)**
  Residential customers and CII customers with residential-style evaporative coolers can qualify for a rebate for a kit to repair leaky evaporative coolers (swamp coolers). This kit consists of 8 feet of 1/4-inch tubing, a new float valve, corrosion resistant spray paint for evaporative coolers and caulking to repair the effects of corrosion and rust, replacement water retention pads, and a pamphlet explaining the use of the items. SBMWD has coordinated the creation of the kit with local hardware and home improvement stores.

- **Drought tolerant trees and shrubs: (Effective July 1, 2011, pending Board approval of FY 2011-2012 budget.)**
  Both residential and CII customers that have attended the Department's Water-Smart Landscaping Class can qualify for a 10 percent rebate on drought tolerant trees and

shrubs. The trees and shrubs must be selected from the Department's plant list provided in the landscaping class. Attendance at the class is required to ensure that the customer has the basic knowledge to properly plant, establish, and maintain the plant to maximize water savings.

- **Irrigation controllers: (Currently in effect – new costs effective July 1, 2011.)**
  All customers can qualify for rebates for the purchase and installation of residential-style electronic sprinkler controllers with 14 or fewer zones. The Department offers an $85 rebate for weather-based controllers, a rebate of the cost of the controller up to $65 for the first-time installation of a standard electronic controller and $35 for the addition of a soil moisture or rain sensor.

- **High Efficiency Sprinklers: (Effective July 1, 2011.)**
  All customers can qualify for a 20 percent rebate for the purchase and installation of high-efficiency sprinkler nozzles similar to the Rain Bird U-series sprinkler nozzle. This rebate is for the nozzle only and does not include the entire sprinkler head or housing.

- **Household Water Conservation Kit: (Currently in effect.)**
  SBMWD offers residents a free water conservation kit to residential customers. The kit includes a low-flow showerhead, a low-flow aerator for both a kitchen and a bathroom sink, a shower timer, and two toilet leak-detection dye tablets.

10.7.5.1.3 Commercial, Industrial, and Institutional Customer Rebates

CII customers may qualify for the above rebates, but the application process is conducted on a case-by-case basis. In this way, rebate packages can be tailored to the CII applicant and other Department and non-Department resources may be used. This will prevent a single CII customer from depleting the rebate budget and defeating one of the goals of the rebate program: encouraging water conservation across all demographics of the service area's population.

10.7.5.2 Conservation Education

- **Water Audits: (Effective July 1, 2011, pending Board approval of FY 2011-2012 budget.)**
  SBWMD's water audit, offered upon request, is designed to help customers better understand how they are using their water and to help them make decisions about how to save water and money on their water bill.

- **Residential Water Audit:**
  The water audit begins with a review of customer's water use history and a calculation of seasonal averages for the last five years. The "auditor" reviews the historical data with the resident and helps the resident discover the basics of water consumption (size of the home, age of the fixtures, number of occupants, and landscaping factors) and water use behavior (number of showers taken each day, number of times the toilet is flushed, etc.). This information is combined on a worksheet to estimate how much water is used in the activities listed so the resident can decide how to save water. The auditor does a follow-up six, twelve, and eighteen months after the audit to see if water consumption behavior

has changed using billing data. Based on the amount of water saved, SBMWD may present certificates of achievement and conduct interviews to learn what changes were made and how the changes affected the resident. This information may be used in advertisements and educational events, with the resident's approval.

- **Commercial Water Audits:**
  Water audits for CII customers follow a similar procedure but are altered based on the nature of the business. For example, restaurants and food handling businesses use a set of evaluation criteria that reflects both general water usage and behaviors specific to the food industry. Similar steps are used to identify the special needs of schools, gyms, and sports facilities. Additionally, special attention is given to the evaporative cooling systems found in large buildings.

A site visit and an assessment of landscaping for both residential and CII customers will accompany the water audit. Recommendations are made to show the customer how water can be saved in the landscaping using water-smart landscaping techniques, plants, and irrigation systems.

10.7.5.3 Water-Smart Landscaping

- **Water-Smart Landscaping Class: (Currently in effect.)**
  SBMWD offers a 3-hour water-smart landscaping class for both residential and commercial customers. This class focuses on the basics of landscape design, water-smart irrigation techniques and technology, and drought tolerant plant selection. Successful students are invited to send photos of their work for use as success stories in SBMWD's public outreach programs.

- **Qualified Water Efficient Landscaper (QWEL) Program:**
  This program provides over twenty hours of training and educational materials designed to teach professional landscapers improved techniques for water management in landscaping. QWEL provides all of the class material; the first class is adjusted to reflect local information about SBMWD while the balance of training may not be changed. Participation in the program requires partnership with "WaterSense" and authorizes the use of that label in conjunction with this program.

10.7.5.4 Public Education

- **School Programs: (Effective July 1, 2011.)**
  Using tours of SBMWD facilities and guest speaking opportunities, SBMWD presents the water conservation message from a local perspective covering topics that include the water-cycle and our impact on it, treatment methods for drinking water, wastewater treatment, and water reclamation/recycling. SBMWD actively seeks opportunities to speak at elementary and secondary schools, local colleges, and civic/youth group meetings in and around the SBMWD's service area.

- **Water Conservation Webpages: (Effective August 1, 2011.)**
  SBMWD's website includes pages dedicated to water conservation to reinforce the concepts taught in the water-smart landscaping class, provide indoor water conservation

tips, offer links to instructions for repairing a leaky toilet, replacing a toilet, and other do-it-yourself water-saving household repairs. Included is a page that helps residential customers perform a water-use self-audit with corresponding comments for improvements.

- **Outdoor Advertising: (Effective July 1, 2011 pending Board approval of FY 2011-2012 budget.)**
  SBMWD advertises water conservation messages and encourages the use of SBMWD programs through local newspapers, radio, local billboards, and signage on buses, as well as SBMWD videos on the City's cable channel. Advertising reminds the public about the rebate and education programs and encourages them to conserve water while offering water conservation tips.

- **Inland Empire Garden Friendly Association: (Effective July 1, 2011, pending Board approval of FY 2011-2012 budget.)**
  This is an association of water wholesalers and retailers along with corporate sponsors, such as the Home Depot, Toro, Rain Bird, and DIG Corp, to present free "Water-Wise" Workshops that cover landscaping techniques and plant selection. Material at the event shows the Department's logo and seal, reminding the participants that the Department is helping local customers conserve water.

10.8 Water Resources

Chapter 2 of this UWMP provides a description of imported water supplies and groundwater supplies. Chapter 2 also provides a description of supply reliability for imported water and groundwater. The subsections below provide information on the current and projected use of these supplies by SBMWD.

SBMWD's current water supply consists solely of water extracted from the underlying underground aquifer, SBBA. However, in the past SBMWD traded a small quantity of water with EVWD.

SBMWD's water distribution system consists of pipelines, storage reservoirs, pumping stations, hydroelectric generating stations, manual and automatic control valves, fire hydrants, and water meters located throughout 19 individual pressure zones.

10.8.1 Imported Water Supplies

Imported water available to SBMWD is State Water Project water purchased from Valley District (Table 10-26). A description of this supply and its reliability is provided in Chapter 2.

TABLE 10-26
WHOLESALE SUPPLIES - EXISTING AND PLANNED SOURCES OF WATER[(a)] (AF)

Wholesale source	2010	2015	2020	2025	2030	2035
Purchase from Valley District[(b)]	2,000	2,000	2,000	2,000	2,000	2,000

Notes:
(a) This table shows supplies expected to be available to SBMWD, depending on water year SBMWD can buy additional supplies.
(b) Data from 2007 IRWMP.

10.8.1.1 Imported Supply Reliability

During times of State-wide drought conditions, the availability of State Water may be reduced. These conditions are normally known in advance, providing SBMWD with the opportunity to plan for the reduced supply. Table 10-27 estimates how imported water supplies available to SBMWD may be reduced during drought conditions. During a drought period, it is Valley District's priority to meet obligations to maintain lake levels at Big Bear Lake and to make direct deliveries to the water treatment plants operated by Redlands, WVWD, YVWD, and SBMWD. In a single dry-year, present until 2029, Valley District anticipates SWP allocation and carryover storage of approximately 23,338 AF. In a single dry year after 2029 Valley District anticipates SWP allocation and carryover storage of approximately 22,338 AF. After accounting for potential demands for maintenance of Big Bear Lake, it is anticipated that between 3,953 and 4,210 AF of imported water, more than SBWMD's typical imported water need, would be available to SBMWD during a single dry year. In a multiple dry year Valley District expects between 44,858 and 45,910 AF of water to be available, meaning Valley District could fulfill normal direct deliveries to water treatment plants in a multiple-dry year.

TABLE 10-27
WHOLESALE SUPPLIES - SINGLE DRY AND MULTIPLE DRY YEARS (AF)

Wholesale Source	2015	2020	2025	2030	2035
Single-Dry Year	2,000	2,000	2,000	2,000	2,000
Multiple-Dry Year	2,000	2,000	2,000	2,000	2,000

10.8.2 Groundwater

Over the last five years, SBMWD has drawn almost 100 percent of its water from wells in the SBBA. Currently, water is derived from 57 groundwater wells located throughout its service area. The wells range from 50 to 1,300 feet in depth, and have production capacities ranging from 50 to 3,500 gpm. Historic groundwater production is summarized in Table 10-28, and anticipated groundwater production for future years is shown in Table 10-29.

TABLE 10-28
GROUNDWATER VOLUME PUMPED[(a)] (AF)

Basin Name	*Metered or Unmetered?*	2005	2006	2007	2008	2009
SBBA	Metered	48,138	57,391	59,594	57,237	42,277
Groundwater as Percent of Total Water Supply		*100%*	*100%*	*100%*	*100%*	*100%*

Note:
(a) San Bernardino Municipal Water Department Public Water System Statistics 2005 to 2008. Year 2009 data provided by SBMWD.

TABLE 10-29
GROUNDWATER - VOLUME PROJECTED TO BE PUMPED (AF)

Basin Name	*Metered or Unmetered?*	2015	2020	2025	2030	2035
SBBA	Metered	50,233	52,671	54,730	56,866	59,082
Groundwater as Percent of Total Water Supply		*96%*	*96%*	*96%*	*97%*	*97%*

10.8.2.1 Groundwater Supply Reliability

As described in Chapter 2, the SBBA is a managed basin. SBMWD therefore has the opportunity to develop additional wells and over-extract groundwater under specified conditions contained in the stipulated judgment. The wells in general have provided a stable source of water supply. Past records show that SBMWD has not removed any well from its supply source during drought conditions, although, some wells had to be lowered to continue extraction of groundwater. During 1990, the driest year on record for Southern California, SBMWD was impacted only by lowered groundwater levels and increased pumping costs. SBMWD maintained full capability to use all wells within its system. As described in Chapter 2, extensive modeling has been used to examine groundwater recharge, groundwater pumping, basin storage, groundwater flow, and groundwater plume location and plume migration. Based on these studies it is anticipated that groundwater pumping by SBMWD and other SBBA users in the Valley District service area will not be reduced or curtailed during a single-dry or multi-dry year.

TABLE 10-30
GROUNDWATER SUPPLIES - NORMAL, SINGLE DRY, AND MULTIPLE DRY YEARS (AF)

	2015	2020	2025	2030	2035
Normal Year	61,039	66,850	72,664	72,664	72,664
Single-Dry Year	61,039	66,850	72,664	72,664	72,664
Multiple-Dry Year	61,039	66,850	72,664	72,664	72,664

10.8.3 Recycled Water

SBMWD currently does not use recycled water to offset potable demand. The 2005 UWMP anticipated up to 800 AFY of recycled water use by year 2010. However, has not yet implemented a recycled water program and SBMWD is actively undertaking design and feasibility studies for the use of recycled water.

Sewer collection systems are not operated by the SBMWD, but rather are operated by the County of San Bernardino, cities of San Bernardino, Loma Linda, and EVWD. Collected wastewater is treated at the San Bernardino Water Reclamation Plant to a secondary treatment level. The San Bernardino Water Reclamation Plant has a current capacity of 33 MGD or 36,948 AFY, but current average annual flow is approximately 29,000 AFY (SAWPA 2010). Table 10-31 shows existing and anticipated wastewater collection and treatment at the San Bernardino Water Reclamation Plant.

TABLE 10-31
CURRENT AND PROJECTED WASTEWATER COLLECTION AND TREATMENT (AFY)

	2010	2015	2020	2025	2030	2035	Disposal Method	Treatment Level
San Bernardino Water Reclamation Plant	29,000	30,294	31,645	32,793	33,983	35,216	Flow to RIX	Secondary
RIX	33,000	34,472	36,010	37,316	38,670	40,073	Discharge to Santa Ana River	Tertiary

Following treatment at the San Bernardino Water Reclamation Plant effluent is conveyed to the RIX Tertiary Treatment Facility in the City of Colton. This facility is jointly owned by SBMWD and the City of Colton, and is operated under contract solely by the City of San Bernardino. At the RIX facility, tertiary treatment to Title 22 standards consists of a native soil filtration process followed by ultraviolet (UV) disinfection prior to discharge to the Santa Ana River. Current RIX capacity is 45,000 AFY, but average annual treatment is about 33,000 AFY (SAWPA 2010). A portion of the discharged water, 16,000 AFY, is provided by contract to Valley District to maintain flows in the Santa Ana River, fulfilling Valley District's downstream obligations under the *Orange County* Judgment.

SBMWD's Water Reclamation Division completed a Water Reclamation Feasibility Study in February 2005. This recycled water optimization plan was designed to explore an effective and efficient means of constructing and distributing recycled water to customers within the service area as no water recycling facilities are currently located in the service area. The results of this study have lead to the proposed Clean Water Factory. The Clean Water Factory is a project to treat effluent from the San Bernardino Water Reclamation Plant to a quality approved for recharge—as set by the California Department of Public Health (CDPH) and the Santa Ana RWQCB — and convey the recycled water to the Waterman Basins, the East Twin Creek Spreading Grounds, and the Devil Canyon and Sweetwater Basins for surface spreading in the northern portion of the SBMWD service area. Recycled water spread at these facilities will

artificially recharge the Bunker Hill Groundwater Basin (Bunker Hill Basin) and, more specifically, the Bunker Hill A Management Zone, as described in the Water Quality Control Plan for the Santa Ana River Watershed (Basin Plan). The Clean Water Factory will also treat a side stream of San Bernardino Water Reclamation Plant effluent to a quality approved for direct use and convey the tertiary treated recycled water to customers that can benefit from a non-potable water supply. With potential expansion (later phases), it is estimated that up to 34,200 AFY of recycled water could be generated and used on the SBMWD service area during the planning period.

Agencies that are participating in the planning for the Clean Water Factory are listed in Table 10-32.

TABLE 10-32
RECYCLED WATER PLAN PARTICIPATING AGENCIES

Participating Agencies	Role in Plan Development
Santa Ana RWQCB	Water Quality Regulation/Protection
CDPH	Water Quality Regulation/Protection
Santa Ana Watermaster	Evaluation of Project Against Required Flows
City of Colton	Projections of Future Wastewater Treatment and Reuse Opportunities
County of San Bernardino	Projections of Future Wastewater, Flood Control and Recharge
City of Loma Linda	Projections of Future Wastewater Treatment and Reuse Opportunities
East Valley Water District	Projections of Future Wastewater Treatment and Reuse Opportunities
Bureau of Reclamation	Technical and Financial Assistance
Valley District	Technical and Financial Assistance
Western Municipal Water District	Technical and Financial Assistance
Santa Ana Watershed Project Authority	Technical and Financial Assistance

10.8.3.1 Potential Users

SBMWD is still in the planning stages for recycled water. As described earlier, the primary use of recycled water is anticipated to be groundwater recharge. Other potential uses include non-potable uses in the vicinity of the San Bernardino Water Reclamation Plant. These existing uses, include landscaping at the reclamation plant itself, the San Bernardino Municipal Golf Course, and landscape irrigation by the California Department of Transportation in the vicinity of Interstate 215. It is estimated these uses have approximately 840 AFY of demand. Table 10-33 provides estimates of future recycled water use.

TABLE 10-33
POTENTIAL RECYCLED WATER USE (AFY)[a]

2015	2020	2025	2030	2035
5,600	7,000	13,000	19,600	25,500

Note: (a) Planning level estimates.

10.8.3.2 Incentives for Recycled Water Use

As described earlier, SBMWD is still in the planning stages for its recycled water, including planning for recycled water use incentives. The primary user of the proposed recycled water will be SBMWD itself; the agency will use the water in-lieu of imported water to maintain the SBBA groundwater basin. Currently, about 5,000 AFY of the groundwater pumped by the SBMWD must be made up by recharging State Water Project water, and this will only increase overtime. So long as recycled water costs less than a like a amount of SWP water, there will be a strong financial incentive to develop and use recycled water for groundwater recharge.

Challenges to the use of recycled water include public acceptance of recycled water, cost, and potential environmental impacts. Given the location of the water reclamation plant, it will be necessary to pump water several miles before it reaches acceptable spreading areas. In addition, there are concerns about maintaining flows for other beneficial uses of the Santa Ana River as well as maintenance of water quality in any groundwater basins that receive recycled water.

10.8.4 Transfers, Exchanges, and Groundwater Banking Programs

10.8.4.1 Transfers and Exchanges

SBMWD has water exchange and transfer agreements with several of the surrounding agencies on an as-needed basis. Exchanges occur when SBMWD pumps water for another agency and in turn receives water from that agency at a future time and at a specified ratio to account for pumping and delivery costs. Existing interties with other agencies and the capacity of the interties are listed in Table 10-34. Exchanges in the past have occurred during periods of lowered groundwater levels, loss of water by other agencies due to groundwater contamination, and to facilitate increased pumping in SBMWD's artesian pressure zone to lower groundwater levels that had infiltrated underground utilities. Exchanges are on an as-needed basis and only occur when adequate supplies are available within SBMWD's service area. Therefore, exchanges are not taken into consideration when examining future water supplies.

TABLE 10-34
TRANSFER AND EXCHANGE OPPORTUNITIES

Exchange Agency	Transfer or Exchange Direction	Maximum Metered Capability (MGD)	Proposed Quantities
East Valley Water District	Transfer Between	4	As needed
City of Riverside	Transfer Between	2	
West Valley Water District	Transfer Between	3	
City of Loma Linda	Transfer Between	5	
City of Colton	Transfer Between	3	
City of Rialto	Transfer Between	3.6	
Valley District	Transfer Between	5	
Riverside Highland Water Company	Transfer Between	3	

10.8.4.2 Groundwater Banking Programs

SBMWD does not currently utilize a groundwater banking program.

10.8.4.3 Planned Water Supply Projects and Programs

As described in Section 10.8.3, SBMWD is planning a recycled water supply.

10.8.5 Total Anticipated Water Supply

Table 10-35 summarizes the water resources available to SBMWD for the 30-year period covered by this plan.

TABLE 10-35
SUMMARY OF CURRENT AND PLANNED WATER SUPPLIES (AF)

Water Supply Source	Supply (AF)					
Existing[a]	*2010*	*2015*	*2020*	*2025*	*2030*	*2035*
Wholesale/Imported	2,000	2,000	2,000	2,000	2,000	2,000
Groundwater	53,940	61,039	66,850	72,664	72,664	72,664
Local Surface Water	0	0	0	0	0	0
Recycled Water	0	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0	0
Groundwater Banking	0	0	0	0	0	0
Total Existing Supplies	*55,940*	*63,039*	*68,850*	*74,664*	*74,664*	*74,664*
Planned[b]						
Wholesale/Imported	0	0	0	0	0	0
Groundwater	0	0	0	0	0	0
Local Surface Water	0	0	0	0	0	0
Recycled Water	0	5,600	7,000	13,000	19,600	25,500
Transfers/Exchanges	0	0	0	0	0	0
Groundwater Banking	0	0	0	0	0	0
Total Planned Supplies	*0*	*5,600*	*7,000*	*13,000*	*19,600*	*25,500*
Total Existing and Planned Supplies	*55,940*	*68,639*	*75,850*	*87,664*	*94,264*	*100,164*

Notes:
(a) From Tables 10-26 and 10-30.
(b) From Tables 10-33.

10.9 Water Shortage Contingency Plan

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, a fire or earthquake which damage delivery or storage facilities, chemical spill, or a regional power outage. Chapter 5 of this UWMP describes water shortage contingency planning for regional water supply sources (imported water, groundwater). This section focuses on water shortage contingency planning for SBMWD.

In order to ensure a reliable water supply in a water shortage situation, SBMWD developed a Drought Contingency Plan that was originally adopted by SBMWD on March 12, 1991 in response to a statewide water shortage. This plan included voluntary conservation measures. The objective of the Drought Contingency Plan was to provide effective, implementable measures to ensure a safe, adequate, and reliable supply of water during continued drought conditions. It was also the SBMWD's intention to continue to cooperate with other local water purveyors to assist them in meeting their water needs. Additionally, SBMWD updated its Emergency Response Plan in 2008. This plan is designed to address emergency water shortages that could occur as a result of an earthquake, flood, fire, or other catastrophic events affecting power supplies and/or the water distribution system.

10.9.1 Coordinated Planning

SBMWD is a participant in ERNIE a water/wastewater mutual aid network within San Bernardino and Riverside counties. In an emergency ERNIE could be activated. If a disaster overwhelms the local resources, SBMWD will activate the CalWARN system for statewide mutual aid. In addition to CalWARN and ERNIE, SBMWD has mutual aid agreements with the City of Loma Linda, City of Rialto, City of Redlands, City of Riverside, and Yucaipa Valley County Water District.

The updated Emergency Response Plan is consistent with the Statewide Emergency Management System and the National Incident Management System, meaning that during an emergency SBMWD will be able to effectively coordinate its response with state and federal agencies and will be able to utilize the Governor's Office of Emergency services to provide and receive mutual aid from nearby agencies.

10.9.2 Actions to Prepare for Catastrophic Interruption

The Emergency Response Plan may be activated whenever any of the following conditions exist:

- Natural disaster, such as an earthquake, flood, fire, etc.
- Loss of water transmission lines, main breaks, or other major facilities.
- Water quality issue involving a "boil water" order or other major public relations/communications issue.
- Emergency curtailment.

- Disturbance affecting nearby utilities.
- Hazardous spill (chlorine).
- Terrorist activities.

SBMWD maintains portable backup power supply and diesel and/or natural gas driven wells at critical locations within the distribution system to provide domestic water for emergency purposes during sustained power outages. In the event of a natural or man-made catastrophe that affects SBMWD's ability to provide a potable water supply for a sustained period of time (30 days or more), the following measures will be implemented as required:

- SBMWD's boil water notification program will be activated. The notice will be provided to local radio stations and newspapers.
- Customers will be notified of supplemental sources of water for cooking and drinking.
- Mutual Aid Agreements will be implemented.
- Potable water will be made available and distributed to customers throughout the SBMWD service area.
- A public information program will be initiated.
- Normal water service conditions will be restored as expediently as possible.

10.9.3 Water Shortage Contingency Resolution

A Drought Contingency Plan and Water Conservation Policy were originally adopted by SBMWD in 1991. More recently, on 5 January 2010, the City of San Bernardino Board of Water Commissioners passed Resolution 763, which amended the general water service/rates as set forth in Rule and Regulation No. 21 (see Appendix G).

10.9.3.1 Stages of Action to Respond to Water Shortages

The resolution that establishes water conservation guidelines is based on the availability of supply. SBMWD's water shortage contingency plan has three stages of action, and each stage has a set of conservation measures. Water Code section 10632 of the Urban Water Management Plan Act requires a shortage situation of a 50 percent reduction in water supply to be addressed. Stage I is designed to be in effect when there are no water shortages. Stage II is implemented when there are water shortages up to 10 percent. Stage III, a water shortage emergency, will provide adequate conservation during a water shortage of up to a 50 percent.

Stage I – Normal Conditions (No Supply Shortage): Normal conditions shall be in effect when the SBMWD is able to meet all the water demands of its customers in the immediate future. During normal conditions, all water users should continue to use water wisely to prevent the waste or unreasonable use of water, and to reduce water consumption to that necessary for ordinary domestic and commercial purposes.

Stage II – Threatened Water Supply Condition (10 percent or less Shortage): In the event of a threatened water supply shortage which could affect the SBMWD's ability to provide water for

ordinary domestic and commercial uses, the following water conservation measures may be implemented:

- Excessive Irrigation and Related Waste – No customer of the SBMWD or other person acting on behalf of or under the direction of a customer shall cause or permit the use of water for irrigation of landscaping or other outdoor vegetation, plantings, lawns or other growth to exceed the amount required to provide reasonable irrigation of same, and shall not cause or permit any unreasonable or excessive waste of water from said irrigation activities or from watering devices or systems. The free flow of water away from an irrigated site shall be presumptively considered excessive irrigation and waste.

- Commercial Facilities – Large water use commercial and industrial facilities shall, upon request of the General Manager, provide the SBMWD with a plan to conserve water at their facilities. The SBMWD will provide these facilities with information regarding the average monthly water use by the facility for the last two year period. The facility will be expected to provide the SBMWD with a plan to conserve or reduce the amount of water used by that percentage deemed by the SBMWD to be necessary under the circumstances.

- Parks, Golf Courses, Swimming Pools, and School Grounds – Public and private parks, golf courses, swimming pools and school grounds which use water provided by the SBMWD shall make every effort to use water for irrigation and pool filling between the hours of 10:00 P.M. and 6:00 A.M. (non-peak water usage hours).

- Domestic Irrigation – The SBMWD may determine that the irrigation of exterior vegetation shall be conducted only during specified hours and/or days, and may impose other restrictions on the use of water for such irrigation. The irrigation of exterior vegetation at other than these times shall be considered to be a waste of water.

- Swimming Pools – All residential, public, and recreational swimming pools of all sizes shall use evaporation-resistant covers and shall recirculate water. Any swimming pool which does not have a cover installed during periods of nonuse shall be considered a waste of water.

- Run Off and Wash Down – No water provided by the SBMWD shall be used for the purposes of wash down of impervious areas (i.e., driveways and sidewalks). Any water used on premises that is allowed to escape the premises and run off into gutters or storm drains shall be considered a waste of water.

- Vehicle Washing – The washing of cars, trucks or other vehicles is not permitted except with a hose equipped with an automatic shut-off device, or a commercial facility so designated for vehicle washing purposes.

- Drinking Water Provided by Restaurants – Restaurants are requested not to provide drinking water to patrons except by request.

Stage III – Water Shortage Emergency – Mandatory Water Conservation Measures (10 to 50 percent Shortage): In the event of a water shortage emergency in the form of a major

deficiency of any supply or failure of a distribution facility caused either by drought or catastrophe in which SBMWD may be prevented from meeting the water demands of its customers, the General Manager may declare a water shortage emergency subject to the ratification of the Board of Water Commissioners within 72 hours of such declaration, and the following water conservation measures may be placed into effect immediately following such declaration:

- Prohibition – Watering of parks, school grounds, golf courses, lawns, landscape irrigation, washing down of driveways, parking lots or other impervious surfaces, washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water, filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes may be prohibited.

- Restaurants – Restaurants shall not serve drinking water to patrons except by request.

- Construction Meters – No new construction meter permits shall be issued by SBMWD. All existing construction meters shall be removed and/or locked out of service.

- Commercial Nurseries and Livestock – Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.

10.9.3.2 Penalties

Rule and Regulation No. 21 contains a series of Notices of Violations for water waste:

- Step 1: Warning letter to customer describing the waste issue and notice of potential fines for continuing waste, providing a SBMWD customer service contact for conservation information and assistance.
- Step 2: Customer site visit to discuss nature of waste and potential solutions. A second warning letter is issued allowing seven calendar days to remedy the waste situation and comply with the conservation restrictions.
- Step 3: A $25 penalty is issued after failure to comply with the second warning letter.
- Step 4: Additional penalties increasing incrementally by $25 per occurrence.
- Step 5: The Department may restrict the amount of water supplied to any customer failing to comply with conservation standards.

Further, during a Stage II or Stage III water shortage, Rule and Regulation 21 implements rates meant to further encourage water conservation:

- Stage II – Imposes a 5 percent reduction in water usage and assess financial penalties on usage in excess of those amounts. A base allowance for each customer is established based on their prior year's water usage. A 10 percent charge will be applied to each billing unit that exceeds the 5 percent required reduction in base allowance.

- Stage III – (Water Shortage Emergency): Will impose a 10 percent reduction in water usage and assess financial penalties on usage in excess of those amounts. A base allowance for each customer is established based on their prior year's water usage. A

20 percent charge will be applied to each billing unit that exceeds the 10 percent required reduction in base allowance.

10.9.4 Financial Impacts of Actions During Shortages

The projected impact on water sales for a one-year period under a Stage II water shortage condition would result in an overall decrease in water sales revenue of approximately 10 percent. A decrease in water sales revenue of this magnitude would not adversely impact the financial operations of SBMWD. However a one year period under a Stage III water shortage condition would reduce sales revenue by approximately 25 percent given the current rate structure. Adequate reserves are available to cover both shortage scenarios described above. However, a 25 percent reduction in water sales revenue would necessitate a water rate increase if the Stage III condition continued beyond the initial one-year period.

10.9.5 Mechanism to Determine Reductions in Water Use

Under normal conditions, SBMWD prepares monthly production reports which are reviewed and compared to production reports and pumping statistics from prior months and the same period of the prior year. Under shortage conditions, these production reports could be prepared as often as daily. In addition billing reports could be reviewed to identify users who are not abiding by water the water shortage contingency plan.

10.9.6 Minimum Water Supply Available During Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the years 2011 to 2013, assuming years 2011 to 2013 repeat the driest three-year historic sequence for each water supply source. As shown in Table 10-36, the total supplies, given a repeat of historically low conditions on all water supplies would be approximately 61,179 AFY. Comparing these supplies to the demand projections provided in Section 10.5, SBMWD has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

TABLE 10-36
MINIMUM WATER SUPPLY AVAILABLE DURING NEXT THREE WATER YEARS (AFY)[(a)]

	2011	2012	2013
Purchased Imported Water	2,000	2,000	2,000
City of San Bernardino Produced Groundwater	61,039	61,039	61,039
City of San Bernardino Produced Surface Water	0	0	0
Transfers/Exchanges	0	0	0
Recycled Water	0	0	0
Banked Water	0	0	0
Total Supply	**63,039**	**63,039**	**63,039**

Note:
(a) From Tables 10-27 and 10-30.

10.10 Supply And Demand Comparisons

The UWMP Act requires urban water suppliers assess water supply reliability by comparing total projected water use with the expected water supply over the next twenty years in five year increments. The Act also requires an assessment of single-dry year and multiple-dry years. This section presents the reliability assessment for SBMWD's service area.

10.10.1 Normal Water Year

The Normal/Average water year is a year in the historical sequence that most closely represents median runoff levels and patterns. This section summarizes SBMWD's water supplies available to meet demands over the 20-year planning period during an average/normal year and compares them to demands for the same period. In Table 10-37, demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Assumptions about supplies and demands are provided in Sections 10.5 and 10.8. Table 10-37 demonstrates that SBMWD anticipates adequate supplies for years 2015 to 2035 under normal conditions.

10.10.2 Single-Dry Year

The single-dry year is generally the lowest annual runoff for a water source in the record. The single-dry year may differ for various sources. This section summarizes SBMWD's water supplies available to meet demands over the 20-year planning period during a single-dry year and compares them to demands for the same period. In Table 10-38, demands are assumed to be 10 percent greater in a single-dry year than during a normal year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Table 10-38 demonstrates the SBMWD anticipates adequate supplies for years 2015 to 2035 under single-dry year conditions.

10.10.3 Multiple-Dry Years

The multiple-dry year is generally the lowest annual runoff for a three year or more consecutive period. The multiple-dry year period may differ for various sources. This section summarizes SBMWD's water supplies available to meet demands over the 20-year planning period during a multiple-dry year period and compares them to demands for the same time frame. In Table 10-39, demands are assumed to be 10 percent greater in a multiple-dry year than during an average year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Table 10-39 demonstrates the SBMWD anticipates adequate supplies for years 2015 to 2035 under multiple-dry year conditions.

TABLE 10-37
PROJECTED AVERAGE/NORMAL YEAR SUPPLIES AND DEMANDS

Existing Supplies[a]	**2015**	**2020**	**2025**	**2030**	**2035**
Wholesale/Imported	2,000	2,000	2,000	2,000	2,000
Groundwater	61,039	66,850	72,664	72,664	72,664
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Existing Supplies	*63,039*	*68,850*	*74,664*	*74,664*	*74,664*
Planned Supplies[a]					
Wholesale/Imported	0	0	0	0	0
Groundwater	0	0	0	0	0
Local Surface Water	0	0	0	0	0
Recycled Water	5,600	7,000	13,000	19,600	25,500
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Planned Supplies	*5,600*	*7,000*	*13,000*	*19,600*	*25,500*
Total Existing and Planned Supplies	***68,639***	***75,850***	***87,664***	***94,264***	***100,164***
Demands without Additional Conservation[b]	52,233	54,671	56,730	58,866	61,082
Conservation	5,223	10,934	11,346	11,773	12,216
Total Adjusted Demands	47,009	43,737	45,384	47,093	48,866
Surplus/Deficit in Normal Year	**21,630**	**32,113**	**42,280**	**47,171**	**51,298**
Difference as % of Supply	**32%**	**42%**	**48%**	**50%**	**51%**
Difference as % of Demand	**46%**	**73%**	**93%**	**100%**	**105%**

Notes:
(a) From Tables 10-26 10-30, and 10-33.
(b) From Tables 10-14, 10-15, 10-16, and 10-17.

TABLE 10-38
PROJECTED SINGLE-DRY YEAR SUPPLIES AND DEMANDS

Existing Supplies[a]	2015	2020	2025	2030	2035
Wholesale/Imported	2,000	2,000	2,000	2,000	2,000
Groundwater	61,039	66,850	72,664	72,664	72,664
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Existing Supplies	*63,039*	*68,850*	*74,664*	*74,664*	*74,664*
Planned Supplies[a]					
Wholesale/Imported	0	0	0	0	0
Groundwater	0	0	0	0	0
Local Surface Water	0	0	0	0	0
Recycled Water	5,600	7,000	13,000	19,600	25,500
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Planned Supplies	*5,600*	*7,000*	*13,000*	*19,600*	*25,500*
Total Existing and Planned Supplies	***68,639***	***75,850***	***87,664***	***94,264***	***100,164***
Demands without Additional Conservation[b]	57,456	60,138	62,403	64,752	67,190
Conservation	5,746	12,028	12,481	12,950	13,438
Total Adjusted Demands	51,710	48,111	49,922	51,802	53,752
Surplus/Deficit in Normal Year	**16,929**	**27,739**	**37,742**	**42,462**	**46,412**
Difference as % of Supply	**25%**	**37%**	**43%**	**45%**	**46%**
Difference as % of Demand	**33%**	**58%**	**76%**	**82%**	**86%**

Notes:
(a) From Tables 10-26, 10-30, and 10-33.
(b) From Tables 10-14, 10-15, 10-16, and 10-17. In dry periods demands assumed to increase 10% above Normal Year demands.

TABLE 10-39
PROJECTED MULTIPLE-DRY YEAR SUPPLIES AND DEMANDS

		2015	2020	2025	2030	2035
Multiple-Dry Year First Year Supply	Supply Totals[(a)]	68,639	75,850	87,664	94,264	100,164
	Demand Totals[(b)]	51,710	48,111	49,922	51,802	53,752
	Difference	16,929	27,739	37,742	42,462	46,412
	Difference as % of Supply	25%	37%	43%	45%	46%
	Difference as % of Demand	33%	58%	76%	82%	86%
Multiple-Dry Year Second Year Supply	Supply Totals[(a)]	68,639	75,850	87,664	94,264	100,164
	Demand Totals[(b)]	51,710	48,111	49,922	51,802	53,752
	Difference	16,929	27,739	37,742	42,462	46,412
	Difference as % of Supply	25%	37%	43%	45%	46%
	Difference as % of Demand	33%	58%	76%	82%	86%
Multiple-Dry Year Third Year Supply	Supply Totals[(a)]	68,639	75,850	87,664	94,264	100,164
	Demand Totals[(b)]	51,710	48,111	49,922	51,802	53,752
	Difference	16,929	27,739	37,742	42,462	46,412
	Difference as % of Supply	25%	37%	43%	45%	46%
	Difference as % of Demand	33%	58%	76%	82%	86%

Notes:
(a) From Tables 10-27, 10-30, and 10-33.
(b) From Table 10-14, 10-15, 10-16, and 10-17. Assumes conservation. In dry periods demands assume to increase 10% above Normal Year demands.

Chapter 11

West Valley Water District

Chapter 11: West Valley Water District

11.1 Description of Agency

WVWD is a County Water District, a public agency of the State of California, organized and existing under the County Water District Law (Division 12, Section 30,000 of the Water Code) of the State of California. Among other typical political subdivision powers, it has the power of taxation and eminent domain.

WVWD is located in southwestern San Bernardino County with a small part in northern Riverside County (Figure 11-1). WVWD is adjacent to the western limits of the City of San Bernardino on the east; adjacent to, and including the eastern part of the City of Fontana on the west; adjacent to the U.S. Forest Service boundary on the north; and the County of Riverside on the south. WVWD is divided into northern and southern sections by the central portion of the City of Rialto.

WVWD was formed in 1952 under the name of Bloomington County Water District. This early agency initially covered an area of only one square mile and served water to approximately two hundred households. It had no water rights of its own, but served water secured through stock owned in the Citizens Land and Water Company. By 1959, WVWD's name had been changed to the Semi-Tropic County Water District. At about the same time, it became clear that the City of San Bernardino and perhaps the San Bernardino Valley Municipal Water District (Valley District) would condemn water rights of the Citizens Land and Water Company and the Lytle Creek Water and Improvement Company, another mutual water company in the same general area. While the rights of the existing customers would be protected, all future growth and development in the service areas of these companies would be stopped by lack of adequate water supply. To deal with this concern, Semi-Tropic County Water District worked out a cooperative agreement to absorb the assets of the Citizens Land and Water Company, Lytle Creek Water and Improvement Company, and the Slover Mutual Water Company. Annexations were completed and a revenue bond was floated to acquire the private companies' assets. A new name was chosen, and in 1962 the West San Bernardino County Water District was formed. The new district acquired water rights that date back to 1897, facilities for surface diversion from Lytle Creek, 22 wells in four different water basins, storage and distribution facilities, administrative offices and equipment, and maintenance and operation facilities.

Prior to becoming the WVWD in 2003, the agency acquired several other water suppliers, including the Park Water Company's Bloomington Water System in 1965, the Inter County Water Company in 1987, and Crestmore Heights Mutual Water Company in 1997, along with Fontana Ranchos Water Company and Southern California Water Company. Today, WVWD serves a population of over 65,000.

WVWD utilized anticipated new developments as a means to estimate future water demand. In addition to anticipated developments, WVWD has assumed that each year there will be miscellaneous developments resulting in new water demand. Based on estimates of equivalent dwelling units from the various anticipated developments and the timeframe during which each development may become completed and occupied, WVWD prepared estimates of future

population as shown in Table 11-1. Though the timeframe for this planning document is through year 2035, WVWD does not anticipate reaching buildout of its service area during this period.

TABLE 11-1
POPULATION - CURRENT AND PROJECTED

	2010	2015	2020	2025	2030	2035	Data source
Service area population	66,571	77,457	100,092	116,881	125,983	138,575	Equivalent Dwelling Units

Based on estimates of equivalent dwelling units from the various anticipated developments and the timeframe during which each development may become completed and occupied.

11.2 Climate

The major features of WVWD's climate are hot, dry summers and cool, wet winters. Most of the precipitation occurs from November to March with little to none occurring during the summer months of June through September. The average rainfall in the Valley is approximately 10 inches per year with occasional droughts on an average seven-year cycle. Summer temperatures commonly are above 85°F and may exceed 103°F (Table 11-2).

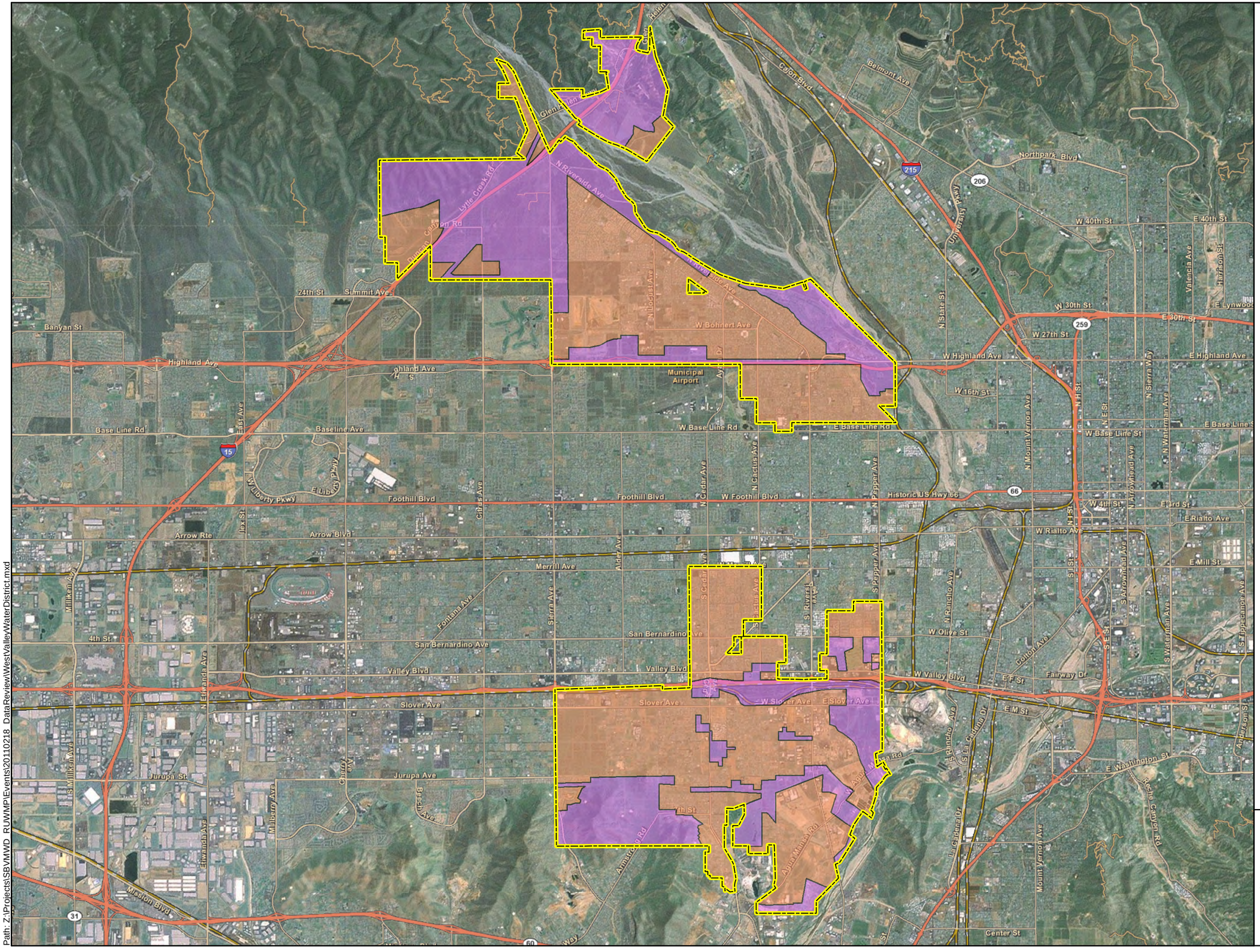
ETo was obtained from the Department of Water Resources' California Irrigation Management Information System (CIMIS). Since no station is located in the WVWD service area, data from the nearest CIMIS station was used. The station is located at the University of California, Riverside (Station 44). Average precipitation and temperature was obtained from the Western Regional Climate Center. The Riverside Citrus Experimental Station (#047473) was the nearest station and is representative of the WVWD service area.

TABLE 11-2
CLIMATE

	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo	2.49	2.91	4.16	5.27	5.94	6.56
Average Rainfall (inches)	2.12	2.16	1.64	0.78	0.23	0.06
Average Temperature (ºF)	54.1	55.6	57.6	61.5	66.1	71.4

	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average ETo	7.22	6.92	5.35	4.05	2.94	2.56	56.37
Average Rainfall (inches)	0.04	0.11	0.24	0.32	0.92	1.22	9.86
Average Temperature (ºF)	77.4	77.9	74.6	67.5	59.5	54.4	64.7

Source: Reference Evapotranspiration Rate (in inches/month) for Station 44, http://www.cimis.water.ca.gov; Riverside Citrus Station #047473 for precipitation and temperature.



Legend

West Valley Water District Service Area

Service Areas

Served

Not Served

N

0 3,500 7,000 Feet

Kennedy/Jenks Consultants

Regional Urban Water Management Plan
San Bernardino Valley

WEST VALLEY WATER DISTRICT SERVICE AREA AND BOUNDARY

K/J 1080012.00
April 2011
Figure 11-1

Path: Z:\Projects\SBVMWD_RUWMP\Events\20110218_DataReview\WestValleyWaterDistrict.mxd

11.3 Historical Water Use

11.3.1 Historical Deliveries

WVWD categorizes its water use customers into the following: single family residential, commercial/institutional, industrial, agriculture, and other. The governmental/institutional accounts are included within the commercial category. WVWD's commercial/governmental customers represent approximately five percent of the current (2009) metered services and 25 percent of the consumptive water use. The land use development trend within the WVWD's service area has historically been residential. In 2000, 95 percent of accounts were residential; the percentage remained stable through 2009 and is expected to remain stable in future years. Actual water deliveries in 2005 and 2009 are provided in Tables 11-3 and 11-4.

TABLE 11-3
WATER DELIVERIES - ACTUAL 2005

	Metered		Not Metered		Total
Water Use Sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**Volume (AFY)**
Single family[(a)]	17,111	14,865			14,865
Multi-family[(a)]					
Commercial[(b)]	690	1,520			1,520
Industrial					
Institutional/Governmental[(b)]					
Landscape					
Agriculture	32	593			593
Other					
Total Deliveries in WVWD Service Area	**17,833**	**16,978**	**-**	**-**	**16,978**

Notes:
(a) Multi-Family residential uses and Single Family residential uses are accounted for together.
(b) WVWD combines Commercial and Institutional/Governmental.

TABLE 11-4
WATER DELIVERIES - ACTUAL 2009

	Metered		Not Metered		Total
Water Use Sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**Volume (AFY)**
Single family[(a)]	17,692	14,182			14,182
Multi-family[(a)]					
Commercial[(b)]	975	4,709			4,709
Industrial	35	156			156
Institutional/governmental[(b)]					
Landscape					
Agriculture	11	126			126
Other					
Total Deliveries in WVWD Service Area	**18,713**	**19,173**	**-**	**-**	**19,173**

Notes:
(a) Multi-Family residential uses and Single Family residential uses are accounted for together.
(b) WVWD combines Commercial and Institutional/Governmental.

11.3.2 Historic Sales

WVWD has sold water to other agencies in the past, as documented in Table 11-5. These sales were made to assist neighboring agencies who requested assistance, including the County of San Bernardino and Marygold Mutual Water Company. These sales were not long-term and do not entail long term obligations for WVWD. A portion of the water shown in Table 11-5 represents water that entered the WVWD treatment plant and was treated on behalf of the City of Rialto.

TABLE 11-5
HISTORIC SALES TO OTHER WATER AGENCIES (AF)

Agency	2005	2006	2007	2008	2009
Multiple	1,414	1,970	171	429	1,137
Total	**1,414**	**1,970**	**171**	**429**	**1,137**

11.3.3 Historical Other Water Uses

In the past, WVWD has not had water use related to saline barriers, groundwater recharge operations, or recycled water. However, WVWD, like all water agencies does have some unaccounted-for water. Unaccounted-for water is the difference between the amount of water produced and the amount of water billed to customers. Over the last five years unaccounted for water has averaged six percent of produced water within WVWD's system. Sources of unaccounted-for water include:

- Hydrant Testing and Flushing - Hydrant testing is performed by both WVWD and the Fire Departments. WVWD and the Fire Departments perform a comprehensive testing program to monitor the level of fire flows available throughout the service area.
- Fire Hydrant Operations by the Fire Department - This represents the use of water for emergencies.
- Customer Meter Inaccuracies - Customer meters represent one of the main sources of unaccounted-for water as they tend to under-represent actual consumption in the water system. WVWD has a replacement program to replace malfunctioning meters.
- Street Cleaning - This represents the use of water for street sweeping.
- Leaks from water lines - Leakage from water pipes is a common occurrence in water systems. A significant number of leaks remain undetected over long periods of time as they are very small; however these small leaks contribute to the overall unaccounted-for water.

Table 11-6 summarizes what DWR refers to as "other" water uses, besides metered deliveries and sales to other agencies.

TABLE 11-6
HISTORIC "OTHER" WATER USES (AF)

Water Use[(a)]	2005	2009
Saline Barriers	0	0
Groundwater Recharge	0	0
Conjunctive Use	0	0
Recycled Water	0	0
System Losses	2,758	1,271
Total	**2,758**	**1,271**

Note:
(a) Any water accounted for in Tables 11-3, 11-4, and 11-5 is not included in this table.

11.3.4 Total Historical Water Use

Table 11-7 below presents information on all historic water uses for the years 2005 and 2009.

TABLE 11-7
HISTORIC TOTAL WATER USE (AF)

Water Use	2005	2009
Historic Total Water Use		
Total Water Deliveries (from Tables 11-3 and 11-4)	16,978	19,173
Sales to Other Water Agencies (from Table 11-5)	1,414	1,137
Additional water uses and losses (from Table 11-6)	2,758	1,271
Total	**21,150**	**21,582**

11.4 Existing and Target Per Capita Water Use

The Water Conservation Bill of 2009 (SBX7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Bill of 2009 provides the regulatory framework to support the statewide reduction in urban per capita water use described in the 20 by 2020 Water Conservation Plan. Consistent with SBX7-7, each water supplier must determine and report its existing baseline water consumption and establish future water use targets in GPCD; reporting is to begin with the 2010 UWMP.

The two primary calculations required by SBX7-7 are:

1. Base Daily Water Use calculation (average GPCD used in past years)
2. Compliance Water Use Target (target gallons per capita per day in 2015 and 2020)

The Base Daily Water Use calculation is based on gross water use by an agency in each year and can be based on a ten-year average ending no earlier than 2004 and no later than 2010 or a 15-year average if ten percent of 2008 demand was met by recycled water. Base Daily Water Use must account for all water sent to retail customers, excluding:

- Recycled water
- Water sent to another water agency
- Water that went into storage

It is at an agency's discretion whether or not to exclude agricultural water use from the Base Daily Water Use calculation. If agricultural water use is excluded from the Base Daily Water Use calculation it must also be excluded from the calculation of actual water use in later urban water management plans. WVWD has elected to include agricultural water use in its Base Daily Water Use calculation.

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). There are four methods for calculating the Compliance Water Use Target:

1. Eighty percent of the urban water supplier's baseline per capita daily water use
2. Per capita daily water use estimated using the sum of the following:
    a. For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of DWR's 2016 report to the Legislature reviewing progress toward achieving the statewide 20 percent reduction target, this standard may be adjusted by the Legislature by statute.
    b. For landscape irrigated through dedicated or residential meters or connections, water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in section 490 et seq. of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992.
    c. For CII uses, a ten percent reduction in water use from the baseline CII water use by 2020.
3. Ninety-five percent of the applicable state hydrologic region target as stated in the state's April 30, 2009, draft *20 by 2020 Water Conservation Plan*. WVWD falls within the South Coast Hydrologic Region; the region target is 142 GPCD.
4. Reduce the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:
    a. Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "BMP Calculator".
    b. A 20 percent savings on all unmetered uses.
    c. A 10 percent savings on baseline CII use.
    d. A 21.6 percent savings on current landscape and water loss uses.

The Interim Water Use Target is set as a halfway point between the Base Daily Water Use GPCD and the 2020 Compliance Water Use Target GPCD.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95 percent of a

5-year average base gross water use from 2003 to 2010. The Maximum Allowable GPCD use is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBX7-7 legislation. If an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as their target.

11.4.1 Base Daily Per Capita Water Use

Figure 11-1 illustrates both the overall WVWD service area and the portion of the service area currently served. For the purposes of this SBX7-7 calculation, the part of the service area designated as "Area Served" in Figure 11-1 is the distribution area used to estimate the Base Daily Per Capita Water Use. Tables 11-8 through 11-10 summarize the Base Daily Water Use calculation for WVWD. As is shown in these tables, WVWD is not eligible to use a 15-year base period. The period 2000 to 2009 has been selected for calculation of the 10-year base period while the period 2004 to 2008 has been selected for calculation of the 5-year base period. The 10-year average Base Daily Per Capita Water Use for WVWD is 316 GPCD; the 5-year is 320 GPCD.

TABLE 11-8
BASE PERIOD RANGES

Base	Parameter	Value
10- to 15- Year Base Period	2008 Total Water Deliveries (AF)	22,780
	2008 Total Volume of Delivered Recycled Water (AF)	0
	2008 Recycled Water as a Percent of Total Deliveries (%)	0
	Allowable Base Period (years)[(a)]	10
	Year Beginning Base Period Range	2000
	Year Ending Base Period Range[(b)]	2009
5-Year Base Period	Year Beginning Base Period Range	2004
	Year ending Base Period Range[(c)]	2008

Notes:
(a) If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater the first base period is a continuous 10- to 15-year period.
(b) The ending year must be between December 31, 2004 and December 31, 2010.
(c) The ending year must be between December 31, 2007 and December 31, 2010.

In order to calculate Base Daily Per Capita Water Use for past years, it was necessary to develop population estimates for past years. WVWD's service area population for years 2000 to 2009 was estimated using the "Alternative Methodology for Service Area Population" as described in Appendix A of the Methodologies for Calculating Baseline and Compliance per Capita Urban Water Use (DWR 2010). First the census blocks in the WVWD service area were identified using GIS software. Then Census 2000 data was used to develop estimates of population residing in single-family structures and population residing in multi-family structures and this was used to estimate population per connection ratios for year 2000. Based on census data it is estimated that there are 3.64 persons per single-family connection and 2.8 persons per multi-family connection. These persons per connection factors were then multiplied by WVWD's connections data for years 2001 to 2009 to estimate population in those years.

TABLE 11-9
BASE DAILY PER CAPITA WATER USE, 10-YEAR

Sequence Year	Calendar Year	Distribution System Population[(a)]	Daily System Gross Water Use (MGD)	Annual Daily Per Capita Water Use (GPCD)
1	2000	54,824	18	330
2	2001	56,856	18	309
3	2002	59,667	18	309
4	2003	60,028	19	317
5	2004	59,267	19	321
6	2005	60,573	18	291
7	2006	60,300	19	322
8	2007	59,568	20	333
9	2008	60,690	20	335
10	2009	62,630	18	291
	Base Daily Per Capita Water Use, 10-Year Average			*316*

Note:
(a) WVWD's service area population estimated using the "Alternative Methodology for Service Area Population" as described in Appendix A of the Methodologies for Calculating Baseline and Compliance per Capita Urban Water Use (DWR 2010).

Table 11-10 provides the data on the Maximum Allowable GPCD. The Maximum Allowable GPCD is based on 95 percent of the 5-year average base gross water use. In this case 95 percent of the 5-year GPCD is 304 GPCD (95% of 320).

TABLE 11-10
BASE DAILY PER CAPITA WATER USE, 5-YEAR

Sequence Year	Calendar Year	Distribution System Population[(a)]	Daily System Gross Water Use (MGD)	Annual Daily Per Capita Water Use (GPCD)
1	2004	59,267	19	321
2	2005	60,573	18	291
3	2006	60,300	19	322
4	2007	59,568	20	333
5	2008	60,690	20	335
	Base Daily Per Capita Water Use, 5-Year Average			*320*

Note:
(a) WVWD's service area population estimated using the "Alternative Methodology for Service Area Population" as described in Appendix A of the Methodologies for Calculating Baseline and Compliance per Capita Urban Water Use (DWR 2010).

11.4.2 Compliance Water Use Targets

In addition to calculating base gross water use, the "20 by 2020" legislation requires that a retail water supplier identify its demand reduction targets. The methodologies for calculating demand reduction targets were described above. WVWD is choosing to meet SBX7-7 targets as an individual agency rather than as part of a regional alliance. WVWD has selected Method 4 to calculate the agency's 2020 Compliance Water Use Target and Interim Water Use Target.

Compliance Water Use Target under Method 4 is Base Daily GPCD less:

- Indoor residential water savings of 15 GPCD or an amount determined by use of DWR's "BMP Calculator"
- 20 percent savings on all unmetered uses
- 10 percent savings on Baseline CII (expressed in GPCD)
- 21.6 percent savings on current landscape and water loss uses (expressed as GPCD)

WVWD is choosing to use the default value of 15 GPCD for the indoor residential water savings. WVWD has no unmetered uses. As shown in Table 11-11, baseline CII water use was estimated using the 10-year average of water sales to CII water uses in the WVWD service area for the years 2000 to 2009 (the same period as was used to calculate the Base Daily Per Capita Water Use). Baseline CII water use is 58 GPCD.

DWR has provided the following formula for calculating landscape and water loss uses:

= Base Daily Per Capita Water Use - Default Indoor Water Use (70 GPCD) - Baseline CII

Based on this formula, WVWD's landscape and water loss use is:

= 316 GPCD - 70 GPCD - 58 GPCD = 188 GPCD

TABLE 11-11
BASELINE COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL WATER USE

Sequence Year	Calendar Year	Distribution System Population[(a)]	CII Water Use (MG)[(b)]	Annual Daily Per Capita Water Use (GPCD)
1	2000	54,824	1,047	52
2	2001	56,856	954	46
3	2002	59,667	837	38
4	2003	60,028	800	36
5	2004	59,267	1,680	78
6	2005	60,573	495	22
7	2006	60,300	1,845	84
8	2007	59,568	1,901	87
9	2008	60,690	1,460	66
10	2009	62,630	1,585	69
Baseline CII Water Use (10-year Average)				*58*

Notes:
(a) WVWD's service area population estimated using the "Alternative Methodology for Service Area Population" as described in Appendix A of the Methodologies for Calculating Baseline and Compliance per Capita Urban Water Use (DWR 2010)
(b) Public Water System Statistics for WVWD and information provided by WVWD.

The resulting Compliance Water Use Target is 254 GPCD, the full calculation is demonstrated in Table 11-12. The Interim Water Use Target is 285 GPCD.

TABLE 11-12
METHOD 4 COMPLIANCE WATER USE TARGET CALCULATION

Baseline GPCD		316
less	indoor residential water savings (GPCD)	-15
less	20 percent unmetered water uses (GPCD)	0
less	10 percent savings on CII water use (GPCD)	-6
less	21.6 percent savings on landscape and water loss uses (GPCD)	-41
	Compliance Water Use Target	*254*
	Interim Water Use Target	*285*

As described earlier, the Maximum Allowable GPCD is 304. The Compliance Water Use Target, under Method 4 (254 GPCD) is less than the Maximum Allowable GPCD, so no adjustments to the Compliance Water Use Target are necessary.

In order to meet the water use targets prescribed by SBX7-7, WVWD will have to reduce current water use by approximately 10 percent by 2015 and by approximately 20 percent by 2020. The programs which WVWD intends to use to achieve these conservation goals are described in Section 11.7.3.

11.5 Projected Water Use

11.5.1 Purveyor Projections

WVWD utilized the anticipated new developments as a means to estimate future water demand. In addition to anticipated developments, WVWD has assumed that each year there will be miscellaneous developments resulting in new water demand. An assumed system loss of eight percent was applied to the demand (this is conservative WVWD's past system loss has typically been around 6 percent). The resulting estimate of future demands in the WVWD service area is shown in Tables 11-13 through 11-15. WVWD does not anticipate build out during the period covered by this plan (2010 to 2035).

TABLE 11-13
WATER DELIVERIES - PROJECTED, 2015

Water Use Sectors	Metered # of accounts	Metered Volume (AFY)	Not metered # of accounts	Not metered Volume (AFY)	Total Volume (AFY)
Single family[a]	18,361	21,271			21,271
Multi-family[a]					0
Commercial[b]	771	4,209			4,209
Industrial[b]	42	117			117
Institutional/governmental[b]					0
Landscape					0
Agriculture	20	784			784
Other	3	246			246
Total without Conservation	*19,197*	*26,627*			*26,627*
Total with Conservation (assumed 10% by year 2015)	*19,197*	*23,964*			*23,964*

Notes:
(a) Multi-Family residential uses and Single Family residential uses are accounted for together.
(b) WVWD combines Commercial and Institutional/Governmental.

TABLE 11-14
WATER DELIVERIES - PROJECTED, 2020

Water Use Sectors	Metered # of accounts	Metered Volume (AFY)	Not metered # of accounts	Not metered Volume (AFY)	Total Volume (AFY)
Single family[a]	19,116	27,486			27,486
Multi-family[a]					0
Commercial[b]	803	5,439			5,439
Industrial[b]	44	151			151
Institutional/governmental[b]					0
Landscape					0
Agriculture	21	1,013			1,013
Other	3	317			317
Total without Conservation	*19,986*	*34,407*	*0*	*0*	*34,407*
Total with Conservation (assumed 20% by year 2020)	*19,986*	*27,526*	*0*	*0*	*27,526*

Notes:
(a) Multi-Family residential uses and Single Family residential uses are accounted for together.
(b) WVWD combines Commercial and Institutional/Governmental.

TABLE 11-15
WATER DELIVERIES - PROJECTED 2025, 2030, AND 2035

Water Use Sectors	2025 Metered # of accounts	2025 Metered Volume (AFY)	2030 Metered # of accounts	2030 Metered Volume (AFY)	2035 Metered # of accounts	2035 Metered Volume (AFY)
Single family[a]	19,902	32,097	20,720	34,596	21,572	38,054
Multi-family[a]					0	
Commercial[b]	836	6,352	870	6,847	906	7,531
Industrial[b]	46	177	47	191	49	210
Institutional/governmental[b]						
Landscape						
Agriculture	21	1,183	22	1,275	23	1,402
Other	3	371	4	399	4	439
Total without Conservation	*20,808*	*40,179*	*21,663*	*43,308*	*22,554*	*47,636*
Total with Conservation (assumed 20% year 2020 and thereafter)	*20,808*	*32,143*	*21,663*	*34,646*	*22,554*	*38,109*

Notes:
(a) Multi-Family residential uses and Single Family residential uses are accounted for together.
(b) WVWD combines Commercial and Institutional/Governmental.

11.5.2 Projected Sales and Other Water Uses

As in the past, WVWD does not anticipate future water use obligations related to saline barriers and groundwater recharge. Recycled water use, and any associated obligations, is currently being evaluated, but at this time no future water demands related to recycled water have been formulated. For the purpose of projections, unaccounted-for water is assumed to be eight percent. WVWD does not plan any future water sales to other agencies.

TABLE 11-16
FUTURE SALES AND "OTHER" WATER USES (AF)

Water Use[a]	2015	2020	2025	2030	2035
Sales to Other Agencies	0	0	0	0	0
Saline Barriers	0	0	0	0	0
Groundwater Recharge	0	0	0	0	0
Conjunctive Use	0	0	0	0	0
Recycled Water	0	0	0	0	0
System Losses	1,917	2,202	2,571	2,772	3,049
Total	**1,917**	**2,202**	**2,571**	**2,772**	**3,049**

Note:
(a) Any water accounted for in Tables 11-13, 11-14, and 11-15 is not included in this table.

11.5.3 Total Projected Water Use

Table 11-17 presents information on all projected water uses for the years 2015 to 2035.

TABLE 11-17
TOTAL PROJECTED WATER USE (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Total Water Deliveries (from Tables 11-13, 11-14, and 11-15)	23,964	27,526	32,143	34,646	38,109
Sales to Other Water Agencies (from Table 11-16)	0	0	0	0	0
Additional water uses and losses (from Table 11-16)	1,917	2,202	2,571	2,772	3,049
Total[(a)]	**25,881**	**29,728**	**34,715**	**37,418**	**41,158**

Note:
(a) Assumes conservation; 10% by 2015, 20% by 2020 and held constant through 2035.

11.5.4 Water Use Projections for Lower Income Households

Senate Bill 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier. The WVWD serves portions of five jurisdictions, the City of Rialto, the City of Fontana, the City of Colton, and unincorporated San Bernardino and Riverside counties.

The City of Rialto updated its housing element in 2010. The housing element estimates that about 44% of households are very low- and low-income in the City. However, there is not specific information on very-low or low income households in the WVWD service area.

The City of Fontana updated its housing element in 2010. The housing element estimates that approximately 38 percent of households are very low- and low-income in Fontana. However, the information is not sufficient to estimate the existing number of low-income households or the associated water demand in the WVWD service area.

The City of Colton updated its housing element in 2005. The Housing Element for 2005 provides information on previously set goals for very low, low, income housing units for each of the categories. In the 2005 Housing Element, Colton estimates that 72 percent of households qualify as very-low or low-income.

The County of San Bernardino updated its housing element in May 2007. The Housing Element provides information on regional housing needs and states goals for new housing to accommodate very-low and low-income households. According to the housing element, approximately 42 percent of households in the unincorporated county are very-low or low-income.

Table 11-18 below makes an estimate of future low-income water demands. Within Table 11-18, the incidence of low-income households in each jurisdiction is weighted by the percentage of the service area represented by each jurisdiction. The weighted percentage estimate of very-low and low-income households in the WVWD service area is 44 percent. Therefore it is assumed that 44 percent of future residential demands come from very-low and

low-income households. These demands are included within the water demands described in Table 11-17 and assumes conservation.

TABLE 11-18
PROJECTIONS OF FUTURE LOW-INCOME HOUSEHOLD WATER USE (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Estimated Very Low and Low-Income Household Water Use	8,423	9,675	11,298	12,178	13,395

Note:
(a) Assumes 44% all future households in WVWD service area qualify as "very-low" or "low" income per the definition provided in Senate Bill 1087.

Further, WVWD will not deny or condition approval of water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households unless one of the following occurs:

- WVWD specifically finds that it does not have sufficient water supply
- WVWD is subject to a compliance order issued by the State Department of Public Health that prohibits new water connections
- the applicant has failed to agree to reasonable terms and conditions relating to the provision of services

11.6 Other Factors Affecting Water Usage

Two major factors that affect water usage are weather and water conservation. Historically, when the weather is hot and dry, water use increases. The amount of increase varies according to the number of consecutive years of hot, dry weather and the conservation activities imposed. During cool and wet years, historical water usage decreases to reflect less water usage for exterior landscaping. Both weather effects and conservation effects are discussed below.

11.6.1 Weather Effects on Water Usage

As described in Section 11.2, WVWD experiences cool winters and dry hot summers. In 2009, during the winter months (November, December, January) WVWD customers used only about 238 GPCD; while in the summer months customers used about 314 GPCD. This variation gives some indication about how weather affects water demands in the WVWD service area. Past studies have indicated that demands increase 6 to 12 percent during dry periods. For this analysis it is estimated that demands will increase ten percent during dry periods.

11.7 Demand Management Measures

In recent years, water conservation has become an increasingly important factor in water supply planning in California. DMMs are programs and activities through which a water supplier can communicate with their customers and encourage and incentivize water conservation. The Urban Water Management Plan Act identities 14 DMMs that are to be evaluated in each UWMP. Within this document DMMs and BMPs are used interchangeably. Although WVWD is

not a signatory to the Memorandum of Understanding Regarding Urban Water Conservation in California, the UWMP Act requires compliance with DMMs. The UWMP Act requires different information for DMMs that have been implemented or are schedule for implementation and DMMS not implemented or not scheduled for implementation.

11.7.1 Information Required for DMMs Implemented or Scheduled for Implementation

For those DMMs being implemented or scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(f):

- The year the DMM was implemented or is scheduled for implementation
- Description of the DMM
- A description of the steps necessary to implement the measure
- An implementation schedule
- Estimate, if available, of conservation savings and the effect of the savings on the suppliers' ability to further reduce demand

11.7.2 Information Required for DMMs Not Implemented or Scheduled for Implementation

For those DMMs being not implemented or scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(g):

- Economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors
- A cost-benefit analysis, identifying total benefits and total costs
- A description of funding available to implement any planned water supply project that would provide water at a higher unit cost
- A description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation

11.7.3 DMMs Currently Being Implemented or Scheduled for Implementation

This section describes DMMs currently being implemented or scheduled for implementation by WVWD.

11.7.3.1 Conservation Coordinator

To be in compliance with this DMM, WVWD must designate (either staff or consultant) a water conservation coordinator. WVWD staff manages the water conservation program as part of

their ongoing duties, and they are also supported by outside consultants. Starting in 2011, WVWD District has had a full time Conservation Coordinator on staff.

11.7.3.2 Water Waste Prevention

To be in compliance with this DMM, a water agency must do one or more of the following:

- Enact and enforce an ordinance or establish terms of service that prohibit water waste (single pass cooling, vehicle washing, commercial laundry systems and decorative fountains).
- Enact and enforce an ordinance or establish terms of service for water efficient design in new development (irrigation and landscape design).
- Support legislation or regulations that prohibit water waste.
- Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures.
- Support local ordinances that prohibit water waste.
- Support local ordinances that establish permits requirements for water efficient design in new development.

WVWD, through Article 24, lists uses of water considered non-essential to the public health, safety and welfare and, defines what constitutes water wasting pursuant to Water Code Section 350 et seq., Water Code Section 71640 et. seq., and the common law. Article 24 was adopted May 1, 2003 and is provided in Appendix F.

11.7.3.3 Water Loss Control

Implementation of this DMM consists of performing a water loss audit consistent with AWWA Manual 36 to quantify real and apparent losses. In addition, a water agency must also analyze the components of real and apparent loss, determine the economic value of recovering water loss, and develop a strategy to reduce loss to the extent actions are cost effective.

Currently WVWD is not in compliance with the revision to the DMM, but has begun to perform the AWWA analyses and collect data for the spreadsheet. WVWD will complete the audit no later than July 2011.

Much of the information needed to implement an AWWA water audit is currently being collected. For the past several years WVWD has performed an annual water audit comparing meter readings against well production meters. Audits from 2006 through 2009 show an annual unaccounted for water loss around 6 percent. The unaccounted for water loss is attributed to line flushing, fire fighting, meter efficiency and street cleaning. In addition to the annual review, WVWD has a leak response program.

WVWD has policies for meter testing and replacement that were implemented in January 2011. WVWD now requires an annual testing of meters 4 inch and larger. The Meter Supervisor must develop a schedule for testing that includes all meters that are 5 years or older. The results are evaluated and reported to the Superintendent and the Water Conservation Coordinator.

WVWD has also set replacement requirements that specify replacement of at least two-hundred (200) 5/8 to 3 inch meters annually. Also, any meters that are stuck or damaged will automatically be replaced. The meters will be replaced at the direction of the Meter Supervisor after approval from the Superintendent and all meters replaced will be reported to the Water Conservation Coordinator.

11.7.3.4 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

This DMM requires meters for all new service connections, establishing a program for retrofit of existing but unmetered connections, and billing customers by volume of use. This DMM also requires that a water agency have a meter maintenance and replacement plan. All of WVWD's customers are metered and WVWD has a meter replacement program and dedicated landscape meters. Its meter replacement program is focused on replacement of broken meters. All of WVWD's customers are billed monthly with commodity rates.

WVWD is in the process of changing its entire meter stock to Automatic Meter Reading (AMR). This system eliminates the need for each meter to be visually read by a technician and ensures that water usage is billed correctly. The AMR system will also be highly useful in identifying and addressing customer-side leaks, as well as for understanding and assessing the impacts of various conservation programs.

11.7.3.5 Retail Conservation Pricing

There are multiple aspects related to compliance with this DMM. This DMM requires a volumetric rate structure, which can be uniform, tiered, allocation-based or seasonal rates as long as the volumetric portion meets minimum levels as defined (70 percent of the rate must be variable). The requirements are any rate designed to recover the cost of providing service and billing for service based on metered water use; these can be uniform rates, increasing block rates or long-run marginal cost rates. Rates that charge customers a fixed amount per billing cycle or rates defined by high fixed and low commodity charges do not satisfy the definition of conservation pricing.

WVWD is in compliance with this DMM. The volumetric portion of District's water revenue accounts for about 71 percent of total.

11.7.3.6 Public Information Programs and School Education Programs

The intent of this DMM is to have customer contact through events, paid and public service advertising, mailers, billings as well as social marketing and other public information programs. To be in full compliance a water agency must have quarterly contact with the public and media, an actively maintained website, and a list of all activities.

WVWD is in compliance with this DMM. WVWD provides informational materials to customers through paid advertising, classes, water bills, demonstration gardens, a website, and quarterly newsletters.

In 2008, WVWD built a Waterwise Demonstration Garden at their Headquarters to offer creative ideas and cost effective methods of landscaping gardens utilizing California friendly drought

tolerant plants that provide opportunities for conservation. WVWD's garden also showcases various hardscapes and irrigation systems.

In 2010, WVWD held a series of workshops called the Water 101 class. This class was offered to all customers within the District's service area and covered everything from the History of the District to water quality. One class was dedicated solely to water conservation. The District is looking to hold these series of classes in the future.

In 2009, WVWD revamped its website to include multiple pages on information for water conservation including rebates and programs that WVWD is participating in, water conservation tips for indoor and outdoor use as well as the ability for customers to report water waste. WVWD's conservation piece of the website is updated on a regular basis to include new ideas.

WVWD continues to hold water conservation classes for students at San Bernardino Valley College as well as local elementary, middle and high schools located within WVWD. The District also gives tours to local schools of the Treatment Plants and hands out conservation materials.

For the last 5 years WVWD has sponsored a Water Conservation Poster Contest with the elementary schools located in the District. This last year the District had more than 25 teachers participate in the contest as well as over 150 entries.

The District also has a quarterly newsletter that is inserted in all of our customer's bills as well as delivered to every school located within the District's service area and a conservation message is included in each of these newsletters. The District will also, from time to time, have conservation messages appear directly on the customer's bill.

In 2010, the District in conjunction with San Bernardino Valley Water District, along with other water agencies in the area have partnered together to participate in the Inland Empire Garden friendly program which is designed to help customers save water by installing climate friendly plants.

For the last several years, the District has created a welcome package for all new customers including a Leak Detection Guide, the Demonstration Garden brochure and plant list, the Quarterly Newsletter and the District's Water Conservation Calendar.

11.7.4 Evaluation of DMMS Not Implemented

This section describes DMMs not being implemented or not being implemented at compliance levels. For each DMM not being implemented, an explanation and cost-effectiveness analysis is provided. For the purpose of calculating the cost-effectiveness of DMMs, WVWD's avoided cost of water (the cost of acquiring another unit of water) is estimated as $126.00 per AF.

11.7.4.1 Residential Assistance Program and Landscape Water Surveys

Implementation of this DMM consists of providing leak detection assistance and landscape water surveys to an average of 1.5 percent of single family and 1.5 percent of multi-family units per year for 10 years. Once that target is met, this DMM requires a water agency maintain a

program whereby surveys are performed in response to high-bill complaints or surveys are performed for at least 0.75 percent of single-family and multi-family units each year.

WVWD is filing a cost-effectiveness exemption for the Residential Assistance and Landscape Water Survey Programs. The analysis for these programs was combined because, from a programmatic perspective, they would likely be implemented together as a single indoor and outdoor audit. To be in compliance with this DMM, WVWD would need to complete 263 single-family and 2 multi-family (indoor only) audits annually. Implementing and managing a program that would meet these requirements would cost the WVWD $940 per AF of water saved, a benefit to cost ratio of 0.1 (Table 11-19). Details on the cost-effectiveness calculations are provided in Appendix F.

TABLE 11-19
COST EFFECTIVENESS OF RESIDENTIAL SURVEY PROGRAMS

Total Costs	$103,786
Total Benefits	$11,571
Benefit/Cost	0.11
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$940
Water Savings (AFY)	110

11.7.4.2 High-Efficiency Clothes Washers (HECWs)

The intent of this DMM is to encourage replacement of old clothes washers with HECW using financial incentives. Qualifying HECWs must meet an average water factor value of 5.0 or the WaterSense Specification, whichever is lower. The annual target is one percent of current single-family accounts or 1.4 percent per year of the market penetration during the first ten years of the program.

WVWD is filing a cost-effectiveness exemption for the HECW Program. To be in compliance with the DMM, WVWD needs to provide 176 rebates. Implementing and managing a program that would meet these requirements would cost the District $364 per AF of water saved, a benefit to cost ratio of 0.28 (Table11-20).

TABLE 11-20
COST EFFECTIVENESS OF HECW PROGRAMS

Total Costs	$21,973
Total Benefits	$6,179
Benefit/Cost	0.28
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$364
Water Savings (AFY)	60

11.7.4.3 WaterSense Specification (WSS) Toilets

The intent of this DMM is to offer incentive for toilets meeting the current WSS standard. Compliance entails demonstrating replacement of a number of toilets of 3.5 gallons per flush or greater that is at least as effective as a retrofit on resale ordinance, or demonstration of market saturation of 75 percent WSS standard toilets.

WVWD will be filing a cost-effectiveness exemption for the WSS Toilet Program. To be in compliance with the DMM, WVWD needs to provide 380 single family and 3 multi-family rebates. Implementing and managing a program that would meet these requirements would cost WVWD $331 per AF of water saved, a benefit to cost ratio of 0.29 for (Table 11-21).

TABLE 11-21
COST EFFECTIVENESS OF WSS TOILETS PROGRAM

Total Costs[(a)]	$47,461
Total Benefits[(a)]	$13,935
Benefit/Cost	0.29
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$331
Water Savings (AFY)	144

Note:
(a) The analysis was only performed on high efficiency toilets and not ultra-low flow toilets since ultra-low flow toilets are being phased out.

11.7.4.4 Water Sense Specification for New Residential Development

This DMM encourages replacement of old plumbing fixtures with plumbing fixtures with WSS[9] fixtures. To be in compliance with this DMM a water agency must provide incentives such as rebates, recognition programs, reduced connection fees, or have ordinances requiring residential construction meeting WSS for single and multi-family housing. These incentives are to be offered until the California universal retrofit on resale statute[10] goes into effect (year 2014) or until all new residential construction meets WSS standards.

WVWD does not have direct regulatory jurisdiction to develop local ordinances but will support local jurisdictions in implementing and promoting codes that support efficiency. WVWD will participate in implementation of the 2010 CAL Green Code which was adopted by the Building Standards Commission in January 2010 and went into effect January 2011. The Code sets mandatory green building measures, including a 20 percent reduction in indoor water use, as well as dedicated meter requirements and regulations addressing landscape irrigation and design; the Code also identifies voluntary measures that set a higher standard of efficiency, which can also be adopted.

[9] WaterSense is an Environmental Protection Agency sponsored program that promotes water-efficient products, programs, and practices. In order to carry the WSS label a product must be independently certified as using 20 percent less water that average products in that category.

[10] Effective January 1, 2014, Senate Bill 407 requires that all pre-1994 residential, multi-family and commercial customers replace non-compliant plumbing fixtures (including toilets, faucets, and shower heads) with water-conserving fixtures when making certain improvements or alterations to a building. By 2017, all single family homes must replace non-compliant plumbing fixtures, and by 2019, all multifamily and commercial buildings must have compliant water-conserving plumbing fixtures in place.

11.7.4.5 Commercial, Industrial, and Institutional (CII)

To be in compliance with this DMM an agency must reduce CII water use by 10 percent of the baseline over a 10-year period. Implementation can be achieved through one or both of the following ways:

- Implementing measures on the CUWCC CII list with well-documented savings. These measures target commercial water use include: toilets, urinals, clothes washers, cooling towers, food steamers, ice machines, steam sterilizers, water brooms and dry vacuum pumps.
- Implementing unique conservation measures whose water savings are calculated on a case-by-case basis. Sample measures include: industrial process water use reduction, industrial laundry retrofits, car wash recycling systems, water-efficient commercial dishwashers, and wet cleaning.

About 25 percent of WVWDs's water use is by commercial/institutional customers and only about 1 percent is industrial.

WVWD will be filing a cost-effectiveness exemption for the CII program. A mix of CII programs from the CUWCC list were evaluated for cost effectiveness (Table 11-22). These include both indoor and landscape program options because both can be used to meet the 10 percent reduction requirements.

TABLE 11-22
COST EFFECTIVENESS OF CUWCC CII PROGRAMS

Program	Lifetime Water Savings (AF)	Cumulative Value of Saved Water ($)	Annual Cost ($)	Benefit/ Cost Ratio	($/AF)
Residential HE Washer Rebates	60.35	$ 6,179	$21,973	0.28	$364
CII WBICs Direct Install	54.19	$ 5,680	$18,938	0.30	$349
CII Precision Nozzles Dist.	22.64	$2,577	$11,363	0.23	$ 502
Dedicated Irrigation Surveys	7.48	$833	$908	0.92	$130
CII Indoor Surveys	451.57	$47,332	$87,674	0.54	$194
CII HE Washer Rebates	532.50	$54,524	$123,840	0.44	$233
CII HET Rebates	777.92	$75,539	$232,145	0.33	$298
CII HE Urinal Rebates	864.39	$82,748	$394,013	0.21	$456
CII ULV Urinal Rebates	864.39	$82,748	$339,289	0.24	$393
CII Zero Consumption Urinal Rebates	864.39	$82,748	$297,912	0.28	$345

11.7.4.6 Large Landscape

There are multiple elements related to this DMM all related to providing non-residential customers with support and incentives to improve their landscape water use efficiency. Specific activities include:

- Developing water use budgets at 70 percent ETo (100 percent for dedicated recreational areas) for 90 percent of accounts with dedicated irrigation meters in 10 years.

- Assisting all accounts that are 20 percent over budget within 6 years.
- Performing surveys on 15 percent of un-metered and mixed use meter accounts in 10 years (CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both the Landscape and CII DMMs).
- Providing an incentive program for irrigation equipment retrofits.
- Provide notices each billing cycle with water use budgets.
- Accounts without Meters or with Mixed-Use Meters:
  - Develop and implement a strategy for marketing surveys.
  - Offer financial incentives.

WVWD is not implementing the Landscape DMM because it is not cost-effective. An exemption can be filed because the cost-effectiveness evaluation indicates that the large landscape surveys would not be cost-effective, with a benefit to cost ratio of 0.92 (Table 11-23). This result is based on a survey cost of $1,500 each, which is the higher range of the CUWCC estimates.

TABLE 11-23
COST EFFECTIVENESS OF LARGE LANDSCAPE DMM

Total Costs	$908
Total Benefits	$833
Benefit/Cost	0.92
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$121
Water Savings (AFY)	7

11.7.5 DMM Implementation and Urban Water Use Targets of the 20x2020 Plan

Section 11.7.2.1 describes several DMMs that WVWD is not currently implementing because they are not considered cost effective. Some of the DMMs could be cost-effective if targeted to specific customers (e.g., residential properties with above normal water use), but are not cost effective when implemented at compliance levels because to achieve compliance levels WVWD would have to target both high and low water use customers (thereby increasing costs without significantly improving water conservation).

In addition, WVWD is exploring a variety of ways of making conservation programs more cost effective including partnering with other water agencies and wastewater utilities to help with the administration and marketing costs as well as potentially the rebate amounts themselves. As part of the IRWMP and UWMP process, agencies in the San Bernardino Valley area have formed a group to study and address conservation needs in the San Bernardino Valley. The first step in this process was identifying the costs and benefits of various demand management measures. Special attention was given to those demand management measures that are not cost effective for an individual agency, but which could be cost effective if implemented as part of a regional collaboration. The second step in the process was to identify the water

conservation target, which was done as part of this UWMP. At the conclusion of Steps 1 and 2, the agencies participating in this UWMP met to coordinate regional implementation of selected conservation actions. The group intends to engage a Regional Conservation Coordinator. The UWMP agencies, along with the Regional Conservation Coordinator will evaluate existing agency resources available to assist with conservation programs and then select conservation programs and processes to be implemented at the regional level. The UWMP agencies will utilize the Regional Conservation Coordinator to track conservation actions, conservation successes, and estimate water savings. The group anticipates having a regional water conservation strategy developed by the end of 2011 and start implementation in 2012.

SBX7-7 requires water use reduction whether or not water conservation is cost-effective. The WVWD in preparation for the 20 percent reduction by the year 2020 plans to implement the following programs to reach that goal. These programs are in addition to all of the existing DMMs that are being implemented at compliance levels. WVWD intends to implement programs that specifically reduce gallons per capita per day.

- **Residential Plumbing Retrofit Kits**
  In 2008 WVWD started offering water conservation kits to customers, free of charge that includes 2 low flow showerheads, 1 kitchen faucet aerator and 2 bathroom faucet aerators. WVWD plans to keep this program in place through 2020.

- **Residential ULFT/HET Rebates**
  In 2010 WVWD implemented its Ultra Low Flush Toilet/High Efficiency Toilet (ULFT/HET) Rebate Program. This program is open to any resident within the WVWD's service area that replaces their toilet with an ULFT or HET toilet. WVWD plans on revising the program to target homes that were built before 1992 to maximize savings. The District in 2011 will also start to target the multi-family use accounts. WVWD plans to keep this program in place through 2020.

- **CII WBIC Direct Install**
  In 2010 WVWD and San Bernardino Valley Municipal Water District, installed a Weather Based Irrigation Control Tower to help CII accounts reduce their outdoor use. WVWD plans to target high water users and provide them with a dedicated irrigation survey. If they qualify, they will be offered rebates to install WBIC controllers. This program will start in 2011 and continue until the funds are exhausted.

- **Institutional Rebate Programs**
  In 2011WVWD is going to implement a rebate program targeted at the schools located within WVWD's boundaries and work with each school on an individual basis to offer them rebates on ULFT/HET toilets, ET controllers for landscaping and any other water efficient devices that WVWD identifies as reducing demand. This program will continue until WVWD funds are exhausted.

- **CII Rebate Programs**
  In 2011 WVWD is going to implement a rebate program for CII accounts within WVWD's boundaries. WVWD will identify the high water users offer them free surveys. WVWD will then work with each company on an individual basis to create a conservation program tailored to their particular needs.

- **Recycled Water**
  WVWD is exploring the use of recycled water to help offset the consumption of potable water. If recycled water and funds are available WVWD will start to implement a recycled water program.

- **High Efficiency Clothes Washers**
  The District will look to implement this program if a regional rebate program is offered.

11.8 Water Resources

Chapter 2 of this UWMP provides a description of imported water supplies and groundwater supplies available in the San Bernardino Valley. Chapter 2 also provides a description of supply reliability for imported water and groundwater. The paragraphs below provide information on the current and projected use of these supplies by WVWD.

The WVWD utilizes three primary sources for drinking water supply: local surface water from flows on the east side of the San Gabriel Mountains, including North Fork Lytle Creek, Middle Fork Lytle Creek, and South Fork Lytle Creek; groundwater; and imported water from the State Water Project (SWP). Groundwater is extracted from groundwater production wells from five regional groundwater basins: Lytle Creek, Rialto-Colton, Bunker Hill, North Riverside, and Chino Basins. All five basins have been adjudicated and are managed. The WVWD service area is divided into eight pressure zones; it currently has 25 existing reservoirs with a total storage capacity of approximately 72.61 million gallons and WVWD also operates a 9.6-mgd water filtration facility.

11.8.1 Imported Water Supplies

WVWD receives SWP from Valley District through the Lytle Turnout off the San Gabriel Feeder Pipeline. Newly constructed metering and transmission facilities will enable WVWD to purchase and treat up to 20 mgd (approximately 23,000 AFY) at final treatment plant expansion. SWP treated at the District's Oliver P. Roemer Water Filtration Facility (WFF) is used for potable supply, to supply non-potable customers, and for groundwater recharge in the Lytle Creek Basin. In 2006 the WFF was expanded to increase production capacity to 14.4 mgd. Ultimately this plant will have a capacity of 20.4 mgd. WVWD utilizes non-potable raw SWP and decanted backwash water from its water filtration facility to supply one of its large users (irrigation of the El Rancho Verde Golf Course). WVWD has been utilizing SWP water through the Lytle Turnout since 1999.

TABLE 11-24
WHOLESALE SUPPLIES - EXISTING AND PLANNED SOURCES OF WATER[(a)] (AF)

Wholesale Source	2010	2015	2020	2025	2030	2035
Purchase from Valley District[(b)]	7,000	7,000	7,000	7,000	7,000	7,000

Notes:
(a) This table represent the supplies anticipated to be available to WVWD, not necessarily the amount of a given supply that will be utilized by WVWD.
(b) Data from 2007 IRWMP.

11.8.1.1 Imported Supply Reliability

SWP deliveries available to WVWD in a normal year are provided in Table 11-24. During times of State-wide drought conditions, the availability of State Water may be reduced. These conditions are normally known in advance, providing WVWD with the opportunity to plan for the reduced supply. Table 11-25 estimates how imported water supplies available to WVWD may be reduced during drought conditions. During a drought period, it is Valley District's priority to meet obligations to maintain lake levels at Big Bear Lake and to make direct deliveries to the water treatment plants operated by Redlands, WVWD, EVWD, YVWD, and SBMWD. In a single dry-year, present until 2029, Valley District anticipates SWP allocation and carryover storage of approximately 23,338 AF. In a single dry year after 2029 Valley District anticipates SWP allocation and carryover storage of approximately 22,338 AF. After accounting for potential demands for maintenance of Big Bear Lake, it is anticipated that approximately 5,412 AF of imported water, would be available to WVWD during a single dry year. In a multiple dry year Valley District expects between 44,858 AF and 45,910 AF of water to be available, meaning Valley District could fulfill normal direct deliveries to water treatment plants in a multiple-dry year.

TABLE 11-25
WHOLESALE SUPPLIES - SINGLE DRY AND MULTIPLE DRY YEARS (AF)

	2015	2020	2025	2030	2035
Single-Dry Year	5,412	5,412	5,412	5,412	5,412
Multiple-Dry Year	7,000	7,000	7,000	7,000	7,000

11.8.2 Groundwater

WVWD draws approximately 65 percent of its water supply from its wells. WVWD's normal operating practice is to pump their wells 16 hours a day during off peak hours to take advantage of Southern California Edison's time of use rate. If, for some reason, wells are not in service (maintenance or repair), WVWD has the ability and right to pump its wells up to 24 hours per day. WVWD has approximately 36 mgd production capability from all of its wells in operation 24 hours per day.

WVWD, in a joint venture with the City of Rialto and Valley District, constructed 25,000 feet of 48-inch transmission line known as the Baseline Feeder. Through an agreement with Valley District, WVWD is to receive 5,000 AFY of supply through this transmission line. WVWD has received water through the Baseline Feeder since 1998.

Historic groundwater production and groundwater purchased by WVWD is shown in Table 11-26. Based on projected demands, anticipated groundwater production for future years is detailed in Table 11-27. Table 11-27 does not represent total groundwater supplies available.

TABLE 11-26
GROUNDWATER VOLUME PUMPED (AF)

Basin Name	*Metered or Unmetered?*	2005	2006	2007	2008	2009
SBBA incl. Lytle Basin and Bunker Hill	Metered	9,336	9,611	9,104	10,378	8,513
SBBA Purchased from Valley District	Metered	4,326	3,402	2,153	2,966	2,568
Chino Basin	Metered	0	0	0	0	0
Rialto Basin	Metered	2,187	2,782	3,013	2,711	3,742
North Riverside Basin	Metered	2,161	2,968	3,876	1,775	2,118
	Total	**18,010**	**18,763**	**18,146**	**17,830**	**16,941**
Groundwater as Percent of Total Water Supply		**85%**	**79%**	**81%**	**77%**	**78%**

TABLE 11-27
GROUNDWATER - VOLUME PROJECTED TO BE PUMPED (AF)

Basin Name	*Metered or Unmetered?*	2015	2020	2025	2030	2035
SBBA incl. Lytle Basin and Bunker Hill	Metered	7,000	10,000	15,000	18,000	20,000
SBBA purchased from Valley District	Metered	5,000	5,000	5,000	5,000	5,000
Chino Basin	Metered	0	900	900	900	900
Rialto Basin	Metered	4,000	6,000	6,000	6,000	6,000
North Riverside Basin	Metered	2,000	2,000	2,500	3,000	4,000
	Total	**18,000**	**23,900**	**29,400**	**32,900**	**35,900**
Groundwater as Percent of Total Water Supply		**68%**	**69%**	**73%**	**76%**	**75%**

Note:
(a) All groundwater produced by WVWD except water purchased from Valley District.

11.8.2.1 Groundwater Supply Reliability

Due to the size of the groundwater basins utilized by WVWD, a single dry year will not affect well production. The annual amount produced in past normal, single dry, or multiple dry water years from a basin does not give an accurate representation of potential basin production. Factors such as lower system demand, cost of pumping, inoperable wells, pumping duration, replenishment costs, water quality, cost of supply and the ability to treat water all affect annual basin production numbers. Table 11-28 summarizes groundwater supplies anticipated to be available to WVWD during a single-dry and multi-year drought.

TABLE 11-28
GROUNDWATER SUPPLIES - SINGLE DRY AND MULTIPLE DRY YEARS (AF)

	2015	2020	2025	2030	2035
Single-Dry Year[a]	33,000	41,000	46,000	50,000	50,000
SBBA incl. Lytle Basin	13,000	18,000	23,000	27,000	27,000
SBBA Purchased from Valley District	5,000	5,000	5,000	5,000	5,000
Chino Basin[b]	0	3,000	3,000	3,000	3,000
Rialto Basin	10,000	10,000	10,000	10,000	10,000
North Riverside Basin[b]	5,000	5,000	5,000	5,000	5,000
Multiple-Dry Year[a]	26,067	34,067	39,067	43,067	43,067
SBBA incl. Lytle Basin	13,000	18,000	23,000	27,000	27,000
SBBA Purchased from Valley District	5,000	5,000	5,000	5,000	5,000
Chino Basin[b]	0	3,000	3,000	3,000	3,000
Rialto Basin	3,067	3,067	3,067	3,067	3,067
North Riverside Basin[b]	5,000	5,000	5,000	5,000	5,000

Notes:
(a) Based on past drought periods, it is assumed the SBBA will be fully reliable during drought periods.
(b) Groundwater supplies available are based on projected usage; extractions may be increased if needed from these basins.

Some of the WVWD's wells have been impacted by arsenic, perchlorate and volatile organic carbons (VOCs). WVWD has implemented wellhead treatment as needed and continues to monitor groundwater contamination and the movement of groundwater contaminant plumes. These past and ongoing groundwater treatment projects have demonstrated that treatment is an economically viable alternative for handling arsenic, perchlorate and VOCs. Based on current conditions water quality is not anticipated to affect WVWD supply reliability. However, water quality issues are constantly evolving. WVWD will take action to protect and treat supply when needed, but it is well recognized that water quality treatment can have significant costs.

11.8.3 Local Surface Water Supplies

WVWD has the right to divert and export out of the Lytle Creek Region 2,290 gpm when it is available. WVWD can also purchase an additional 1,350 gpm of Lytle Creek flows through an agreement with the City of San Bernardino (San Bernardino is not able to utilize their surface water flows), which is treated at the Oliver P. Roemer WFF. WVWD also utilizes Lytle Creek surface water flows for groundwater recharge in the Lytle Creek Basin and to supply the El Rancho Verde Golf Course. Table 11-29 summarizes local supplies anticipated to be available to WVWD during a normal year.

TABLE 11-29
SURFACE WATER SUPPLIES - EXISTING AND PLANNED SOURCES OF WATER[a] (AF)

Source	2010	2015	2020	2025	2030	2035
Lytle Creek - WVWD Produced[a]	3,500	3,500	3,500	3,500	3,500	3,500
Lytle Creek - Purchased[a]	2,000	2,000	2,000	2,000	2,000	2,000

Note:
(a) WVWD has the right to divert and export out of the Lytle Creek Region 2,290 gpm when it is available. WVWD purchases an additional 1,350 gpm of Lytle Creek flows through an agreement with the City of San Bernardino (San Bernardino is not able to utilize their surface water flows).

11.8.3.1 Local Surface Water Reliability

WVWD has been able to utilize up to 5,500 AFY during normal times from Lytle Creek surface flows and projects a minimum of 2,130 AFY during extended drought conditions. WVWD and its predecessors have been utilizing Lytle Creek surface flows for water supply for more than 130 years.

Geologic hazards within Lytle Creek have the potential to disrupt the water supply system by restricting the flow and/or introducing large quantities of suspended solids to the runoff, thereby increasing turbidity levels. To deal with this water quality issue, WVWD added pre-treatment capability at the Oliver P. Roemer WFF to achieve both turbidity removal and total organic carbon reduction.

The single-dry and multiple dry years shown in Table 11-30 reflects the amount of Lytle Creek surface water that was treated at the WFF and used for irrigation at the El Rancho Verde Golf Course in the corresponding year. These numbers may not reflect the amount of water that was available to be treated by the District. Demand within the system and operations at the WFF will also contribute to the amount of water treated in a given year. Based on estimates of groundwater recharge, water treated at the plant, and non-potable deliveries from Lytle Creek, normal water year supplies are estimated to be 5,500 AFY.

Based on current conditions water quality is not anticipated to affect WVWD local surface water supply reliability. However, water quality issues are constantly evolving. WVWD will take action to protect and treat supply when needed, but it is well recognized that water quality treatment can have significant costs.

TABLE 11-30
SURFACE WATER SUPPLIES - SINGLE DRY AND MULTIPLE DRY YEARS (AF)

Anticipated Supply	Normal	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
Lytle Creek	5,500	2,130	3,822	3,503	2,130
% of Normal	NA	39%	69%	64%	39%
Basis of Water Year Data (year or year sequence)	Average	2002	2000	2001	2002

11.8.4 Recycled Water

The bulk of the wastewater collected within WVWD is treated by the City of Rialto (City), though some wastewater is also handled by facilities run by the City of Colton and the Inland Empire Utilities Agency. The City of Rialto has a 12.0 mgd tertiary treatment plant with a current flow of 8 mgd. All of the City's treatment plant effluent meets Title 22 for recycled water usage in restricted irrigation. Reclaimed water not currently being used for irrigation is discharged into the Santa Ana River. WVWD does provide non-potable backwash water to the El Rancho Verde golf course, but does not currently utilize recycled water. WVWD intends to add recycled water to its non-potable supply usage but, would rely on the City of Rialto to provide the recycled water from their wastewater treatment facility.

The City of Rialto is updating its Recycled Water Master Plan update prepared for them to investigate the expansion of its existing tertiary treatment plant and reclaimed water system as a way to supplement the City's water supply. As part of its 2010 to 2014 Capital Improvement Plan, the City has planned to:

- Review of proposed land development of the City;
- Conduct an engineering feasibility analysis for converting an unused water main for recycled water distribution;
- Identify potential customers for the recycled water and conduct a market evaluation;
- Develop documents and models that will provide the basis and justification for CIP projects for water, wastewater, and recycled water; and
- Develop accurate information to form the basis of a rate study and complete a rate analysis report for water, wastewater and recycled water.

WVWD is evaluating current large landscape and non-potable users for potential use of recycled water and the infrastructure required to supply that demand. To the extent feasible, if and when recycled water is available to WVWD, this water will be offered to WVWD customers.

11.8.5 Transfers, Exchanges, and Groundwater Banking Programs

11.8.5.1 Transfers and Exchanges

WVWD currently has interconnections with the Cities of Rialto, Colton and San Bernardino, the Fontana Water Company, Marygold Mutual Water Company and Valley District which can be utilized as needed. WVWD purchase of water from Valley District is described in Chapters 11.8.1 and 11.8.2. WVWD purchase of surface water from SBMWD is described in Chapter 11.8.3.

11.8.5.2 Groundwater Banking Programs

WVWD benefits from groundwater banking in the SBBA. See Section 2.4.2.

11.8.6 Planned Water Supply Projects and Programs

WVWD plans to utilize a greater amount from each of their supply sources, up to their legal rights and availability. To meet the future demands within the system, WVWD plans to rehabilitate existing wells, to drill new wells and equip wells with wellhead treatment if required. These wells are planned for various groundwater basins and pressure zones within the distribution system.

Groundwater is not the only planned supply source to be utilized by WVWD to meet the anticipated future demands. WVWD has expanded the Oliver P. Roemer Water Filtration Facility to allow additional treatment of State Project Water when available. A future expansion of the plant will increase the ultimate capacity of the facility to 20.4 mgd.

When planning future water supply sources, WVWD selects projects that will provide sufficient supply to meet peak day demands. When possible, these sources are planned by pressure zone thereby reducing the need to lift water to a higher zone. WVWD currently pumps their wells 16 hours per day to take advantage of Southern California Edison's reduced off peak pumping rate. This pumping schedule lowers overall costs and allows WVWD operational flexibility within their system.

As development progresses and increased demands are placed on the system WVWD will determine which projects to implement. Although WVWD may not need to utilize each source to its full potential, construction of these water supply projects gives WVWD this option should one or more source be off line due to maintenance.

11.8.7 Total Anticipated Water Supply

Table 11-31 below summarizes the water resources available to WVWD for the 25-year period covered by this plan.

11.9 Water Shortage Contingency Plan

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, an earthquake which damages delivery or storage facilities, or a regional power outage. Chapter 5 of this UWMP describes water shortage contingency planning for regional water supply sources (imported water, groundwater). This Chapter focuses on water shortage contingency planning for WVWD.

TABLE 11-31
SUMMARY OF CURRENT AND PLANNED WATER SUPPLIES (AF)

Water Supply Source	Supply (AF)					
Existing	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Wholesale/Imported	0	7,000	7,000	7,000	7,000	7,000
Groundwater	15,822	32,000	32,000	32,000	32,000	32,000
Local Surface Water	5,383	5,500	5,500	5,500	5,500	5,500
Recycled Water	0	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0	0
Groundwater Banking	0	0	0	0	0	0
Total Existing Supplies	*21,205*	*44,500*	*44,500*	*44,500*	*44,500*	*44,500*
Planned						
Wholesale/Imported	0	0	0	0	0	0
Groundwater	0	3,500	11,500	16,500	21,000	21,000
Local Surface Water	0	0	0	0	0	0
Recycled Water	0	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0	0
Groundwater Banking	0	0	0	0	0	0
Total Planned Supplies	**0**	**3,500**	**11,500**	**16,500**	**21,000**	**21,000**
Total Existing and Planned Supplies	**21,205**	**48,000**	**56,000**	**61,000**	**65,500**	**65,500**

11.9.1 Coordinated Planning

To offset the prolonged effects of the drought periods, the Board of Directors adopted a Water Conservation Plan with Ordinance No. 68 on July 5, 1990 by adding Article No. 24 entitled "Water Conservation" to its water service regulations and a Water Shortage Contingency Plan with Ordinance No. 69 on February 6, 1992 which amended portions of the Water Conservation Plan. On May 1, 2003 the Board of Directors adopted Resolution No. 390, rescinding all previous resolutions, which established water service regulations, schedules of rates, and charges. Article No. 24 describes Water Conservation objectives and outlines four stages of action to be implemented during a water shortage. WVWD's Plan includes voluntary and mandatory stages.

The purpose of Article 24 is to provide water conservation measures in order to minimize the effect of a water shortage on the citizens of, and the economic well-being of the communities WVWD serves. This Article adopts provisions that will significantly reduce the wasteful and inefficient consumption of water, thereby extending the available water resources required for the domestic, sanitation, and fire protection needs of the citizens of the communities they serve while reducing the hardship on WVWD and the general public to the greatest extent possible.

Priorities By Use - The priorities for the use of available water, based on California Water Code Chapter 3 and community input are:

- Health and Safety - Interior Residential and Fire Fighting
- Commercial, Industrial and Governmental - Maintain Jobs and Economic Base
- Crops - Project Jobs
- Existing Landscaping - Especially Trees and Shrubs
- New Demand - New Development and Construction

11.9.2 Stages of Action to Respond to Water Shortages

In order to minimize the social and economic impact of water shortages, WVWD will manage water supplies prudently. As the shortages become evident to WVWD Manager, he or she invokes the appropriate stage, unless the Board of Directors votes otherwise. Shortages may evoke a stage at any time. The four-stage rationing plan to be undertaken by WVWD in response to water supply shortages is listed in Table 11-32 and is described in the "Water Conservation Provisions of Stages 2, 3 and 4".

TABLE 11-32
WATER CONSERVATION PROVISIONS

Stage	Percent Shortage	Conservation Measures	Expected Overall Reduction
1	Normal	Voluntary	10%
2	10% to 25%	Voluntary/Mandatory	25%
3	25% to 35%	Mandatory	35%
4	35% to 50%	Mandatory	50%+

11.9.3 Stage 1 - Normal Conditions

During times of normal supply, it is recommended that water conservation be practiced within the home or business and all restaurants are requested not to serve water to their customers unless specifically requested by the customer. Stage 1 also lists water uses considered non-essential to the public health, safety, and welfare, and would be considered wasting of water and are therefore prohibited. These include the following:

- There shall be no hose washing of paved, concrete or other hard surface area unless done with a hand held hose equipped with a trigger nozzle, except for the flushing of dangerous or unhealthy substances.
- No water shall be used to clean, fill, operate or maintain levels in decorative fountains unless the water is part of a recycling system.
- The repair of leaking plumbing fixtures shall be repaired in a timely manner so as to not waste water.
- Washing of automobiles, trucks, trailer, boats, and other mobile equipment is prohibited unless done with a hand held device equipped with an automatic shut off trigger nozzle. This does not apply to commercial car washes utilizing a recycling system or when the health and safety of the public would necessitate.
- Water used which results in flooding or run-off should be prevented and controlled.
- The use of sprinklers for any type of irrigation during high winds is prohibited.

11.9.4 Stage 2 - Water Alert Conditions

In addition to the prohibitions contained in State 1, Stage 2 has the following savings:

- Washing of automobiles, trucks and boats is prohibited unless it is done at a commercial carwash that recycles water.
- Commercial nurseries shall water only between 11 P.M. and 6 A.M. using hand-held devices or drip irrigation. Commercial nurseries are limited to 75 percent of previous year's consumption.
- All golf courses and large landscaped areas shall be irrigated between 11 P.M. and 6 A.M. Consumption shall be reduced by 25 percent unless raw creek water or reclaimed water is used.
- All publicly owned lawns, landscape watered between 11 P.M. and 6 A.M. Consumption shall be reduced by 25 percent.
- All residential lawn watering to be limited to the hours of 8 P.M. to 6 A.M.
- Irrigation limited to crops presently planted.
- Construction water shall be by permit only.
- All restaurants prohibited from serving water to their customers except when requested by customer.

11.9.5 Stage 3 - Water Warning Conditions

State 3 has the following aspects, in addition to the prohibitions and actions under State 2:

- Commercial nurseries shall water only between 11 P.M. and 6 A.M. using hand-held devices or drip irrigation. Commercial nurseries are limited to 50 percent of previous year's consumption.
- School grounds to be watered on odd numbered days with watering limited to the hours of 11 P.M. and 6 A.M. Consumption is limited to 60 percent of previous year's consumption.
- All publicly owned lawns, landscape to be watered between 11 P.M. and 6 A.M. on even numbered days. Consumption shall be reduced by 50 percent.
- All residential lawn watering to be done on odd and even days corresponding to house number, between the hours of 8 P.M. to 6 A.M.
- All agricultural water users shall irrigate only at times approved by WVWD
- Swimming pools and fountains not to be refilled after draining

11.9.6 Stage 4 - Water Emergency Conditions

State 4 is the most restrictive stage. Under this stage water use is limited to essential household, commercial, manufacturing or processing uses. No lawn or landscape water will be allowed. No construction water use to be allowed, construction meters to be locked off or removed.

11.9.7 Actions to Prepare for Catastrophic Interruption

Extended multi-week supply shortages due to natural disasters or accidents which damage all water sources are unlikely. WVWD's 23 storage reservoirs hold 66 million gallons, which is sufficient water to meet the health and safety requirements of 50 gallons per day per capita for the 62,630 customers for 23 days. This assumes zero non-residential use. Under emergency power outages or a catastrophic earthquake conditions, the existing storage is expected to provide a supply of 4 days of average day demand or 2.5 days under maximum summer demand.

WVWD also has interconnections with three other agencies for emergency supplies.

WVWD has portable back-up generators that can be used in the event of an area wide power outage. These generators can be located on both wells and booster stations to continue water production. These generators will be located in the northern part of the distribution system. Water can then be boosted to higher zones or gravity fed to the lower zones. In addition to the portable generators, WVWD is constructing back-up generators at the Zone 5 and 6 booster stations.

11.9.8 Prohibitions, Penalties, and Consumption Reduction Methods

Consumption limits in the progressively restrictive stages are imposed on different uses. These are based on percentage reductions in water allotments, and restrictions on specific uses. The specific percentage reductions at each stage and for each user class are detailed in Section 11.9.4. The individual customer allotments will be based on the previous year's use. This provides WVWD a basis for reviewing appeals.

Mandatory provisions to reduce water use during the different stages of water shortage are also summarized in the table. Provisions of Article 24 - Water Conservation, adopted May 1, 2003 were adopted pursuant to Sections 375 and 376 of the California Water Code. Any second or subsequent violation of this policy after notice as specified in Section 2411 1(a) is a misdemeanor (California Water Code Section 377).

11.9.8.1 Violations

In addition to criminal prosecution available to WVWD as described above, violation of Ordinance may result in the imposition of surcharges and restriction and/or termination of water service as set forth below:

- First Violation - written warning accompanied by a copy of the Ordinance.
- Second Violation - (within one year) - a surcharge of $100 or 100 percent of the current water billing cycle, whichever is higher.
- Third Violation - (within one year of the first violation) - a surcharge of $300 or 200 percent of current water billing cycle, whichever is higher, and installation of flow restricting device in the meter for a minimum of 96 hours.
- Fourth Violation - (within one year of the first violation) - a surcharge of $500 or 300 percent of the current water billing cycle, whichever is higher, and termination of service for such period as the Board of Directors determines to be appropriate under the circumstances, following a hearing regarding said issue. Written notice of the hearing shall be mailed to the customer at least ten days before the hearing.

Any surcharge assessed shall be in addition to the basic water rates and other charges of WVWD for the account and shall appear on and be payable with the billing statement for the period during which the violation occurred; non-payment shall be subject to the same remedies available to WVWD as for non-payment of basic water rates. In addition to any surcharge, a customer violating this Ordinance shall be responsible for payment of WVWD's charges for installing and/or removing any flow restricting device and for disconnecting and/or reconnecting service per WVWD's Schedule of Charges at that time in effect. Such charges shall be paid prior to the removal of the flow restrictor or reconnection of service, whichever the case may be.

11.9.9 Minimum Water Supply Available During Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the years 2011 to 2013, assuming years 2011 to 2013 repeat the driest three-year historic sequence for each water supply source. As shown in Table 11-33, the total supplies, given a repeat of historically low conditions on all water supplies would be approximately 33,687 AFY.

Comparing these supplies to the demand projections provided in section 11.5, WVWD has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

TABLE 11-33
MINIMUM WATER SUPPLY AVAILABLE DURING NEXT THREE WATER YEARS (AFY)[(a)]

	2011	2012	2013
Purchased Imported Water	5,412	5,412	5,412
WVWD Produced Groundwater	28,000	28,000	28,000
Purchased Groundwater	5,000	5,000	5,000
WVWD Produced Surface Water	2,130	2,130	2,130
Transfers/Exchanges	0	0	0
Recycled Water	0	0	0
Banked Water	0	0	0
Total Supply	**40,542**	**40,542**	**40,542**

Note:
(a) From Tables 11-28 and 11-30.

11.9.10 Financial Impacts of Actions During Shortages

During Stages 2 through 4 of the District's Water Shortage Contingency Plan, water consumption will decrease based upon each individual stage and the amount of reduction goal achieved. The impacts of these reductions will result in a reduction in water sales revenues and a reduction of water production expenditures. In order to mitigate the financial impacts of a water shortage, WVWD maintains sufficient funds within their account. These funds could be used to stabilize water rates during periods of water shortage or disasters affecting the water supply. Even with these reserves, rate increases may be necessary during a prolonged water shortage.

If required by a drought creating a water shortage, and in order to maintain a balanced budget, WVWD may have to establish a Rate Stabilization Fund by adopting a surcharge to its basic rates under Stages 2, 3 and 4 of the plan. Three alternatives for establishing a Rate Stabilization Fund include:

- Alternative A - Monthly Service Charge Surcharge
- Alternative B - Graduated Water Rate Surcharge
- Alternative C - Combination Service Charge and Water Rate Surcharge

Alternative A would add a monthly surcharge onto the monthly service charge that would increase based upon the appropriate stage. Alternative B would assign a lifeline rate to each connection based on meter equivalents of ¾" meters. This surcharge would be added to usage over the lifeline rate each month and would increase based upon the appropriate stage. Alternative C would be a combination of both Alternative A and Alternative B. The surcharge rates would remain in effect until water supply conditions return to satisfactory levels and water consumption returns to normal.

11.9.11 Mechanism to Determine Reductions in Water Use

The mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency plan will be the review of the daily production figures and the monthly water meter readings. The General Manager of WVWD, or his designee, shall access all available water supply data and shall make a report of his findings to the Board of Directors at the next regular meeting or at a special meeting called for that purpose. The Board of Directors at that time determine and declare which of the four previously discussed conditions WVWD's water supply is in and the extent of water conservation required to prudently plan for and supply water to the District's customers.

11.10 Supply and Demand Comparisons

The UWMP Act requires urban water suppliers assess water supply reliability by comparing total projected water use with the expected water supply over the next 25-years in five year increments. The Act also requires an assessment of single-dry year and multiple-dry years. This section presents the reliability assessment for WVWD's service area.

11.10.1 Normal Water Year

The Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. This section summarizes WVWD's water supplies available to meet demands over the 20-year planning period during an average/normal year and compares them to demands for the same period. In Table 11-34, below, demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Assumptions about supplies and demands are provided in Section 11.5 and 11.8. Table 11-34 demonstrates WVWD anticipates adequate supplies for years 2015 to 2035 under Normal conditions.

11.10.2 Single-Dry Year

The single-dry year is generally the lowest annual runoff for a water source in the record. The single-dry year may differ for various sources. This section summarizes District's water supplies available to meet demands over the 20-year planning period during a single-dry year and compares them to demands for the same period. In Table 11-35, below, demands are assumed to be 10 percent greater in a single-dry year than during a normal year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Table 11-35 demonstrates WVWD anticipates adequate supplies for years 2015 to 2035 under single-dry year conditions.

11.10.3 Multiple-Dry Years

The multiple-dry year is generally the lowest annual runoff for a three year or more consecutive period. The multiple-dry year period may differ for various sources. This section summarizes District's water supplies available to meet demands over the 20-year planning period during a multiple-dry year period and compares them to demands for the same time frame. In Table 11-36, below, demands are assumed to be 10 percent greater in a multiple-dry year than

during an average year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Table 11-36 demonstrates WVWD anticipates adequate supplies for years 2015 to 2035 under multiple-dry year conditions.

TABLE 11-34
PROJECTED AVERAGE/NORMAL YEAR SUPPLIES AND DEMANDS (AF)

	2015	2020	2025	2030	2035
Existing Supplies[a]					
Wholesale/Imported	7,000	7,000	7,000	7,000	7,000
Groundwater	32,000	32,000	32,000	32,000	32,000
Local Surface Water	5,500	5,500	5,500	5,500	5,500
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Existing Supplies	*44,500*	*44,500*	*44,500*	*44,500*	*44,500*
Planned Supplies[a]					
Wholesale/Imported	0	0	0	0	0
Groundwater	3,500	11,500	16,500	21,000	21,000
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Planned Supplies	*3,500*	*11,500*	*16,500*	*21,000*	*21,000*
Total Existing and Planned Supplies	***48,000***	***56,000***	***61,000***	***65,500***	***65,500***
Demands without Additional Conservation[b]	26,627	34,256	40,179	43,308	47,636
Conservation	2,663	6,730	8,036	8,662	9,527
Total Adjusted Demands	23,964	27,526	32,143	34,646	38,109
Surplus/Deficit in Normal Year	**24,036**	**28,474**	**28,857**	**30,854**	**27,391**
Difference as % of Supply	**50%**	**51%**	**47%**	**47%**	**42%**
Difference as % of Demand	**100%**	**103%**	**90%**	**89%**	**72%**

Notes:
(a) From Tables 11-25, 11-29, and 11-31.
(b) From Table 11-13, 11-14, 11-15 and 11-16.

TABLE 11-35
PROJECTED SINGLE-DRY YEAR SUPPLIES AND DEMANDS (AF)

	2015	2020	2025	2030	2035
Existing Supplies[a]					
Wholesale/Imported	5,412	5,412	5,412	5,412	5,412
Groundwater	29,500	29,500	29,500	29,500	29,500
Local Surface Water	2,130	2,130	2,130	2,130	2,130
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Existing Supplies	*37,042*	*37,042*	*37,042*	*37,042*	*37,042*
Planned Supplies[a]					
Wholesale/Imported	0	0	0	0	0
Groundwater	3,500	11,500	16,500	20,500	20,500
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Planned Supplies	*3,500*	*11,500*	*16,500*	*20,500*	*20,500*
Total Existing and Planned Supplies	***41,442***	***48,542***	***53,542***	***57,542***	***57,542***
Demands without Additional Conservation[b]	29,289	37,682	44,197	47,638	52,400
Conservation	2,929	7,403	8,839	9,528	10,480
Total Adjusted Demands	26,360	30,278	35,357	38,111	41,920
Surplus/Deficit in Normal Year	**14,182**	**18,264**	**18,185**	**19,431**	**15,622**
Difference as % of Supply	**35%**	**38%**	**34%**	**34%**	**27%**
Difference as % of Demand	**54%**	**60%**	**51%**	**51%**	**37%**

Notes:
(a) From Tables 11-25, 11-28, and 11-30
(b) From Table 11-13, 11-14, 11-15 and 11-16. In dry periods demands assume to increase 10% above Normal Year demands.

TABLE 11-36
PROJECTED MULTIPLE-DRY YEAR SUPPLIES AND DEMANDS (AF)

		2015	2020	2025	2030	2035
Multiple-Dry Year First Year Supply	Supply Totals[(a)]	36,889	44,889	49,889	53,889	53,889
	Demand Totals[(b)]	26,360	30,278	35,357	38,111	41,920
	Difference	10,529	14,611	14,532	15,778	11,969
	Difference as % of Supply	29%	33%	29%	29%	22%
	Difference as % of Demand	40%	48%	41%	41%	29%
Multiple-Dry Year Second Year Supply	Supply Totals[(a)]	36,570	44,570	49,570	53,570	53,570
	Demand Totals[(b)]	26,360	30,278	35,357	38,111	41,920
	Difference	10,210	14,292	14,213	15,459	11,650
	Difference as % of Supply	28%	32%	29%	29%	22%
	Difference as % of Demand	39%	47%	40%	41%	28%
Multiple-Dry Year Third Year Supply	Supply Totals[(a)]	35,197	43,197	48,197	52,197	52,197
	Demand Totals[(b)]	26,360	30,278	35,357	38,111	41,920
	Difference	8,837	12,919	12,840	14,086	10,277
	Difference as % of Supply	25%	30%	27%	27%	20%
	Difference as % of Demand	34%	43%	36%	37%	25%

Notes:
(a) From Tables 11-25, 11-28 and 11-30.
(b) From Table 11-13, 11-14, 11-15 and 11-16. Assumes conservation. In dry periods demands assume to increase 10% above Normal Year demands.

Chapter 12

Yucaipa Valley Water District

Chapter 12: Yucaipa Valley Water District

12.1 Description of Agency

Yucaipa Valley Water District (YVWD) was formed as part of a reorganization, pursuant to the Reorganization Act of 1965, being Division I of Title 6 of the Government Code of the State of California. This reorganization consisted of the dissolution of the Calimesa Water Company and formation of Improvement District No. 1 of YVWD as successor-in-interest thereto, and the dissolution of Improvement District "A" of the San Bernardino Valley Municipal Water District and the formation of Improvement District "A" of YVWD as successor-in-interest thereto. On September 14, 1971, the Secretary of State of the State of California certified and declared the formation of the District.

YVWD operates under the County Water District Law, being Division 12 of the State of California Water Code. Although the immediate function of the District at the time was to provide water service, YVWD currently provides a variety of services to residential, commercial and industrial customers. These services include: potable water service, drinking water treatment, recycled water service, sewer collection, sewer treatment and salinity elimination.

YVWD is located in the upper portion of the Santa Ana Watershed approximately 40 miles west of Palm Springs, 70 miles east of Los Angeles, and 120 miles north of San Diego in a high elevation valley at the base of the San Bernardino Mountain Range. YVWD's primary service area ranges in elevation from a low elevation of 2,044 feet above sea level to a high elevation of 5,184 feet above sea level. The range in elevation of 3,140 feet within the District requires YVWD to provide water service from 18 separate pressure zones.

YVWD's current service area encompasses approximately 25,742 acres, or 40 square miles which include the City of Calimesa and the City of Yucaipa. Neighboring cities include the City of Redlands and the City of Beaumont. YVWD's sphere of influence expands the acreage to 43,525 acres, or 68 square miles. Figure 12-1 shows the YVWD service area and sphere of influence boundary.

TABLE 12-1
POPULATION PROJECTIONS FOR JURISDICTIONS IN YUCAIPA VALLEY WATER DISTRICT

	2010	2020	2035	Growth Rate 2010-2020	Growth Rate 2021-2035	% service area	Data Source
San Bernardino County	51,458[(a)]	55,698	61,934	.0079	.0071	80	SCAG
Riverside County	7,308	10,279	17,803	.0347	.0373	20	

Note:
(a) Estimates include population for Western Heights Mutual Water Company and South Mesa Water Company, since the two mutual water companies are located within the Yucaipa Valley Water District boundary.

FIGURE 12-1
YUCAIPA VALLEY WATER DISTRICT SERVICE AREA AND SPHERE OF INFLUENCE BOUNDARY

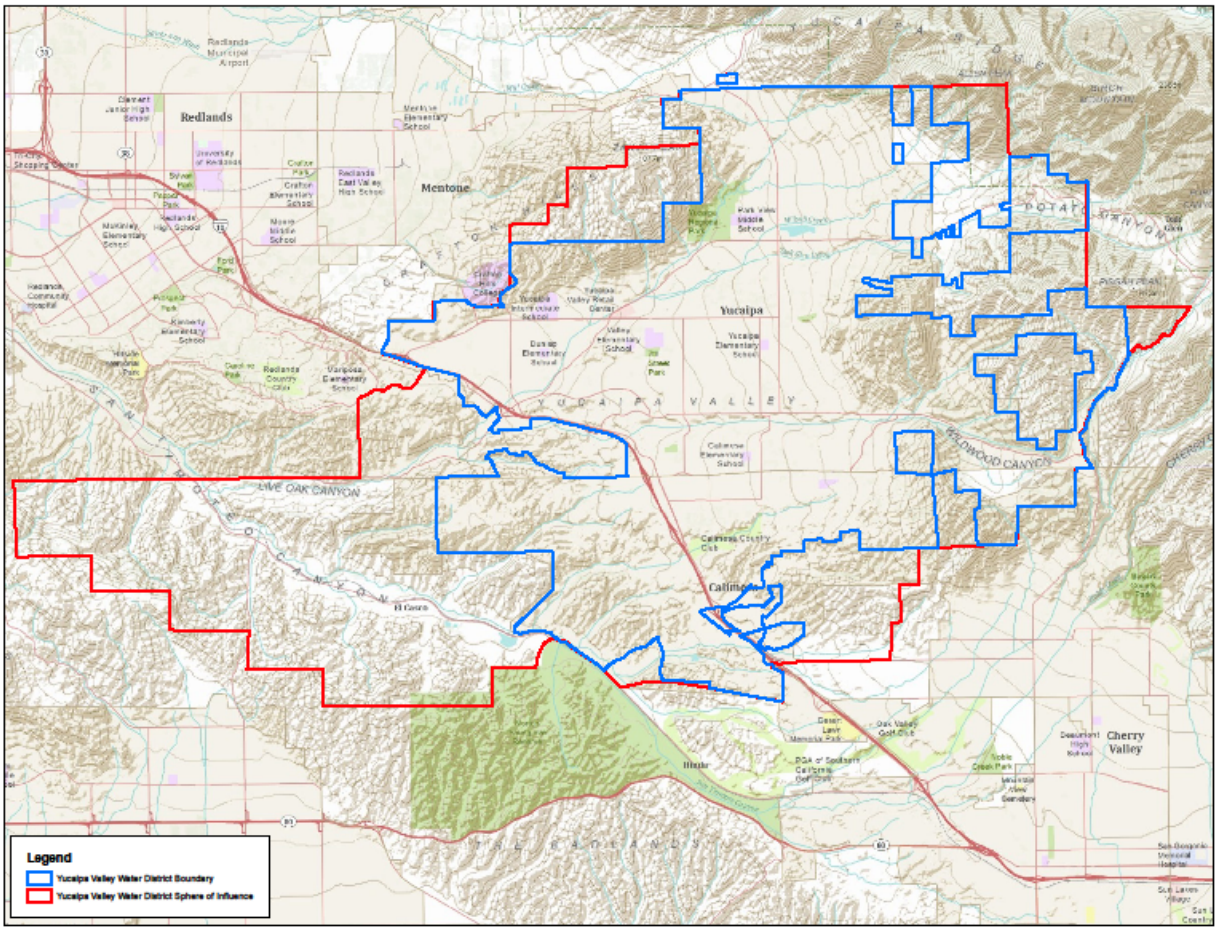


TABLE 12-2
POPULATION – CURRENT AND PROJECTED

	2010	2015	2020	2025	2030	2035	Data Source
Service area population [(a)]	42,171	45,627	61,934	49,602	60,435	64,228	(a)

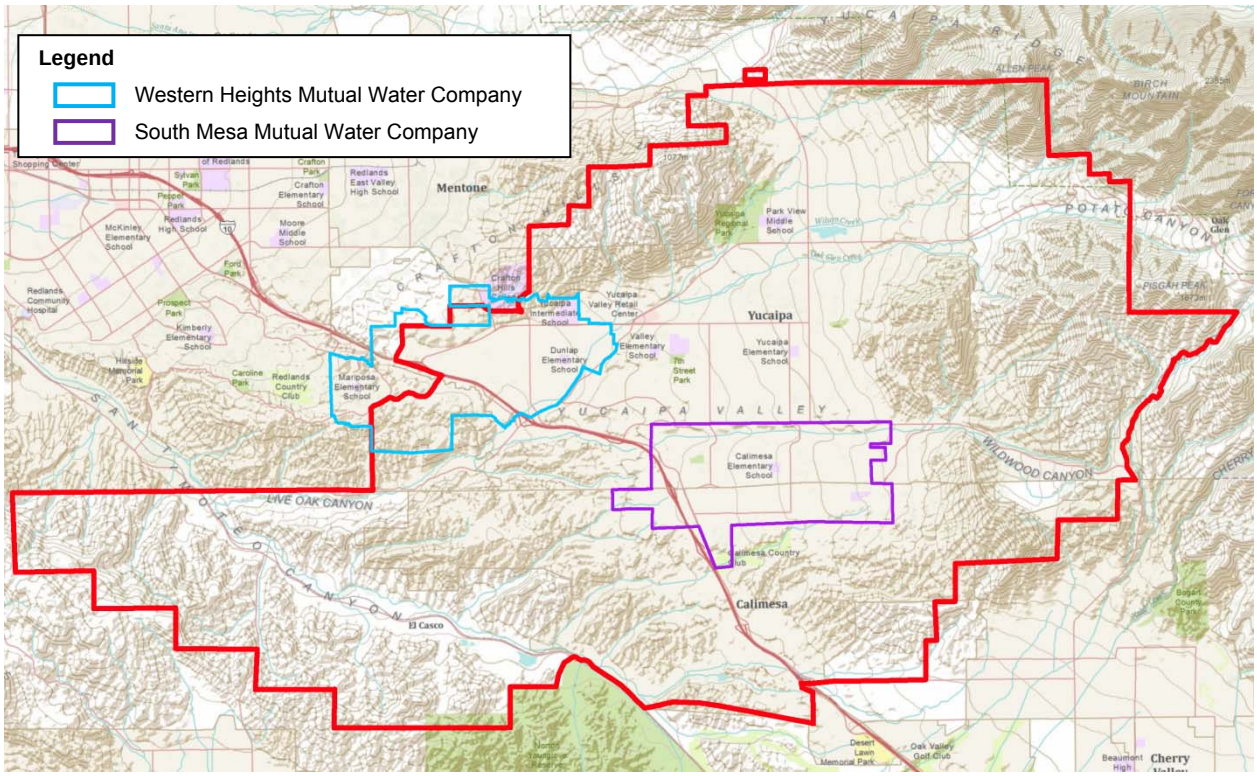
Note:
(a) The City of Calimesa and the City of Yucaipa provided population projections for the years 2020, 2030, 2040, and 2050. It is assumed that these projections include the portions of the unincorporated County areas that lie in the District's sphere of influence.

YVWD has experienced significant growth in the last 20 year as with many areas in San Bernardino and Riverside County. Within the last 3 years Yucaipa and Calimesa's growth has slowed due to overall economic conditions across the United States.

The YVWD includes mountainous areas unlikely to be developed. It is estimated that the majority of YVWD customers are comprised of single family water customers, approximately 91.1%. The remaining customers consist of; multi-family at 4.3%, commercial and institutional at 2.3%, industrial at 0.1%, landscape irrigation at 1.4% and the remaining miscellaneous customers at 0.8%.

The service area of the YVWD includes two mutual water companies the Western Heights Water Company and the South Mesa Water Company. The service area of the Western Heights Mutual Water Company is 4.53 square miles (2,902 acres) and the service area of the South Mesa Mutual Water Company is 4.00 square miles (2,561 acres). In the future, the population of Western Heights Mutual Water Company and South Mesa Water Company are expected to have limited growth as compared to the larger service area boundary of YVWD. Figure 12-2 shows the boundaries for the mutual water companies.

FIGURE 12-2
YUCAIPA VALLEY WATER DISTRICT, WESTERN HEIGHTS MUTUAL WATER COMPANY, SOUTH MESA MUTUAL WATER COMPANY



12.2 Climate

YVWD is located in the upper portion of the Santa Ana Watershed within the South Coast Hydrologic Region. Temperatures range from an average high of 78º and an average low of 49º. The record high for the area is 117º and the record low is 17º.

The annual average rainfall for the area is about 15.80 inches per year. The climate is characterized by hot dry summers when temperatures can rise above 100º, and moderate winters, with rare freezing temperatures. A major portion of the precipitation occurs between December and March. Snow in the upper reaches of the area is possible, but is not considered an important contributing factor to runoff.

TABLE 12-3
CLIMATE

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Standard Monthly Avg. ET0 (inches)	3.32	2.41	4.62	5.58	6.32	5.37	7.60	6.68	5.89	4.40	3.18	2.08	57.45
Avg. Total Precipitation (inches)	2.67	2.65	2.31	1.18	0.48	0.11	0.06	0.15	0.29	0.70	1.14	1.79	13.53
Avg. Max. Temperature (degrees F)	64.7	66.1	69.1	73.7	78.5	86.7	94.5	94.2	90	81	72.6	65.9	78.1
Avg. Min. Temperature (degrees F)	39.3	41.3	43.6	46.8	51.1	55.2	60.3	60.6	57.5	51.2	44	39.6	49.2

Average evapotranspiration from a standardized grass surface (reference evapotranspiration or ET0) was found on the California Irrigation Management System (CIMIS) website. The nearest CIMIS station is at the University of California, Riverside, Station #44, which has been operating since June 1985.[b] Average temperature and precipitation information for Redlands, CA is from the National Oceanic and Atmospheric Administration (NOAA) website http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?caredl. The period of record is from 12/1/1927 to 3/31/2005.

12.3 Historical Water Use

12.3.1 Historical Deliveries

With the establishment of the San Gabriel Mission (located in Los Angeles) in 1771, European settlement of the area began. In 1819, the San Bernardino de Sena Estancia was constructed as the influence of the Spanish missions moved inland towards the Yucaipa Valley. Spanish missionaries introduced the principle of irrigation with the first irrigation ditch -- the Mill Creek Zanja -- built in 1819 by the Indians. This water improvement allowed for increased farming and cattle raising in the area and opened the way for increased settlements.

The Mission period ended with the Act of Secularization in 1833 which began the Rancho period and initiated growth of cattle grazing and agricultural development. Irrigation efforts also expanded, bringing water from Yucaipa's year-round streams and springs to drier sites in the vicinity.

In the early 1900's approximately 95% of the area's water supply was used for irrigation purposes. Other actions in the early 1900s included the formation of several mutual water companies, some still in operation today. By the 1950s post-World War II development pressures brought increased urbanization to the Yucaipa area. Agricultural production decreased from the farming and ranching activities of the prior decades.

From the 1960s to the present urbanization trends have increased throughout the San Bernardino and Riverside areas, earning the nickname "Inland Empire" for the entire region. Yucaipa, as part of the Inland Empire, has historically experienced similar growth pressures. However, limited water supplies and water quality regulations imposed on the septic systems in the 1980s by the Santa Ana Regional Water Quality Control Board significantly reduced the growth of the Yucaipa Valley as compared to other Inland Empire communities. Historic water use by sector is provided in Tables 12-4 and 12-5.

TABLE 12-4
WATER DELIVERIES – ACTUAL 2005

	Metered		Not Metered		Total
Water use sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**Volume (AFY)**
Single family	10,900	8,138			8,138
Multi-family	523	1,000			1,000
Commercial/Institutional	262	480			480
Industrial	21	37			37
Landscape	129	1,600			1,600
Agriculture	2	12			12
Other	144	224			224
Total Deliveries in YVWD Service Area	*11,979*	*11,491*	*0*	*0*	*11,491*

TABLE 12-5
WATER DELIVERIES – ACTUAL 2010

	Metered		Not Metered		Total
Water use sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**Volume (AFY)**
Single family	11,044	7,522			7,522
Multi-family	518	1,225			1,225
Commercial/Institutional	279	471			471
Industrial	15	81			81
Landscape	165	1,691			1,691
Agriculture	2	22			22
Other	103	356			356
Total Deliveries in YVWD Service Area	*12,126*	*11,368*	*0*	*0*	*11,368*

12.3.2 Historic Sales

Historically, YVWD relied solely on the groundwater supply to serve the customers within the Yucaipa Valley. As mentioned above, two mutual water companies exist within the Yucaipa Valley Water District, South Mesa Mutual Water Company and Western Heights Mutual Water Company. Past sales to these water agencies have occurred due to the lack of groundwater available in the mutual water companies' service area. In the future, the population of Western Heights Mutual Water Company and South Mesa Water Company are expected to have limited growth as compared to the larger service area boundary of the Yucaipa Valley Water District.

TABLE 12-6
HISTORIC SALES TO OTHER WATER AGENCIES (AF)

Agency	2005	2006	2007	2008	2009	2010
Western Heights Mutual Water Company	0	0	0	529	815	158
South Mesa Mutual Water Company	0	0	0	0	0	0
Total	*0*	*0*	*0*	*529*	*815*	*158*

12.3.3 Historical Other Water Uses

In the past, YVWD has not had water use related to saline barriers due to the upland location of the district. YVWD does have historical water activity comprised of groundwater recharge and recycled water. In addition unaccounted-for water can also be counted as a water use, as with all water districts. Unaccounted-for water is the difference between the amount of water produced and the amount of water billed to customers. Over the last five years unaccounted for water has been less than 6 percent of produced water within YVWD's system (system loss was determined by comparing overall production to overall sales for 2004 to 2009). Sources of unaccounted-for water include:

- Hydrant Testing and Flushing - Hydrant testing is performed by both YVWD and the Fire Departments.
- Fire Hydrant Operations by the Fire Department - This represents the use of water for emergencies.
- Customer Meter Inaccuracies - Customer meters represent one of the main sources of unaccounted-for water as they tend to under-represent actual consumption in the water system.
- Leaks from water lines - Leakage from water pipes is a common occurrence in water systems. A significant number of leaks remain undetected over long periods of time as they are very small; however these small leaks contribute to the overall unaccounted-for water.

Table 12-7 summarizes the California Department of Water Resources definition of "other" water uses, besides metered deliveries and sales to other agencies.

TABLE 12-7
HISTORIC "OTHER" WATER USES (AF)

Water Use [(a)]	2005	2010
Saline Barriers Water Use	0	0
Groundwater Recharge	0	4,603
Conjunctive Use	0	920
Recycled Water	0	0
System Losses	855	604

Note:
(a) Any water accounted for in Table 12-4, 12-5 and 12-6 is not included in this table.

12.3.4 Total Historical Water Use

Table 12-8 below presents information on all historic water uses for the years 2005 and 2010.

TABLE 12-8
HISTORIC TOTAL WATER USE (AF)

Water Use	2005	2010
Total Water Deliveries (from Tables 12-4 and 12-5)	11,491	11,368
Sales to Other Water Agencies (from Table 12-6)	0	158
Additional water uses and losses (from Table 12-7)	855	6,127
Total	**12,346**	**17,653**

12.4 Existing and Targeted Per Capita Water Use

The Water Conservation Bill of 2009 (SBX7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Bill of 2009 provides the regulatory framework to support the statewide reduction in urban per capita water use described in the 20 by 2020 Water Conservation Plan. Consistent with SBX7-7, each water supplier must determine and report its existing baseline water consumption and establish future water use targets in gallons per capita per day (GPCD); reporting is to begin with the 2010 UWMP.

The two primary calculations required by SBX7-7 are:

1. Base Daily Water Use calculation (average GPCD used in past years)
2. Compliance Water Use Target (target gallons per capita per day in 2015 and 2020)

The Base Daily Water Use calculation is based on gross water use by an agency in each year and can be based on a ten-year average ending no earlier than 2004 and no later than 2010 or a 15-year average if ten percent of 2008 demand was met by recycled water. Base Daily Water

Use must account for all water sent to retail customers, excluding:

- Recycled water
- Water sent to another water agency
- Water that went into storage

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). There are four methods for calculating the Compliance Water Use Target:

1. Eighty percent of the urban water supplier's baseline per capita daily water use
2. Per capita daily water use estimated using the sum of the following:
    a) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of DWR's 2016 report to the Legislature

reviewing progress toward achieving the statewide 20 percent reduction target, this standard may be adjusted by the Legislature by statute.

b) For landscape irrigated through dedicated or residential meters or connections, water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in section 490 et seq. of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992.

c) For commercial, industrial, and institutional (CII) uses, a ten percent reduction in water use from the baseline CII water use by 2020.

3. Ninety-five percent of the applicable state hydrologic region target as stated in the state's April 30, 2009, draft 20 by 2020 Water Conservation Plan. YVWD falls within the South Coast Hydrologic Region; the region target is 142 GPCD. The South Coast region encompasses several coastal counties (Ventura, Los Angeles, Orange, and San Diego) and also includes portions of inland areas such as San Bernardino and Riverside. This target is more appropriate for coastal, rather than inland, areas.

4. Reduce the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:

   a) Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "BMP Calculator".

   b) A 20 percent savings on all unmetered uses.

   c) A 10 percent savings on baseline CII use.

   d) A 21.6 percent savings on current landscape and water loss uses.

The Interim Water Use Target is set as a halfway point between the Base Daily Water Use GPCD and the 2020 Compliance Water Use Target GPCD.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95% of a 5- year average base gross water use ending no earlier than 2003 and no later than 2010. The Maximum Allowable GPCD use is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBX7-7 legislation. If an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as their target.

12.4.1 Base Daily Per Capita Water Use

Figure 12-2 illustrates both the overall YVWD service area in addition to the sphere of influence boundary. For the purposes of this SBX7-7 calculation, the part of the service area designated as "Area Served" in Figure 12-1 is the distribution area used to estimate the Base Daily Per Capita Water Use. Tables 12-9 through 12-11 summarize the Base Daily Water Use calculation for YVWD. Years 2000 to 2009 have been selected for calculation of the 10-year base period while years 2005 to 2009 have been selected for calculation of the 5-year base period. The 10-year average Base Daily Per Capita Water Use for YVWD is 291 GPCD; the 5- year is 307 GPCD.

TABLE 12-9
BASE PERIOD RANGES

Base	Parameter	Value	Units
10- to 15-year base period	2008 total water deliveries (AF)	14,061	*see below*
	2008 total volume of delivered recycled water (AF)	1,197	*see below*
	2008 recycled water as a percent of total deliveries(%)[(a)]	8.5	percent
	Number of years in base period [b]	10	years
	Year beginning base period range	2000	
	Year ending base period range	2009	
5-year base period	Number of years in base period [c]	5	years
	Year beginning base period range	2005	
	Year ending base period range	2009	

Notes:
(a) If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first base period is a continuous 10- to 15-year period.
(b) The ending year must be between December 31, 2004 and December 31, 2010.
(c) The ending year must be between December 31, 2007 and December 31, 2010.

TABLE 12-10
BASE DAILY PER CAPITA WATER USE, SELECTED 10-YEAR PERIOD

Sequence Year	Calendar Year	Distribution System Population	Daily System Gross Water Use (million gallons)	Annual daily per capita water use (GPCD)
Year 1	2000	34,862	9,204,411	264.02
Year 2	2001	35,548	9,298,082	261.56
Year 3	2002	36,245	10,486,548	289.32
Year 4	2003	36,974	9,803,014	265.13
Year 5	2004	37,637	11,465,808	304.64
Year 6	2005	38,447	11,204,822	291.44
Year 7	2006	39,356	12,135,534	308.35
Year 8	2007	40,044	13,198,822	329.61
Year 9	2008	40,881	12,557,945	307.18
Year 10	2009	41,471	12,131,013	292.52
		Base Daily Per Capita Water Use		*291.38*

The past population for the YVWD were determined using data published from the California Department of Finance and the U.S. Census Bureau. The District's service area boundary falls within Category 2 of the Department of Water Resources three scenarios of potential boundary characteristics. Category 2 is described as water suppliers whose actual distribution area does not overlap substantially (≥95%) with city boundaries but has Geographic Information System maps of their distribution area. The service area population was further refined using a geographical information system coupled with additional local population resources provided by the Southern California Association of Governments.

The first step for calculating the service area population of the Yucaipa Valley Water District was to determine the population of the entire service area. YVWD fully encompasses two mutual water companies within its service area, South Mesa Mutual Water Company and Western Heights Mutual Water Company, (Figure 12-2). Population estimates for the two water districts were conducted using the same method for the YVWD population estimates. The population totals for the two mutual water companies were then subtracted from YVWD's total population estimates.

Table 12-11 below provides the data on the Maximum Allowable GPCD. The Maximum Allowable GPCD is based on 95% of the 5-year average base gross water use. For YVWD the Maximum Allowable GPCD is 292 (0.95 * 307 GPCD).

TABLE 12-11
BASE DAILY PER CAPITA WATER USE, 5-YEAR

Sequence Year	Calendar Year	Distribution System Population[(a)]	Daily system gross water use (MGD)	Annual daily per capita water use (GPCD)
Year 1	2005	38,447	11,204,822	291.44
Year 2	2006	39,356	12,135,534	308.35
Year 3	2007	40,044	13,198,822	329.61
Year 4	2008	40,881	12,557,945	307.18
Year 5	2009	41,471	12,131,013	292.52
	Base Daily Per Capita Water Use, 5-Year Average			*306.82*

Note:
(a) YVWD's service area boundary falls within Category 2 of the Department of Water Resources three scenarios of potential boundary characteristics. Category 2 is described as water suppliers whose actual distribution area *does not* overlap substantially (≥95%) with city boundaries but has Geographic Information System maps of their distribution area.

12.4.2 Compliance Water Use Targets

In addition to calculating base gross water use, SBX7-7 requires that a retail water supplier identify its demand reduction targets. The methodologies for calculating demand reduction targets were described above. YVWD is choosing to meet SBX7-7 targets as an individual agency rather than as part of a regional alliance. YVWD has selected Method 1 to calculate its 2020 Compliance Water Use Target and Interim Water Use Target.

Compliance Water Use Target under Method 1 is eighty percent of the water supplier's baseline per capita water use. The resulting Compliance Water Use Target is 233 GPCD, the interim Water Use Target is 262 GPCD. The programs which YVWD intends to use to achieve these conservation goals are described in Section 12.7.3.

As described earlier, the Maximum Allowable GPCD is 292 GPCD. The Compliance Water Use Target under Method 1 (233 GPCD) is less than the Maximum Allowable GPCD so no adjustments to the compliance Water Use Target are necessary.

12.5 Projected Water Use

12.5.1 YVWD Projections

Based on the San Bernardino Association of Governments (SANBAG), the Southern California Association of Governments and the Census' American Factfinder, population projections were determined using the growth rate estimates from these agencies. The water demands are shown in Tables 12-12 and 12-13

TABLE 12-12
WATER DELIVERIES – PROJECTED, 2015, 2020, 2025 (AF)

	2015 Customer Accounts Metered		2020 Customer Accounts Metered		2025 Customer Accounts Metered	
Water Use Sectors	**Accounts**	**Volume**	**Accounts**	**Volume**	**Accounts**	**Volume**
Single family	12,798	9,388	14,817	9,796	17,583	10,244
Multi-family	613	1,448	709	1,509	842	1,580
Commercial/Institutional	322	580	373	604	443	632
Industrial	19	98	22	101	26	104
Landscape	147	1792	170	1,868	201	1,954
Agriculture [a]	2	15	2	15	2	15
Other [a]	132	267	153	279	182	291
Total without Conservation	*14,033*	*13,588*	*16,247*	*14,174*	*19,279*	*14,822*

Note:
(a) *These uses served by recycled water from the Wochholz Regional Water Recycling Facility.*

TABLE 12-13
WATER DELIVERIES – PROJECTED 2030, 2035 (AF)

	2030 Customer Accounts Metered		2035 Customer Accounts Metered	
Water Use Sectors	**Accounts**	**Volume**	**Accounts**	**Volume**
Single family	22,198	10,200	23,929	11,290
Multi-family	1,063	1,724	1,145	1,740
Commercial/Institutional	559	675	602	696
Industrial	33	110	36	117
Landscape	254	2,485	274	2,154
Agriculture[(a)]	2	20	2	15
Other[(a)]	229	410	247	322
Total without Conservation	*24,338*	*15,624*	*26,234*	*16,334*

Note:
(a) *These uses served by recycled water from the Wochholz Regional Water Recycling Facility.*

12.5.2 Projected Sales and Other Water Uses

YVWD does anticipated sales to other water agencies in the future. While South Mesa Mutual Water Company has not purchased water from YVWD recently, Western Heights Mutual Water Company has made purchases the past few years.

TABLE 12-14
FUTURE SALES AND "OTHER" WATER USES (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Western Heights Mutual Water Co.	445	440	439	439	439
Saline Barriers	0	0	0	0	0
Groundwater Recharge	5,000	5,250	5,500	5,500	5,500
Conjunctive Use (Valley District)[b]	877	930	979	1,028	1,074
Conjunctive Use (SGPWA)[(b)]	123	163	209	267	337
Recycled Water	0	0	0	0	0
System Losses	350	363	356	346	330
Total	*6,795*	*7,146*	*7,483*	*7,580*	*7,680*

Notes:
(a) Any water accounted for in Tables 12-12 and 12-13 is not included in this table.
(b) YVWD's service area covers San Bernardino County and Riverside County requiring purchase of SWP water from two wholesalers.

12.5.3 Total Projected Water Use

Table 12-15 below presents information on all projected water uses for the years 2015 to 2035

TABLE 12-15
TOTAL PROJECTED WATER USE (AF)

Water Use [(a)]	2015	2020	2025	2030	2035
Total Water Deliveries	13,588	14,174	14,822	15,624	16,334
Sales to Other Water Agencies	445	440	439	439	439
Additional Water Uses and Losses	6,795	7,146	7,483	7,580	7,680
Total	*20,828*	*21,760*	*22,744*	*23,643*	*24,453*

Note:
(a) Numbers not adjusted for conservation

12.5.4 Water Use Projections for Lower Income Households

Senate Bill 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier. YVWD contains three jurisdictions, the City of Yucaipa and the City of Calimesa, and unincorporated County of San Bernardino.

12.5.4.1 City of Yucaipa

The City of Yucaipa revised their Housing Element in November 2008. Yucaipa's Housing Needs Assessment utilizes data from the 2000 U.S. Census, California Department of Finance (DOF), California Employment Development Department (EDD), SCAG and other relevant sources. Supplemental data was obtained through field surveys and from private vendors. A shortfall of lower-income sites compared to the Yucaipa's share of regional housing need was determined with the November 2008 Housing Element Study. The City of Yucaipa's Community Development Department will identify and rezone a minimum of 59 acres for multi-family development "as-of-right" at a density of 20-24 units/acre (excluding any density bonus) to bridge this gap. Rezoned sites will have a capacity of at least 16 units.

In 2000, approximately 1,835 low-income households resided in Yucaipa, representing 12.1% of the total households. The City has a projected need for 238 low-income units. YVWD has determined approximately 80% of Yucaipa's Low Income Households fall within the District boundaries (Yucaipa Housing Element, November 2008).

12.5.4.2 City of Calimesa

SCAG estimated the distribution of Calimesa households by income category in the course of developing its Regional Housing Needs Assessment. SCAG's estimates indicate that the City's population is predominantly low and moderate income. This is further supported by a citywide household income survey conducted by the City in 2004, which was funded by a Community Development Block Grant from the Department of Housing and Urban Development that documented approximately 55 percent of the City's households as low income (i.e., low income, very low income and extremely low income). YVWD has determined approximately 60% of Calimesa's Low Income Households fall within the District boundaries.

Using estimates from the City of Yucaipa and City of Calimesa, YVWD has determined what percentage of future residential demand will be related to low-income housing demands (Table 12-16).

TABLE 12-16
PROJECTIONS OF FUTURE LOW INCOME HOUSING WATER USE (AF)

Water Use	2015	2020	2025	2030	2035
Estimated Very Low and Low-Income Households Water Use	900	1,020	1,140	1,260	1,353

YVWD will not deny or condition approval of water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households if water supply conditions are reliable and sound. .

12.6 Demand Management Measures

DMMs are mechanisms implemented by YVWD to increase water conservation. YVWD is a signatory to the California Urban Water Conservation Council's Memorandum of Understanding which was developed to expedite implementation of reasonable water conservation measures in

urban areas and to establish assumption for use in calculating estimates of reliable future water conservation savings. The Department of Water Resources Demand Management Measures coincide with the 14 Best Management Practices developed by the California Urban Water Conservation Council. The conservation measures are defined below. A description if each Demand Management Measure is listed below defining the current status of implementation. In 2010, YVWD hired a full-time water use efficiency coordinator in order to ensure current programs are ongoing and programs scheduled for implementation are carried out.

TABLE 12-17
DEMAND MANAGEMENT MEASURES REQUIRED INFORMATION, IMPLEMENTED, SCHEDULED, NOT IMPLEMENTED

Information required for DMM's implemented or scheduled for implementation [a]	Description of Demand Management Measure A description of the steps necessary to implement the measure An implementation schedule Estimate, if available, of conservation savings and the effect of the savings on the suppliers' ability to further reduce demand.
Information required for DMM's not implemented or scheduled for implementation [b]	Economic and noneconomic factors, including A cost-benefit analysis, identifying total benefits and total costs A description of funding available to implement any planned water supply project that would provide water at a higher unit cost A description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation

Notes:
(a) Water Code Section 10631(F)
(b) Water Code Section 10631(g)

12.6.1 DMM's Currently Being Implemented or Scheduled for Implementation

12.6.1.1 WSS for New Residential Development

In April 2010, YVWD purchased 500 faucet aerators that qualified under the WaterSense Specifications (WSS) in order to meet one component of the water-survey program. Estimated effectiveness is shown in Table 12-18.

Implementation Schedule – Faucet Aerators

The faucet aerators were purchased to coincide with several community events that provided a substantial audience to distribute and educate about the importance of water efficient devices inside and outside the home. Distribution of the faucet aerators took place during the following events.

1. Iris Festival – May 14th 15th and 16th, 2010. The Iris Festival is a three day community event located in the City of Yucaipa. Vendors are comprised of public and private agencies which hosts approximately 20,000 attendees.

2. Calimesa 20th Anniversary – November 6th, 2010. The Calimesa 20th Anniversary event consisted of booths and activities for residents in Yucaipa and Calimesa. The venue provided an opportunity for YVWD to discuss indoor and outdoor water-saving techniques.

YVWD will continue to take advantage of community events to distribute WaterSense Specific devices and educate the community about water efficient technologies and techniques.

TABLE 12-18
EVALUATION OF EFFECTIVENESS

Water Efficiency Product	Quantity	Cost per Device	Estimated Water Savings Per Household
WaterSense Specification Faucet Aerator	500	0.91	1.2 gallon savings pp x 4 pph.
Total		*$495.00*	*1,753 gallons per year*

Note: DeOreo, et. al. 2001

It's often difficult to gage the effectiveness of water efficient devices since installation tracking is not cost effective for a water retailer. Effectiveness relies on not only the device installation but the education component that is conducted during the giveaway.

Implementation Schedule – Low-flow Showerheads

In 1991, it is estimated there were 6,634 single-family residences and 2,299 multi-family units within YVWD boundaries. In 2008, the numbers increased to 10,964 single-family residential units and 503 multi-family units. Yucaipa experienced significant growth of single-family residential units from 1995 – 2008 resulting in the "current housing" interpretation to be a greater saturation than 53% as referenced in the 2003 YVWD Urban Water Conservation Feasibility Study and Implementation Plan. In future years, a rebate program or giveaway of low flow showerheads will most likely be implemented as part of a collaborative program with Valley District.

Evaluation of Effectiveness

Proper distribution and installation of low-flow shower heads has an effect on the 75% saturation goal. Customers who presently have a low-flow shower head may have a tendency to acquire an additional device, keeping the saturation level at a zero net gain. In addition, customers who take advantage of the free low-flow shower head may not install the device as expected. This program coupled with the residential assistance program becomes imperative to ensure the customer installs the low-flow device within the home.

12.6.1.2 Leak Detection and Repair

YVWD has been conducting a system water audit, leak detection and repair program since 2002. The water audits are conducted by an outside consultant who conducts a 10-day leak detection survey on various sections of the water distribution system for the YVWD. A total of 75.45 miles were surveyed in 2010.

Implementation Schedule

YVWD's leak detection program occurs every year in approximately March of each year. The water audits locations rotate each year in order to have a historic tracking of leak detection throughout the district.

Evaluation of Effectiveness

Thirty-one total leaks were detected in 2010. Most of the reported leaks were due to YVWD public works staff repaired leaks that were detected through the water audit. In addition, there were a total of 8 leak identified on customers properties. Notification letters were sent to these customers in order to notify them to conduct the repairs. Estimated effectiveness of the leak detection program is shown in Table 12-19.

TABLE 12-19
YVWD LEAK DETECTION PROGRAM RESULTS

Total Leaks	GPM	Average / Per Leak	Calculated Totals
31	47.75	1.54	
Gallons Per Minute			47.75
Gallons Per Day			68,760.00
Gallons Per Year			25,097,400.00
Acre Feet Per Year			77 AFY

12.6.1.3 Metering With Commodity Rates for All New Connections and Retrofit of Existing Connections

YVWD implements metering and commodity rates for the residential water service with a tiered or inclining block rate structure and five tiers or blocks, with inclining rates based on increased usage. In 2010 there were a total of 12,126 potable and recycled water metered accounts with 100% coverage. However Sewer rates are flat rates for residential service and uniform rates, increasing block rates or long-run marginal cost rates. Commercial and industrial water and sewer service are metered and billed according to consumption quantity.

Implementation Schedule

The metering with commodity rates for all new connection takes place on the retail water service portion but not on the sewer service portion for residential homes. Metering residential sewer activity will most likely not occur.

Evaluation of Effectiveness

Customers can review the five tiered rating structure on their monthly bill. In addition, YVWD adopted a Water Meter Repair, Maintenance and Replacement Program in October 2010. The metering with commodity rates structure provides YVWD the opportunity to recover costs associated with the fluctuations in water service.

12.6.1.4 Large Landscape Conservation Programs and Incentives

Large landscape programs generally include landscapes over three acres such as schools, parks, golf courses and other commercial, industrial and institutional customers. The incentives often consist of Weather Based Irrigation Controllers (WBIC), system retrofits and irrigation training. In 2010, YVWD partnered with Valley District on a weather-based irrigation controller program in order to target large landscape water users.

Implementation Schedule

The WBIC program was implemented in 2010. Valley District developed a Weather Based Irrigation Controller Program that funds 50% of the cost to install Weather Based Irrigation Controller Systems on publicly owned sites. In order for the WBIC program to accurately interpret weather conditions, YVWD installed a Weather Station at the Yucaipa Valley Regional Water Filtration Facility in December 2009. In addition, YVWD also installed irrigation system controllers at nine (9) District owned sites in order to determine the effectiveness of the WBIC's. The nine sites selected would benefit from the program since they used approximately 500 acre feet of water in FY 2009. The following table demonstrates the commitments made to the Landscape Water Survey.

Evaluation of Effectiveness

Studies have shown that Weather Based (ET) control systems can result in water savings of 25% to 45% per year. The implementation schedule correlates to the evaluation of effectiveness. During the 2010 calendar year it was determined that water consumption at weather based irrigation controller locations did not decrease. This was due to the fact that in most instances human practice consisted of turning off sprinkler systems during the cooler months whereas the WBIC's continued to water minimally during that time. In addition, some of the locations may have been stressed in the summer months prior to the WBIC installation due to lack of watering presumably due to reducing costs (Table 12-20).

TABLE 12-20
YUCAIPA VALLEY WATER DISTRICT AND SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT WEATHER BASED IRRIGATION CONTROLLER PROGRAM EXPENSES

Weather Based Irrigation Controllers	$5,450.00
Weather Station (1)	$3,725.00
Water Audits	$1,240.00
Total	*$10,415.00*

12.6.1.5 Public Information Programs

The public information BMP component consists of utilizing public information programs as an effective tool to inform customers about the need for water conservation and ways they can conserve, and to influence customer behavior to conserve.

- Yucaipa Valley Regional Water Filtration Facility Tours - YVWD has an active public information program which provides numerous tours throughout the year at the Yucaipa Valley Regional Water Filtration Facility. In 2010, YVWD conducted 32 tours to various members of the community. Tour dialogue consisted of

identifying YVWD's water sources, methods of drinking water treatment along with a water conservation component. Prior to 1997, water supply was 100% groundwater. Due to the increase in growth, the groundwater basins were decreasing rapidly, requiring imported water and recycled water. The facility tours provide an opportunity to transfer this information to the community to discuss the importance of water conservation throughout the community.

- Website Outreach - In 2010 YVWD restructured the website to include more comprehensive information about YVWD. The new website has a specific drop down Conservation tab in order to direct customers directly to the water conservation component of the site. Additional information includes; the Drought Contingency Plan, Landscape Showcase which includes information and photographs about drought tolerant landscaping tips and techniques and water saving tips for customers. The YVWD website can be found at www.yvwd.dst.ca.us
- Community Event Participation - YVWD is actively involved in various community events to communicate the current projects and goals undertaken by the District.
- Monthly Bill Notifications - YVWD has the capability to include significant information about relevant water awareness news. For example, in 2010 YVWD included several conservation tip notifications on the customer bills. For example, the August 2008 bill included a tip to keep showers under 5 minutes to save 1000 gallons of water per month.
- Media Outreach - Media outreach is a necessary element in YVWD's Public Information Program. The local media is present at every YVWD Board Meeting in order to communicate the current activity taking place within the District. In addition, YVWD utilizes a public affairs professional to develop articles that inform the community on important current affairs relevant to YVWD.
- Drought Tolerant Landscaping - YVWD participated in Valley District's Inland Empire Garden Friendly campaign. The Inland Empire Garden Friendly program was developed by the four major water suppliers of western Riverside and San Bernardino counties in California with cooperation from a university institute, conservation district and local botanic garden. The purpose of the program is to develop a strategy to strengthen consumer demand for climate-appropriate landscaping. The project began in December 2010 so results and effectiveness of the program are to be determined.

Evaluation of Effectiveness

YVWD's Public Information program is extremely successful and beneficial for the customers. The multi-faceted outreach programs target a diversified audience in order to ensure wide-ranging coverage of water conservation messaging.

12.6.1.6 School Education Programs

Yucaipa Valley Water District partners with Inland Empire Resource Conservation District (IERCD) on water conservation programs within the schools. YVWD and IERCD collectively developed a program for the K-12 student which also meets the California State Standards criteria for science. IERCD staff visits the school site and conducts the water conservation

program. Topics are grade specific to the State Standards but all students are taught the universal element of Yucaipa and Calimesa's water sources and the importance of water conservation. In 2010, IERCD conducted 21 water conservation programs on behalf of YVWD.

Evaluation of Effectiveness

IERCD distributes teacher surveys at the conclusion of each program. In most instances the surveys aren't returned for review but the occasional completed forms offer an opportunity to gage program success. In addition, students who received the program in previous years retain the information and actively engage in the water conservation program the subsequent year.

12.6.1.7 Conservation Pricing

The Retail Water Service Rate BMP was developed to establish a strong nexus between volume-related system costs and volumetric commodity rates, allowing conservation pricing to reward water efficient customers.

YVWD practices conservation pricing for its water service with a commodity rate structure that includes five tiers.

Implementation

YVWD is currently implementing conservation pricing. With the incentive to conserve structured in the water rate, it is deemed unnecessary to attempt to construct a commodity rate structure for sewer service. Additionally the accuracy of such rate structures, which rely on a formula based on water consumption, are questionable as they generally assess charges based upon winter season demands, which vary demanding on hydrology of a given year and landscaping demands YVWD UWMP, 2005).

Evaluation of Effectiveness

The effectiveness of this program can be evaluated by longitudinal studies reviewing billing consumption records and pricing structure for a sampling of housing units over time (Table 12-21). (YVWD UWMP, 2005)

TABLE 12-21
YUCAIPA VALLEY WATER DISTRICT
CONSERVATION PRICING

Units	Cost/Unit
1-15	$1.429
16-60	$1.919
61-100	$2.099
101 & over	$2.429
30+ multiple units x 0.800 factor	
Non-Potable Water - Commodity Charge	
1000 gallons	$1.235

Note:
Potable Water Commodity Charge –
Step Rate Table-per 1000 gallon units

12.6.1.8 Water Conservation Coordinator

In March 2010 YVWD hired a full-time Resources Sustainability Manager to carry-out the water conservation programs required by the Department of Water Resources and the California Urban Water Conservation Council.

12.6.1.9 Water Waste Prohibition

This program consists of implementing methods that prohibit gutter flooding, single pass cooling systems in new connections, non-recirculating systems in all new conveyer car wash and commercial laundry systems, and non recycling decorative water fountains.

Implementation

YVWD has a Water Waste Prohibition Ordinance which is included within Ordinance No. 48-1998, section 5.15 (see Appendix F). The ordinance was passed in 1998 and should be updated to correlate with current industry trends and standards. YVWD will adopt a new water waste ordinance within the Calendar Year 2011.

12.6.2 Evaluation of DMMS Not Implemented But Scheduled For Implementation

12.6.2.1 System Water Audits

In order to comply with BMP 1.2 – System Water Audits, YVWD recognizes that completing the standard water audit and balance using the American Water Works Association (AWWA) Water Loss software is required. This is to determine the current volume of apparent and real water loss and the cost impact of these losses on utility operations.

Implementation Schedule

YVWD has not implemented the AWWA Water Loss methodology as of December 2010. The schedule for implementation of the AWWA Water Loss Control Program is March 2012 to coincide with the next Water Line Leak Detection Program.

12.6.2.2 Water Survey Program for Single-family, Residential and Multi-family Residential Customers

Landscape Water Survey

YVWD became a signatory to the California Urban Water Conservation Council's (CUWCC) MOU in 2007 requiring 15% of single family and 15% of multi-family accounts receive surveys within 10 years of the implementation year. YVWD has approximately 11,044 single family residential dwelling units and 518 multi-family units. To comply with the within the (CUWCC) coverage requirements, YVWD must offer approximately165 surveys per year. The single-family survey is expected to cost $150 with the multi-family survey totaling $50. Therefore a budget of $24,750 per year is required (Yucaipa Valley Water District, Feasibility Study, 2003).

Implementation Schedule

YVWD will implement a landscape water survey program for residential customers by 2015. This concept may be completed with agency collaboration with the City of Yucaipa and Inland Empire Resource Conservation District. In addition, water retailers within the Valley District service area are collaborating to determine the most cost effective way to partner on the Demand Management Measures.

Evaluation of Effectiveness

The evaluation of effectiveness will be determined by the number of single-family and multi-family account landscape water surveys completed during the reporting period.

12.6.2.3 Residential Assistance Program

YVWD does not have a formal leak detection assistance program. However, YVWD actively responds to customer leaks throughout the year and at that time, discussions regarding water usage on the landscape often occur. Coverage requirements for the residential assistance program would be provided simultaneously with the coverage requirements of the landscape water survey referenced above.

Implementation Schedule

YVWD will implement a Residential Assistance Program for single-family households by 2015. YVWD does not currently have a formal water survey program. In 2010, YVWD public works department did conduct 88 service calls to repair leaks throughout the District service area. This provides an opportunity to discuss water efficiency measures and provide a water survey program to the customer.

Evaluation of Effectiveness

The evaluation of effectiveness will be determined by monthly water usage reductions with each residential assistance program conducted. In addition customers receive both current and previous year water usage, graphed by month, on their monthly bills for comparison of usage.

12.6.2.4 High-Efficiency Washing Machine Rebate Programs

This BMP provides incentives or institutes ordinances requiring the purchase of high-efficiency clothes washing machines (HECWs) that meet an average water factor value of 5.0. If the WaterSense Specification is less than 5.0, then the average water factor value will decrease to that amount.

Implementation Schedule

This Demand Management Measure provides a default assumption of water savings equal to 5,100 gallons per year, or 0.022 AFY. With a service life of 10 years and avoided costs equal to $417/AF, the benefit in undiscounted dollar terms is $92 incentive for high efficiency washers. These results indicate YVWD should provide a $92, possibly $100 incentive for high efficiency

washers. This BMP is scheduled for implementation during fiscal year 2011-2012. The budgeted amount has not been determined to report the estimated number of rebates offered.

Evaluation of Effectiveness

Under state legislation passed in 2002, the Energy Commission established standards to ensure washing machines sold in California after 2007 use no more than 8.5 gallons of water per cubic foot of washing machine capacity, later decreased to six gallons by 2010. Water efficient washing machines will use on average only 21.1 gallons per wash, or 8,271 gallons a year - compared to typical models that used an average of 39.2 gallons per wash or 15,366 gallons a year for a normal household three years ago. While the consumer on average will pay $130 more for a washing machine, savings during the life of the machine will average $242 in lower energy costs and water bills (California Energy Commission, 2002).

12.6.2.5 Conservation Programs for Commercial, Industrial, and Institutional Accounts

Scheduled for Implementation

Commercial, industrial and institutional (CII) water demands make up a large percentage of total demand for California (CUWCC, MOU June 2010). YVWD has identified and ranked by use commercial, industrial and institutional customers, YVWD does not have a large manufacturing population. Current commercial, industrial and institutional accounts in the base year 2008 total 288. This portion of the population consumed 206.88 million gallons or 635 acre feet within the 2008 calendar year.

Implementation Schedule

YVWD is not currently meeting the Conservation Programs for CII accounts at this time. It was determined in the 2005 UWMP that the best way to meet the Demand Management Measure was through ultra low flush toilets (ULFT). An implementation schedule and cost is represented in Table 12-22.

TABLE 12-22
COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL ULTRA LOW FLUSH TOILET REBATE PROGRAM

Program Intervention	FY 2012-13	FY 2013-14	FY 2014-15
CII Ultra Low Flush Toilets	$7,750	$15,300	$23,150

(2005 Urban Water Management Plan, numbers changed to reflect present value cost estimates.)

Evaluation of Effectiveness

The Conservation Programs for CII Accounts effectiveness will be evaluated by the number of CII ULFT's installed. The CII accounts can be cross referenced with past consumption data to determine if water use decreased.

12.6.2.6 Wholesale Agency Programs

Not Applicable

12.6.2.7 Residential Ultra-Low Flush Toilet Replacement Programs

YVWD does not have a current toilet rebate program. As mentioned with the other water conservation device replacement programs, a key element necessary to consider targeting conservation program is the device market saturation. YVWD has experienced a considerable amount of new development since 1992. New building codes have propelled water conservation devices increasing the saturation within the community.

In addition beginning January 1st, 2014, 100% of all toilets and urinals sold or installed within the state must be high-efficiency fixtures meeting requirements of the two key plumbing standards, ASME A112.19.2 and ASME A112.19.14. The effective flush volume cannot exceed 1.28 gallons.

Implementation Schedule

As a result of the impending plumbing standards, YVWD will maximize this water savings Demand Management Measure by possibly implementing toilet rebates in July 2014. This will provide YVWD the opportunity to plan and budget for the rebate program.

Evaluation of Effectiveness

The evaluation of the effectiveness of the toilet rebate program will be determined through a customer water usage comparison after the toilet installation.

12.6.3 DMM Implementation and Urban Water Use Targets of the 20x2020 Plan

As part of the IRWMP and UWMP process, agencies in the San Bernardino Valley area have formed a group to study and address conservation needs in the San Bernardino Valley. The first step in this process was identifying the costs and benefits of various demand management measures. Special attention was given to those demand management measures that are not cost effective for an individual agency, but which could be cost effective if implemented on as part of a regional collaboration. The following demand management measures were identified as potentially cost effective if costs could be shared amongst multiple entities:

- High Efficiency Clothes Washers Rebates
- Water Sense Specification Toilet Rebates
- Support and incentives to non-residential customers to improve landscape water use efficiency
- Targeted programs at large CII customers

The second step in the process was to identify the water conservation target, which was done as part of this UWMP. At the conclusion of Steps 1 and 2, the agencies participating in this UWMP met to coordinate regional implementation of selected conservation actions. The group intends to engage a Regional Conservation Coordinator. In addition to the programs listed above, the Regional Conservation Coordinator would lead public outreach programs and school education programs. The UWMP agencies, along with the Regional Conservation Coordinator

will evaluate existing agency resources available to assist with conservation programs and then select conservation programs and processes to be implemented at the regional level. The UWMP agencies will utilize the Regional Conservation Coordinator to track conservation actions, conservation successes, and estimate water savings. The group anticipates having a regional water conservation strategy developed by the end of 2011 and start implementation in 2012.

YVWD will continue with its existing conservation programs, will participate in the region-wide conservation programs, and will work with its land use partners to implement both the Landscape Model Ordinance and 2010 California Green Building Standards Code.

As part of its annual reporting of public water system statistics to the California Department of Public Health, YVWD will evaluate progress toward reducing water use in terms of gallons per capita per day.

12.7 Water Resources

The Yucaipa Valley Water District relies on four primary water resources to meet our annual water demands: groundwater resources, local surface water resources; imported water resources; and recycled water resources.

12.7.1 Imported Water Supplies

YVWD purchases imported water from two State Water Project contractors, the Valley District for the San Bernardino County portion of the service area, and the San Gorgonio Pass Water Agency (SGPWA), for the Riverside County portion of the service area.

The two State Water Contractors convey imported water from the Sacramento San Joaquin Delta which is utilized as a supplemental potable water source to the local supply and is treated at the Yucaipa Valley Regional Filtration Facility. The imported water is also used for groundwater recharge and recycled water irrigation of landscaping at numerous sites throughout the community.

12.7.1.1 San Bernardino Valley Municipal Water District (Valley District)

The San Bernardino Valley Municipal Water District has an entitlement to 102,600 AFY of SWP water that is used for both direct deliveries to treatment plants and artificial recharge of the groundwater basins (Regional Water Management Plan, 2010).

TABLE 12-23
VALLEY DISTRICT WATER SUPPLY USES

Use	AFY
Direct Deliveries	10,146
Groundwater Recharge	14,122
Recycled Water	3,608
Total	*27,876*

The following table and chart reflects the anticipated imported water demands from Valley District.

TABLE 12-24
VALLEY DISTRICT WHOLESALE SUPPLIES –
EXISTING AND PLANNED SOURCES OF WATER (AF)

Imported Water Demands	2010	2015	2020	2025	2030	2035
Drinking Water Demands: Yucaipa Valley Water Filtration Facility	5,522	5,851	6,187	6,520	6,855	7,165
Conjunctive Use Demands: Local Water Banking	828	877	928	978	1,028	1,075
New Development Long-Term Supply Sustainability Program	133	1,200	1,169	1,215	1,092	1,129
Purchase from Valley District	*6,483*	*7,928*	*8,284*	*8,713*	*8,975*	*9,369*

12.7.1.2 San Gorgonio Pass Water Agency

The San Gorgonio Pass Water Agency has an entitlement to 17,300 AFY of SWP water that is used for both direct deliveries to treatment plants and artificial recharge of the groundwater basins. The San Gorgonio Pass Water Agency needs to secure an additional 22,000 AFY of supplemental water to meet the ultimate demand of 94,000 AFY by year 2045 (SGPWA Supplemental Water Supply Planning Study, October 2009). YVWD received a total of 713 AF from the San Gorgonio Pass Water Agency for direct deliveries in 2010.

The following table and chart reflects the anticipated imported water demands from the San Gorgonio Pass Water Agency.

TABLE 12-25
SGPWA WHOLESALE SUPPLIES – EXISTING AND PLANNED SOURCES OF WATER (AF)

Imported Water Demands	2010	2015	2020	2025	2030	2035
Drinking Water Demands: Yucaipa Valley Water Filtration Facility	614	825	1,079	1,396	1,779	2,259
Conjunctive Use Demands: Local Water Banking	92	124	162	209	267	339
New Development Long-Term Supply Sustainability Program	7	816	1,022	1,221	1,543	1,862
Total	**713**	**1,765**	**2,263**	**2,826**	**3,589**	**4,460**

While the YVWD began to utilize imported water in 2002 to meet non-potable water demands, it was not until 2005 when the Yucaipa Valley Water District first operated a water filtration facility to produce drinking water from imported water resources delivered to the YVWD from the Valley

District (which serves portions of the Yucaipa Valley Water District in San Bernardino County) and the San Gorgonio Pass Water Agency (which serves portions of the Yucaipa Valley Water District in Riverside County).

In 2000, imported water resources were not utilized to meet the water demands of the Yucaipa Valley Water District. By 2010, this resource supplied 28.2% of total water demands.

TABLE 12-26
WHOLESALE SUPPLIES – EXISTING AND PLANNED SOURCES OF WATER IN A NORMAL YEAR (AF)

Wholesale source	2010	2015	2020	2025	2030	2035
Purchase from Valley District	6,484	7,927	8,284	8,713	8,975	9,369
Purchase from SGPWA	713	1,765	2,263	2,826	3,589	4,460

TABLE 12-27
WHOLESALE SUPPLIES – SINGLE DRY AND MULTIPLE DRY YEARS (AF)

Wholesale source	2015	2020	2025	2030	2035
Single-Dry Year	5,000	5,000	5,000	5,000	5,000
Multiple-Dry Year	6,200	6,200	6,200	6,200	6,200

The numbers presented in Table 12-27 are very conservative. During a shortage, it is anticipated that direct deliveries are the first priority for any SWP water. Valley District alone has estimated that it could supply YVWD with 5,000 AF in a dry year and 6,200 AF during a multiple dry year. YVWD continues to recharge groundwater basins and can use groundwater sources to back up imported water deliveries during a single-dry and multiple-dry years.

12.7.2 Groundwater

YVWD has traditionally met the bulk of service area customer needs from groundwater through the use of groundwater extraction wells. In 2010, over 75% of the groundwater used by the YVWD was extracted from the Wilson Creek Basin and the Calimesa Basin. The remaining groundwater production was from the Beaumont Basin, Chicken Hill Basin, Triple Falls Creek Basin, Oak Glen Basin and the Wildwood Basin.

Since about 1970 and especially during the 1990's, the wide-spread urbanization of southern California has extended into the Yucaipa area. Undeveloped land, agricultural land, and sparsely populated residential land has been converted into tracts of single family homes. The net effect of this change in land use has been an increase in the demand for water.

Since the local supply of surface water and groundwater is limited in this semiarid region, water purveyors in the Yucaipa Valley have explored several alternatives related to the development of water resources in the area. Most studies have identified groundwater resources at 200-300 feet below the surface elevation with a general basin-wide movement of both surface water and groundwater from the surrounding hills and mountains, to the south and west. After a brief study of the area, it becomes apparent to most observers that on a localized scale, the movement of groundwater through the numerous faults is very complex.

The quantity and quality of groundwater in the area has generally been sufficient to meet the demands of the Yucaipa Valley over the past fifty years.

The groundwater extractions by appropriators in the sphere of influence of the Yucaipa Valley Water District have decreased over the past five years. This is mainly attributed to the increased use of recycled water and imported water in the region. Overall, the three appropriators in the Yucaipa Valley are progressing towards a balanced safe yield of groundwater extractions at about 3,000 million gallons per year.

As discussed above, the overall water demand in the region has increased, but the amount of groundwater used to meet the demands has decreased. Technically, most of the groundwater basins in the Yucaipa Valley area considered in an overdraft situation, but significant efforts have been made by the YVWD to increase the amount of water in storage in the central part of the Yucaipa Valley.

Groundwater projection in the Yucaipa Valley generally is associated with three primary groundwater basins, the Yucaipa, San Timoteo and Beaumont Basins. The Yucaipa Basin is divided into a series of eight subbasins separated by faults and other physical barriers:

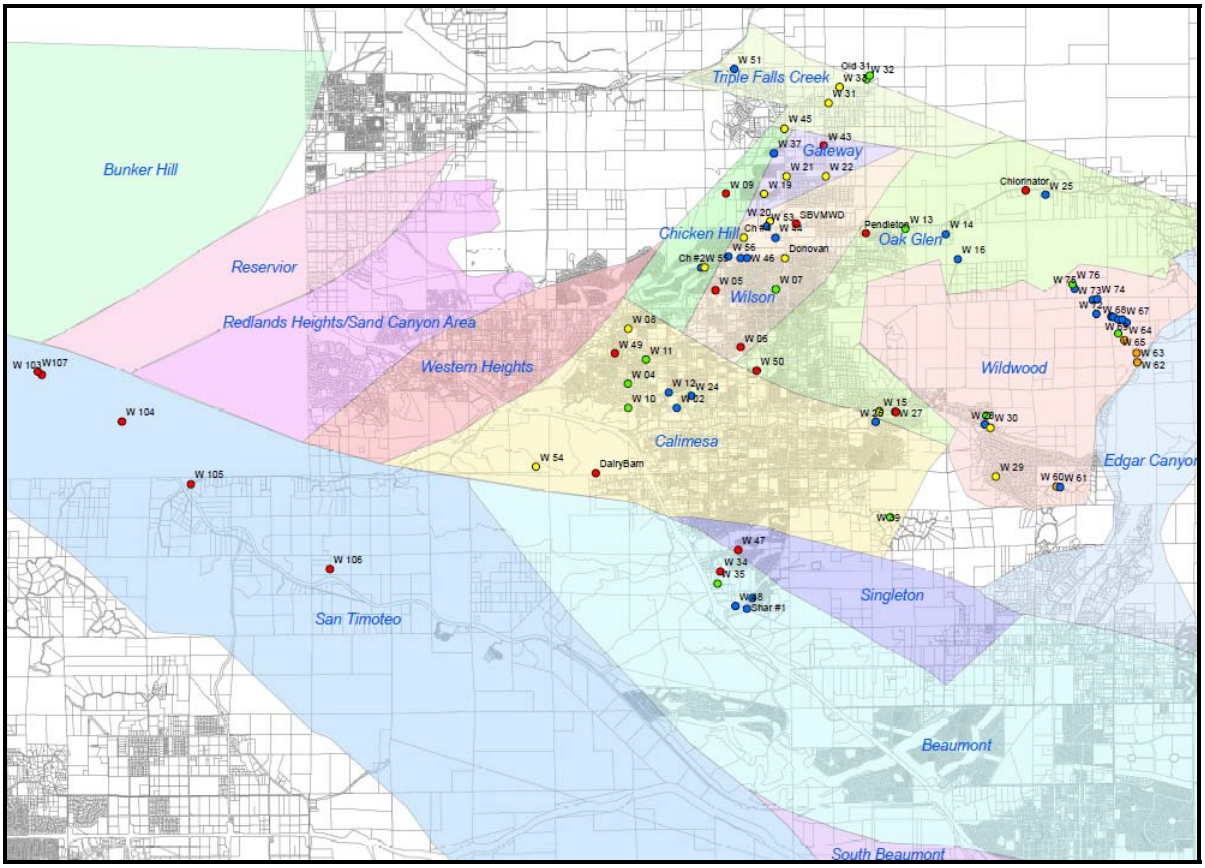
1. Calimesa Basin
2. Chicken Hill Basin
3. Gateway Basin
4. Oak Glen Basin
5. Triple Falls Basin
6. Western Heights Basin
7. Wilson Basin
8. Wildwood Basin

Other local groundwater basins operated and managed by the Yucaipa Valley Water District include: the San Timoteo Groundwater Basin; the Beaumont Groundwater Basin and the Singleton Groundwater Basin. The Department of Water Resources recognizes the Beaumont and San Timoteo Basin as one basin, the San Timoteo Subbasin.

TABLE 12-28
YUCAIPA VALLEY WATER DISTRICT GROUNDWATER BASINS

Groundwater Basin	Acres	Square Miles
Beaumont	17,035.48	26.62
Calimesa	6,627.40	10.36
Chicken Hill	1,043.65	1.63
Edgar Canyon	5,187.77	8.11
Gateway	570.05	0.89
Oak Glen	5,193.71	8.12
Sand Canyon	3,849.26	6.01
San Timoteo	31,131.42	48.64
Singleton	2,033.47	3.18
Triple Falls	1,632.30	2.55
Western Heights	2,601.53	4.06
Wildwood	4,980.71	7.78
Wilson	1,846.08	2.88

FIGURE 12-3
GROUNDWATER PRODUCTION BASINS OF THE YUCAIPA VALLEY WATER DISTRICT



The following charts illustrate the variations of groundwater production by each subbasin within the Yucaipa Valley Water District Sphere of Influence.

TABLE 12-29
SUMMARY OF GROUNDWATER BASIN HYDROGEOLOGIC CHARACTERISTICS

Parameter	Yucaipa Basin	Beaumont Basin	San Timoteo Basin
Basin Area	41 square miles[b]	26 square miles[a],[c]	49 square miles
Groundwater formations	Alluvium[a],[d]	Alluvium[a],[d]	Alluvium[a],[d]
Depth of water bearing sediments	700 - 1000 feet[a],[e]	700 - 1,000 feet[a],[e]	700 - 1,000 feet[a],[e]
Typical Specific Yields	4 - 22% [a],[f] (10% average)	3 - 35 %[a] (11% average)	3 - 35%[a] (11% AVERAGE)
Groundwater Storage Capacity	800,000 af[a],[g]	1,000,000 AF[a], [h]	1,000,000 AF[a], [h]
Estimated Long-term Natural Recharge	8,000 AFY[a], [i]	8,560 AFY[a], [j]	> 20,000 AFY[a], [k]
Current Approximate Extractions	14,000 AFY[a]	16,000 AFY[a], [l]	Not Available[m]
Dominant Recharge Source	Stream flow infiltration[a], [n]	Stream flow infiltration and artificial Recharge[a]	Stream flow infiltration, subsurface inflow, and deep percolation[a]
Artificial Recharge Potential	7000-14,000 AF[a]	200,000 AF[a], [o]	Not Available[m]
Typical Well Yields	200 gpm (average)[a]	200 gpm (average)[a]	Not Available[m]
Maximum Well Yields	2,800 gpm[a]	2,000 gpm[a], [p]	Not Available[m]
Typical Municipal Well Depths	500 feet[a]	500 feet[a]	500 feet[a]
Typical Range of TDS concentration	200 - 630 mg/l[a]	170 - 340 mg/l[a]	Not Available[m]
Average Groundwater TDS	320 mg/l[a]	250 mg/l[a]	Not Available[m]

Notes:

(a) From DWR Bulletin No. 118 (*California's Groundwater*, 2004).

(b) Water bearing sediments cover approximately 29 square miles (19,000 acres) within the Yucaipa Basin. The total watershed area of the basin is approximately 39 square miles (25,000 acres).

(c) Water bearing sediments cover approximately 26 square miles (16,000 acres) within the Beaumont Basin. The total combined watershed area of the Beaumont and San Timoteo Basins is approximately 114 square miles (73,000 acres).

(d) Includes recent alluvium from Holocene age, older Pleistocene age alluvium, and alluvial deposits within the eroded and folded Pliocene-Pleistocene age sediments of the San Timoteo Formation.

(e) San Timoteo Formation depths extend t1500 to 2000 ft, but water-bearing sediments limited to depths of 700 to 1000 ft.

(f) Lowest specific yields are reported northeast of Yucaipa. In the southern part of the basin, specific yields are estimated to range from 6 to 22 percent, with an average of 10 percent.

(g) Storage capacity estimates reported by DWR Bulletin No. 118 range from approximately 800,000 AF to 1.2 million AF.

(h) Total combined storage capacity of the Beaumont and San Timoteo Basins is estimated at 2,000,000 by DWR. Approximately one-half of this capacity is in the Beaumont Basin and one half is in the San Timoteo Basin.

(i) Approximate long-term yield presented in DWR Bulletin No. 118 on the basis of studies performed in 1980. A 1988 study performed for YVWD entitled Perennial Yield of the Yucaipa Groundwater Basin (David Keith Todd Consulting Engineers, 1988) estimated a long-term yield of approximately 7,900 AFY.

(j) Long-term yield estimated at 8,650 AFY, as reported in the FY2005-2006 annual Beaumont Basin Watermaster Report.

(k) Estimate not available. Recharge estimates for the combined San Timoteo/Beaumont Basins provided within DWR Bulletin No. 118 suggest that the total long-term recharge to the San Timoteo Basin is in excess of 20,000 AFY.

(l) Annual production has ranged from 14,100 AFY to 19,300 AFY during the period FY2003-04 and FY2006-07, as reported in the FY 2006-07 Beaumont Basin Watermaster report.

(m) Estimated value not available for the San Timoteo Basin.

(n) Infiltration from Yucaipa, Wilson, and Oak Glen Creeks, predominantly in the north and eastern portions of the basin.

(o) Estimated by Beaumont Basin Watermaster in annual report for FY2006-07.

(p) Based on pumping data presented in the Beaumont Basin Watermaster FY 2006-2007 Annual Report, adjusted by an assumed 70 percent operational factor.

Table 12-30 provides information on groundwater pumped, by basin, by YVWD.

TABLE 12-30
GROUNDWATER VOLUME PUMPED (AF)

Basin name(s)	Metered or Unmetered?	2006	2007	2008	2009	2010
Yucaipa Groundwater Basin	Metered	8,839	8,076	6,281	5,840	6,625
Beaumont Groundwater Basin	Metered	2,027	1,682	572	504	672
San Timoteo Groundwater Basin	Unmetered	0.0	0.0	0.0	0.0	0.0
Percentage of Total Water Supply		79.5%	65.4%	48.1%	45.1%	60.1%
Percentage of Potable Water Supply		87.5%	74.5%	53.0%	49.3%	65.8%

12.7.2.1 Yucaipa Groundwater Basin

The Yucaipa Groundwater Basin is located in the Santa Ana Subregion of the South Coast Hydrologic Region within the County of San Bernardino. The Yucaipa Basin has a surface area of 25,300 acres (DWR Bulletin 118) and a capacity of 800,000 AF (Groundwater Water Recharge/Recovery Project, 2009). The Basin is bounded on the north by the San Andreas fault, on the west by the Redlands fault and the Crafton Hills, on the south by the Banning fault, and on the east by the Yucaipa Hills.

Alluvial deposits in the subbasin are divided into older and younger units. The Holocene age younger alluvium consists of unconsolidated boulders, gravel, sand, silt, and clay (Moreland 1970). This unit forms a thin veneer and is mostly above the water table (Moreland 1970). The middle to late Pleistocene age older alluvium consists of boulders, gravel, sand, silt, and clay (Moreland 1970), and holds the primary source of groundwater in the subbasin. Clays present in this section are due to weathering and soil formation during accumulation of the deposits (DPW 1934).

The 2003 California Department of Water Resources Bulletin 118-2003 identifies the Basin in overdraft. Although the basin is defined in an overdraft state; water levels are at or near historic highs (California's Groundwater Bulletin 118, 2004). Moreover, the Yucaipa Valley Water District has decreased groundwater pumping dramatically since 2007 attributable to the supplemental supply of State Water Project Water and the use of recycled water. Prior to importing State Water Project water, YVWD pumped 3,585 million gallons per year (YVWD 2005 Production Report). Incorporating supplemental water has reduced pumping by 50% (YVWD 2010 Production Report).

The Yucaipa Groundwater Basin is subdivided into several subbasins including the: Calimesa, Chicken Hill, Gateway, Oak Glen, Singleton, Triple Falls Creek, Western Heights, Wildwood and Wilson Subbasin.

- Calimesa Subbasin - The Calimesa subbasin along with the Wilson Creek subbasin are the two largest subbasins within the Yucaipa Groundwater Basin. Total capacity of the Calimesa subbasin is estimated at 175,000 acre-feet (Groundwater Water Recharge/Recovery Project, 2009). The safe yield of the basin is small compared to this storage capacity, and is estimated at 1,500 million gallons per year, or

4,600 AFY (Wildermuth, 2005). Groundwater is typically reached within 225-350 feet below the land surface (Wildermuth, 2005).

- Chicken Hill Subbasin - The Chicken Hill subbasin is located in the northwest portion of the Yucaipa Basin. The subbasin has a total of five wells with two of those wells being active as of December 2010.
- Gateway Subbasin - The Gateway subbasin is located in the northern portion of the Yucaipa Basin. Currently there are no active wells in use as of December 2010. The Gateway subbasin contains three abandoned wells and one monitoring well.
- Oak Glen Subbasin - The Oak Glen Subbasin is located in the Northeastern portion of the Yucaipa Basin while extending south between the Wilson and Wildwood Subbasins as it straddles the mountain range to the east. The subbasin represents one of the largest subbasins within the Yucaipa Basin. Five active wells, four monitoring wells and one inactive well are located within this subbasin.
- Singleton Subbasin - The Singleton Subbasin is located in the Southern most portion of the Yucaipa Valley Water District's service area within the City of Calimesa in Riverside County. The subbasin containing one monitoring well
- Triple Falls Creek Subbasin - The Triple Falls Creek subbasin is the northernmost subbasin within Yucaipa Valley Water District's service area. This subbasin contains one active well, two abandoned wells and two inactive wells just outside of the subbasin boundary.
- Western Heights Subbasin - The Western Heights Subbasin is located in the western portion of the Yucaipa Basin and extends into the City of Redlands. The basin contains no wells utilized by the Yucaipa Valley Water District. Groundwater extraction from this basin is generally from the Western Heights Mutual Water Company.
- Wildwood Subbasin - The Wildwood Subbasin is located in the eastern portion of the Yucaipa Basin and possesses the largest amount of active wells utilized by YVWD totaling 11 active wells. Additional well status results in three inactive wells, four standby and two abandoned wells.
- Wilson Subbasin - The Wilson subbasin is one of the largest subbasins within the Yucaipa Basin. The Wilson Subbasin has a large storage capacity (estimated at 125,000 acre-feet by Carollo, 1985). The safe yield of the subbasin is small (estimated at 1,500 AFY (Wildermuth, 2005) compared to the large storage capacity. Existing depth to groundwater in the Wilson basin average roughly 175 to 425 feet below ground surface (Wildermuth, 2005).
- The additional spreading of water in the Wilson Creek spreading grounds and utilization of the Oak Glen Creek stream channel for recharge has contributed to increased groundwater levels. By maximizing the existing spreading grounds the capability exists to spread from 7,000 to 14,000 acre-feet of surface water annually into the Yucaipa Basin.

With ample storage, ability to recharge the basin through in-lieu use of surface water and by direct spreading surface waters and apparent flexibility in managing groundwater levels without subsidence problems, the Yucaipa Basin could be conjunctively managed both to meet normal annual demands and to meet water resource needs in the event of a drought and curtailment or loss of inconsistent surface water supplies, resulting in a highly reliable water supply. Current goals are to secure agreements to not pump beyond the long-term safe yield of the basin by utilizing the imported surface water supplemental supply.

YVWD has cooperated with the U.S. Geological Survey and the San Bernardino Valley Municipal Water District to construct real-time groundwater monitoring wells in the area. Groundwater level data indicates that the groundwater levels in the Wilson subbasin have increased in 2009 and 2010. This is attributed to the additional supplemental supply of State Water Project water (Groundwater Water Recharge/Recovery Project, 2009).

The Yucaipa Valley Water District is currently involved with development of a groundwater management plan (AB 3030 Plan) to proscribe collective management of the Yucaipa Groundwater Basin. With ample storage, ability to recharge the basin by spreading surface waters and apparent flexibility in managing groundwater levels without subsidence problems, the Yucaipa Basin could be conjunctively managed both to meet normal annual demands and to meet water resource needs in the event of a drought and curtailment or loss of inconsistent surface water supplies, resulting in a highly reliable water supply. Current goals are to secure agreements to not pump beyond the safe yield of the basin, supplementing supplies with imported surface.

12.7.2.2 San Timoteo Groundwater Basin

The San Timoteo Groundwater Basin is located downstream from the Yucaipa and Beaumont groundwater basins in northeastern Riverside County and Southeastern San Bernardino County. This groundwater basin covers approximately 29 square miles. Groundwater movement in the San Timoteo Groundwater Basin trends from the east to the west. Surface water in the area is drained by San Timoteo Creek.

As with the Yucaipa and Beaumont Basins, groundwater is found in alluvium and in the San Timoteo Formation to depths of 700 to 1000 feet. Estimates for total groundwater storage capacity within the basin vary. On the basis of information presented by DWR (2004), the total groundwater capacity in the basin appears to be approximately 1,000,000 AF.

On the basis of information presented in DWR Bulletin No. 118, it appears that long-term recharge to the San Timoteo Basin is significantly higher than recharge within either the Yucaipa or Beaumont Basins (estimated to be on the order of 20,000 AFY). No significant long-term decline in depths to groundwater is reported in the San Timoteo Basin.

The San Timoteo Basin is not adjudicated, and reliable estimates of total groundwater pumping within the San Timoteo basin are not available. Because water table elevations within the basin have not declined (and remain near the surface in some areas along San Timoteo Creek), it may be concluded that long-term pumping within the basin is less than the long-term average recharge.

12.7.2.3 Beaumont Groundwater Basin

The Beaumont Basin is located in northwestern Riverside County, south of the Yucaipa Basin. While this basin is located outside of San Bernardino Valley Municipal Water District's jurisdiction, the basin eventually drains to San Timoteo Creek, a tributary of the Santa Ana River and covers approximately 26 square miles. Groundwater elevations generally slope from the northeast to southwest in the basin.

Groundwater within the basin is predominantly found in Holocene age alluvium and in the San Timoteo Formation. While the San Timoteo Formation extends to depths in excess of 1500 feet, water bearing sediments within the Beaumont Basin exist to depths of 700 to 1000 feet. Estimates for total groundwater storage capacity within the basin vary. The Beaumont Basin storage capacity is estimated at approximately 1,000,000 AF. (Beaumont Basin Watermaster, 2007)

In February 2004 the San Timoteo Watershed Management Authority filed a judgment adjudicating the groundwater rights in the Beaumont Basin and assigned the Beaumont Basin Watermaster with the authority to manage the groundwater basin. The Beaumont Basin Watermaster is comprised of managers from the Beaumont Cherry Valley Water District, City of Banning, City of Beaumont, South Mesa Mutual Water Company and Yucaipa Valley Water District. The Beaumont Basin Watermaster reports a long-term yield for the Beaumont Basin of 8,560 AFY. Extraction within the basin is limited to a long-term average of 16,000 AFY (160,000 AF over 10 years). During the past four years, the Watermaster reports annual groundwater extractions in the basin that range from 14,100 AFY to 19,300 AFY. Yucaipa Valley Water District pumping from the Beaumont basin was approximately 527 AFY during FY 2008/2009

In February 2004 the San Timoteo Watershed Management Authority filed a judgment adjudicating the groundwater rights in the Beaumont Basin and assigned the Beaumont Basin Watermaster with the authority to manage the groundwater basin (Judgment Pursuant To Stipulation Adjudicating Groundwater Rights in the Beaumont Basin, 2004). The adjudication of the Beaumont Basin has defined overlying and appropriator pumping rights and also allows for supplemental water to be stored and recovered from the basin.

TABLE 12-31
APPROPRIATORS OF THE BEAUMONT BASIN

Producer	Average Production During 1997-2001 (AFY)	Share of Safe Yield Allocated to Appropriators	Initial Estimate of Appropriate Rights[(a)] (AFY)	Controlled Overdraft and Supplemental Water Recharge Allocation[(b)] (AFY)	Operating Yield (AFY)
City of Banning	2,170	31.43%	882	5,029	5,910
City of Beaumont	0	0.00%	0	0	0
Beaumont Cherry Valley Water District	2,936	42.51%	1,193	6,802	7,995
South Mesa Water Company	862	12.48%	350	1,996	2,346
Yucaipa Valley Water District	938	13.58%	381	2,173	2,554
Total	**6,906**	**100.00%**	**2,805**	**16,000**	**18,805**

The Beaumont Basin, under this adjudication, is considered to be in a condition of overdraft with assigned maximum annual overlying production rights of 8,650 acre-feet. The Yucaipa Valley Water District has a right to an operating yield of 2,552 acre-feet annually from the Beaumont Basin, which consists of 381 acre-feet of appropriative right and 2,173 acre-feet of Controlled Overdraft and Supplemental Water Recharge Allocation. The District can deliver amounts in addition to the 2,552 acre-feet as supported from overlying water right holders.

12.7.2.4 Groundwater Basin Management

The two basins that have not been adjudicated within the Yucaipa Valley Water District's service area are the Yucaipa Basin and San Timoteo Basin. Under present management conditions the basins are expected to have controlled overdraft conditions. Prior to 2007, the Yucaipa Basin was considered in overdraft due to over extractions by the Yucaipa Valley Water District, South Mesa Water Company and Western Heights Mutual Water Company. In 2005, the Yucaipa Valley Water District began treating State Water Project water through a newly constructed Yucaipa Valley Regional Filtration Facility. This has provided an opportunity to alleviate pumping from local supplies increasing groundwater levels to 70 feet in one well location in the Wilson subbasin (USGS Groundwater Monitoring Levels).

As the table 12-30 indicates, groundwater pumping was elevated in 2006 and 2007. During the peak temperature months, demands exceeded groundwater supply. It is unlikely the District could meet 100 percent of the full summer water demands solely with groundwater. Utilizing data from 2007 which represented a single-dry year, the monthly production exceeded the well capacity for four months. In a more realistic scenario, the available production during maximum day pumping would be 85% of the total well capacity. Table 12-32 projects groundwater volumes projected to be pumped for years 2015 to 2035.

TABLE 12-32
GROUNDWATER – VOLUME PROJECTED TO BE PUMPED (AF)

Basin name(s)	Metered or Unmetered?	2015	2020	2025	2030	2035
Yucaipa Groundwater Basin	Metered	5,829	5,829	5,829	5,829	5,829
Beaumont Groundwater Basin	Metered	125	125	125	125	125
San Timoteo Groundwater Basin	Metered	384	384	384	384	384
Percentage of Total Water Supply		42.5%	39.4%	36.5%	33.8%	31.2%
Percentage of Potable Water Supply		47.5%	45.5%	43.5%	41.5%	39.5%

Table 12-33 presents anticipated groundwater supplies in a normal, single-dry, and multiple dry year.

TABLE 12-33
GROUNDWATER SUPPLIES - NORMAL, SINGLE-DRY, AND MULTIPLE DRY YEARS (AF)

	2015	2020	2025	2030	2035
Normal Year	12,100	16,100	17,700	17,700	17,700
Single Dry Year	11,500	13,100	14,700	14,700	14,700
Multiple-Dry Year	12,424	13,850	15,450	15,450	15,450

12.7.3 Local Surface Water Resources

The watershed of the Yucaipa Valley extends from the crest of the Crafton Hills in the northwest, to the crest of the Yucaipa Ridge of the San Bernardino Mountains to the north east, and the Yucaipa Hills in the south east to the Badlands of San Timoteo Canyon to the south west. Drainage in the area is by many small ephemeral creeks including: Yucaipa Creek, Oak Glen Creek, Wilson Creek, Birch Creek, and San Timoteo Creek. These creeks all begin in the upland areas to the northeast and drain down to the southwest through Live Oak Canyon to San Timoteo Creek which is a tributary of the Santa Ana River.

Stream gauge data and observations by District staff reveal that the creeks are generally dry during most of the year except along their upland reaches where small sustained year-round flows may occur. Irregular flows do occur occasionally along the entire reach of the creeks during both high intensity summer cloudbursts and long duration seasonal winter storms. In both cases, the stream flows generated from these conditions tend to be very flashy, with water levels changing rapidly over time and large amounts of unconsolidated sediments being scoured from the upper reaches and washed downstream. The largest volume of these flow events occur during the winter storm season from November through April.

The main tributaries in the sphere of influence of the YVWD are considered relatively small by comparison to the Santa Ana River and Mill Creek directly to the north of YVWD. Drainage courses in the boundary of YVWD include Wilson Creek, Oak Glen Creek, Yucaipa Creek, and San Timoteo Wash.

YVWD has operated and maintained a surface water resources from the Oak Glen area since the early 1900's. The existing Oak Glen Surface Water Filtration Facility continues to produce a steady flow of high quality drinking water for the Yucaipa Valley.

In 2000, local surface water supplies provided 6.3% of the total water demands of YVWD. By 2010, this source supplied 3.0% of total water demands.

TABLE 12-34
LOCAL SURFACE WATER SUPPLIES - NORMAL, SINGLE-DRY, AND MULTIPLE DRY YEARS (AF)

	2015	2020	2025	2030	2035
Normal Year					
Oak Glen	*350*	*350*	*350*	*350*	*350*
Single Dry Year					
Oak Glen	*175*	*175*	*175*	*175*	*175*
Multiple-Dry Year					
Oak Glen	*175*	*175*	*175*	*175*	*175*

12.7.4 Recycled Water

YVWD is a proactive advocates of recycled water use and implementation in the Inland Empire. The Board of Directors have adopted planning guidelines that require the use of recycled water for front and rear yard irrigation of new development throughout the YVWD service area.

Recycled water is currently used to provide up to 10 percent of Yucaipa Valley Water District's overall water demands. A significant portion of YVWD's projected future water demands will be met with the use of recycled water for irrigation of golf courses, parks, landscape areas and front-/rear-yard irrigation of residential dwellings.

To serve the projected water demands, YVWD has implemented an extensive dual water distribution system. The dual water system includes a drinking water conveyance system to convey potable water to customers and a separate recycled water distribution system to convey recycled water to customers.

As water becomes an increasingly precious commodity, Yucaipa Valley Water District is stepping up its recycling efforts so that more water can be reused on golf courses, school grounds, roadside medians and for other landscaping purposes -- even the front and rear yards of new homes.

To achieve this objective, YVWD recently expanded and enhanced the sewer treatment plant, or water recycling facility, to a capacity of 8 million gallons per day. YVWD's water recycling facility is one of a relatively small number of sewer treatment facilities in the country to be equipped with microfiltration filters and ultraviolet light for disinfection. The treatment process used to transform our sewer water to recycled water is very similar to some drinking water treatment plants. This provides high quality recycled water that is also extremely safe.

The new microfiltration technology is important because it sets the stage for YVWD to install a reverse osmosis system at the water recycling facility to further purify our recycled water. While the microfiltration system does not allow particles larger than 0.1 micrometer to pass through the filtration system and become part of the recycled water supply, a reverse osmosis system will create a physical barrier to stop salt molecules while allowing water molecules to pass through. The resulting water supply will be very similar to the purity of rainwater.

This state-of-the-art technology commonly used by desalinization plants to convert ocean water to drinking water will soon be used by YVWD to meet strict water quality objectives set by the Regional Water Quality Control Board. With the requirement to produce such exceptionally high quality recycled water, YVWD has developed plans to use the recycled water for the direct benefit of the community.

With the construction of the reverse osmosis facility, YVWD will be required to construct a new pipeline to dispose of the salts removed by the treatment system. The Yucaipa Valley Brineline will be a 15-mile pipeline that will connect to an existing brine disposal pipeline located in San Bernardino. Ultimately the brine solution created by YVWD, which is about 1/10th as salty as sea water, will be conveyed to the Orange County Sanitation District to be added to their ocean outfall.

TABLE 12-35
RECYCLED WATER – WASTEWATER COLLECTION AND TREATMENT (AF)

Type of Wastewater	2005	2010	2015	2020	2025	2030	2035
Wastewater Collected and Treated to Advanced Tertiary in the Yucaipa Valley Water District Service Area	3,896	4,130	4,550	4,946	5,483	6,026	6,403
Percentage of Wastewater Collected that Meets Recycled Water Standard	100%	100%	100%	100%	100%	100%	100%
Volume of Water Disposed by Land Outfalls	2,016	2,016	2,016	2,016	2,016	2,016	2,016

YVWD began treating wastewater in 1986. The sewer collection system has been expanded steadily over the years to provide additional recycled water supplies to the community. In the 2005 UWMP, YVWD projected delivering 1,900 AF of recycled water by year 2010; YVWD delivered 2,016 AF of recycled water in 2010.

The Wochholz Regional Water Recycling Facility was recently expanded to a 6.7 MGD wastewater treatment facility. The ultimate facility is expected to be capable of treating up to 10 MGD of wastewater and includes the following major components:

- Septage Receiving Station - A septage receiving facility provides septage haulers an efficient location to discharge septage wastes for treatment at the plant.
- Headworks Grit Removal System - The grit removal system has been recently upgraded and enlarged to increase grit removal efficiency and reduce the impacts of grit on downstream treatment processes.
- Primary Equalization Tank - The primary equalization tank provides YVWD with the ability to stabilize daily flow variations and hold additional wastewater during peak periods for a steady-state treatment flow throughout the treatment facility.
- Secondary Treatment System - The secondary treatment system has been equipped with nitrogen removal technology that is used to provide compliance with the total inorganic nitrogen limits of 6 mg/l.
- Advanced Tertiary Treatment Facilities - Equalized flows are treated with microfiltration technology commonly used in the beverage and drinking water industry. The recycled water product from this treatment process is significantly more pure than the tertiary filters previously used by YVWD. This treatment technology is a precursor to the reverse osmosis treatment that will be added to the treatment process.
- Recycled Water Storage Reservoir - A 4.0-MG recycled water storage reservoir and pump station is used to store the recycled water prior to plant effluent.

Recycled water used in the service area of the YVWD is currently produced at the Yucaipa Valley Regional Water Filtration Facility. YVWD will be constructing a pipeline, reservoir and booster station to complete the recycled water system to the Wochholz Regional Water

Recycling Facility. When this facility is completed in January 2014, YVWD will be capable of using recycled water to meet the irrigation demands within the service area.

Currently, recycled water produced from the Wochholz Regional Water Recycling Facility is discharged into San Timoteo Creek. YVWD provides about 300-350 million gallons (920-1,075 acre feet) of recycled water per year. Since recycled water is used for irrigation purposes, the actual amount of recycled water fluctuates each year and is highly dependent on weather conditions.

Recycled water demands are met by treating the backwash water at the Yucaipa Valley Regional Water Filtration Facility. By 2014, YVWD will be adding another supply of recycled water to the Regional Conveyance System from the Wochholz Regional Water Recycling Facility. This source will contribute an additional 3.5 MGD, or approximately 1,300 million gallons per year. As the Henry N. Wochholz Regional Water Recycling Facility (WRWRF) expands, the amount of recycled water generated from this facility will increase.

The WRWRF has a rated capacity of 6.67 mgd. Currently, treated effluent is conveyed through a land outfall and discharged to San Timoteo Creek. Three customers along the existing land outfall are receiving recycled water for irrigation purposes. Delivery amounts are expected to grow to about 6,700 acre-feet by 2020 or about 24 percent of total agency water demands. Ultimately, YVWD expects to deliver about 8,000 AFY of recycled water.

The potential exists for YVWD to increase the amount of water that is beneficially reused within the service area from the existing WRWRF facility. Additional environmental analysis on the potential impacts to San Timoteo Creek and surrounding areas is required before this can occur.

Yucaipa Valley Water District (District) is continuing to expand its non-potable water system to meet increasing demand in the system. The increasing demand is a result of additional golf courses, schools, community parks, and other non-potable water users, as well as increased residential development. The existing (Phase I) non-potable water system went into operation in 2002, and currently makes use of two predominant water sources – including raw water from the State Water Project and local surface water from Mill Creek. Upon completion of the Phase II system improvements, YVWD will increase its recycled water supply by up to 8.0 million gallons per day of recycled water from the WRWRF. YVWD also plans the incorporation of seasonal storage into the overall system operation with the construction of a series of aquifer storage and recovery projects. YVWD will use both spreading basins and direct injection to address its seasonal storage needs. In the vicinity of the WRWRF, a series of aquifer storage and recovery wells will be constructed. In addition to these wells, YVWD will also have several spreading basins located throughout its service area for groundwater recharge with excess non-potable water. In the winter, when irrigation demands are low, YVWD will store excess recycled water from various water sources at its disposal, in the underlying groundwater basin. During high demand periods, groundwater recovery wells located adjacent to the WRWRF and various spreading basins, will be used to supplement the system as additional recycled water supply. YVWD also has several non-potable water wells throughout its service area that may also be used to recover stored water from the underlying groundwater basin. The recovered water supplies will be combined to serve the maximum day recycled water demand during high demand periods of the year. (Preliminary Design Report for the Phase II Non-Potable Water Distribution System Expansion, 2008)

In addition, YVWD is currently conducting an environmental review to possibly extend the current Regional Recycled Water Conveyance System to the YVWD's southernmost service area boundary. This extension would involve the construction of a 24" recycled water pipeline, approximately 18,500 linear feet (3.5 miles) through the City of Calimesa. The purpose of the pipeline is to provide recycled water service to customers within YVWD and provide surplus recycled water to neighboring water agencies such as the Beaumont Cherry Valley Water District and the City of Banning.

12.7.5 Impacts of Water Quality on Supply

Federal law requires states to establish water quality standards for all water bodies within the state's jurisdiction. A water quality standard is comprised of three parts: 1) the beneficial uses that apply to the water body; 2) the water quality criteria needed to protect those uses; and 3) an antidegradation policy to protect water quality that is already better than the applicable criteria. The Porter-Cologne Water Quality Control Act (Division 7, "Water Quality", of the California Water Code) establishes similar requirements in state law.

YVWD has identified TDS in recycled water as a water supply issue. Of particular concern to YVWD are the limitations set for total dissolved solids or typical salt (salinity) constituents in the recycled water supply. To utilize the recycled water in the upper portion of the Santa Ana Watershed, the quality of the recycled water needs to meet an average quality of 330 mg/l for the Beaumont Management Zone; 370 mg/l for the Yucaipa Management Zone; or 400 mg/l for the San Timoteo Management Zone. In all cases, the amount of salt, or total dissolved solids of the recycled water, is more than the water quality objective set by the Regional Water Quality Control Board. These water quality objectives severely constrain the District from utilizing recycled water without additional water treatment.

While these stringent objectives will result in additional costs YVWD and its customers, these standards are actually relaxed based on a demonstration that less restrictive water quality objectives provide a benefit to the people of California. The most protective water quality objectives are established as the "antidegradation" values and will be triggered if certain commitments are not fully achieved.

YVWD continues to meet the commitments, however. In November 2010, the YVWD learned of the lack of assimilative capacity in the San Timoteo Management Zone which now requires the immediate implementation of reduced total dissolved solids to a five-year average of 400 mg/l in order not to trigger the even more restrictive and costly antidegradation objectives.

In order to contend with the groundwater salinity issues, YVWD has began construction of a Water Supply Renewal Project including the construction of reverse osmosis membrane treatment at the Yucaipa Valley Regional Water Filtration Facility (YVRWFF) for the treatment of imported water supplies in compliance with the basin plan objectives set by the Regional Water Quality Control Board. Additionally, the YVWD will be adding reverse osmosis membrane treatment equipment at the Wochholz Regional Water Recycling Facility (WRWRF) to produce high quality recycled water in compliance with the basin plan objectives.

12.7.6 Transfers, Exchanges, and Groundwater Banking Programs

The Santa Ana-Mill Creek Cooperative Water Project Agreement permits YVWD to exchange up to 32 cfs of water from the State Water Project for Mill Creek water when available. This source and exchange concept is highly variable, and largely depends on local hydrology and participation by other local water purveyors. Generally, the lack of storage limits the ability to use this water during dry years.

YVWD is in the process of investigating the ability to participate in dry year purchase programs of water supply arranged by the Department of Water Resources, through the San Bernardino Valley Municipal Water District and the San Gorgonio Pass Water Agency, or pursue individual District initiated transfers as may be necessary and as supplies may be available. YVWD has not initiated nor does it have plans to initiate any short or long-term transfers for water at this time.

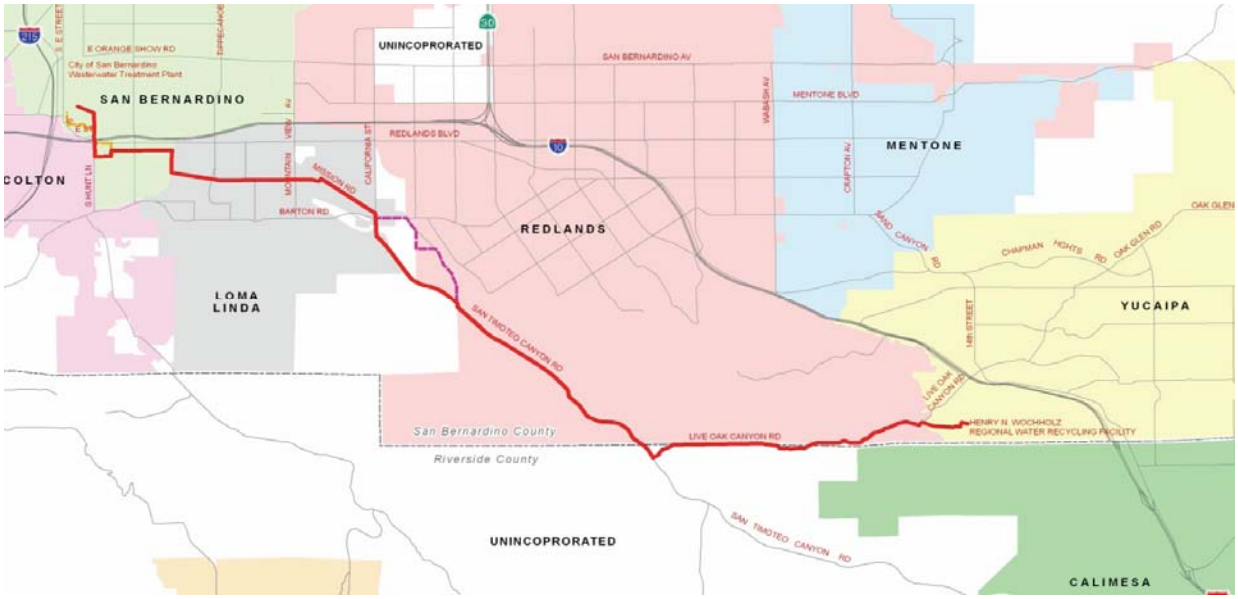
12.7.6.1 Desalinated Water Opportunities

YVWD's Water Supply Renewal Project includes the construction of reverse osmosis membrane treatment at the Yucaipa Valley Regional Water Filtration Facility (YVRWFF) for the treatment of imported water supplies in compliance with the basin plan objectives set by the Regional Water Quality Control Board. Additionally, YVWD will be adding reverse osmosis membrane treatment equipment at the WRWRF to produce high quality recycled water in compliance with the basin plan objectives.

Both of these advanced treatment systems are dependent upon the completion of the Yucaipa Valley Regional Brineline, a 15-mile extension of the Santa Ana Regional Interceptor to the WRWRF (see Figure 12-4).

The Yucaipa Valley Regional Brineline began construction in September 2010. The 15-mile pipeline will connect the Wochholz Regional Water Recycling Facility with the eastern termination point of the Santa Ana Regional Interceptor owned and operated by the Santa Ana Watershed Project Authority. From the termination point, the At this point the brineline extends another 73 miles traversing San Bernardino, Riverside and Orange counties to Orange County Sanitation District Wastewater Treatment Plant No. 2 in Huntington Beach, where the salt water is treated and discharged to the Pacific Ocean.

FIGURE 12-4
YUCAIPA VALLEY REGIONAL BRINELINE ALIGNMENT



12.8 Water Shortage Contingency Plan

Water conservation is more than just restricting water use. Water conservation is the efficient use of water through conservation measures and increased efficiency. Implementing water conservation allows water utilities to avoid the cost of building additional drinking water facilities and reasonably expands the use of water resources. Water conservation is one of the last options available for communities to continue the long tradition in America of cheap, available water. Inexpensive and readily available water supplies are often taken for granted while in many parts of the world this luxury is unique.

The objective of Water Shortage Contingency Planning is to establish actions and procedures for managing water supply and demands during water shortages. The plan would help YVWD maintain essential public health and safety and minimize adverse impacts on economic activity, environmental resources and the region's lifestyle.

This plan complements YVWD's Emergency Response Plan. That plan is an emergency plan that defines decision making authority in emergencies and creates specific emergency action plans for a number of systems, security, and management procedures.

As part of the Emergency Response Plan, YVWD would provide a unified incident command center as a disaster response command team at the Administration Building. These team leaders will determine policies and strategies for handling major disasters. Individual departments, working on a common incident, will coordinate their field efforts through the incident command structure.

While water supply disruptions can occur for a variety of reasons, a weather related water shortage, or drought, is one category of particular importance to YVWD for reasons described below. Droughts are naturally occurring but unpredictable weather events of varying frequency, duration and severity. In the Yucaipa Valley, historical data indicates a high probability of short term and/or multi-year drought conditions.

This region is generally faced with a relatively dry summer period with very little rainfall occurring during the summer months. Most of the annual 16 inches of precipitation occurs during the fall and winter months from November to April, with most of the rainfall occurring in February. Since YVWD is typically reliant on local surface water and groundwater, the amount of precipitation received in the Yucaipa Valley is extremely important to recharge our underground water basins. Certain weather events that can affect this cycle may manifest in one or more of the following ways:

- Less than normal winter precipitation and snowpack in the Yucaipa Valley, which would limit the quantity of water available at the Oak Glen Surface Water Filtration Facility and ultimately reduce the amount of groundwater recharge.
- Unusually warm spring weather bringing with it early melting of the snowpack, resulting in early drawdown of the mountain resources.
- Unusually hot and dry summer weather which can significantly increase peak season demands.
- A delayed return of the fall rains, or a dry winter, which can delay the fall percolation refill cycle (which replenishes the underground storage reservoirs after the peak season).

Yucaipa Valley Water District's strategy for dealing with the hydrologic uncertainty associated with drought management and related emergency issues involve several components:

- To deal with hydrologic uncertainty in real-time and in longer term planning horizons, YVWD's management team uses a number of available informational and data gathering sources. One of the most valuable resources used by YVWD is the California Department of Water Resources Data Exchange Center. This center provides real time data at the California Department of Forestry Fire Station located on Highway 38.

- Through the National Oceanic and Atmospheric Administration (NOAA), YVWD regularly monitors daily weather forecasts, mid-range weather forecasts, 30- and 90-day and multi-season climate outlooks. The Internet has greatly improved access to these sources of information. For example, NOAA's El Niño Theme Page on the Internet provides a wealth of timely information on current and forecasted El Niño and La Niña conditions with enough lead time for YVWD to prepare for such events.

- YVWD's management team works closely with members of other local, state, and federal agencies including the City of Yucaipa, City of Calimesa, County of San Bernardino, County of Riverside, U.S. Army Corps of Engineers. The local agencies meet once a month to discuss several issues related to the Yucaipa Valley, including hydrologic conditions, facility and system operations, and other subjects as may be beneficial in managing our water supplies.

- Operational flexibility is key, with operating plans changing as conditions and forecasts change. Dynamic groundwater pumping and reservoir storage settings are continuously monitored and modified to best fit the daily temperature forecasts. All of the tools, information sources and communications outlined above, are needed for coordinating and decision making related to real-time operations.

12.8.1 Coordinated Planning

YVWD is a participant within the Emergency Response Network of the Inland Empire (ERNIE) a water/wastewater mutual aid network within San Bernardino and Riverside Counties. ERNIE is the first aid network that would be activated in the event of a disaster affecting water/wastewater services in the San Bernardino Valley. If the disaster overwhelms the local resources, YVWD will activate the California Water/Wastewater Agency Response Network (CalWARN) system for statewide mutual aid. YVWD will immediately contact the California Department of Public Health (CDPH), San Bernardino County Fire, Operations of Emergency Services, and the California Utilities Emergency Association to coordinate mutual aid and assistance. If local resources are overwhelmed by the disaster, the County of San Bernardino Fire Operations of Emergency Services will contact the State of California Governor's Office of Emergency Services for assistance.

12.8.2 Actions to Prepare for Catastrophic Interruptions

No single strategy can be created which will meet the needs of YVWD for all emergency scenarios. Emergencies initially require quick and immediate response. Once an assessment is made as to how long it will take to restore the system, the immediate response strategy may change if it appears that the repair process will be lengthy.

The strategy for most emergencies can be narrowed to measures having the most immediate impact on water supply and consumption. All needed and available back up supplies would be activated during an emergency, including the use of interties and standby water production wells.

12.8.3 Stages of Action to Respond to Water Shortages

This plan provides four stages of response based of increasing severity, as progressively more serious conditions warrant. This type of response would be appropriate to a summer drought or other long-range disruption. The four stages include a variety of communications, internal operations, and supply and demand management strategies as appropriate, and are characterized as follows:

- Advisory Stage -The public is informed as early as meaningful data are available that a possible shortage may occur.
- Voluntary Stage - If supply conditions worsen, the plan moves to the Voluntary Stage which relies on voluntary cooperation and support of customers to meet target consumption goals. During this stage, specific voluntary actions are suggested for both residential and commercial customers.

- Mandatory Stage - If the Voluntary Stage does not result in the reduction needed, the Mandatory Stage prohibits or limits certain actions. This stage would be accompanied by an enforcement plan which could include fines for repeated violation.
- Emergency Curtailment - This addresses the most severe need for demand reduction and could include a combination of mandatory measures and rate surcharges. This could be used as the last stage of a progressive situation, such as a drought of increasing severity, or to address an immediate crisis, such as a facility failure.

Recommendations about implementing the Water Conservation Implementation Plan would be made to the General Manager, based upon recommendations by District staff. The General Manager would then inform the members of the Board of actions taken or approval to implement specific strategies depending upon the severity of the situation. Prior to making a recommendation, YVWD staff would consider the following factors in making its recommendations:

- Total supply availability, including groundwater, interties, and other available water supplies;
- The rate of decline in total reservoir storage compared with the normal operating rule curve;
- Short and long term weather forecasts by the NOAA National Weather Service;
- Computer modeling of weather and demand assumption data;
- The trends and forecasts of the system's daily water demands;
- The estimated margin of safety provided by the demand reduction, compared with the level of risk assumed if no action is taken;
- The value of lost water sales revenue compared with the increased margin of reliability;
- The length of time between stage changes (abrupt starts and stops are to be avoided), and required time lags to shift administrative gears and institute program (printing, purchasing, etc.);
- Current events;
- Customer response.

12.8.3.1 Advisory Stage

Objectives

To prepare the cities, school district, developers and water users for potential water shortage thereby allowing all parties adequate planning and coordination time.

To undertake supply management actions that forestalls or minimizes the need later for more stringent demand or supply management actions.

Triggers

As presented earlier, there are a variety of weather and other conditions that may cause concern about water availability and a potential water shortage. The most fundamental weather condition that would trigger an "Advisory" would be when the winter season rainfall total is significantly less than the average annual rainfall of 18 inches per year for Yucaipa (as measured at the Mill Creek CDF Fire Station).

The Advisory would be withdrawn when projected water supplies such as State Water Project water and/or recycled water are in sufficient supply to provide normal water supply conditions to YVWD's customers.

Public Message

The potential exists for lower than normal supply; conditions may return to normal or, later on, we may need to reduce consumption. We'll keep you informed."

Advisory Stage Goal

Voluntary conservation measures resulting in a 5% - 10% reduction in water use, which can generally be achieved by reducing residential landscaping, and irrigation use.

Advisory Stage Action Plan:

- Brief elected officials
- District staff to issue a water conservation press release/newsletter during the summer months as a reminder to customers. See the sample press release as provided in Attachment "A".
- District adds text to monthly billing to remind customers of water conservation practices. An example would be:
- "During the summer months, please remember not to water between the hours of 10:00am and 8:00 pm. Thank you for conserving".
- District staff to regulate construction meter activity. This may include restricting quantity of water used and the issuance of new construction meters.
- District staff to monitor and record potable water irrigation practices at golf courses, parks and schools to effectively regulate the use of limited potable supplies.
- District staff to encourage the use of recycled water as a means to remain drought tolerant and promote continuous water conservation measures.
- Weekly planning meetings to include updates on water supply issues and alternatives to prepare for the next stage of the implementation plan.
- Intensify ongoing media education effort about the water system, particularly relationship of weather patterns to supply and demand; provide up to date data and implications for water use, if known.

YVWD Internal Operations for Advisory Stage:

- Prepare to establish purveyor "hotline", a frequently updated recording providing latest information and supply and demand data.
- Consult with other major customer groups, e.g., parks departments, landscape industry, forming a committee if needed, to assist the shortage advisory group to define message and provide feedback on utility actions.
- Initiate status report to entities with special interests, e.g., large water users especially landscape and nursery industry, parks, major water using industries.
- Prepare public information materials explaining the Water Conservation Implementation Plan stages and range of actions; prepare "Questions and Answers" for all customer groups, including those who may be planning new landscaping projects.
- Intensify coordination with other regional water suppliers to learn what conditions they are projecting for their systems.
- Evaluate ability, resources, plans to move into Voluntary stage; as appropriate, begin preparatory measures.
- Intensify data collection actions (storage reservoirs, wells and power supply) and monitoring weather forecasts.
- Intensify YVWD's computer modeling runs of projected supply, storage and demand scenarios.
- Intensify supply side management techniques to optimize existing sources.
- Assess current water main flushing and reservoir cleaning activities to determine whether they should be accelerated to be completed prior to the peak season or reduced to conserve supply.
- Assess water quality in reservoirs and distribution system to target for correction areas that may be predicted to experience problems.
- Initiate planning and preparation for Voluntary Stage actions, including an assessment of potential staffing impacts, training needs, and communications strategies including use of web-based information.

12.8.3.2 Voluntary Stage – 10%-15% Water Shortage

Objectives

- To maintain or reduce demand to meet target consumption levels by customer voluntary actions.
- To forestall or minimize need later for more stringent demand or supply management actions.
- To minimize the disruption to customers' lives and businesses while meeting target consumption goals.
- To maintain the highest water quality standards throughout the shortage.

Triggers

- The "Voluntary Stage" is implemented when one or both of the following factors applies:
    - Supply conditions identified in the Advisory Stage have not improved.
    - Demand levels indicate the need for a more systematic response to manage the situation

- Heavy groundwater pumping coupled with higher summer temperatures means that there might be an increased likelihood that water quality problems may become an issue. Consideration will be given to potential water quality issues in defining the supply and demand management strategies.

Voluntary Stage Goal

At this stage, the goal would be to achieve a 10% - 15% reduction in water use. Customers can generally achieve this goal through constant water conservation practices.

Voluntary Stage Action Plan

YVWD staff shall meet frequently to re-evaluate the situation based on current and projected supply conditions and the season, and determine the appropriate actions and strategies. The staff will determine target consumption goals to be achieved on a voluntary basis which may be revised as necessary. (See attachment B) Based on the consumption goal, some or all of the following actions will be taken; those actions that are asterisked (*) will be considered initially for implementation if demand reductions more than 10 to 15 percent below normal are necessitated, or later if voluntary measures implemented fail to deliver targeted savings.

- Establish systematic communications with elected officials at the committee and Board level to communicate the nature and scope of voluntary measures and strategy
- District staff to evaluate whether targeted consumption levels and supply conditions warrant a rate surcharge to reinforce voluntary actions and/or to recover revenue losses*; the General Manager makes recommendation to Board members
- Prepare appropriate legislation regarding emergency surcharges, if required
- Consult with customer groups throughout the shortage to help develop public information messages and materials and to obtain feedback on utility actions
- Initiate major public information, media and advertising campaign:
    - In daily newspapers, publish and promote consumption graph that displays the goal and previous 24 hour consumption;
    - Promote consumption goals for typical households, and a percentage reduction goal for commercial customers (Attachment C contains a list of recommended actions for customers to take to reduce consumption)
    - Develop and implement a marketing plan, including paid advertising, to keep customers informed about supply and demand conditions; reinforces desired customer actions; recommends customer actions to reduce demand sufficiently;

and, depending on conditions, reminds customers that if goals are not achieved, restrictions may be necessary

- Identify what potential next steps will be to reduce demand including timing, what type of restrictions and/or surcharges will be imposed.
- Establish routine timing for press releases (e.g., every Monday morning) that provide current status and outlook; present information in standardized format that becomes familiar to media and public.
- Include water quality information in public information so that if flushing is necessary, the public understands that it is essential for water quality maintenance.
- Publicize the water supply conditions web page, which is updated regularly. Ensure the information provided covers the needs of all key interests: the public, news media and purveyors.
- Meet with landscape industry representatives to inform them of current and projected conditions; develop partnership programs and informational materials on the shortage, consumption goals, etc. for distribution by industry and utilities.
- Establish and promote "hotlines" for customers to obtain additional conservation information.
- Contact largest customers to request percentage reduction. Contact City and other public agencies to inform them of conditions and request their cooperation.
- Prepare list of commercial car wash facilities that recycle water.
- Establish regular communication mechanism to keep Department employees, especially utility account representatives and water service consultants, up to date on goals, conditions, and actions.
- Print generic postcards to acknowledge receipt of customer correspondence regarding the shortage and to inform customer that specific response is being prepared.
- Initiate remaining planning and preparation for Mandatory Stage.

YVWD Internal Operations for Voluntary Stage

- Continue actions listed in the Advisory Stage.
- Eliminate all operating system water uses determined not to be essential to maintain water quality such as pipeline flushing, reservoir overflows; complete cleaning of any reservoirs known to be vulnerable to warm weather taste and odor concerns.
- Increase water quality monitoring actions.
- Implement staffing reassignments as needed, and plan staffing changes which may be needed for the Mandatory Stage, including staff to enforce mandatory restrictions.

Supply and Demand Management Actions

- Issue a request that non-recirculating fountains be turned off*

- Restrict construction meters to only essential purposes*
- Activate any existing interties to increase supply availability*
- Request that Fire Department limit training exercises that use water.
- Request that City agencies eliminate washing fleet vehicles unless recycling car washes are used.
- Request that hosing sidewalks, driveways, parking lots, etc. be limited to situations that require it for public health and safety.
- Have YVWD field personnel "tag" observed obvious water waste such as hoses without shutoff nozzles, gutter flooding, etc. with notice that informs customer about the supply conditions and need to conserve.
- Evaluate ability to accelerate or enhance or expand long term conservation programs; implement as appropriate.

12.8.3.3 Mandatory Stage – 15% - 30% Water Shortage

Objectives

- To achieve targeted consumption reduction goals by restricting defined water uses.
- To ensure that adequate water supply will be available during the duration of the situation to protect public health and safety.
- To minimize the disruption to customers' lives and businesses while meeting target consumption goals.
- To maintain the highest water quality standards throughout the shortage.
- To promote equity amongst customers by establishing clear restrictions that affect all customers.

Triggers

The General Manager, with approval from the Board of Directors, would approve progression to this stage if goals established in the Advisory and Voluntary Stage have not been met, and additional action is needed. The specific restrictions imposed during the mandatory stage would be determined based on the season of the year, targeted demand levels, and other considerations previously mentioned. Variations of the specific restrictions may be applied based on water supply conditions. For example, lawn watering restrictions may simply consist of time of day restrictions; or, if conditions warrant, lawn watering could be restricted to certain times of day and allowed only once a week.

Public Message

"It is necessary to impose mandatory restrictions to reduce demand based on the current water shortage. We are continuing to rely on the support and cooperation of the public to comply with these restrictions but need the certainty and predictability of restricting certain water uses in

order to ensure that throughout the duration of this shortage an adequate supply of water is maintained for public health and safety."

Mandatory Stage Goal - Mandatory conservation measures resulting in a 10% - 15% reduction in water use.

Mandatory Stage Action Plan

- YVWD staff will make recommendations regarding the nature, scope and timing of restrictions to the members of the Water Conservation Committee. YVWD staff will need to determine that the water supply and demand management strategies will not result in unacceptable water quality degradation.
- The General Manager recommends to the Board of Directors to implement the Mandatory Stage conservation measures and other appropriate actions.
- The Board adopts a resolution on mandatory restrictions and, if needed and not already in place, emergency surcharges.
- The public is informed about the nature and scope of the mandatory restrictions through a press conference, paid advertising and other means, including direct mail.
- The enforcement mechanisms, rate surcharges, target consumption goals, projections for how long restrictions will be in place and the reasons for imposing restrictions will also be identified, as will the possible consequences if goals are not met.
- Any exemptions from restrictions will be clearly identified.
- In communicating mandatory restrictions to the public, a clear distinction will be made between lawn/turf watering and watering gardens and ornamental plantings. The type and amount of watering allowed will be clearly defined.
- A "Customer Hotline" will be set up to report violations of restrictions.
- Customers who irrigate with private wells will be urged to install signs to let the public know that private well water is being used.
- Communication actions from the Advisory and Voluntary stages will be continued and enhanced.
- Plans will be made to move into the fourth stage - Emergency Curtailment - and to begin preparatory measures as appropriate

YVWD Internal Operation Plan for Mandatory Stage

- Continue appropriate actions from previous stages
- Finalize and implement procedures for exemptions from restrictions and/or emergency surcharges.
- Finalize and implement enforcement procedures for restrictions including highly visible "Water Watchers".
- Increase water quality monitoring actions at storage reservoirs.

Supply and Demand Management Actions

Overall supply conditions will be considered at regular meetings by District staff and the members of the water conservation committee in evaluating which restrictions to impose.

Watering Restrictions

The following are several possible approaches to watering restrictions. The nature of the restrictions used will depend on the situation, and may change as severity of the situation changes.

- Prohibit all watering during the day, for example between 6:00 a.m. and 9:00 p.m.
- Limit all watering to a specific number of days per week or per month. This choice will depend on target consumption goals, the time of year and the extent to which watering is occurring, and how much demands have already decreased.

Other Restrictions

- Prohibit use of any ornamental fountain using drinking water for operation or make-up.
- Prohibit car washing except at commercial car wash facilities that recycle water.
- Rescind water construction meter hydrant permits.
- Prohibit washing of sidewalks, streets, decks or driveways except as necessary for public health and safety.
- Limit pressure washing of buildings to situations that require it as part of scheduled building rehabilitation project (e.g., painting).
- Prohibit water waste including untended hoses without shut-off nozzles, obvious leaks and water running to waste such as gutter flooding and sprinklers/irrigation whose spray pattern unnecessarily and significantly hits paved areas

Exemptions from Water Use Restrictions

- Lawn Watering Ban Exemption - Newly installed lawns may be exempted from a ban if the procedures listed below are followed. Those wishing to use this exemption would need to contact YVWD office in advance of the exemption being granted, providing their name, address, phone number, size of lawn and type of watering system. This information would allow YVWD to quantify the amount of water used under this exemption and to spot check for compliance. The procedures relating to the exemption and the requirements of the exemption would be clearly outlined at the time of the ban. The following procedures are subject to change:
    - Each applicant would be mailed a packet stating the requirements.
    - Once the requirements are met, an authorization packet would be mailed to the customer including a sign to be posted indicating that YVWD's requirements are being complied with.

- New lawns must be properly installed, meaning that two inches of organic soil amendment, such as composted yard waste or biosolids, is cultivated into the top six inches of existing soil, at a minimum.
- New lawns must be watered according to guidelines to be provided in the packet mentioned above.
- For purposes of this exemption, "new lawn" refers to a lawn newly installed during the current year only. Over seeded or otherwise renovated lawns would not be exempt.

- In the event that the shortage continues to worsen and the Emergency Curtailment Stage is invoked, this exemption would be revoked. It would also be revoked on a case-by-case basis if the rules stated above are not followed, or in the case of a water system emergency. Monitoring and enforcement are at the discretion of YVWD. The existence of an exemption to a watering ban would be announced early in the response process, for example when the Advisory Stage is invoked.
- Automatic Irrigation System Exemption - Users of automatic irrigation systems may be exempt from certain mandatory watering restrictions if proper procedures are followed - but not from a total watering ban. This approach allows an alternate path to achieving savings due to the precision with which such systems can be operated, but is not intended to be a loophole to avoid the need to curtail use. For example, if only 30 minutes of lawn watering is allowed per week, automatic irrigation systems which meet the criteria would be allowed to water based on a certain percentage of evapotranspiration (ET), such as 50%, instead of the time-limit based restriction. [Note: ET is a factor calculated according to climatic data, which is commonly used for lawn watering in commercial applications; ET data would be made available on YVWD's web page and in alternate formats.] In the event of a total watering ban, these users would also be prohibited from watering (unless other safety-based criteria are met, as stipulated in the Water Conservation Implementation Plan).
- The procedures to be met include:
    - The area must be audited by an Irrigation Auditor as certified by the Irrigation Association (list from the IA to be available on request).
    - Irrigation efficiency of the system must be at least 62.5%, as defined by the Irrigation Association (includes both system distribution uniformity and management practices).
    - A baseline irrigation schedule based on historical ET must be provided to the system's owner/operator.
    - The owner/operator must evaluate actual ET on at least a weekly basis and change the irrigation schedule if warranted by the ET index.
    - The owner/operator must contact the utility to provide the name of the auditor, date of inspection and the efficiency rating, as well as the name, address and phone number of the contact person for the site being watered, prior to using the exemption
    - Time of day restrictions, such as watering prohibited between 6:00 am and 8:00 pm, would have to be met.
    - The system must have a functioning rain-shutoff device.
    - Watering limitations stipulated by YVWD would need to be followed. The limitations would be stated as a percent of ET, so that, for example, users who

meet the above requirements would be able to water based on 50% of ET (the specific percent amount would be decided upon at the time the restriction is announced, depending on the supply outlook). YVWD's website (www.yvwd.dst.ca.us/conserve.htm) would be regularly updated to provide the information needed for those watering according to this exemption; the information would be available through other means as well.

- Other Exemptions - For purposes of dust control, water may be applied to construction areas or other areas needing to comply with air quality requirements. If recycled water is available, consider requiring or promoting that it be used for dust control, if feasible.
- Ball fields and play fields may be watered at the minimum rate necessary for dust control and safety purposes.
- YVWD will exempt customers with special medical needs such as home dialysis from any emergency surcharge provided individual customers notify YVWD of such a need

Water Supply Actions

- If not already implemented, activate interties and any other alternative sources of supply.

12.8.3.4 Emergency Curtailment Stage – 30% - 50% Water Shortage

At this stage, YVWD recognizes that a critical water situation exists. Without additional significant curtailment actions, a shortage of water for public health and safety will be imminent. No prior emergency in YVWD's history fits this description.

This stage is characterized by two basic approaches. First, increasingly stringent water use restrictions are established and enforced. Secondly, significant rate surcharges are used to encourage customer compliance. While a rate surcharge may be implemented in either the Voluntary or Mandatory stages, a surcharge is a key component to the success of this stage and previous surcharge may be increased if appropriate.

Emergency Curtailment Action Plan

- Continue all previous, applicable actions.
- Define the problem to the public as an emergency and institute formal procedures to declare an emergency.
- Inform customers of the rate surcharge and how it will affect them. Provide information on an appeal process.
- Coordinate with police and fire departments requesting their assistance in enforcing prohibition of water waste.
- Inform customers that taste and odor water quality problems may occur with system-wide reduced water consumption.
- Inform customers about possible pressure reductions and problems this may entail.
- Define and communicate exemptions for medical facilities and other public health situations.

YVWD Internal Operations for Emergency Curtailment Stage

- Continue and enhance "Water Watcher" patrols.
- Continue actions listed in prior stages.
- Curtail fire flow and pipeline testing unless it can be shown to be essential to protect the immediate public health and safety.
- Further enhance water quality monitoring actions

Supply and Demand Management Actions

Rate surcharges would be implemented to encourage customer compliance with the restrictions, as follows:

- Commercial Customers - Commercial, multifamily and industrial users would be asked to reduce water use by a set percentage of their consumption during the same period in the previous year. Emergency rate surcharges would be established to provide an additional incentive to reduce water use. It is YVWD's intention to establish a multi-tiered structure. This "variable block approach" would allow for different surcharge rates based on the individual customer's consumption during the same period in the previous year. For example, if YVWD were to target desired reduction of 85% from the previous year's consumption in that period, any consumption between 0 and 85% would be billed at one rate and any consumption over 85% would be billed at another, much higher rate. In this way, the targeted reduction amount and resulting surcharges would be customized around each customer's water use patterns, while still resulting in a steep surcharge for consumption in excess of the target amount for each block.
- A billing system modification would be needed to allow YVWD to accomplish this. If this has not been done by the time it may be needed, a simple across-the-board rate surcharge would be applied.
- Residential Customers - A multi-tiered, increasingly steep rate structure would be implemented for residential customers (includes single-family dwellings and duplexes). While there are differences in household size, there is more similarity in residential domestic water use than there is in commercial water use.
    - All lawn and turf irrigation would be prohibited
    - Make recycled water available for street cleaning, construction projects, landscape irrigation, dust control, etc.
    - Require that all fire fighting agencies discontinue the use of water in training exercises until emergency is over.
    - Rescind all construction meter or fire hydrant permits.

12.8.3.5 Short-Term Emergency Curtailment Plan

Although many of the demand reduction measures employed would be similar to those used during a progressive, weather-related shortage, short-term emergencies are unique because of a lack of preparation time and the urgency of immediate, large-scale demand reductions. Each emergency scenario is different, but most of them require major curtailment actions by customers. Also, unlike a drought, some emergencies would be localized, requiring demand reduction for only a limited geographic area.

Strategies for dealing with emergencies have been developed based on lessons learned from previous water utility events, other utility experiences, and a sorting of measures based on specific criteria.

Throughout water shortage events, consistent conservation messages and information on appropriate demand reduction measures should be delivered to water users through the media and by direct contact. Although exact demand reduction goals may not always be met by water users, the water demands during short-term emergencies must be curtailed enough to be beneficial and avoid more serious water shortages.

There are several criteria by which to decide which demand management measures are appropriate to initially reduce demand during an emergency:

- Timing can the measure(s) or action(s) deliver the necessary savings in the necessary timeframe, i.e., are immediate savings needed or can the system support a gradual reduction in demand;
- Magnitude of savings will the measure produce enough savings to make a meaningful difference i.e., reduce demand to the level the impaired water system can handle;
- Does the action make any impact at the time of year that the emergency occurs, i.e., banning lawn watering will have little impact in the winter months;
- How severe are the cost implications of the measure to the customer, including local business and industry.

12.8.4 Financial Impacts of Actions During Shortages

It is difficult to precisely gauge the revenue and expenditure impacts of water shortages. The drought contingency plan provides for both prohibitions, water use allotments, and penalty pricing for exceeding allotments, the ultimate revenue impacts will be based upon a mix of responses to these requirements. Additionally, weather can be a factor as well. Customers may find it more difficult to meet allocations during hot weather where a desire to maintain landscaping uses at a higher level exists, and therefore more customers may find themselves paying penalty rates.

For planning purposes, it is assumed that District conservation goals are met at each stage and that revenue losses are proportional to the commodity rate revenue not received, exclusive of penalty rates, plus revenue losses due to particular prohibitions. It is also assumed that additional District expenses for implementing the plan would be offset by excess use penalties.

Based upon YVWD's current fiscal situation, impacts during Stages I and II could be absorbed by District reserves without requiring a rate increase, provided the shortage condition did not persist for more than two years. Impacts beyond two years would need to be reassessed.

Stages III and beyond could require reductions in the pay-as-you-go portion of YVWD's Capital Improvement Program. Additionally, deferring non-critical maintenance items and filling some personnel vacancies would be considered. Should revenue loss impacts begin to affect essential District operations, a temporary emergency surcharge on the base water rate could be imposed to fund District operations.

12.8.5 Mechanism to Determine Reductions in Water Use

YVWD accounts are fully metered, accounting for actual consumption will be afforded for each customer against any allocation. Well production records and imported water purchases will also be tallied to discern overall production amounts versus conservation goals. Collectively, these data will be analyzed to assess any need for alterations to the Water Shortage Contingency Plan.

12.8.6 Minimum Water Supply Available During Next Three Years

Comparing supplies to demand projections provided in section 12.5, YVWD has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

TABLE 12-36
MINIMUM WATER SUPPLY AVAILABLE DURING NEXT THREE WATER YEARS (AFY)

	2011	2012	2013
Purchased Imported Water	5,000	5,000	5,000
Groundwater	11,500	11,500	11,500
Surface Water	175	175	175
Transfers/Exchanges	0	0	0
Recycled Water	4,550	4,550	4,550
Total Supply	**21,225**	**21,225**	**21,225**

Note:
From Tables, 12-27, 12-33, 12-34, and 12-35.

12.9 Supply And Demand Comparisons

The UWMP Act requires urban water suppliers assess water supply reliability by comparing total projected water use with the expected water supply over the next twenty years in five year increments. The Act also requires an assessment of single-dry year and multiple-dry years. This section presents the reliability assessment for YVWD's service area.

12.9.1 Normal Water Year

The Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. This section summarizes YVWD's water supplies available to meet demands over the 25-year planning period during an average/normal year and compares them to demands for the same period. In Table 12-37, below, demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Table 12-37 demonstrates that YVWD anticipates adequate supplies for years 2015 to 2035 under Normal conditions.

12.9.2 Single-Dry Year

The single-dry year is generally the lowest annual runoff for a water source in the record. The single-dry year may differ for various sources. This section summarizes YVWD's water supplies available to meet demands over the 25-year planning period during a single-dry year and

compares them to demands for the same period. In Table 12-38, below, demands are assumed to be 10 percent greater in a single-dry year than during a normal year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Table 12-38 demonstrates the YVWD anticipates adequate supplies for years 2015 to 2035 under single-dry year conditions.

12.9.3 Multiple-Dry Years

The multiple-dry year is generally the lowest annual runoff for a three year or more consecutive period. The multiple-dry year period may differ for various sources. This section summarizes YVWD's water supplies available to meet demands over the 25-year planning period during a multiple-dry year period and compares them to demands for the same time frame. In Table 12-39, below, demands are assumed to be 10 percent greater in a multiple-dry year than during an average year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions. Table 12-39 demonstrates that YVWD anticipates adequate supplies for years 2015 to 2035 under multiple-dry year conditions.

TABLE 12-37
PROJECTED AVERAGE/NORMAL YEAR SUPPLIES AND DEMANDS (AFY)

	2015	2020	2025	2030	2035
Existing Supplies					
Wholesale Imported	9,692	10,547	11,539	12,564	13,829
Groundwater	12,100	14,500	14,500	14,500	14,500
Local Surface Water	350	350	350	350	350
Recycled Water	4,550	4,946	5,483	6,026	6,403
Transfers/Exchanges	0	0	0	0	0
Total Existing Supplies	26,692	30,343	31,872	33,440	35,082
Planned Supplies					
Wholesale Imported	0	0	0	0	0
Groundwater	0	1,600	3200	3200	3200
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Total Planned Supplies	*0*	*1,600*	*3,200*	*3,200*	*3,200*
Total Existing and Planned Supplies	***26,692***	***31,943***	***35,072***	***36,640***	***38,282***
Demands without Additional Conservation	20,828	21,760	22,744	23,643	24,453
Conservation	2,083	4,352	4,549	4,729	4,891
Total Adjusted Demands	18,745	17,408	18,195	18,914	19,562
Surplus/Deficit in Normal Year	7,947	14,535	16,877	17,726	18,720
Difference as % of Supply	30%	46%	48%	48%	49%
Difference as % of Demand	42%	83%	93%	94%	96%

Notes:
From Tables 12-15, 12-26, 12-33, 12-34, and 12-35

TABLE 12-38
PROJECTED SINGLE-DRY YEAR SUPPLIES AND DEMANDS (AFY)

	2015	2020	2025	2030	2035
Existing Supplies					
Wholesale Imported	5,000	5,000	5,000	5,000	5,000
Groundwater	11,500	11,500	11,500	11,500	11,500
Local Surface Water	175	175	175	175	175
Recycled Water	4,550	4,946	5,483	6,026	6,403
Transfers/Exchanges	0	0	0	0	0
Total Existing Supplies	21,225	21,621	22,158	22,701	23,078
Planned Supplies					
Wholesale Imported	0	0	0	0	0
Groundwater	0	1,600	3,200	3,200	3,200
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Total Planned Supplies	*0*	*1,600*	*3,200*	*3,200*	*3,200*
Total Existing and Planned Supplies	***21,225***	***23,221***	***25,358***	***25,901***	***26,278***
Demands without Additional Conservation	22,911	23,936	25,018	26,007	26,898
Conservation	2,291	4,787	5,004	5,201	5,380
Total Adjusted Demands	20,620	19,149	20,015	20,806	21,519
Surplus/Deficit in Single-Dry Year	605	4,072	5,343	5,095	4,759
Difference as % of Supply	3%	18%	21%	20%	18%
Difference as % of Demand	3%	21%	27%	24%	22%

Notes:
From Tables 12-15, 12-27, 12-33, 12-34, and 12-35
In dry periods, demands assume to be 10% above Normal Years Demands

TABLE 12-39
PROJECTED MULTIPLE-DRY YEAR SUPPLIES AND DEMANDS (AFY)

		2015	2020	2025	2030	2035
Multiple-Dry Year First Year Supply	Supply Totals[(a)]	23,349	23,221	25,358	25,901	26,278
	Demand Totals[(b)]	20,620	19,149	20,015	20,806	21,519
	Difference	2,729	10,748	12,315	12,151	11,904
	Difference as % of Supply	12%	46%	49%	47%	46%
	Difference as % of Demand	13%	86%	94%	88%	83%
Multiple-Dry Year Second Year Supply	Supply Totals[(a)]	23,349	23,221	25,358	25,901	26,278
	Demand Totals[(b)]	20,620	19,149	20,015	20,806	21,519
	Difference	2,729	10,748	12,315	12,151	11,904
	Difference as % of Supply	12%	46%	49%	47%	46%
	Difference as % of Demand	13%	86%	94%	88%	83%
Multiple-Dry Year Third Year Supply	Supply Totals[(a)]	23,349	23,221	25,358	25,901	26,278
	Demand Totals[(b)]	20,620	19,149	20,015	20,806	21,519
	Difference	2,729	10,748	12,315	12,151	11,904
	Difference as % of Supply	12%	46%	49%	47%	46%
	Difference as % of Demand	13%	86%	94%	88%	83%

Notes:
(a) From Tables 12-15, 12-27, 12-33, 12-34, and 12-35
(b) In dry periods, demands assume to be 10% above Normal Years Demands

Chapter 13

City of Colton

Chapter 13: City of Colton

13.1 Description of Agency

Colton Water Department provides water service for domestic consumption, fire protection, and irrigation customers within its service area. Colton, which was incorporated in 1887, is approximately 50 miles east of Los Angeles, bounded by the City of San Bernardino on the north and northeast, the City of Grand Terrace and unincorporated areas of Riverside County on the south, the City of Loma Linda on the east, and the City of Rialto on the west (Figure 13-1).

Colton's service area covers approximately 90 percent of the City of Colton. It includes 14 square miles in the City of Colton and approximately 0.8 square mile of unincorporated area in San Bernardino County. Colton's service area is within the boundaries of Valley District.

Colton's water supply is comprised entirely of groundwater extracted from the San Bernardino Basin Area (Bunker Hill Basin portion), the Rialto-Colton Basin, and the Riverside Basin (Riverside North Basin portion). Colton does not currently import water in order to meet the demands of its service area.

Colton currently serves a population of approximately 47,400. An estimate of future population growth for 2015 to 2035 was prepared for the Colton water service area based on SCAG projected populations for 2008, 2020, and 2035 presented in the *2012 Integrated Growth Forecast*. Table 13-1 shows the anticipated growth rate for the City of Colton. The water service area is approximately 90 percent of the size of the City of Colton; population projections for the water service area are shown in Table 13-2.

TABLE 13-1
POPULATION PROJECTIONS FOR JURISDICTIONS IN COLTON WATER DEPARTMENT SERVICE AREA

Jurisdiction	2008	2020	2035	Growth Rate 2008-2020	Growth Rate 2020-2035	Data Source
Colton	51,640	62,220	73,266	0.0157	0.0110	SCAG *Integrated Growth Forecast for 2012*

TABLE 13-2
POPULATION - CURRENT AND PROJECTED

	2010	2015	2020	2025	2030	2035	Data Source
Service Area Population	47,429	50,919	54,667	57,823	61,161	64,692	SCAG

13.2 Climate

Colton's service area is located within the South Coast Air Basin. The basin is a 6,600 square mile area bounded by the Pacific Ocean to the west, and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties.

Temperatures in the area vary between highs in excess of 100°F during summer months and lows below 40°F during winter months. Annual rainfall averages approximately ten inches. The monthly average temperatures, monthly average rainfall, and standard monthly average ETo are shown in Table 13-3.

TABLE 13-3
CLIMATE

	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo (inches)	2.49	2.91	4.16	5.27	5.94	6.56
Average Rainfall (inches)	3.22	3.25	2.86	1.29	0.47	0.09
Average Temperature (ºF)	52.4	54.5	56.7	61.0	65.5	71.5

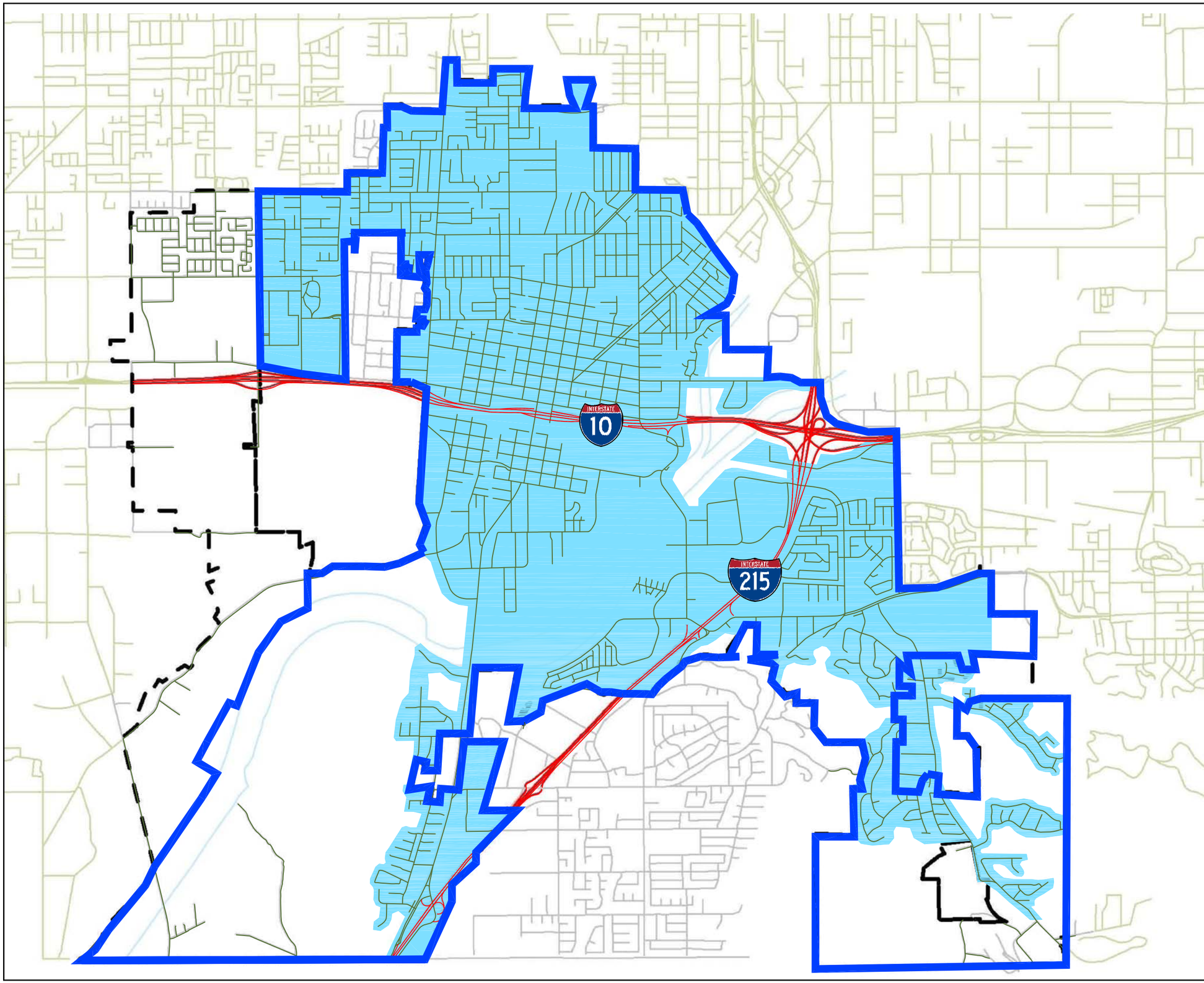
	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average ETo	7.22	6.92	5.35	4.05	2.94	2.56	56.37
Average Rainfall (inches)	0.04	0.15	0.33	0.71	1.32	2.38	16.10
Average Temperature (ºF)	77.7	77.8	74.0	66.4	58.5	53.2	63.9

Note:
(a) Rainfall and temperature data were obtained from the "San Bernardino 047723" station, as provided on the National Weather Service Western Regional Climate Center website at http://www.wrcc.dri.edu for the period of record January 1, 1893 to October 22, 2010. Evapotranspiration (ETo) data were obtained from the U.C. Riverside Station as provided on the California Irrigation Management Information System (CIMIS) website at http://wwwcimis.water.ca.gov, as of December 17, 2010.

13.3 Historical Water Use

13.3.1 Historic Water Deliveries

Colton categorizes customers as residential, commercial, industrial, landscape and “other” uses. Water deliveries for each customer class in 2005 and 2009 are summarized in Tables 13-4 and 13-5, respectively. On average, 56 percent of water deliveries are for residential use and 39 percent are for commercial use, while the remaining 5 percent is split between industrial (3 percent) and other uses (2 percent). Landscape water use has not been separately tracked since 2005.



Legend

City Boundary

Service Areas

Distribution Areas

Kennedy/Jenks Consultants

Regional Urban Water Management Plan
San Bernardino Valley

CITY OF COLTON
WATER SERVICE AND DISTRIBUTION AREAS

K/J 1089014.00
April 2011
Figure 13-1

TABLE 13-4
WATER DELIVERIES – ACTUAL 2005

	2005				
	Metered		Not metered		Total
Water Use Sectors	# of Accounts	Volume (AFY)	# of Accounts	Volume (AFY)	Volume (AFY)
Single family	8,664	6,651			6,651
Multi-family					
Commercial	1,078	4,903			4,903
Industrial	153	586			586
Institutional/governmental					
Landscape	22	78			78
Agriculture					0
Other					0
Total	**9,917**	**12,218**	**0**	**0**	**12,218**

TABLE 13-5
WATER DELIVERIES – ACTUAL 2009

	2009				
	Metered		Not metered		Total
Water Use Sectors	# of Accounts	Volume (AFY)	# of Accounts	Volume (AFY)	Volume (AFY)
Single family	8,812	5,901			5,901
Multi-family					
Commercial	974	4,056			4,056
Industrial	149	413			413
Institutional/governmental					
Landscape	0	0			0
Agriculture					0
Other	11	32			32
Total	**9,946**	**10,402**	**0**	**0**	**10,402**

13.3.2 Historic Sales

Colton did not have any water sales to other agencies in the years 2005 to 2009.

13.3.3 Historical Additional Water Uses

In the past, Colton has not used water for saline barriers, groundwater recharge, conjunctive use, or recycled water. However, Colton, like many water agencies, does have some unaccounted-for water use. Unaccounted-for water is the difference between the amount of water produced and the amount of water billed to customers (Table 13-6).

TABLE 13-6
HISTORIC ADDITIONAL WATER USES (AF)

Water Use[(a)]	2005	2010
Saline Barriers	0	0
Groundwater Recharge	0	0
Conjunctive Use	0	0
Recycled Water	0	0
System Losses	421	767

Notes:
(a) Any water accounted for in Tables 13-4 and 13-5 is not included in this table.
(b) Year 2009 data used for year 2010.

Over the last five years, unaccounted water has been approximately 10 to 12 percent of produced water within Colton's system (system loss was determined by comparing overall production to overall sales for 2004 to 2009). Sources of unaccounted-for water include:

- Hydrant Testing and Flushing
- Fire Hydrant Operations by the Fire Department
- Customer Meter Inaccuracies
- Leaks from water lines

13.3.4 Total Historical Water Use

Table 13-7 below presents information on all historic water uses for the years 2005 and 2010.

TABLE 13-7
HISTORIC TOTAL WATER USE (AF)

Water Use	2005	2010
Total Water Deliveries (from Tables 13-4 and 13-5)	12,218	10,402
Sales to Other Water Agencies	0	0
Additional water uses and losses (from Table 13-6)	421	767
Total	**12,639**	**11,169**

Note:
(a) Year 2009 data used for year 2010.

13.4 Existing and Targeted Per Capita Water Use

The Water Conservation Bill of 2009 (SBX7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Bill of 2009 provides the regulatory framework to support the statewide reduction in urban per capita water use described in the 20 by 2020 Water Conservation Plan. Consistent with SBX7-7, each water supplier must determine and report its existing baseline water consumption and establish future water use targets in GPCD; reporting is to begin with the 2010 UWMP.

Two of the primary calculations required by SBX7-7 are:

1. Base Daily Per Capita Water Use (average GPCD used in past years)
2. Compliance Water Use Target (target gallons per capita per day in 2015 and 2020)

The Base Daily Water Use calculation is based on gross water use by an agency in each year and can be based on a ten-year average ending no earlier than 2004 and no later than 2010 (or a 15-year average if ten percent of 2008 demand was met by recycled water). Base Daily Per Capita Water Use must account for all water sent to retail customers, excluding:

- Recycled water
- Water sent to another water agency
- Water that went into storage

It is at an agency's discretion whether or not to exclude agricultural water use from the Base Daily Water Use calculation. If agricultural water use is excluded from the Base Daily Water Use calculation it must also be excluded from the calculation of actual water use in later urban water management plans. Colton does not specifically account for agricultural water use in its service area. Any incidental agricultural water use has been included in the Base Daily Water Use calculation.

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). There are four methods for calculating the Compliance and Interim Water Use Targets as set forth by Water Code section 10608.20(b):

1. Eighty percent of the urban water supplier's baseline GPCD.

2. GPCD water use estimated using the sum of the following:

    a. For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of DWR's 2016 report to the Legislature reviewing progress toward achieving the statewide 20 percent reduction target, this standard may be adjusted by the Legislature by statute.

    b. For landscape irrigated through dedicated or residential meters or connections, water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in section 490 et seq. of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992.

    c. For CII uses, a 10 percent reduction in water use from the baseline CII water use by 2020.

3. Ninety-five percent of the applicable state hydrologic region target as stated in the state's April 30, 2009, draft *20 by 2020 Water Conservation Plan*. SBMWD falls within the South Coast Hydrologic Region; the region target is 142 GPCD.

4. Provisional Method 4 developed by DWR pursuant to SBX7-7. Generally, the calculation under Method 4 is performed by reducing the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:
    a. Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "BMP Calculator".
    b. A 20 percent savings on all unmetered uses.
    c. A 10 percent savings on baseline CII use.
    d. A 21.6 percent savings on current landscape and water loss uses.

The Interim Water Use Target is set as a halfway point between the Base Daily Water Use GPCD and the 2020 Compliance Water Use Target GPCD.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95 percent of a 5-year average base gross water use from 2003 to 2010. The Maximum Allowable GPCD is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBX7-7 legislation. Specifically, if an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as their target.

13.4.1 Base Daily Per Capita Water Use

Tables 13-8 through 13-10 summarize the Base Daily Per Capita Water Use calculation for Colton. Years 1999 to 2008 have been selected for calculation of the 10-year base period, while years 2003 to 2007 have been selected for calculation of the 5-year base period. The 10-year average Base Daily Per Capita Water Use for Colton is 241 GPCD; the 5-year is 221 GPCD.

TABLE 13-8
BASE PERIOD RANGES

Base	Parameter	Value
10- to 15- Year Base Period	2008 Total Water Deliveries (AF)	12,276
	2008 Total Volume of Delivered Recycled Water (AF)	0
	2008 Recycled Water as a Percent of Total Deliveries (%)	0
	Allowable Base Period (years)[(a)]	10
	Year Beginning Base Period Range	1999
	Year Ending Base Period Range[(b)]	2008
5-Year Base Period	Year Beginning Base Period Range	2003
	Year ending Base Period Range[(c)]	2007

Notes:
(a) If the 2008 recycled water percent is less than 10%, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10% or greater the first base period is a continuous 10- to 15-year period.
(b) The ending year must be between December 31, 2004 and December 31, 2010.
(c) The ending year must be between December 31, 2007 and December 31, 2010.

TABLE 13-9
BASE DAILY PER CAPITA WATER USE, SELECTED 10-YEAR PERIOD

Sequence Year	Calendar Year	Distribution System Population[(a)]	Daily System Gross Water Use (MGD)	Annual Daily Per Capita Water Use (GPCD)
1	1999	42,173	10	234
2	2000	42,896	10	228
3	2001	43,284	10	236
4	2002	43,675	11	257
5	2003	44,071	10	238
6	2004	44,469	11	239
7	2005	44,872	11	245
8	2006	45,278	11	248
9	2007	45,687	12	258
10	2008	46,101	10	225
Base Daily Per Capita Water Use, 10-Year Average				*241*

Note:
(a) Colton's water service area population assumed to be 90 percent of the City of Colton population based on the 1990, 2000, and 2010 Census.

TABLE 13-10
BASE DAILY PER CAPITA WATER USE, 5-YEAR

Sequence Year	Calendar Year	Distribution System Population[(a)]	Daily System Gross Water Use (MGD)	Annual Daily Per Capita Water Use (GPCD)
1	2003	48,967	10	214
2	2004	49,410	11	215
3	2005	49,857	11	221
4	2006	50,309	11	223
5	2007	50,764	12	232
Base Daily Per Capita Water Use, 5-Year Average				*221*

Note:
(a) Colton's water service area population assumed to be 90 percent of the City of Colton population based on the 1990, 2000, and 2010 Census.

In order to calculate Base Daily Per Capita Water Use for past years, it was necessary to develop population estimates for past years. Under DWR's *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use*, Colton is a "Category 2" water supplier, meaning Colton's water service area does not substantially (95 percent or more) overlap with city boundaries, but a GIS map of the distribution area is available. Using GIS data it was estimated that Colton's water service area (including the small portion in the unincorporated county) is about 90 percent of the size of the City of Colton and generally overlaps the City of Colton. Population for the City of Colton was taken from the 1990, 2000, and 2010 Census, with intervening years extrapolated. It was then assumed that the water service area contained 90 percent of the City of Colton population.

Table 13-10 provides the data on the Maximum Allowable GPCD. The Maximum Allowable GPCD is based on 95 percent of the 5-year average base gross water use (221 GPCD). In this case 95 percent of the 5-year GPCD is 210 GPCD.

13.4.2 Compliance Water Use Targets

In addition to calculating base gross water use, SBX7-7 requires the retail water supplier to identify its demand reduction targets. The methodologies for calculating demand reduction targets were described above. Colton is choosing to meet SBX7-7 targets as an individual agency rather than as part of a regional alliance. Colton has selected Method 1 to calculate its 2020 Compliance Water Use Target and Interim Water Use Target. The resulting Compliance Water Use Target is 193 GPCD and the Interim Water Use Target is 217 GPCD.

As described earlier, the Maximum Allowable GPCD is 210. The Compliance Water Use Target, under Method 1 (193 GPCD) is less than the Maximum Allowable GPCD, so no adjustments to the Compliance Water Use Target are necessary.

In order to meet the water use targets prescribed by SBX7-7, Colton will have to reduce current water use by approximately 10 percent by the year 2015 and by approximately 20 percent by year 2020. The programs which Colton intends to use to achieve these conservation goals are described in Section 13.7.3.

13.5 Projected Water Use

13.5.1 Purveyor Projections

Projected water use was estimated based on population growth rates derived for each jurisdiction served by Colton, as described in Section 13.1 and shown in Tables 13-1 and 13-2. The growth rates were applied to SCAG's base year (2008) water demand to derive estimated future water demands shown in Tables 13-11 through 13-13.

TABLE 13-11
WATER DELIVERIES - PROJECTED, 2015

	2015				
	Metered		Not metered		Total
Water Use Sectors	# of Accounts	Volume (AFY)	# of Accounts	Volume (AFY)	Volume (AFY)
Single family	10,060	7,133			7,133
Multi-family					
Commercial	1,249	4,951			4,951
Industrial	121	416			416
Institutional/governmental					
Landscape	15	66			66
Agriculture					0
Other	44	274			274
Total without Conservation	11,488	12,839	0	0	12,839
Total with Conservation (assumed 10% by year 2015)	11,488	11,555	0	0	11,555

TABLE 13-12
WATER DELIVERIES - PROJECTED, 2020

	2020				
	Metered		Not metered		Total
Water Use Sectors	# of Accounts	Volume (AFY)	# of Accounts	Volume (AFY)	Volume (AFY)
Single family	10,800	7,658			7,658
Multi-family					
Commercial	1,341	5,315			5,315
Industrial	130	446			446
Institutional/governmental					
Landscape	16	71			71
Agriculture					0
Other	47	294			294
Total without Conservation	12,334	13,784	0	0	13,784
Total with Conservation (assumed 20% by year 2020)	12,334	11,027	0	0	11,027

TABLE 13-13
WATER DELIVERIES - PROJECTED 2025, 2030, AND 2035

	2025		2030		2035	
	Metered		Metered		Metered	
Water Use Sectors	# of Accounts	Volume (AFY)	# of Accounts	Volume (AFY)	# of Accounts	Volume (AFY)
Single family	11,424	8,100	12,083	8,567	12,781	9,062
Multi-family						
Commercial	1,418	5,315	1,500	5,947	1,587	6,290
Industrial	138	446	146	499	154	528
Institutional/governmental						
Landscape	17	71	18	80	19	84
Agriculture						
Other	50	294	52	329	55	348
Total without Conservation	13,046	14,226	13,799	15,422	14,596	16,312
Total with Conservation (assumed 20% by year 2020)	13,046	11,381	13,799	12,388	14,596	13,050

In addition to the demands anticipated in the SCAG growth rate, Colton has evaluated known potential developments. It is assumed all water demand from these known developments will be realized by year 2020. Total demands from known developments are shown in Table 13-14. These new developments include:

- The proposed Iron Horse Tract Homes at Reche Canyon Area. This development is proposed to include construction of 186 new homes.

- Construction of 73 homes in the Rosedale tract located in South Colton.

- Construction of 37 homes in the Crystal Ridge tract located on Reche Canyon Road.

Table 13-14 shows the estimated demands for these developments.

TABLE 13-14
ESTIMATED DEMANDS KNOWN FUTURE DEVELOPMENTS (AF), 2015 TO 2035

Development Name	2015	2020	2025	2030	2035
Iron Horse Tract Homes	115	231	231	231	231
Rosedale Tract	45	91	91	91	91
Crystal Ridge Tract	23	46	46	46	46
Total	**183**	**368**	**368**	**368**	**368**

13.5.2 Projected Sales and Other Water Uses

Colton does not anticipate any routine or single large water sales to other agencies in the future. As in the past, Colton does not anticipate future water use related to saline barriers, groundwater recharge operations, or recycled water. For the purpose of projections, unaccounted-for water is assumed to be 11 percent; this is conservative for planning purposes. Colton will continue efforts to decrease water loss and thereby reduce gallons per capita per day of water use (Table 13-15).

TABLE 13-15
FUTURE SALES AND "OTHER" WATER USES (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Sales to Other Agencies	0	0	0	0	0
Saline Barriers	0	0	0	0	0
Groundwater Recharge	0	0	0	0	0
Conjunctive Use	0	0	0	0	0
Recycled Water	0	0	0	0	0
System Losses	1,271	1,213	1,252	1,328	1,435
Total	**1,271**	**1,213**	**1,252**	**1,357**	**1,435**

Note:
(a) Any water accounted for in Tables 13-11, 13-12, and 13-13 is not included in this Table.

13.5.3 Total Projected Water Use

Table 13-16 presents information on all projected water uses for the years 2015 to 2035.

13.5.4 Water Use Projections for Lower Income Households

Senate Bill 1087 requires water use projections in an UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier. The Colton Water Department serves two jurisdictions: Colton and certain unincorporated areas in the County of San Bernardino.

TABLE 13-16
TOTAL PROJECTED WATER USE (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Total Water Deliveries (from Tables 13-11, 13-12, and 13-13)[(a)]	11,555	11,027	11,381	12,074	13,050
Projected Water Use Known Developments (from Table 13-14)	183	368	368	368	368
Sales to Other Water Agencies	0	0	0	0	0
Additional water uses and losses (from Table 13-14)	1,271	1,213	1,252	1,357	1,435
Total[(a)]	**13,010**	**12,608**	**13,001**	**13,799**	**14,853**

Note:
(a) Assumes conservation implemented per SBX7-7.

Colton's recently approved housing element was for 2000 to 2005. Based on data in the housing element, it is estimated that about 44 percent of all Colton households qualify as low-income. Table 13-17 provides an estimate of future low-income water demands. Table 13-17 assumes a similar occurrence of low-income households in the overall Colton service area as in the City of Colton. These demands are included within the water demands described in Table 13-17 and assume conservation implemented pursuant to SBX7-7.

TABLE 13-17
PROJECTIONS OF FUTURE LOW-INCOME HOUSEHOLD WATER USE (AF)

Water Use[(a)]	2015	2020	2025	2030	2035
Estimated Very Low and Low-Income Household Water Use	2,825	2,695	2,851	3,016	3,190

Note:
(a) Assumes 44% all future households in the Colton water service area qualify as "very-low" or "low" income per the definition provided in Senate Bill 1087. Assumes conservation implemented pursuant to SBX7-7.

Further, in accordance with SB 1087, Colton will not deny or condition approval of water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households unless one of the following occurs:

- Colton specifically finds that it does not have sufficient water supply;
- Colton is subject to a compliance order issued by the State Department of Public Health that prohibits new water connections; and/or
- The applicant has failed to agree to reasonable terms and conditions relating to the provision of services.

13.6 Other Factors Affecting Water Usage

Two major factors that affect water usage are weather and water conservation. Historically, when the weather is hot and dry, water usage increases. The amount of increase varies according to the number of consecutive years of hot, dry weather and the conservation activities imposed. During cool and wet years, historical water usage decreases to reflect less water

usage for exterior landscaping. Both weather effects and conservation effects are discussed below.

13.6.1 Weather Effects on Water Usage

As described in Section 13.2, Colton experiences cool winters and dry hot summers. This leads to variations in GPCD throughout the year. During the winter months (December to February) the GPCD is lower than any other time of the year; while during the summer months (June to August) the GPCD is at its highest. From the month of June to the month of August the GPCD is approximately 30 percent higher than the annual average GPCD; while from the month of December to the month of February the GPCD is approximately 40 percent lower than the annual average GPCD.

During hot, dry years the annual average GPCD has increased by approximately 9 percent from a normal year; while during a cool, wet year the GPCD has decreased by approximately 13 percent from a normal year.

13.6.2 Conservation Effects on Water Usage

In recent years, water conservation has become an increasingly important factor in water supply planning in California. The local region experienced a prolonged drought from 1987 through 1992 and was in the midst of prolonged drought conditions again until 2011. According to the Urban Drought Guidebook 2008 Updated Edition (Drought Guidebook) prepared by the State of California Department of Water Resources, Office of Water Use Efficiency and Transfers, 2006 was the hottest year on record in most of California and the United States, and 2006-2007 was the driest water year on record in many California counties. This provided impetus for implementation of conservation programs.

In June 2008, the Governor issued Executive Order S-06-08 declaring a statewide drought and directing his state agencies and departments to take immediate action to address the serious drought conditions and water delivery reductions that existed in California.

The City's water supply is subject to stress during periods of drought; however, since its source of supply is groundwater, and since it holds sufficient groundwater rights to satisfy its existing and projected demands, it is somewhat insulated from a reduction of supply during a single-dry year and multiple-dry years. To date, all of Colton's demands have been reliably met, even through the long droughts that have occurred over the past 35 years.

Drought impacts, however, increase with the length of a drought, as water stored in reservoirs is depleted and water levels in groundwater basins decline. In order to prepare for a potential water shortage, Colton has prepared a Water Shortage Contingency Plan (WSCP). The WSCP, in Section 13.9.6 herein, provides an estimate of Colton's water supply in the event of three consecutive dry years, and sets forth appropriate conservation measures and responses consistent with the varying severity of water shortages, enabling Colton to provide water for public health and safety while minimizing impacts on economic activities, environmental resources, and lifestyle within Colton.

13.7 Demand Management Measures

Specific DMMs are set forth in Section 10631(f) of the Urban Water Management Planning Act. The DMMs correspond to the 14 Best Management Practices (BMPs) identified by the CUWCC. Colton is not a signatory to the CUWCC's MOU; however, Colton is committed to implementing water conservation programs within its Service Area. The UWMP Act requires retail water suppliers to demonstrate compliance with DMMs. Different information must be provided for DMMs that have been implemented or are scheduled for implementation, versus DMMs that have not been implemented or are not scheduled for implementation, as follows.

13.7.1.1 Information Required for DMMs Implemented or Scheduled for Implementation

For DMMs being implemented or scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(f):

- Description of the DMM
- A description of the steps necessary to implement the measure
- An implementation schedule
- A description of the methods, if any, that will be used to evaluate the effectiveness of the DMMs implemented or described
- Estimate, if available, of conservation savings and the effect of the savings on the suppliers' ability to further reduce demand.

Methods to evaluate DMM effectiveness and estimates of potential conservation savings are detailed in Appendix F. Colton is now expanding its conservation programs and currently the potential for demand hardening is considered to be very low. However, as conservation devices and practices are more widely adopted in the service area, Colton will evaluate the potential for demand hardening.

13.7.1.2 Information Required for DMMs Not Implemented or Scheduled for Implementation

For those DMMs not implemented or not scheduled to be implemented within the next five years, the following information is required by Water Code Section 10631(g):

- Economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors
- A cost-benefit analysis, identifying total benefits and total costs
- A description of funding available to implement any planned water supply project that would provide water at a higher unit cost
- A description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation

13.7.2 DMMs Currently Being Implemented or Scheduled for Implementation

This section describes DMMs that Colton is currently implementing or is scheduled to implement.

13.7.2.1 Conservation Coordinator

To be in compliance with this DMM, Colton must designate a water conservation coordinator. Colton has a designated part-time conservation coordinator; this position has been filled by the City's Director of Water and Wastewater since 2003. There are no available estimates on the conservation savings resulting from the DMM or the effects of this DMM on Colton's ability to further reduce demand.

13.7.2.2 Water Waste Prohibition

To be in compliance with this DMM, a water agency can do one or more of the following:

- Enact and enforce an ordinance or establish terms of service that prohibit water waste (single pass cooling, vehicle washing, commercial laundry systems and decorative fountains).
- Enact and enforce an ordinance or establish terms of service for water efficient design in new development (irrigation and landscape design).
- Support legislation or regulations that prohibit water waste.
- Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures.
- Support local ordinances that prohibit water waste.
- Support local ordinances that establish permits requirements for water efficient design in new development.

Colton supports measures prohibiting gutter flooding, single-pass cooling systems in new connections, non-recirculating systems in all new conveyor car wash and commercial laundry systems, and non-recycling decorative water fountains. As part of their 2005 UWMP, Colton prepared a draft no-waste ordinance, An Ordinance of the City Council of the City of Colton Prohibiting the Wasteful Use of Water and Setting Forth Regulations and Restrictions on Water Use. The ordinance included the following measures:

- Prohibitions on wasting potable water, defined as follows:
  - Irrigating between the hours of 10:00 A.M. and 6:00 P.M. or in such a manner that results in runoff for more than five minutes;
  - Using potable water to wash walkways, driveways, or other paved areas, except where necessary for public health or safety;
  - Allowing potable water to escape from breaks within the customer's plumbing system for more than twenty-four hours after the customer discovers or is notified of the break;

    - Washing cars or other vehicles by hose without a shutoff nozzle and bucket (except at facilities where recycled water is used); and
    - Using potable water to clean, fill, or maintain decorative fountains, lakes, or ponds unless such water is recycled.
- Water use restrictions that are in effect during a declared Water Shortage Emergency
- Enforcement procedures for violating the above water use prohibitions and restrictions.
- Penalties for violating the above water use prohibitions and restrictions
- Appeals procedure.

Colton has full authority to adopt and enforce ordinances through their municipal codes. The no-waste ordinance was not adopted as planned in September of 2009, but Colton plans to proceed with adoption in 2014. Upon adoption, Colton will enforce the no-waste ordinance, including responding to reported or observed violations and educating and assisting the user in corrective action.

13.7.2.3 Water Loss Control (System Water Audits, Leak Detection, and Repair)

Implementation of this DMM consists of performing a water loss audit consistent with AWWA Manual 36 to quantify real and apparent losses. In addition, a water agency must also analyze the components of real and apparent loss, determine the economic value of recovering water loss, and develop a strategy to reduce loss to the extent actions are cost effective.

Colton plans to implement the standard water audit approach per Manual 36 in FY 2013. The AWWA water audit methodology will be performed annually and losses carefully monitored. To date, Colton has been conducting system water audits, leak detection and repair as necessary in order to maintain its distribution system. Meters that are 2 inches or less are repaired or replaced as-needed, if found to be operating incorrectly. Defective meters are usually found by the meter reader or by the customer service department, which reviews consumption histories.

Colton maintains a complete record and map of distribution system leaks and repairs. Analysis of this record allows pipelines and other facilities to be scheduled for replacement as part of Colton's capital improvement program. Most of the older, steel water mains throughout Colton have been replaced, greatly reducing the incidence of leaks within the distribution system. Between 2005 and 2007, approximately 37,000 linear feet of steel water pipelines were replaced with polyvinyl chloride (PVC) or ductile iron pipe (DIP). Maintenance crews are on call at all times to respond to water leaks, pipeline ruptures, and damaged facilities as needed. Continued implementation of water loss control practices and procedures is not anticipated to have an effect on Colton’s ability to further reduce demand.

13.7.2.4 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

This DMM calls for meters for all new service connections, retrofit of existing unmetered connections, and billing customers by volume of use. This DMM also requires that a water agency have a meter maintenance and replacement plan.

All of Colton's customers (residential and commercial) are metered, as are all new connections. All customers are billed with commodity rates. Colton has a meter maintenance and replacement plan. Meters are replaced either when they fail or at 10 years.

13.7.2.5 Retail Conservation Pricing

There are multiple aspects related to compliance with this DMM. This DMM calls for a volumetric rate structure, which can be uniform, tiered, allocation-based or seasonal rates as long as the volumetric portion meets minimum levels as defined (70 percent of the rate must be variable/volumetric, as opposed to fixed charges). Colton bills all domestic water accounts volumetrically, per 100 cubic feet of use, plus a monthly service based on meter size. Based on the ratio of volumetric to total charges over the past five years, Colton is implementing this DMM.

13.7.2.6 Public Information Programs

The intent of this DMM is to have customer contact through events, paid and public service advertising, mailers, billings as well as social marketing and other public information programs. A water agency must have quarterly contact with the public and media, an actively maintained website, and a list of all activities.

Colton is implementing this DMM. Colton provides informational materials to customers through bill inserts and bills showing water usage in comparison to previous year's usage. Colton plans to expand public service announcements and updates to Colton's website over the next year. The public information program encourages Colton's customers to conserve water and provides a means by which customers can measure the effectiveness of water conservation efforts. Specific program components include:

- Preparation of an irrigation guide for distribution with utility bills;
- Continuation of water bills featuring a comparison of water use for the same month during the previous year;
- Distribution of pamphlets which include specific conservation practices; facts concerning state, local, residential, and individual water consumption statistics; and waste statistics;
- Posting water conservation information and statistics on the Water Department page of the City's website (www.ci.colton.ca.us); and
- Providing water conservation information on public access television (Channel 3).

There are no available estimates on the conservation savings resulting from this DMM. However, it is not anticipated that any savings resulting from this DMM effect Colton's ability to further reduce demand.

13.7.2.7 School Education Programs

This DMM calls for a water agency to have a conservation-related school education program and provide support and educational materials to local school districts. Colton staff has collaborated with Colton Joint Unified School District staff in implementing water awareness activities in the past, but has limited this activity recently due to financial limitations. In FY 2012

the City will create a team to implement a school educational program and provide support on educational materials to local school districts.

13.7.2.8 Water Sense Specification for New Residential Development (Residential Plumbing Retrofit)

This DMM encourages replacement of old plumbing fixtures with plumbing fixtures with WSS[11] fixtures. This DMM calls for a water agency to provide incentives such as rebates, recognition programs, reduced connection fees, or have ordinances requiring residential construction meeting WSS for single and multi-family housing.

The WSS specification is a new standard and the City does not currently have any WSS development ordinance and does not offer development incentives to promote WSS fixtures for new development. The City is authorized to implement and enforce such an ordinance. Colton may evaluate whether a new development ordinance would be effective based on growth in the area or if a retrofit on resale ordinance would be more effective since many homes were built prior to 1992.

In addition, Colton will work to participate in implementation of the 2010 California Green Building Standards Code (CAL Green Code), which was adopted by the Building Standards Commission in January 2010 and went into effect in January 2011. The Code sets mandatory green building measures, including a 20 percent reduction in indoor water use, as well as dedicated meter requirements and regulations addressing landscape irrigation and design. The Code also identifies voluntary measures that set a higher standard of efficiency, which can also be adopted. It is anticipated that indoor water use in WSS homes will be 20 percent lower than in older homes that do not have WSS plumbing fixtures. The amount of water savings however, will depend on the extent of future residential development.

13.7.3 Evaluation of DMMS Not Implemented

This section describes DMMs not being implemented. For each DMM not being implemented, an explanation and cost-effectiveness analysis is provided. For the purpose of calculating the cost-effectiveness of DMMs, Colton's avoided cost of water (the cost of acquiring another unit of water is estimated as $331.00 per AF).

13.7.3.1 Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

Implementation of this DMM consists of providing leak detection assistance and landscape water surveys to an average of 1.5 percent of single family and 1.5 percent of multi-family units per year for 10 years. Once that target is met, this DMM calls for a water agency to maintain a program whereby surveys are performed in response to high-bill complaints or surveys are performed for at least 0.75 percent of single-family and multi-family units each year.

[11] WaterSense is an Environmental Protection Agency sponsored program that promotes water-efficient products, programs, and practices. In order to carry the WSS label a product must be independently certified as using 20 percent less water than average products in that category.

Colton has offered audits upon customer request since 1998; however, they have been requested infrequently. Colton is not implementing either the Residential Assistance Program DMM or the Landscape Water Survey DMM as neither of these programs is cost-effective. The cost-effectiveness analysis for these programs was combined, because from a programmatic perspective, they would likely be implemented together as a single indoor and outdoor audit. To fully implement this DMM, Colton would need to complete 130 single-family residential audits per year. Implementing and managing a program of that scope would cost the City $940 per AF of water saved. The resulting benefit-to-cost ratio of 0.29 indicates the program would not be cost effective (Table 13-18). Additional details on the cost-effectiveness calculations are provided in Appendix F.

TABLE 13-18
COST EFFECTIVENESS OF RESIDENTIAL ASSISTANCE PROGRAM

Total Costs	$51,582
Total Benefits	$15,058
Benefit/Cost	0.29
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$940
Water Savings (AFY)	55

13.7.3.2 High-Efficiency Clothes Washers (HECWs) Rebate Program

The intent of this DMM is to encourage replacement of old clothes washers with HECWs using financial incentives. Qualifying HECWs must meet an average water factor value of 5.0 or the WaterSense Specification, whichever is lower. The annual target is one percent of current single-family accounts or 1.4 percent per year of the market penetration during the first ten years of the program.

Colton is not currently implementing a HECW rebate program. Though, as shown in Table 13-19, this program is marginally cost effective, Colton does not currently have sufficient funding available to implement this program. To fully implement this DMM, Colton would need to provide approximately 88 rebates per year for ten years. Implementing and managing a program of that scope would cost Colton $16,500 per year, at a cost of $239 per AF saved (see Table 13-19). Additional details on the cost-effectiveness calculations are provided in Appendix F.

TABLE 13-19
COST EFFECTIVENESS OF HECW REBATE PROGRAM

DWR DMM Review Table	
Cost Effectiveness Summary	
Total Costs	$16,489
Total Benefits	$16,543
Benefit/Cost	1.00
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$239
Water Savings (AFY)	69

13.7.3.3 Residential Ultra Low Flush Toilet Replacement Program

This DMM calls for an agency to offer incentive for toilets meeting the current WSS standard. The DMM entails demonstrating replacement of a number of toilets of 3.5 gallons per flush (or greater) with: (a) at least as many toilets as would be replaced should a retrofit upon resale ordinance be in effect, or (b) demonstration of 75 percent market saturation with WSS standard toilets.

To implement this DMM, Colton would need to issue 331 SF rebates. Implementing and managing a program of this scope would cost Colton about $24,000 per year at a cost of $331 per AF saved, as shown in Table 13-20. Colton has not implemented a residential ULFT replacement program to date, and does not anticipate initiating this in the future. Accordingly, Colton is filing a cost-effectiveness exemption for the WSS Toilet Program.

TABLE 13-20
COST EFFECTIVENESS OF WSS TOILET REPLACEMENT PROGRAM

Total Costs[(a)]	$23,744
Total Benefits[(a)]	$18,254
Benefit/Cost	0.77
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$331
Water Savings (AFY)	72

Note:
(a) The analysis was only performed on high efficiency toilets and not ultra-low flow toilets since ultra-low flow toilets are being phased out.

13.7.3.4 Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

This DMM calls for an agency to reduce CII water use by 10 percent of the baseline over a 10-year period. Implementation can be achieved through one or both of the following ways:

- Implementing measures on the CUWCC CII list with well-documented savings. These measures target commercial water use that include: toilets, urinals, clothes washers, cooling towers, food steamers, ice machines, steam sterilizers, water brooms and dry vacuum pumps.
- Implementing unique conservation measures whose water savings are calculated on a case-by-case basis. Sample measures include: industrial process water use reduction, industrial laundry retrofits, car wash recycling systems, water-efficient commercial dishwashers, and wet cleaning.

Colton has large areas of commercial, industrial, and institutional water use within its boundaries. Institutional accounts include schools, churches, and municipal (City-owned) facilities. To implement this DMM, Colton needs to reduce CII use by 58 AFY for 10 years. Colton responds to requests from CII accounts with information and assistance regarding water conservation, but is not formally implementing CII programs. Colton has examined the cost effectiveness of a mix of CII programs recommended by the CUWCC (Table 13-20). These include both indoor and landscape program options because both can be used to meet the 10 percent reduction standard. The results indicate that there are some programs that are cost-effective such as the WBIC and washer rebates; other programs like CII indoor surveys and nozzle distribution are not likely to be cost-effective.

Colton is not able to fully implement this DMM. Though, as shown in Table 13-21, some aspects of this are cost effective, Colton does not currently have sufficient funding available to implement this program. Colton's FY 2010 Budget Summary is included with Appendix F; this budget documents that Colton's water department is currently operating at a deficit and is financially unable to implement a full range of conservation actions at this time.

TABLE 13-21
COST EFFECTIVENESS OF CII PROGRAMS

	Lifetime Water Savings (AF)	Cummulative Value of Saved Water ($)	Annual Costs ($)	Benefit:Cost	Cost of Saved Water ($ per AF)
BMP5: CII WBICs Rebates	690	189,298	75,000	2.5	109
BMP5: CII WBICs Direct Install	345	94,649	125,000	0.8	362
BMP5: CII Precision Nozzles Distr.	5	1,485	2,500	0.6	502
BMP5: Dedicated Irrigation Surveys	8	2,269	1,815	1.2	233
BMP9: CII Indoor Surveys	155	42,592	750,000	0.1	4,833
BMP9: CII Performance Based Program	535	146,943	70,298	2.1	131
BMP9: CII HE Washer Rebates	276	66,265	28,125	2.4	102
BMP9: CII HET Rebates	102	25,960	30,469	0.9	298
BMP9: CII HE Urinal Rebates	185	46,399	84,375	0.5	456
BMP9: CII ULV Urinal Rebates	215	53,882	84,375	0.6	393
BMP9: CII Zero Consumption Urinal Rebates	1,025	256,889	353,208	0.7	345

13.7.3.5 Large Landscape Conservation Programs and Incentives

There are multiple elements related to this DMM, all related to providing non-residential customers with support and incentives to improve their landscape water use efficiency. Specific activities include:

- Developing water use budgets at 70 percent ETo (100 percent for dedicated recreational areas) for 90 percent of accounts with dedicated irrigation meters in 10 years.
- Assisting all accounts that are 20 percent over budget within 6 years.
- Performing surveys on 15 percent of un-metered and mixed use meter accounts in 10 years (CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both the Landscape and CII DMMs).
- Providing an incentive program for irrigation equipment retrofits.
- Provide notices each billing cycle with water use budgets.
- Accounts without Meters or with Mixed-Use Meters:
    - Develop and implement a strategy for marketing surveys.
    - Offer financial incentives.

Colton has not fully implemented this DMM to date, but promotes water savings through financial incentives on landscape with dedicated landscapes meters. Business owners are encouraged to have separate meters for landscaping (irrigation) water use and for interior domestic water use. Sewer rates for commercial, industrial, and institutional water users are based upon domestic water use, thereby providing a financial incentive for having separate domestic and irrigation water meters. This corresponds with Colton's current water rates, which were adopted in 1998. Chapter 18 of Colton's Municipal Code sets forth Colton's development landscaping requirements and landscape irrigation requirements. Colton's development landscaping requirements specify, in part, that "Drought-resistant landscaping shall be provided for the development of any lot." Colton's landscape irrigation requirements specify, in part, that "Wherever possible, the watering system shall utilize the least amount of water."

To fully implement this DMM, Colton would need to conduct about 17 surveys per year, which could provide an estimated 8 AFY in savings. Such a program is estimated to cost Colton $1,815 per year.

Colton is not currently able to fully implement this DMM. Though, as shown in Table 13-22, this DMM could be cost effective, Colton does not currently have either the staff or the funding available to implement this program.

TABLE 13-22
COST EFFECTIVENESS OF LARGE LANDSCAPE PROGRAM

DWR DMM Review Table	
Cost Effectiveness Summary	
Total Costs	$1,815
Total Benefits	$2,269
Benefit/Cost	1.25
Discount Rate	2.9%
Time Horizon	25 years
Cost of Water	$233
Water Savings (AFY)	8

13.7.3.6 Wholesale Agency Assistance Programs

This DMM is not applicable to Colton, which is strictly a municipal water supplier.

13.7.4 DMM Implementation and Urban Water Use Targets of the 20x2020 Plan

As part of the IRWMP and UWMP process, agencies in the San Bernardino Valley area have formed a group to study and address conservation needs in the San Bernardino Valley. The first step in this process was identifying the costs and benefits of various demand management measures. Special attention was given to those demand management measures that are not cost effective for an individual agency, but which could be cost effective if implemented as part of a regional collaboration. The following demand management measures were identified as potentially cost-effective if costs could be shared among multiple entities:

- High Efficiency Clothes Washers Rebates
- Water Sense Specification Toilet Rebates
- Support and incentives to non-residential customers to improve landscape water use efficiency
- Targeted programs at large CII customers

The second step in the process was to identify the water conservation target, which was done as part of this UWMP. At the conclusion of Steps 1 and 2, the agencies participating in this UWMP met to coordinate regional implementation of selected conservation actions. The group intends to engage a Regional Conservation Coordinator. In addition to the programs listed above, the Regional Conservation Coordinator would lead public outreach programs and school education programs. The UWMP agencies, along with the Regional Conservation Coordinator will evaluate existing agency resources available to assist with conservation programs and then select conservation programs and processes to be implemented at the regional level. The UWMP agencies will utilize the Regional Conservation Coordinator to track conservation actions, conservation successes, and estimate water savings. The group anticipates having a

regional water conservation strategy developed by the end of 2011 and start implementation in 2012.

In addition to these strategies, the City of Colton intends to:

a. Educate the public about the importance of water conservation; provide support on educational materials to local school districts; community groups; local media, etc. Enforce prohibitions against wasting water.

b. Convert most of Colton's turf areas into landscape requiring very little water and installation of tree bark and mulch throughout the entire City.

c. Minimize system losses (main breaks, leaks, etc) by continuing the "Citywide Water Main Replacement Program", the project scope includes a list of major and minor water lines that will be replaced for a period of 10 years.

   Colton is planning to have a valve exercise program to reduce water loss by identifying system valves in need of repair or replacement.

   Colton shall continue the availability of maintenance crews which are on call 24 hours per day, seven days per week, and are ready to respond to water leaks, pipeline ruptures, and damaged facilities on short notice. The maintenance crews are fully staffed and maintain an inventory of the supplies necessary to make repairs to any of Colton's water facilities.

d. To continue the implementation of the requirements for metering, new meters for all new service connections, preparation of meter maintenance & replacement plan and meter classification of customer for commercial and residential which requires to have dedicated landscape meters.

e. Enforcement of the existing Colton ordinances that encourage the use of drought resistant landscaping for new development and ordinance that require large water user for conservation of water.

18.10.180 - Landscaping

A. Drought-resistant landscaping shall be provided for the development of any lot. Landscaping shall provide a mixture of shrubs, vines, groundcover, flowers or lawns throughout the entire front yard area. In addition, two twenty-four-inch box trees shall be provided in the same area, the type of tree to be determined by the planning division.

B. The required landscaping shall be maintained in a neat, clean, safe, orderly and healthful condition.

C. The landscaped areas shall be provided with a suitable permanent method for watering or sprinkling of plants. Wherever possible, the watering system shall utilize the least amount of water. Sprinklers used

to satisfy the requirements of this provision shall be so spaced as to assure complete coverage of the landscaped area.

<u>13.04.200</u> - Special Uses - City's Determination and Action for Conservation

In any case where the city may determine that the user is using an exceptionally large quantity of water or using water for special purposes or with particular types of equipment or machines that in the opinion of the city, water is being wasted in the use thereof, or in the opinion of the city, water can be conserved by the user making certain changes or improvements in the use thereof, the city shall require the user to make such changes or improvements as the city may deem to be necessary to conserve the use thereof for the benefit of the entire system and should any such user fail to make such recommended changes and improvements to conserve the use of water, the city shall terminate such service and cease to supply water to such user until and unless such changes and improvements are made.

f. Adoption of the proposed ordinance of the City Council of the City of Colton Prohibiting the Wasteful Use of Water and Setting Forth Regulations and Restrictions on Water Use. Prohibitions on wasting potable water, defined as follows:

- Irrigating between the hours of 10:00 a.m. and 6:00 p.m. or in such a manner that results in runoff for more than five minutes;
- Using potable water to wash walkways, driveways, or other paved areas, except where necessary for public health or safety;
- Allowing potable water to escape from breaks within the customer's plumbing system for more than twenty-four hours after the customer discovers or is notified of the break;
- Washing cars or other vehicles by hose without a shutoff nozzle and bucket (except at facilities where recycled water is used); and o Using potable water to clean, fill, or maintain decorative fountains, lakes, or ponds unless such water is recycled.
- Water use restrictions that are in effect during a declared Water Shortage Emergency.

As part of its annual reporting of public water system statistics to the California Department of Public Health, Colton will evaluate progress toward reducing water use in terms of gallons per capita per day.

13.8 Water Resources

The paragraphs below provide information on Colton's current and projected uses of water supplies described in Chapter 2.

13.8.1 Imported Water Supplies

Colton does not currently import water. For the period of this Plan, groundwater pumped by Colton is expected to meet all water supply needs.

13.8.2 Groundwater

Colton extracts groundwater from three adjudicated basins: the San Bernardino, Rialto-Colton, and Riverside Basin Areas (these basins are described in Chapter 2). Previously, approximately 50 percent of the water supply was derived from eight Colton wells in the San Bernardino Basin, specifically the Bunker Hill Subbasin; approximately 35 percent of the supply was obtained from five Colton wells in the Rialto-Colton Basin; and about 15 percent of the water was obtained from one Colton well in the Riverside North Basin. Two new wells were constructed in the Riverside North Basin. These wells will operate at or below 3,000 GPM until a proposed recharge facility is constructed, or until an equivalent level of recharge capability is in place. The recharge facility is designed to provide groundwater recharge to the Riverside North Basin, and is a joint venture between Valley District, City of San Bernardino, and City of Colton. The recharge facility is tentatively planned to be operational in 2012.

Future water demand will be met by continued and increased production from the same three basins. Historic groundwater production by Colton is shown in Table 13-23. Anticipated groundwater production from the SBBA for future years is detailed in Table 13-24.

TABLE 13-23
GROUNDWATER - VOLUME PUMPED (AF)

Basin Name	Metered or Unmetered?	2005	2006	2007	2008	2009
SBBA	Metered	6,635	6,758	7,101	6,254	6,405
Rialto-Colton Basin	Metered	4,280	4,359	4,580	4,034	4,131
Riverside North Basin	Metered	1,418	1,445	1,518	1,337	1,369
	Total Groundwater	12,333	12,562	13,199	11,625	11,905
Groundwater as Percent of Total Water Supply		100%	100%	100%	100%	100%

TABLE 13-24
GROUNDWATER - VOLUME PROJECTED TO BE PUMPED (AF)

Basin Name	*Metered or Unmetered?*	2015	2020	2025	2030	2035
SBBA	Metered	7,000	6,783	6,994	7,408	7,991
Rialto-Colton Basin	Metered	4,515	4,375	4,511	4,778	5,154
Riverside North Basin	Metered	1,496	1,450	1,495	1,584	1,708
	Total Groundwater	*13,011*	*12,608*	*13,000*	*13,770*	*14,853*
Groundwater as Percent of Total Water Supply		*100%*	*100%*	*100%*	*100%*	*100%*

13.8.2.1 Groundwater Supply Reliability

Perchlorate was first detected in Colton's water supply wells in the Rialto-Colton Basin (RCB) in 1997. Colton evaluated best available treatment technologies for perchlorate, and two ion exchange treatment systems were installed in 2003 to treat water from three wells (Colton -15, -17 and -24). These systems are still in use.

Ongoing investigations by Colton and others in 2009 and 2010 have shown that the perchlorate plume persists. Until basin-wide efforts are implemented by the responsible parties to remediate the perchlorate, Colton will continue to use wellhead treatment systems.

Based on current conditions, water quality is not expected to affect Colton's supply reliability. However, water quality issues are constantly evolving. Colton will take action to protect and treat supplies when needed, though water quality treatment is known to have significant costs. Table 13-25 summarizes groundwater supplies anticipated to be available.

TABLE 13-25
GROUNDWATER SUPPLIES - NORMAL, SINGLE-DRY AND MULTIPLE-DRY YEARS (AF)

Wholesale source	2015	2020	2025	2030	2035
Normal Year Total	21,400	21,400	21,400	21,400	21,400
SBBA	8,070	8,070	8,070	8,070	8,070
Rialto Colton	5,205	5,205	5,205	5,205	5,205
Riverside North	8,125	8,125	8,125	8,125	8,125
Single-Dry Year Total	21,400	21,400	21,400	21,400	21,400
SBBA	8,070	8,070	8,070	8,070	8,070
Rialto Colton	5,205	5,205	5,205	5,205	5,205
Riverside North	8,125	8,125	8,125	8,125	8,125
Multiple-Dry Year Total	21,400	21,400	21,400	21,400	21,400
SBBA	8,070	8,070	8,070	8,070	8,070
Rialto Colton	5,205	5,205	5,205	5,205	5,205
Riverside North	8,125	8,125	8,125	8,125	8,125

13.8.3 Local Surface Water Supplies and Reliability

Colton currently has no plans for future use of surface water supplies.

13.8.4 Recycled Water

Colton provides wastewater collection and treatment services to customers within its service Area. Colton owns, operates, and maintains a wastewater collection, pumping, and treatment system. Colton's WWTP also serves the City of Grand Terrace and some nearby unincorporated County areas. Colton jointly owns, with SBMWD, the RIX facility. The RIX facility further treats discharges from Colton's WWTP and from the San Bernardino Water Reclamation Plant.

Colton currently collects and treats approximately 5.3 MGD of wastewater from its service area, as well from City of Grand Terrace and some unincorporated County areas. Wastewater conveyed to Colton's WWTP undergoes conventional and extended aeration secondary treatment processes to produce secondary treated effluent in compliance with Regional Water Quality Control Board (Santa Ana River Basin Region) regulations. Treated effluent from Colton's wastewater treatment plant is conveyed to the RIX facility. The RIX facility treats a combined secondary-treated effluent stream of approximately 33 MGD from Colton's WWTP and the San Bernardino Water Reclamation Plant to tertiary standards in accordance with the standards set forth in Title 22, Division 4 of the California Code of Regulations (hereinafter, Title 22). The RIX facility utilizes natural biofiltration through the use of percolation basins, followed by an ultraviolet disinfection system. The RIX-treated wastewater consistently meets or exceeds required discharge standards and is often superior in quality to effluent produced by conventional tertiary treatment facilities (see Table 13-26).

TABLE 13-26
WASTEWATER COLLECTION AND TREATMENT CURRENT AND PROJECTED (AFY)

Treatment Plant	2010	2015	2020	2025	2030	2035	Disposal Method	Treatment Level
Colton WWTP	6,393	6,713	7,049	7,402	7,829	8,281	Flows to RIX	Secondary
RIX	33,000	33,000	36,010	37,316	38,670	40,073	Santa Ana River	Tertiary/Title 22

All of the RIX-treated water is discharged to the Santa Ana River; quantities discharged beyond the 16,000 AFY downstream obligations may be available for future landscape uses or for sale to downstream users by SBMWD. As described in Chapter 10, SBMWD is planning to create recycled water from wastewater received at its reclamation plan, prior to that wastewater being sent to RIX.

Recycled water facilities are not currently available in Colton's service area. No recycled water is currently used in the Colton service area. Construction of such facilities is cost prohibitive at this time and no recycled water use is anticipated during the period covered by this Plan.

Despite the fact that developing recycled water facilities in the Colton service area is cost prohibitive at the current time, Colton does recognize the potential value of recycled water. Should recycled water become available in Colton, potential users would include landscape irrigation at schools, cemeteries, parks, and roadway medians as well as industrial process water. However, because Colton does not specifically track these uses, potential recycled water demand cannot be quantified.

13.8.5 Transfers, Exchanges and Groundwater Banking Programs

Colton does not anticipate regular or long-term transfers or exchanges, during the period covered by this Plan. Rather any transfer or exchanges would be as-needed related to an emergency. Colton has two emergency water system connections with the City of San Bernardino (1,000 GPM and 800 GPM); one with the City of Riverside (800 GPM); two with

Riverside Highland Water Company (1,000 GPM and 800 GPM), and one with WVWD (1,500 GPM).

13.8.6 Planned Water Supply Projects and Programs

The only future water supply projects anticipated at this time are the construction and completion of Wells 30 and 31 in the Riverside North Basin, in accordance with the City's Well Pumping Plants Construction and Retirement Schedule in Colton's Master Plan. These wells are projected to yield 4,000 GPM of supply water (about 6,400 AFY) and will be completed by year 2015. The Master Plan also identifies construction of Wells 32 through 35 at sometime in the future, but the actual implementation timeframe is not currently known. For the purposes of this Plan, water supply projections include future water from Wells 30 and 31 but not Wells 32 through 35.

In the unplanned and unexpected event existing groundwater resources prove to be inadequate to meet service area demands in the future, Colton will further evaluate potential alternative sources of supply, such as imported water, water transfers/exchanges, and recycled water.

13.8.7 Total Anticipated Water Supply

Table 13-27 summarizes the water resources available to Colton for the 25-year period covered by this Plan.

TABLE 13-27
SUMMARY OF CURRENT AND PLANNED WATER SUPPLIES (AF)

	Supply (AF)					
Water Supply Source	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Existing[(a)]						
Wholesale/Imported	0	0	0	0	0	0
Groundwater	15,000	15,000	15,000	15,000	15,000	15,000
Local Surface Water	0	0	0	0	0	0
Recycled Water	0	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0	0
Groundwater Banking	0	0	0	0	0	0
Total Existing Supplies	*15,000*	*15,000*	*15,000*	*15,000*	*15,000*	*15,000*
Planned						
Wholesale/Imported	0	0	0	0	0	0
Groundwater	0	6,400	6,400	6,400	6,400	6,400
Local Surface Water	0	0	0	0	0	0
Recycled Water	0	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0	0
Groundwater Banking	0	0	0	0	0	0
Total Planned Supplies	*0*	6,400	6,400	6,400	6,400	6,400
Total Existing and Planned Supplies	***15,000***	***21,400***	***21,400***	***21,400***	***21,400***	***21,400***

Note:
(a) From Tables 13-23 and 13-25.

13.9 Water Shortage Contingency Plan

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, an earthquake which damages delivery or storage facilities, or a regional power outage. Chapter 5 of this UWMP describes water shortage contingency planning for regional water supply sources (imported water, groundwater). This section focuses on water shortage contingency planning for City of Colton.

13.9.1 Coordinated Planning

Colton has an agreement with WVWD to purchase water from WVWD on an as-needed basis under emergency conditions (such as in the event of equipment failure during peak summer demand). Colton does not have written transfer or exchange agreements with the City of San Bernardino, City of Riverside, or Riverside Highland Water Company; however, Colton may transfer or exchange water with these agencies under emergency circumstances.

13.9.2 Stages of Action to Respond to Water Shortages

Colton has a civic and legal responsibility to provide for the water-related health and safety needs of the community. A draft Resolution to Declare a Water Shortage Emergency is included in Appendix G. This resolution was developed to provide for a minimum of 60 percent of normal supply during a severe or extended water shortage. Colton's priorities for use of available water during a water shortage are:

A. Fire protection, health, and welfare emergency uses
B. Domestic - interior uses only (residential)
C. Public buildings, schools - interior uses only
D. Commercial and Industrial - interior uses only
E. Commercial and Industrial - other uses (not including landscape watering or other nonessential use)
F. Domestic - other uses (including exterior residential use)

During declared water shortages, Colton can invoke a four-stage rationing plan (Table 13-28). The rationing plan includes voluntary and mandatory rationing, depending on the causes, severity, and anticipated duration of the water supply shortage.

TABLE 13-28
RATIONING AND REDUCTION GOALS

Stage	Decrease in Water Supply	Customer Use Reduction	Type of Program
1	25 – 40%	15%	Voluntary
2	40 – 50%	25%	Voluntary
3	50 – 60%	30%	Mandatory
4	>60%	40%	Mandatory

In Stage 1 and Stage 2 shortages, customers may adjust either interior or exterior water use (or both), in order to meet the voluntary water reduction goal. Customer allotments will be based on the past five years of usage data, but will not exceed usage of the most recent year.

In Stage 3 and Stage 4 shortages, mandatory rationing will occur. For residential customers, Colton has established a health and safety allotment of 68 GPCD for Stage 3. This amount of water is estimated to be sufficient for essential interior water uses, without changing customer habits or plumbing fixtures. If customers can change their water use habits or plumbing fixtures, 68 GPCD is sufficient to provide for limited non-essential (i.e., outdoor) uses. For non-residential customers, Stage 3 reductions will be required on a percentage basis, as shown in Table 13-28.

Stage 4 rationing, which is likely to be declared only as a result of a prolonged water shortage or as a result of a disaster, would require residential customers to make changes in their interior water use habits (for instance, not flushing toilets unless "necessary" or taking less frequent showers). These changes are expected to reduce water use to 48 GPCD. Non-residential requirements for Stage 4 will be a further percentage reduction, as shown in Table 13-28.

Customers will be classified and individual allotments that reflect seasonal patterns will be calculated by the City's Director of Water and Wastewater. Each customer will be notified of their classification and allotment by mail in advance of the effective date of the water shortage emergency. In the event of a disaster, customers will be notified by available media. Any customer may appeal the City's classification on the basis of use, or their designated allotment on the basis of incorrect calculation.

To clarify the Colton's prohibition on water wasting, Colton has prepared a draft no waste ordinance, An Ordinance of the City Council of the City of Colton Prohibiting the Wasteful Use of Water and Setting Forth Regulations and Restrictions on Water Use, a copy of which is included in Appendix G. Said ordinance includes prohibitions on various wasteful water uses such as lawn watering during mid-day hours, washing sidewalks and driveways with potable water, and allowing plumbing leaks to go uncorrected more than 24 hours after customer notification. Table 13-29 provides details on water use restrictions.

TABLE 13-29
MANDATORY WATER USE PROHIBITIONS

Prohibition	Stage when Prohibition Becomes Mandatory
Use of potable water to irrigate turf, ground-cover, shrubbery, crops, vegetation, and trees (agricultural accounts are excluded from the time of irrigation restriction) between the hours of 10:00 AM and 6:00 PM, or in such a manner as to result in runoff for more than five (5) minutes.	At all times
Use of potable water to wash sidewalks, walkways, driveways, parking lots, open ground, or other hard-surfaced areas. At all times allowing potable water to escape from breaks within the customer's plumbing system for more than twenty-four (24) hours after the customer is notified or discovers the break.	At all times
Washing cars, boats, trailers, aircraft, or other vehicles by hose without a shutoff nozzle and bucket, except to wash such vehicles at commercial or fleet vehicle washing facilities.	At all times
Use of potable water to clean, fill, or maintain decorative fountains, lakes,	At all times

Prohibition	Stage when Prohibition Becomes Mandatory
or ponds, unless such water is recycled.	
No restaurant, hotel, café, cafeteria or other public place where food is sold, served, or offered for sale, shall serve drinking water to any customer unless expressly requested.	During a declared water shortage emergency
Use of potable water for street or parking lot sweeping or for building washdown where non-potable or recycled water is sufficient.	During a declared water shortage emergency
Use of potable water for sewer system maintenance or fire protection training without prior approval by the General Manager.	During a declared water shortage emergency
Use of potable water for any purpose in excess of the amounts allocated for each class of service.	During a declared water shortage emergency
New water service connections	During a declared water shortage emergency

13.9.3 Penalties

During any declared Water Shortage Emergency, a customer who exceeds the established allotment will pay a surcharge of two times the highest rate tier per ccf of water for excess water delivered during the first or second billing period of the declared water shortage emergency, and a surcharge of four times the highest rate tier per ccf for excess water delivered during the third and subsequent consecutive billing periods of the declared water shortage emergency. If, however, a customer's total annual usage is equal to or less than the annual allotment, any surcharge payments will be refunded to the customer.

If a customer exceeds the allotted usage for three consecutive billing periods, Colton will install a flow restrictor at the service meter with a capacity of two gpm for meters up to one and one-half inch size, and comparatively sized restrictors for larger meters, for a period of seven days. The customer must pay a flow restrictor installation and removal charge of $100 before normal service will be restored. Service may be terminated to any customer who knowingly and willfully violates any of the water use provisions. Chapter 13.04.210 of the City's Municipal Code states:

> Any customer violating the regulations and restrictions on water use set forth in this chapter shall receive a written warning for the first such violation. Upon a second violation, the customer shall receive a written warning and the City may cause a flow-restrictor to be installed in the service. If a flow-restrictor is placed, the cost of installation and removal shall be paid by the violator. Any willful violation occurring subsequent to the issuance of the second written warning shall constitute a misdemeanor and may be referred to the County District Attorney's Office for prosecution. The City may also disconnect the water service. If water service is disconnected, it shall be restored only upon payment of the turn-on charge fixed by the City Council.
>
> Except as provided in the enforcement section for the first and second violations, any person, firm, partnership, association, corporation or political entity violating or causing or permitting the violation of any of the provisions of this section or providing false information to the district in response to the City's requests for information needed by the district to calculate consumer water allotments shall be guilty of a misdemeanor punishable by imprisonment in the county jail for not more that thirty days or by a fine not exceeding one thousand dollars or both. Each separate day or portion thereof in which

any violation occurs or continues without a good faith effort by the responsible party to correct the violation shall constitute a separate offense and, upon conviction thereof, shall be separately punishable.

13.9.4 Financial Impacts of Actions During Shortages

Surplus revenues are placed in Colton's reserve, which is used to fund emergency repairs and capital improvements for the water system. The financial reserve is adequate to address the costs of multiple plant repairs. The City projects that water shortages will have a minimal impact on water sales, and it is adequately funded to respond to emergencies.

During a shortage, Colton anticipates increased staff costs, increased operation and maintenance costs, decreased water sales revenue, all of which will impact the reserve fund. Use of the existing reserve fund is the primary means to deal with revenue impacts due to shortage, but Colton will seek a rate adjustment in an extended shortage. If shortage is due to a natural disaster, Colton will seek funding assistance from the Federal Emergency Management Agency.

13.9.5 Mechanism to Determine Reductions in Water Use

Under normal water supply conditions, production figures are recorded daily in Colton's computerized database. Total production and consumption by all categories of customers are reported monthly to City Water and Wastewater Department staff.

During a Stage 1 or 2 water shortage, daily production figures will be reported to the Water and Wastewater Operations Manager, who will compare the weekly production to the target weekly production to verify that the reduction goal is being met. Weekly reports will be forwarded to the Director of Water and Wastewater. Monthly reports will be provided to the City Council, the Director of Water and Wastewater, and the Customer Accounts Department. The Customer Accounts Department will serve as the City's Water Shortage Response Team. If reduction goals are not met, the Water Shortage Response Team will examine individual customer usages and identify corrective actions to be taken.

During a Stage 3 or 4 water shortage, the same procedures will apply, with the addition of a daily production report to the Director of Water and Wastewater. During a disaster shortage, production figures will be reported on an hourly basis to the Water and Wastewater Operations Manager, and daily to the Director of Water and Wastewater, the Water Shortage Response Team, and the City Council.

13.9.6 Minimum Water Supply Available During Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the years 2011 to 2013, assuming years 2011 to 2013 repeat the driest three-year historic sequence for each water supply source. As shown in Table 13-30, total supplies, given a repeat of historically low conditions on all water supplies, would be approximately 15,000 AFY. Comparing these supplies to the demand projections provided in Section 13.5, Colton has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

TABLE 13-30
MINIMUM WATER SUPPLY AVAILABLE DURING NEXT THREE WATER YEARS (AFY) [(a)]

	2011	2012	2013
Purchased Imported Water	0	0	0
City of Colton Produced Groundwater	15,000	15,000	15,000
City of Colton Produced Surface Water	0	0	0
Transfers/Exchanges	0	0	0
Recycled Water	0	0	0
Banked Water	0	0	0
Total Supply	**15,000**	**15,000**	**15,000**

Note:
(a) From Table 13-25.

13.9.7 Actions to Prepare for Catastrophic Interruption

In the event of a water shortage emergency resulting from equipment failure, power outage, or other catastrophe, Colton is prepared to purchase emergency water supplies from nearby agencies while repairs or other remedial actions are underway. Colton may also implement its four-stage plan for conservation, as described above, with either voluntary or mandatory reductions depending on the severity of the shortage. For severe disasters (Stage 4), mandatory water use reductions are specified.

13.10 Supply and Demand Comparisons

The UWMP Act requires urban water suppliers assess water supply reliability by comparing total projected water use with the expected water supply over the next 20 years in five year increments. The Act also requires an assessment of single-dry year and multiple-dry years. This section presents the reliability assessment for Colton's service area.

13.10.1 Normal Water Year

The Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. This section summarizes Colton's water supplies available over the 25-year planning period for average/normal years, in comparison with demands for the same period. In Table 13-31 demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions under SBX7-7. Assumptions about supplies and demands were provided in Sections 13.5 and 13.8. Table 13-31 demonstrates that Colton anticipates adequate supplies for years 2015 to 2035 under Normal conditions.

13.10.2 Single-Dry Year

The single-dry year is generally the lowest annual runoff for a water source in the record. The single-dry year may differ for various sources. This section summarizes Colton's water supplies available to meet demands over the 25-year planning period during a single-dry year and compares them to demands for the same period. In Table 13-32 demands are conservatively

assumed to be 10 percent greater in a single-dry year than during a normal year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions under SBX7-7. Table 13-32 demonstrates that Colton anticipates adequate supplies for years 2015 to 2035 under single-dry year conditions.

13.10.3 Multiple-Dry Years

The multiple-dry year is generally the lowest annual runoff for a three year or more consecutive period. The multiple-dry year period may differ for various sources. This section summarizes Colton's water supplies available to meet demands over the 25-year planning period during a multiple-dry year period and compares them to demands for the same time frame. In Table 13-33 demands are conservatively assumed to be 10 percent greater in a multiple-dry year than during an average year. Demands are shown with and without the effects of the assumed demand reduction resulting from conservation actions under SBX7-7. Table 13-33 demonstrates that Colton anticipates adequate supplies for years 2015 to 2035 under multiple-dry year conditions.

TABLE 13-31
PROJECTED AVERAGE/NORMAL YEAR SUPPLIES AND DEMANDS (AFY)

	Amount (AFY)				
Water Supply Source	**2015**	**2020**	**2025**	**2030**	**2035**
Existing Supplies[a]					
Wholesale/Imported	0	0	0	0	0
Groundwater	15,000	15,000	15,000	15,000	15,000
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Existing Supplies	*15,000*	*15,000*	*15,000*	*15,000*	*15,000*
Planned Supplies[a]					
Wholesale/Imported	0	0	0	0	0
Groundwater	6,400	6,400	6,400	6,400	6,400
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Planned Supplies	6,400	6,400	6,400	6,400	6,400
Total Existing and Planned Supplies	***21,400***	***21,400***	***21,400***	***21,400***	***21,400***
Demands without Additional Conservation[b]	14,294	15,365	15,846	16,789	18,115
Conservation	1,284	2,757	2,845	3,019	3,262
Total Adjusted Demands	13,010	12,608	13,000	13,770	14,853
Surplus/Deficit in Normal Year	**8,390**	**8,792**	**8,400**	**7,630**	**6,547**
Difference as % of Supply	**39%**	**41%**	**39%**	**36%**	**31%**
Difference as % of Demand	**64%**	**70%**	**65%**	**55%**	**44%**

Notes:
(a) From Tables 13-25.
(b) From Table 13-11, 13-12, 13-13, 13-14, 13-15.

TABLE 13-32
PROJECTED SINGLE-DRY YEAR SUPPLIES AND DEMANDS (AFY)

Water Supply Source	Supply (AFY)				
	2015	2020	2025	2030	2035
Existing Supplies[a]					
Wholesale/Imported	0	0	0	0	0
Groundwater	15,000	15,000	15,000	15,000	15,000
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Existing Supplies	*15,000*	*15,000*	*15,000*	*15,000*	*15,000*
Planned Supplies[a]					
Wholesale/Imported	0	0	0	0	0
Groundwater	6,400	6,400	6,400	6,400	6,400
Local Surface Water	0	0	0	0	0
Recycled Water	0	0	0	0	0
Transfers/Exchanges	0	0	0	0	0
Groundwater Banking	0	0	0	0	0
Total Planned Supplies	6,400	6,400	6,400	6,400	6,400
Total Existing and Planned Supplies	***21,400***	***21,400***	***21,400***	***21,400***	***21,400***
Demands without Additional Conservation[b]	15,724	16,901	17,430	18,468	19,927
Conservation	1,412	3,033	3,130	3,320	3,589
Total Adjusted Demands	14,311	13,869	14,300	15,147	16,338
Surplus/Deficit in Single-Dry Year	**7,089**	**7,531**	**7,100**	**6,253**	**5,062**
Difference as % of Supply	**33%**	**35%**	**33%**	**29%**	**24%**
Difference as % of Demand	**50%**	**54%**	**50%**	**41%**	**31%**

Notes:
(a) From Tables 13-25.
(b) From Table 13-11, 13-12, 13-13, 13-14, 13-15. In dry periods, demands assumed to increase 10% above Normal Year Demands.

TABLE 13-33
PROJECTED MULTIPLE-DRY YEAR SUPPLIES AND DEMANDS (AFY)

		2015	2020	2025	2030	2035
Multiple-Dry Year First Year Supply	Supply Totals [a]	21,400	21,400	21,400	21,400	21,400
	Demand Totals [b]	14,311	13,869	14,300	15,147	16,338
	Difference	7,089	7,531	7,100	6,253	5,062
	Difference as % of Supply	33%	35%	33%	29%	24%
	Difference as % of Demand	50%	54%	50%	41%	31%
Multiple-Dry Year Second Year Supply	Supply Totals [a]	21,400	21,400	21,400	21,400	21,400
	Demand Totals [b]	14,311	13,869	14,300	15,147	16,338
	Difference	7,089	7,531	7,100	6,253	5,062
	Difference as % of Supply	33%	35%	33%	29%	24%
	Difference as % of Demand	50%	54%	50%	41%	31%
Multiple-Dry Year Third Year Supply	Supply Totals [a]	21,400	21,400	21,400	21,400	21,400
	Demand Totals [b]	14,311	13,869	14,300	15,147	16,338
	Difference	7,089	7,531	7,100	6,253	5,062
	Difference as % of Supply	33%	35%	33%	29%	24%
	Difference as % of Demand	50%	54%	50%	41%	31%

Notes:
(a) From Tables 13-25.
(b) From Table 13-11, 13-12, 13-13, 13-14, 13-15. Assumes conservation. In dry periods, demands assumed to increase 10% above Normal Year Demands.

Chapter 14: References

Chapter 2

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Appendix A

Public Outreach Materials

- Meeting 1 Materials
- Meeting 2 Materials
- Meeting 3 Materials
- Meeting 4 Materials
- Meeting 5 Materials
- Meeting 6 Materials
- Meeting 7 Materials
- Meeting 8 Materials
- Notification of Urban Water Management Plan Update to Water Use Agencies and Land Use Agencies
- Hearing Notices
- Adoption Meeting Materials

Public Meetings

Public Meeting No. 1

Meeting Agenda

Project:	RUWMP for the San Bernardino Valley	**Date:**	April 20, 2010
		Time:	2 pm to 3:30 pm
Subject:	Regional Urban Water Management Plan Kickoff Meeting	**Location:**	Valley District Board Room

1. Introductions
2. Requirements of an Urban Water Management Plan
    a. Major Contents
    b. Required Coordination and Notification
    c. Process and Timelines
        i. Pending Legislation Affecting Due Dates (AB 2776 and SB 1478)
    d. Penalties
3. New Requirements of Urban Water Management Plans (different for wholesalers and retailers)
    a. Reporting on Demand Management Measures per UWMP Act and AB 1465 (Hill)
    b. 20% by Year 2020 (SBX7 7)
        i. Selection of calculation option(s)
        ii. ACWA proposal for “Option 4”
    c. AB 1420 (not a requirement, but beneficial to include)
    d. Notification requirements
    e. Projections of water use for lower income households
4. Data Needed
    a. Participating
        i. 2010 UWMP Data Form
        ii. 2010 DMM Data Form
            1. Table 1
            2. Table 2 plus DWR Sheet 2
    b. Non-Participating
5. Schedule
    a. Dealing with Uncertainty of Upcoming Guidelines
    b. Upcoming Meetings and Meeting Topics
6. Other

Meeting Time:	2PM to 3:30PM	**Page:**	1 of 3
Meeting Location:	Valley District Office	**Date:**	21 April 2010
Meeting Date:	20 April 2010	**K/J Job No.:**	1089014.00
Project:	RUWMP San Bernardino Valley		

Persons Attending:

Kennedy/Jenks	***Client/Contractor***	***Other***	***Organization***
Lynn Takaichi	Mike Medina		City of Colton
Meredith Clement	Russ Handy		City of Loma Linda
Leila Khatib	T. Jarb Thaipejr		City of Loma Linda
	Woody Hynes		City of Redlands
	Ron Buchwald		East Valley Water District
	Don Hough		Riverside Highlands Water Company
	Thomas Crowley		West Valley Water District
	Jennifer Ares		Yucaipa Valley Water District
		Claud Seal	San Bernardino Valley Water Conservation District
		Jeff Davis	San Gorgonio Pass Water Agency
		Linda Jadeski	Engineering Resources (w/West Valley)

Subject:

Kickoff Meeting – UWMP Requirements and Data Request

1) Introductions
2) Realizing that the deadline to submit 2010 UWMPs has been extended for retail water agencies (and likely for wholesale agencies pending legislation) to July 2011 and that the 2010 guidelines have not yet been released, the question was asked whether we would be wise to wait and start our plan after we receive the guidelines. Kennedy/Jenks explained that the new legislation does not take anything away from the prior legislation but, instead, adds some notification requirements and the 20% by 2020 requirement. Thus, the plan is to proceed with the known requirements of the prior legislation while we await the requirements of the more recent legislation.
3) Kennedy/Jenks reviewed requirements of an UWMP, including requirements mandated by legislation such as AB1465, SBx7-7, and AB1420. Presentation materials are available through the project Extranet site.
4) Particular time was given to a discussion on how to comply with SBx7-7's 20x2020 plan. The group reviewed the options for calculating base gross water use as well as the options for calculating water use reduction targets. There are four methodologies for calculating reduction targets, one of which ("Method 4") is under development by the Department of Water Resources. The group also received an overview of the proposed Method 4 put forward by the Association of California Water Agencies.

   Clarification from the meeting. There was a specific question related to what should be included in the base gross water use calculation. The specific question related to a well that

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was not being operated because the water from the well was too high in fluoride to use for potable water. The intent is to eventually use water from this well for an agricultural use. Does this well's water need to be included in the base gross water use calculation? Does non-potable water need to be included in the calculation? Does agricultural water need to be included in the calculation?

From Senate Bill 7 "Gross Water Use" means the total volume of water, whether treated or untreated entering the distribution system of an urban retail water supplier excluding:

- Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.
- The net volume of water that the urban retail water supplier places into long-term storage;
- The volume of water the urban retail water supplier conveys for use by another urban water supplier; and
- At the retailers discretion, water delivered for agricultural use

It's at the discretion of the retailer whether or not to include water delivered for agricultural in their base gross water use calculation. Obviously it seems like an advantage to include ag water use because it will raise the base gross water use figure, potentially making it easier to meet the demand reduction targets. ***But there is a down side*** - if a retailer decides to include ag water use in the base gross water use calculation that retailer must use Method 2 to calculate their demand reduction targets. Under Method 2 targets are set as follows: 55 gpcpd for indoor residential use, landscape irrigation set at 0.7 to 0.8 ETo, a 10 percent reduction in base CII use, and an ag water use standard of 100 percent reference evapotranspiration multipled by the crop coefficient for irrigated acres.

The specific language is found in Senate Bill 7, Chapter 4, Section 10608.24 subsection (f):

> "An urban retail water supplier that includes agricultural water use in an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) may include the agricultural water use in determining gross water use. An urban retail water supplier that includes agricultural water use in determining gross water use and develops its urban water use target pursuant to paragraph (2) of subdivision (b) of Section 10608.20 shall use a water efficient standard for agricultural irrigation of 100 percent of reference evapotranspiration multiplied by the crop coefficient for irrigated acres."

In short, including ag water in your base gross water use greatly complicates the calculation of water reduction targets and may result in unreasonably low targets.

5) Kennedy/Jenks and the group went over the data collection sheets (all data collection sheets are available on the Extranet site). Data collection sheets need to be completed by all retailers (except Riverside Highlands Water Company, City of Redlands, and Yucaipa Valley Water District) by June 1, 2010. Retailers should provide information as it becomes available, rather than waiting until June 1.
6) A template was provided to those retailers (Riverside Highlands Water Company, City of Redlands, and Yucaipa Valley Water District) preparing their own chapters of the RUWMP. This template is available on the Extranet site.

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7) The next meeting is scheduled on June 9 from 2pm to 3:30pm at the Valley District offices.

The table below includes action items from the meeting:

Action Item/Task	Due Date	Responsible Party
Complete Data Collection Sheets. Load data and references to Extranet site.	June 1, 2010	City of Loma Linda City of Colton East Valley Water District San Bernardino Municipal Water Dept. West Valley Water District
Complete Regional Water Supply Outlook	June 1, 2010	Kennedy/Jenks
Complete DMM Data Collection Sheet, Table 2. Complete DWR Sheet 2 pages 13-14.	June 1, 2010	Valley District
Complete Individual Agency Chapters	October 1, 2010	Riverside Highland Water Company City of Redlands Yucaipa Valley Water District

Distribution: Team
Extranet

By: Meredith Clement

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2010 Urban Water Management Plan

Regional Urban Water Management Plan
San Bernardino Valley

April 2010

Requirements of an UWMP

- Major Contents
  - UWMP Act applies to all CA water suppliers with 3,000 or more service connections or selling at least 3,000 afy (retail or wholesale)
  - Main focus: to identify gaps between supply and demand through time (20-year analysis required)
  - UWMP must describe how demand will be met through time, in all hydrologic year types (normal, multiple dry, critical dry)

Requirements of an UWMP

- Major Contents (cont'd.)
  - Requires detailed description of all supply sources (surface, recycled, groundwater)
  - Water quality problems
  - Demand Management Measures (water conservation programs)
  - Water shortage contingency planning
  - Must update every five years, in years ending in 5 and 0 (such as 2010).

Requirements of an UWMP

- Required Coordination and Notification

"Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practical"

Requirements of an UWMP

- Required Coordination and Notification

Other:

  - Must hold public hearing prior to adoption of UWMP
  - Must give cities and counties in service area 60 days notice prior to public hearing
  - Must provide cities and counties in service area with copies of UWMP within 30 days of adoption

Requirements of an UWMP

- Timelines
  - SBx7-7 extended UWMP deadline to July 1, 2011 for retailers. SBx7-7 silent on extension for wholesalers.
  - Under current UWMP Act, wholesalers should complete UWMP by December 31, 2010. But "cleanup legislation" (AB 2776 and SB 1478) anticipated that will extend deadline to July 1, 2011 for wholesalers.
  - Due to recent legislative amendments, DWR has not prepared 2010 guidebook – guidebook not anticipated until late 2010!
  - DWR direction is to use 2005 guidebook in the interim

Requirements of an UWMP

- Penalties
  - Ineligible for State Grant and Loan Funding (at least until plan completed to DWR satisfaction)
  - Interested persons could pursue litigation for failure to comply with UWMP Act

New UWMP Requirements

- New Law: SBX7-7 ("20% x 2020"), reporting starts with 2010 UWMPs
  - Base gross water use in gpcd: must be calculated using one of three methodologies
  - Target reduction from base by 2020: must be calculated using one of four methodologies
  - Agencies must hold public hearing to explain how targets will be met (can be held as part of UWMP hearing)

Requirements of an UWMP

- Q&A/Discussion

New UWMP Requirements

- Base gross water use in gpcd: calculation

  Total volume of water (treated or not) entering the retail distribution system, divided by the total population of the service area

  (Excludes: recycled water, net volume into long-term storage, water conveyed to another retailer, agricultural water)

New UWMP Requirements

- Base gross water use in gpcd: methodologies
  - 10-year average
    - *ending no earlier than 2004 – no later than 2010*
  - 15-year average if 10% of 2008 demand met by recycled water
    - *get to add 5 years to calculation*
  - 5-year average if agency is already close to target
    - *100 gpcd; at least 5% reduction*
    - *ending no earlier than 2007 – no later than 2010*

New UWMP Requirements

- Base gross water use in gpcd
  - Averages are determined on a rolling basis
  - Should review demands over various periods to determine hydrologic and demand year types
  - Should choose a high demand period so that reduction target is easier to achieve
  - Recent economic impacts and drought response may have reduced demand!

New UWMP Requirements

- Base gross water use in gpcd: iterative approach

Example:

	Yr. 1 (1996)	Yr. 2 (1997)	...Yr. X	Yr. 10 (2006)	AVG
DEMAND (GPCD)	150	195	200	195	X GPCD
	Yr. 1 (1997)	Yr. 2 (1998)	...Yr. X	Yr. 10 (2007)	AVG
DEMAND (GPCD)	200	250	195	225	X GPCD

New UWMP Requirements

- Target reduction methodology options
  1. 20% reduction from base (i.e., 80% of average gross water use in gpcd)
  2. Combination of state standards:
     - 55 gpcd indoor residential + landscape use at 70% -80% ETo + 10% reduction in commercial/industrial/institutional use
  3. DWR 20x2020 hydrologic region target (So. Coast region = 149 gpcd)
  4. Option to be developed by October 2010

New UWMP Requirements

- Reduction Target Option 4
  - Subject to DWR public process during 2010
  - Will identify targets to achieve cumulative statewide 20% reduction
  - Must allow flexibility for water supplier service area characteristics
  - Will derive methodologies for calculations: population, base water use, gross water use, sector water use, others

New UWMP Requirements

- Reduction Target Option 4 Issues
  - If DWR derives new methodology standards, agencies may be required to use them
  - Won't be final until October 2010 (ps. December)
  - If work has already been done, it may need to be repeated
  - If agency has already adopted UWMP, it may need to be amended

= Reason for UWMP deadline extension to July 1, 2011

New UWMP Requirements

- ACWA Proposal for Option 4
  - Relies on comparison to a Reference Area (an area that has met/nearly met hydrologic region target).
  - For Reference Area DWR to:
    - determine population-weighted gpcpd uses for CII, residential indoor, and residential outdoor
    - calculate population weighted evapotranspiration
    - Calculate per capita residential landscape area

New UWMP Requirements

- ACWA Proposal for Option 4
  - Retailer - Estimate baseline urban CII use, residential indoor use, and residential outdoor use.
  - Retailer – Estimates water use targets adjusting for
    - Ratio of its ETo vs Reference Area
    - Ratio of per capita landscape area vs Reference Area
    - 95% baseline residential indoor water use
    - 90 % baseline CII use

New UWMP Requirements

- Other
  - SB 1087 (Florez) - requires an UWMP to include projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier.

New UWMP Requirements

- Questions/Discussion

Data Needed to Complete RUWMP

- Participating agencies
  - Complete individual agency chapter using template or
  - Complete:
    - 2010 UWMP Data Form
    - 2010 DMM Data Form
      - Table 1 or
      - Table 2 plus DWR Sheet 2

Data Needed to Complete RUWMP

- Non-Participating agencies
  - Complete 2010 UWMP Data Form

Data Needed to Complete RUWMP

- Questions/Discussion

Schedule

- Kickoff Meeting – April 20
- Purveyors Provide Data – June 1, 2010
- K/J Develops Regional Supply Outlook – June 1, 2010
- K/J Evaluates Water Efficiency Programs – October 2010
- Anticipated 20x2020 guidance, UWMP Guidebook – November 2010
- K/J prepares Admin Draft RUWMP – February 2011
- K/J prepared Draft RUWMP – March 2011
- Adoption of RUWMP by agencies – May 2011
- Submit RUWMP to DWR – June 2011

Meetings

- Kickoff Meeting – April 20
- Regional Water Resources Outlook – June 2010
- Review of Retailer Projections – August 2010
- Review of 3 Individual Agency Chapters – September 2010
- Review of 2 Individual Agency Chapters – October 2010
- Review of DWR 20x2020 Guidance and UWMP Guidelines – November 2010
- Review of Admin Draft RUWMP – December 2010

Meetings

- Pick Future Meeting Day and Time

Extranet/Website

- Contents
  - Announcements
  - Contacts
  - Shared Documents
    - Meetings
    - Data from Retailers
    - Regional Data
    - Documents for Review
    - Completed Documents
    - Other

Public Meeting No. 2

Meeting Agenda

Project:	RUWMP for the San Bernardino Valley	**Date:**	June 9, 2010
		Time:	2 pm to 3:30 pm
Subject:	Regional Urban Water Management Plan Meeting #2	**Location:**	Valley District Board Room

1. Introductions
2. Update on Development of UWMP Guidelines
3. Regional Water Supply Outlook
    a. Imported
    b. Groundwater
    c. Recycled
4. Water Demand Estimates and Assumptions of Retailers
5. Review of RUWMP Upcoming Tasks and Schedule
    a. Missing Data
6. Schedule Next Meeting

Meeting Time:	2PM to 3:30PM	**Page:**	1 of 4
Meeting Location:	Valley District Office	**Date:**	11 June 2010
Meeting Date:	9 June 2010	**K/J Job No.:**	1089014.00
Project:	RUWMP San Bernardino Valley		

Persons Attending:

Kennedy/Jenks	***Client/Contractor***	***Other***	***Organization***
Mary Lou Cotton	Mike Medina		City of Colton
Meredith Clement	Russ Handy		City of Loma Linda
	Chris Diggs		City of Redlands
	Woody Hynes		City of Redlands
	Peter Fox		City of Rialto
	Greg Gage		City of San Bernardino
	Ron Buchwald		East Valley Water District
	Linda Jadeski		West Valley Water District
	Jennifer Ares		Yucaipa Valley Water District

Subject:

Update on UWMP Guidelines, Regional Water Supply Outlook, Individual Agency Data and Projections

1) Introductions
2) The Department of Water Resources has convened various committees and groups to address various aspects of SBx7-7. To date, DWR and the various groups have raised the issue of how to calculate:
   a) base gross water use,
   b) service area population,
   c) base daily per capita use,
   d) compliance daily per capita use,
   e) landscape area water use,
   f) baseline CII use,
   g) compliance year adjustment criteria,
   h) indoor residential use, and
   i) Reduction Target Option 4

   At the time of the Kickoff Meeting, it was anticipated that the methodologies for calculating current water use (in gallons per capita per day) and targeted water use would not be well developed until October 2010. DWR is now stating that some of these methodologies won't be finalized until December 2010. In addition, DWR has indicated that they may proscribe the manner for calculating service area population. This raised concerns among the group because the calculation of service area population will affect the water demand projections as well as the reduction target. The group asked Kennedy/Jenks to redo the schedule so that work related to

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population estimates, demand projections, and reduction targets will occur after more concrete guidance is provided by DWR. In the near future, work should focus on demand management measures, recycled water and supply projections.

3) Kennedy/Jenks had taken a rough look at the regional water supply outlook based on data provided by the retailers, the 2009 DWR Supply Reliability Study, and the 2007 IRWMP. The data emphasized the need to implement conservation. However, it was determined that some of the data used was old. Valley District will provide K/J with the most up to date (Nov 2008) water budget.

4) The group went over the data provided by the retailers, specifically:

   a) Population projections

   b) Water demand estimates

   c) Water supply reliability

   The intent of the discussion was to review the various data sources and methodologies and to decide if the group wanted all agencies to use similar data sources and methods. With regard to population projections some agencies had used 2004 SCAG projections, some used 2008 SCAG projections, some agencies used number of connections and an estimate of persons per connection, some applied a long-term growth rate. The group agreed that using number of connections and assumed estimates of persons per connection was probably the best method for calculating past service area population because connection data is readily available and works even for those agencies whose service area includes multiple jurisdictions. To estimate future population, a long-term growth rate could be applied to the assumed year 2010 population. The long-term growth rate could come from the Department of Finance. The Department of Finance provides growth projections for cities as well as the unincorporated county. However, because there is uncertainty about whether or not DWR will proscribe a method for calculating population, the group decided to postpone population estimates until DWR has made a decision. Because assumptions about population will also affect water demand estimates, this topic will also be postponed.

   In order for the UWMP to be of the most use to the retail agencies, entities should include the demands of potential developments in their water demand projections. These potential developments and their associated water use should be detailed to the extent possible. In this manner the UWMP will simplify future Water Supply Assessments.

   Many agencies have assumed water quality will not affect water supply reliability. However, water quality is expected to necessitate treatment. In order to demonstrate that water quality will not affect the reliability of the water supply it will be necessary for the UWMP to discuss the potential contaminants and to detail the proposed treatment method, schedule for treatment, and associated costs.

   Within the materials submitted by the retailers, commonly missing data includes:

   a) Year 2035 population, year 2035 demand projections, and year 2035 water supply

   b) Water demands of low income households

   c) Legal, economic, and other justification for not implementing DMMs.

   The group has decided to hold off on additional work related to 2035 population and demand projections until additional guidance is provided by DWR. Kennedy/Jenks will work with Valley District to develop the year 2035 water supply.

   Senate Bill 1087 created the requirement for agencies to evaluate the current and future amount of

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water needed by low income communities. The definition of low income communities is supposed to come from the applicable general plan. However, Kennedy/Jenks is finding that general plans typically do not define low income communities nor provide information on the location of these communities. Kennedy/Jenks is proposing language similar to the following to comply with SB 1087:

> "Senate Bill 1087 requires that water use projections of a UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier. The *name of entity* last updated its housing element in *year*. The *name of entity*'s housing element does not identify the number or specific location of low income households in the service area of *name of entity*. Nor does the housing element project the number or location of low-income households in the future. For this reason, it is not possible to project water use for lower income households separate from overall residential demand. However, the *name of entity* will not deny or condition approval of water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households unless one of the following occurs:
>
> – the *name of entity* specifically finds that it does not have sufficient water supply
>
> – the *name of entity* is subject to a compliance order issued by the State Department of Health Services that prohibits new water connections
>
> – the applicant has failed to agree to reasonable terms and conditions relating to the provision of services"

The group will discuss the appropriate justifications and calculations needed for any DMMs not implemented during the upcoming DMM workshop.

5) A question arose at the meeting about what specific information is needed to address "Catastrophic Supply Interruption" within the RUWMP. Many agencies have large unwieldy documents and want to avoid having to upload such large files. Within an UWMP the water code requires an agency to describe the actions to be undertaken by the urban water supplier to prepare for, and implement, during a catastrophic interruption of water supplies including but not limited to a regional power outage, an earthquake or other disaster. Catastrophic events are non-drought related. For our RUWMP we will need to be able to describe the vulnerabilities of each water supply source (e.g., water treatment plant vulnerable during heavy flooding) and a summary of the plans in place to minimize the impacts of supply interruption on your service area (e.g., have intertie to, and have contracted with, adjacent agency to use water from their WTP). We need enough information to demonstrate that your agency has a plan in place, we do not need to detail the specific types of equipment, details on intertie pipelines, etc.
6) The next meeting will be a workshop focused on DMMs. This meeting has been scheduled on July 19, 2010 from 10 am to 2 pm in the Board Room of Valley District.
7) The table below includes action items from the meeting:

Action Item/Task	**Due Date**	**Responsible Party**
Add link to DWR/UWMP Guidelines Materials to the RUWMP Extranet	June 10, 2010	Kennedy/Jenks
Revised RUWMP Schedule	June 17, 2010	Kennedy/Jenks
Outline specific information needed to address catastrophic supply interruption within the UWMP (see Item 5 above)	June 17, 2010	Kennedy/Jenks
Review data provided by Loma Linda (2010 UWMP form)	June 20, 2010	Kennedy/Jenks
Complete Regional Water Supply Outlook (Water	Sept 8, 2010	Kennedy/Jenks

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Budget)		
Complete Individual Agency Chapters	January 10, 2011	Riverside Highland Water Company City of Redlands Yucaipa Valley Water District

“

Distribution: Team
Extranet

By: Meredith Clement

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Regional Urban Water Management Plan
San Bernardino Valley

June 9, 2010

Outline

- Introductions
- Update on Development of UWMP Guidelines
- Regional Water Supply Outlook
- Water Demand Estimates and Assumptions
- Review of RUWMP Upcoming Tasks and Schedule
  - Next meeting

Update on Guidelines

SBx7-7

- DWR has convened the Urban Stakeholder Committee ("USC")
  - Co-chaired by DWR and CUWCC
- Has formed an Agency Team: DWR, SWRCB, CPUC, CDPH, CBDA, USBR
- Has hired a consultant team (mainly economists and statisticians)

Update on Guidelines

SBx7-7

- USC had two meetings to date
- Members have agreed to a Charter regarding their charge (per statute), facilitated consensus-based process and input to methodologies
  - Note: "*DWR may accept or modify, <u>or may not follow</u>, the recommendations of the USC…as it prepares final documents or final products.*"

Update on Guidelines

SBx7-7

- DWR has defined several technical methodologies efforts, based on statute
- DWR Legal has reviewed statute and provided guidance to DWR staff and consultant team
- Developed a set of Issue Papers for each methodology in statute
- Has created groupings according to task:

Update on Guidelines

SBx7-7

- U3:
  - Gross water use
  - Service area population*
  - Base daily per capita use*
  - Compliance daily per capita use
  - Landscape area water use
  - Baseline CII use
  - Compliance year adjustment criteria*
  - Indoor residential use

*significant issue

Update on Guidelines

SBx7-7

- U4:Target Reduction Option 4
  - Proposal from ACWA
  - Pending proposal from CUWCC
  - DWR/Consulting Team proposal
- U4 Workgroup (voluntary) set up, will focus on how to formulate methodology
  - Note: *comments at last USC meeting showed difference between DWR and stakeholder approaches to Option 4*

Update on Guidelines

SBx7-7

- U5:Process Water
- U6 TBP:
  - Guidance for Regional UWMPs and Conservation Target Reductions

Update on Guidelines

SBx7-7

- Tentative Schedule:
  - June 22 USC and U4 Meetings at IEUA
  - July: USC and U4 Meetings TBD
  - August: **U3 Public Workshops (mid-late Aug)** and USC Meeting
  - September USC Meeting
  - October 1 finalize U3 methodologies, **U4 Public Meetings/Comment Period**
  - November USC Meeting
  - December 31 U4 method finalized

Update on Guidelines

- ALL MEETINGS ARE OPEN TO PUBLIC
- Website contains all materials:

http://www.dwr.water.ca.gov/wateruseefficiency/sb7/

Update on Guidelines

- Questions?

Outline

- Introductions
- Update on Development of UWMP Guidelines
- Regional Water Supply Outlook
- Water Demand Estimates and Assumptions
- Review of RUWMP Upcoming Tasks and Schedule
  - Next meeting

Regional Water Supply Outlook

Imported Water

Imported Supplies	Table A Amount	Average Reliability	Multi-Year Drought	Single-Year Drought
Valley District Supplies Shown in 2007 IRWMP	102,400	77% 79,000 AF	39% 40,000 AF	21% 21,500 AF
Valley District Supplies, Based on 2009 DWR Supply Reliability Report*	102,400	60% 61,400 AF	32% 32,800 AF	7% 7,200 AF

* Single-Dry Year based on repeat of 1977 hydrologic conditions, Multiple-Dry Year based on repeat of 1987 to 1992 hydrologic conditions

Regional Water Supply Outlook

Groundwater

Groundwater Basin	Management	Issues Affecting Reliability
San Bernardino Basin Area	*Western* Judgment, recharge by Valley District, Conservation District, and others	Contaminant plumes requiring wellhead treatment
Rialto-Colton	*Western* Judgment, replenishment as needed by Valley District	Perchlorate plume requiring treatment
Yucaipa	Recharge by YVWD with recycled water and purchased water	High nitrate levels
Riverside-North	*Western* Judgment, replenishment as needed by Valley District	Perchlorate plumes requiring treatment

Regional Water Supply Outlook

Groundwater – Normal Year

	2005	2010	2015	2020	2025	2030
SBBA Groundwater	193,100	193,100	193,100	193,100	193,100	193,100
SBBA Return Flow from Extractions above safe yield[1]	8,400	9,500	15,485	19,260	21,845	22,950
SBBA return flow from SWP deliveries[1]	1,000	5,000	5,130	5,220	4,930	4,930
Rialto-Colton Groundwater	17,300	17,300	17,300	17,300	17,300	17,300
Riverside North Groundwate	9,000	9,000	9,000	9,000	9,000	9,000
Yucaipa Groundwater	10,000	10,000	10,000	10,000	10,000	10,000
Other Groundwater	8,700	8,800	8,300	8,700	9,000	9,300
Groundwater Total	*247,500*	*252,700*	*258,315*	*262,580*	*265,175*	*266,580*

[1] Data from 2007 IRWMP but assumes conservation of 5% in year 2015, 10% in year 2020, 15 % in year 2025 and onward.

Regional Water Supply Outlook

Groundwater – Dry Years

- In Single-Dry Year, SWP supplies could be as low as 7,200 AF. Need to maintain groundwater credits and infrastructure to pump, treat, and deliver groundwater in the event of a severe Single-Dry Year.
- In Multiple-Dry Year, SWP supplies anticipated to be 32,800 AF for up to 5 years. Groundwater credits sufficient through year 2020, after year 2020 conservation of up to an additional 20% needed.

Regional Water Supply Outlook

Recycled Water

- No new recycled water projections provided, should 2007 IRWMP projections be used?

Agency	2005	2010	2015	2020	2025	2030	2035
San Bernardino MWD	0	800	800	800	800	800	?
Yucaipa Valley WD	1,300	2,500	3,800	5,000	5,500	6,000	?
West Valley WD	900	3,700	3,700	3,700	3,700	3,700	?
Total	*2,200*	*7,000*	*8,300*	*9,500*	*10,000*	*10,500*	*?*

From 2007 IRWMP

Regional Water Supply Outlook

Summary

- Conservation is needed in order to ensure long-term water demands do not exceed anticipated supplies
  - Law requires reduction of 10% in gpcpd by 2015 and 20% in gpcpd by year 2020
- Aggressive conservation or new supplies needed in the event of a multi-year drought year 2020 and later
- Need to maintain groundwater credits
- Need to maintain groundwater infrastructure

Outline

- Introductions
- Update on Development of UWMP Guidelines
- Regional Water Supply Outlook
- Water Demand Estimates and Assumptions
- Review of RUWMP Upcoming Tasks and Schedule
  - Next meeting

Water Demand Estimates and Assumptions

- See Handout
- Source of population estimates varied
  - used SCAG 2004, 2008 projections
  - used number of connections
  - used long-term average growth rate
- Water demand estimate methodology varied
  - most common method - take population assumption and apply a demand factor of between 200 to 250 gallons per capita per day
  - West Valley and San Bernardino MWD considered future land uses and known developments

Water Demand Estimates and Assumptions

- Assumed water supply reliability varied
  - some agencies assumed no shortage
  - range of 45-100% reliable supply in single-dry or multiple-dry year
  - no agency identified water quality as cause of water shortage

Water Demand Estimates and Assumptions

- Commonly missing data
  - Year 2035 population, water supply, and demand projections
  - Water demands of disadvantaged communities
  - Legal, economic, and other justification for not implementing DMMs

Outline

- Introductions
- Update on Development of UWMP Guidelines
- Regional Water Supply Outlook
- Water Demand Estimates and Assumptions
- Review of RUWMP Upcoming Tasks and Schedule
  - Next meeting

RUWMP Upcoming Tasks

- Kennedy/Jenks developing water supply and demand estimates
- Kennedy/Jenks evaluating agency DMMs for UWMP and AB 1420 compliance
- Next meeting proposed to be workshop to review DMMs

Public Meeting No. 3

Workshop Agenda

Project:	RUWMP for the San Bernardino Valley	**Date:**	July 19, 2010
Subject:	Preparing the Demand Management Measures Section of the 2010 Urban Water Management Plan	**Time:**	10 am to 2 pm
		Location:	Valley District Board Room

1. New legislation and the UWMP requirements
2. UWMP background
3. DMMs: requirements, compliance, implementation options and exemptions
4. Getting it done: assessing activity levels, options for compliance and developing implementation plans
5. Breakout sessions: status updates, FAQs, discussion of case-specific questions, problems and issues

Meeting Time:	10 AM to 2 PM	**Page:**	1 of 5
Meeting Location:	Valley District Office	**Date:**	21 July 2010
Meeting Date:	19 July 2010	**K/J Job No.:**	1089014.00
Project:	RUWMP San Bernardino Valley		

Persons Attending:

Kennedy/Jenks	***Client/Contractor***	***Other***	***Organization***
Mary Lou Cotton	Mike Medina		City of Colton
Meredith Clement	Russ Handy		City of Loma Linda
Dana Haasz	T. Jarb Thaipejr		City of Loma Linda
Leila Khatib	Chris Diggs		City of Redlands
	Woody Hynes		City of Redlands
	Greg Gage		City of San Bernardino
	Ted Brunson		City of San Bernardino
	Ron Buchwald		East Valley Water District
	Bob Tincher		San Bernardino Valley MWD
	Linda Jadeski		West Valley Water District
	Thomas Crowley		West Valley Water District
	Amanda Kasten		West Valley Water District
	Jennifer Ares		Yucaipa Valley Water District
	Jack Nelson		Yucaipa Valley Water District
		Max Rasouli	City of Riverside

Subject:

Workshop on Demand Management Measures Section of the 2010 Urban Water Management Plan

Introductions and Announcements

1) On August 5, 2010 the Department of Water Resources will be holding a public workshop on implementation of SBX7-7. This workshop is anticipated to cover methodologies for calculating baseline population and baseline water gallons per capita. Everyone is encouraged to attend. The meeting will be held at the Metropolitan Water District, starting at 10 am running until as late as 3 pm (past workshops have been less than 2 hours). Metropolitan is located immediately adjacent to Union Station, so it is convenient to take Amtrak or Metrolink to the meeting.

New Legislation and the UWMP Requirements

1) New legislation since the 2005 UWMPs includes SBx7-7 and AB 1420. Most legislation since the 2005 UWMP is directed at water conservation. The Demand Management Measures (DMMs) section is not a new requirement for UWMPs, *but* the new legislation requires reporting, accountability, and targets related to DMMs. More detailed information is now required related to implementation levels, cost-effectiveness calculations, and plans for implementing water conservation activities.
2) If a water supplier fails to comply with the new requirements of the UWMP Act and the associated DMM section requirements, that water supplier will be ineligible for state grant and loan funding.

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Further, if a water supplier fails to meet its SBX7-7 water use reduction targets by the end of 2020, it is possible that the water supplier could be the target of a waste and unreasonable use filing with the SWRCB, or could be subject to litigation.

DMMs and BMPs

1) The terms "Demand Management Measures" and "Best Management Practices (BMPs)" are used interchangeably. They are programs or activities through which a water supplier can communicate with their customers and encourage or incentivize water conservation. During the 2005 UWMP cycle water suppliers had to describe their compliance with 14 DMMs. The DMMs have been revised and now are grouped as follows:
   a) Foundational BMPs. These are mandatory. There are no exemptions from the Foundational BMPs.
   b) Programmatic BMPs. These may or may not be implemented, depending on which compliance option a water supplier chooses: BMP implementation, Flex Track, or Gallons Per Capita Per Day (GPCD). If the water supplier chooses to comply using the BMP option, then they must implement the BMPs that are cost-effective.

Compliance Options

1) There are three DMM compliance options. In addition to implementing the Foundational BMPs, a water supplier may:
   a) Implement Programmatic BMPs as defined by the California Urban Water Conservation Council (CUWCC). If the water supplier can document an exemption to a particular BMP, the water supplier will not have to implement that particular BMP. There are three exemption categories: cost-effectiveness, legal authority and budgetary limitation. However, the budgetary exemption cannot be used if another less cost-effective water supply program is implemented instead of the BMP.
   b) Develop a Flex Track program. Under this option a water supplier develops and implements a program that will achieve water savings greater than or equal to using the BMP option (the total savings volume of all the BMPs).
   c) Develop a Plan to reduce GPCD. Under this option a water supplier develops a means to reduce GPCD by 18% by year 2018. To also be consistent with SBx7-7, the water supplier must develop a plan to reduce GPCD 20% by year 2020. Therefore agencies may want to consider this option.

Foundational BMPs

1) 1.1 Operations Practices (formerly BMPs 10, 12, and 13). Requires:
   a) creation of a conservation coordinator (can be a part-time position or consultant)
   b) enactment and enforcement of ordinances that prohibit water waste, require efficient indoor and outdoor design principles, describe actions to be taken in a water shortage
   c) wholesale agency assistance programs (apply only to wholesalers). Programs must be mutually agreed upon between a retailer and the wholesaler.
2) 1.2 Water Loss Control (formerly BMP 3)
   a) This requires quantifying real and apparent water losses using the AWWA Water Audit M36 manual (manual here: www.awwa.org/Resources/WaterLossControl.cfm?ItemNumber=47957, software here:

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www.awwa.org/Resources/WaterLossControl.cfm?ItemNumber=48511&navItemNumber=48158&showLogin=N). During the meeting there was some discussion about exactly what DWR would require a water supplier to report related to this BMP. Based on information from the CUWCC, a water supplier should be prepared to provide the following information to demonstrate compliance with this BMP:

b) the completed AWWA Standard Water Audit and Water Balance worksheets

c) a discussion on apparent (meter under-read, fire flows) and real losses (leaks) and their causes by quantity and type

   i) the economic value of real loss recovery

   ii) document how the agency has, and will, reduce real losses when cost-effective.

   iii) document how the agency has, and will, reduce advise customers when it appears that a leak exists on the customer's side of the meter

3) 1.3 Metering with Commodity Rates (formerly BMP 4). This requires meters for all new service connections and establishment of a program to retrofit unmetered connections. A water supplier must document that they have a meter maintenance and replacement plan. Finally, a water supplier must bill customers based on volume of use based on actual meter reads (see also BMP 1.4)

4) 1.4 Retail Conservation Pricing (formerly BMP 11). A water supplier must implement a volumetric rate structure, which can be uniform, tiered, allocation-based, or seasonal rates as long as the volumetric portion is at least 70% of the rate.

5) 2.1 Public Information Programs (formerly BMP 7). Quarterly, a water supplier must contact customers with a water conservation message. Methods include events, paid and public service advertising, mailers, billings, social marketing websites, and a maintained agency website.

6) 2.2 School Education Programs (formerly BMP 8). A water supplier must implement a school education program and provide support and educational materials to local school districts.

<u>Programmatic BMPs</u>

1) Residential Assistance (BMPs 1 and 2) require that a water supplier implement all three of the following:

   a) Leak detection assistance to 1.5 % of single family and multi-family units, each year, during the first 10 years

   b) Thereafter, maintain a program whereby leak detection assistance is given to customers complaining about high bills or 0.75% of single family and multi-family units.

   c) Distribute low-flow showerheads until 75% market saturation is achieved.

   Regarding market saturation, these estimates should take into account the fact that houses built post-1992 will have low flow showerheads (as required by the building code that went into effect in 1992) and the fact that showerheads typically only last about 8 years.

2) Landscape Water Surveys (BMP 1) requires a water supplier to provide landscape water surveys to 1.5% of single family accounts each year during the first 10 years and therafter maintain a program whereby landscape water surveys are provided to customers complaining of high water bills or at least 0.75% of single family accounts per year. A single survey that looks at indoor and outdoor water use will count towards BMP 1 and BMP 2.

3) High-Efficiency clothes washers (BMP 6) requires that a water supplier provide inventives for the purchase of high efficiency clothes wasters, targeting 1% of single family accounts or 1.4% per of

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the market penetration during the first 10 years.

4) WaterSense Specification toilets (BMP 14) requires that until market saturation of 75% is achieved or until the universal retrofit statute goes into effect in 2014, an agency provide incentives for toilets meeting the WaterSense Specification and replace at least as many toilets using 3.5 or more gallons per flush as would occur with a retrofit on resale ordinance. A water agency can offer rebates or offer reduced connection fees for new housing that includes WaterSense specification toilets.
5) Commercial, Industrial, and Institutional BMPs (BMP 9). This requires a water agency to reduce CII use by 10% over a 10-year period using measures on the CUWCC's CII list or implementing unique conservation measures with quantifiable water savings. This particular BMP may be influenced by requirements in SBX7-7 for a 10% reduction in the CII sector statewide by 2020; guidance will not be available until 2012.
6) Landscape BMP (BMP 5). Requires a water agency to provide incentives to non-residential large landscape customers. A water supplier must:
   a) Develop water use budgets for 90% of landscape accounts with dedicated meters within a 10 year period. Water budgets should be consistent with the Model Water Efficient Landscape Ordinance.
   b) Provide audits or irrigation checks for all landscape accounts that are 20% over their water budget within six years.
   c) Provide surveys to 15% of un-metered and mixed use meter accounts in 10 years (CII surveys that include both indoor and outdoor can be credited to both the landscape and CII BMPs).
      i) Provide incentives for irrigation equipment retrofits
      ii) Provide notices each billing cycle with water use budgets.

<u>Exemptions from Programmatic BMPs</u>

1) Exemptions are allowed from the Programmatic BMPs. A supplier can be exempted from a BMP if:
   a) The BMP is not cost-effective (cost-effectiveness should be demonstrated using the CUWCC cost-effectiveness model, which has been loaded to the RUWMP Extranet site).
   b) Lack of funding. The argument to not implement a particular BMP cannot be used if a less cost-effective BMP is being implemented.
   c) Legal impediments.

   Regardless of whether or not a BMP is cost-effective, a water supplier may need to implement it in order to meet the requirements of SBx7-7 (reduction in GPCD by 20% by year 2020)

<u>Steps to Preparing DMM section of the UWMP</u>

1) As shown below, there are several steps in preparing the DMM section of the UWMP, we are currently at the first step, "Assess Compliance."

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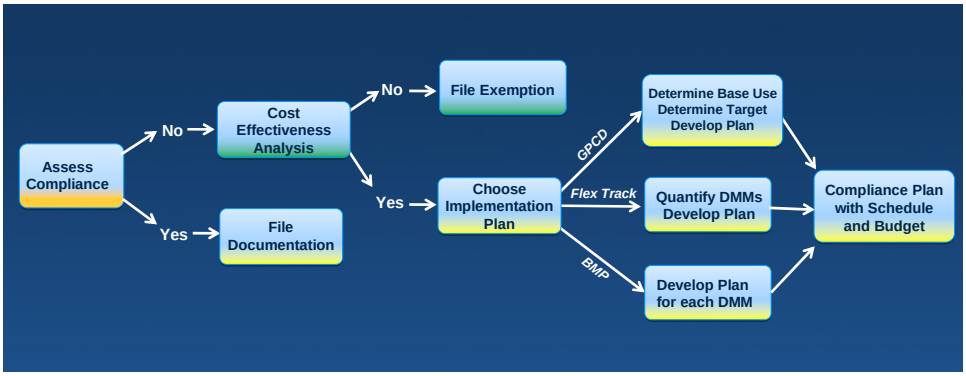

2) In order to assess compliance, Kennedy/Jenks needs complete data forms. Commonly agencies have provided the data they used for the 2005 UWMP, but data for years 2005 to 2010 is missing. Kennedy/Jenks will contact each agency with a list describing the missing data. The goal is to provide the missing data by August 6.

Upcoming Meetings and Action Items

1) The next meeting is anticipated mid- to late- September and will focus on Regional Water Supply.
2) The table below includes action items from the meeting:

Action Item/Task	**Due Date**	**Responsible Party**
Provide link to CA Green Building Code on Extranet (done)	July 21, 2010	Kennedy/Jenks
Provide link to AWWA Water Audit Manual M36 on Extranet (done)	July 21, 2010	Kennedy/Jenks
Load DMM Cost-Effectiveness Worksheets to Extranet	July 23, 2010	Kennedy/Jenks
Provide list of missing DMM data to agencies	***July 23, 2010***	***Kennedy/Jenks***
Provide missing DMM data	***August 6, 2010***	***All agencies***
Complete Regional Water Supply Outlook	Sept 8, 2010	Kennedy/Jenks
Complete Individual Agency Chapters	January 10, 2011	Riverside Highland Water Company City of Redlands Yucaipa Valley Water District

Distribution: Team
Extranet

By: Meredith Clement

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On July 19th SBVMWD will be hosting a Demand Management Measures (DMM) Workshop for our retailers, which will focus on the DMM section of the 2010 Urban Water Management Plan (UWMP). The Workshop will be led by the Kennedy/Jenks Consultants team that is developing our plan.

What will be covered:

As you all probably know, the demand management requirements of the 2010 UWMP mark a dramatic shift from previous years. Included in the 2010 UWMP are the new legislative requirements of SBX7-7 ("20%X2020") and AB 1420, which set water use reduction targets and link compliance with DMMs to eligibility for grant and loan funding. This workshop will explain the 2010 UWMP and related legislative requirements, define all the DMMs and their compliance standards, reporting and scheduling requirements, briefly outline various methods of compliance, define exemptions, and discuss data needs. Finally, we will provide guidance on how to start and make your way through the DMM reporting process.

Preparing for the workshop:

This workshop is for *you*, so please come prepared to participate and ask questions! Our break-out sessions will be an opportunity for us to help you address issues specific to your service area, customers and data limitations.

To enable Kennedy/Jenks to help you, please bring the following information for your service area:

- 2010 DMM data forms (from Kennedy/Jenks), completed to the extent possible
- Brief written descriptions of your current conservation programs, including all activities from 2005 through 2010
- Information on any regional or cooperative programs
- DMM section of your 2005 UWMP
- Consumption and population data for 1994-2008 (this is needed for SBX7-7)

Also, please review the DMM section of the UWMP as well as the language of SBX7-7 (attached)

Who should attend:

This is a technical workshop designed for conservation coordinators and/or retailer staff responsible for preparing the DMM section of the 2010 UWMP. It will also be informative for managers.

If you have any thoughts or suggestions, please let us know. We look forward to seeing you.

Regional Urban Water Management Plan
San Bernardino Valley

Agenda

1. UWMP background
2. New legislation and UWMP requirements
3. DMMs: requirements, compliance, implementation options and exemptions
4. Getting it done: assessing activity levels, options for compliance and developing implementation plans
5. Breakout sessions: status updates, FAQs, discussion of case-specific questions, problems and issues

UWMPs: The Basics

When	Every 5 years. Extension to June 31, 2011 Guidebook not expected until January 2011
Who	Urban agencies with 3,000+ connections or AFY deliveries
Why	Identify gaps between supply and demand
How	Detailed Description of: • Supply sources: surface, recycled, groundwater • Hydrologic year types: normal, multiple dry, critical dry • Water quality problems • **Demand Management Measures** • Water shortage contingency planning

2010 UWMPs: What's New

- Most new legislated requirements target water conservation
- DMM section is not new
- What is new: reporting, accountability, targets, measurements and oversight
- Detailed information on implementation levels, cost-effectiveness evaluations, schedules and budgets
- Requires more effort!

New Legislative Requirements

- SBX7-7 ("20% x 2020"):
  - 20% demand reduction statewide by 2020
  - Sets mandatory demand reduction goal for each retail agency
- AB 1420 and SBX7-7: tie compliance with DMMs to eligibility for all water management grants and loans
  - Funding can be available to bring an agency into compliance

SBX7-7 : Determining Your Target

Target reduction methodology options:

1. 20% reduction from base (80% of average gross water use in gpcd)
2. Combination of state standards:
   - 55 gpcd indoor residential + landscape use at 70% - 80% ETo + 10% reduction in commercial/industrial/institutional use
3. DWR 20x2020 hydrologic region target (South Lahontan region = 149 gpcd)
4. Option to be developed by October 2010

All retailers must reduce by a minimum of 5%!

New 2010 Plan Requirements

- Identification of 2015 and 2020 goals AND
- Compliance with DMMs, OR
- A plan to get into compliance that includes:
  - Implementation Schedule
  - Financing plan
  - Budget , OR
- Documentation that the DMM is not cost-effective

What Happens If You Don't Do It?

- Measure at 2016 – DWR to evaluate statewide and individual agency progress toward 20%
- Grants and loans eligibility
- We don't know what, but something else likely coming based on Legislature interest in subject
- January 1, 2021: potential waste and unreasonable use filing with SWRCB, or litigation

DMMs, BMPs and the CUWCC

DWR DMM = CUWCC BMP (What is the CUWCC?)

- Created during the drought of 1987-92, in 1991
- Partnership between water suppliers, public interest groups and private sector
- Conducts research, manages programs, develops BMPs and provides forum for collaboration
- Goal: integrate urban water conservation into planning and management of water resources
- Revised BMPs and compliance options in 2008 to increase agency flexibility

What are DMMs?

- Programs that allow suppliers to access their customers and either *encourage or incentivize* them to reduce water demand
- Active and passive savings
- Savings are quantifiable ("hardware-based") or non-quantifiable ("support" programs)

BMPs: The "Original" 14

1. Residential water surveys
2. Residential plumbing retrofits
3. System audits, leak detection and repair
4. Metering with commodity rates for new connections and retrofit of existing ones
5. Large landscape programs/incentives
6. High-efficiency clothes washers
7. Public information
8. School education
9. Conservation programs for CII accounts
10. Wholesale agency assistance programs
11. Conservation pricing
12. Conservation coordinator
13. Water waste prohibition
14. Residential toilet replacement

(Non-quantifiable)

The Revised BMPs

BMPs are now grouped into:

- Foundational:
  - Public education, metering, pricing, system water loss control
    - Mandatory
    - Non-quantifiable
- Programmatic:
  - Three categories: Residential, Landscape, CII
    - Requirement contingent on cost-effectiveness
    - Quantifiable

Compliance Options

Three Options:

1. **BMP implementation** (original method) – implement BMPs as defined. Prescriptive approach.
2. **Flex track –** Implement tailored program that will achieve water savings greater than or equal to using the BMPs. Can use CUWCC program list or your own. Proper documentation required.
3. **GPCD** - 18% reduction by 2018 (Baseline = the average annual potable GPCD between 1997 through 2006).

Foundational BMPs: Utility Operations

1.1 Operations Practices

a. Conservation Coordinator (formerly BMP 12)
Establish a conservation coordinator position.

b. Water Waste Prevention (BMP 13)
Enact and enforce ordinances that either prohibit waste, require efficient indoor or outdoor design principles, establish shortage measures, etc.

Foundational BMPs: Utility Operations

c. Wholesale Agency Assistance Programs (BMP 10)

- Cost-effectiveness assessments
- Technical support, incentives, staff or consultant support
- Program management and BMP reporting assistance
- Water shortage allocations plans that encourage long-term conservation
- Reporting on non-signatory BMP implementation
- Encouraging CUWCC membership

Foundational BMPs: Utility Operations

1.2 Water Loss Control (formerly BMP 3)

Implementation consists of at least the following:

- Quantifying real and apparent losses using AWWA Water Audit per the M36 manual
- Data validation
- Determining the economic value of loss recovery (avoided cost)
- Component analysis of apparent and real losses
- Loss reduction to cost effective levels
- Advising customers of leaks

Foundational BMPs: Utility Operations

1.3 Metering with commodity rates for all new connections and retrofit of existing connections (BMP 4)

Implementation consists of at least the following:

- Requiring meters for all new service connections
- Establishing a program to retrofit unmetered connections
- Reading meters and billing customers by volume of use
- Preparing a meter maintenance and replacement plan
- Exploring mixed-use metering and dedicated landscape meters

Foundational BMPs: Utility Operations

1.4 Retail Conservation Pricing (BMP 11)

Volumetric rate structure, which can be uniform, tiered, allocation-based or seasonal rates as long as the volumetric portion is at least 70% of rate.

Foundational BMPs: Education

2.1 Public Information Programs (BMP 7)

Quarterly customer contact through events, paid and public service advertising, mailers, billings and social marketing and an actively maintained website.

Foundational BMPs: Education

2.2 School Education Programs (BMP 8)

Implementing of a school education program and providing support and educational materials to local school district.

Residential BMPs

1. **Residential Assistance Program (BMPs 1 & 2)**
   - Leak detection assistance to 1.5% of SF and MF units during the first 10 years.
   - Maintaining a program at least at the level of high-bill complaints or 0.75%/year of SF and MF units.
   - Distributing showerheads until 75% market saturation is achieved.

Residential BMPs

2. **Landscape Water Surveys (BMP 1)**
   - Landscape water surveys to 1.5%/yr of SF accounts during the first 10 years.
   - Maintaining the program at the level of high-bill complaints or at least 0.75%/yr.

Residential BMPs

3. **High-efficiency clothes washers (BMP 6)**
   - Financial incentives for the purchase of HECWs.
   - Annual target is 1.0% of SF accounts or 1.4% per year of the market penetration during the first 10 years.

Residential BMPs

4. **WaterSense Specification toilets (BMP 14)**
   - Incentive for toilets meeting WSS standard.
   - Replacement of a number of toilets of 3.5 gpf+, at least as effective as a retrofit on resale ordinance until 2014, OR
   - Market saturation of 75%.

Residential BMPs

5. **WSS for new residential development**
   - Incentives such as rebates, recognition programs, reduced connection fees, or ordinances requiring residential construction meeting WSS for SF and MF housing.
   - Continue until a local, state or federal regulation is passed requiring water efficient fixtures.

Commercial, Industrial, and Institutional BMPs (BMP 9)

Reduce CII use by 10% over a 10-year period by:

i. Implementing measures on the CUWCC's CII list with well-documented savings (e.g. toilets, urinals, clothes washers, etc), AND/OR

ii. Implementing unique conservation measures whose water savings are calculated on a case-by-case basis (e.g. industrial process water use reduction, industrial laundry retrofits, car wash recycling systems, etc.). Documentation is key.

Landscape BMP (BMP 5)

Support and incentives for non-residential customers.

- Develop water use budgets at 70% ETo (100% for recreational areas) for 90% of accounts with dedicated irrigation meters in 10 years.
- Assist all accounts that are 20% over budget within 6 years.
- Surveys on 15% of un-metered and mixed use meter accounts in 10 years (CII surveys that include both indoor and outdoor can be credited for both the Landscape and CII BMPs).
- Incentive program for irrigation equipment retrofits.
- Provide notices each billing cycle with water use budgets.

Landscape BMP (cont'd)

For accounts without Meters or with Mixed-Use Meters:

- Develop and implement a strategy for marketing surveys.
- Offer financial incentives.

Exemptions

According to MOU, supplier can exempt from a BMP if:

1. BMP is not cost-effective (c-e). The CUWCC provides the analysis tool. Supplier needs to provide documentation, avoided cost values and good faith effort.
2. Lack of funding. Cannot be used if a less c-e water management option is implemented.
3. Legal impediments exist. Supplier must make a good faith effort to remove barriers.

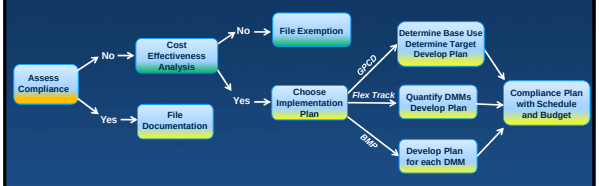
BUT…

Exemptions (cont'd)

Exemptions are not what they used to be because:

1. Flex Track: an agency can design their own program to be more c-e.
2. SBX7-7: exemption from a DMM does not obviate "20 x 2020" requirement. Still need to meet demand reduction goals!

Demand Management Flowchart



The Steps - Compliance

1. Data Collection – DMM forms, conservation activities, SBX7-7 data
2. Determine DMM compliance
3. Ensure compliance with foundational BMPs

Depending on results:

4. File supporting documentation, OR
5. Perform c-e evaluations, AND
6. Prepare exemption materials, OR
7. Prepare implementation plans

The Steps - Implementation

Decide on implementation method:

- If BMP – develop plan for each BMP
  - Provides a prescriptive, formulaic, pre-designed approach
  - Requires less analysis
  - Regional programs easier is everyone's doing same thing
  - Not tailored to specific needs
- If Flex Track – quantify BMPs and develop plan
  - More tailored, customer-specific approach. Less likely to implement programs that won't give you savings
  - CUWCC CII list fairly extensive
  - Requires additional analysis, customer information and, potentially, supporting documentation

The Steps – Implementation (cont'd)

- If gpcd – determine base use, develop plan
  - Full flexibility for program design
  - Focus on one goal: SBX7-7 is gpcd-based as well and consistent with DMM compliance goals
  - Regional applicability of approach
  - Requires additional analysis, customer information and, potentially, supporting documentation

Kennedy/Jenks' Support

Kennedy/Jenks needs:

- Population and consumption data
- DMM forms (filled out as much as possible)
- All available information on conservation activities

Kennedy/Jenks will:

- Calculate SBX7-7 goals options
- Help determine DMM compliance levels
- Provide general recommendations for achieving compliance

Breakout Sessions

Public Meeting No. 4

Meeting Agenda

Project:	RUWMP for the San Bernardino Valley	**Date:**	October 28, 2010
Subject:	Regional Urban Water Management Plan Meeting #4	**Time:**	1 to 3:30 pm
		Location:	Valley District Board Room

1. Update on SBx7-7 compliance
    a. DWR Guidelines/Methodologies (30 min)
    b. Strategy for DMM compliance (20 min)
    c. Strategy for 20% reduction by 2020 compliance (30 minutes)
    d. Estimating Population (30 minutes)
2. Finalize approach to Regional Urban Water Management Plan (20 min)

Meeting Time:	1:30 PM to 4 PM	**Page:**	1 of 4
Meeting Location:	Valley District Office	**Date:**	5 November 2010
Meeting Date:	28 October 2010	**K/J Job No.:**	1089014.00
Project:	RUWMP San Bernardino Valley		

Persons Attending:

Kennedy/Jenks	*Client/Contractor*	*Other*	*Organization*
Mary Lou Cotton	Mike Medina		City of Colton
Meredith Clement	Russ Handy		City of Loma Linda
Dana Haasz	T. Jarb Thaipejr		City of Loma Linda
	Chris Diggs		City of Redlands
	Woody Hynes		City of Redlands
	Greg Gage		City of San Bernardino
	Ted Brunson		City of San Bernardino
	Ron Buchwald		East Valley Water District
	Don Hough		Riverside Highland Water Company
	Bob Tincher		San Bernardino Valley MWD
	Doug Headrick		San Bernardino Valley MWD
	San Fuller		San Bernardino Valley MWD
	Linda Jadeski		West Valley Water District
	Thomas Crowley		West Valley Water District
	Amanda Kasten		West Valley Water District
	Jennifer Ares		Yucaipa Valley Water District
	Jack Nelson		Yucaipa Valley Water District
		Susan Lien Longville	Water Resources Institute

Subject:

DMM Compliance, SBx7-7 Compliance, Approach to Regional Urban Water Management Plan

Introductions and Announcements

1) The Department of Water Resources was originally going to hold a webinar on the Urban Water Management Plan Guidelines on November 18, 2010. *The webinar has been moved to November 30* from 9 am to 3 pm. Here is the link: http://www.water.ca.gov/calendar/index.cfm?meeting=15102
2) SB 1478 was approved, this means wholesale agencies, like Valley District, have the same deadline for the 2010 Urban Water Management Plan as retailers, July 1, 2011.

Demand Management Measures (DMMs)

1) Demand Management Measures are required to be discussed in the UWMP and are an important tool for achieving the 20% reduction by 2020 required by SBx7-7)

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2) An agency must implement Foundational DMMs. In addition, an agency must:
   a) demonstrate compliance with DMMs OR
   b) develop a DMM implementation plan that includes a schedule and budget showing how the agency will come into compliance with DMMs, OR
   c) Prepare documentation supporting an exemption

   Examples of a compliance plan and documentation supporting an exemption are provided on the Extranet site in the "Other" Category. The Water Use Efficiency Plan prepared by Western Municipal Water District has also been posted to the website as an example of a compliance plan.
3) An agency cannot exempt from a Foundational DMM. An agency can exempt from a Programmatic DMM, but will still need to comply with "20x2020".
4) K/J has assessed DMM compliance for the participating agencies. Agencies now need to prepare their cost effectiveness analyses, prepare the paperwork to document DMM exemptions, and prepare an applicable DMM implementation plans. *Kennedy/Jenks will prepare draft cost-effectiveness evaluations for Colton, Loma Linda, San Bernardino Municipal Water Department, East Valley, West Valley, and Valley District.* Agencies will be responsible for reviewing and finalizing these evaluations and then developing their DMM implementation plans.
5) Agencies should complete their cost-effectiveness evaluations, exemption documentation, and compliance plan by December 3, 2010.
6) The group determined to hold a meeting to discuss whether implementing some conservation programs as a regional group (sharing costs and sharing expertise) would be beneficial. This meeting will be held December 8, 2010, 3 pm, at the offices of Valley District.

<u>SBx7-7 Compliance - Base Water Use Calculation</u>

1) The two primary calculations required by SBx7-7 are:
   a) Base Water Use Calculation (gallons per capita per day used in past years)
   b) Compliance Water Use (target gallons per capita per day in 2015 and 2020)
2) The Base Water Use calculation can be based on:
   a) a 10-year average ending no earlier than 2004 and no later than 2010 or
   b) a 15-year average if 10% of 2008 demand met by recycled water
3) In addition, an agency must report their 5-year base water use calculation. This 5-year period can end no earlier than 2007 and no later than 2010.
4) **The group determined that no agency qualifies to use the 15-year average in their Base Water Use calculation.**
5) Base Water Use must account for all water sent to retail customers, excluding:
   - Recycled water
   - Water sent to another water agency
   - Water that went into storage
   - Water sent to ag customers
   - Optional - an agency may exclude process water if its industrial water use comprises a substantial percentage of its total water use.
6) Population estimates used in the Base Water Use calculation must relate to data from the California Department of Finance or the US Census, but can be refined using local data sources

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such as SCAG.

7) **In June the group decided to calculate population using the number of connections:**

   (# connections) x (persons per connection)

8) Kennedy/Jenks will recommend a persons per connection number based on Department of Finance or US Census data. Agencies, if they haven't done so already, need to provide information on number of connections by Single-Family and Multi-Family for years 1994 to present.

9) A handout on the Base Water Use calculation is attached to these meeting minutes.

<u>SBx7-7 Compliance (20% reduction by 2020) - Compliance Water Use Calculation</u>

1) There are four methods for calculating Compliance Water Use:
   - Method 1: 20% reduction from Base Water Use
   - Method 2: Meet separate targets for indoor water use (55 ppcd), outdoor water use (consistent with water use allowed under Model Landscape Ordinance), and CII customers
   - Method 3: Meet DWR South Coast region target of 149 gpcd
   - Method 4: Still in process

   The group determined that Method 2 required data not readily available and eliminated it from further consideration. The group also determined that Method 3 would not be reasonable for the San Bernardino area. All indications are that Method 4 will incorporate some of the approach of Method 2 which renders it highly unlikely. Thus, Method 1 is the most likely method for the San Bernardino area.

<u>Formal Regional Compliance with SBx7-7?</u>

1) Compliance with SBx7-7 can be done individually or as a region.

2) DWR has developed a formal process whereby agencies can form a "Regional Alliance". Compliance with SBx7-7 targets would then be evaluated for the Regional Alliance as a whole. This could help agencies struggling with compliance, but would mean that some agencies would have to achieve more than a 20% water savings in order to bring the Regional Alliance group into compliance.

3) **After discussion on the pros and cons of forming a Regional Alliance, the group decided against it for the 2010 submittal. However, this concept may be considered prior to preparation of a 2015 RUWMP.**

<u>One Document or Multiple Documents</u>

1) One of the agencies heard about litigation filed against the Castaic Lake Water Agency joint urban water management plan. All of the agencies in the joint plan were brought into the lawsuit. The question was whether these other agencies were brought into the litigation solely based on the fact that they were in the joint document. A separate handout was distributed with the pros and cons (see attached).

2) **After discussion of the pros and cons of preparing a single joint UWMP versus multiple individual UWMPs, the group confirmed their approach to prepare a single UWMP for the entire region.**

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Upcoming Meetings and Action Items

1) The next RUWMP meeting is scheduled December 8, 2010 from 1:30 to 3 pm at the Valley District office.
2) A meeting to discuss regional coordination on conservation measures is scheduled December 8, 2010 from 3 to 4 pm at the Valley District office (this meeting will immediately follow the RUWMP meeting).
3) The table below includes action items from the meeting:

Action Item/Task	**Due Date**	**Responsible Party**
Kennedy/Jenks to review data provided by agencies, identify any missing data needed to complete SBx7-7 calculations	Nov 11, 2010	Kennedy/Jenks
Provide missing data needed to complete SBx7-7 calculations	Nov 18, 2010	City of Colton City of Loma Linda City of San Bernardino East Valley Water District West Valley Water District
Provide draft cost-effectiveness evaluations to Colton, Loma Linda, San Bernardino Municipal Water Department, East Valley Water District, and West Valley Water District	Nov 19, 2010	Kennedy/Jenks
Complete DMM cost-effectiveness evaluations, exemption documentation, and compliance plans	Dec 3, 2010	City of Colton City of Loma Linda City of San Bernardino East Valley Water District West Valley Water District
Answer the following questions: 1) how to account for service area base gross water use if customers within the service area drill private wells to reduce or remove reliance on the water retailer. 2) status of stormwater offsets: not specifically called out in statute, but could be part of a residential landscape water conservation program	Nov 30, 2010	Kennedy/Jenks
Perform SBx7-7 Base Water Use Calculation for each agency	Nov 30, 2010	Kennedy/Jenks
Perform SBx7-7 Compliance Water Use Calculation for each agency	Nov 30, 2010	Kennedy/Jenks
Review regional DMM options to determine those most cost-effective (Extranet) prior to December 8 meeting.	Dec 3, 2010	All agencies
Complete calculations and Chapter	Feb 18, 2011	Riverside Highland Water Company City of Redlands Yucaipa Valley Water District

Distribution: Team
Extranet

By: Meredith Clement

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SBx7-7 Calculations

Baseline Gross Water Use

Primary Calculations:

- Calculation of Baseline Gross Water Use
- Calculation of Compliance Gross Water Use (Targets)

Calculation of Baseline Gross Water Use

1.1 Calculate Gross Water Use
1.2 Calculate Population
1.3 Calculate Average Gallons per Capita per Day Water Use
1.4 Determine Appropriate Timeframe for Reporting Average Gallons per Capita per day base

1.1 Calculate Gross Water Use

Goal here is to account for all water sent for delivery to retail customers. Remember, you will need to do this calculation for each possible year from December 31, 1994 through December 31, 2010 (this will make it possible to select what timeframe is most advantageous).

1.1.1 Define the distribution system that serves water to retail customers. Measurement locations for distribution include the:
- Exit points for water treatment plants
- Exit points for treated water reservoirs
- Wells feeding directly into the distribution system
- Imported water entering directly into the distribution system

1.1.2 Tabulate all water sent for delivery to retail customers from the sources defined in 1.1.1.
1.1.3 Subtract from 1.1.2, any water sent through the distribution system to another water utility or jurisdiction
1.1.4 Subtract from 1.1.3, any water that entered the distribution system but went into storage
1.1.5 Add to 1.1.4, any water that was sent from storage to retail delivery
1.1.6 Subtract from 1.1.5, any recycled water that directly entered the distribution system
1.1.7 Subtract from 1.1.6, any recycled water indirectly entering the distribution system (this would be recycled water that augments surface supply reservoirs, recycled water used for groundwater recharge).
Optional Subtract from 1.1.7, water delivered to agricultural users*
Optional Subtract from 1.1.7, water delivered for process water use**

* if a retailer decides to *include* ag water use in the base gross water use calculation that retailer must use Method 2 to calculate their Target Gross Water Use. Under Method 2 targets are set as follows: 55 gpcd for indoor residential use, landscape irrigation set at 0.7 to 0.8 ETo, a 10 percent reduction in base CII use, and an ag water use standard of 100 percent reference evapotranspiration multiplied by the crop coefficient for irrigated acres. *In short, including ag water in your base gross water use greatly complicates the calculation of water reduction targets and may result in unreasonably low targets.*

** "Process water" means water used for producing a product or product content or water used for research and development, including, but not limited to, continuous manufacturing processes, water used for testing and maintaining equipment used in producing a product or product content, and water used in combined heat and power facilities used in producing a product or product content. Process water does not mean incidental water uses not related to the production of a product or product content, including, but not limited to, water used for restrooms, landscaping, air conditioning, heating, kitchens, and laundry.

1.2 Calculate Population

Remember, you will need to do this calculation for each possible year from 1995 through 2010. This part must use the same retail service area as used in 1.1.1.

DWR strongly recommends using data published by the California Department of Finance (DOF) or US Census Bureau, but this data can be refined using local data sources (county assessor records, Southern California Association of Governments, San Bernardino Association of Governments).

Potential Options

1.2.1A For those agencies whose service area substantially overlaps with city boundaries, use corresponding DOF data

1.2.1B For those agencies whose service area does not overlap with city boundaries:

- Get service area population from SCAG or SBAG (if their estimates use DOF or Census as basis)
- Other GIS calculation of population

1.2.3C Use DOF, Census, SCAG, or SBAG to define persons per single-family, then calculate yearly population based on number of single-family and multi-family connections each year

1.2.2 Calculate Population for each year of the each year 1995 to 2010

1.2.3 Subtract from 1.2.2 any residents of large water users that depend on private supply (example would be prisons, colleges)

1.3 Calculate Average Gallons per Capita per Day Water Use

Remember, you will need to do this calculation for each possible year from 1995 to 2010.

1.3.1 Calculate daily per capita water use for each year by dividing gross water use in that year (from part 1.1) by the estimated population in that year (from part 1.2)

1.3.2 Calculate Base Daily Per Capita Water Use. Calculate rolling 5-year and 10-year or 15-year average per capita water use by summing the values calculated in Step 1.3.1 and dividing by the number of years in the base period. The result is Base Daily Per Capita Water Use for the selected base period.

1.4 Determine Appropriate Timeframe for Reporting

SBx7-7 requires that Baseline Gross Water Use be calculated using either a 10-year period or a 15-year period and an agency must also report data for 5-year period.

14.1 An agency should use the average of a 10-year period ending no earlier than December 31, 2004 and ending no later than December 31, 2010,
OR
An agency can use the average of a 15-year period, ending no earlier than December 31, 1999 and no later than December 31, 2010 *if* 10% of 2008 demand met by recycled water, AND

1.4.2 The average of a 5-year period, ending no earlier than December 31, 2007 and not later than December 31, 2010.

Regional Urban Water Management Plan
San Bernardino Valley

Meeting 4

October 28, 2010

Overview

- Demand Management Measures (DMMs)
- SBx7-7 Compliance
  - Legislative update
  - Next Steps
    - Calculate Base Daily Per Capita Water Use
      - Selection of base period
      - Calculating population
    - Calculating Compliance "Target"
      - Overview of methods
      - Choosing a method
    - Compliance regionally vs. individually

SBx7-7 Compliance

- New Law: SBX7-7 ("20% x 2020") for 2010 UWMPs
- Four methods are available for determining compliance:
  - Method 1: 20% reduction from base (gpcd)
  - Method 2: Meet separate targets for indoor (55 gpcd), landscaped area and CII
  - Method 3: Meet DWR target (South Coast region = 149 gpcd)
  - Method 4: In process (December 2010)

SBx7-7 Compliance

- Legislative Update
  - SB 1478 – APPROVED: Provides the same deadline extension (July 2011) to wholesale water agencies.
  - Update on Method 4
  - Other

Demand Management Requirements (DMMs)

- Required in UWMPs
- Required by AB 1420
- Used to achieve 20% reduction by 2020

NEW DMM Requirements

Compliance requires one of the following:

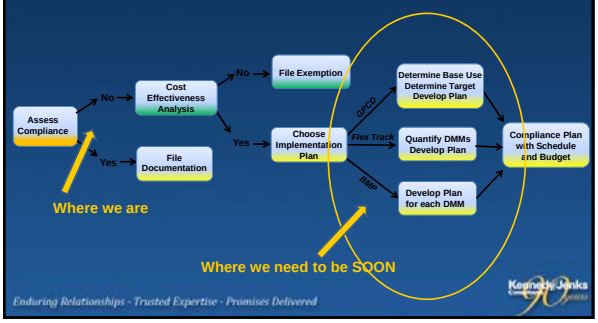
- Implementation of Foundation DMMs
- Compliance with DMMs, OR
- A plan to get into compliance that includes:
  - Implementation Schedule
  - Financing plan
  - Budget, OR
- Documentation supporting exemption

Exemptions are not what they used to be

Things are different in 2010:

- Can't exempt from a Foundational DMM
- Can exempt from a Programmatic DMM but not from "20 x 2020"
- UWMP must identify 2015 and 2020 water use targets and develop a plan for getting there
- Every retail water supplier must comply with 20x2020 – NO EXEMPTIONS

DMM Compliance Process



Strategy for DMM Compliance

1. ~~Data Collection~~ √
2. ~~Determine DMM compliance~~ √
3. Ensure compliance with foundational BMPs Some √

Depending on results:

4. File supporting documentation, Some √ OR
5. Perform c-e evaluations, AND
6. Prepare exemption materials, OR
7. Prepare implementation plans

DMM Compliance – Next Steps

Each agency knows their current implementation status

NOW each agency must:

1. Implement the Foundationals (or develop plan)
2. Determine implementation resources
3. Analyze non-compliant Programmatic DMMs for cost-effectiveness
4. Choose an implementation option (option should track with "20x2020" implementation plan)
5. Calculate "20x2020" targets

Regional DMM Programs?

Is there interest in implementing some or all programs regionally with Valley District providing funding? Sharing in the cost of a Water Conservation Coordinator?

If Yes:

a) Which DMM option(s) is/are best?
b) How will it be managed?
c) What are the programs and desired participation level by Valley District?

SBx7-7 Compliance

- All methods require calculation of Base Use (current use)
- Choose most favorable Method for Target

SBx7-7 Compliance – Base Use

- Base Use (required for all Methods)

$$\frac{\text{Base water use (base period)}}{\text{Population}} = \text{gpc}$$

Base Daily Per Capita Water Use

- 10-year average
  - *ending no earlier than 2004 – no later than 2010*
- ~~15-year average if 10% of 2008 demand met by recycled water~~
  - ~~*get to add 5 years to calculation*~~
- 5-year average
  - *at least 5% reduction*
  - *ending no earlier than 2007 – no later than 2010*

Action Point: K/J will look at all possible periods so that an agency can choose the reduction target that is most realistic to achieve

Base Daily Per Capita Water Use

- Base Water Use Calculation
  - All water sent to retail customers
  - Exclude
    - Recycled water
    - Water sent to another water utility
    - Water that went into storage
    - Water sent to Ag customers (if known)
    - Water used as process water (if known)

Action Point: Each agency must provide this data to K/J.

Population

- Population
  - Must use data from California Department of Finance or US Census (can be refined using local data sources (county assessor records, SCAG, SBAG)
  - Can revise based on 2010 Census data
  - Exclude any residents of large water users that depend on private water supply

Population (cont.)

- Options for Calculating Population
  - At our June 9, 2010 meeting, we decided to calculate population using:

(# connections) x (people/connection) = POPULATION

  - Required data
    - <u># Connections</u>: do all agencies have this data (back to '94)?
    - <u>People/connection</u>
      - Varies by agency and area (apartments, etc.)
      - To be calculated by K/J

Base Daily Per Capita Water Use

- Agency Action Items
  - ✓ Provide connection data to K/J by _____
  - ✓ Provide connection data to K/J by _____
- K/J Action Items
  - ✓ K/J will calculate the Base Daily Per Capita Water Use by _____
  - ✓ K/J will calculate the Target amount for all of the Methods that apply to determine the one most favorable to each agency

Finalize Approach: One Document vs. Multiple Documents

- QUESTION: WE HAVE HEARD ABOUT THE LITIGATION AGAINST THE CASTAIC LAKE WATER AGENCY JOINT URBAN WATER MANAGEMENT PLAN AND THAT THE RETAIL AGENCIES WERE BROUGHT INTO THE LITIGATION. WERE THE RETAIL WATER AGENCIES BROUGHT INTO THIS LITIGATION SIMPLY BECAUSE THEY WERE PART OF THE REGIONAL DOCUMENT?
- Action Point: One document or multiple documents?

Regional Compliance?

- Regional compliance through a "Regional Alliance"
  - Through wholesale supplier
  - Regional water management group
  - IRWMP area
  - Hydrologic region
  - Other?

Regional Compliance?

- Options
  1. $T_{regional(R)} = \frac{\Sigma T*P}{RP}$
  2. Sum individual base water use and population then apply one of the Methods.
  3. Calculate base water use and population for the region then apply one of the Methods

Regional Compliance?

- Pros
  - Helps agencies that may have difficulty complying
  - Looks good on grant applications
- Cons
  - Could result in some agencies not taking responsibility for achieving compliance
  - Could cause tension if one, or more, agencies are keeping the region from compliance.
- Action point: Do we want regional compliance or individual compliance?

Schedule

- DWR UWMP Guidebook Webinar - November 18th
- K/J Starts 20x2020 Calculations/Works with Agencies to Develop Missing Data - December 2010
- Meeting 5 – December 2010
- K/J completes individual agency chapters - February 2011
- Chapters from Redlands, Yucaipa, and Riverside-Highland Due – February 2011
- K/J holds meetings with individual agencies – March 2011
- K/J prepared Draft RUWMP – April 2011
- Adoption of RUWMP by agencies – May 2011
- Submit RUWMP to DWR – June 2011

Action Items

- Agency Action Items
  - ✓ DMMs
    - Implement the Foundationals (or develop plan)
    - Determine implementation resources
    - Analyze non-compliant Programmatic DMMs for cost-effectiveness
    - Choose an implementation option (option should track with "20x2020 implementation plan)
    - Provide connection data to K/J by_____
- K/J Action Items
  - ✓ Calculate the Base Daily Per Capita Water Use by _____
  - ✓ Calculate the Target amount for all of the Methods that apply to determine the one most favorable to each agency

Public Meeting No. 5

Workshop Agenda

Project:	RUWMP for the San Bernardino Valley	**Date:**	TBD
		Time:	TBD
Subject:	Regional Urban Water Management Plan Meeting #5	**Location:**	Valley District Board Room

1. Update on Guidelines/Methodologies
2. Population Estimates
3. Regional Water Supply
4. Climate Change

Meeting Time:	1:30 PM to 3 PM	**Page:**	1 of 5
Meeting Location:	Valley District Office	**Date:**	17 December 2010
Meeting Date:	8 December 2010	**K/J Job No.:**	1089014.00
Project:	RUWMP San Bernardino Valley		

Persons Attending:

Kennedy/Jenks	***Client/Contractor***	***Other***	***Organization***
Meredith Clement	Mike Medina		City of Colton
Dana Haasz	Adrianne Rogers		City of Colton
	Russ Handy		City of Loma Linda
	T. Jarb Thaipejr		City of Loma Linda
	Chris Diggs		City of Redlands
	Woody Hynes		City of Redlands
	Greg Gage		City of San Bernardino
	Ted Brunson		City of San Bernardino
	Matt Litchfield		City of San Bernardino
	Ron Buchwald		East Valley Water District
	Don Hough		Riverside Highland Water Company
	Bob Tincher		San Bernardino Valley MWD
	Linda Jadeski		West Valley Water District
	Amanda Kasten		West Valley Water District
	Jennifer Ares		Yucaipa Valley Water District

Subject:

Update on Guidebook, SBx7-7 Calculations, DMM Cost-Effectiveness Analysis, Growth and Water Demand Projections

Introductions and Announcements

1) The Department of Water Resources will host a webinar on January 5, 2011 from 9:30 am to 12:30 pm to go over SBx7-7 Base Gross Per Capita Water Use and Compliance Water Use calculations.

SBx7-7 Compliance Option 4

1) As part of RUWMP Meeting 4, the group determined that SBx7-7 Compliance Option 4 would not be a favorable method for the RUWMP because it would require data that was not collected by any of the agencies. However, since that time, significant revisions to Option 4 have been proposed. Under the proposed revisions, Option 4 may simply require an agency to fully implement their Demand Management Measures. If that is the case, this Option will be worth consideration. Kennedy/Jenks will continue to follow developments related to Option 4 and will report back to the group.

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Update on Guidebook

1) Draft Guidebook anticipated mid-December 2010
2) Final Guidebook anticipated late January or early February 2011
3) UWMPs can be (but are not required to be) submitted electronically
4) 2010 UWMPs will have much the same content as 2005 plans but with the addition of SBx7-7 and DMM requirements
5) Its unclear how much detail needs to be provided about how an agency will achieve 20% water savings by year 2020. Kennedy/Jenks will continue to seek guidance on this from DWR.

SBx7-7 Calculations

1) Draft SBx7-7 Base Gross Water Use calculations were prepared for the City of Loma Linda, the City of San Bernardino, East Valley Water District, and West Valley Water District.
2) The Base Gross Water Use calculations include a calculation of the base gross water use for a 10-year average as well as a 5-year average. The 10-year average base gross water use is what is used for determining the compliance/target water use. The 5-year average base gross water use is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBx7-7 legislation. Within the 2010 UWMP it will be necessary to report the maximum allowable GPCD - which is 95% of the 5-year average Daily Per Capita Water Use. The following example is taken from the *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use*:

    Suppose a water supplier has a 10-yr baseline per capita water use of 170 GPCD and a 5-year baseline per capita water use of 168 GPCD.

        The maximum allowable GPCD target in 2020 is 0.95*168 GPCD = 160 GPCD.

        The 2020 target based on the 10-year average (using Option 1) is 0.8*170 GPCD = 136 GPCD.

    Because the target under Option 1 is less than 160 GPCD, no adjustment to the 2020 target is needed.

3) Rough estimates of the water savings the City of Loma Linda, San Bernardino Water Department, East Valley Water District, and West Valley Water District would need to achieve compliance with SBx7-7 in year 2015 and 2020 was provided in the powerpoint presentation. Please use CAUTION, these are estimates and are based on assumptions of future growth. These estimates are just intended to provide agencies with an idea of the scale of their needed conservation. Agencies are encouraged to annually examine their GPCD to see if they are on track to be in compliance with SBx7-7.
4) There was a question about what constituted "compliance" with SBx7-7, both in year 2015 and 2020. Since the meeting Kennedy/Jenks researched this specific question.

    SBx7-7 section 10608.24 states, " (a)Each urban retail water supplier shall meet its interim urban water use target by December 31, 2015. (b) Each urban retail water supplier shall meet its urban water use target by December 31, 2020." Section 10608.56 states "(a) On and after July 1, 2016, an urban retail water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part…(c) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the

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grant or loan agreement, for achieving the per capita reductions."

So it appears "compliance" with SBx7-7 in year 2015 is more than simply reporting per capita water use; an agency will need to achieve their interim target or provide a plan for coming into compliance in order to be eligible for state grants and loans. DWR has not given any indication how daily per capita water use will be measured in the compliance years (will it be a single year?, a 5-year average?, a trend line over a 5-year period?).

For year 2020 the same provisions apply, but in addition, section 10608.8(a)(2) comes into play, "Because an urban agency is not required to meet its urban water use target until 2020 pursuant to subdivision (b) of Section 10608.24, and urban retail water suppliers' failure to meet those targets shall not establish a violation of law for purposes of any state administrative or judicial proceeding prior to January 1, 2021." Meaning an agency that does not meet the water use targets by December 2020 could be subject to lawsuits for unreasonable use and water waste.

DMM Cost-Effectiveness Analysis

1) Draft DMM cost-effectiveness calculations were prepared for the City of Colton, City of Loma Linda, the City of San Bernardino, and East Valley Water District. The cost-effectiveness calculations used the California Urban Water Conservation Council protocols and standard assumptions. Results of the analysis varied by agency, depending on avoided cost of water. Basic results are as follows:
   a) Residential Audit Programs (indoor and outdoor surveys) are not cost-effective for any agency.
   b) High Efficiency Clothes Washers and certain CII programs are cost-effective for all agencies
   c) High Efficiency Toilet incentives and Large Landscape programs could be cost effective if implemented as a regional program.

   Please see the DMM cost-effectiveness handout (attached to these minutes) for more details.

2) If a DMM is not cost-effective, an agency can exempt from the requirement to perform that DMM BUT, an agency must implement the Foundational DMMs and will still have to implement a combination of conservation programs and recycled water as needed to reduce per capita daily water use consistent with SBx7-7.
3) DMM next steps:
   a) Implement the Foundational DMMs
   b) Evaluate the cost-effectiveness memos
   c) Use the cost-effectiveness results to identify best programs, quantify costs and savings
   d) Work with Valley District, identify regional opportunities, and develop commitments
   e) Develop implementation plan for SBx7-7 and DMM compliance

4) During the meeting there was a question about some of the assumptions used to calculate cost per AF of water saved for various DMMs. Attached to these meeting minutes is a table of Kennedy/Jenks assumptions

Water Demand Growth Projections

1) Kennedy/Jenks proposes to use Southern California Association of Governments (SCAG) Regional Transportation Improvement Plan growth forecasts for 2008, 2020, and 2035 as a proxy

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for growth in water demand. SCAG provides a growth rate for each city and unincorporated San Bernardino County. The proposal is to assume an agency's water growth rate as follows:

(% of agency in City A * annual growth rate City A) + (% of agency in City B* annual growth rate City B) + (% of agency in unincorporated County * annual growth rate unincorporated County).

In addition to these growth projections, Kennedy/Jenks proposes to also include any water demands from known upcoming development projects in each agency's service area.

2) **The group agreed to using the method proposed by Kennedy/Jenks to estimate future water demands. However, in addition, for East Valley Water District, the UWMP will also present information on growth projections from their Water Masterplan.**

Upcoming Meetings and Action Items

1) The next RUWMP meeting is scheduled January 26, 2011 from 1:30 to 3 pm at the Valley District office.
2) A meeting to discuss regional coordination on conservation measures is scheduled January 26, 2011 from 3 to 4 pm at the Valley District office (this meeting will immediately follow the RUWMP meeting).
3) The table below includes action items from the meeting:

Action Item/Task	Due Date	Responsible Party
Kennedy/Jenks to prepare "missing data" sheet	Dec 17, 2010	Kennedy/Jenks
Provide missing data needed to complete SBx7-7 calculations	Dec 31, 2010	City of Colton
Provide data needed to complete cost-effectiveness evaluations.	Dec 31, 2010	Loma Linda, West Valley Water District
Review and provide any comments on Draft SBx7-7 calculations, DMM cost-effectiveness analysis	Jan 7, 2011	City of Colton City of Loma Linda City of San Bernardino East Valley Water District West Valley Water District
Provide information on upcoming developments in your service area that you want included in water demand projections. Data needs to include: o Name and location of development (e.g., Cypress Oaks Estates, northwest corner of Main and C Street in the City of Colton) o Description of development (e.g., 400 single family homes, one school, 10,000 square feet commercial) o Whether the development will be dual plumbed o A description of the current land use (e.g., irrigated ag) and whether or not your agency serves the current land use o Any assumptions about water demands for the project o A schedule for the development (e.g., 100	Jan 14, 2011	City of Colton City of Loma Linda City of San Bernardino East Valley Water District West Valley Water District

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homes a year starting in 2015)		
Prepare water demand growth projections for City of Colton, City of Loma Linda, City of San Bernardino, East Valley Water District, and West Valley Water District	Jan 21 2011	Kennedy/Jenks
Complete individual chapters	Feb 18, 2011	Riverside Highland Water Company City of Redlands Yucaipa Valley Water District

Distribution: Team
Extranet

By: Meredith Clement

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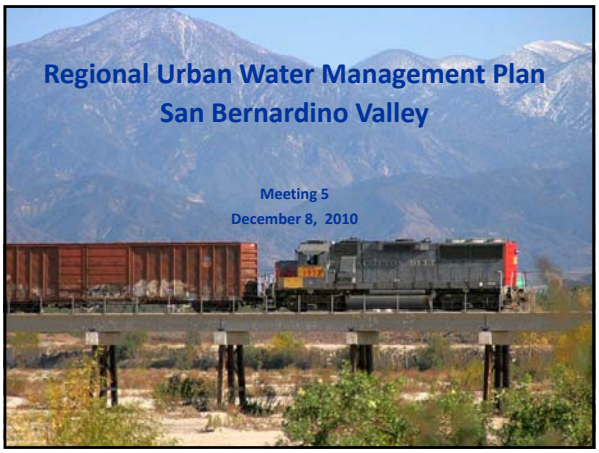

Agenda

- Update on Guidebook
- SBx7-7 Calculations
- DMM Cost-Effectiveness Analysis
- Next Steps for Conservation Programs
- Growth and Water Demand Projections
- Schedule
- Action Items

Update on SBx7-7 Methodologies

- 20x2020 Compliance Method 4 may be significantly revised
  - Originally group had decided to eliminate consideration of Method 4
  - If revised, Method 4 may be favorable means to calculate 20x2020 target
- Method 4 to be released in January 2011

Update on Guidebook

- Draft Guidebook anticipated mid-December 2010
- Final Guidebook anticipated late January early February 2011
- UWMPs can be (but are not required to be) submitted electronically

Update on Guidebook

- 2010 UWMPs will have much the same content as 2005 plans, with the addition of SBx7-7 and DMM requirements, but has been significantly reordered
- Unclear how much detail needs to be provided about how an agency will achieve 20x2020
- Some confusion about by when a Regional Alliance must be formed
  - *Regional Alliance not required for regional implementation*

SBx7-7 Compliance – Base Use

- Base Use (required for all Methods)

$$\frac{\text{Base water use (base period)}}{\text{Population}} = \text{gpc}$$

Base Daily Per Capita Water Use

- 10-year average
  - *ending no earlier than 2004 – no later than 2010*
- ~~15-year average if 10% of 2008 demand met by recycled water~~
  - ~~*get to add 5 years to calculation*~~
- 5-year average (this is a tool for DWR to estimate maximum allowable GPCD)
  - *at least 5% reduction*
  - *ending no earlier than 2007 – no later than 2010*

Base Daily Per Capita Water Use

- Base Water Use Calculation
  - All water sent to retail customers
  - Exclude
    - Recycled water
    - Water sent to another water utility
    - Water that went into storage
    - Water sent to Ag customers (optional)
    - Water used as process water (optional)

Population (cont.)

- At our June 9, 2010 meeting, we decided to calculate population using:

(# connections) x (people/connection) = POPULATION

1. Used GIS data to determine what census blocks fell in each agencies service area
2. Determined number of occupied SF and MF units
3. Determined Population by structure type (SF or MF)
4. Used data from 2 and 3 to come up with persons per SF and MF household

Base Daily Per Capita Water Use

- Outstanding Data

Colton
- Data on water sent to retail customers and number of connections for years 2003 to 2006.
- If possible, data on water sent to retail customers and number of connections for years 1995 to 1999.

San Bernardino Municipal Water Department
- If possible, data on SF and MF connections 1995 to 1999

Please provide missing data by end of December.

Base Daily Per Capita Water Use

- Initial Results

East Valley Water District
- 3.00 persons per SF household, 2.42 persons per MF
- Gross Base Water Use 310-332 GPCD
- Highest Base Water Use 2000-2009, 333 GPCD
- Compliance Target (0.80*333) = 266 GPCD

West Valley Water District
- 3.64 persons per SF household, 2.80 persons per MF
- Gross Base Water Use 294-316 GPCD
- Highest Base Water Use 2000-2009, 316 GPCD
- Compliance Target (0.80*339) = 253 GPCD

Base Daily Per Capita Water Use

- Initial Results

Loma Linda
- 2.54 persons per SF household, 2.06 persons per MF
- Gross Base Water Use 443 to 456 GPCD
- Highest Base Water Use 1995-2005, 456 GPCD
- Compliance Target (0.80*456) = 365 GPCD

City of San Bernardino
- 3.10 persons per SF household, 2.46 persons per MF
- Highest Base Water Use 2000-2009, 374 GPCD
- Compliance Target (0.80*374) = 299 GPCD

Water Savings Needed to be in Compliance*

Agency	Est. Growth 2010 to 2015	Est. Growth 2010 to 2020	Year 2015 Savings Target (AF)	Year 2020 Savings Target (AF)
City of Loma Linda	1%	2%	100	600
City of San Bernardino	1%	2%	1,600	7,100
East Valley	1%	2%	3,100	6,000
West Valley	1%	2%	400	2,900

*Rough estimates!

Questions on SBx7-7 Calculations

?

DMM C-E Analysis

- K/J Analyzed cost-effectiveness of implementing each DMM
- Used CUWCC protocol and standard assumptions
- Results vary by agency, depending on avoided cost
- All agencies have relatively low avoided cost
- Focus on regional collaboration?

Results of C-E Analysis

Not Cost Effective for any agency: (> $300/AF)
- Residential Audit Programs - indoor and landscape

Cost Effective for all agencies: (<$200/AF)
- High Efficiency Clothes Washers
- CII Program – depending on design

Potentially Cost Effective as Regional Program: ($200-$300/AF)
- High Efficiency Toilet Incentives
- Large Landscape Programs

Results of C-E Analysis

Program	$/AF	Program	$/AF
BMP9: CII HE Washer Rebates	$ 71.30	BMP5: CII Precision Nozzles Distr.	$ 441.60
BMP5: CII WBICs Rebates	$ 115.74	Residential WBICs Rebate Program	$ 550.00
BMP6: Residential HE Washer Rebates	$ 167.43	BMP5: CII Cash for Grass (Turf rebates)	$ 611.11
BMP5: Dedicated Irrigation Surveys	$ 203.03	BMP1: Residential Cash for Grass (Turf Rebates)	$ 622.46
BMP14: Residential HET Rebates (MFR)	$ 205.13	BMP1: Residential Assistance (Surveys)	$ 622.46
BMP9: CII HET Rebates	$ 205.22	BMP5: CII Outdoor Surveys	$ 800.24
BMP2: Residential Plumbing retrofit kits	$ 221.05	BMP9: CII Indoor Surveys	$ 5,143.94
BMP14: Residential HET Rebates (SFR)	$ 258.60	BMP9: CII Indoor Surveys	$ 819.61
BMP9: CII ULV Urinal Rebates	$ 299.93		
BMP5: CII WBICs Direct Install	$ 385.80	**Average**	**$ 661.28**

C-E Analysis – things to think about

- Traditional fixture rebate programs for both residential and CII are c-e.
  - Opportunities exist due to lack of historic programs
- There is considerable savings potential in landscape – need to evaluate what type of approach would fit best.
- Regional programs are generally more efficient ($) and effective (reach)

C-E: next steps

IF a DMM is not c-e, can file a c-e exemption

BUT

- Still have to implement Foundationals
- Still have to reduce by 20%

IF a DMM is c-e, need to address implementation

DMM Compliance Process

DMM Compliance – Next Steps for Retail Agencies

1. Implement the Foundationals (or develop plan)
2. Evaluate c-e memos
3. Use c-e results to identify best programs, quantify costs and savings
4. Work with Valley District, identify regional opportunities, and develop commitments
5. Develop implementation plan for SBX7 and DMM compliance

Questions on C-E Evaluations

?

Water Demand Growth Projections

- In 2005 UWMPs, most agencies relied on SCAG data
- IRWMP relied on 2005 UWMPs
- For 2010 UWMPs recommend:
  1. SCAG RTIP 2012 growth forecasts for 2008, 2020, and 2035

     Assumed Agency Water Demand Growth Rate

     = (% in City A x annual rate City A) + (% in City B x annual rate City B)

     AND

  2. Demands from any large development projects in your service area

Schedule

- K/J Works with Agencies to Develop Missing Data - December 2010
- Meeting 6 – January 2010 (growth projections/regional water supply)
- K/J completes individual agency chapters - February 2011
- Chapters from Redlands, Yucaipa, and Riverside-Highland Due – February 2011
- K/J holds meetings with individual agencies – March 2011
- K/J prepared Draft RUWMP – April 2011
- Adoption of RUWMP by agencies – May 2011
- Submit RUWMP to DWR – June 2011

Action Items

- Retail Agency Action Items
  - ✓ DMMs
    - Implement the Foundationals (or develop plan)
    - Determine implementation resources
    - Choose an implementation option (option should track with "20x2020 implementation plan)
  - ✓ Provide any missing data
  - ✓ Provide contact information for developments in service area
- Valley District
  - ✓ Work with K/J to complete regional water supply outlook
- K/J Action Items
  - ✓ Prepare water demand growth scenarios for each agency
  - ✓ Work with Valley District to complete regional water supply outlook

Public Meeting No. 6

Meeting Agenda

Project:	RUWMP for the San Bernardino Valley	**Date:**	January 26, 2011
		Time:	1:30 to 3:30
Subject:	Regional Urban Water Management Plan Meeting #6	**Location:**	Valley District Board Room

1. Update on Guidelines/Methodologies
2. Regional Water Supply Outlook
    a. Water Quality Impacts on Supply Reliability
3. Water Demand Calculations
4. Public Outreach/Required Notices and Hearings
5. Schedule
6. Action Items
7. Next Meeting

Meeting Time:	1:30 PM to 3 PM	**Page:**	1 of 5
Meeting Location:	Valley District Office	**Date:**	17 December 2010
Meeting Date:	8 December 2010	**K/J Job No.:**	1089014.00
Project:	RUWMP San Bernardino Valley		

Persons Attending:

Kennedy/Jenks	***Client/Contractor***	***Other***	***Organization***
Meredith Clement	Mike Medina		City of Colton
Ric Corona	Russ Handy		City of Loma Linda
Dana Haasz (phone)	T. Jarb Thaipejr		City of Loma Linda
	Chris Diggs		City of Redlands
	Woody Hynes		City of Redlands
	Greg Gage		City of San Bernardino
	Ted Brunson		City of San Bernardino
	Ron Buchwald		East Valley Water District
	Don Hough		Riverside Highland Water Company
	Bob Tincher		San Bernardino Valley MWD
	Linda Jadeski		West Valley Water District
	Amanda Kasten		West Valley Water District
	Jack Nelson		Yucaipa Valley Water District
	Jennifer Ares		Yucaipa Valley Water District

Subject:

Update on Guidebook, Regional Water Supply Outlook, Water Quality Impacts on Supply Reliability, Water Demand Calculations, Public Outreach, Notices and Hearings, Schedule

Overview of Process

1) So far the group has completed calculation of water use targets (using Target Methodology 1), prepared estimates of future demands, and prepared an estimate of future supplies.
2) Major upcoming tasks:
   a) Agencies to determine how to meet water use targets
   b) Kennedy/Jenks to prepare individual agency chapters
   c) Agencies review individual agency chapters
   d) Public and agency outreach

Update on Guidebook

1) The Draft Guidebook was released December 21, 2010, a copy of this guidebook can be found here: www.water.ca.gov/urbanwatermanagement/docs/UWMP_ReviewDraft.pdf

   A copy has also been loaded to the RUWMP extranet site (under the "Other" category).

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2) DWR will be sending out errata/addenda to the Draft Guidelines, specifically related to AB 1420 and the relationship to DMMs, and the SBx7-7 implementation plan.
3) The comment deadline for the Draft Guidebook will be extended until sometime after errata provided.
4) One item described in the Draft Guidebook and during DWR webinars on the Draft Guidebook, is the need to include a map that displays both the service area boundary for an agency as well as the area actually served within that boundary. Kennedy/Jenks has received from Valley District GIS data on the service area boundaries. The group had a discussion about what data might serve to show area actually served. Potential resources include maps showing the actual distribution system. Kennedy/Jenks would like to be provided GIS maps or maps of high enough quality to be digitized.

Target Method 4

1) Target Method 4 has undergone several iterations. The early versions of Method 4 required data that the group did not collect. So, this method was initially eliminated from further consideration. However, since that time, Method 4 has been drastically revised and preliminary calculations by K/J indicate that it may be a good option for City of San Bernardino, East Valley Water District, and West Valley Water District.
2) DWR released a public draft of Method 4 on January 24, 2011 and held webinars on Method 4 on January 27 and January 28. A recording of the January 28th webinar can be found here: www.water.ca.gov/calendar/materials/webinar_recording_01-28-11_10812.pdf
3) Statewide workshops on Method 4 will be held in February 2011.
4) A copy of DWR's description of Method 4 can be found here: www.water.ca.gov/calendar/materials/provisional_method_4_1-24-11_10821.pdf

   A copy of this methodology has also has been loaded to the RUWMP extranet site (under the "Other" category).
5) The Urban Water Use Target Under Method 4 is Baseline Daily GPCD less:
   a) Indoor Residential Water Savings (default is 15 GPCD)
   b) 20% savings on all unmetered uses
   c) 10% savings on Baseline CII (CII must be converted to GPCD)
   d) 21.6% savings on current landscape and water loss uses (must be expressed as GPCD)

   The following formula for calculating landscape and water loss uses is provided by DWR.

   Landscape and Water Loss Use = Base Daily Per Capita Water Use - Default Indoor Water Use (70 GPCD) - Baseline CII

Regional Water Supply Outlook

1) The Water Supply Outlook illustrates all the potential water supplies available in a given water year type (e.g., normal, single-dry, multi-dry). Kennedy/Jenks prepared the Regional Water Supply Outlook based on water budget prepared for the IRWMP as revised by Valley District in 2008. A table displaying the draft Regional Water Supply Outlook is attached to these minutes. Demands by retailers were updated (using data prepared for the RUWMP) to calculate return flows. Potential State Water Project supply was updated based on the 2009 State Water Project Reliability Report which assumes:
   a) Long-term SWP supplies 60% of Table A allocation
   b) Dry-Year Supplies assumed to be 7 - 11% of Table A allocation

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c) Multiple-Dry Year assumed to be 32 - 34% of Table A allocation

2) The Regional Water Supply Outlook does not currently contain any benefits associated with the water management strategy of storing water in wet years for later use during droughts (IRWMP). Storage would take place locally and could take place in other groundwater "banks". The modeling conducted for the IRWMP includes this management strategy. Kennedy/Jenks will coordinate with Valley District and Geoscience (modeler) to add this benefit to the Regional Water Supply Outlook.

3) Recycled water has been left out of the Regional Water Supply Outlook because it has to be accounted for as a local supply under SBx7-7.

4) A comparison of the draft Regional Water Supplies vs draft Regional Demands has indicated that supplies are greater than demands for years 2010 to 2035 in a Normal Year, even without accounting for reductions that will occur under SBx7-7. In a Single-Dry Year, a shortage of 10% could be experienced, but this could be "made-up" with conservation, recycled water, and stored water. In a Multiple-Dry Year, shortage of up to 3% could be experienced, but not until year 2020; this could be "made-up" with conservation, recycled water, and stored water.

Water Quality Impacts on Supply

1) The UWMP Act requires that an UWMP discuss impacts of water quality on supply reliability. Water quality was the issue in the 2005 Castaic Lake Urban Water Management Plan litigation. The plaintiff's argued that the Castaic plan failed to address the time needed to implement the treatment of contaminated water and failed to describe the reliability of the groundwater supply while the treatment project was being constructed.

2) Identified water quality issues include:

a) The Muscoy and Newmark plume. In this plume contaminant practices are in place, extraction and treatment are underway. **The group agreed that, given the current data on this plume, no water supply impacts are anticipated related to this plume.**

b) The Norton Air Force Base plume. Extraction and treatment of this plume has occurred and the treatment facility now operates in standby mode. **The group agreed, given the current data on this plume, that it is not expected to have water supply impacts.**

c) The Santa Fe plume. The group had no particular information on this plume. Valley District may have some data on this plume and will provide whatever data they have.

d) The Redlands-Crafton plume. Contaminant practices are in place, extraction and treatment is underway. **The group agreed, given the current data on this plume, that it is not expected to have water supply impacts.**

e) TDS in State Water. Based on groundwater modeling in dry years the TDS in State Water could exceed levels that are typically acceptable to the Regional Water Quality Control Board for groundwater spreading during some times of the year in specific groundwater basins. Valley District to provide Kennedy/Jenks with the Cooperative Agreement with the Regional Water Quality Control Board regarding the use of SWP water for groundwater spreading.

f) The group discussed the need to not discount the potential impacts of water quality. Based on current conditions water quality is not anticipated to affect supply, BUT water quality issues are constantly evolving. Water agencies will take action to protect supply and treat supply when needed, but it is well recognized that water quality treatment can have significant costs.

Water Demand Growth Projections

1) Draft water demand calculations 2010 to 2035 have been sent to agencies. The water demand

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calculations assumed growth in water demand consistent with population growth described in the Southern California Association of Governments (SCAG) Regional Transportation Improvement Plan. SCAG provides a growth rate for each city and unincorporated San Bernardino County. Water demand estimates need to be enhanced with any specific information on upcoming developments (this data has been provided by East Valley Water District and West Valley Water District).

Public Outreach/Public Notices

1) Required to coordinate preparation of UWMP with other appropriate agencies in the area.
2) Should encourage the active involvement of diverse social, cultural, and economic elements of the service area population.
3) Required to notify any city or county where the supplier provides water that plan is being prepared/reviewed. Must notify at least 60 days prior to public hearing. **The group agreed that the preferred method to comply with this notification requirement would be to send letters to each land use entity letting them know that a plan is under preparation and to offer to meet with them to go over the UWMP.** Notification of any hearings on the UWMP will also be sent to the various cities and counties. Kennedy/Jenks will prepare a draft letter to the land use entities that each entity can tailor for their use. Copies of letters sent to land use entities should also be provided to Kennedy/Jenks. If land use entities express a desire to be given more information on the RUWMP, the group will schedule a meeting to brief the interested agencies.
4) Each agency is required to make plan available for public inspection and hold a hearing prior to adoption. Each agency must provide notice of the hearing consistent with Section 6066 of Government Code (must publish notice of hearing once a week for two consecutive weeks in a newspaper of general circulation. First notice must be 2 weeks before hearing). Each agency should also follow their internal policies for public notice. Kennedy/Jenks will prepare a draft public notice that each agency can tailor for their use. Copies of public notices/newspaper proof sheets should be provided to Kennedy/Jenks.
5) Finally, an agency is required to hold a hearing to get community input on the compliance water use target, their plan for complying with SBx7-7, and the economic impacts of plan for complying with SBx7-7. This hearing can be combined with the hearing on the UWMP.
6) A question was raised about the implications of not meeting the 20x2020 plan - specifically if an agency does not meet their demand reduction goals will they be ineligible for *water* related grants and loans or *all* state grants and loans? Since the meeting Kennedy/Jenks researched this specific question.

   SBx7-7 section 10608.56 states "(a) On and after July 1, 2016, an urban retail water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part…(c) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for achieving the per capita reductions." In addition, SBx7-7 section 1 states, "The bill, with certain exceptions, would provide that urban retail water suppliers, on and after July 1, 2016, and agricultural water suppliers, on and after July 1, 2013, are not eligible for state water grants or loans unless they comply with the water conservation requirements established by the bill." Therefore it appears that SBx7-7's provisions affect only water-related grants and loans.

   In addition to the above language. There has also been some discussion about the possibility of charging an agency that does not achieve a 20% reduction by 2020 with a "waste and unreasonable use" of water.

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Schedule

In order to submit the document by the required deadline, the following milestones must be met:

1) K/J completes draft individual agency chapters – early March 2011
2) Chapters from Redlands, Yucaipa, and Riverside-Highland Due – early March 2011
3) K/J holds meetings with individual agencies – March 2011
4) K/J prepared Draft RUWMP – April 2011
5) Notification to cities/counties of UWMP update – April 2011
6) Hearings/Adoption of RUWMP by agencies – June 2011
7) Submit RUWMP to DWR – July 2011

Action Items

1) See the attached Action Items List.

Distribution: Team
Extranet

By: Meredith Clement

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Agenda

- Update on Guidelines/Methodologies
- Regional Water Supply Outlook
  - Water Quality Impacts on Supply Reliability
- Water Demand Calculations
- Public Outreach/Required Notices and Hearings
- Schedule
- Action Items
- Next Meeting

Overview

- ✓ Calculation of Water Use Targets
- ✓ Estimation of Future Demands
- ✓ Estimation of Future Supplies
- ⇨ Agencies determine how to meet water use targets
- ⇨ Prepare individual agency chapters
- ⇨ Agencies review individual agency chapters
- ⇨ Public and agency outreach

Update on Guidebook

- DWR will be sending out errata/addenda to the Draft Guidelines.
  - AB 1420 and the relationship to DMMs, SBx7-7 implementation plan
- Comment deadline for the Draft Guidebook will be extended until sometime after errata provided.
- For SBx7-7, maps of the service area need to show the service area boundary and the area actually served within that boundary

Update on Guidebook

- Method 4
  - DWR released a draft of Method 4 on January 24, 2011
  - Target Method 4 Webinar January 25, 2011
  - Workshops to solicit comment on Method 4 to be held January 27 (10 am to noon at Met) and January 28 (Sacramento)
- Statewide workshops on the UWMP will start mid-February

Method 4

Method 4 may be a good option

- Urban Water Use Target under Method 4 is Baseline Daily GPCD less:
  - Indoor Residential Water Savings (default is 15 GPCD)
  - 20 % savings on all unmetered uses (GPCD)
  - 10 % savings on Baseline CII (GPCD)
  - 21.6 % savings on current Landscape and Water Loss Uses (GPCD)
  - But how do we calculate Landscape and Water Loss Uses?
    - DWR provides this formula: Landscape and Water Loss =

Base Daily Per Capita Water Use – Default Indoor Water Use (70 gpcd) – Baseline CII

Regional Water Supply Outlook

- Updated water budget prepared for IRWMP and revised by Valley District in 2008
  - Updated to be UWMP format
    - In UWMP show total amount of supply potentially available in given water year, not amount of supply used
  - Updated demands by retailers to calculate return flows
  - Updated SWP availability based on 2009 Reliability Report
    - Long-term SWP supplies assumed to be 60% of Table A allocation
    - Dry Year Supplies assumed to be 7-11% of Table A allocation
    - Multiple-Dry Year assumed to be 32-34% of Table A allocation

Regional Water Supply Outlook

- Supplies greater than demands 2010-2035 in a Normal Year (even without accounting for 20x2020)
- In Single-Dry Year, shortage of up to 10% experienced
  - Could be "made-up" with conservation, recycled water, SBBA credits
- In Multiple-Dry Year, shortage of up to 3% experienced, but not until year 2020
  - Could be "made-up" with conservation, recycled water, SBBA credits

Water Quality Impacts on Supply

- UWMP Act requires that UWMP discuss impacts of water quality on supply reliability
- Water Quality was the issue in the CLWA UWMP litigation. Plaintiff's argued CLWA Plan:
  - failed to address the time needed to implement the available method for treating the contaminated water
  - failed to describe the reliability of the groundwater supply while the treatment project was being constructed

Water Quality Impacts on Supply

- Identified Water Quality Issues:
  - Muscoy and Newmark Plume
  - Norton AFB Plume
  - Santa Fe Plume
  - Redlands-Crafton Plume
  - SWP TDS

Water Demand Calculations

- Draft water demand calculations 2010-2035 sent to agencies
- Based on SCAG Integrated Growth Forecast
- Water demand estimates do not include conservation
- Need to enhance water demand estimates with any information on specific developments

Water Demand Calculations

Water Agency	Annual 2008-2020 SCAG Growth Rate	Annual 2021-2029 SCAG Growth Rate
City of Colton	1.43%	1.13%
City of Loma Linda	1.16%	1.21%
City of San Bernardino	0.90%	0.80%
East Valley Water District	0.97%	1.08%
West Valley Water District	0.80%	1%

Water Demand Calculations

- Questions/Comments on Water Demand Calculations

?

Public Outreach/Public Notices

- Required to coordinate preparation of plan with other appropriate agencies in the area.
- Should encourage the active involvement of diverse social, cultural, and economic elements of the service area population.
- Required to notify any city or county where the supplier provides water that plan is being prepared/reviewed. Must notify at least 60 days prior to public hearing.

Public Outreach/Public Notices

- Required to make plan available for public inspection and hold a hearing prior to adoption. Must provide notice of the hearing consistent with Section 6066 of Government Code.
  - Must publish notice of hearing once a week for two consecutive weeks in a newspaper of general circulation. First notice must be 2 weeks before hearing.

Public Outreach/Public Notices

- Required to hold a hearing to get community input on:
  - compliance water use target
  - plan for complying with SBx7-7
  - economic impacts of plan for complying with SBx7-7
  - This hearing can be combined with the hearing on the UWMP

Schedule

- Meeting 6 – January 2010 (growth projections/regional water supply)
- K/J completes draft individual agency chapters – early March 2011
- Chapters from Redlands, Yucaipa, and Riverside-Highland Due – early March 2011
- K/J holds meetings with individual agencies – March 2011
- K/J prepared Draft RUWMP – April 2011
- Notification to cities/counties of UWMP update – April 2011
- Hearings/Adoption of RUWMP by agencies – June 2011
- Submit RUWMP to DWR – July 2011

Action Items

- Agency Action Items
  - ✓ DMMs
    - Implement the Foundationals (or develop plan)
    - Determine implementation resources
    - Choose an implementation option (option should track with "20x2020 implementation plan)
  - ✓ Provide any missing data
  - ✓ Service area maps
  - ✓ Provide contact information for developments in service area

K/J Action Items

- ✓ Prepare draft chapters for agency review

Public Meeting No. 7

2010 Urban Water Management Plan

Regional Urban Water Management Plan
San Bernardino Valley

Meeting with City of San Bernardino Planning
and County of San Bernardino Department of Public Works

April 2011

Requirements of an UWMP

- Major Contents
  - UWMP Act applies to all CA water suppliers with 3,000 or more service connections or selling at least 3,000 AFY (retail or wholesale)
  - Main focus: to identify gaps between supply and demand through time (20-year analysis required)
  - UWMP must describe how demand will be met through time, in all hydrologic year types (normal, multiple dry, critical dry)

Requirements of an UWMP

- Major Contents (cont'd.)
  - Requires detailed description of all supply sources (imported, recycled, groundwater)
  - Water quality problems
  - Demand Management Measures (water conservation programs)
  - Water shortage contingency planning
  - Must update every five years, in years ending in 5 and 0 (such as 2010).

Requirements of an UWMP

- Required Coordination and Notification

"Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practical"

Requirements of an UWMP

- Required Coordination and Notification

Other:

  - Must hold public hearing prior to adoption of UWMP
  - Must provide cities and counties in service area with copies of UWMP within 30 days of adoption

Requirements of an UWMP

- Q&A/Discussion

New UWMP Requirements

- New Law: SBX7-7 ("20% x 2020"), reporting starts with 2010 UWMPs
  - Must calculate "baseline" water demand in GPCD
  - Must set GPCD targets for years 2015 and 2020

New UWMP Requirements

- Other
  - SB 1087 (Florez) - requires an UWMP to include projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier.

New UWMP Requirements

- Questions/Discussion

Estimate of Available Supplies

- Available supplies include:
  - SBBA groundwater. Available supply based on provisions of the Western Judgment and groundwater modeling.
  - Imported water. Based on the Department of Water Resources *2009 State Water Project Reliability Report*
  - *Estimates of existing available supply:*
    - *Normal Year – 63,000 AF (current), 74,700 AF (2035)*
    - *Single Dry Year – 63,000 AF (current), 74,700 AF (2035)*
    - *Multiple Dry Year – 63,000 AF (current), 74,700 AF (2035)*

Future Supplies

- Clean Water Factory:
  - Will treat water from the San Bernardino Water Reclamation Plant to standards acceptable for groundwater recharge
  - Will artificially recharge the SBBA.
  - Up to 9,900 AF available in near-term, up to 34,200 AF in future.

Projected Demands

- Future demands based on existing demands, growing at a rate consistent with growth projected in SCAG 2012 Integrated Growth Forecast for the City of San Bernardino (~1% a year until 2020, ~0.8% after 2020)
- In addition, water demands for known, near term developments were included in addition to "background" growth.
- *Projected Demands w/o additional conservation – 52,200 AF (current), 61,100 AF (2035)*
- *Projected Demands w/ additional conservation – 47,000 AF (current), 48,900 AF (2035)*

Projected Demands – Low Income

- Based on Draft Housing Element
- Assumes ~61 percent all households qualify as very-low (50% or less median state income) or low-income (51-80% of median state income)
- Assumes 61% of all future Single-Family and Multi-Family demand from low income households.

Required Conservation

The 20x2020 law is nuanced:

- Requires agencies to reduce gross water use in terms of GPCD
- BUT allows a water agency to exclude any recycled water from the calculation
- *Recycled water use - good way to comply.*

- Other required conservation includes:
  - Conservation Coordinator
  - Water Waste Prevention Ordinance
  - Water Loss Control (audits)
  - Metering with commodity rates
  - Public Information Programs
  - School Information Programs
  - Consistency with WSS for New Development/2010 Green Building Standards

SBMWD's Planned Conservation Actions

- Development of Recycled Water System
- Rebates/Discounts
  - High Efficiency Toilets - $85
  - High Efficiency Clothes Washer - $200
  - High Efficiency Dishwasher - $85
  - Low Flow Showerhead - $15
  - Irrigation Controller – up to $85
  - 10% discount on drought tolerant trees and shrubs
  - 20% discount on High Efficiency Sprinkler Nozzles
- Residential and Commercial Indoor and Outdoor Water Audits
- Water Smart Landscaping Classes and Qualified Water Efficient Landscaper Program
- Public Outreach
- Evaporative Cooler Repair Kits

Draft Results

- Depending on rate at which recycled water is developed in the service area, SBMWD will need to show conservation of up to 20% by the year 2020 to be in compliance with the 20x2020 law
- During the Planning Period (2010 to 2035) projected supplies are sufficient to meet anticipated demands, even during a single-dry or multiple dry year.

Schedule

- Draft RUWMP – May 2011
- Review and Adoption of RUWMP – June 2011
- Submit RUWMP to DWR – July 2011
- Provide copies of RUWMP to land use agencies – July 2011

Public Meeting No. 8

2010 Urban Water Management Plan

Regional Urban Water Management Plan
San Bernardino Valley

Meeting with City of Highland

April 2011

Requirements of an UWMP

- Major Contents
  - UWMP Act applies to all CA water suppliers with 3,000 or more service connections or selling at least 3,000 AFY (retail or wholesale)
  - Main focus: to identify gaps between supply and demand through time (20-year analysis required)
  - UWMP must describe how demand will be met through time, in all hydrologic year types (normal, multiple dry, critical dry)

Requirements of an UWMP

- Major Contents (cont'd.)
  - Requires detailed description of all supply sources (imported, recycled, groundwater)
  - Water quality problems
  - Demand Management Measures (water conservation programs)
  - Water shortage contingency planning
  - Must update every five years, in years ending in 5 and 0 (such as 2010).

Requirements of an UWMP

- Required Coordination and Notification

"Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practical"

Requirements of an UWMP

- Required Coordination and Notification

Other:

  - Must hold public hearing prior to adoption of UWMP
  - Must provide cities and counties in service area with copies of UWMP within 30 days of adoption

New UWMP Requirements

- New Law: SBX7-7 ("20% x 2020"), reporting starts with 2010 UWMPs
  - Must calculate "baseline" water demand in GPCD
  - Must set GPCD targets for years 2015 and 2020

New UWMP Requirements

- Other
  - SB 1087 (Florez) - requires an UWMP to include projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier.

Estimate of Available Supplies

- Available supplies include:
  - SBBA groundwater. Available supply based on provisions of the Western Judgment and groundwater modeling.
  - Imported water. Based on the Department of Water Resources *2009 State Water Project Reliability Report.*
  - Santa Ana River. Based on past hydrologic records.
  - Estimates of existing available supply:
    - *Normal Year – 37,400 AF (current), 62,400 AF (2035)*
    - *Single Dry Year – 29,100 AF (current), 54,100 AF (2035)*
    - *Multiple Dry Year – 34,100 AF (current), 59,100 AF (2035)*
  - Future supplies of ~2,800 AFY through additional stock ownership in North Fork Mutual Water Company

Projected Demands

- Future demands based on existing demands, growing at a rate consistent with growth projected in SCAG 2012 Integrated Growth Forecast for the City of Highland, City of San Bernardino, and unincorporated County (~1% a year until 2020, ~1.1% after 2020)
- In addition, water demands for known, near term development of Sunrise Ranch was added to "background" growth.
- *Projected Demands w/o additional conservation – 25,500 AF (current), 48,100 AF (2035)*
- *Projected Demands w/ additional conservation – 23,000 AF (current), 38,500 AF (2035)*

Projected Demands – Low Income

- Based on Draft Housing Element
- Assumes ~45% all households qualify as very-low (50% or less median state income) or low-income (51-80% of median state income) (40% HH of Highland, 61% HH of San Bernardino, 42% HH in unincorporated County)
- Assumes 45% of all future Single-Family and Multi-Family water demand from low income households.

Required Conservation

The 20x2020 law:

- Requires agencies to reduce gross water use in terms of GPCD
- EVWD will need to reduce water use by approximately 20% by year 2020.

- Other required conservation includes:
  - Conservation Coordinator
  - Water Waste Prevention Ordinance
  - Water Loss Control (audits)
  - Metering with commodity rates
  - Public Information Programs
  - School Information Programs
  - Consistency with WSS for New Development/2010 Green Building Standards

Draft Results

- During the Planning Period (2010 to 2035) projected supplies are sufficient to meet anticipated demands, even during a single-dry or multiple dry year. But without conservation, during a single-dry year, there could be very little excess water.

Schedule

- Draft RUWMP – May 2011
- Review and Adoption of RUWMP – June 2011
- Submit RUWMP to DWR – July 2011
- Provide copies of RUWMP to land use agencies – July 2011

Notification Letters

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Stacey R. Aldstadt
General Manager
San Bernardino Municipal Water Department
300 North "D" Street, 5th Floor
San Bernardino, CA 92418

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Stacey,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District. Matt Litchfield, Greg Gage and Ted Brunson have been participating in this process on behalf of the San Bernardino Municipal Water Department.

The RUWMP will include updated water demand projections within Valley District's service area. Water demand projections rely upon growth and population estimates from local land use plans and state and regional agencies. Valley District is encouraging land use agencies and other interested parties to participate in the development of the RUWMP. **We would like to extend an invitation to your agency to meet and go over the various elements of the RUWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs. If you are interested, please contact me at (909) 387-9215 or bobt@sbvmwd.com, no later than March 11, 2011.**

Board of Directors and Officers

MARK ALVAREZ Division 1 | GEORGE A. AGUILAR Division 2 | C.PATRICK MILLIGAN Division 3 | MARK BULOT Division 4 | STEVE COPELAN Division 5 | DOUGLAS D. HEADRICK General Manager

We anticipate that a draft of the RUWMP will be available for public review starting in May 2011 and that Valley District will hold a public hearing in June 2011, prior to adoption of the UWMP. The public hearing will be announced on a Valley District Board Meeting Agenda. Valley District's Board meeting agendas are posted online at sbvmwd.com.

Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Charlotte VanEck
Clerk of the Board
Bear Valley Mutual Water Company
101 East Olive Avenue
Redlands, CA 92373

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. VanEck,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

The RUWMP will include updated water demand projections within Valley District's service area. Water demand projections rely upon growth and population estimates from local land use plans and state and regional agencies. Valley District is encouraging land use agencies and other interested parties to participate in the development of the RUWMP. **We would like to extend an invitation to your agency to meet and go over the various elements of the RUWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs. If you are interested, please contact me at (909) 387-9215 or bobt@sbvmwd.com, no later than March 11, 2011.**

Board of Directors and Officers

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We anticipate that a draft of the RUWMP will be available for public review starting in May 2011 and that Valley District will hold a public hearing in June 2011, prior to adoption of the UWMP. The public hearing will be announced on a Valley District Board Meeting Agenda. Valley District's Board meeting agendas are posted online at sbvmwd.com.

Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Vicki Sheppard
Clerk of the Board
Big Bear Municipal Water District
PO Box 2863
Big Bear Lake, CA 92315

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Sheppard,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

The RUWMP will include updated water demand projections within Valley District's service area. Water demand projections rely upon growth and population estimates from local land use plans and state and regional agencies. Valley District is encouraging land use agencies and other interested parties to participate in the development of the RUWMP. **We would like to extend an invitation to your agency to meet and go over the various elements of the RUWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs. If you are interested, please contact me at (909) 387-9215 or bobt@sbvmwd.com, no later than March 11, 2011.**

Board of Directors and Officers

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We anticipate that a draft of the RUWMP will be available for public review starting in May 2011 and that Valley District will hold a public hearing in June 2011, prior to adoption of the UWMP. The public hearing will be announced on a Valley District Board Meeting Agenda. Valley District's Board meeting agendas are posted online at sbvmwd.com.

Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Mr. Mark Tomich
Development Services Director
City of Colton
650 N. La Cadena Drive
Colton, CA 92324

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Tomich,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District. The staff person who has been assigned to this project from the City of Colton is Mike Medina.

The RUWMP will include updated water demand projections within Valley District's service area. Water demand projections rely upon growth and population estimates from local land use plans and state and regional agencies. Valley District is encouraging land use agencies and other interested parties to participate in the development of the RUWMP. **We would like to extend an invitation to your agency to meet and go over the various elements of the RUWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs. If you are interested, please contact me at (909) 387-9215 or bobt@sbvmwd.com, no later than March 11, 2011.**

Board of Directors and Officers

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We anticipate that a draft of the RUWMP will be available for public review starting in May 2011 and that Valley District will hold a public hearing in June 2011, prior to adoption of the UWMP. The public hearing will be announced on a Valley District Board Meeting Agenda. Valley District's Board meeting agendas are posted online at sbvmwd.com.

Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Don Williams
Community Development Director
City of Fontana
Fontana City Hall
8353 Sierra Avenue
Fontana, CA 92335

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Williams,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

The RUWMP will include updated water demand projections within Valley District's service area. Water demand projections rely upon growth and population estimates from local land use plans and state and regional agencies. Valley District is encouraging land use agencies and other interested parties to participate in the development of the RUWMP. **We would like to extend an invitation to your agency to meet and go over the various elements of the RUWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs. If you are interested, please contact me at (909) 387-9215 or bobt@sbvmwd.com, no later than March 11, 2011.**

Board of Directors and Officers

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We anticipate that a draft of the RUWMP will be available for public review starting in May 2011 and that Valley District will hold a public hearing in June 2011, prior to adoption of the UWMP. The public hearing will be announced on a Valley District Board Meeting Agenda. Valley District's Board meeting agendas are posted online at sbvmwd.com.

Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Ms. Joyce Powers
Community and Economic Development Director
City of Grand Terrace
22795 Barton Road
Grand Terrace, CA 92313

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Powers,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

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Board of Directors and Officers

MARK ALVAREZ Division 1 | GEORGE A. AGUILAR Division 2 | C.PATRICK MILLIGAN Division 3 | MARK BULOT Division 4 | STEVE COPELAN Division 5 | DOUGLAS D. HEADRICK General Manager

We anticipate that a draft of the RUWMP will be available for public review starting in May 2011 and that Valley District will hold a public hearing in June 2011, prior to adoption of the UWMP. The public hearing will be announced on a Valley District Board Meeting Agenda. Valley District's Board meeting agendas are posted online at sbvmwd.com.

Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Mr. John Jaquess
Community Development Director
City of Highland
27215 Base Line Highland
Highland, CA 92346

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Jaquess,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

The RUWMP will include updated water demand projections within Valley District's service area. Water demand projections rely upon growth and population estimates from local land use plans and state and regional agencies. Valley District is encouraging land use agencies and other interested parties to participate in the development of the RUWMP. **We would like to extend an invitation to your agency to meet and go over the various elements of the RUWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs. If you are interested, please contact me at (909) 387-9215 or bobt@sbvmwd.com, no later than March 11, 2011.**

Board of Directors and Officers

MARK ALVAREZ Division 1 | GEORGE A. AGUILAR Division 2 | C.PATRICK MILLIGAN Division 3 | MARK BULOT Division 4 | STEVE COPELAN Division 5 | DOUGLAS D. HEADRICK General Manager

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Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Ms. Deborah Woldruff
Community Development Director
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Woldruff,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District. The staff who have been assigned to this project from the City of Loma Linda are Jarb Thaipejr and Russ Handy.

The RUWMP will include updated water demand projections within Valley District's service area. Water demand projections rely upon growth and population estimates from local land use plans and state and regional agencies. Valley District is encouraging land use agencies and other interested parties to participate in the development of the RUWMP. **We would like to extend an invitation to your agency to meet and go over the various elements of the RUWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs. If you are interested, please contact me at (909) 387-9215 or bobt@sbvmwd.com, no later than March 11, 2011.**

Board of Directors and Officers

MARK ALVAREZ Division 1 | GEORGE A. AGUILAR Division 2 | C.PATRICK MILLIGAN Division 3 | MARK BULOT Division 4 | STEVE COPELAN Division 5 | DOUGLAS D. HEADRICK General Manager

We anticipate that a draft of the RUWMP will be available for public review starting in May 2011 and that Valley District will hold a public hearing in June 2011, prior to adoption of the UWMP. The public hearing will be announced on a Valley District Board Meeting Agenda. Valley District's Board meeting agendas are posted online at sbvmwd.com.

Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Mr. Oscar Orci
Community Development Director
City of Redlands
35 Cajon Street
Redlands, CA 92373

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Orci,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District. The staff that have been assigned to this project from the City of Redlands are Chris Diggs and Woody Hynes.

The RUWMP will include updated water demand projections within Valley District's service area. Water demand projections rely upon growth and population estimates from local land use plans and state and regional agencies. Valley District is encouraging land use agencies and other interested parties to participate in the development of the RUWMP. **We would like to extend an invitation to your agency to meet and go over the various elements of the RUWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs. If you are interested, please contact me at (909) 387-9215 or bobt@sbvmwd.com, no later than March 11, 2011.**

Board of Directors and Officers

MARK ALVAREZ Division 1 | GEORGE A. AGUILAR Division 2 | C.PATRICK MILLIGAN Division 3 | MARK BULOT Division 4 | STEVE COPELAN Division 5 | DOUGLAS D. HEADRICK General Manager

We anticipate that a draft of the RUWMP will be available for public review starting in May 2011 and that Valley District will hold a public hearing in June 2011, prior to adoption of the UWMP. The public hearing will be announced on a Valley District Board Meeting Agenda. Valley District's Board meeting agendas are posted online at sbvmwd.com.

Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Mr. Mike Story
Development Services Director
City of Rialto
Rialto Civic Center
150 S. Palm Avenue
Rialto, CA 92376

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Story,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

The RUWMP will include updated water demand projections within Valley District's service area. Water demand projections rely upon growth and population estimates from local land use plans and state and regional agencies. Valley District is encouraging land use agencies and other interested parties to participate in the development of the RUWMP. **We would like to extend an invitation to your agency to meet and go over the various elements of the RUWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs. If you are interested, please contact me at (909) 387-9215 or bobt@sbvmwd.com, no later than March 11, 2011.**

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Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Ms. Margo Wheeler
Director, Community Development Department
City of San Bernardino
300 North "D" Street, 3rd Floor
San Bernardino, CA 92418

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Wheeler,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

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Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Mr. John McMains
Community Development Director
City of Yucaipa
34272 Yucaipa Boulevard
Yucaipa, CA 92399

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. McMains,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

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Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

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380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
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www.sbvmwd.com

February 28, 2011

Ms. Christine Kelley
Director, Land Use Services Department
County of San Bernardino
385 N. Arrowhead Avenue-1st Floor
San Bernardino, CA 92415-0182

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Kelley,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

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Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Robert Martin
East Valley Water District
3654 E. Highland Avenue, Suite 18
Highland, CA 92346-2607

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Martin,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District. The staff person who has been assigned to this project from East Valley Water District is Ron Buchwald.

The RUWMP will include updated water demand projections within Valley District's service area. Water demand projections rely upon growth and population estimates from local land use plans and state and regional agencies. Valley District is encouraging land use agencies and other interested parties to participate in the development of the RUWMP. **We would like to extend an invitation to your agency to meet and go over the various elements of the RUWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs. If you are interested, please contact me at (909) 387-9215 or bobt@sbvmwd.com, no later than March 11, 2011.**

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Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Mr. Robert Young
Fontana Water Company
15966 Arrow Route
Fontana, CA 92335

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Young,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

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Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Mr. Don Hough
Riverside Highland Water Company
12374 Michigan Street
Grand Terrace, CA 92313-5602

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Hough,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

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Board of Directors and Officers

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Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
www.sbvmwd.com

February 28, 2011

Daniel Cozad
San Bernardino Valley Water Conservation District
1630 West Redlands Blvd. # A
Redlands, CA 92373

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Cozad,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

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Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
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www.sbvmwd.com

February 28, 2011

Jody Noiron, Forest Supervisor
United States Forest Service
San Bernardino National Forest
1824 South Commercenter Circle
San Bernardino, CA 92408-3430

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Noiron,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

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Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

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380 East Vanderbilt Way
San Bernardino, CA 92408
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www.sbvmwd.com

February 28, 2011

Thomas Crowley
West Valley Water District
855 W. Baseline Road
Rialto, CA 92377

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Crowley,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

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Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

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380 East Vanderbilt Way
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www.sbvmwd.com

February 28, 2011

Jennifer Ares
Yucaipa Valley Water District
12770 Second Street
Yucaipa, CA 92399

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Ares,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

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Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

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380 East Vanderbilt Way
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phone: 909.387.9200
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www.sbvmwd.com

February 28, 2011

Lee Sena
Muscoy Mutual Water Company
2167 Darby Street
San Bernardino, CA 92407

SUBJECT: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Sena,

The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document which requires water suppliers to analyze the reliability of their water supplies under the affects of increasing demands and the possibility of drought and/or other possible water shortages. An UWMP is necessary for San Bernardino Valley Municipal Water District (Valley District) to remain eligible for state drought water bank assistance and is also a requirement for state grant and loan funding programs. Valley District has been participating in the development of a *Regional Urban Water Management Plan* (RUWMP) for the San Bernardino Valley in cooperation with the City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

The RUWMP will include updated water demand projections within Valley District's service area. Water demand projections rely upon growth and population estimates from local land use plans and state and regional agencies. Valley District is encouraging land use agencies and other interested parties to participate in the development of the RUWMP. **We would like to extend an invitation to your agency to meet and go over the various elements of the RUWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs. If you are interested, please contact me at (909) 387-9215 or bobt@sbvmwd.com, no later than March 11, 2011.**

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We anticipate that a draft of the RUWMP will be available for public review starting in May 2011 and that Valley District will hold a public hearing in June 2011, prior to adoption of the UWMP. The public hearing will be announced on a Valley District Board Meeting Agenda. Valley District's Board meeting agendas are posted online at sbvmwd.com.

Sincerely,

Robert M. Tincher, P.E.
Manager of Engineering and Planning

cc: Douglas Headrick

CITY OF SAN BERNARDINO
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"Trusted, Quality Service since 1905"

February 14, 2011

Mr. Kevin Blakeslee
Chief Public Works Engineer
County of San Bernardino
825 East Third Street
San Bernardino, CA 92415

Dear Mr. Blakeslee:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

The 2010 UWMP will include an update of anticipated water demands in the San Bernardino Valley including the City of San Bernardino, the City of Loma Linda, and the County of San Bernardino. Water demand projections will rely upon growth and population estimates from local land use plans and state and regional agencies. SBMWD is encouraging participation by land use agencies, water use agencies, and other interested parties in the UWMP. The SBMWD would like to extend to your agency an opportunity to meet with us to go over the various elements of the UWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs.

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Corporate Yards: (909) 384-5260 Water Reclamation Plant: (909) 384-5258

We anticipate that a draft UWMP will be available for public review starting in May 2011 and our agency will hold a public hearing in June 2011, prior to adoption of the UWMP. Hence we would like to solicit your input in the near future.

If your agency would like to learn more about the Regional Urban Water Management Plan, please contact Ted Brunson at (909) 384-5931 or Brunson_Te@sbcitywater.org, no later than February 25, 2011.

Sincerely,

Matthew H. Litchfield, P.E.
Director of Water Utility

MHL:TB:jmt

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VALERIE HOUSEL
Director of Environmental & Regulatory Compliance

February 14, 2011

Mr. Granville M. Bowman
Director of Public Works
County of San Bernardino
825 East Third Street
San Bernardino, CA 92415

Dear Mr. Bowman:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Director of Water Utility

MHL:TB:jmt

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February 14, 2011

Ms. Terri Rahhal
City Planner
City of San Bernardino
300 North "D" Street, 3rd Floor
San Bernardino, CA 92418

Dear Ms. Rahhal:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Sincerely,

Matthew H. Litchfield, P.E.
Director of Water Utility

MHL:TB:jmt

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February 14, 2011

Ms. Margo Wheeler
Director of Community Development
City of San Bernardino
300 North "D" Street, 3rd Floor
San Bernardino, CA 92418

Dear Ms. Wheeler:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Sincerely,

Matthew H. Litchfield, P.E.
Director of Water Utility

MHL:TB:jmt

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February 14, 2011

Mr. Peter Fox
City of Rialto
150 South Palm Avenue
Rialto, CA 92376

Dear Mr. Fox:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

The 2010 UWMP will include an update of anticipated water demands in the San Bernardino Valley including the City of San Bernardino, the City of Loma Linda, and the County of San Bernardino. Water demand projections will rely upon growth and population estimates from local land use plans and state and regional agencies. SBMWD is encouraging participation by land use agencies, water use agencies, and other interested parties in the UWMP. The SBMWD would like to extend to your agency an opportunity to meet with us to go over the various elements of the UWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs.

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If your agency would like to learn more about the Regional Urban Water Management Plan, please contact Ted Brunson at (909) 384-5931 or Brunson_Te@sbcitywater.org, no later than February 25, 2011.

Sincerely,

Matthew H. Litchfield, P.E.
Director of Water Utility

MHL:TB:jmt

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Director of Environmental & Regulatory Compliance

February 14, 2011

Mr. Tom Crowley
Assistant General Manager
West Valley Water District
855 West Baseline Road
P.O. Box 920
Rialto, CA 92377

Dear Mr. Crowley:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

The 2010 UWMP will include an update of anticipated water demands in the San Bernardino Valley including the City of San Bernardino, the City of Loma Linda, and the County of San Bernardino. Water demand projections will rely upon growth and population estimates from local land use plans and state and regional agencies. SBMWD is encouraging participation by land use agencies, water use agencies, and other interested parties in the UWMP. The SBMWD would like to extend to your agency an opportunity to meet with us to go over the

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various elements of the UWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs.
We anticipate that a draft UWMP will be available for public review starting in May 2011 and our agency will hold a public hearing in June 2011, prior to adoption of the UWMP. Hence we would like to solicit your input in the near future.

If your agency would like to learn more about the Regional Urban Water Management Plan, please contact Ted Brunson at (909) 384-5931 or Brunson_Te@sbcitywater.org, no later than February 25, 2011.

Sincerely,

Matthew H. Litchfield, P.E.
Director of Water Utility

MHL:TB:jmt

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February 14, 2011

Mr. T. Jarb Thaipejr
Public Works Director
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Dear Mr. Thaipejr:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Sincerely,

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Director of Water Utility

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February 16, 2011

Mr. Rudy Garcia
Supervisor
Muscoy Mutual Water Department
2167 Darby Street
San Bernardino, CA 92407

Dear Mr. Garcia:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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"Trusted, Quality Service since 1905"

February 16, 2011

Ms. Paula Stevens
Director and Chief Operator
Baseline Garden Mutual Water Company
P.O. Box 3331
San Bernardino, CA 92413

Dear Ms. Stevens:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Director of Water Utility

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MATTHEW H. LITCHFIELD, P.E.
Director of Water Utility
JOHN A. CLAUS
Director of Water Reclamation
DON SHACKELFORD
Director of Finance
VALERIE HOUSEL
Director of Environmental &
Regulatory Compliance

"Trusted, Quality Service since 1905"

February 16, 2011

Mr. Chris Diggs
Assistant Utilities Director
City of Redlands
35 Cajon Street
Redlands, CA 92373

Dear Mr. Diggs:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

The 2010 UWMP will include an update of anticipated water demands in the San Bernardino Valley including the City of San Bernardino, the City of Loma Linda, and the County of San Bernardino. Water demand projections will rely upon growth and population estimates from local land use plans and state and regional agencies. SBMWD is encouraging participation by land use agencies, water use agencies, and other interested parties in the UWMP. The SBMWD would like to extend to your agency an opportunity to meet with us to go over the various elements of the UWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs.

300 North "D" Street, San Bernardino, California 92418 P.O. Box 710, 92402 Phone: (909) 384-5141
FACSIMILE NUMBERS: Administration: (909) 384-5215 Engineering: (909) 384-5532 Customer Service: (909) 384-7211
Corporate Yards: (909) 384-5260 Water Reclamation Plant: (909) 384-5258

We anticipate that a draft UWMP will be available for public review starting in May 2011 and our agency will hold a public hearing in June 2011, prior to adoption of the UWMP. Hence we would like to solicit your input in the near future.

If your agency would like to learn more about the Regional Urban Water Management Plan, please contact Ted Brunson at (909) 384-5931 or Brunson_Te@sbcitywater.org, no later than February 25, 2011.

Sincerely,

Matthew H. Litchfield, P.E.
Director of Water Utility

MHL:TB:jmt

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Regulatory Compliance

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February 16, 2011

Ms. Jennifer P. Ares
Conservation Manager
Yucaipa Valley Water District
12770 Second Street
Yucaipa, CA 92399

Dear Ms. Ares:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Director of Water Utility

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Director of Environmental & Regulatory Compliance

February 14, 2011

Mr. Robert E. Martin
General Manager
East Valley Water District
3654 E. Highland Avenue, Suite 18
Highland, CA 92346

Dear Mr. Martin:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including City of Colton, City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for San Bernardino Municipal Water Department (SBMWD) to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Matthew H. Litchfield, P.E.
Director of Water Utility

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Regulatory Compliance

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February 14, 2011

Mr. Doug Headrick
General Manager
SBVMWD
380 East Vanderbilt Way
San Bernardino, CA 92408

Dear Mr. Headrick:

RE: 2010 REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE SAN BERNARDINO VALLEY

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Matthew H. Litchfield, P.E.
Director of Water Utility

MHL:TB:jmt

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3654 East Highland Avenue, Suite 18, Highland, CA 92346
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February 14, 2011

Ms. Christine Kelley
Director, Land Use Services Department
County of San Bernardino
385 N. Arrowhead Avenue, 1st Floor
San Bernardino, CA 92415-0182

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Kelley,

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Sincerely,

Robert E. Martin, P.E.
General Manager

REM: etb

East Valley Water District

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District Engineer

February 14, 2011

Mr. Mark Tomich
Development Services Director
City of Colton
659 N. La Cadena Drive
Colton, CA 92324

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Tomich

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Sincerely,

Robert E. Martin, P.E.
General Manager

REM: etb

Administration (909) 885-4900, Fax (909) 889-5732 • Engineering (909) 888-8986, Fax (909) 383-1481
Customer Service (909) 889-9501, Fax (909) 888-6741 • Finance (909) 381-6463, Fax (909) 888-6741

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Chief Financial Officer

Ronald E. Buchwald
District Engineer

February 14, 2011

Ms. Deborah Woldruff
Community Development Director
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Woldruff

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Sincerely,

Robert E. Martin, P.E.
General Manager

REM: etb

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Chief Financial Officer

Ronald E. Buchwald
District Engineer

February 14, 2011

Mr. John Jaquess
Community Development Director
City of Highland
27215 Baseline
Highland, CA 92346

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Jaquess

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Robert E. Martin, P.E.
General Manager

REM: etb

East Valley Water District

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Chief Financial Officer

Ronald E. Buchwald
District Engineer

February 14, 2011

Mr. Mike Story
Development Services Director
City of Rialto
150 S. Palm Avenue
Rialto, CA 92376

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Story,

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Ronald E. Buchwald
District Engineer

February 14, 2011

Mr. Don Williams
Community Development Director
City of Fontana
8353 Sierra Avenue
Fontana, CA 92335

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Williams,

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District Engineer

February 14, 2011

Ms. Joyce Powers
Community and Economic Development Director
City of Grand Terrace
22795 Barton Road
Grand Terrace, CA 92313

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Powers,

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Ronald E. Buchwald
District Engineer

February 14, 2011

Mr. Oscar Orci
Community Development Director
City of Redlands
35 Cajon Street
Redlands, CA 92373

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Orci,

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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If your agency would like to learn more about the Regional Urban Water Management Plan, please contact Ron Buchwald at (909) 888-8986 or rbuchwald@eastvalley.org, no later than February 25, 2011.

Sincerely,

Robert E. Martin, P.E.
General Manager

REM: etb

East Valley Water District

3654 East Highland Avenue, Suite 18, Highland, CA 92346
P.O. Box 3427, San Bernardino, CA 92413

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Ronald E. Buchwald
District Engineer

February 14, 2011

Mr. John McMains
Community Development Director
City of Yucaipa
34272 Yucaipa Blvd.
Yucaipa, CA 92399

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. McMains,

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Sincerely,

Robert E. Martin, P.E.
General Manager

REM: etb

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Customer Service (909) 889-9501, Fax (909) 888-6741 • Finance (909) 381-6463, Fax (909) 888-6741

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Brian W. Tompkins
Chief Financial Officer

Ronald E. Buchwald
District Engineer

February 14, 2011

Bear Valley Mutual Water Company
101 East Olive Avenue
Redlands, CA 92373

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

To whom it may concern:

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Robert E. Martin, P.E.
General Manager

REM: etb

East Valley
Water District

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Chief Financial Officer

Ronald E. Buchwald
District Engineer

February 14, 2011

Mr. Don Hough
Riverside Highland Water Company
12374 Michigan Street
Grand Terrace, CA 92313-5602

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Hough,

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Sincerely,

Robert E. Martin, P.E.
General Manager

REM: etb

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Brian W. Tompkins
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Ronald E. Buchwald
District Engineer

February 14, 2011

Mr. Robert Young
Fontana Water Company
15966 Arrow Route
Fontana, CA 92335

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Young,

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Brian W. Tompkins
Chief Financial Officer

Ronald E. Buchwald
District Engineer

February 14, 2011

Muscoy Mutual Water Company
2167 Darby Street
San Bernardino, CA 92407

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

To whom it may concern:

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General Manager

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Brian W. Tompkins
Chief Financial Officer

Ronald E. Buchwald
District Engineer

February 14, 2011

Jeanne Wade Evans, Forest Supervisor
United States Forest Service
San Bernardino National Forest
1824 South Commercenter Circle
San Bernardino, CA 92408-3430

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Evans,

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Robert E. Martin, P.E.
General Manager

REM: elb

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Robert E. Martin
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Brian W. Tompkins
Chief Financial Officer

Ronald E. Buchwald
District Engineer

February 14, 2011

Clerk of the Board
West Valley Water District
855 W. Baseline Road
Rialto, CA 92377

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

To whom it may concern,

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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REM: etb

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Chief Financial Officer

Ronald E. Buchwald
District Engineer

February 14, 2011

Clerk of the Board
Yucaipa Valley Water District
12770 Second Street
Yucaipa, CA 92399

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

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REM: etb

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Brian W. Tompkins
Chief Financial Officer

Ronald E. Buchwald
District Engineer

February 14, 2011

Clerk of the Board
San Bernardino Valley Municipal
Water Department
380 East Vanderbilt Way
San Bernardino, CA 92408

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

To whom it may concern,

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Ronald E. Buchwald
District Engineer

February 14, 2011

Clerk of the Board
San Bernardino Valley Water
Conservation District
1630 West Redlands Blvd., #A
Redlands, CA 92373

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

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Water District

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Robert E. Martin
General Manager

Brian W. Tompkins
Chief Financial Officer

Ronald E. Buchwald
District Engineer

February 14, 2011

Clerk of the Board
Big Bear Municipal Water District
P.O. Box 2863
Big Bear, CA 92315

Subject: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

To whom it may concern,

Multiple agencies in the San Bernardino Valley area are coordinating the preparation of a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for East Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

The 2010 UWMP will include an update of anticipated water demands in the San Bernardino Valley including San Bernardino County, the City of San Bernardino and the City of Highland. Water demand projections will rely upon growth and population estimates from local land use plans and state and regional agencies. East Valley Water District is encouraging participation by land use agencies, water use agencies, and other interested parties in the UWMP. **East Valley Water District would like to extend to your agency an opportunity to meet with us to go over the various elements of the UWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs.**

We anticipate that a draft UWMP will be available for public review starting in May 2011 and our agency will hold a public hearing in June 2011, prior to adoption of the UWMP. Hence we would like to solicit your input in the near future.

If your agency would like to learn more about the Regional Urban Water Management Plan, please contact Ron Buchwald at (909) 888-8986 or rbuchwald@eastvalley.org, no later than February 25, 2011.

Sincerely,

Robert E. Martin, P.E.
General Manager

REM: etb

West Valley Water District

855 West Base Line, P.O. Box 920
Rialto, California 92377-0920
Phone (909) 875-1804

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Fax (909) 875-1361 Engineering
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February 23, 2011

Don Williams
Community Development Director
City of Fontana
Fontana City Hall
8353 Sierra Avenue
Fontana, CA 92335

2010 Regional Urban Water Management Plan for the San Bernardino Valley

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for West Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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If your agency would like to learn more about the Regional Urban Water Management Plan, please contact Tom Crowley, Assistant General Manager at (909) 875-1804 ext. 702 or by email at tcrowley@wvwd.org, no later than March 4, 2011.

Sincerely,

Thomas J. Crowley

Thomas J. Crowley, P.E.
Assistant General Manager

West Valley Water District

855 West Base Line, P.O. Box 920
Rialto, California 92377-0920
Phone (909) 875-1804

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February 23, 2011

Mr. Mike Story
Development Services Director
City of Rialto
Rialto Civic Center
150 S. Palm Avenue

2010 Regional Urban Water Management Plan for the San Bernardino Valley

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Sincerely,

Thomas J. Crowley

Thomas J. Crowley, P.E.
Assistant General Manager

West Valley Water District

855 West Base Line, P.O. Box 920
Rialto, California 92377-0920
Phone (909) 875-1804

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February 23, 2011

Mr. Mark Tomich
Development Services Director
City of Colton
659 N La Cadena Drive
Colton CA 92324

2010 Regional Urban Water Management Plan for the San Bernardino Valley

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Sincerely,

Thomas J. Crowley

Thomas J. Crowley, P.E.
Assistant General Manager

West Valley Water District

855 West Base Line, P.O. Box 920
Rialto, California 92377-0920
Phone (909) 875-1804

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Administrative Secretary

Fax (909) 875-7284 Administration
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Fax (909) 875-1849 Customer Service

February 23, 2011

Ms. Christine Kelley
Director, Land Use Services Department
County of San Bernardino
385 N. Arrowhead Avenue - 1st Floor
San Bernardino, California 92415-0182

2010 Regional Urban Water Management Plan for the San Bernardino Valley

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Thomas J. Crowley

Thomas J. Crowley, P.E.
Assistant General Manager

West Valley Water District

855 West Base Line, P.O. Box 920
Rialto, California 92377-0920
Phone (909) 875-1804

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February 23, 2011

Carolyn Syns Luna
County of Riverside Planning Department
P.O. Box 1409
Riverside, CA 92502

2010 Regional Urban Water Management Plan for the San Bernardino Valley

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for West Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Thomas J. Crowley

Thomas J. Crowley, P.E.
Assistant General Manager

West Valley Water District

855 West Base Line, P.O. Box 920
Rialto, California 92377-0920
Phone (909) 875-1804

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February 23, 2011

Clerk of the Board
San Bernardino Valley Municipal Water Department
380 East Vanderbilt Way,
San Bernardino, CA 92408

2010 Regional Urban Water Management Plan for the San Bernardino Valley

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for West Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Sincerely,

Thomas J. Crowley, P.E.
Assistant General Manager

COLTON

Public Utilities

March 14, 2011

Mr. Clyde Graham
President, Terrace Water Company
1095 1/2 Stevenson St
Colton, CA 92324

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If your agency would like to learn more about the Regional Urban Water Management Plan, please contact me at 909-514-4210 or by email at vortiz@ci.colton.ca.us no later than April 7, 2011.

Sincerely,

Victor Ortiz P.E.
Engineering Manager
Public Works and Utility Services Department
City of Colton

160 South 10th Street
Colton, California 92324
(909) 370-5099

Committed to Our Community

COLTON

Public Utilities

March 24, 2011

Clerk of the Board
San Bernardino Valley Municipal Water District
380 East Vanderbilt Way,
San Bernardino CA 92408

2010 Regional Urban Water Management Plan for the San Bernardino Valley

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Sincerely,

Victor Ortiz P.E.
Engineering Manager
Public Works and Utility Services Department
City of Colton

160 South 10th Street
Colton, California 92324
(909) 370-5099

Committed to Our Community

COLTON

Public Utilities

March 24, 2011

Ms. Christine Kelley
Director, Land Use Services Department
County of San Bernardino
385 N. Arrowhead Avenue – 1st Floor
San Bernardino CA 92415-0182

2010 Regional Urban Water Management Plan for the San Bernardino Valley

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Victor Ortiz P.E.
Engineering Manager
Public Works and Utility Services Department
City of Colton

160 South 10th Street
Colton, California 92324
(909) 370-5099

Committed to Our Community

COLTON
Public Utilities

March 24, 2011

Ms. Deborah Woldruff
Community Development Director
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

2010 Regional Urban Water Management Plan for the San Bernardino Valley

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Victor Ortiz P.E.
Engineering Manager
Public Works and Utility Services Department
City of Colton

160 South 10th Street
Colton, California 92324
(909) 370-5099

Committed to Our Community

COLTON
Public Utilities

March 24, 2011

Ms. Joyce Powers
Community and Economic Development Director
City of Grand Terrace
22795 Barton Road
Grand Terrace, CA 92313

2010 Regional Urban Water Management Plan for the San Bernardino Valley

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Victor Ortiz P.E.
Engineering Manager
Public Works and Utility Services Department
City of Colton

160 South 10th Street
Colton, California 92324
(909) 370-5099

Committed to Our Community

COLTON
Public Utilities

March 24, 2011

Mr. Don Hough
Riverside Highland Water Company
12374 Michigan Street
Grand Terrace, CA 92313-5602

2010 Regional Urban Water Management Plan for the San Bernardino Valley

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Engineering Manager
Public Works and Utility Services Department
City of Colton

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Colton, California 92324
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COLTON

Public Utilities

March 24, 2011

Clerk of the Board
San Bernardino Valley Water
Conservation District
1630 West Redlands Blvd #A
Redlands, CA 92373

2010 Regional Urban Water Management Plan for the San Bernardino Valley

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for City of Colton Public Utilities to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

The 2010 UWMP will include an update of anticipated water demands in the San Bernardino Valley in cooperation with the Cities of Loma Linda, Riverside, Rialto and the counties of San Bernardino and Riverside. Water demand projections will rely upon growth and population estimates from local land use plans and state and regional agencies. City of Colton Public Utilities is encouraging participation by land use agencies, water use agencies, and other interested parties in the UWMP. **We would like to extend to your agency an opportunity to meet with us to go over the various elements of the UWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs.**

We anticipate that a draft UWMP will be available for public review starting in May 2011 and our agency will hold a public hearing in June 2011, prior to adoption of the UWMP. Hence we would like to solicit your input in the near future.

If your agency would like to learn more about the Regional Urban Water Management Plan, please contact me at 909-514-4210 or by email at vortiz@ci.colton.ca.us no later than April 7, 2011.

Sincerely,

Victor Ortiz P.E.
Engineering Manager
Public Works and Utility Services Department
City of Colton

160 South 10th Street
Colton, California 92324
(909) 370-5099

Committed to Our Community

COLTON

Public Utilities

March 24, 2011

Clerk of the Board
East Valley Water District
3654 E. Highland Avenue, Suite 18
Highland, CA 92346-2607

2010 Regional Urban Water Management Plan for the San Bernardino Valley

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for City of Colton Public Utilities to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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If your agency would like to learn more about the Regional Urban Water Management Plan, please contact me at 909-514-4210 or by email at vortiz@ci.colton.ca.us no later than April 7, 2011.

Sincerely,

Victor Ortiz P.E.
Engineering Manager
Public Works and Utility Services Department
City of Colton

160 South 10th Street
Colton, California 92324
(909) 370-5099

Committed to Our Community

City of Redlands

February 16, 2011

Clerk of the Board
San Bernardino Valley Municipal Water Department
380 East Vanderbilt Way, San Bernardino, CA 92408

Dear Clerk of the Board,

Multiple agencies in the San Bernardino Valley area are preparing a Regional Urban Water Management Plan, including the cities of Colton, Loma Linda, Redlands, San Bernardino, and East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document that includes an evaluation and comparison of a utility's water supply and ability to meet existing and projected demands. The completion of a UWMP is necessary as it allows Redlands to remain eligible for state drought water bank assistance and is a requirement for state grant and loan funding programs.

The 2010 Redlands UWMP will include anticipated water demands in the San Bernardino Valley for all or portions of the cities of Redlands, Loma Linda, San Bernardino, Yucaipa, and unincorporated areas of San Bernardino County. Water demand projections will rely on growth and population estimates from local land use plans and state and regional agencies. Redlands is encouraging participation by land use agencies, water use agencies, and other interested parties.

We anticipate a draft UWMP will be available for public review starting in May 2011, and we will hold a public hearing in June 2011 prior to adoption of the UWMP. If you would like to learn more about our UWMP, review information to be included, and/or participate in the development of this important document, please contact me.

Very truly yours,

Chris Diggs
Assistant Utilities Director

City of Redlands

February 16, 2011

Clerk of the Board
Yucaipa Valley Water District
12770 Second Street
Yucaipa, CA 92399

Dear Clerk of the Board,

Multiple agencies in the San Bernardino Valley area are preparing a Regional Urban Water Management Plan, including the cities of Colton, Loma Linda, Redlands, San Bernardino, and East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document that includes an evaluation and comparison of a utility's water supply and ability to meet existing and projected demands. The completion of a UWMP is necessary as it allows Redlands to remain eligible for state drought water bank assistance and is a requirement for state grant and loan funding programs.

The 2010 Redlands UWMP will include anticipated water demands in the San Bernardino Valley for all or portions of the cities of Redlands, Loma Linda, San Bernardino, Yucaipa, and unincorporated areas of San Bernardino County. Water demand projections will rely on growth and population estimates from local land use plans and state and regional agencies. Redlands is encouraging participation by land use agencies, water use agencies, and other interested parties.

We anticipate a draft UWMP will be available for public review starting in May 2011, and we will hold a public hearing in June 2011 prior to adoption of the UWMP. If you would like to learn more about our UWMP, review information to be included, and/or participate in the development of this important document, please contact me.

Very truly yours,

Chris Diggs
Assistant Utilities Director

City of Redlands

February 16, 2011

Clerk of the Board
East Valley Water District
3654 E. Highland Avenue, Suite 18
Highland, California 92346-2607

Dear Clerk of the Board,

Multiple agencies in the San Bernardino Valley area are preparing a Regional Urban Water Management Plan, including the cities of Colton, Loma Linda, Redlands, San Bernardino, and East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document that includes an evaluation and comparison of a utility's water supply and ability to meet existing and projected demands. The completion of a UWMP is necessary as it allows Redlands to remain eligible for state drought water bank assistance and is a requirement for state grant and loan funding programs.

The 2010 Redlands UWMP will include anticipated water demands in the San Bernardino Valley for all or portions of the cities of Redlands, Loma Linda, San Bernardino, Yucaipa, and unincorporated areas of San Bernardino County. Water demand projections will rely on growth and population estimates from local land use plans and state and regional agencies. Redlands is encouraging participation by land use agencies, water use agencies, and other interested parties.

We anticipate a draft UWMP will be available for public review starting in May 2011, and we will hold a public hearing in June 2011 prior to adoption of the UWMP. If you would like to learn more about our UWMP, review information to be included, and/or participate in the development of this important document, please contact me.

Very truly yours,

Chris Diggs
Assistant Utilities Director

City of Redlands

February 16, 2011

Clerk of the Board
San Bernardino Valley Water Conservation District
1630 West Redlands Blvd. # A
Redlands, CA 92373

Dear Clerk of the Board,

Multiple agencies in the San Bernardino Valley area are preparing a Regional Urban Water Management Plan, including the cities of Colton, Loma Linda, Redlands, San Bernardino, and East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document that includes an evaluation and comparison of a utility's water supply and ability to meet existing and projected demands. The completion of a UWMP is necessary as it allows Redlands to remain eligible for state drought water bank assistance and is a requirement for state grant and loan funding programs.

The 2010 Redlands UWMP will include anticipated water demands in the San Bernardino Valley for all or portions of the cities of Redlands, Loma Linda, San Bernardino, Yucaipa, and unincorporated areas of San Bernardino County. Water demand projections will rely on growth and population estimates from local land use plans and state and regional agencies. Redlands is encouraging participation by land use agencies, water use agencies, and other interested parties.

We anticipate a draft UWMP will be available for public review starting in May 2011, and we will hold a public hearing in June 2011 prior to adoption of the UWMP. If you would like to learn more about our UWMP, review information to be included, and/or participate in the development of this important document, please contact me.

Very truly yours,

Chris Diggs
Assistant Utilities Director

City of Redlands

February 16, 2011

Bear Valley Mutual Water Company
101 East Olive Avenue
Redlands, CA 92373

Dear Bear Valley Mutual Water Company,

Multiple agencies in the San Bernardino Valley area are preparing a Regional Urban Water Management Plan, including the cities of Colton, Loma Linda, Redlands, San Bernardino, and East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document that includes an evaluation and comparison of a utility's water supply and ability to meet existing and projected demands. The completion of a UWMP is necessary as it allows Redlands to remain eligible for state drought water bank assistance and is a requirement for state grant and loan funding programs.

The 2010 Redlands UWMP will include anticipated water demands in the San Bernardino Valley for all or portions of the cities of Redlands, Loma Linda, San Bernardino, Yucaipa, and unincorporated areas of San Bernardino County. Water demand projections will rely on growth and population estimates from local land use plans and state and regional agencies. Redlands is encouraging participation by land use agencies, water use agencies, and other interested parties.

We anticipate a draft UWMP will be available for public review starting in May 2011, and we will hold a public hearing in June 2011 prior to adoption of the UWMP. If you would like to learn more about our UWMP, review information to be included, and/or participate in the development of this important document, please contact me.

Very truly yours,

Chris Diggs
Assistant Utilities Director

City of Redlands

February 16, 2011

Mr. John McMains
Community Development Director
City of Yucaipa
34272 Yucaipa Boulevard
Yucaipa, CA 92399

Dear Mr. John McMains,

Multiple agencies in the San Bernardino Valley area are preparing a Regional Urban Water Management Plan, including the cities of Colton, Loma Linda, Redlands, San Bernardino, and East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document that includes an evaluation and comparison of a utility's water supply and ability to meet existing and projected demands. The completion of a UWMP is necessary as it allows Redlands to remain eligible for state drought water bank assistance and is a requirement for state grant and loan funding programs.

The 2010 Redlands UWMP will include anticipated water demands in the San Bernardino Valley for all or portions of the cities of Redlands, Loma Linda, San Bernardino, Yucaipa, and unincorporated areas of San Bernardino County. Water demand projections will rely on growth and population estimates from local land use plans and state and regional agencies. Redlands is encouraging participation by land use agencies, water use agencies, and other interested parties.

We anticipate a draft UWMP will be available for public review starting in May 2011, and we will hold a public hearing in June 2011 prior to adoption of the UWMP. If you would like to learn more about our UWMP, review information to be included, and/or participate in the development of this important document, please contact me.

Very truly yours,

Chris Diggs
Assistant Utilities Director

City of Redlands

February 16, 2011

Mr. John Jaquess
Community Development Director
City of Highland
27215 Base Line
Highland, CA 92346

Dear Mr. John Jaquess,

Multiple agencies in the San Bernardino Valley area are preparing a Regional Urban Water Management Plan, including the cities of Colton, Loma Linda, Redlands, San Bernardino, and East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document that includes an evaluation and comparison of a utility's water supply and ability to meet existing and projected demands. The completion of a UWMP is necessary as it allows Redlands to remain eligible for state drought water bank assistance and is a requirement for state grant and loan funding programs.

The 2010 Redlands UWMP will include anticipated water demands in the San Bernardino Valley for all or portions of the cities of Redlands, Loma Linda, San Bernardino, Yucaipa, and unincorporated areas of San Bernardino County. Water demand projections will rely on growth and population estimates from local land use plans and state and regional agencies. Redlands is encouraging participation by land use agencies, water use agencies, and other interested parties.

We anticipate a draft UWMP will be available for public review starting in May 2011, and we will hold a public hearing in June 2011 prior to adoption of the UWMP. If you would like to learn more about our UWMP, review information to be included, and/or participate in the development of this important document, please contact me.

Very truly yours,

Chris Diggs
Assistant Utilities Director

City of Redlands

February 16, 2011

Ms. Margo Wheeler
Director, Community Development Department
City of San Bernardino
300 North "D" Street, 3rd Floor
San Bernardino, CA 92418

Dear Ms. Margo Wheeler,

Multiple agencies in the San Bernardino Valley area are preparing a Regional Urban Water Management Plan, including the cities of Colton, Loma Linda, Redlands, San Bernardino, and East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document that includes an evaluation and comparison of a utility's water supply and ability to meet existing and projected demands. The completion of a UWMP is necessary as it allows Redlands to remain eligible for state drought water bank assistance and is a requirement for state grant and loan funding programs.

The 2010 Redlands UWMP will include anticipated water demands in the San Bernardino Valley for all or portions of the cities of Redlands, Loma Linda, San Bernardino, Yucaipa, and unincorporated areas of San Bernardino County. Water demand projections will rely on growth and population estimates from local land use plans and state and regional agencies. Redlands is encouraging participation by land use agencies, water use agencies, and other interested parties.

We anticipate a draft UWMP will be available for public review starting in May 2011, and we will hold a public hearing in June 2011 prior to adoption of the UWMP. If you would like to learn more about our UWMP, review information to be included, and/or participate in the development of this important document, please contact me.

Very truly yours,

Chris Diggs
Assistant Utilities Director

City of Redlands

February 16, 2011

Ms. Deborah Woldruff
Community Development Director
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Dear Ms. Deborah Woldruff,

Multiple agencies in the San Bernardino Valley area are preparing a Regional Urban Water Management Plan, including the cities of Colton, Loma Linda, Redlands, San Bernardino, and East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document that includes an evaluation and comparison of a utility's water supply and ability to meet existing and projected demands. The completion of a UWMP is necessary as it allows Redlands to remain eligible for state drought water bank assistance and is a requirement for state grant and loan funding programs.

The 2010 Redlands UWMP will include anticipated water demands in the San Bernardino Valley for all or portions of the cities of Redlands, Loma Linda, San Bernardino, Yucaipa, and unincorporated areas of San Bernardino County. Water demand projections will rely on growth and population estimates from local land use plans and state and regional agencies. Redlands is encouraging participation by land use agencies, water use agencies, and other interested parties.

We anticipate a draft UWMP will be available for public review starting in May 2011, and we will hold a public hearing in June 2011 prior to adoption of the UWMP. If you would like to learn more about our UWMP, review information to be included, and/or participate in the development of this important document, please contact me.

Very truly yours,

Chris Diggs
Assistant Utilities Director

City of Redlands

February 16, 2011

Ms. Christine Kelley
Director, Land Use Services Department
County of San Bernardino
385 N. Arrowhead Avenue - 1st Floor
San Bernardino, California 92415-0182

Dear Ms. Christine Kelley,

Multiple agencies in the San Bernardino Valley area are preparing a Regional Urban Water Management Plan, including the cities of Colton, Loma Linda, Redlands, San Bernardino, and East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document that includes an evaluation and comparison of a utility's water supply and ability to meet existing and projected demands. The completion of a UWMP is necessary as it allows Redlands to remain eligible for state drought water bank assistance and is a requirement for state grant and loan funding programs.

The 2010 Redlands UWMP will include anticipated water demands in the San Bernardino Valley for all or portions of the cities of Redlands, Loma Linda, San Bernardino, Yucaipa, and unincorporated areas of San Bernardino County. Water demand projections will rely on growth and population estimates from local land use plans and state and regional agencies. Redlands is encouraging participation by land use agencies, water use agencies, and other interested parties.

We anticipate a draft UWMP will be available for public review starting in May 2011, and we will hold a public hearing in June 2011 prior to adoption of the UWMP. If you would like to learn more about our UWMP, review information to be included, and/or participate in the development of this important document, please contact me.

Very truly yours,

Chris Diggs
Assistant Utilities Director

City of Loma Linda

25541 Barton Road, Loma Linda, California 92354-3160 • (909) 799-2800 • FAX (909) 799-2890

Sister Cities: Manipal, Karnataka, India - Libertadore, San Martin, Argentina • www.lomalinda-ca.gov

March 28, 2011

Clerk of the Board
San Bernardino Valley Municipal Water Department
380 East Vanderbilt Way
San Bernardino, Ca. 92408

2010 Regional Urban Water Management Plan for the San Bernardino Valley

Multiple agencies in the San Bernardino Valley area are coordinating the prepare a Regional Urban Water Management Plan, including the Cities of Colton, Loma Linda, Redlands and San Bernardino along with East Valley, West Valley, Yucaipa Valley and San Bernardino Valley Municipal Water Districts and the Riverside Highland Water Company. The Urban Water Management Planning Act requires that every urban water supplier above a certain size prepare and adopt an Urban Water Management Plan (UWMP) every five (5) years. The UWMP is a planning document that water suppliers use to evaluate and compare existing water supplies and reliability to projected demands. A complete UWMP is necessary for the City of Loma Linda to remain eligible for State drought water bank assistance. It is also required for State grant and loan funding opportunities.

The 2010 UWMP will include an update of anticipated water demands in the San Bernardino Valley including the City of Loma Linda. Water demand projections will rely upon growth and population estimates from local land use plans as well as State and regional planning agencies. The City of Loma Linda encourages participation by land use agencies, water use agencies and any other stakeholder or interested party in the UWMP process. The City of Loma Linda extends an invitation to your agency an opportunity to meet with us to review and comment on the various elements of the UWMP. The elements include assumptions concerning population growth, future water supply, demands and conservation efforts.

We anticipate a draft UWMP will be available in May 2011 with a public hearing scheduled in June 2011. Adoption of the UWMP would then follow the review and hearing process. Your timely input will be greatly appreciated. If you have any questions or need additional information please contact me, Russ Handy at (909) 799-4420, or rhandy@lomalinda-ca.gov by April 5, 2011.

Sincerely,

Russell T. Handy

Russ Handy, Utility Services Superintendent

Recycled Paper

Yucaipa Valley Water District

12770 Second Street • P. O. Box 730 • Yucaipa, California 92399-0730
(909) 797-5117 • Fax: (909) 797-6381 • www.yvwd.dst.ca.us

February 10, 2011

Ms. Christine Kelley
Director, Land Use Services Department
County of San Bernardino
385 N. Arrowhead Avenue – 1st Floor
San Bernardino, CA 92415-0182

RE: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Kelley:

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for Yucaipa Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

The 2010 Regional UWMP will include an update of anticipated water demands in the San Bernardino Valley including the city of Yucaipa and the County of San Bernardino. Water demand projections will rely upon growth and population estimates from local land use plans and state and regional agencies. Yucaipa Valley Water District is encouraging participation by land use agencies, water use agencies, and other interested parties in the Regional UWMP. **Yucaipa Valley Water District would like to extend to your agency an opportunity to meet with us to go over the various elements of the Regional UWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs.**

We anticipate that a draft Regional UWMP will be available for public review starting in May 2011 and our agency will hold a public hearing in June 2011, prior to adoption of the Regional UWMP. Hence we would like to solicit your input in the near future. In addition, Yucaipa Valley Water District will host public review and a public hearing for the agency's individual Urban Water Management Plan that will require a separate hearing date to be determined.

If your agency would like to learn more about the Regional Urban Water Management Plan, please contact Jennifer Ares at (909) 790-3301.

Sincerely,

Jennifer Ares
Resource Sustainability Manager

Directors and Officers

IAN CUTHBERTSON	BRUCE GRANLUND	JAY BOGH	LONNI GRANLUND	HANK WOCHHOLZ	JOSEPH B. ZOBA
Division 1	Division 2	Division 3	Division 4	Division 5	General Manager and Secretary

Yucaipa Valley Water District

12770 Second Street • P. O. Box 730 • Yucaipa, California 92399-0730
(909) 797-5117 • Fax: (909) 797-6381 • www.yvwd.dst.ca.us

February 10, 2011

Mr. John McMains
Community Development Director
City of Yucaipa
34272 Yucaipa Boulevard
Yucaipa, CA 92399

RE: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. McMains:

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for Yucaipa Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

The 2010 Regional UWMP will include an update of anticipated water demands in the San Bernardino Valley including the City of Yucaipa and the County of San Bernardino. Water demand projections will rely upon growth and population estimates from local land use plans and state and regional agencies. Yucaipa Valley Water District is encouraging participation by land use agencies, water use agencies, and other interested parties in the Regional UWMP. **Yucaipa Valley Water District would like to extend to your agency an opportunity to meet with us to go over the various elements of the Regional UWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs.**

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If your agency would like to learn more about the Regional Urban Water Management Plan, please contact Jennifer Ares at (909) 790-3301.

Sincerely,

Jennifer Ares
Resource Sustainability Manager

Directors and Officers

IAN CUTHBERTSON	BRUCE GRANLUND	JAY BOGH	LONNI GRANLUND	HANK WOCHHOLZ	JOSEPH B. ZOBA
Division 1	Division 2	Division 3	Division 4	Division 5	General Manager and Secretary

Yucaipa Valley Water District

12770 Second Street • P. O. Box 730 • Yucaipa, California 92399-0730
(909) 797-5117 • Fax: (909) 797-6381 • www.yvwd.dst.ca.us

February 10, 2011

Clerk of the Board
San Bernardino Valley Water Conservation District
1630 West Redlands Blvd. #A
Redlands, CA 92373

RE: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Clerk of the Board:

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for Yucaipa Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

The 2010 Regional UWMP will include an update of anticipated water demands in the San Bernardino Valley including the City of Yucaipa and the County of San Bernardino. Water demand projections will rely upon growth and population estimates from local land use plans and state and regional agencies. Yucaipa Valley Water District is encouraging participation by land use agencies, water use agencies, and other interested parties in the Regional UWMP. **Yucaipa Valley Water District would like to extend to your agency an opportunity to meet with us to go over the various elements of the Regional UWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs.**

We anticipate that a draft Regional UWMP will be available for public review starting in May 2011 and our agency will hold a public hearing in June 2011, prior to adoption of the Regional UWMP. Hence we would like to solicit your input in the near future. In addition, Yucaipa Valley Water District will host public review and a public hearing for the agency's individual Urban Water Management Plan that will require a separate hearing date to be determined.

If your agency would like to learn more about the Regional Urban Water Management Plan, please contact Jennifer Ares at (909) 790-3301.

Sincerely,

Jennifer Ares
Resource Sustainability Manager

Directors and Officers

IAN CUTHBERTSON, Division 1 | BRUCE GRANLUND, Division 2 | JAY BOGH, Division 3 | LONNI GRANLUND, Division 4 | HANK WOCHHOLZ, Division 5 | JOSEPH B. ZOBA, General Manager and Secretary

Yucaipa Valley Water District

12770 Second Street • P. O. Box 730 • Yucaipa, California 92399-0730
(909) 797-5117 • Fax: (909) 797-6381 • www.yvwd.dst.ca.us

February 10, 2011

Ms. Jeanne Wade Evans, Forest Supervisor
United States Forest Service
San Bernardino National Forest
1824 South Commercenter Circle
San Bernardino, CA 92408-3430

RE: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Ms. Evans:

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for Yucaipa Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

The 2010 Regional UWMP will include an update of anticipated water demands in the San Bernardino Valley including the City of Yucaipa and the County of San Bernardino. Water demand projections will rely upon growth and population estimates from local land use plans and state and regional agencies. Yucaipa Valley Water District is encouraging participation by land use agencies, water use agencies, and other interested parties in the Regional UWMP. **Yucaipa Valley Water District would like to extend to your agency an opportunity to meet with us to go over the various elements of the Regional UWMP, including assumptions about future population, future water demand, future water supplies, and upcoming water conservation programs.**

We anticipate that a draft Regional UWMP will be available for public review starting in May 2011 and our agency will hold a public hearing in June 2011, prior to adoption of the Regional UWMP. Hence we would like to solicit your input in the near future. In addition, Yucaipa Valley Water District will host public review and a public hearing for the agency's individual Urban Water Management Plan that will require a separate hearing date to be determined.

If your agency would like to learn more about the Regional Urban Water Management Plan, please contact Jennifer Ares at (909) 790-3301.

Sincerely,

Jennifer Ares
Resource Sustainability Manager

Directors and Officers

IAN CUTHBERTSON Division 1 | BRUCE GRANLUND Division 2 | JAY BOGH Division 3 | LONNI GRANLUND Division 4 | HANK WOCHHOLZ Division 5 | JOSEPH B. ZOBA General Manager and Secretary

Yucaipa Valley Water District

12770 Second Street • P. O. Box 730 • Yucaipa, California 92399-0730
(909) 797-5117 • Fax: (909) 797-6381 • www.yvwd.dst.ca.us

February 10, 2011

Clerk of the Board
San Bernardino Valley Municipal Water District
380 East Vanderbilt Way
San Bernardino, CA 92408

RE: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Clerk of the Board:

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for Yucaipa Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Jennifer Ares
Resource Sustainability Manager

Directors and Officers

IAN CUTHBERTSON	BRUCE GRANLUND	JAY BOGH	LONNI GRANLUND	HANK WOCHHOLZ	JOSEPH B. ZOBA
Division 1	Division 2	Division 3	Division 4	Division 5	General Manager and Secretary

Yucaipa Valley Water District

12770 Second Street • P. O. Box 730 • Yucaipa, California 92399-0730
(909) 797-5117 • Fax: (909) 797-6381 • www.yvwd.dst.ca.us

February 10, 2011

Mr. Joe Calpino, District Manager
Western Heights Mutual Water Company
32352 Avenue D
Yucaipa, CA 92399

RE: 2010 Regional Urban Water Management Plan for the San Bernardino Valley

Dear Mr. Calpino:

Multiple agencies in the San Bernardino Valley area are coordinating to prepare a Regional Urban Water Management Plan, including the City of Colton, the City of Loma Linda, City of Redlands, City of San Bernardino, East Valley Water District, Riverside Highland Water Company, San Bernardino Valley Municipal Water District, West Valley Water District, and Yucaipa Valley Water District. The Urban Water Management Planning Act requires every "urban water supplier" of a certain size to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. A complete UWMP is necessary for Yucaipa Valley Water District to remain eligible for state drought water bank assistance and is a requirement of state grant and loan funding programs.

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Sincerely,

Jennifer Ares
Resource Sustainability Manager

Directors and Officers

IAN CUTHBERTSON Division 1 | BRUCE GRANLUND Division 2 | JAY BOGH Division 3 | LONNI GRANLUND Division 4 | HANK WOCHHOLZ Division 5 | JOSEPH B. ZOBA General Manager and Secretary

Hearing Notices

SAN BERNARDINO COUNTY SUN

This space for filing stamp only

4030 N GEORGIA BLVD, SAN BERNARDINO, CA 92407
Telephone (909) 889-9666 / Fax (909) 885-1238

RECEIVED
JUL - 1 2011
East Valley Water District

Justine Hendricksen
EAST VALLEY WATER DISTRICT
PO BOX 3427
SAN BERNARDINO, CA - 92413

SBS#: 2116740

PROOF OF PUBLICATION

(2015.5 C.C.P.)

State of California)
County of SAN BERNARDINO) ss

Notice Type: HRGSB - NOTICE OF HEARING-SB

Ad Description: Public Hearing 2010 UWMP

I am a citizen of the United States and a resident of the State of California; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer and publisher of the SAN BERNARDINO COUNTY SUN, a newspaper published in the English language in the city of SAN BERNARDINO, county of SAN BERNARDINO, and adjudged a newspaper of general circulation as defined by the laws of the State of California by the Superior Court of the County of SAN BERNARDINO, State of California, under date 06/20/1952, Case No. 73084. That the notice, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

06/14/2011, 06/21/2011

Executed on: 06/21/2011
At Los Angeles, California

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Signature

EAST VALLEY WATER DISTRICT NOTICE OF PUBLIC HEARING 2010 URBAN WATER MANAGEMENT PLAN

NOTICE IS HEREBY GIVEN that on June 28, 2011 at 3:00 pm, in the meeting room of the Board of Directors of the East Valley Water District, 3694 E. Highland Ave, Suite 30, Highland, CA, the Board of Directors will conduct a public hearing pursuant to California Water Code sections 10642 and 10608.26 to consider and receive comments and input on the East Valley Water District's 2010 Urban Water Management Plan, to allow community input regarding the East Valley Water District's implementation plan for complying with Part 2.55 of the Water Code, to consider the potential economic impacts of the implementation plan, and to adopt a method pursuant to Water Code section 10608.20(b) for determining the East Valley Water District's urban water use targets. A copy of the East Valley Water District's Draft 2010 Urban Water Management Plan is available for public review, Monday through Friday, during normal business hours at the East Valley Water District's Engineering Department located at 3654 East Highland Ave, Suite 18, Highland, CA In addition, an electronic version of the Draft 2010 UWMP will be accessible at eastvalley.org. In summary, the East Valley Water District's 2010 Urban Water Management Plan has been developed for implementation in accordance with the requirements of the California Urban Water Management Planning Act, Water Code sections 10610 through 10657, and the Water Conservation Act of 2009, Water Code sections 10608 through 10608.64. Public input from diverse social, cultural and economic elements of the population is encouraged and will be considered as part of the 2010 Urban Water Management Plan process. Input from and coordination with the County of San Bernardino, cities within which the East Valley Water District provides water supplies and other public agencies is also encouraged and will be considered. (Water Code §§ 10620(d)(2); 10621(b); 10642.) Any written comments regarding the Draft 2010 Urban Water Management Plan should be submitted by the close of the public hearing on June 28, 2011, to the address set forth above, attention Ron Buchwald. Public comments can also be made at the public hearing at the time and place first set forth above. Upon conclusion of the public hearing,

A0000022356 45

the Board of Directors of the East Valley Water District may revise, change, modify, and/or adopt the 2010 Urban Water Management Plan. Questions regarding the public hearing or the 2010 Urban Water Management Plan should be directed to Ron Buchwald at 909-888-8986. If you are disabled in any way and need accommodation to participate in the public hearing, please call Justine Hendricksen at 909-885-4900 for assistance at least three working days (72 hours) prior to the hearing so the necessary arrangements can be made.
6/14, 6/21/11

SBS-2116740#

SAN BERNARDINO COUNTY SUN

This space for filing stamp only

4030 N GEORGIA BLVD, SAN BERNARDINO, CA 92407
Telephone (909) 889-9666 / Fax (909) 885-1253

Pamela Byrnes-O'Camb
CITY OF LOMA LINDA
25541 BARTON ROAD
LOMA LINDA, CA - 92354

PROOF OF PUBLICATION

(2015.5 C.C.P.)

State of California)
County of SAN BERNARDINO) ss

Notice Type: HRGSB - NOTICE OF HEARING-SB

Ad Description:

NOH-Regional Urban Water Management Plan

I am a citizen of the United States and a resident of the State of California; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer and publisher of the SAN BERNARDINO COUNTY SUN, a newspaper published in the English language in the city of SAN BERNARDINO, county of SAN BERNARDINO, and adjudged a newspaper of general circulation as defined by the laws of the State of California by the Superior Court of the County of SAN BERNARDINO, State of California, under date 06/20/1952, Case No. 73084. That the notice, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

05/31/2011, 06/07/2011

Executed on: 06/07/2011
At Los Angeles, California

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Signature

SBS#: 2109969

CITY OF LOMA LINDA
NOTICE OF PUBLIC HEARING
2010 Regional URBAN WATER MANAGEMENT PLAN

NOTICE IS HEREBY GIVEN that on June 14, 2011 at 7:00 p.m. or as soon thereafter as possible, in the City Council Chamber, 25541 Barton Road, Loma Linda, CA, the City Council will conduct a public hearing pursuant to California Water Code sections 10642 and 10608.26 to consider and receive comments and input on the 2010 San Bernardino Valley Regional Urban Water Management Plan, to allow community input regarding the City of Loma Linda's implementation plan for complying with Part 2.55 of the Water Code, to consider the potential economic impacts of the implementation plan, and to adopt a method pursuant to Water Code section 10608.20(b) for determining the City of Loma's urban water use targets.

This document has been prepared at the direction of San Bernardino Valley Municipal Water District, the City of Colton, East Valley Water District, the City of Loma Linda, the City of Redlands, the City of San Bernardino, West Valley Water District, and Yucaipa Valley Water District.

A copy of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be available for public review on or before June 1, 2011, Monday through Thursday during normal business hours at the City of Loma Linda Public Works Department located at 25541 Barton Road, Loma Linda, CA. In addition, an electronic version of the Draft 2010 UWMP will be accessible at www.lomalinda-ca.gov.

In summary, the 2010 San Bernardino Valley Regional Urban Water Management Plan has been developed for implementation in accordance with the requirements of the California Urban Water Management Planning Act, Water Code sections 10610 through 10657, and the Water Conservation Act of 2009, Water Code sections 10608 through 10608.64. Public input from diverse social, cultural and economic elements of the population is encouraged and will be considered as part of the urban water management planning process. Input from and coordination with the County of San Bernardino cities within which the City of Loma Linda provides water supplies, and other public agencies is also encouraged and will be considered. (Water Code §§ 10620(d)(2); 10621(b); 10642.)

Any written comments regarding the Draft 2010 San Bernardino Valley

A0000022178 66

Regional Urban Water Management Plan should be submitted by the close of business on June 13, 2011 to the address set forth above, attention Public Works Director Jarb Thaipeir. Public comments can also be made at the public hearing at the time and place first set forth above. Upon conclusion of the public hearing, the City Council of the City of Loma Linda may revise, change, modify, and/or adopt the 2010 San Bernardino Valley Regional Urban Water Management Plan. Questions regarding the public hearing or the 2010 Urban Water Management Plan should be directed to Public Works Director Jarb Thaipeir at (909) 799-2811.

If you are disabled in any way and need accommodation to participate in the public hearing, please call City Clerk Pamela Byrnes-O'Camb at (909) 799-2819 for assistance at least two working days prior to the hearing so the necessary arrangements can be made.

5/31, 6/7/11

SBS-2109969#

PROOF OF PUBLICATION

(2015.5 C.C.P.)

(Space below for stamp only)

STATE OF CALIFORNIA
County of San Bernardino
ss.

The undersigned hereby certifies as follows:

I am a citizen of the United States and a resident of the County aforesaid. I am over the age of twenty-one years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer of the Redlands Daily Facts, a newspaper of general circulation, published daily except Saturday in the City of Redlands, County of San Bernardino, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of San Bernardino, State of California, under the date of October 10, 1927, Case Number 26980; that the notice, of which the annexed is a true printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on each of the following dates, to-wit:

6/7, 6/14

all in the year 20 11.

I certify under the penalty of perjury that the foregoing is true and correct.

Melinda Jones

Signature

Executed on the 14 day of June, 20 11, at Redlands, in the County of San Bernardino, State of California.

Proof of Publication of

CITY OF REDLANDS
NOTICE OF PUBLIC HEARING 2010 URBAN WATER MANAGEMENT PLAN

NOTICE IS HEREBY GIVEN that on June 21, 2011 at 6 pm, in the City Council Chambers located at 35 Colon Street, Redlands, CA, the City Council of the City of Redlands, will conduct a public hearing pursuant to California Water Code sections 10642 and 10608.26 to consider and receive comments and input on the City of Redlands 2010 Urban Water Management Plan, to allow community input regarding the City of Redlands' implementation plan for complying with Part 2.55 of the Water Code, to consider the potential economic impacts of the implementation plan, and to adopt a method pursuant to Water Code section 10608.20(b) for determining the City of Redlands' urban water use targets.

A copy of the City of Redlands' Draft 2010 Urban Water Management Plan will be available for public review on or before June 1, 2011, Monday through Thursday, during normal business hours at the City of Redlands' Municipal Utilities and Engineering located at 35 Colon Street. In addition, an electronic version of the Draft 2010 UWMP will be accessible at www.ci.redlands.ca.us

In summary, the City of Redlands' 2010 Urban Water Management Plan has been developed for implementation in accordance with the requirements of the California Urban Water Management Planning Act, Water Code sections 10610 through 10657, and the Water Conservation Act of 2009, Water Code sections 10608 through 10608.64. Public input from diverse social, cultural and economic elements of the population is encouraged and will be considered as part of the 2010 Urban Water Management Plan process. Input from and coordination with the County of San Bernardino, cities within which the City of Redlands provides water supplies, and other public agencies is also encouraged and will be considered. (Water Code 10620(d)(2); 10621(b); 10642.) Any written comments regarding the Draft 2010 Urban Water Management Plan should be submitted to the City Clerk at the address above, public comments can also be made at the public hearing at the time and place first set forth above. Upon conclusion of the public hearing, the City Council of the City of Redlands may revise, change, modify, and/or adopt the 2010 Urban Water Management Plan. Questions regarding the public hearing or the 2010 Urban Water Management Plan should be directed to Chris Diggs at 909-798-7658.

Dated this 31st day of May, 2011.

/s/SAM IRWIN
City Clerk
City of Redlands

6/7,14/11 6293X

Sent to Cindy 6-22-11

DAILY JOURNAL CORPORATION
CALIFORNIA NEWSPAPER SERVICE BUREAU

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JUN 22 2011
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MUNICIPAL WATER DEPARTMENT

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Customer Account Number 1124119955	
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PO BOX 710
SAN BERNARDINO, CA 92402 USA

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MUNICIPAL WATER DEPT/CITY S.B.
PO BOX 710
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Type	Order No	Description	Amount
Invoice	B2110650	NOTICE OF PUBLIC HEARING BID NOTICE INVITING BIDS 24031 EL CHICANO 06/02,06/09/2011 LEGAL SECTION SET 1 COL. WIDE X MIN. TYPE *12.5 Inches x @ $18.95* 473.75	473.75

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PO BOX 710
SAN BERNARDINO, CA 92402 USA

DAILY JOURNAL CORPORATION
CALIFORNIA NEWSPAPER SERVICE BUREAU

P.O. Box 54026 LOS ANGELES CALIFORNIA 90054-0026
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FEDERAL TAX ID:95-4133299

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MUNICIPAL WATER DEPT/CITY S.B.
PO BOX 710
SAN BERNARDINO, CA 92402 USA

Proof of Publication

(201.15.5 C.C.P.)q

STATE OF CALIFORNIA.
SS
County of San Bernardino.,
I declare under penalty of perjury that:

I am a citizen of the United States and a resident of the County aforesaid: I am over the age of eighteen years, and not a party to nor interested in the above entitled matter. I am the principal clerk of the printer of the El Chicano Community Newspaper, a newspaper printed and published weekly in the City of San Bernardino, County of San Bernardino and which newspaper has petitioned the Superior Court of said county for determination as a newspaper of general circulation being case no. 154019; dated May, 1, 1972, that the Notice of Application for Determination as a Newspaper of General Circulation and Petition for Determination as a Newspaper of General Circulation, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

June 2, 9, 2011

I certify under penalty of perjury that the foregoing is true and correct.

Dated: June 9, 2011

Signature _____

El Chicano Newspaper
P.O. Box 6247
San Bernardino, California 92412-6247
Phone (909) 381-9898 • 384-0406 FAX

A000000223424 7

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT NOTICE OF PUBLIC HEARING 2010 REGIONAL URBAN WATER MANAGEMENT PLAN

NOTICE IS HEREBY GIVEN that on June 21, 2011 at 11:30 a.m., in the Boardroom of the Board of Water Commissioners of the San Bernardino Municipal Water Department (SBMWD), 300 North "D" Street, 5th Floor, San Bernardino, California 92418, the SBMWD Board of Water Commissioners will conduct a public hearing pursuant to California Water Code sections 10642 and 10608.26 to consider and receive comments and input on the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan, to allow community input regarding the SBMWD's implementation plan for complying Division 6, with Part 2.6 of the Water Code, to consider the potential economic impacts of the implementation plan, and to adopt a method pursuant to Water Code section 10608.20(b) for determining the SBMWD's urban water use targets.

This document has been prepared at the direction of the San Bernardino Municipal Water Department, San Bernardino Valley Municipal Water District, the City of Colton, East Valley Water District, the City of Loma Linda, the City of Redlands, West Valley Water District, and Yucaipa Valley Water District.

A copy of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be available for public review on June 1, 2011, Monday through Friday, during normal business hours at the SBMWD's Customer Service counter located at 300 North "D" Street, 5th Floor, San Bernardino, California 92418. In addition, an electronic version of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be accessible at www.sbcity.org

Newspaper
ox 6247
lifornia 92412-6247
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4247*

Water Department, San Bernardino Valley Municipal Water District, the City of Colton, East Valley Water District, the City of Loma Linda, the City of Redlands, West Valley Water District, and Yucaipa Valley Water District.

A copy of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be available for public review on June 1, 2011, Monday through Friday, during normal business hours at the SBMWD's Customer Service counter located at 300 North "D" Street, 5th Floor, San Bernardino, California 92418. In addition, an electronic version of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be accessible at www.sbcity.org. In summary, the 2010 San Bernardino Valley Regional Urban Water Management Plan has been developed for implementation in accordance with the requirements of the California Urban Water Management Planning Act, Water Code sections 10610 through 10656, and the Water Conservation Act of 2009, Water Code sections 10608 through 10608.64. Public input from diverse social, cultural and economic elements of the population is encouraged and will be considered as part of the urban water management planning process. Input from and coordination with the County of San Bernardino, cities within which the SBMWD provides water supplies, and other public agencies is also encouraged and will be considered. (Water Code §§ 10620(d)(2); 10621(b); 10642.) Any written comments regarding the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan should be submitted by the close of business on June 14, 2011 to the address set forth above, attention Ted Brunson, or via e-mail to SBMWD-UWMP Comments@sbcitywater.org. Public comments can also be made at the public hearing at the time and place first set forth above. Upon conclusion of the public hearing, the Board of Water Commissioners of the SBMWD may revise, change, modify, and/or adopt the 2010 San Bernardino Valley Regional Urban Water Management Plan. Questions regarding the public hearing or the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan should be directed to Ted Brunson at (909) 384-5931.

CNS-2110650#
PUBLISHED EL CHICANO
6/2, 6/9/11 E-5118

Proof of Publication

(201.15.5 C.C.P.)q

STATE OF CALIFORNIA.
SS
County of San Bernardino.,
I declare under penalty of perjury that:

I am a citizen of the United States and a resident of the County aforesaid: I am over the age of eighteen years, and not a party to nor interested in the above entitled matter. I am the principal clerk of the printer of the El Chicano Community Newspaper, a newspaper printed and published weekly in the City of San Bernardino, County of San Bernardino and which newspaper has petitioned the Superior Court of said county for determination as a newspaper of general circulation being case no. 154019; dated May, 1, 1972, that the Notice of Application for Determination as a Newspaper of General Circulation and Petition for Determination as a Newspaper of General Circulation, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

June 2, 9, 2011

I certify under penalty of perjury that the foregoing is true and correct.

Dated: June 9, 2011

Signature Denise Berver

El Chicano Newspaper
P.O. Box 6247
San Bernardino, California 92412-6247
Phone (909) 381-9898 • 384-0406 FAX

A000002234247

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT
NOTICE OF PUBLIC HEARING
2010 REGIONAL URBAN WATER MANAGEMENT PLAN

NOTICE IS HEREBY GIVEN that on June 21, 2011 at 11:30 a.m., in the Boardroom of the Board of Water Commissioners of the San Bernardino Municipal Water Department (SBMWD), 300 North "D" Street, 5th Floor, San Bernardino, California 92418, the SBMWD Board of Water Commissioners will conduct a public hearing pursuant to California Water Code sections 10642 and 10608.26 to consider and receive comments and input on the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan, to allow community input regarding the SBMWD's implementation plan for complying Division 6, with Part 2.6 of the Water Code, to consider the potential economic impacts of the implementation plan, and to adopt a method pursuant to Water Code section 10608.20(b) for determining the SBMWD's urban water use targets.

This document has been prepared at the direction of the San Bernardino Municipal Water Department, San Bernardino Valley Municipal Water District, the City of Colton, East Valley Water District, the City of Loma Linda, the City of Redlands, West Valley Water District, and Yucaipa Valley Water District.

A copy of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be available for public review on June 1, 2011, Monday through Friday, during normal business hours at the SBMWD's Customer Service counter located at 300 North "D" Street, 5th Floor, San Bernardino, California 92418. In addition, an electronic version of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be accessible at www.sbcity.org. In summary,

Water Department, San Bernardino Valley Municipal Water District, the City of Colton, East Valley Water District, the City of Loma Linda, the City of Redlands, West Valley Water District, and Yucaipa Valley Water District.

A copy of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be available for public review on June 1, 2011, Monday through Friday, during normal business hours at the SBMWD's Customer Service counter located at 300 North "D" Street, 5th Floor, San Bernardino, California 92418. In addition, an electronic version of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be accessible at www.sbcity.org. In summary, the 2010 San Bernardino Valley Regional Urban Water Management Plan has been developed for implementation in accordance with the requirements of the California Urban Water Management Planning Act, Water Code sections 10610 through 10656, and the Water Conservation Act of 2009, Water Code sections 10608 through 10608.64. Public input from diverse social, cultural and economic elements of the population is encouraged and will be considered as part of the urban water management planning process. Input from and coordination with the County of San Bernardino, cities within which the SBMWD provides water supplies, and other public agencies is also encouraged and will be considered. (Water Code §§ 10620(d)(2); 10621(b); 10642.) Any written comments regarding the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan should be submitted by the close of business on June 14, 2011 to the address set forth above, attention Ted Brunson, or via e-mail to SBMWD-UWMP Comments@sbcitywater.org. Public comments can also be made at the public hearing at the time and place first set forth above. Upon conclusion of the public hearing, the Board of Water Commissioners of the SBMWD may revise, change, modify, and/or adopt the 2010 San Bernardino Valley Regional Urban Water Management Plan. Questions regarding the public hearing or the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan should be directed to Ted Brunson at (909) 384-5931.

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PROOF OF PUBLICATION

(2015.5 C.C.P.)

State of California)
County of SAN BERNARDINO) ss

Notice Type: BID - NOTICE INVITING BIDS

Ad Description: NOTICE OF PUBLIC HEARING

I am a citizen of the United States and a resident of the State of California; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer and publisher of the SAN BERNARDINO COUNTY SUN, a newspaper published in the English language in the city of SAN BERNARDINO, county of SAN BERNARDINO, and adjudged a newspaper of general circulation as defined by the laws of the State of California by the Superior Court of the County of SAN BERNARDINO, State of California, under date 06/20/1952, Case No. 73084. That the notice, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

06/03/2011, 06/10/2011

Executed on: 06/10/2011
At Los Angeles, California

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Helen Tang

Signature

SBS#: 2110651

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT NOTICE OF PUBLIC HEARING 2010 REGIONAL URBAN WATER MANAGEMENT PLAN

NOTICE IS HEREBY GIVEN that on June 21, 2011 at 11:30 a.m., in the Boardroom of the Board of Water Commissioners of the San Bernardino Municipal Water Department (SBMWD), 300 North "D" Street, 5th Floor, San Bernardino, California 92418, the SBMWD Board of Water Commissioners will conduct a public hearing pursuant to California Water Code sections 10642 and 10608.26 to consider and receive comments and input on the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan, to allow community input regarding the SBMWD's implementation plan for complying Division 6, with Part 2.6 of the Water Code, to consider the potential economic impacts of the implementation plan, and to adopt a method pursuant to Water Code section 10608.20(b) for determining the SBMWD's urban water use targets.

This document has been prepared at the direction of the San Bernardino Municipal Water Department, San Bernardino Valley Municipal Water District, the City of Colton, East Valley Water District, the City of Loma Linda, the City of Redlands, West Valley Water District, and Yucaipa Valley Water District.

A copy of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be available for public review on June 1, 2011, Monday through Friday, during normal business hours at the SBMWD's Customer Service counter located at 300 North "D" Street, 5th Floor, San Bernardino, California 92418. In addition, an electronic version of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be accessible at www.sbcity.org. In summary, the 2010 San Bernardino Valley Regional Urban Water Management Plan has been developed for implementation in accordance with the requirements of the California Urban Water Management Planning Act, Water Code sections 10610 through 10656, and the Water Conservation Act of 2009, Water Code sections 10608 through 10608.64. Public input from diverse social, cultural and economic elements of the population is encouraged and will be considered as part of the urban water management planning process. Input from and coordination with the County of San Bernardino, cities within which the

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* A 0 0 0 0 0 2 2 2 3 2 8 3 *

SBMWD provides water supplies, and other public agencies is also encouraged and will be considered. (Water Code §§ 10620(d)(2); 10621(b); 10642.) Any written comments regarding the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan should be submitted by the close of business on June 14, 2011 to the address set forth above, attention Ted Brunson, or via e-mail to SBMWD-UWMP Comments@sbcitywater.org. Public comments can also be made at the public hearing at the time and place first set forth above. Upon conclusion of the public hearing, the Board of Water Commissioners of the SBMWD may revise, change, modify, and/or adopt the 2010 San Bernardino Valley Regional Urban Water Management Plan. Questions regarding the public hearing or the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan should be directed to Ted Brunson at (909) 384-5931.

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AMANDA KASTEN
WEST VALLEY WATER DISTRICT
P.O. BOX 920
RIALTO, CA - 92377

SBS #: 2104623

PROOF OF PUBLICATION

(2015.5 C.C.P.)

State of California)
County of SAN BERNARDINO) ss

Notice Type: HRGSB - NOTICE OF HEARING-SB

Ad Description: 2010 URBAN WATER MANAGEMENT PLAN

I am a citizen of the United States and a resident of the State of California; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer and publisher of the SAN BERNARDINO COUNTY SUN, a newspaper published in the English language in the city of SAN BERNARDINO, county of SAN BERNARDINO, and adjudged a newspaper of general circulation as defined by the laws of the State of California by the Superior Court of the County of SAN BERNARDINO, State of California, under date 06/20/1952, Case No. 73084. That the notice, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

06/02/2011, 06/09/2011

Executed on: 06/09/2011
At Los Angeles, California

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Helen Tang

Signature

WEST VALLEY WATER DISTRICT
NOTICE OF PUBLIC HEARING
2010 URBAN WATER
MANAGEMENT PLAN

NOTICE IS HEREBY GIVEN that on June 16, 2011 at 3:00 p.m., in the meeting room of the Board of Directors of the West Valley Water District, located at 855 W. Baseline Rd., Rialto, CA 92376 the Board of Directors will conduct a public hearing pursuant to California Water Code sections 10642 and 10608.26 to consider and receive comments and input on the 2010 San Bernardino Valley Regional Urban Water Management Plan, which serves as the 2010 Urban Water Management Plan for West Valley Water District. The hearing will allow the community to provide input regarding the West Valley Water District's implementation plan for complying with Part 2.55 of the Water Code, to consider the potential economic impacts of the implementation plan, and to adopt a method pursuant to Water Code section 10608.20(b) for determining the West Valley Water District's urban water use targets.

A copy of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be available for public review on or before June 1, 2011, Monday through Friday, during normal business hours at the West Valley Water District's Administrative Office located at 855 W. Baseline Rd, Rialto, CA 92376. In addition, an electronic version of the Draft 2010 San Bernardino Valley Regional Urban Water Management Plan will be accessible at www.wvwd.org. In summary, the 2010 San Bernardino Valley Regional Urban Water Management Plan has been developed for implementation in accordance with the requirements of the California Urban Water Management Planning Act, Water Code sections 10610 through 10657, and the Water Conservation Act of 2009, Water Code sections 10608 through 10608.64. Public input from diverse social, cultural and economic elements of the population is encouraged and will be considered as part of the 2010 Urban Water Management Plan process. Input from and coordination with the County of San Bernardino, cities within which the West Valley Water District provides water supplies and other public agencies is also encouraged and will be considered. (Water Code §§ 10620(d)(2); 10621(b); 10642.) Any written comments regarding the 2010 San Bernardino Valley Regional Urban Water Management Plan should be submitted by the close of business on

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June 13, 2011 to the address set forth above, attention Linda Jadeski. Public comments can also be made at the public hearing at the time and place first set forth above. Upon conclusion of the public hearing, the Board of Directors of the West Valley Water District may revise, change, modify, and/or adopt the 2010 San Bernardino Valley Regional Urban Water Management Plan. Questions regarding the public hearing or the 2010 San Bernardino Valley Regional Urban Water Management Plan should be directed to Linda Jadeski at (909) 875-1804 ext. 352. If you are disabled in any way and need accommodation to participate in the public hearing, please call Peggy Asche at (909) 875-1804 ext. 703 for assistance at least 7 working days prior to the hearing so the necessary arrangements can be made.

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CHELSIE FOGUS
YUCAIPA VALLEY WATER DIST
12770 SECOND ST PO BOX 730
YUCAIPA, CA 92399

COPY OF NOTICE

Notice Type: HRGSB NOTICE OF HEARING-SB

Ad Description 2010 RUWMP AND UWMP PUBLIC NOTICE

To the right is a copy of the notice you sent to us for publication in the SAN BERNARDINO COUNTY SUN. Please read this notice carefully and call us with any corrections. The Proof of Publication will be filed with the County Clerk, if required, and mailed to you after the last date below. Publication date(s) for this notice is (are):

05/27/2011 , 06/03/2011

The charge(s) for this order is as follows. An invoice will be sent after the last date of publication. If you prepaid this order in full, you will not receive an invoice.

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NOTICE OF PUBLIC HEARING YUCAIPA VALLEY WATER DISTRICT 2010 URBAN WATER MANAGEMENT PLAN AND THE 2010 SAN BERNARDINO VALLEY REGIONAL URBAN WATER MANAGEMENT PLAN

NOTICE IS HEREBY GIVEN that on June 15th, 2011 at 6:00 p.m., in the meeting room of the Board of Directors of the Yucaipa Valley Water District at 12770 Second Street, Yucaipa, California 92399, the Board of Directors will conduct a public hearing pursuant to California Water Code sections 10642 and 10608.26 to consider and receive comments and input on the 2010 Yucaipa Valley Water District Urban Water Management Plan and the 2010 San Bernardino Valley Regional Urban Water Management Plan, to allow community input regarding the Yucaipa Valley Water District implementation plan for complying with Part 2.55 of the Water Code, to consider the potential economic impacts of the implementation plan, and to adopt a method pursuant to Water Code section 10608.20(b) for determining the Yucaipa Valley Water District's urban water use targets.

A copy of the Draft 2010 Yucaipa Valley Water District Urban Water Management Plan is currently available for public review. The San Bernardino Valley Regional Urban Water Management Plan will be available for public review on or before June 1, 2011. Both documents will be available Monday through Friday, during normal business hours at the Yucaipa Valley Water District's Administrative Office located at 12770 Second Street, Yucaipa, California 92399. In addition, an electronic version of the Draft Yucaipa Valley Water District Urban Water Management Plan and the San Bernardino Valley Regional Urban Water Management Plan will be accessible at the District website at www.yvwd.dst.ca.us.

In summary, the 2010 Yucaipa Valley Water District Urban Water Management Plan and the 2010 San Bernardino Valley Regional Urban Water Management Plan has been developed for implementation in accordance with the requirements of the California Urban Water Management Planning Act, Water Code sections 10610 through 10657, and the Water Conservation Act of 2009, Water Code sections 10608 through 10608.64. Public input from diverse social, cultural and economic elements of the population is encouraged and will be considered as part of the urban

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water management planning process. Input from and coordination with the Counties of San Bernardino and Riverside, cities within which the Yucaipa Valley Water District provides water and other public agencies are encouraged to provide comments. (Water Code §§ 10620(d)(2); 10621(b); 10642.)

Any written comments regarding the Draft 2010 Yucaipa Valley Water District Urban Water Management Plan and the 2010 San Bernardino Valley Regional Urban Water Management Plan should be submitted by the close of business on June 8th, 2011 to the address set forth above, attention Jennifer Ares. Public comments can also be made at the public hearing. Upon conclusion of the public hearing, the Board of Directors of the Yucaipa Valley Water District may revise, change, modify, and/or adopt the 2010 Yucaipa Valley Water District Urban Water Management Plan and the San Bernardino Valley Regional Urban Water Management Plan. Questions regarding the public hearing or the 2010 Urban Water Management Plan's should be directed to Jennifer Ares at (909)-790-3301. If you are disabled in any way and need accommodation to participate in the public hearing, please call Chelsie Fogus at (909)-797-5118 for assistance at least two working days prior to the hearing so the necessary arrangements can be made.

YUCAIPA VALLEY WATER DISTRICT

5/27, 6/3/11

SBS-2108851#

Adoption Meeting Materials

2010 Urban Water Management Plan

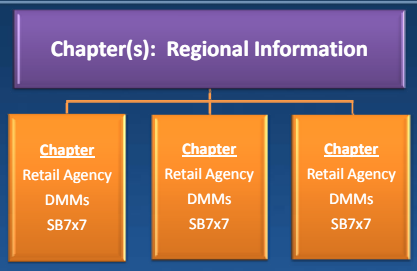
City of Loma Linda

June 14, 2011

Regional Urban Water Management Plan

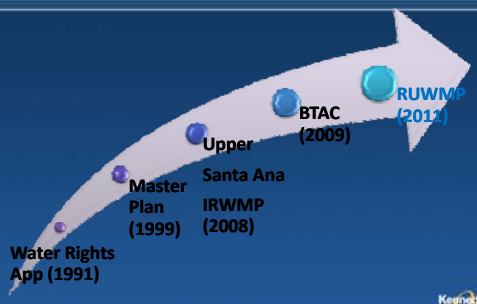
- Eight Agencies in San Bernardino Valley Coordinated Preparation of RUWMP
  - San Bernardino Valley Municipal Water District
  - East Valley Water District
  - City of Loma Linda
  - City of Redlands
  - City of San Bernardino Water Department
  - West Valley Water District
  - Yucaipa Valley Water District
  - City of Colton

Regional Urban Water Management Plan



Regional Urban Water Management Plan

Regional Urban Water Management Plan



Requirements of an UWMP

- Major Contents
  - UWMP Act applies to all CA water suppliers with 3,000 or more service connections or selling at least 3,000 afy (retail or wholesale)
  - Main focus: to identify gaps between supply and demand through time (20-year analysis required)
  - UWMP must describe how demand will be met through time, in all hydrologic year types (normal, single-dry, and multiple dry years)

Requirements of an UWMP

- Major Contents (cont'd.)
  - Requires detailed description of all supply sources (surface, recycled, groundwater)
  - Water quality problems
  - Demand Management Measures (water conservation programs)
  - Water shortage contingency planning
  - Must update every five years, in years ending in 5 and 0 (such as 2010).

New UWMP Requirements

- New Law: SBX7-7 ("20% x 2020"), reporting starts with 2010 UWMPs
  - Base gross water use in gpcd: must be calculated using one of three methodologies
  - Target reduction from base by 2020: must be calculated using one of four methodologies
  - Agencies must hold public hearing to explain how targets will be met (can be held as part of UWMP hearing)

Anticipated Water Supplies

Water Supply Sources	2010	2015	2020	2025	2030	2035
Existing Supplies						
Local Supplies						
Groundwater SBBA	4,496	8,800	9,400	9,900	10,200	10,600
Surface Water (Santa Ana River/Bear Valley Mutual Water Company)	34	34	34	34	34	34
Total Existing Supplies	***5,530***	***8,834***	***9,434***	***9,934***	***10,234***	***10,634***

All units acre-feet per year

Projected Water Demands

Weighted Growth Rate Calculated:

- Growth rates for each of City of Loma Linda's jurisdictions based on SCAG population projections for 2008, 2020, and 2035
- Percentage of the service area covered by each jurisdiction (City of Loma Linda, unincorporated County)

Weighted Growth rate applied to demand base year (2008)

	2015	2020	2025	2030	2035
Total Demand without Conservation	6,385	6,764	7,184	7,630	8,105

All units acre-feet per year

Water Use Target Methods

1. Eighty percent of the urban water supplier's baseline per capita daily water use
2. Per capita daily water use estimated using the sum of the following: Residential + Landscape + CII GPCD standards
3. Ninety-five percent of the applicable state hydrologic region target (South Coast region target is 142 GPCD)
4. Reduce the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:
   - Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "Best Management Practices Calculator".
   - A 20 percent savings on all unmetered uses.
   - A 10 percent savings on baseline CII use.
   - A 21.6 percent savings on current landscape and water loss uses.

SBX7-7 Water Use and Targets

- Baseline Water Use – 255 GPCD
- Interim Water Use Target (2015) – 230 GPCD
- Compliance Water Use Target (2020) – 204 GPCD

In order to comply with SBX7-7, Loma Linda will need to reduce current gallons per capita per day water use by 9-10% by year 2015 and by 19-20% by year 2020.

SBX7-7 Implementation Plan

Plan to meet targets by continuing existing conservation actions and adding some additional conservation activities

	Present	Near-Term	Exploring Regional Program
Conservation Coordinator	X		
Water Waste Prevention	X		
Water Loss Control/Water Audit	X		
Metering with Commodity Rates	X		
Public Information Programs	X		
School Education Programs	X		
Water Sense Specification for New Development		X	
Commercial, Industrial, Institutional		X	
High Efficiency Clothes Washer Rebates			X
Water Sense Specification Toilet Rebates			X
Incentives to Improve Landscape Water Use Efficiency			X

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Economic Impacts SBX7-7 Implementation

Some water savings will be achieved through requirements placed on new development

It will also be necessary for Loma Linda to increase its conservation activities

Financial impacts of SBx7-7 compliance not certain, following CUWCC methodology, it could cost as much as $20,000 - $25,000 a year (starting in 2012) to reduce water use by 19-20% by year 2020.

Enduring Relationships - Trusted Expertise - Promises Delivered

Projected Normal Year Supplies and Demands

	2015	2020	2025	2030	2035
Total Existing and Planned Supplies	***8,834***	***9,434***	***9,934***	***10,234***	***10,634***
Demands without Additional Conservation	6,385	6,764	7,184	7,630	8,105
Conservation	575	1,285	1,365	1,450	1,540
Total Adjusted Demands	5,811	5,478	5,819	6,181	6,565
Surplus/Deficit in Normal Year	3,023	3,956	4,115	4,053	4,069
Difference as % of Supply	34%	42%	41%	40%	38%
Difference as % of Demand	52%	72%	71%	66%	62%

All units acre-feet per year

Enduring Relationships - Trusted Expertise - Promises Delivered

Projected Single-Dry Year Supplies and Demands

	2015	2020	2025	2030	2035
Total Existing and Planned Supplies	***8,809***	***9,409***	***9,909***	***10,209***	***10,609***
Demands without Additional Conservation	7,024	7,440	7,902	8,393	8,915
Conservation	632	1,414	1,501	1,595	1,694
Total Adjusted Demands	6,374	6,002	6,375	6,771	7,192
Surplus/Deficit in Single Dry Year	2,417	3,382	3,508	3,410	3,387
Difference as % of Supply	27%	36%	35%	33%	32%
Difference as % of Demand	38%	56%	55%	50%	47%

All units acre-feet per year

Enduring Relationships - Trusted Expertise - Promises Delivered

Projected Multiple-Dry Year Supplies and Demands

	2015	2020	2025	2030	2035
Total Existing and Planned Supplies	***8,809***	***9,409***	***9,909***	***10,209***	***10,609***
Demands without Additional Conservation	7,024	7,440	7,902	8,393	8,915
Conservation	632	1,414	1,501	1,595	1694
Total Adjusted Demands	6,392	6,026	6,401	6,799	7,221
Surplus/Deficit in Single Dry Year	2,417	3,382	3,508	3,410	3,387
Difference as % of Supply	27%	36%	35%	33%	32%
Difference as % of Demand	38%	56%	55%	50%	47%

All units acre-feet per year

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2010 UWMP

- Q&A/Discussion

Enduring Relationships - Trusted Expertise - Promises Delivered

2010 Urban Water Management Plan

West Valley Water District

June 16, 2011

Enduring Relationships - Trusted Expertise - Promises Delivered

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2

Regional Urban Water Management Plan

- Eight Agencies in San Bernardino Valley Coordinated Preparation of RUWMP
  - San Bernardino Valley Municipal Water District
  - East Valley Water District
  - City of Loma Linda
  - City of Redlands
  - City of San Bernardino Water Department
  - West Valley Water District
  - Yucaipa Valley Water District
  - City of Colton

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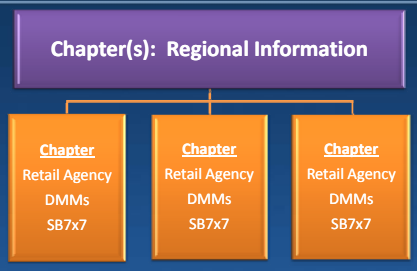
3

Regional Urban Water Management Plan



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Regional Urban Water Management Plan

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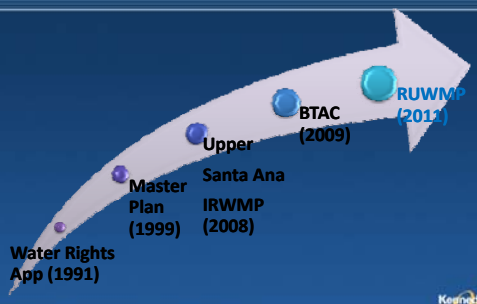
Regional Urban Water Management Plan



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Requirements of an UWMP

- Major Contents
  - UWMP Act applies to all CA water suppliers with 3,000 or more service connections or selling at least 3,000 afy (retail or wholesale)
  - Main focus: to identify gaps between supply and demand through time (20-year analysis required)
  - UWMP must describe how demand will be met through time, in all hydrologic year types (normal, single-dry, and multiple dry years)

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Requirements of an UWMP

- Major Contents (cont'd.)
  - Requires detailed description of all supply sources (surface, recycled, groundwater)
  - Water quality problems
  - Demand Management Measures (water conservation programs)
  - Water shortage contingency planning
  - Must update every five years, in years ending in 5 and 0 (such as 2010).

New UWMP Requirements

- New Law: SBX7-7 ("20% x 2020"), reporting starts with 2010 UWMPs
  - Base gross water use in gpcd: must be calculated using one of three methodologies
  - Target reduction from base by 2020: must be calculated using one of four methodologies
  - Agencies must hold public hearing to explain how targets will be met (can be held as part of UWMP hearing)

Existing Water Supplies

Water Supply Sources	2010	2015	2020	2025	2030	2035
Existing Supplies						
Wholesale and Purchased						
Valley District	0	7,000	7,000	7,000	7,000	7,000
Local Supplies						
Groundwater	16,000	32,000	32,000	32,000	32,000	32,000
Surface Water	5,400	5,500	5,500	5,500	5,500	5,500
Total Existing Supplies	***21,400***	***44,500***	***44,500***	***44,500***	***44,500***	***44,500***

All units acre-feet per year

Additional Future Water Supplies

Water Supply Sources	2010	2015	2020	2025	2030	2035
Planned Supplies						
Groundwater	0	3,500	11,500	16,500	21,000	21,000
Total Planned Supplies	***0***	***3,500***	***11,500***	***16,500***	***21,000***	***21,000***

All units acre-feet per year

Projected Water Demands

Accounts for:
- Future planned developments
- Miscellaneous development
- System loss (8%)

	2015	2020	2025	2030	2035
Total Demand without Conservation	26,627	34,256	40,179	43,308	47,636

All units acre-feet per year

Water Use Target Methods

1. Eighty percent of the urban water supplier's baseline per capita daily water use
2. Per capita daily water use estimated using the sum of the following: Residential + Landscape + CII GPCD standards
3. Ninety-five percent of the applicable state hydrologic region target (South Coast region target is 142 GPCD)
4. ★ Reduce the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:
   - Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "Best Management Practices Calculator".
   - A 20 percent savings on all unmetered uses.
   - A 10 percent savings on baseline CII use.
   - A 21.6 percent savings on current landscape and water loss uses.

SBX7-7 Water Use and Targets

- Baseline Water Use – 316 GPCD
- Interim Water Use Target (2015) – 285 GPCD
- Compliance Water Use Target (2020) – 254 GPCD

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SBX7-7 Implementation Plan

Plan to meet targets by continuing existing conservation actions and adding some additional conservation activities

	Present	Near-Term	Exploring Regional Program
Conservation Coordinator	X		
Water Waste Prevention	X		
Water Loss Control/Water Audit	X		
Metering with Commodity Rates	X		
Public Information Programs	X		
School Education Programs	X		
Water Sense Specification for New Development		X	
Residential Plumbing Retrofit Kits	X		
Commercial, Industrial, Institutional Rebates	X		X
High Efficiency Clothes Washer Rebates			X
ULFT/HET Toilet Rebates	X		X
Incentives to Improve Landscape Water Use Efficiency			X

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Economic Impacts SBX7-7 Implementation

Some water savings will be achieved through requirements placed on new development

It will also be necessary for West Valley Water District to increase its conservation activities

Financial impacts of SBx7-7 compliance not certain. West Valley Water District has budgeted $243,000 a year (starting in FY 2012). Each year West Valley Water District will assess progress towards meeting SBX7-7 targets and need for additional conservation actions.

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Projected Normal Year Supplies and Demands

	2015	2020	2025	2030	2035
Total Existing and Planned Supplies	***48,000***	***56,000***	***61,000***	***65,500***	***65,500***
Demands without Additional Conservation	26,627	34,256	40,179	43,308	47,636
Conservation	2,663	6,730	8,036	8,662	9,527
Total Adjusted Demands	23,964	27,526	32,143	34,646	38,109
Surplus/Deficit in Normal Year	24,036	28,474	28,857	30,854	27,391

All units acre-feet per year

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Projected Single-Dry Year Supplies and Demands

	2015	2020	2025	2030	2035
Total Existing and Planned Supplies	***41,442***	***48,542***	***53,542***	***57,542***	***57,542***
Demands without Additional Conservation	29,289	37,682	44,197	47,638	52,400
Conservation	2,929	7,403	8,839	9,528	10,480
Total Adjusted Demands	26,360	30,278	35,357	38,111	41,920
Surplus/Deficit in Normal Year	14,182	18,264	18,185	19,431	15,622

All units acre-feet per year

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Projected Third Year of Multiple-Dry Year Supplies and Demands

	2015	2020	2025	2030	2035
Total Existing and Planned Supplies	***35,197***	***43,197***	***48,197***	***52,197***	***52,197***
Demands without Additional Conservation	29,289	37,682	44,197	47,638	52,400
Conservation	2,929	7,403	8,839	9,528	10,480
Total Adjusted Demands	26,360	30,278	35,357	38,111	41,920
Surplus/Deficit in Multiple Dry Year	8,837	12,919	12,840	14,086	10,277

All units acre-feet per year

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Proposed Changes for Final RUWMP

- Figure 1-6 Map, more accurate portrayal of West Valley Water District service area
- Table 11-35, correction to existing groundwater supplies for West Valley Water District during a Single-Dry Year
- Section 11.7.3.6 and 11.7.3.7, additional description of school and public information activities

2010 UWMP

- Q&A/Discussion

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2010 Urban Water Management Plan

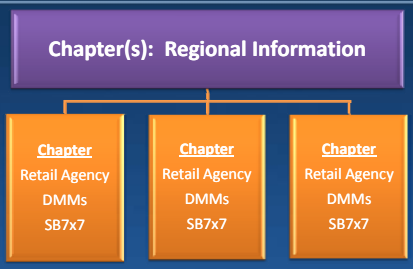
City of San Bernardino Municipal Water Department

June 21, 2011

Regional Urban Water Management Plan

- Eight Agencies in San Bernardino Valley Coordinated Preparation of RUWMP
  - San Bernardino Valley Municipal Water District
  - East Valley Water District
  - City of Loma Linda
  - City of Redlands
  - City of San Bernardino Water Department
  - West Valley Water District
  - Yucaipa Valley Water District
  - City of Colton

Regional Urban Water Management Plan



UWMP

- Compares anticipated supply and demand in normal, single-dry, and multiple dry years 2010 to 2035
- Describes Demand Management Measures
- Describes Water shortage contingency planning

New UWMP Requirements

- New Law: SBX7-7 ("20% x 2020"), reporting starts with 2010 UWMPs
  - Base gross water use in gpcd
  - Target reduction in gpcd by 2020
  - GPCD = Gross Water Use ÷ Estimated Population
  - Population estimated using year 1990, 2000, and 2010 Census data for City of San Bernardino

Water Use Target Methods

1. Eighty percent of the urban water supplier's baseline per capita daily water use
2. Per capita daily water use estimated using the sum of the following: Residential + Landscape + CII GPCD standards
3. Ninety-five percent of the applicable state hydrologic region target (South Coast region target is 142 GPCD)
4. ★ Reduce the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:
   - Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "Best Management Practices Calculator".
   - A 20 percent savings on all unmetered uses.
   - A 10 percent savings on baseline CII use.
   - A 21.6 percent savings on current landscape and water loss uses.

SBX7-7 Water Use and Targets

- Baseline Water Use – 249 GPCD
- Interim Water Use Target (2015) – 225 GPCD
- Compliance Water Use Target (2020) – 201 GPCD

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SBX7-7 Implementation Plan

Plan to meet targets by increased recycled water use, continuing existing conservation actions and adding some additional conservation activities

	Present	Near-Term	Exploring Regional Program
Conservation Coordinator	X	X	
Water Waste Prevention	X	X	
Water Loss Control/Water Audit	X	X	
Metering with Commodity Rates	X	X	
Public Information Programs	X	X	
School Education Programs	X	X	
Water Sense Specification for New Development		X	
Residential Rebates (toilets, washing machines, dishwasher, showerhead, evaporative cooler repair kits, drought tolerant landscaping, irrigation controllers, sprinklers)	X	X	X
CII Rebates		X	
Commercial and Residential Water Audits	X	X	
Water-Smart Landscaping	X	X	X
Public Education	X	X	

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Economic Impacts SBX7-7 Implementation

Some water savings through requirements on new development , some of SBx7-7 requirements met through increased recycled water deliveries

It will also be necessary for San Bernardino to increase its conservation activities

Financial impacts of SBx7-7 compliance not certain

- Budget of $40,000 for Fiscal Year 2011-2012
- Each year progress towards SBx7-7 targets and need for new conservation assessed

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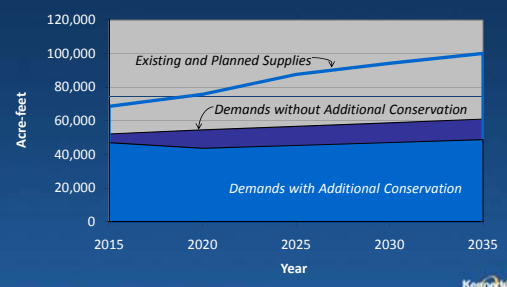
Projected Normal Year Supplies and Demands



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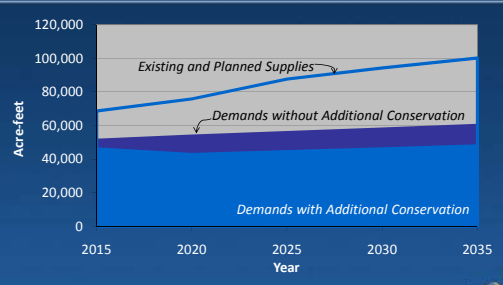
Projected Single-Dry Year Supplies and Demands



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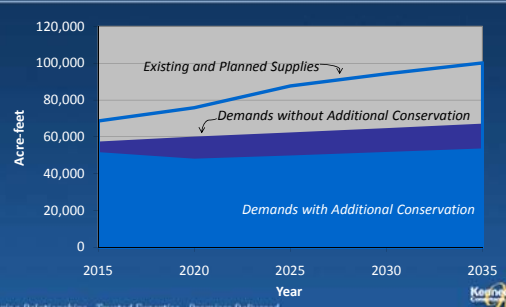
Projected Multiple-Dry Year Supplies and Demands



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2010 UWMP

- Q&A/Discussion

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Appendix B

Factors Affecting State Water Project Supply

APPENDIX B
FACTORS AFFECTING STATE WATER PROJECT SUPPLY

Since the last round of Urban Water Management Plans (UWMPs) were prepared in 2005, the California Department of Water Resources (DWR) has twice updated its State Water Project (SWP) Delivery Reliability Report. In each of its updates, DWR has projected further reductions in average SWP water deliveries than were projected in 2005. The 2009 Report is the most recent update, and identifies several emerging factors that have the potential to affect the availability and reliability of SWP supplies. Although the 2009 Report presents an extremely conservative projection of SWP delivery reliability, particularly in light of events occurring since its release, it remains the best available information concerning the SWP. Following is information and a brief summary of several factors identified in the 2009 Report having the potential to affect the availability and reliability of SWP supplies.

New U.S. Fish and Wildlife Service Biological Opinion for Delta Smelt and Related Litigation Matters

SWP operations have been challenged in connection with potential impacts to the delta smelt, a small fish that resides only in the Delta and is protected under CESA and the ESA. In February 2005, the United States Fish and Wildlife Service (FWS) issued a "no jeopardy" determination and biological opinion (B.O.) analyzing potential impacts to the delta smelt in connection with the long-term coordinated operations of the California State Water Project (SWP) and the federal Central Valley Project (CVP) through the year 2030. The project/action evaluated in the B.O., formally known as the "Operations Criteria and Plan" (or OCAP), includes existing pumping operations, proposals to increase SWP pumping over the next 30-year period, and other proposed long-term operational changes. In February 2005, several environmental groups filed suit in federal court against FWS and the Secretary of the Interior challenging the validity of the B.O. (*Natural Resources Defense Council v. Kempthorne*, USDC Case No. 05-CV-1207-OWW.)

In May 2007, the Federal District Court for the Eastern District of California determined that the B.O. violated the requirements of the ESA. In order that the SWP and CVP could continue to operate, the court established interim operating requirements for the Projects that would remain in place until a new B.O. was completed (the Interim Remedies)(December 14, 2007). The Interim Remedies were based on various factors occurring in the Delta, such as prevailing hydrologic and flow conditions, and the distribution and spawning status of delta smelt. For the 2007-2008 water year, the Interim Remedies were reported to have reduced SWP supplies by approximately 500,000 acre-feet.

On December 15, 2008, FWS issued its new B.O. The B.O. concludes that the proposed long-term coordinated CVP and SWP operations will "jeopardize" the delta smelt and "adversely modify" its critical habitat according to ESA standards. Pursuant to the ESA, because the B.O. is a "jeopardy" opinion, FWS was required to formulate and adopt as part of the B.O. a "Reasonable and Prudent Alternative" (RPA) to the proposed action that FWS believes will not cause jeopardy to the delta smelt or adversely modify or destroy its critical habitat, and which can be implemented by Reclamation and DWR. (16 U.S.C. § 1536(b)(3)(A).) The RPA adopted

as part of the B.O. imposed various new operating restrictions upon the CVP and SWP and has the potential to result in substantial water supply reductions from the Projects.

Soon after the B.O. was issued, DWR published information estimating that in comparison to the level of SWP exports from the Delta previously authorized under State Water Resources Control Board (State Board) Decision 1641 (D-1641),[1] the FWS B.O. could reduce those deliveries by 18 to 29 percent during average and dry conditions, respectively. As with the Interim Remedies, potential water supply restrictions under the new B.O. are dependent on highly variable factors such as hydrologic conditions affecting Delta water supplies, flow conditions in the Delta, migratory and reproductive patterns of delta smelt, and numerous other non-Project factors that impact the health and abundance of delta smelt and its critical habitat.

Due to a number of alleged scientific and other deficiencies in the new FWS B.O., in early 2009 the State Water Contractors, the San Luis and Delta-Mendota Water Authority and several individual State and Federal contractor water agencies filed legal challenges against the B.O., which were consolidated in the Federal District Court for the Eastern District of California. (*The Consolidated Delta Smelt Cases*, Lead Case No. 1:09-CV-00407-OWW-GSA.) Early on in the proceedings, several of the plaintiff water agencies and the federal defendants filed cross-motions for summary judgment to determine whether a violation of the National Environmental Policy Act (NEPA) occurred in connection with federal defendants' adoption and implementation of the NMFS B.O. and its RPA. In a Memorandum Decision issued in November 2009, the court ruled that the moving plaintiffs were entitled to summary judgment on their claim that the federal defendants violated NEPA by failing to perform any NEPA analysis prior to adopting and implementing the new FWS B.O. and its RPA. (*The Consolidated Delta Smelt Cases*, Doc. No. 399 at 46-47.)

Separately, several of the plaintiffs filed a motion for preliminary injunction against the implementation of Component 2 (Action 3) of the RPA that proposed to restrict Delta exports during a particular timeframe in spring and summer months, depending on certain biological and environmental parameters. In May 2010, the court issued its Findings of Fact and Conclusions of Law Regarding Plaintiffs' Request for Preliminary Injunction Against Implementation of RPA Component 2 (a/k/a Action 3). In that decision, the court reconfirmed its earlier ruling that the federal defendants failed to examine the potential environmental and human consequences of the RPA actions adopted under the B.O. in violation of NEPA. (*Consolidated Delta Smelt Cases*, Doc. No. 704 at 120-122.) The court also ruled that the plaintiffs were likely to prevail on their claims that FWS violated the ESA and the federal Administrative Procedure Act (APA) in formulating and adopting RPA Component 2 without support of the best available science and without adequate explanation regarding its biological benefit to delta smelt. (*Id.* at 123-125.)

In the meantime, the parties also filed cross motions for summary judgment to obtain a final ruling in the cases. Those motions were argued in early July 2010. In December 2010, the court issued a memorandum decision that invalidated the B.O. and RPA in several respects and remanded the matter to FWS. Further proceedings are expected to address interim operations of the SWP and CVP.

[1] See additional discussion below regarding SWP exports as authorized under D-1641.

Because delta smelt are also protected under the California ESA, the SWP and CVP are required to obtain take authorization from the California Department of Fish and Game (DFG). In July 2009, DFG issued a "consistency determination" pursuant to Fish and Game Code section 2080.1. That determination provides that operations of the SWP and CVP are in compliance with CESA so long as those operations occur in accordance with the FWS delta smelt B.O. and RPA. Because the consistency determination posed a risk that the SWP could remain bound to the terms of the RPA even if the FWS B.O. was eventually overturned by a federal court, DFG's decision was challenged in state court by the State Water Contractors and the Kern County Water Agency. (*State Water Contractors v. California Department of Fish and Game, et al.*, Kern County Superior Court Case No. S-1500-CV-268074[2]; *Kern County Water Agency v. Department of Fish and Game, et al.*, Sacramento County Superior Court Case No. 34-2010-80000450.) The challenges assert, among other things, that DFG's consistency determination is invalid because it relies upon and seeks to enforce restrictions established under the new FWS B.O. that are alleged under *The Consolidated Delta Smelt Cases* to be invalid and unenforceable. The case is currently stayed by stipulation of the parties, pending the outcome of *The Consolidated Delta Smelt Cases*.

These litigation matters challenging the validity of the FWS B.O. and the DFG consistency determination give rise to the possibility that the restrictions on SWP exports could be relaxed and that SWP exports may return to the levels allowed by the Interim Remedies (above) or State Board Decision D-1641[3] pending issuance of a new B.O. and/or the implementation of the Bay-Delta Conservation Plan (BDCP). As an additional factor, by letter dated May 3, 2010, the federal Secretaries of the Department of Interior and the Department of Commerce have announced a joint initiative to develop a single integrated B.O. for the Delta and related water operations of the CVP and SWP.[4] The timing, nature and extent of the regulatory measures to be contained in any such B.O., and whether those measures would be legally challenged or upheld, cannot be predicted with any degree of certainty at this time.

New National Marine Fisheries Service Biological Opinion Salmon/Anadromous Species and Related Litigation Matters

SWP operations have also been challenged in connection with potential impacts to anadromous species in the San Francisco Bay-Delta estuary. In October 2004, the National Marine Fisheries Service (NMFS) issued a "no jeopardy" determination and B.O. analyzing potential impacts to federally listed winter-run and spring-run salmon and steelhead trout related to the long-term coordinated operations of the CVP and SWP through the year 2030. As with the 2005 FWS B.O. and *Kempthorne* case discussed above, OCAP was the project/action evaluated in the 2004

[2] In June 2010, the case was transferred to Sacramento, California, where it is now referenced as *State Water Contractors v. California Department of Fish and Game, et al.*, Sacramento County Superior Court Case No. 34-2010-80000552.

[3] D-1641 implements the objectives of the 1995 Bay-Delta Plan and imposes flow and water quality objectives to assure protection of beneficial uses in the Delta. The requirements of D-1641 address, among other things, standards for fish and wildlife protection, municipal and industrial water quality, agricultural water quality, and salinity. D-1641 imposed a new operating regime for the Delta, including measures such as X2, an export/inflow ratio, and the Vernalis Adaptive Management Program (VAMP). The standards under D-1641 are accomplished through requirements and conditions imposed on the water right permits for the SWP, the CVP and others. (*See*, California Water Plan Update 2009, Regional Reports Volume 3, Sacramento-San Joaquin River Delta at DB-6.)

[4] http://www.doi.gov/news/pressreleases/upload/Roy.pdf

NMFS B.O., which included the Projects' existing Delta pumping operations, proposals to increase SWP pumping by 20 percent over the long term, and other operational changes. In August 2005, several environmental groups filed suit in federal court against NMFS and the Secretary of Commerce challenging the validity of the B.O. (*Pacific Coast Federation of Fishermen's Associations, et al. v. Gutierrez, et al*., Case No. 1:06-CV-00245-OWW-GSA.)

In April 2008, the United States District Court for the Eastern District of California issued its decision invalidating the NMFS B.O. for failing to comply with the requirements of the federal ESA. As with the *Kempthorne* case (above), the court did not vacate the B.O., meaning that SWP and CVP operations were authorized to continue pending the preparation of a new B.O. and any interim remedies imposed by the court. Remedy proceedings were held similar to those conduced in the *Kempthorne* case discussed above and, in separate Findings of Fact and Conclusions of Law issued in July and October 2008, Judge Wanger determined that additional water supply restrictions beyond those required in *Kempthorne* (i.e., the Interim Remedies for delta smelt) were not required at that time for the anadromous species.

On June 4, 2009, NMFS issued a new B.O. regarding the effects of SWP and CVP operations on listed winter and spring-run salmon, steelhead trout, green sturgeon, and southern resident killer whales. Like the new FWS B.O. discussed above, the NMFS B.O. concludes that the proposed long-term coordinated operations of the CVP and SWP will jeopardize the species and adversely modify the critical habitats of most of those species. Pursuant to the ESA, because the B.O. is a "jeopardy" opinion, NMFS was required to formulate and adopt a Reasonable and Prudent Alternative (RPA) to the proposed action that NMFS believed would not cause jeopardy to the species or adversely modify or destroy their critical habitats, and which can be implemented by Reclamation and DWR. (16 U.S.C. § 1536(b)(3)(A).) The RPA adopted by NMFS imposed various new operating restrictions upon the CVP and SWP which have the potential to result in substantial reductions in water supply from the Projects.

NMFS calculated that its new B.O. has the potential to reduce SWP deliveries from the Delta by 7 percent in addition to the potential reductions under the new FWS B.O. for delta smelt (above). DWR has estimated that average annual reductions to SWP deliveries could be closer to 10 percent beyond the restrictions imposed under the FWS B.O. (thus, a total of 28 to 39 percent during average and dry conditions, respectively, in comparison to SWP exports authorized under D-1641). As with the FWS B.O., potential water supply restrictions under the NMFS B.O. are dependent on several variable factors, such as hydrologic conditions in the Delta region, migratory and reproductive patterns of protected salmonid species, and other non-Project factors that impact the health and abundance of the species and their habitats.

In June 2009, numerous legal challenges were filed against the new NMFS B.O. and consolidated in the United States District Court for the Eastern District of California alleging, among other things, that the operating restrictions set forth in the B.O. are in violation of the federal ESA, the federal APA, and other laws. (*The Consolidated Salmonid Cases*, Lead Case No. 1:09-CV-1053-OWW-DLB.) Early in the proceedings, several of the plaintiff water agencies and the federal defendants filed cross-motions for summary judgment to determine whether a NEPA violation occurred in connection with federal defendants' adoption and implementation of the NMFS B.O. and its RPA. The court heard oral argument on the motions in February 2010, and took the matter under submission.

Separately, in January 2010, several of the plaintiff water agencies filed applications for a temporary restraining order and motions for preliminary injunction regarding the implementation of RPA Actions IV.2.1 and IV.2.3, which are designed to restrict Delta exports during a particular timeframe in spring and summer months, depending on certain biological and environmental parameters. In February 2010, the court issued its Memorandum Decision and Order Re Plaintiffs' Motion for Temporary Restraining Order. The decision found that federal defendants violated NEPA by failing to consider the potential human and environmental impacts caused by implementation of the RPA Actions, and that a temporary injunction against RPA Action IV.2.3 would not cause jeopardy to the species, whereas a failure to enjoin the Action would cause irreparable water supply impacts to the plaintiffs. (*The Consolidated Salmonid Cases*, Doc. No. 202 at 20-22.) In subsequent rulings issued in March 2010, the court ordered that plaintiffs were entitled to summary judgment on their claims that federal defendants violated NEPA by failing to prepare any NEPA documentation in the adoption and implementation of the NMFS B.O. and its RPA. (*The Consolidated Salmonid Cases*, Doc. Nos. 266 and 288 at 3.)

Plaintiffs' motions for a preliminary injunction were heard in April and May 2010, and in May 2010 the court issued Findings of Fact and Conclusions of Law Re Plaintiffs' Request for Preliminary Injunction. In that decision, the court reconfirmed its previous ruling that federal defendants violated NEPA by failing to undertake an analysis of whether the RPA Actions adopted by NMFS under its new B.O. would adversely impact humans and the human environment. (*The Consolidated Salmonid Cases*, Doc. No. 347 at 129-130, 138.) Further, the court ruled that the plaintiff water agencies had a substantial likelihood of being able to show that the federal defendants violated the ESA and the APA by failing to adequately justify, through generally recognized scientific principles, the precise flow prescriptions imposed by RPA Actions IV.2.1 and IV.2.3. (*Id.* at 130, 133-134.)[5]

Following its May 18th ruling, the court conducted further proceedings and accepted additional evidence to address the proposed injunction and whether the relief requested by the plaintiffs would adversely affect the species (namely, Central Valley spring-run Chinook salmon and Central Valley steelhead). Based on those proceedings, in June 2010, the court issued Supplemental Findings of Fact and Conclusions of Law Re Plaintiffs' Request for Preliminary Injunction. (*The Consolidated Salmonid Cases*, Doc. No. 380.) The Supplemental Findings noted that if RPA Actions IV.2.1 and IV.2.3 were enjoined through June 15, 2010, the FWS B.O. for delta smelt (above) would control Project operations between May 26th and June 15th, unless those restrictions were also enjoined, in which case Project operations would be controlled by D-1641.[6] (Doc. No. 380 at 12.) Accordingly, the court granted an injunction against RPA Actions

[5] RPA Action IV.2.1 limits combined water exports by the CVP and SWP based on San Joaquin River flows as measured at Vernalis. (NMFS B.O. at 642.) When flows at Vernalis range from 0 to 6,000 cfs, Action IV.2.1 limits combined CVP and SWP exports to 1,500 cfs. (NMFS B.O. at 642.) When flows at Vernalis range from 6,000 to 21,750 cfs, Action IV.2.1 imposes an inflow to combined CVP and SWP exports ratio of 4:1. (NMFS B.O. at 642.) The pumping restrictions associated with Action IV.2.1 terminate May 31st. (NMFS B.O. at 641-642.) RPA Action IV.2.3 limits Old and Middle River (OMR) flows to no more negative than -2,500 cfs between January 1 and June 15, or until the average daily water temperature at Mossdale is greater than 72 degrees Fahrenheit for seven consecutive days, whichever occurs first. (NMFS B.O. at 648-650.)

[6] Among other things, D-1641 limits Project exports to a combined total of not more than 35 percent of total Delta inflow and further limits Project operations to ensure that certain water quality standards are met as measured by the location of the isohaline condition referred to as spring X2. (See *The Consolidated Salmonid Cases*, Doc. No. 380 at 12-14.)

IV.2.1 and IV.2.3 and authorized Project operations in accordance with D-1641, provided that export pumping could be reduced on shortened notice upon a showing of jeopardy to the species or adverse modification of its critical habitat. (*Id.* at 17-18.)

In August and November 2010, the parties also filed motions for summary judgment to obtain a final ruling in the cases. Those motions were argued on December 16 and 17, 2010, and the court is expected to issue a memorandum decision on the motions.

Because the salmon species covered by the new NMFS B.O. are also protected under CESA, the SWP and CVP are required to obtain take authorization from DFG. In September 2009, DFG issued a "consistency determination" pursuant to Fish and Game Code section 2080.1. That determination provides that operations of the SWP and CVP are in compliance with CESA so long as those operations occur in accordance with the RPA set forth in the NMFS B.O. Because the consistency determination posed a risk that the SWP could remain bound to the terms of the RPA even if the NMFS B.O. was eventually overturned by a federal court, DFG's decision was challenged in state court by the State Water Contractors and the Kern County Water Agency. (*State Water Contractors v. California Department of Fish and Game, et al.*, Kern County Superior Court Case No. S-1500-CV-268497.)[7] The challenge asserts, among other things, that DFG's consistency determination is invalid because it relies upon and seeks to enforce restrictions established under the NMFS B.O. that are alleged under *The Consolidated Salmon Cases* to be invalid and unenforceable. As described above, the Federal District Court for the Eastern District of California has ruled that plaintiffs have a strong likelihood of being able to show that portions of the NMFS B.O. fail to comply with the ESA and the APA, and has enjoined implementation of several RPA Actions. Because the court's ruling effectively modified aspects of the NMFS B.O. for 2010, DWR requested that DFG make a determination that the NMFS B.O., as modified by the court, remained consistent with the provisions of CESA. In May 2010, DFG issued a new consistency determination, finding the court-modified NMFS B.O. consistent with CESA. In June 2010, an amended complaint was filed against the May 24th consistency determination. By stipulation of the parties, the case is currently stayed pending the outcome of *The Consolidated Salmonid Cases*.

The current legal challenges regarding the validity of the new NMFS B.O. and the DFG consistency determination give rise to the possibility that the restrictions on SWP exports could be relaxed and that SWP exports may return to the higher levels allowed by the Interim Remedies decision in *Kempthorne* (above) or D-1641 pending the issuance of a new B.O. and/or implementation of the BDCP. Furthermore, as noted above, in May 2010 the Department of Interior and the Department of Commerce announced a joint initiative to develop a single, integrated B.O. for the coordinated operations of the CVP and SWP in the Delta.[8] The timing, nature, and extent of the regulatory measures to be contained that B.O., and whether those measures would be legally challenged or upheld, cannot be predicted with any degree of certainty at this time.

[7] In June 2010, the case was transferred to Sacramento, California, where it is now referenced as *State Water Contractors v. California Department of Fish and Game, et al.*, Sacramento County Superior Court Case No. 34-2010-80000560.

[8] http://www.doi.gov/news/pressreleases/upload/Roy.pdf

Watershed Enforcers v. California Department of Water Resources

Another litigation matter concerning SWP operations is *Watershed Enforcers v. Cal. Dept. of Water Resources* (2010) 185 Cal. App. 4th 969 (Alameda County Superior Court Case No. RG06292124). In that case, a plaintiffs group filed suit against DWR alleging the SWP was being operated without "take authorization" under CESA. The case was heard by the Alameda County Superior Court in November 2006 and, in April 2007, the court ordered DWR to cease and desist further operations of the Harvey O. Banks pumping plant facilities of the SWP unless DWR obtained proper authorization from DFG for the take of delta smelt and salmon species listed under CESA. The trial court decision was appealed by DWR and several water agency parties and the court's order was stayed pending the appeal, meaning that DWR was not required to cease its operations of the Banks facilities.

As discussed above, the new FWS and NMFS B.O.s were issued while the *Watershed Enforcers* case was pending on appeal. Based on those new B.O.s, DFG issued consistency determinations and take authorization for the SWP under CESA with respect to delta smelt and the listed anadromous species. (Also discussed above, those consistency determinations have been challenged in state court.) Thereafter, in September 2009, DWR and one of the water agency parties dismissed their appeals in the *Watershed Enforcers* case. The case remained active in 2009-2010, however, for purposes of resolving the discrete legal issue raised by the remaining water agency parties as to whether DWR is the type of entity that is subject to the take prohibitions under CESA. In a June 2010 decision, the First District Court of Appeal affirmed the trial court decision in all respects, including the determination that DWR qualifies as a "person" within the meaning of CESA, which means that DWR is subject to CESA's permitting requirements. (*Watershed Enforcers v. Department of Water Resources* (2010) 185 Cal. App. 4th 969, 973.)

California Department of Fish and Game Incidental Take Permit for Longfin Smelt and Related Litigation Matters

Regulatory actions related to longfin smelt also have the potential to affect the availability and reliability of SWP supplies. In February 2008, the California Fish and Game Commission (Commission) approved a petition to list the longfin smelt as a "candidate" species under CESA. Under CESA, once a species is granted candidate status, it is entitled to protections until the Commission determines whether to list the species as threatened or endangered. To afford such interim protection, in February 2008, the Commission adopted the first in a series of emergency take regulations that authorized the CVP and SWP to take longfin smelt, yet established certain operating restrictions on Project exports from the Delta in an effort to protect the species. The emergency regulations were proposed to remain in effect until February 2009, at which time the Commission was required to decide whether to list the longfin as a threatened or endangered species. Initially, the Commission's take regulation imposed the same Delta export restrictions that were established in the *Kempthorne* case (i.e., the Interim Remedies discussed above). In November 2008, however, the Commission revised its emergency regulations in a manner that threatened to impose export restrictions beyond those established for delta smelt. According to information published by DWR, the Commission's 2008-2009 revised emergency take regulations had the potential to reduce SWP supplies in the January to February 2009 period by up to approximately 300,000 acre-feet under a worst-case scenario. Under other scenarios,

however, the SWP delivery reductions were expected to be no greater than those imposed under the new FWS B.O. for delta smelt. In December 2008, several water agency interests filed suit against the Commission's revised take regulation, alleging it violated CESA.

In March 2009, the Commission determined that the listing of longfin smelt as a "threatened" species was warranted under CESA. CESA sets forth a general prohibition against the take of a threatened species except as otherwise authorized by statute. One such authorization is provided by California Fish and Game Code section 2081, wherein DFG may authorize the incidental taking of a threatened species in connection with an otherwise lawful activity through the issuance of a permit. In February 2009, in advance of an official listing of the species as threatened, DFG issued Incidental Take Permit No. 2081-2009-001-03 (Permit) to DWR which imposes terms and conditions on the ongoing and long-term operation of SWP facilities in the Delta for the protection of longfin smelt. The operating restrictions under the Permit are based in large part on the restrictions imposed on the SWP by the new FWS B.O. for delta smelt (see above).

In June 2009, the Commission officially listed longfin smelt as a threatened species under CESA. As with the FWS B.O., potential water supply restrictions under the Permit are dependent on several variable factors, such as hydrologic conditions in the Delta region, migratory and reproductive patterns of longfin smelt, and other non-Project factors affecting longfin smelt abundance in the Delta. DWR has not indicated whether any particular reductions in SWP exports are likely to result from the Permit. As noted above, however, DWR has estimated that the restrictions imposed by the FWS B.O. and RPA for delta smelt could reduce SWP deliveries between 18 and 29 percent in comparison to Project deliveries authorized under D-1641. In March 2009, due to a number of alleged scientific and other deficiencies in the Permit, the State Water Contractors challenged the Permit in Sacramento County Superior Court. (*State Water Contractors v. California Dept. of Fish and Game, et al.*, Sac. Sup. Ct. Case No. 34-2009-80000203.) That case puts DFG's ability to enforce the Permit into question.

California Drought Conditions

On June 4, 2008, the Governor of California proclaimed a statewide drought due to record-low rainfall in Spring 2008 and court-ordered restrictions on Delta exports as discussed above. (Executive Order S-06-08.) Soon thereafter, the Governor proclaimed a state of drought emergency to exist within the Counties of Sacramento, San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and Kern. (Proclamation dated June 12, 2008.) On February 27, 2009, the Governor declared a statewide water supply emergency to combat California's third consecutive year of drought conditions, evidenced by low reservoir storage and estimated snowpack water content at that time. (Proclamation dated February 27, 2009.)

Since then, statewide hydrologic conditions have improved, although the State's water supply emergency declaration has not been lifted. In March 2010, DWR announced that both manual and electronic readings indicate that the water content in California's mountain snowpack was 107 percent of normal and stated that the "readings boost our hope that we will be able to increase the State Water Project allocation by this spring to deliver more water to our cities and farms." Among these readings, DWR reported that electronic sensor readings showed northern

Sierra snow water equivalents at 126 percent of normal for that date, central Sierra at 93 percent, and southern Sierra at 109 percent.[9] As of January 2011, DWR reported snow water equivalents for the northern Sierra at 164 percent of normal, 186 percent of normal for the central Sierra, and 260 percent for the southern Sierra.[10] According to DWR's California Data Exchange Center, hydrologic conditions in California as of December 1, 2010 were as follows: statewide precipitation was 155 percent of average; statewide runoff was 115 percent of average; and key historical average statewide reservoir storage was at 105 percent, with two of the state's largest reservoirs, Lake Shasta (CVP) and Lake Oroville (SWP), respectively storing 116 percent and 75 percent of their historical averages.[11]

Development of Delta Plan and Delta Flow Criteria Pursuant to New State Laws

In November 2009, the California Legislature enacted SBX7-1 as one of several bills passed as part of a comprehensive water package related to water supply reliability, ecosystem health, and the Delta. SBX7-1 became effective on February 3, 2010 and adds Division 35 to the California Water Code (commencing with Section 85300), referred to as the Sacramento-San Joaquin Delta Reform Act of 2009 (Act). Among other things, the Act creates the Delta Stewardship Council (Council) as an independent agency of the state. (Wat. Code § 85200.) SBX7-1 also amends the California Public Resources Code to specify changes to the Delta Protection Commission and to create the Delta Conservancy. (Pub. Res. Code §§ 29702-29780.) The Act directs the Council to develop a comprehensive management plan for the Delta by January 1, 2012 (Delta Plan) and to first develop an Interim Plan that includes recommendations for early actions, projects, and programs for the Delta. (*See generally*, Second Draft Interim Plan, Prepared for Consideration by the Delta Stewardship Council at 1.)

In addition to these and other requirements, SBX7-1 requires the State Board to use the best available scientific information to develop flow criteria for the Delta ecosystem necessary to protect public trust resources, including fish, wildlife, recreation and scenic enjoyment. Similarly, DFG is required to identify quantifiable biological objectives and flow criteria for species of concern in the Delta. In August 2010, the State Board adopted Resolution No. 2010-0039 approving its report entitled "Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem" (Flow Criteria). The State Board report concludes that substantially higher flows are needed through the Delta than in have occurred in previous decades in order to benefit zooplankton and various fish species. (Flow Criteria at 5-8.) Separately, in September 2010, DFG issued a draft report entitled "Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta" (DFG Report). The DFG Report is based on similar biological objectives and recommends Delta flows similar to those set forth in the State Board's Flow Criteria. (DFG Report at 13.) Notably, both the State Board and DFG recognize that their recommended flow criteria for the Delta do *not* balance the public interest or the need to provide an adequate and reliable water supply. (Flow Criteria at 4; DFG Report at 16.) Also of importance, both the State Board and DFG acknowledge that their recommended flow criteria do not have any regulatory or adjudicatory effect; however, they may be used to inform the Council as it prepares the Delta Plan, and may be considered as the Bay

[9] http://www.water.ca.gov/news/newsreleases/2010/030310snow.pdf
[10] http://cdec.water.ca.gov/cgi-progs/snow/DLYSWEQ
[11] http://cdec.water.ca.gov/cgi-progs/reports/EXECSUM

Delta Conservation Plan (BDCP) process moves forward. (Flow Criteria at 3, 10; DFG Report at ES-4.)

DWR's Final 2009 SWP Delivery Reliability Report

DWR continues to evaluate the issues affecting SWP exports from the Delta and how those issues may affect the long-term availability and reliability of SWP deliveries to the SWP Contractors. In September 2010, DWR released its Final 2009 SWP Delivery Reliability Report (DWR Report), which forecasts additional reductions to SWP supplies in comparison to the 2007 Report. According to DWR, the long-term average delivery of contractual SWP Table A supply is projected to be 60 percent under current and future conditions over the 20-year projection. (DWR Report at 43, 48, Tables 6.3 and 6.12.) Within that long-term average, SWP Table A deliveries can range from 7 percent (single dry year) to 68 percent (single wet year) of contractual amounts under current conditions, and from 11 percent (single dry year) to 97 percent (single wet year) under future conditions. (Id. at 43-44, 49, Tables 6.4, 6.5, 6.13 and 6.14.) Contractual amounts are projected to range from 32 to 38 percent during multiple-dry year periods, and from 79 to 93 percent during multiple wet periods. (Id. at 49, Tables 6.13 and 6.14.)

To ensure a conservative analysis, the DWR Report expressly assumes and accounts for the institutional, environmental, regulatory, and legal factors affecting SWP supplies, including but not limited to: water quality constraints, fishery protections, other D-1641 requirements, and the operational limitations imposed by the FWS and NMFS B.O.s that are discussed above. The DWR Report also considers the potential effects of Delta levee failures and other seismic or flood events. (*See*, *e.g.*, DWR Report at 19-24, 25-28, 29-35, Appendices A, A-1, A-2, B.) Notably, the DWR Report assumes that all of these restrictions and limitations will remain in place over the next 20-year period and that no actions to improve the Delta will occur, even though numerous legal challenges, various Delta restoration processes, and new legal requirements for Delta improvements are currently underway (i.e., BDCP, Delta Vision, Delta Plan, etc.). Finally, DWR's long-term SWP delivery reliability analyses incorporate assumptions that are intended to account for potential supply shortfalls related to global climate change. (*See*, *e.g.*, DWR Report at 19, 29-30, Appendices A-B.) Based on these and other factors, the DWR Report presents an extremely conservative projection of SWP delivery reliability.

Conclusion

DWR's most recently published SWP Delivery Reliability Report (September 2010) demonstrates that the projected long-term average delivery amounts of contractual SWP Table A supplies have decreased in comparison to previous estimates. However, as noted, the projections developed by DWR are predicated on extremely conservative assumptions, which make the projections useful from a long-range urban water supply planning perspective.[12] Indeed, recent rulings in various legal actions and other factors described above, among others, support higher estimates of average annual SWP deliveries than projected in DWR's 2009 Report. While this

[12] *See*, *e.g.*, *Sonoma County Water Coalition v. Sonoma County Water Agency* (2010) 189 Cal.App.4th 33; *Watsonville Pilots Association v. City of Watsonville* (2010) 183 Cal.App.4th 1059; *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova* (2007) 40 Cal.4th 412.

may lead DWR to increase its projections in its next scheduled Report, the 2009 Report remains the best available information concerning the long-term delivery reliability of SWP supplies.

Appendix C

Local Water Management

These items are being provided on compact disc.

- Western Judgment (Superior Court of the State of California for the County of Riverside; April 17, 1969. Case No. 78426: Western Municipal Water District of Riverside County et al., vs. East San Bernardino County Water District et al.)
- Orange County Judgment (Orange County Water District v. City of Chino, et al. Case No. 117628 - County of Orange.)
- Chino Optimum Basin Management Plan

Western Judgment

FILED
RIVERSIDE COUNTY

APR 17 1969

DONALD [illegible], Clerk
By [illegible], Deputy

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF RIVERSIDE

WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY, a municipal water district; CITY OF RIVERSIDE, a municipal corporation; THE GAGE CANAL COMPANY, a corporation; AGUA MANSA WATER COMPANY, a corporation, MEEKS & DALEY WATER COMPANY, a corporation; RIVERSIDE HIGHLAND WATER COMPANY, a corporation, and THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, Plaintiffs, -vs- (A) EAST SAN BERNARDINO COUNTY WATER DISTRICT, et al., Defendants	No. 704726 JUDGMENT

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APPENDIX A -- Map showing San Bernardino Basin Area, Colton Basin Area, and Riverside Basin Area situated within San Bernardino County; Riverside Basin Area within Riverside County; Bunker Hill Dike; Riverside Narrows; and

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Boundaries of San Bernardino Valley Municipal Water District & Western Municipal Water District of Riverside County

APPENDIX B -- Extractions by Plaintiffs from San Bernardino Basin Area.

APPENDIX C -- Exports for Use on Lands not Tributary to Riverside Narrows

APPENDIX D -- Miscellaneous Data

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RECITALS

(a) Complaint. The complaint in this action was filed by certain parties exporting water from the area defined herein as the San Bernardino Basin Area for use within Western, and sought a general adjudication of water rights.

(b) Orange County Water District Action. Subsequently the Orange County Water District filed an action for the adjudication of the water rights of substantially all water users in the area tributary to Prado Dam in the Santa Ana River Watershed. A decree of physical solution has been entered in such action whereby individual water users were dismissed, and San Bernardino Valley and Western assumed responsibility for the deliveries of certain flows at Riverside Narrows and Prado respectively.

(c) Physical Solution. The Judgment herein will further implement the physical solution in the Orange County Water District action, as well as determine the rights of the hereinafter named Plaintiffs to extract water from the San Bernardino Basin Area, and provide for replenishment of the area above Riverside Narrows. Such Judgment is fair and equitable, in the best interests of the parties, and in furtherance of the water policy of the State. San Bernardino Valley has the statutory power and resources to effectuate this Judgment and accordingly the other defendants may be dismissed.

(d) Stipulation. The parties named herein through their respective counsel have proposed and filed a written stipulation agreeing to the making and entry of this Judgment. By reason of such stipulation, and good cause appearing

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therefor,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED as follows:

I

ACTIVE PARTIES

(a) The parties to this Judgment are as follows:

(1) Plaintiff Western Municipal Water District of Riverside County, a California municipal water district, herein often called "Western", appearing and acting pursuant to Section 71751 of the Water Code;

(2) Plaintiff City of Riverside, a municipal corporation;

(3) Plaintiffs Riverside Highland Water Company, Agua Mansa Water Company and Meeks & Daley Water Company, each of which is a mutual water company and a California corporation;

(4) Plaintiff The Regents of the University of California, a California public corporation;

(5) Defendant San Bernardino Valley Municipal Water District, a California municipal water district, herein often called "San Bernardino Valley", appearing and acting pursuant to Section 71751 of the Water Code;

(b) This Judgment shall inure to the benefit of, and be binding upon, the successors and assigns of the parties.

II

DISMISSED PARTIES

All parties other than those named in the preceding Paragraph I are dismissed without prejudice.

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III

PRIOR JUDGMENTS

(a) The Judgment dated and entered on May 13, 1959, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino, entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff v. Riverside Water Company, a corporation, et al., Defendants", No. 97031, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to the rights determined in that action.

(b) The Judgment dated June 23, 1965, and entered on April 21, 1966, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff, v. Riverside Water Company, a corporation, et al., Defendants," No. 111614, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to any rights determined in that action.

(c) As used in this Paragraph III only, "party" includes any person or entity which stipulates with the parties hereto to accept this Judgment.

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IV

DEFINITIONS

The following ground water basins and tributary areas are situated within the Santa Ana River watershed upstream from Riverside Narrows and are tributary thereto, and their approximate locations and boundaries for purposes of this Judgment are shown upon the map attached hereto as Appendix "A": San Bernardino Basin Area (the area above Bunker Hill Dike, but excluding certain mountainous regions and the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins); Colton Basin Area, Riverside Basin Area within San Bernardino County, and Riverside Basin Area within Riverside County.

As used herein the following terms shall have the meanings herein set forth:

(a) Bunker Hill Dike - The San Jacinto Fault, located approximately as shown on Appendix "A", and forming the principal downstream boundary of the San Bernardino Basin Area.

(b) Riverside Narrows - That bedrock narrows in the Santa Ana River indicated on Appendix "A".

(c) Extractions - Any form of the verb or noun shall include pumping, diverting, taking or withdrawing water, either surface or subsurface, by any means whatsoever, except extractions for hydroelectric generation to the extent that such flows are returned to the stream, and except for diversions for replenishment.

(d) Natural Precipitation - Precipitation which falls naturally in the Santa Ana River watershed.

(e) Imported Water - Water brought into the Santa Ana River watershed from sources of origin outside such watershed.

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(f) Replenishment - Artificial recharge of the ground water body achieved through the spreading or retention of water for the purpose of causing it to percolate and join the underlying ground water body, or injection of water into the ground water resources by means of wells; provided that as used with reference to any obligation of Western to replenish the Riverside Basin Area in Riverside County, the term replenishment shall include any water caused to be delivered by Western for which credit is received by San Bernardino Valley against its obligation under the Orange County Judgment to provide base flow at Riverside Narrows.

(g) Safe Yield - Safe yield is that maximum average annual amount of water that could be extracted from the surface and subsurface water resources of an area over a period of time sufficiently long to represent or approximate long-time mean climatological conditions, with a given areal pattern of extractions, under a particular set of physical conditions or structures as such affect the net recharge to the ground water body, and with a given amount of usable underground storage capacity, without resulting in long-term, progressive lowering of ground water levels or other undesirable result. In determining the operational criteria to avoid such adverse results, consideration shall be given to maintenance of adequate ground water quality, subsurface outflow, costs of pumping, and other relevant factors.

The amount of safe yield is dependent in part upon the amount of water which can be stored in and used from the ground water reservoir over a period of normal water supply under a given set of conditions. Safe yield is thus related to factors which influence or control ground water recharge, and

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to the amount of storage space available to carry over recharge occurring in years of above average supply to years of deficient supply. Recharge, in turn, depends on the available surface water supply and the factors influencing the percolation of that supply to the water table.

Safe yield shall be determined in part through the evaluation of the average net groundwater recharge which would occur if the culture of the safe yield year had existed over a period of normal native supply.

(h) Natural Safe Yield - That portion of the safe yield of the San Bernardino Basin Area which could be derived solely from natural precipitation in the absence of imported water and the return flows therefrom, and without contributions from new conservation. If in the future any natural runoff tributary to the San Bernardino Basin Area is diverted away from that Basin Area so that it is not included in the calculation of natural safe yield, any replacement made thereof by San Bernardino Valley or entities within it from imported water shall be included in such calculation.

(i) New Conservation - Any increase in replenishment from natural precipitation which results from operation of works and facilities not now in existence, other than those works installed and operations which may be initiated to offset losses caused by increased flood control channelization.

(j) Year - A calendar year from January 1 through December 31. The term "annual" shall refer to the same period of time.

(k) Orange County Judgment - The final judgment in Orange County Water District v. City of Chino, et al., Orange County Superior Court No. 117628, as it may from time to

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time be modified.

(l) Return Flow - That portion of the water applied for use in any particular ground water basin which subsequently reaches the ground water body in that basin.

(m) Five Year Period - a period of five consecutive years.

V

EXTRACTIONS FROM THE SAN BERNARDINO BASIN AREA

(a) For Use by Plaintiffs. The average annual extractions from the San Bernardino Basin Area delivered for use in each service area by each Plaintiff for the five year period ending with 1963 are hereby determined to be as set forth in Table B-1 of Appendix "B". The amount for each such Plaintiff delivered for use in each service area as set forth in Table B-1 shall be designated, for purposes of this Judgment, as its "base right" for such service area.

(b) For Use by Others. The total actual average annual extractions from the San Bernardino Basin Area by entities other than Plaintiffs for use within San Bernardino County for the five year period ending with 1963 are assumed to be 165,407 acre feet; the correct figure shall be determined by the Watermaster as herein provided.

VI

SAN BERNARDINO BASIN AREA RIGHTS AND REPLENISHMENT

(a) Determination of Natural Safe Yield. The natural safe yield of the San Bernardino Basin Area shall be computed by the Watermaster, reported to and determined initially by supplemental order of this Court, and thereafter

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shall be subject to the continuing jurisdiction thereof.

(b) Annual Adjusted Rights of Plaintiffs.

1. The annual "adjusted right" of each Plaintiff to extract water from the San Bernardino Basin Area for use in each service area designated in Table B-1 shall be equal to the sum of the following:

(a) its base right for such service area, until the natural safe yield of the San Bernardino Basin Area is determined, and thereafter its percentage of such natural safe yield determined by the methods used in Table B-2; and (b) an equal percentage for each service area of any new conservation, provided the conditions of the subparagraph 2 below have been met.

2. In order that the annual adjusted right of each such Plaintiff shall include its same respective percentage of any new conservation, such Plaintiff shall pay its proportionate share of the costs thereof. Each Plaintiff shall have the right to participate in new conservation projects, under procedures to be determined by the Watermaster for notice to Plaintiffs of the planned construction of such projects. With respect to any new conservation brought about by Federal installations, the term "costs" as used herein shall refer to any local share required to be paid in connection with such project. Each Plaintiff shall make its payment at times satisfactory to the constructing agency, and new conservation shall be credited to any participating Plaintiff as such conservation is effected.

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3. In any five year period, each Plaintiff shall have the right to extract from the San Bernardino Basin Area for use in each service area designated in Table B-1 an amount of water equal to five times its adjusted right for such service area; provided, however, that extractions by each Plaintiff in any year in any service area shall not exceed such Plaintiff's adjusted right for that service area by more than 30 percent.

4. If the natural safe yield of the San Bernardino Basin Area has not been determined by January 1, 1972, the initial determination thereof shall be retroactive to that date and the rights of the Plaintiffs, and the replenishment obligation of San Bernardino Valley as hereinafter set forth, shall be adjusted as of such date. Any excess extractions by Plaintiffs shall be charged against their respective adjusted rights over the next five year period, or in the alternative, Plaintiffs may pay to San Bernardino Valley the full cost of any replenishment which it has provided as replenishment for such excess extractions. Any obligation upon San Bernardino Valley to provide additional replenishment, by virtue of such retroactive determination of natural safe yield, may also be discharged over such next five year period.

5. Plaintiffs and each of them and their agents and assigns are enjoined from extracting any more water from the San Bernardino Basin Area than is permitted under this Judgment. Changes in place

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of use of any such water from one service area to another shall not be made without the prior approval of Court upon a finding of compliance with Paragraph XV(b) of this Judgment. So long as San Bernardino Valley is in compliance with all its obligations hereunder, and Plaintiffs are allowed to extract the water provided for in this Judgment, Plaintiffs are further enjoined from bringing any action to limit the water extracted from the San Bernardino Basin Area for use within San Bernardino Valley.

6. Nothing in this Judgment shall prevent future agreements between San Bernardino Valley and Western under which additional extractions may be made from the San Bernardino Basin Area, subject to the availability of imported water not required by San Bernardino Valley, and subject to payment satisfactory to San Bernardino Valley for replenishment required to compensate for such additional extractions.

(c) San Bernardino Valley Replenishment. San Bernardino Valley shall provide imported water for replenishment of the San Bernardino Basin Area at least equal to the amount by which extractions therefrom for use within San Bernardino County exceed during any five year period the sum of: (a) five times the total average annual extractions determined under Paragraph V(b) hereof, adjusted as may be required by the natural safe yield of the San Bernardino Basin Area; and (b) any new conservation to which users within San Bernardino Valley are entitled. Such replenishment shall be

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supplied in the year following any five year period; provided that during the first five year period, San Bernardino Valley shall supply annual amounts on account of its obligations hereunder, and such amounts shall be not less than fifty percent of the gross amount of excess extractions in the previous year.

1. Against its replenishment obligation over any five year period San Bernardino Valley shall receive credit for that portion of such excess extractions that returns to the ground water of the San Bernardino Basin Area.

2. San Bernardino Valley shall also receive credit against any future replenishment obligations for all replenishment which it provides in excess of that required herein, and for any amounts which may be extracted without replenishment obligation, which in fact are not extracted.

(d) In this subparagraph (d), "person" and "entity" mean only those persons and entities, and their successors in interest, which have stipulated with the parties to this Judgment within six months after its entry to accept this Judgment.

San Bernardino Valley agrees that the base rights of persons or entities other than Plaintiffs to extract water from the San Bernardino Basin Area for use within San Bernardino Valley will be determined by the average annual quantity extracted by such person or entity during the five year period ending with 1963. After the natural safe yield of the San Bernardino Basin Area is determined hereunder, such

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base rights will be adjusted to such natural safe yield; the adjusted right of each such person or entity shall be that percentage of natural safe yield as determined hereunder from time to time which the unadjusted right of such person or entity is of the amount determined under Paragraph V(b).

San Bernardino Valley further agrees that in the event the right to extract water of any of such persons or entities in the San Bernardino Basin Area is adjudicated and legal restrictions placed on such extractions which prevent extracting of water by said persons or entities in an amount equal to their base rights, or after natural safe yield is determined, their adjusted rights, San Bernardino Valley will furnish to such persons or entities or recharge the ground water resources in the area of extraction for their benefit with imported water, without direct charge to such persons or entities therefor, so that the base rights, or adjusted rights, as the case may be, may be taken by the person or entity.

Under the provisions hereof relating to furnishing of such water by San Bernardino Valley, such persons or entities shall be entitled to extract in addition to their base rights or adjusted rights any quantities of water spread for repumping in their area of extractions, which has been delivered to them by a mutual water company under base rights or adjusted base rights included by the Watermaster under the provisions of Paragraph V (b) hereof. Extractions must be made within three years of spreading to so qualify.

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VII

WATER DISCHARGED ACROSS THE BUNKER HILL DIKE

Basis for Case 3 & Hillcliffs

San Bernardino Valley shall keep in force an agreement with the City of San Bernardino that the present annual quantity of municipal sewage effluent discharged across Bunker Hill Dike, assumed for all purposes herein to be 16,000 acre feet annually, shall be committed to the discharge of the downstream obligations imposed on San Bernardino Valley under this Judgment or under the Orange County Judgment, and that such effluent shall comply with the requirements of the Santa Ana River Basin Regional Water Quality Control Board in effect December 31, 1968.

VIII

EXTRACTIONS FROM COLTON BASIN AREA AND RIVERSIDE BASIN AREA IN SAN BERNARDINO COUNTY.

BWN & CBM

(a) The average annual extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County, for use outside San Bernardino Valley, for the five year period ending with 1963 are assumed to be 3,349 acre feet and 20,191 acre feet, respectively; the correct figures shall be determined by the Watermaster as herein provided.

(b) Over any five year period, there may be extracted from each such Basin Area for use outside San Bernardino Valley, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 20 percent, Western shall provide replenishment in the following year equal to the excess

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extractions over such 20 percent peaking allowance.

(c). To the extent that extractions from each such Basin Area for use outside San Bernardino Valley exceed the amounts specified in the next preceding Paragraph (b), Western shall provide replenishment. Except for any extractions in excess of the 20 percent peaking allowance, such replenishment shall be supplied in the year following any five year period, and shall not be from reclaimed water produced within San Bernardino Valley. Such replenishment shall also be of a quality at least equal to the water extracted from the Basin Area being recharged; provided, that water from the State Water Project shall be deemed to be of acceptable quality. Replenishment shall be supplied to the Basin Area from which any excess extractions have occurred and in the vicinity of the place of the excess extractions to the extent required to preclude influence on the water level in the three wells below designated; provided that discharge of imported water into the Santa Ana River or Warm Creek from a connection on the State Aqueduct near the confluence thereof, if released in accordance with a schedule approved by the Watermaster to achieve compliance with the objectives of this Judgment, shall satisfy any obligation of Western to provide replenishment in the Colton Basin Area, or that portion of the Riverside Basin Area in San Bernardino County, or the Riverside Basin Area in Riverside County.

(d) Extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County, for use within San Bernardino Valley, shall not be limited. However, except for any required replenishment by Western, San Bernardino Valley shall provide the water to maintain the static water levels in the area, as determined by wells numbered

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1S 4W 21 Q3, 1S 4W 29 H1, and 1S 4W 29 Q1 at an average level no lower than that which existed in the Fall season of 1963. Such 1963 average water level is hereby determined to be 822.04 feet above sea level. In future years, the level shall be computed by averaging the lowest static water levels in each of the three wells occurring at or about the same time of the year, provided that no measurements will be used which reflect the undue influence of pumping in nearby wells, or in the three wells, or pumping from the Riverside Basin in Riverside County in excess of that determined pursuant to Paragraph IX(a) hereof.

(e) Extractions by Plaintiffs from the Colton Basin Area and the portion of the Riverside Basin Area in San Bernardino County may be transferred to the San Bernardino Basin Area if the level specified in Paragraph (d) above is not maintained, but only to the extent necessary to restore such 1963 average water level, provided that Western is not in default in any of its replenishment obligations. San Bernardino Valley shall be required to replenish the San Bernardino Basin Area in an amount equal to any extractions so transferred. San Bernardino Valley shall be relieved of responsibility toward the maintenance of such 1963 average water level to the extent that Plaintiffs have physical facilities available to accommodate such transfers of extractions, and insofar as such transfers can be legally accomplished.

(f) The Colton Basin Area and the portion of the Riverside Basin Area in San Bernardino County constitute a major source of water supply for lands and inhabitants in both San Bernardino Valley and Western, and the parties hereto have a mutual interest in the maintenance of water quality in these Basin Areas and in the preservation of such supply. If

If amount the level drop the Western pool can go to before the well water level exceed 822.04

Need to talk to Hamger to clarify this

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when would gains strength in SA WW

the water quality in such Areas, as monitored by the City of Riverside wells along the river, falls below the Objectives set therefor by the Santa Ana River Basin Regional Water Quality Control Board, the Court shall have jurisdiction to modify the obligations of San Bernardino Valley to include, in addition to its obligation to maintain the average 1963 water level, reasonable provisions for the maintenance of such water quality.

(g) The primary objectives of Paragraph VIII and related provisions are to allow maximum flexibility to San Bernardino Valley in the operation of a coordinated replenishment and management program, both above and below Bunker Hill Dike; to protect San Bernardino Valley against increased extractions in the area between Bunker Hill Dike and Riverside Narrows, which without adequate provision for replenishment might adversely affect base flow at Riverside Narrows, for which it is responsible under the Orange County Judgment; and to protect the area as a major source of ground water supply available to satisfy the historic extractions therefrom for use within Western, without regard to the method of operation which may be adopted by San Bernardino Valley for the San Bernardino Basin Area, and without regard to the effect of such operation upon the historic supply to the area below Bunker Hill Dike.

If these provisions should prove either inequitable or unworkable, the Court upon the application of any party hereto shall retain jurisdiction to modify this Judgment so as to regulate the area between Bunker Hill Dike and Riverside Narrows on a safe yield basis; provided that under such method of operation, (1) base rights shall be determined on the basis of total average annual extractions for use within San Bernardino Valley and Western, respectively, for the five year period ending

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with 1963; (2) such base rights for use in both Districts shall be subject to whatever adjustment may be required by the safe yield of the area, and in the aggregate shall not be exceeded unless replenishment therefor is provided; (3) in calculating safe yield, the outflow from the area at Riverside Narrows shall be determined insofar as practical by the base flow obligations imposed on San Bernardino Valley under the Orange County Judgment; and (4) San Bernardino Valley shall be required to provide replenishment for any deficiency between the actual outflow and the outflow obligation across Bunker Hill Dike as established by safe yield analysis using the base period of 1934 through 1960.

IX

EXTRACTIONS FROM THE PORTION OF RIVERSIDE BASIN AREA IN RIVERSIDE COUNTY WHICH IS TRIBUTARY TO RIVERSIDE NARROWS.

(a) The average annual extractions from the portion of the Riverside Basin Area in Riverside County which is tributary to Riverside Narrows, for use in Riverside County, for the five year period ending with 1963 are assumed to be 30,044 acre feet; the correct figures shall be determined by the Watermaster as herein provided.

(b) Over any five year period, there may be extracted from such Basin Area, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 20 percent, Western shall provide replenishment in the following year equal to the excess extractions over such 20 percent peaking allowance.

(c) To the extent that extractions from such Basin Area exceed the amounts specified in the next preceding

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Paragraph (b), Western shall provide replenishment. Except for any extractions in excess of the 20 percent peaking allowance, such replenishment shall be supplied in the year following any five year period, and shall be provided at or above Riverside Narrows.

(d) Western shall also provide such replenishment to offset any reduction in return flow now contributing to the base flow at Riverside Narrows, which reduction in return flow results from the conversion of agricultural uses of water within Western to domestic or other uses connected to sewage or waste disposal systems, the effluent from which is not tributary to the rising water at Riverside Narrows.

X

REPLENISHMENT TO OFFSET NEW EXPORTS OF WATER TO AREAS NOT TRIBUTARY TO RIVERSIDE NARROWS.

Certain average annual amounts of water extracted from the San Bernardino Basin Area and the area downstream therefrom to Riverside Narrows during the five year period ending in 1963 have been exported for use outside of the area tributary to Riverside Narrows and are assumed to be 50,667 acre feet annually as set forth in Table C-1 of Appendix "C"; the correct amount shall be determined by the Watermaster as herein provided. Western shall be obligated to provide replenishment at or above Riverside Narrows for any increase over such exports by Western or entities within it from such areas for use within areas not tributary to Riverside Narrows. San Bernardino Valley shall be obligated to provide replenishment for any increase over the exports from San Bernardino Valley for use in any area not within Western nor tributary to Riverside Narrows as set forth in Table C-2 of

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Appendix "C", such amounts being subject to correction by the Watermaster, or for any exports from the San Bernardino Basin Area for use in the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins.

XI

REPLENISHMENT CREDITS AND ADJUSTMENT FOR QUALITY

(a) All replenishment provided by Western under Paragraph IX and all credits received against such replenishment obligation shall be subject to the same adjustments for water quality applicable to base flow at Riverside Narrows, as set forth in the Orange County Judgment.

(b) Western shall receive credit against its replenishment obligations incurred under this Judgment for the following:

1. As against its replenishment obligation under Paragraph VIII, any return flow to the Colton Basin Area or the portion of the Riverside Basin Area within San Bernardino County, respectively, resulting from any excess extractions therefrom; and as against its replenishment obligation under Paragraph IX, any return flow to the portion of the Riverside Basin Area in Riverside County, which contributes to the base flow at Riverside Narrows, resulting from any excess extractions therefrom, or from the Riverside Basin Area in San Bernardino County, or from the Colton Basin Area.

2. Subject to adjustment under Paragraph (a) hereof, any increase over the present amounts of sewage effluent discharged from

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treatment plants within Riverside County which are tributary to Riverside Narrows, and which results from the use of imported water.

3. Any replenishment which may be provided in excess of that required; any amounts which hereunder are allowed to be extracted from the Colton and Riverside Basin Areas without replenishment obligation by Western, and which in fact are not extracted; any storm flows conserved between Bunker Hill Dike and Riverside Narrows by works financed solely by Western, or entities within it, which would not otherwise contribute to base flow at Riverside Narrows; and any return flow from imported water used in Riverside County which contributes to base flow at Riverside Narrows; provided, however, that such use of the underground storage capacity in each of the above situations does not adversely affect San Bernardino Valley in the discharge of its obligations at Riverside Narrows under the Orange County Judgment, nor interfere with the accomplishment by San Bernardino Valley of the primary objectives of Paragraph VIII, as stated in Subdivision (g).

Storage Accts

Does this allow overpumping of Bunker Hill?

(c) The replenishment obligations of Western under this Judgment shall not apply during such times as amounts of base flow at Riverside Narrows and the amounts of water stored in the ground water resources below Bunker Hill Dike and tributary to the maintenance of such flow are found by Order of the Court to be sufficient to satisfy any obligation which San Bernardino Valley may have under this Judgment, or under the

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Orange County Judgment, and if the Court further finds by Order that during such times any such increase in pumping, changes in use or exports would not adversely affect San Bernardino Valley in the future.

(d) The replenishment obligations of San Bernardino Valley under Paragraph X of this Judgment for increase in exports from the Colton and Riverside Basin Areas within San Bernardino Valley below the Bunker Hill Dike shall not apply during such times as the amounts of water in the ground water resources of such area are found by Order of the Court to be sufficient to satisfy the obligations which San Bernardino Valley may have to Plaintiffs under this Judgment, and if the Court further finds by Order that during such times any such increases in exports would not adversely affect Plaintiffs in the future.

XII

CONVEYANCE OF WATER BY SAN BERNARDINO VALLEY TO RIVERSIDE NARROWS.

If San Bernardino Valley determines that it will convey reclaimed sewage effluent, or other water, to or near Riverside Narrows, to meet its obligations under this or the Orange County Judgment, the City of Riverside shall make available to San Bernardino Valley for that purpose any unused capacity in the former Riverside Water Company canal, and the Washington and Monroe Street storm drains, without cost except for any alterations or capital improvements which may be required, or any additional maintenance and operation costs which may result. The use of those facilities shall be subject to the requirements of the Santa Ana River Basin Regional Water Quality Control Board and of the State Health Department, and compliance

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therewith shall be San Bernardino Valley's responsibility.

XIII

WATERMASTER

(a) This Judgment and the instructions and subsequent orders of this Court shall be administered and enforced by a Watermaster. The parties hereto shall make such measurements and furnish such information as the Watermaster may reasonably require, and the Watermaster may verify such measurements and information and obtain additional measurements and information as the Watermaster may deem appropriate.

(b) The Watermaster shall consist of a committee of two persons. San Bernardino Valley and Western shall each have the right to nominate one of such persons. Each such nomination shall be made in writing, served upon the other parties to this Judgment, and filed in Court. Such person shall be appointed by and serve at the pleasure of and until further order of this Court. If either Western or San Bernardino Valley shall at any time nominate a substitute appointee in place of the last appointee to represent it, such appointee shall be appointed by the Court in place of such last appointee.

(c) Appendix "D" to this Judgment contains some of the data which have been used in preparation of this Judgment, and shall be utilized by the Watermaster in connection with any questions of interpretation.

(d) Each and every finding and determination of the Watermaster shall be made in writing certified to be by unanimous action of both members of the Watermaster committee. In the event of failure or inability of such Watermaster Committee to reach agreement, the Watermaster committee may determine to submit the dispute to a third person to be selected

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by them, or if they are unable to agree on a selection, to be selected by the Court, in which case the decision of the third person shall be binding on the parties; otherwise the fact, issue, or determination in question shall forthwith be certified to this Court by the Watermaster, and after due notice to the parties and opportunity for hearing, said matter shall be determined by order of this Court, which may refer the matter for prior recommendation to the State Water Resources Control Board. Such order of the Court shall be a determination by the Watermaster within the meaning of this Judgment.

(e) The Watermaster shall report to the Court and to each party hereto in writing not more than seven (7) months after the end of each year, or within such other time as the Court may fix, on each determination made by it pursuant to this Judgment, and such other items as the parties may mutually request or the Watermaster may deem to be appropriate. All of the books and records of the Watermaster which are used in the preparation of, or are relevant to, such reported data, determinations and reports shall be open to inspection by the parties hereto. At the request of any party this Court will establish a procedure for the filing and hearing of objections to the Watermaster's report.

(f) The fees, compensation and expenses of each person on the Watermaster shall be borne by the District which nominated such person. All other Watermaster service costs and expenses shall be borne by San Bernardino Valley and Western equally.

(g) The Watermaster shall initially compute and report to the Court the natural safe yield of the San Bernardino Basin Area, said computation to be based upon the cultural

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conditions equivalent to those existing during the five calendar year period ending with 1963.

(h) The Watermaster shall as soon as practical determine the correct figures for Paragraphs V(b), VI(b)1, VIII(a), IX(a) and X, as the basis for an appropriate supplemental order of this Court.

XIV

CONTINUING JURISDICTION OF THE COURT

(a) The Court hereby reserves continuing jurisdiction of the subject matter and parties to this Judgment, and upon application of any party, or upon its own motion, may review and redetermine, among other things, the following matters and any matters incident thereto:

1. The hydrologic condition of any one or all of the separate basins described in this Judgment in order to determine from time to time the safe yield of the San Bernardino Basin Area.

2. The desirability of appointing a different Watermaster or a permanent neutral member of the Watermaster, or of changing or more clearly defining the duties of the Watermaster.

3. The desirability of providing for increases or decreases in the extraction of any particular party because of emergency requirements or in order that such party may secure its proportionate share of its rights as determined herein.

4. The adjusted rights of the Plaintiffs as required to comply with the provisions hereof with respect to changes in the natural safe yield of the San Bernardino Basin

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Area. If such changes occur, the Court shall adjudge that the adjusted rights and replenishment obligations of each party shall be changed proportionately to the respective base rights.

5. Conforming the obligations of San Bernardino Valley under this Judgment to the terms of any new judgment hereafter entered adjudicating the water rights within San Bernardino Valley, if inconsistencies of the two judgments impose hardship on San Bernardino Valley.

6. Adjusting the figures in Paragraphs V(b), VI(b) 1, VIII(a) IX(a), and X, to conform to determination by the Watermaster.

7. Credit allowed for return flow in the San Bernardino Basin Area if water levels therein drop to the point of causing undue hardship upon any party.

8. Other matters not herein specifically set forth which might occur in the future and which would be of benefit to the parties in the utilization of the surface and ground water supply described in this Judgment, and not inconsistent with the respective rights of the parties as herein established and determined.

(b) Any party may apply to the Court under its continuing jurisdiction for any appropriate modification of this Judgment if its presently available sources of imported water are exhausted and it is unable to obtain additional supplies of imported water at a reasonable cost, or if there is any substantial delay in the delivery of imported water through the State Water Project.

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XV

SAVING CLAUSES

(a) Nothing in this Judgment precludes San Bernardino Valley, Western, or any other party from exercising such rights as it may have or obtain under law to spread, store underground and recapture imported water, provided that any such use of the underground storage capacity of the San Bernardino Basin Area by Western or any entity within it shall not interfere with any replenishment program of the Basin Area.

(b) Changes in the place and kind of water use, and in the transfer of rights to the use of water, may be made in the absence of injury to others or prejudice to the obligations of either San Bernardino Valley or Western under Judgment or the Orange County Judgment.

(c) If any Plaintiff shall desire to transfer all or any of its water rights to extract water within San Bernardino Valley to a person, firm, or corporation, public or private, who or which is not then bound by this Judgment, such Plaintiff shall as a condition to being discharged as hereinafter provided cause such transferee to appear in this action and file a valid and effective express assumption of the obligations imposed upon such Plaintiff under this Judgment as to such transferred water rights. Such appearance and assumption of obligation shall include the filing of a designation of the address to which shall be mailed all notices, requests, objections, reports and other papers permitted or required by the terms of this Judgment.

If any Plaintiff shall have transferred all of its said water rights and each transferee not theretofore bound by this Judgment as a Plaintiff shall have appeared in this action

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and filed a valid and effective express assumption of the obligations imposed upon such Plaintiff under this Judgment as to such transferred water rights, such transferring Plaintiff shall thereupon be discharged from all obligations hereunder. If any Plaintiff shall cease to own any rights in and to the water supply declared herein and shall have caused the appearance and assumption provided for in the third preceding sentence with respect to each voluntary transfer, then upon application to this Court and after notice and hearing such Plaintiff shall thereupon be relieved and discharged from all further obligations hereunder. Any such discharge of any Plaintiff hereunder shall not impair the aggregate rights of defendant San Bernardino Valley or the responsibility hereunder of the remaining Plaintiffs or any of the successors.

(d) Non-use of any right to take water as provided herein shall not result in any loss of the right. San Bernardino Valley does not guarantee any of the rights set out herein for Western and the other Plaintiffs as against the claims of third parties not bound hereby. If Western or the other Plaintiffs herein should be prevented by acts of third parties within San Bernardino County from extracting the amounts of water allowed them by this Judgment, they shall have the right to apply to this Court for any appropriate relief, including vacation of this Judgment, in which latter case all parties shall be restored to their status prior to this Judgment insofar as possible.

(e) Any replenishment obligation imposed hereunder on San Bernardino Valley may be deferred until imported water first is available to San Bernardino Valley under its contract with the California Department of Water Resources and the

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obligation so accumulated may be discharged in five approximately equal annual installments thereafter.

(f) No agreement has been reached concerning the method by which the cost of providing replenishment will be financed, and no provision of this Judgment, nor its failure to contain any provision, shall be construed to reflect any agreement relating to the taxation or assessment of extractions.

XVI

EFFECTIVE DATE

The provisions of Paragraphs III and V to XII of this Judgment shall be in effect from and after January 1, 1971; the remaining provisions are in effect immediately.

XVII

COSTS

No party shall recover its costs herein as against any other party.

THE CLERK WILL ENTER THIS JUDGMENT FORTHWITH.

DATED: April 17, 1969

ENTERED

APR 17 1969

JUDGMENT BOOK 124 PG 42

JUDGE OF THE SUPERIOR COURT

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Orange County Judgment

JUDGMENT

Base Yrs - 26 yr
34/35 → 59/60

APR 1 7 1969
W. E. ST JOHN, County Clerk
CB

ENTERED IN
JUDGMENT BOOK
No. 362 Page 303
Date APR 1 7 1969

SUPERIOR COURT FOR THE STATE OF CALIFORNIA

FOR THE COUNTY OF ORANGE

ORANGE COUNTY WATER DISTRICT,
Plaintiff,
v.
CITY OF CHINO, et al.,
Defendants.

CITY OF CHINO, et al.,
Cross-Complainants,
v.
CITY OF ANAHEIM, et al.,
Cross-Defendants.

CORONA FOOTHILL LEMON COMPANY, et al.,
Cross-Complainants,
v.
CITY OF ANAHEIM, et al.,
Cross-Defendants.

CITY OF POMONA, a municipal corporation,
Cross-Complainant,
v.
CITY OF ANAHEIM, et al.,
Cross-Defendants.

No. 117628

JUDGMENT

CITY OF RIVERSIDE, et al.,

Cross-Complainants,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

BEAR VALLEY MUTUAL WATER COMPANY, et al.,

Cross-Complainants,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT, a municipal water district,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

EAST SAN BERNARDINO COUNTY WATER DISTRICT, a county water district,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

CITY OF SAN BERNARDINO, a municipal corporation,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

CITY OF REDLANDS, a municipal corporation,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

CITY OF COLTON, a municipal corporation,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

SAN BERNARDINO VALLEY WATER CONSERVATION DISTRICT, a water conservation district,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

CITY OF RIALTO, a municipal corporation,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

BIG BEAR MUNICIPAL WATER DISTRICT, a municipal water district,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

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RECITALS

a. Complaint. The complaint herein was filed on October 18, 1963, seeking an adjudication of water rights against substantially all water users in the area tributary to Prado Dam in the Santa Ana River Watershed.

b. Cross-Complaints. Thirteen cross-complaints were subsequently filed in the period of February 22 to March 22, 1968, by which said adjudication of rights was extended to substantially all water users within the Santa Ana River Watershed downstream from Prado Dam.

c. Physical and Legal Complexities. The physical and legal complexities of the case as framed by the complaint and cross-complaints are unprecedented. In excess of 4,000 individual parties have been served and the water supply and water rights of an entire stream system extending over 2,000 square miles and into four counties have been brought into issue. Every type and nature of water rights known to California law, excepting only Pueblo rights, is in issue in the case. Engineering studies by the parties jointly and severally leading toward adjudication of these rights or, in the alternative, to a physical solution, have required the expenditure of over four years' time and many hundreds of thousands of dollars.

d. Need for Physical Solution. It is apparent to the parties and to the Court that development of a physical solution based upon a formula for inter-basin allocation of obligations and rights is in the best interests of all the parties and is in furtherance of the water policy of the State. For purposes of such a physical solution, it is neither necessary nor helpful to define individual rights of all claimants within the watershed. Nontributary supplemental sources of water are or will be available to the parties in quantities sufficient to assure implementation of a solution involving inter-basin allocation of the natural water

supply of the Santa Ana River system. Sufficient information and data of a general nature are known to formulate a reasonable and just allocation as between the major hydrologic sub-areas within the watershed, and such a physical solution will allow the public agencies and water users within each such major hydrologic sub-area to proceed with orderly water resource planning and development.

e. Parties. Orange County Water District, Chino Basin Municipal Water District, Western Municipal Water District of Riverside County and San Bernardino Valley Municipal Water District are public districts overlying, in the aggregate, substantially all of the major areas of water use within the watershed. Said districts have the statutory power and financial resources to implement a physical solution. Accordingly, dismissals have been entered as to all defendants and cross-defendants other than said four public districts.

f. Cooperation by Dismissed Parties. As a condition of dismissal of said defendants and cross-defendants, certain of said parties have stipulated to cooperate and support the inter-basin water quality and water management objectives of the physical solution and this Judgment.

DECREE

NOW, THEREFORE, IT IS HEREBY ORDERED, ADJUDGED AND DECREED:

1. Jurisdiction. The Court has jurisdiction of the subject matter of this action and of the parties herein.

2. Exhibits. The following exhibits are attached to this Judgment and made a part hereof.

(a) Exhibit A -- map entitled "Santa Ana River Watershed", showing boundaries and other relevant features of the area subject to this Judgment.

(b) Exhibit B -- Engineering Appendix.

3. Definitions. As used in this Judgment, the following

terms shall have the meanings herein set forth:

(a) OCWD -- Orange County Water District, appearing and acting individually and in a representative capacity for and on behalf of all riparian, overlying and other landowners, water users and inhabitants within said District pursuant to Subdivision 7 of Section 2 of the Orange County Water District Act, as amended.

(b) CBMWD -- Chino Basin Municipal Water District, appearing and acting pursuant to Section 71751 of the California Water Code.

(c) WMWD -- Western Municipal Water District of Riverside County, appearing and acting pursuant to said Section 71751.

(d) SBVMWD -- San Bernardino Valley Municipal Water District, appearing and acting pursuant to said Section 71751.

Eastern not included

(e) Upper Districts -- CBMWD, WMWD and SBVMWD.

(f) Upper Area -- The area on Exhibit A which lies upstream from Prado.

(g) Lower Area -- The area on Exhibit A which lies downstream from Prado.

(h) Prado -- Said term shall be synonomous with Prado Dam, a facility constructed and maintained by the United States Corps of Engineers, as shown on Exhibit A.

(i) Riverside Narrows -- That bedrock narrows in the Santa Ana River indicated as such on Exhibit A.

(j) Storm Flow -- That portion of the total surface flow passing a point of measurement, which originates from precipitation and runoff without having first percolated to ground water storage in the zone of saturation, calculated in accordance with procedures

referred to in Exhibit B.

(k) Base Flow -- That portion of the total surface flow passing a point of measurement, which remains after deduction of Storm Flow, and modified as follows:

(1) At Prado. Base Flow shall:

(i) include any water caused to be delivered by CBMWD or WMWD directly to OCWD, pursuant to its direction and control and not measured at the gages at Prado;

(ii) exclude any nontributary water or reclaimed sewage water purchased by OCWD and delivered into the river upstream and which subsequently passes Prado, and

(iii) exclude water salvaged from evapo-transpiration losses by OCWD on lands presently owned by it above Prado.

(2) At Riverside Narrows. Base Flow shall:

(i) include any water caused to be delivered by SBVMWD directly to CBMWD or WMWD pursuant to their direction and control, or directly to OCWD with the consent of CBMWD and WMWD and pursuant to the direction and control of OCWD, and not measured at the gage at Riverside Narrows;

(ii) exclude any nontributary water purchased by CBMWD, WMWD or OCWD and delivered into the river upstream and which subsequently passes Riverside Narrows; and

(iii) exclude any effluent discharged from the City of Riverside sewage treatment plant.

(l) TDS -- Total dissolved solids determined as set forth in Exhibit B.

(m) Water Year -- The period from October 1 to the following September 30. Where reference is made herein to "year" or "annual", such terms shall be construed as referring to Water Year, unless the context indicates otherwise.

(n) Adjusted Base Flow -- Actual Base Flow in each year adjusted for quality as provided hereinbelow. Compliance with the respective obligations under Paragraph 5 shall be measured by the Adjusted Base Flow.

4. Declaration of Rights. Substantially all of the parties to this action, whether situate in Upper Area or Lower Area have or claim rights to the use of a portion of the water supply of the Santa Ana River system. In the aggregate, water users and other entities in Lower Area have rights, as against all Upper Area claimants, to receive an average annual supply of 42,000 acre feet of Base Flow at Prado, together with the right to all Storm Flow reaching Prado Reservoir. Water users and other entities in Upper Area have rights in the aggregate, as against all Lower Area claimants, to divert, pump, extract, conserve, store and use all surface and ground water supplies originating within Upper Area without interference or restraint by Lower Area claimants, so long as Lower Area receives the water to which it is entitled under this Judgment and there is compliance with all of its provisions.

5. Physical Solution. The Court hereby declares the following physical solution to be a fair and equitable basis for satisfaction of all said rights in the aggregate between Lower Area and Upper Area. The parties are hereby ordered and directed to comply with this Physical Solution and such compliance shall constitute full and complete satisfaction of the rights declared in

Paragraph 4 hereof.

(a) General Format. In general outline, SBVMWD shall be responsible for the delivery of an average annual amount of Base Flow at Riverside Narrows. CBMWD and WMWD shall jointly be responsible for an average annual amount of Base Flow at Prado. Insofar as Lower Area claimants are concerned, Upper Area water users and other entities may engage in unlimited water conservation activities, including spreading, impounding and other methods, in the area above Prado Reservoir, so long as Lower Area receives the water to which it is entitled under the Judgment and there is compliance with all of its provisions. Lower Area water users and other entities may make full conservation use of Prado Dam and reservoir, subject only to flood control use.

(b) Obligation of SBVMWD. SBVMWD shall be responsible for an average annual Adjusted Base Flow of 15,250 acre feet at Riverside Narrows. A continuing account, as described in Exhibit B, shall be maintained of actual Base Flow at Riverside Narrows, with all adjustments thereof and any cumulative debit or credit. Each year the obligation to provide Base Flow shall be subject to the following:

(1) Minimum Annual Quantities. Without regard to any cumulative credits, or any adjustment for quality for the current Water Year under subparagraph (2) hereof, SBVMWD each year shall be responsible at Riverside Narrows for not less than 13,420 acre feet of Base Flow plus one-third of any cumulative debit; provided, however, that for any year

commencing on or after October 1, 1986, when there is no cumulative debit, or for any year prior to 1986 whenever the cumulative credit exceeds 10,000 acre feet, said minimum shall be 12,420 acre feet.

(2) Adjustment for Quality. The amount of Base Flow at Riverside Narrows received during any year shall be subject to adjustment based upon the weighted average annual TDS in such Base Flow, as follows:

If the Weighted Average TDS in Base Flow at Riverside Narrows is:	Then the Adjusted Base Flow shall be determined by the formula:
Greater than 700 ppm	$Q - \frac{11}{15,250} Q\ (TDS-700)$
600 ppm - 700 ppm	Q
Less than 600 ppm	$Q + \frac{11}{15,250} Q\ (600-TDS)$

Where: Q = Base Flow actually received.

(3) Periodic Reduction of Cumulative Debit. At least once in any ten (10) consecutive years subsequent to October 1, 1976, SBVMWD shall provide sufficient quantities of Base Flow at Riverside Narrows to discharge completely any cumulative debits. Any cumulative credits shall remain on the books of account until used to offset any subsequent debits, or until otherwise disposed of by SBVMWD.

(c) Obligation of CBMWD and WMWD. CBMWD and WMWD shall be responsible for an average annual Adjusted Base Flow of 42,000 acre feet at Prado. A continuing account, as described in Exhibit B, shall

(l) TDS -- Total dissolved solids determined as set forth in Exhibit B.

(m) Water Year -- The period from October 1 to the following September 30. Where reference is made herein to "year" or "annual", such terms shall be construed as referring to Water Year, unless the context indicates otherwise.

(n) Adjusted Base Flow -- Actual Base Flow in each year adjusted for quality as provided hereinbelow. Compliance with the respective obligations under Paragraph 5 shall be measured by the Adjusted Base Flow.

4. Declaration of Rights. Substantially all of the parties to this action, whether situate in Upper Area or Lower Area have or claim rights to the use of a portion of the water supply of the Santa Ana River system. In the aggregate, water users and other entities in Lower Area have rights, as against all Upper Area claimants, to receive an average annual supply of 42,000 acre feet of Base Flow at Prado, together with the right to all Storm Flow reaching Prado Reservoir. Water users and other entities in Upper Area have rights in the aggregate, as against all Lower Area claimants, to divert, pump, extract, conserve, store and use all surface and ground water supplies originating within Upper Area without interference or restraint by Lower Area claimants, so long as Lower Area receives the water to which it is entitled under this Judgment and there is compliance with all of its provisions.

5. Physical Solution. The Court hereby declares the following physical solution to be a fair and equitable basis for satisfaction of all said rights in the aggregate between Lower Area and Upper Area. The parties are hereby ordered and directed to comply with this Physical Solution and such compliance shall constitute full and complete satisfaction of the rights declared in

Paragraph 4 hereof.

(a) General Format. In general outline, SBVMWD shall be responsible for the delivery of an average annual amount of Base Flow at Riverside Narrows. CBMWD and WMWD shall jointly be responsible for an average annual amount of Base Flow at Prado. Insofar as Lower Area claimants are concerned, Upper Area water users and other entities may engage in unlimited water conservation activities, including spreading, impounding and other methods, in the area above Prado Reservoir, so long as Lower Area receives the water to which it is entitled under the Judgment and there is compliance with all of its provisions. Lower Area water users and other entities may make full conservation use of Prado Dam and reservoir, subject only to flood control use.

(b) Obligation of SBVMWD. SBVMWD shall be responsible for an average annual Adjusted Base Flow of 15,250 acre feet at Riverside Narrows. A continuing account, as described in Exhibit B, shall be maintained of actual Base Flow at Riverside Narrows, with all adjustments thereof and any cumulative debit or credit. Each year the obligation to provide Base Flow shall be subject to the following:

(1) Minimum Annual Quantities. Without regard to any cumulative credits, or any adjustment for quality for the current Water Year under subparagraph (2) hereof, SBVMWD each year shall be responsible at Riverside Narrows for not less than 13,420 acre feet of Base Flow plus one-third of any cumulative debit; provided, however, that for any year

commencing on or after October 1, 1986, when there is no cumulative debit, or for any year prior to 1986 whenever the cumulative credit exceeds 10,000 acre feet, said minimum shall be 12,420 acre feet.

(2) Adjustment for Quality. The amount of Base Flow at Riverside Narrows received during any year shall be subject to adjustment based upon the weighted average annual TDS in such Base Flow, as follows:

If the Weighted Average TDS in Base Flow at Riverside Narrows is:	Then the Adjusted Base Flow shall be determined by the formula:
Greater than 700 ppm	$Q - \frac{11}{15,250} Q (TDS-700)$
600 ppm - 700 ppm	Q
Less than 600 ppm	$Q + \frac{11}{15,250} Q (600-TDS)$

Where: Q = Base Flow actually received.

(3) Periodic Reduction of Cumulative Debit. At least once in any ten (10) consecutive years subsequent to October 1, 1976, SBVMWD shall provide sufficient quantities of Base Flow at Riverside Narrows to discharge completely any cumulative debits. Any cumulative credits shall remain on the books of account until used to offset any subsequent debits, or until otherwise disposed of by SBVMWD.

(c) Obligation of CBMWD and WMWD. CBMWD and WMWD shall be responsible for an average annual Adjusted Base Flow of 42,000 acre feet at Prado. A continuing account, as described in Exhibit B, shall

be maintained of actual Base Flow at Prado, with all adjustments thereof and any cumulative debit or credit. Each year the obligation to provide Base Flow shall be subject to the following:

(1) Minimum Annual Quantities. Without regard to any cumulative credits, or any adjustments for quality for the current Water Year under subparagraph (2) hereof, CBMWD and WMWD each year shall be responsible for not less than 37,000 acre feet of Base Flow at Prado, plus one-third of any cumulative debit; provided, however, that for any year commencing on or after October 1, 1986, when there is no cumulative debit, or for any year prior to 1986 whenever the cumulative credit exceeds 30,000 acre feet, said minimum shall be 34,000 acre feet.

(2) Adjustment for Quality. The amount of Base Flow at Prado received during any year shall be subject to adjustment based upon the weighted average annual TDS in Base Flow and Storm Flow at Prado as follows:

If the Weighted Average TDS in Base Flow and Storm Flow at Prado is:	Then the Adjusted Base Flow shall be determined by the formula:
Greater than 800 ppm	$Q - \frac{35}{42,000} Q (TDS-800)$
700 ppm - 800 ppm	Q
Less than 700 ppm	$Q + \frac{35}{42,000} Q (700-TDS)$

Where: Q = Base Flow actually received.

(3) Periodic Reduction of Cumulative Debit. At least once in ten (10) consecutive years subsequent to October 1, 1976, CBMWD and WMWD shall

provide sufficient quantities of Base Flow at Prado to discharge completely any cumulative debits. Any cumulative credits shall remain on the books of account until used to offset any subsequent debits, or until otherwise disposed of by CBMWD and WMWD.

(d) Inter-basin Export. Upper Districts are hereby restrained and enjoined from exporting water from Lower Area to Upper Area, directly or indirectly. OCWD is enjoined and restrained from pumping, producing and exporting or directly or indirectly causing water to flow from Upper to Lower Area, except as to salvage of evapo-transpiration losses, as follows: OCWD owns certain lands within and above Prado Reservoir on which it has or claims certain rights to salvage evapo-transpiration losses by pumping or otherwise. Pumping for said salvage purposes shall not exceed 5,000 acre feet of ground water in any water year. Only the actual net salvage, as determined by the Watermaster, shall be excluded from Base Flow.

(e) Inter-basin Acquisition of Rights. The acquisition by Upper Districts or other Upper Area entities of Lower Area water rights shall in no way affect or reduce Lower Area's entitlement; and the acquisition of Upper Area water rights by OCWD or other Lower Area entities shall be deemed to be included within the aggregate entitlement of Lower Area and shall not increase said entitlement.

(f) Effective Date. Obligations under this physical solution shall accrue from and after October 1, 1970.

6. Prior Adjudications. So long as SBVMWD is in

commencing on or after October 1, 1986, when there is no cumulative debit, or for any year prior to 1986 whenever the cumulative credit exceeds 10,000 acre feet, said minimum shall be 12,420 acre feet.

(2) Adjustment for Quality. The amount of Base Flow at Riverside Narrows received during any year shall be subject to adjustment based upon the weighted average annual TDS in such Base Flow, as follows:

If the Weighted Average TDS in Base Flow at Riverside Narrows is:	Then the Adjusted Base Flow shall be determined by the formula:
Greater than 700 ppm	$Q - \frac{11}{15,250} Q\ (TDS-700)$
600 ppm - 700 ppm	Q
Less than 600 ppm	$Q + \frac{11}{15,250} Q\ (600-TDS)$

Where: Q = Base Flow actually received.

(3) Periodic Reduction of Cumulative Debit. At least once in any ten (10) consecutive years subsequent to October 1, 1976, SBVMWD shall provide sufficient quantities of Base Flow at Riverside Narrows to discharge completely any cumulative debits. Any cumulative credits shall remain on the books of account until used to offset any subsequent debits, or until otherwise disposed of by SBVMWD.

(c) Obligation of CBMWD and WMWD. CBMWD and WMWD shall be responsible for an average annual Adjusted Base Flow of 42,000 acre feet at Prado. A continuing account, as described in Exhibit B, shall

be maintained of actual Base Flow at Prado, with all adjustments thereof and any cumulative debit or credit. Each year the obligation to provide Base Flow shall be subject to the following:

(1) Minimum Annual Quantities. Without regard to any cumulative credits, or any adjustments for quality for the current Water Year under subparagraph (2) hereof, CBMWD and WMWD each year shall be responsible for not less than 37,000 acre feet of Base Flow at Prado, plus one-third of any cumulative debit; provided, however, that for any year commencing on or after October 1, 1986, when there is no cumulative debit, or for any year prior to 1986 whenever the cumulative credit exceeds 30,000 acre feet, said minimum shall be 34,000 acre feet.

(2) Adjustment for Quality. The amount of Base Flow at Prado received during any year shall be subject to adjustment based upon the weighted average annual TDS in Base Flow and Storm Flow at Prado as follows:

If the Weighted Average TDS in Base Flow and Storm Flow at Prado is:	Then the Adjusted Base Flow shall be determined by the formula:
Greater than 800 ppm	$Q - \frac{35}{42,000} Q (TDS-800)$
700 ppm - 800 ppm	Q
Less than 700 ppm	$Q + \frac{35}{42,000} Q (700-TDS)$

Where: Q = Base Flow actually received.

(3) Periodic Reduction of Cumulative Debit. At least once in ten (10) consecutive years subsequent to October 1, 1976, CBMWD and WMWD shall

provide sufficient quantities of Base Flow at Prado to discharge completely any cumulative debits. Any cumulative credits shall remain on the books of account until used to offset any subsequent debits, or until otherwise disposed of by CBMWD and WMWD.

(d) Inter-basin Export. Upper Districts are hereby restrained and enjoined from exporting water from Lower Area to Upper Area, directly or indirectly. OCWD is enjoined and restrained from pumping, producing and exporting or directly or indirectly causing water to flow from Upper to Lower Area, except as to salvage of evapo-transpiration losses, as follows: OCWD owns certain lands within and above Prado Reservoir on which it has or claims certain rights to salvage evapo-transpiration losses by pumping or otherwise. Pumping for said salvage purposes shall not exceed 5,000 acre feet of ground water in any water year. Only the actual net salvage, as determined by the Watermaster, shall be excluded from Base Flow.

(e) Inter-basin Acquisition of Rights. The acquisition by Upper Districts or other Upper Area entities of Lower Area water rights shall in no way affect or reduce Lower Area's entitlement; and the acquisition of Upper Area water rights by OCWD or other Lower Area entities shall be deemed to be included within the aggregate entitlement of Lower Area and shall not increase said entitlement.

(f) Effective Date. Obligations under this physical solution shall accrue from and after October 1, 1970.

6. Prior Adjudications. So long as SBVMWD is in

compliance with the terms of the physical solution herein, OCWD is enjoined and restrained from enforcing the judgments listed below against SBVMWD or any entities within or partially within SBVMWD which have stipulated to accept and adopt such physical solution. So long as WMWD and CBMWD are in compliance with the terms of the physical solution, OCWD is enjoined and restrained from enforcing the judgments listed below against WMWD and CBMWD or any entities within or partially within WMWD or CBMWD which have stipulated to accept and adopt such physical solution.

(a) The Irvine Company, plaintiff, Orange County Water District, intervenor, vs. San Bernardino Valley Water Conservation District, et al., defendants, U. S. Dist. Ct., S.D. Cal. Civ. No. Y-36-M, judgments entered September 11, 1942 (Judgment Book 11 page 134), and recorded Book 1540 page 251 and Book 1541 page 85, Official Records of San Bernardino County.

(b) Orange County Water District vs. City of Riverside, et al., San Bernardino Superior Court No. 84671.

7. Watermaster. The Watermaster, when appointed by the Court, shall administer and enforce the provisions of this Judgment and the instructions and subsequent orders of this Court.

(a) Composition, Nomination and Appointment. The Watermaster shall consist of a committee composed of five (5) persons. CBMWD, WMWD and SBVMWD shall each have the right to nominate one representative and OCWD shall have the right to nominate two (2) representatives to the Watermaster committee. Each such nomination shall be made in writing, served upon the other parties to the Stipulation for this Judgment and filed with the Court. Said Watermaster representatives shall be appointed by and serve at

the pleasure of and until further order of this Court.

(b) Watermaster Determinations. Each and every finding and determination of the Watermaster shall be made in writing certified to be by unanimous action of all members of the Watermaster Committee. In the event of failure or inability of said Watermaster Committee to reach unanimous agreement, the fact, issue, or determination in question shall forthwith be certified to this Court by the Watermaster, and after due notice to the parties and opportunity for hearing, said matter shall be determined by order of this Court.

(c) Annual Report. The Watermaster shall report to the Court and to each party in writing not more than five (5) months after the end of each Water Year, each of the items required by Paragraph 4 of the Engineering Appendix, Exhibit B hereto, and such other items as the parties may mutually request or the Watermaster may deem to be appropriate. All of the books and records of the Watermaster which are used in the preparation of, or are relevant to, such reported data, determinations and reports shall be open to inspection by the parties to the Stipulation for Judgment herein.

(d) Watermaster Service Expenses. The fees, compensation and expenses of each representative on the Watermaster shall be borne by the district which nominated such person. All other Watermaster service costs and expenses shall be borne by the parties in the following proportions:

OCWD	-	40%
CBMWD	-	20%

SBVMWD - 20%

WMWD - 20%

The Watermaster may from time to time in its discretion require advances of operating capital from the parties in said proportions.

8. Continuing Jurisdiction of the Court. Full jurisdiction, power and authority are retained and reserved by the Court for the purpose of enabling the Court, upon application of any party or of the Watermaster by motion and upon at least 30 days' notice thereof, and after hearing thereon:

(a) To make such further or supplemental orders or directions as may be necessary or appropriate for the construction, enforcement or carrying out of this Judgment, and

(b) To modify, amend or amplify any of the provisions of this Judgment whenever substantial changes or developments affecting the physical, hydrological or other conditions dealt with herein may, in the Court's opinion, justify or require such modification, amendment or amplification; provided, however, that no such modification, amendment or amplification shall change or alter (1) the average annual obligation of CBMWD and WMWD for delivery of 42,000 acre feet of Base Flow per year at Prado, (2) the average annual obligation of SBVMWD for delivery of 15,250 acre feet of Base Flow per year at Riverside Narrows, (3) the respective minimum Base Flows at Riverside Narrows and Prado, nor (4) the right of the parties to this Judgment or of those who stipulate to accept and adopt the physical solution herein to conserve or store flows.

9. Notices. All notices, requests, objections, reports and other papers permitted or required by the terms of this

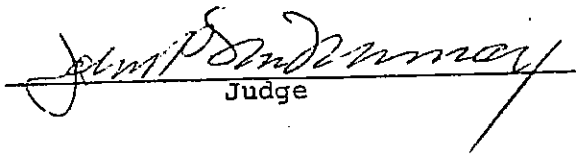
Judgment shall be given or made by written document and shall be served by mail on each party and its attorney entitled to notice and where required or appropriate, on the Watermaster. For all purposes of this paragraph, the mailing address of each party and attorney entitled to notice shall be that set forth below its signature in the Stipulation for Judgment, until changed as provided below. If any party or attorney for a party desires to change its designation of mailing address, it shall file a written notice of such change with the Clerk of this Court and shall serve a copy thereof by mail on the Watermaster. Upon receipt of any such notice, the Watermaster shall promptly give written notice thereof. Watermaster addresses for notice purposes shall be as specified in the orders appointing each representative on the Watermaster.

10. Successors. No party shall dissolve, nor shall it abandon or transfer all or substantially all of its powers or property, without first providing for its obligations under this Judgment to be assumed by a successor public agency, with the powers and resources to perform hereunder. Any such successor shall be approved by the Court after notice to all parties and an opportunity for hearing.

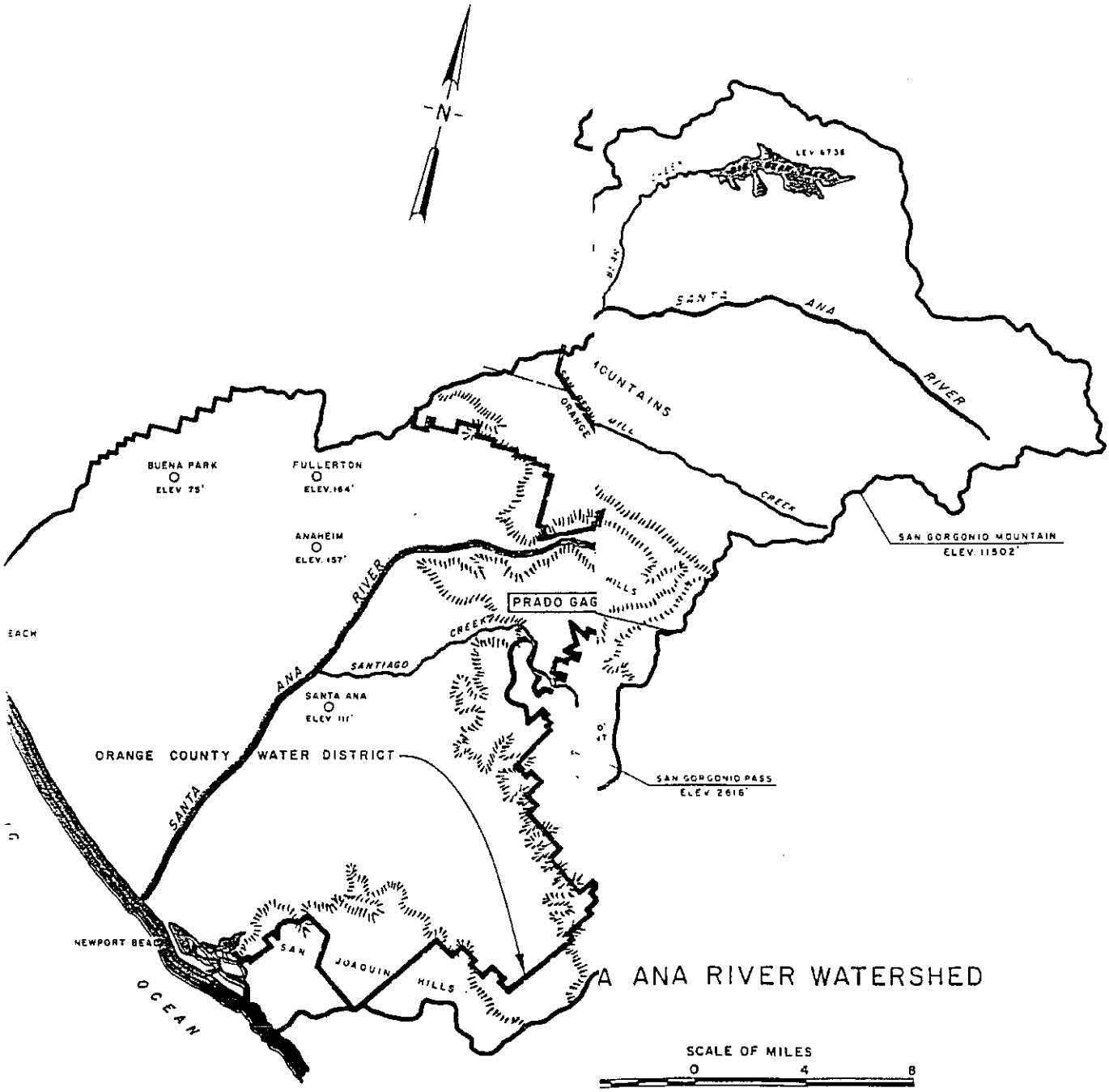
11. Future Actions. In the event that any Lower Area claimant shall in the future obtain from any court of competent jurisdiction a decree awarding to such claimant a right to receive a stated amount of water from the Upper Area for use in the Lower Area, any water delivered pursuant to such decree shall be considered as part of Base Flow. In the event that the relief obtained by any such claimant is in the form of a restriction imposed upon production and the use of water in Upper Area, rather than a right to receive a stated amount of water, then notwithstanding the proviso in Paragraph 8, any Upper District may apply to the Court to modify the physical solution herein.

12. Costs. None of the parties shall recover any costs from any other party.

Dated: April 17, 1969



Judge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SANTA ANA RIVER
MOUNTAINS
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BUENA PARK
ELEV 75'
FULLERTON
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ANAHEIM
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SANTA ANA
ELEV 111'
SAN GORGONIO MOUNTAIN
ELEV. 11502'
PRADO DAM
HILLS
CREEK
SANTIAGO
SANTA ANA RIVER
ORANGE COUNTY WATER DISTRICT
SAN GORGONIO PASS
ELEV 2616'
NEWPORT BEACH
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A ANA RIVER WATERSHED
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EXHIBIT A

ENGINEERING APPENDIX

The purpose of the Engineering Appendix is to establish the basis for measurements, calculations and determinations required in the operation of the physical solution.

1. Measurements.

In administering the physical solution, it will be necessary to determine the quantity and quality of stream flow and flow in pipelines or other conveyance facilities at several points along the Santa Ana River. Watermaster shall make, or obtain from United States Geological Survey (USGS), flood control districts or other entities, all measurements necessary for making the determinations required by the Judgment.

a. Change in Measuring Device or Location. If any measuring device used or useful in making such determinations is inoperative, abandoned, changed or moved, Watermaster shall estimate the quantity that would have been measured at the station had it been operative at its original location, or may use a substitute device or location.

b. Erroneous Measurement. If Watermaster determines there is an error in any measurement or record, he may utilize his estimate in lieu of said measurement or record.

c. Preliminary Records. Watermaster may utilize preliminary records of measurement. If revisions are subsequently made in the records, Watermaster may reflect such changes in subsequent accounting.

2. Determination of Flow Components.

Since the records available only provide data on the total quantity of surface flow and since storm runoff occurs during and following periods of rainfall, Watermaster must determine what portion of total measured surface flow at Prado and at Riverside

Narrows is Storm Flow and what portion is Base Flow.

Under paragraph 3(k) of the Judgment, certain categories of water are to be included or excluded from Base Flow. As such waters may or may not be measured by the USGS gages at Prado and/or Riverside Narrows, Watermaster must make appropriate adjustments to account for the same.

The parties, in reaching the physical solution provided for in the Judgment, used certain procedures to separate or scalp the Storm Flow from the total measured surface flow and to determine Base Flow. These procedures are reflected in the Work Papers of the engineers, bound copies of which shall be filed with the Watermaster. Watermaster shall use either the same procedures or procedures which will give equivalent results, giving due consideration to all sources of the surface flow measured at the gages, to changes in the amounts and the proportionate contributions of each source, and to changes in location of measuring points.

3. Water Quality Determinations.

It will be necessary to determine for each water year the weighted average Total Dissolved Solids (TDS) content of the Base Flow at Riverside Narrows and of the total flow at Prado.

TDS shall be determined by the method set forth under "B. Filterable Residual", starting on page 245 of Standard Methods for Examination of Water and Wastewater, Twelfth Edition, 1965, Library of Congress Catalog Card No. 55-1979. The drying temperature shall be 180° centigrade. Milligrams per liter (mg/l) shall be deemed equivalent to parts per million (ppm) for purposes of the Judgment.

a. Procedure at Prado.

(1) Determinations of the electrical conductivity at 25°C. near the gaging station at Prado shall be made or obtained.

(2) A sufficient number of determinations of TDS of the flow at the same point shall be

made or obtained to provide the relationship between TDS and electrical conductivity for all rates of flow. This relationship shall be used to determine the average daily TDS weighted by flow, for each day of the year. During periods of Storm Flow, samples shall be taken at least daily.

(3) The annual weighted average TDS of all waters passing Prado shall be determined. Any direct deliveries or flows which are included or excluded in the definition of Base Flow as set forth in paragraph 3(k) of the Judgment, shall be similarly included or excluded in the calculation of the annual weighted average TDS.

b. Procedure at Riverside Narrows. The procedure to adjust Base Flow at Riverside Narrows shall be the same as that outlined in paragraph a. above, except that the annual weighted average TDS of Base Flow only is to be determined. Therefore during periods of Storm Flow, the TDS of Base Flow shall be estimated.

4. Accounting.

Utilizing the appropriate obligations set forth in the Judgment and the measurements, calculations and determinations described in this Engineering Appendix, Watermaster shall maintain a continuing account for each year of the following items.

a. Prado Accounting.

(1) Base Flow at Prado. See Paragraph 2 of this Engineering Appendix and Paragraph 3(k) of the Judgment.

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(2) Annual Weighted TDS of Total Flow at Prado. See Paragraph 3a of this Engineering Appendix.

(3) Annual Adjusted Base Flow. See Paragraph 5(c)(2) of the Judgment and items (1) and (2) above.

(4) Cumulative Adjusted Base Flow. This is the cumulation of quantities shown in item (3) above.

(5) Cumulative Entitlement of OCWD at Prado. This is the product of 42,000 acre feet multiplied by the number of years after October 1, 1970.

(6) Cumulative Credit or Debit. This is item (4) minus item (5).

(7) One-third of Cumulative Debit. This is equal to one-third of any cumulative debit shown in item (6) above.

(8) Minimum Required Base Flow in Following Year. This is the minimum quantity of Base Flow at Prado which CBMWD and WMWD must jointly cause to occur in the following year determined in accordance with paragraph 5(c)(1) of the Judgment and utilizing item (7) above.

b. Riverside Narrows Accounting.

(1) Base Flow at Riverside Narrows. See Paragraph 2 of this Engineering Appendix and Paragraph 3(k) of the Judgment.

(2) Annual Weighted TDS of Base Flow at Riverside Narrows. See Paragraph 3b of this Engineering Appendix.

(3) Annual Adjusted Base Flow. See

Paragraph 5(b)(2) of the Judgment and items (1) and (2) above.

(4) Cumulative Adjusted Base Flow. This is the cumulation of quantities shown in item (3) above.

(5) Cumulative Entitlement of CBMWD and WMWD at Riverside Narrows. This is the product of 15,250 acre feet multiplied by the number of years after October 1, 1970.

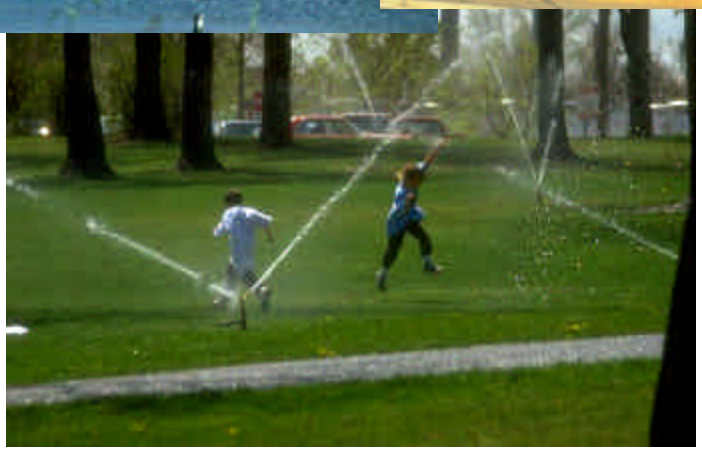
(6) Cumulative Credit or Debit. This is item (4) minus item (5).

(7) One-third of Cumulative Debit. This is equal to one-third of any cumulative debit shown in item (6) above.

(8) Minimum Required Base Flow in Following Year. This is the minimum quantity of Base Flow at Riverside Narrows which SBVMWD must cause to occur in the following year determined in accordance with Paragraph 5(b)(1) of the Judgment and utilizing item (7) above.

Chino Optimum Basin Management Plan

Optimum Basin Management Program



Draft Phase I Report

Prepared for

Chino Basin Watermaster

August 19, 1999

WE Wildermuth Environmental, Inc.

Optimum Basin Management Program

Phase I Report

Prepared for the

Chino Basin Watermaster

August 19, 1999

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SECTION 1
INTRODUCTION

An Optimum Basin Management Program (OBMP) for the Chino Basin (Figure 1-1) is being developed pursuant to a Judgment entered in the Superior Court of the State of California for the County of San Bernardino and a February 19, 1998 ruling as described below. Pursuant to the Judgment, the Chino Basin Watermaster (Watermaster) files an annual report of Watermaster activities with the Court each year. The information presented below regarding the Judgment, Watermaster, and the events leading up to the February 19, 1998 ruling was obtained from these annual reports.

THE CHINO BASIN JUDGMENT AND WATERMASTER

The Chino Basin Watermaster was established under a Judgment entered in the Superior Court of the State of California for the County of San Bernardino, entitled "Chino Basin Municipal Water District v. City of Chino *et al*," (originally Case No. SCV 164327, file transferred August 1989, by order of the Court and assigned new Case No. RCV 51010). The Honorable Judge Howard B. Wiener signed the Judgment on January 27, 1978. The effective date of this Judgment for accounting and operations was July 1, 1977.

The Judgment resulted from studies and discussions that began in the early 1970's and continued for several years. The initial action to formalize the producers' intentions was the passage in 1974 of a "Memorandum of Agreement on the Chino Basin Plan." In January 1975, Senator Ruben S. Ayala introduced Senate Bill 222 (S.B. 222) in the California Legislature. This bill authorized a production assessment levy of $2.00 per acre-foot per year for a period of three years. The funds were utilized to finance the essential studies and negotiations to implement a water management program for the Chino Groundwater Basin.

S.B. 222 was subsequently renumbered as a part of the Municipal Water District Law at Section 74120 of the Water Code. It was approved by Governor Ronald Reagan and filed with the Secretary of State on June 28, 1975. Three major groups that represented the majority of the producer's interests became active in the early negotiations under S.B. 222. The groups formalized into committees and eventually became known as the: Overlying (Agricultural) Pool, including the State of California and minimal producers; Overlying (Non-Agricultural) Pool representing industries; and Appropriative Pool, representing cities, water districts and water companies. Engineering, legal and other working sub-committees were formed to analyze and define specific problem areas. Representatives of the three pools, when acting together, were called the "Watermaster Advisory Committee." The Watermaster Advisory Committee forwarded recommendations for formal action to the Chino Basin Municipal Water District (CBMWD), which was assigned the responsibility of administering S.B. 222. Socio-economic, safe yield and other studies were conducted to provide the information necessary to reach an agreement regarding the allocation of rights between and within the pool committees.

The Watermaster Advisory Committee was established as the policy setting body and charged with oversight of Watermaster's discretionary activities. Members of each of the three pool committees met regularly to transact the business concerns of its respective producers. Decisions affecting more than one pool committee were forwarded to the Watermaster Advisory Committee. The Judgment provided a method to determine the voting power of the producers on the committees, through a formula based on assessments paid in the prior year and allocated safe yield.

The Judgment declares that the safe yield of the Chino Basin is 140,000 acre-ft/yr, which is allocated among the three pools as follows:

Overlying agricultural pool	82,800 acre-ft/yr
Overlying non-agricultural pool	7,366 acre-ft/yr
Appropriative pool	49,834 acre-ft/yr

A fundamental premise of the Judgment (aka the physical solution) is that all Chino Basin water users will be allowed to pump sufficient water from the Basin to meet their requirements. To the extent that pumping exceeds the share of the safe yield, assessments are levied by the Watermaster to replace the overproduction. The Judgment recognizes that there exists a substantial amount of available groundwater storage capacity in the Chino Basin that can be utilized for storage and conjunctive use of supplemental water and basin waters; makes utilization of this storage subject to Watermaster control and regulation; and provides that any person or public entity, whether or not a party to the Judgment, may make reasonable beneficial use of the available storage, provided that no such use shall be made except pursuant to a written storage agreement with the Watermaster.

EVENTS LEADING UP TO THE FEBRUARY 19, 1998 RULING

During fiscal year 1995-96, it was determined that the reappointment of the CBMWD board as Watermaster had not been submitted to the Court for approval in 1993. In January 1996, a motion was made and supported by a majority of the Advisory Committee to appoint the Advisory Committee to serve as Watermaster. Initially, this motion was supported by 71.64% of the Advisory Committee and as provided in Paragraph 16 of the Judgment, Watermaster Counsel was directed by the Advisory Committee to file the motion with the Court. A Watermaster Ad Hoc Transition Committee of pool members and interested parties was formed to work out the logistics involved with changing the Watermaster. Shortly after the motion was filed, the case was assigned to the Honorable Judge J. Michael Gunn. Fifteen committee members attended the first Ad Hoc Transition Committee meeting on January 31, 1996, and agreed unanimously to propose that an arbitrator or an arbitration process be put in place to address initial concerns raised by some parties to the Judgment regarding the Advisory Committee serving as Watermaster.

By early March, the Overlying (Agricultural) Pool and a few appropriators had reconsidered their positions and were opposed to the motion to appoint the Advisory Committee as Watermaster, even with an arbitration process. As a result, the motion was taken off calendar and additional Ad Hoc Transition Committee meetings were held. These meetings resulted in the development of a proposal for a nine-member board, which was approved by the Advisory Committee in April 1996. Watermaster Counsel was directed to file a motion to appoint the nine-member board, which was set for hearing on June 18, 1996.

On June 3, 1996, CBMWD filed an ex-parte motion to shorten the time on a motion to appoint itself as Interim Watermaster, to appoint itself "*nunc pro tunc*" Watermaster and to disqualify Watermaster Counsel based on the allegation that Counsel had a conflict of interest in serving both Watermaster and the Advisory Committee. The motion to shorten time was granted and the hearing was set for June 18, 1996. At the June 18, 1996 hearing, the Honorable Judge J. Michael Gunn granted the motions to appoint CBMWD nunc pro tunc and Interim Watermaster, and denied the motion to disqualify Watermaster Counsel. The Judge also ordered the parties to meet and confer regarding the nine-member board

proposal, which continued the matter to a *meet and confer* among all the interested parties, held July 29, 1996.

July 29, 1996, was the first of two *meet and confers*, held at the City of Chino Council Chambers. Although there was much discussion on that date, the only substantive decision made was to hold an additional *meet and confer* on August 28, 1996.

As a result of the second *meet and confer*, a three-member Watermaster Board proposal was submitted to the Court for hearing on September 18, 1996. As of the Court hearing date, only two of the three municipal water districts invited to participate on the proposed three-member Watermaster Board had responded affirmatively. CBMWD was expected to agree to participate after consideration at their October board meeting and the Court continued the motion until November 20, 1996. CBMWD did not take action to participate on the three-member Watermaster Board as anticipated and the motion was taken off calendar in November of 1996. Four additional workshops were held during late 1996 and into the early months of 1997. As a result, the original nine-member Watermaster Board proposal was modified and approved by the Watermaster Advisory Committee on January 30, 1997, by a majority vote of 67.99 percent.

On March 11, 1997, a new motion to appoint a nine-member Watermaster Board was heard by the Honorable Judge J. Michael Gunn. On April 29, 1997, Judge Gunn issued a ruling which:

- Appointed Anne J. Schneider, Esq. as Special Referee to make a recommendation to the Court regarding the issues raised by the motions.
- Ordered CBMWD, the Advisory Committee, and the DWR (Department of Water Resources) to negotiate terms for the DWR to serve as Interim Watermaster.
- Granted a motion submitted on March 6, 1997, by the law firm of Cihigoyenetche, Grossberg & Clouse, general counsel for CBMWD, to disqualify Watermaster Counsel.

Negotiations began regarding the DWR serving as interim Watermaster through Special Counsel to the Watermaster Advisory Committee, James L. Markman, CBMWD Counsel, Jean Cihigoyenetche, and the attorneys for the DWR.

Anne Schneider accepted the Court's appointment to become a Special Referee and began the process necessary to make a recommendation to the Court. No substantial decisions were reached by fiscal year end and the matter continued into fiscal year 1997-98.

The Special Referee held a special hearing on October 21, 1997, at the Watermaster offices. By mid December 1997, the Special Referee filed her written *Report and Recommendation* with the Court. Based on the *Report and Recommendation*, the Honorable J. Michael Gunn entered a ruling on February 19, 1998 which:

- Appointed the Nine-Member Board as Interim Watermaster.
- Directed that an Optimum Basin Management Program be developed.
- Directed negotiation with DWR be resumed.
- Set hearing dates regarding:
  - The Optimum Basin Management Program (October 28, 1999).
  - Continuance of the Nine-Member Board (October 28, 1999).

- Status of negotiations with DWR to serve as Watermaster and to carry out Watermaster operations (September 30, 1999).

This report documents the development of the OBMP for the Chino Basin pursuant to the Honorable J. Michael Gunn's February 19,1998 ruling.

PROCESS TO DEVELOP THE OBMP

Since the ruling, the Watermaster, the producers, and other interested parties have met twice a month and held special workshops to develop the scope of work to prepare an OBMP and to cooperatively develop the OBMP. The Court officially accepted the scope of work to develop the OBMP on November 5, 1998.

Development of the OBMP required three parallel processes: institutional, engineering, and financial. The institutional process defined the management agenda, directed the engineering and financial processes, and built an institutional support for OBMP implementation. The engineering process developed planning data and management elements, and evaluated the technical and economic performance of the management elements. The financial process was supposed to develop alternative financing plans for the OBMP through its evolution. However because of institutional complexity involved in developing regional water supply facilities and their related financing, most of the financial process will occur in the latter half of 1999 and into the year 2000 – after this document is submitted to the Court in October 1999.

Institutional Process

The institutional process consisted of the following tasks:

Task 1 Identify needs and interests of interested parties.

Task 2 Establish a meeting schedule necessary to complete the OBMP within the time frame allocated.

Task 3 Develop and refine the scope of work based on identified needs.

Task 4 Identify early implementation actions and develop a list of potential program (management) elements of the OBMP to balance needs and interests.

Task 5 Evaluate program elements and develop recommended management and implementation plan.

The first three tasks were completed with the submission of the recommended scope of work to the Special Referee and the Court. Task 4 work was begun in June 1998 with several early implementation action items having already been approved and with initial management concepts submitted to begin the list of potential program elements of the OBMP. The management concepts that were submitted represented concepts or implementation plans that described the party's vision of the OBMP. Submission of management concepts continued into July and August of 1998 and reflected the needs and interests that were previously identified for the OBMP. All proposals submitted were discussed and listed.

As part of Task 5, those proposals that appeared the most promising were forwarded to the engineering and financial consultants for reconnaissance-level, technical, economic and financial analyses. The results of the engineering and financial analyses were submitted to the producers and Watermaster for

review. Working together, the producers and the Watermaster Board have developed an Optimum Basin Management Program for the Chino Basin.

Engineering Process

The engineering process consisted of the following tasks:

Task 1 Develop Optimum Basin Management Program Criteria

Task 2 Assess Current State of the Basin

Task 3 Prepare Sections 1, 2, and 3 of the Optimum Basin Management Program document

Task 4 Develop the Components of the Optimum Basin Management Program

Task 5 Develop Implementation Plan

Task 6 Finalize Optimum Basin Management Program document

Tasks 1 and 2 define the basin problems, planning environment, and the needs and interests of the basin producers. Tasks 1, 2, and 3 were completed in December 1998 and draft Sections 1, 2, and 3 of the OBMP were provided to all interested parties for review. A matrix was developed that contains the goals, impediments to the goal, action items to achieve the goals and the implications of the action items. This matrix was used to define the program elements of the OBMP. Tasks 4 and 5 were engineering efforts to develop these elements and to describe the implementation process.

Over time, the institutional process Tasks 4 and 5, and engineering process Tasks 4 and 5 merged and became one seamless process. Completion of engineering process Task 6 will be completed when the financial process is completed sometime in the year 2000.

ORGANIZATION OF THE OPTIMUM BASIN MANAGEMENT PROGRAM REPORT

The OBMP report is being presented in two phases. This document is the Phase I report and contains a description of the OBMP and the following additional sections:

Section 2 – Current Physical State of the Basin – This section describes the state of the Basin in terms of historical groundwater levels, storage, production, water quality, and safe yield. Current and projected water demands and water supply plans are described. Problems in these areas are identified and potential solutions or solution processes are described.

Section 3 – Goals of the Optimum Basin Management Program – This section describes the major issues defined by stakeholders in the OBMP process, the mission statement for the OBMP process and the goals for the OBMP process.

Section 4 – Management Plan – This section describes program elements to achieve the goals of the OBMP, a management plan, and a process to periodically review and update the OBMP.

Appendix A – Public Comments. This appendix contains written correspondence and a transcript of public comments on the OBMP from a Watermaster hearing held on September 15, 1999 (bound separately).

The technical memoranda produced to support the program elements and implementation process described in Section 4 are on file at the Watermaster offices. Copies are available upon request.

The Phase II report consists of more detailed descriptions of capital-intensive and institutionally complex features of the OBMP. The Phase 2 report will be bound separately.

SECTION 2
STATE OF THE BASIN

This section has been prepared for the OBMP stakeholders so that they will have a common starting point or frame of reference from which to develop the OBMP. The stakeholders developed the outline of this section with input from the Special Referee.

This section of the OBMP report describes the Basin, its physical state, future water demands in the Chino Basin area, and concludes with a summary of problems within the Basin. The physical state of the Basin includes a description of groundwater levels, groundwater storage, production patterns, groundwater quality, and safe yield. These characteristics of the Basin are intimately related, as are the solutions to the problems associated with these characteristics. Water demands in the Chino Basin area include an estimate of current water usage and future water demand projections for groundwater and other sources, an assessment of water quality conditions, and future projections of wastewater generation – including the relationship of source water quality and wastewater quality.

DESCRIPTION OF THE BASIN

The Chino Basin consists of about 235 square miles of the upper Santa Ana River watershed. Figure 1-1 illustrates the boundary of the Chino Basin as it is legally defined in the stipulated Judgment in the case of Chino Basin Municipal Water District vs. the City of Chino *et al.* Figure 1-1 also shows the hydrologic boundary of the Basin, which is slightly different from the adjudicated boundary. Chino Basin is an alluvial valley that is relatively flat from east to west and slopes from the north to the south at a one to two percent grade. Valley elevation ranges from about 2,000 feet in the foothills to about 500 feet near Prado Dam. Chino Basin is bounded:

- on the north by the San Gabriel Mountains and the Cucamonga Basin;
- on the east by the Rialto-Colton Basin, Jurupa Hills, and the Pedley Hills;
- on the south by the La Sierra area and the Temescal basin; and
- on the west by the Chino Hills, Puente Hills, and the Pomona and Claremont Basins.

The Chino Basin is one of the largest groundwater basins in southern California with about 5,000,000 acre-ft of water in the Basin and an unused storage capacity of about 1,000,000 acre-ft. Cities and other water supply entities produce groundwater for all or part of their municipal and industrial supplies; and about 300 to 400 agricultural users produce groundwater from the Basin. The Chino Basin is an integral part of the regional and statewide water supply system. Prior to 1978, the Basin was in overdraft. After 1978, the Basin has been operated as described in the 1978 Judgment in Chino Basin Municipal Water District vs. City of Chino *et al*. (Chino Judgment or Judgment).

SURFACE WATER RESOURCES

The principal drainage course of the Chino Basin is the Santa Ana River. It flows 69 miles across the Santa Ana Watershed from its origin in the San Bernardino Mountains to the Pacific Ocean. The Santa Ana River enters the Basin at the Riverside Narrows and flows along the southern boundary to the Prado Flood Control Reservoir where it is eventually discharged through the outlet at Prado Dam. Chino Basin is traversed by a series of ephemeral and perennial streams that include: Chino Creek, San Antonio Creek, Cucamonga Creek, Deer Creek, Day Creek, Etiwanda Creek and San Sevaine Creek. Figure 2-1

illustrates the stream system in the Chino Basin. San Antonio Creek joins Chino Creek and along with Cucamonga Creek, discharges directly into the Prado Reservoir. Cucamonga Creek changes its name to Mill Creek just north of the Prado Reservoir. Deer Creek was realigned and now discharges into Cucamonga Creek. Currently, Etiwanda Creek discharges into Day Creek at Wineville Basin. In the near future, Etiwanda Creek will be joined with San Sevaine Creek. Day Creek and San Sevaine Creek flow south and enter the Santa Ana River upstream of the Prado Reservoir.

These creeks carry significant flows only during, and for a short time after, intermittent storms that typically occur from November through March. Year-round flow occurs along the entire reach of the Santa Ana River due to year round surface inflows at Riverside Narrows, discharges from municipal water recycling plants that discharge in the River between the narrows and Prado Dam, and rising groundwater. Rising groundwater occurs in Chino Creek, in the Santa Ana River at Prado Dam, and potentially other locations on the Santa Ana River depending on climate and season. The rising groundwater in Chino Creek and the Santa Ana River contains high concentrations of total dissolved solids (TDS). Year-round discharges are sustained:

- in Chino Creek from the Inland Empire Utilities Agency (IEUA) Regional Plant No. 2 (RP2) to the Prado Reservoir, the source of which is from recycled water discharges from RP2; and
- in Cucamonga Creek from IEUA Regional Plant No. 1 (RP1) to the Prado Reservoir, the source of which is from recycled water discharges from RP1.

Significant nuisance flows have developed in Cucamonga Creek above RP1, the source of which is excess landscape irrigation and other outside urban uses. Some of the storm water runoff from the San Gabriel Mountains and urban areas is diverted for recharge in flood retention and spreading basins. These basins are shown in Figure 2-1.

Geology

Chino Basin was formed when eroded sediments from the San Gabriel Mountains, the Chino Hills, Puente Hills, and the San Bernardino Mountains filled a structural depression. The formation of the Basin is described in detail in the *Final* Task 2.2 and 2.3 Report, Describe Watershed Hydrology and Identify Current TDS and TIN Inflows in the Watershed (Wildermuth, 1997). The bottom of the Basin – the effective base of the freshwater aquifer – consists of impermeable sedimentary and igneous rocks. The base of the aquifer is overlain by older alluvium of the Pleistocene period followed by younger alluvium of the Holocene period.

The younger alluvium varies in thickness from over 100 feet near the mountains to a just few feet, south of Interstate 10 and generally covers most of the north half of the Basin in undisturbed areas. The younger alluvium is not saturated and thus does not yield water directly to wells. Water percolates readily in the younger alluvium and most of the large spreading basins are located in the younger alluvium.

The older alluvium varies in thickness from about 200 feet thick near the southwestern end of the Basin to over 1,100 feet thick southwest of Fontana, and averages about 500 feet throughout the Basin. Well capacities range between 500 and 1,500 gallons per minute (gpm). Well capacities exceeding 1,000 gpm are common, with some modern production wells test-pumped at over 4,000 gpm (e.g., Ontario Wells 30 and 31 in southeastern Ontario). In the southern part of the Basin where sediments tend to be more clayey, wells generally yield 100 to 1,000 gpm. Three main water-bearing (hydrostratigraphic) units were identified by Montgomery Watson (1992) during the development of a three-dimensional groundwater model of the Basin. Figure 2-2 shows the locations of two (of seven) generalized cross-sections through

the Chino Basin. These generalized cross-sections illustrate these main aquifer units and are shown in Figures 2-3 and 2-4.

Faults are one of the principal agents in the development of the landscape and restriction of groundwater flow in the Chino Basin. The basin is bounded by major fault systems along which the mountains and hills have been uplifted. The location of fault and groundwater barriers, and displacements in the effective base of the aquifer at faults are shown in Figure 2-2. The faults and groundwater barriers are significant in that they define the external boundaries of the Basin and influence the magnitude and direction of groundwater flow near the boundaries.

MAJOR FLOW SYSTEMS

While considered one basin from geologic and legal perspectives, the Chino Basin can be hydrologically subdivided into at least five flow systems that act as separate and distinct basins. Figure 2-5 is a groundwater elevation contour map for fall of 1997. Figure 2-5 also shows the location of five groundwater flow systems developed during the *TDS and Nitrogen Study* (Wildermuth, 1999) of which the Watermaster, the Chino Basin Water Conservation District (CBWCD), and the IEUA are study participants. Each flow system has a unique hydrology, and water resource management activities that occur in each flow system have little or no impact on the other systems. Each flow system can be considered a management zone. These management zones can be subdivided further if necessary to define and manage flow systems at a finer scale. These management zones are used to characterize the groundwater level, storage, production, and water quality conditions. Figure 2-6 shows these management zones relative to the subbasins used in the 1995 Regional Water Quality Control Plan (Basin Plan) for the Santa Ana Watershed. The Regional Water Quality Control Board, Santa Ana Region (Regional Board) has established water quality objectives for these subbasins and writes waste discharge requirements for waste dischargers based in part on these objectives. Presently, the Basin Plan subbasin boundaries and objectives are being rigorously reviewed. New boundaries similar to the management zone boundaries have been proposed. Revised boundaries and water quality objectives should be adopted sometime in the year 2000.

Management Zone 1. Management Zone 1 is bounded:

- on the southwest by the Chino and Puente Hills,
- on the northwest by the San Jose fault that separates Chino Basin from the Pomona and Claremont Heights Basins,
- on the north by an unnamed non-echelon fault system associated with the Cucamonga and Red Hill faults and separates the Chino Basin from the Cucamonga Basin,
- and on the east by a line that stretches from the southern most edge of the Red Hill fault to Prado Dam.

Groundwater in Management Zone 1 flows generally south with some localized flows to the west in response to groundwater production. Sources of water to Management Zone 1 include direct percolation of precipitation, returns from irrigation, recharge of storm flows and imported water in spreading basins, and subsurface inflow from the Pomona, Claremont Heights, and Cucamonga Basins. Discharge is through groundwater production and as rising groundwater in Chino Creek and the Santa Ana River.

Management Zone 2. Management Zone 2 is bounded:

- on the west by Management Zone 1,
- on the north by the Red Hill fault that separates the Chino Basin from the Cucamonga Basin,
- on the northeast by a segment of the Rialto-Colton fault,
- and on the east by a segment of Barrier J and a line extending from Barrier J in a southwesterly direction to a point of convergence with other management zone boundaries near Prado Dam.

Groundwater in Management Zone 2 flows generally in a southwesterly direction in the northern half of the management zone and then due south in the southern half of the zone. Sources of water to Management Zone 2 include direct percolation of precipitation, returns from irrigation, recharge of storm flows and imported water in spreading basins and subsurface inflow from the part of the Rialto Basin northwest of Barrier J and the Cucamonga Basin. Discharge is mainly through groundwater production and potentially small amounts of rising groundwater in the Prado Reservoir area.

Management Zone 3. Management Zone 3 is bounded:

- on the west by Management Zone 2,
- on the northeast by the Rialto-Colton fault that separates the Chino Basin from the Rialto Basin,
- on the southeast by the Bloomington divide, Jurupa Hills and line projecting from the most western extension of the Jurupa Hills to a point of convergence with other management zone boundaries near Prado Dam.

Groundwater in Management Zone 3 flows generally in a southwesterly direction. Sources of water to Management Zone 3 include direct percolation of precipitation, returns from irrigation, and subsurface inflow from the part of the Rialto Basin southeast of Barrier J. Discharge is mainly through groundwater production and potentially small amounts of rising groundwater in the Prado Reservoir area.

Management Zone 4. Management Zone 4 is bounded

- on the west by Management Zone 3,
- on the north by the Jurupa Hills,
- on the southeast by the Pedley Hills, and
- on the south by Management Zone 5.

Groundwater in Management Zone 4 flows west. Sources of water to Management Zone 4 include direct percolation of precipitation, and returns from irrigation. Discharge is through groundwater production.

Management Zone 5. Management Zone 5 is bounded:

- on the north and west by the Management Zones 3 and 4, Prado Dam,
- on the east by the Riverside Narrows, and
- on the south by the La Sierra area and Temescal Basin.

Sources of water to Management Zone 5 include streambed percolation in the Santa Ana River, direct percolation of precipitation, returns from irrigation and subsurface inflow from the Temescal Basin. Discharge is through groundwater production, consumptive use by phreatophytes, and rising groundwater

in the Prado Reservoir area, and potentially other locations on the Santa Ana depending on climate and season.

GROUNDWATER LEVELS AND STORAGE

Historical Groundwater Level Monitoring

Various entities have collected groundwater-level data in the past. Municipal and agricultural water supply entities have historically collected groundwater-level data in programs that range from irregular, study-oriented measurements to long-term periodic measurements. Groundwater-level measurements were made for specific investigations such as various California Department of Water Resources (DWR) studies, the 1969 Judgment on the Santa Ana River (Orange County Water District *vs.* City of Chino *et al.*), and the Chino Basin Judgment (Chino Basin Municipal Water District vs. City of Chino *et al.*). The spatial extent and temporal history of groundwater-level measurements south of State Route 60 have always been less than north of State Route 60. The DWR and the San Bernardino County Flood Control District (SBCFCD) were very active in collecting groundwater-level measurements in the Chino Basin prior to the settlement of the Chino Basin adjudication. After the Judgment was entered in 1978, the water level monitoring south of State Route 60 stopped almost completely except for the cities of Chino, Chino Hills, and the Jurupa Community Services District (JCSD). Most of the pre-1978 measurements were digitized by the DWR.

Watermaster conducted its first mass groundwater-level monitoring program for the Chino Basin in the spring of 1986. In 1989, Watermaster initiated a more regular monitoring program for the Basin with groundwater-level measurements obtained in 1990, and periodically thereafter through 1997. Watermaster's program relies on municipal producers and other government agencies supplying their groundwater-level measurements on a cooperative basis. Watermaster staff supplements these data with groundwater-level measurements collected by staff, primarily south of State Route 60. In addition to Watermaster staff efforts, private contractors conducting well efficiency tests collect groundwater-level measurements and submit these measurements to Watermaster. Watermaster has digitized all of these recent measurements. Watermaster has combined digitized groundwater-level measurements from all known sources into a database structure that is maintained at Watermaster's office.

Watermaster began a process to develop a comprehensive groundwater-level monitoring program in the spring of 1998. The process consists of collecting groundwater-level data at all wells in the Basin from which groundwater-level measurements can be obtained for fall 1999, spring 2000, fall 2000, and spring 2001. These data will be mapped and reviewed. Based on this review and Watermaster management needs, a long-term water-level monitoring program will be developed and implemented in the fall of 2001.

Historical Groundwater Levels

This section describes the groundwater-level time histories in the Chino Basin by management zone and characterizes the differences between management zones. Figure 2-7 illustrates the location of wells whose groundwater-level time histories are discussed herein and the management zone boundaries described in Section 1. The wells were selected based on length of record, completeness of record, and geographical distribution. Wells discussed herein are identified by their state well number. The behavior of groundwater-levels at specific wells is compared to climate, to pre- and post-Judgment periods, and to other factors as appropriate.

Management Zone 1. Wells 01S07W08N01 (Figure 2-8) and 01S08W11R01 and 01S08W14A03 (Figure 2-9) illustrate typical groundwater-level time histories in the northern end of Management Zone 1. The accumulated departure from mean precipitation (ADFM) curve is plotted on Figures 2-8 and 2-9 to illustrate climatic conditions. Positive sloping lines on the ADFM curve imply wet years or wet periods. Negatively sloping lines imply dry years or dry periods. For example, the period between 1937 to 1944 and 1978 to 1983 are extremely wet periods, and are represented as positively sloping lines. The period 1945 through 1977 is a drought period and is represented as a negatively sloping line, punctuated with a few wet years (positively sloped in 1952, 1958 and 1969). Short-term groundwater-level fluctuations shown in these figures are caused by including static and dynamic observations in the groundwater-level time histories. These time histories follow the climatic trends very closely with the 01S08W11R01 and 0S08W14A03 (westernmost wells) being slightly more sensitive to high rainfall years than 01S7W08N01 (eastern well). The groundwater-level response in well 01S7W08N01 lags the 1937 to 1944 and the 1978 to 1983 wet periods by about three to four years. By comparison, wells 01S08W11R01 and 0S08W14A03 responded to the 1978 to 1983 wet period within a year. The difference in response time is due to proximity of recharge to the area near the wells. Wells 01S08W11R01 and 0S08W14A03 are relatively close the Upland and Montclair Basins. Well 01S7W08N01 is two miles east of wells 01S08W11R01 and 0S08W14A03 with no significant recharge facilities nearby. In addition, the Metropolitan Water District of Southern California (MWDSC) recharged large quantities of State Water Project (SWP) water in the Montclair Basins during the period 1978 to 1983. The depth to water in the vicinity of these wells ranged from about 460 feet in the late 1920s to about 600 feet in 1996.

Wells 01S08W28E01 (Figure 2-10) and 01S08W31J01 and 01S08W33D01 (Figure 2-11) are about three miles south of wells 01S08W11R01 and 01S08W14A03 (Figure 2-9). These wells follow the general climatic trend, but show essentially no response to intermittent wet years in 1952, 1958, and 1969. The post-1977 groundwater-level increase is due to the 1978 to 1983 wet period, the reduction in overdraft following the implementation of the Chino Basin Judgment, the initiation of groundwater replenishment with imported water, and the reduction in pumping due to increased use of imported surface water. The groundwater-level response in these wells responded to the 1978 to 1983 wet period within a year. The depth to water in the vicinity of these wells ranged from about 130 to 160 feet in the late 1920s to about 150 to 280 feet in 1996 with well 01S08W28E01 showing the greatest depth to water. Well 01S08W28E01 is a municipal production well owned by the City of Pomona and is located in an area of regionally depressed groundwater levels.

Wells 02S08W04P01 and 02S08W12F01 (Figure 2-12) are located about two to three miles south of well 01S08W28E01 (Figure 2-10) and wells 01S08W31J01 and 01S08W33D01 (Figure 2-11). These wells follow the general climatic trend, but show essentially no response to intermittent wet years in 1952, 1958 and 1969. The groundwater-level responses in these wells lag the 1937 to 1944 and the 1978 to 1983 wet periods by about two to three years. The response to the 1937 to 1944 wet period is surprisingly subtle compared to most other wells with contemporaneous time histories in Management Zone 1. This suggests that recharge in the area is low and that production is high. The post-1977 groundwater level increase for 02S08W04P01 is due to the 1978 to 1983 wet period, the reduction in overdraft following the implementation of the Chino Basin Judgment, the initiation of groundwater replenishment with imported water, and the reduction in pumping due to increased use of imported surface water. The depth to water in the vicinity of these wells ranged from about 20 to 40 feet in the late 1920s to about 200 feet in 1982.

From north to the south, the following observations can be made regarding time histories of groundwater levels in Management Zone 1:

- groundwater levels are down from observed period of record highs in the late 1920s;
- the lowest groundwater levels were observed around 1977;

- groundwater levels have recovered slightly since 1977 due in part to the wet period of 1978 to 1983, reduction in overdraft after 1977, the initiation of groundwater replenishment with imported water, and the reduction in pumping due to increased use of imported surface water;
- a condition of long-term overdraft has occurred in this management zone with groundwater levels dropping by about 100 to 140 feet between the late 1920s to the present with most of the decline prior to 1977 and the Chino Basin Judgment (1978).

Management Zone 2. Figure 2-13 contains groundwater-level time histories for 01S07W14G01, 01S07W27D01, and 02S07W09M01. These wells are aligned north to south, approximately along a flow line. The groundwater-level time histories in Figure 2-13 show a general decline since before the 1937 to 1944 wet period, with little or no response to wet years until 1978. The post-1977 increase is probably due to the combination of 1978 to 1983 wet period, reduction in overdraft following the implementation of the Chino Basin Judgment, the start of artificial replenishment with imported water in the San Sevaine and Etiwanda flood control basins, and the increased use of imported surface water. The depth to water for 01S07W27D01 ranged from about 200 feet in the late 1920s to about 380 feet in 1974, a decline in groundwater levels of about 180 feet.

Management Zone 3. Figure 2-14 contains time histories for wells 01S06W11B01 and 01S05W16C01 that are located in the most upgradient part of Management Zone 3. The groundwater-level observations in these wells follow the general climatic trend. The groundwater-level time history for well 01S06W16C01 shows a general decline since the 1920s and a general non-responsiveness to significant wet years or periods. For example, there is a slight response to the 1937 to 1944 and 1978 to 1983 wet periods and no response to wet years in 1952, 1958, and 1969. Well 01S06W11B01 behaves in a similar manner with slightly less responsiveness. The lack of responsiveness is due to the lack of significant sources of recharge. There are no major streams or recharge basins in the upper part of Management Zone 3. The peak groundwater levels for both of these wells are lagged about three years behind the peaks in the ADFM curve for the 1937 to 1944 and 1978 to 1983 wet periods. The depth to water ranges from about 360 to 430 feet in the late 1920s to about 430 to 540 in 1978 for wells 01S05W16C01 and 01S06W11B01, respectively. The groundwater decline from the 1920s to the early 1990s is about 20 feet and 60 feet for wells 01S05W16C01 and 01S06W11B01, respectively. Figure 2-15 is a similar plot for wells 01S05W30L01 and 01S06W23D01. These wells have similar response characteristics as 01S06W11B01 and 01S05W16C01 with about 60 to 70 feet of groundwater decline over the period from the late 1920s to the early 1990s.

The relative amount of decline from 1920s to 1977 is less in Management Zone 3 than in Management Zone 1. This is due to greater production in Management Zone 1 than in Management Zone 3 and because of the specific yield (fraction of usable groundwater per unit volume), which is greater in the eastern portion of Chino Basin than in the western portion. The alluvium in the eastern part of the Chino Basin is derived from granitic rocks of the San Gabriel Mountains. The alluvium on the west side of Chino Basin is derived in part from the San Gabriel Mountains and marine sedimentary rocks of the Chino and Puente Hills. The latter produce finer-grained alluvium with more clay and poorer storage properties.

Figure 2-16 contains time histories for wells 02S06W05B01 and 02S07W34H01. These wells are aligned northeast to southwest, approximately along a flow line. The groundwater-level time histories end in the late 1970s or early 1980s, as is typical for agricultural wells in the southern half of the Basin. These time histories follow the general climatic trend, however, there is trend among the wells of a decreasing climatic influence from northeast to southwest. The depth to water for 02S06W05B01 ranged from 130 feet in the late 1920s, to about 200 feet in 1978, a decline in groundwater levels of about 70 feet.

Management Zone 4. Management Zone 4 is bounded on the north by the Jurupa Hills, on the east by the Pedley Hills, on the south by Management Zone 5 and on the west by Management Zone 3. The only outflow from Management Zone 4 is by production. Figure 2-17 contains groundwater-level time histories for wells 02S06W16B02 and 02S06W14C02. These wells generally follow the climatic trend. The depth to water for 02S06W14C02 ranged from about 7 feet in 1945 to about 17 feet in 1993, corresponding to an overall decline in groundwater levels of about 10 feet for this period.

Management Zone 5. Management Zone 5 is bounded on the north and west by the Management Zones 3 and 4, on the east by the Riverside Narrows and on the south by various unnamed hills. Figure 2-18 contains time histories for wells 02S07W36H02, 02S06W26D02, and 03S07W03N01. Groundwater levels in these wells follow the general climatic trend. However, wells 2S07W36H02 and 03S07W03N01 are much less responsive than well 02S07W26D02 due to the stabilizing effects of being adjacent to the Santa Ana River. The depth to water for 02S07W26D02 ranged from about 24 feet in 1939 to about 28 feet in 1992, corresponding to an overall decline in groundwater levels of about 4 feet for this period.

For the most part, the response of groundwater levels in the Chino Basin to significant storms and wet climatic periods is small. There are two reasons for this. First, the mountain drainage areas tributary to the Chino Basin are relatively small compared to the size of Chino Basin (235 square miles) and the amount of water in storage (~5,000,000 acre-ft). The mountain drainage areas tributary to the Chino Basin areas are:

San Antonio Creek	17.7	sq mi
Cucamonga Creek	13.6	
Deer Creek	6.4	
Day Creek	7.7	
Etiwanda Creek	6.7	
San Sevaine Creek	9.7	
Total	61.7	sq mi

San Antonio Creek is mostly diverted for direct use and recharge in the Claremont Heights and Cucamonga Basins. Cucamonga, Deer, and Day Creeks are diverted for direct use and recharge in the Cucamonga Basin. Large storm flows from these creeks can make it into the Chino Basin, however these channels are concrete-lined and consequently large amounts of storm flow are not recharged. In contrast, San Bernardino area groundwater basins (Bunker Hill and Lytle Basins) – located just to the east of the Chino Basin – consist of about 120 square miles of aquifer and with about 466 square miles of tributary areas in the San Gabriel and San Bernardino mountains. The groundwater level response in the Chino Basin due to wet years is small, on the order of a few feet to tens of feet. In contrast, the San Bernardino area groundwater-level response to significant wet years and climatic periods could range from 100 to 300 feet.

Regional Groundwater Level Changes

Figures 2-19 and 2-20 are groundwater elevation contour maps for the Chino Basin for 1997 and 1933, respectively. The 1997 map is based on data collected in Watermaster's ongoing monitoring programs and is representative of current conditions. The 1933 map is based on groundwater-level data compiled and mapped by the DWR. Figure 2-21 shows the change in groundwater level from 1933 to 1997 based on the groundwater elevation maps for 1933 and 1997. The regional groundwater decline by management zone is:

Management Zone	Range
1	50 to 150 feet
2	50 to 100 feet
3	50 to 100 feet
4	less than 50 feet
5	less than 50 feet

Figure 2-22 is a map similar to Figure 2-21 with the water service area boundaries shown in place of management zone boundaries. The areas of greatest regional groundwater decline underlie the city of Pomona, the Monte Vista Water District, the City of Chino, and the western half of the City of Ontario.

Figure 2-23 shows the depth to water for fall 1997. Mendenhall surveyed the Basin in 1902 and found parts of the Chino Basin to be artesian as evidenced by springs and marshy areas (Mendenhall, 1904). This artesian area is also shown on Figure 2-23. In the artesian areas, the historical groundwater level or piezometric surface was at or exceeded the ground surface. Figure 2-23 suggests that the regional groundwater decline in the western Chino Basin is up to 200 feet since 1902. Groundwater levels appear to have stabilized since the Chino Basin Judgment was implemented and groundwater production has been managed within the Basin's safe yield. However, there may still be areas experiencing localized overdraft including the area overlain by the Cities of Chino, Chino Hills, Pomona, the western portion of the City of Ontario, and the Monte Vista Water District. Todd defines the *safe yield* of a groundwater basin as the amount of water that can be withdrawn annually without producing an undesirable result. Withdrawal or production is excess of safe yield is an *overdraft*. Domenico (1972) defines undesirable results to include not only the depletion of groundwater in storage but also intrusion of water of undesirable quality, contravention of existing water rights, and the deterioration of the economic advantages of pumping. Cherry (1979) includes subsidence in the list of undesirable results.

The significant issues related to large-scale regional groundwater declines in the Chino Basin include: decline in storage, higher pumping costs, loss of production capacity, water quality degradation, and subsidence.

In the mid-1970s, ground fissuring was identified in the southwestern portion of Chino Basin. Ground fissuring in this area has continued to the present, and subsidence has been documented and identified as the cause of ground fissuring (Kleinfelder, 1993; 1996). Kleinfelder documented regional subsidence through an analysis of topographic benchmarks from 1987 to 1993, 1993 to 1995, and from 1995 to 1999. The resulting contour maps of equal differences in elevation revealed a north-south trending, elongated area of subsidence underlying the City of Chino and California Institute of Men (CIM) (see Figures 2-23 and 2-24). Maximum subsidence over the period 1987-1995 was reported to be about 2 feet located along Central Avenue between Schaefer and Eucalyptus Avenues. However, about one foot (or 50 percent) of this subsidence occurred over the period from 1993-1995 – indicating that the rate of subsidence has increased. This was confirmed independently by scientists at the Jet Propulsion Laboratories using remote sensing (see www-radar.jpl.nasa.gov/sect323/InSar4crust/LosAngeles.html). Kleinfelder (1993; 1996) concluded that regional subsidence was caused by localized groundwater overdraft and declining groundwater levels. The reasoning to support this conclusion is four-fold:

- As shown in Figure 2-23, the area of regional subsidence and ground fissuring geographically coincides with the late 1800s artesian area mapped by Mendenhall (1904, 1908) – an area that has experienced extreme declines in groundwater levels.

- Subsidence is well documented in areas where underlying soils have experienced extensive fluid withdrawal. In saturated soils, buoyant conditions exist, where stresses between soil particles are low. But as the water level drops, the stresses between soil particles increase and overburden pressure causes soil consolidation.
- The initiation of ground fissuring temporally coincides with new groundwater production by the city of Chino Hills in the area of maximum subsidence. By 1975, groundwater levels had declined by a maximum of 200 feet in the former artesian area.
- Regional subsidence and ground fissuring is not attributable to other potential causes of subsidence. The area does not coincide with known faults or groundwater barriers and the area has not experienced significant petroleum extractions.

Methodology for Estimating Groundwater Storage

Estimating groundwater storage within the Chino Basin is a critical exercise because of the direct influence of storage upon the safe yield and reliability of the aquifer. The safe yield of a groundwater basin approximates the average annual recharge in a basin if the storage in the basin is large. The larger the storage, the more reliable the basin will be in dry period. The amount of water in storage in the Chino Basin is directly proportional to groundwater level.

The methodology for computing the volume of groundwater in storage consists of the following steps:

1. develop groundwater elevation maps for the basin;
2. obtain and map aquifer storage properties;
3. obtain and map the effective base of the freshwater aquifer;
4. divide the basin into a regular grid – with each grid cell assigned a:
   - groundwater elevation,
   - tops and bottom elevations of each aquifer
   - elevation of the effective base of the bottommost aquifer (*e.g.*, bedrock elevation), and
   - storage properties;
5. compute the volume of groundwater in storage for each grid cell, and sum the storage values of all grid cells.

In most parts of the Chino Basin, unconfined aquifers overlie confined aquifers. Thus, the storage in some grid cells consists of the sum of water in storage in confined and unconfined aquifers. The volume of groundwater in storage in each grid cell is estimated from the following equations:

volume in an unconfined aquifer in a grid cell is given by:

$$V_{i,l} = (GWE_{i,l} - B_{i,l}) * A_i * P_{i,l} \qquad \text{(Equation 1)}$$

volume in a confined aquifer in a grid cell is given by:

$$V_{i,l} = [(GWE_{i,l} - T_{i,l}) * SC_{i,l} + (T_{i,l} - B_{i,l}) * P_{i,l}] * A_I \qquad \text{(Equation 2)}$$

where:

$GWE_{i,l}$ is the groundwater/piezometric elevation for grid cell *i* and aquifer *l*
$T_{i,l}$ is the effective top elevation of a grid cell *i* and aquifer *l*
$B_{i,l}$ is the effective bottom elevation of grid cell *i* and aquifer *l*
A_i is the surface area of grid cell *i*
$P_{i,l}$ is the effective porosity of grid cell *i* and aquifer *l*
$SC_{i,l}$ is the storage coefficient of a grid cell *i* and aquifer *l*

Not all the water in storage is available for production. A minimum volume of groundwater must be maintained in storage to ensure that groundwater can flow to wells. This minimum storage is included in the volume computations described above.

A maximum storage could also be defined, although it is more difficult to do so. The difficulties associated with maximum storage relate to defining which high groundwater-level impacts are acceptable and to whom. An across-the-basin increase of 50 feet would probably impact only those lands near the Santa Ana River with unknown water quality impacts everywhere.

Time History of Groundwater Storage for the Basin

Groundwater-level maps were prepared using all available data for 1933, 1965, 1969, 1974, 1977, 1983, 1991, and 1997. Aquifer geometry and storage properties were developed from the Chino Basin Water Resources Management Study (CBWRMS) (Montgomery Watson, 1995). Equations 1 and 2 were used to estimate the groundwater in storage for these years. Figures 2-19 and 2-20 illustrate the spatial distribution of groundwater elevations within the Chino Basin for the fall 1997 and 1933, respectively. The estimated volume of groundwater in storage in the Chino Basin using this methodology and information was:

Year	Volume (acre-ft)
1933	6,300,000
1997	5,300,000

Groundwater storage decreased by about 1,000,000 acre-ft during the 64-year period of 1933 to 1997. Table 2-1 lists the estimated storage in each of the management zones shown in Figure 2-5 and aggregations of the management zones into the Lower Chino Basin (south of State Route 60), the Upper Chino Basin (north of State Route 60) and the Total Chino Basin. The storage estimates in Table 2-1 are shown graphically in Figures 2-25 and 2-26. The lowest level of groundwater storage during the period 1960 to the present occurred in 1977 at the end of a 33-year drought. Prior to 1977, groundwater storage was falling at a rate of about 25,500 acre-ft/yr. The decline in storage was due to drought and groundwater production in excess of sustainable yield. The period of 1978 though 1983 was an extremely wet period. The physical solution with the Chino Basin Judgment was implemented in 1978. The end of the drought and the elimination of basin-wide overdraft caused an increase in storage. Table 2-1 shows the change in storage relative to 1977 (the lowest level of storage) for the period 1965 to 1997. The losses in storage that occurred during the period 1965 to 1977 have been partially offset by gains in storage that occurred after 1977.

Figure 2-27 shows the time history of storage in the upper and lower parts of the Chino Basin. There was a decline in storage prior to 1977. After 1977, storage in the upper basin increases, however the rate of increase declines over time. This continued increase in storage after 1983 probably is due to:

- accumulation of unproduced safe yield rights in local storage accounts;
- lagged inflows from the deep unsaturated zone in the northern half of the Basin; and
- lagged subsurface inflows from the Lytle Basin north of Barrier J and the Riverside Basin through the Bloomington divide.

After 1977, storage in the lower part of the Basin appears to have stabilized and follows the general climatic pattern.

Table 2-2 and Figure 2-28 show a comparison of the time history of total Chino Basin storage to groundwater production, volume of water stored in cyclic and local storage accounts, and climate. As of fall 1997, the combined volume of water in cyclic and local storage accounts was about 274,000 acre-ft and is greater than the increase in total storage that occurred between 1977 (pre-Judgment) and the present. The increase in storage since 1977 is about 174,000 acre-ft. This is counter intuitive, that is, the change in total storage since 1977 should be greater than the volume of water in cyclic and local storage accounts – especially given that the Basin has experienced a wetter than average period since 1977. The discrepancy may be due in part to under reporting of production in the agricultural pool, storage losses to the Santa Ana River, and inaccuracies in the methods used to compute storage herein.

Losses From Storage

The surface water discharge in the Santa Ana River consists of storm flow and baseflow. Baseflow is divided into two components: wastewater discharged from publicly-owned treatment plants (POTWs) and rising groundwater. The rising groundwater component in the Santa Ana River can be divided into two components: short-term storage water from seasonal recharge along the river, and persistent rising water caused by the regional groundwater gradient towards the river. The short-term storage component of rising water will decrease when total groundwater storage is increased either naturally (wet years) or artificially. If total groundwater storage is maintained at higher levels, recharge of surface water from the Santa Ana River will decrease.

Because of the spatial distribution of storage, the rising groundwater response to increases in groundwater storage is often lagged and variable in time. For example, the baseflow at Riverside Narrows (the location where the Santa Ana River enters the Chino Basin) peaks about five to seven years after heavy recharge years in the upstream groundwater basins. Chino Basin groundwater discharge to the river also exhibits a slight lag time. The time history of baseflow at Prado consists of a complicated mix of rising water responses from the Bunker Hill, Riverside, Chino and Temescal Basins. Analysis of the increase in rising water in the Chino Basin caused by an increase in groundwater storage requires the filtering out of these other sources of surface discharge from historical records and modeling results.

The accumulation of groundwater in storage will cause an increase in groundwater discharge in the Santa Ana River and its tributaries Chino Creek and Mill Creek – losses from storage that are not recoverable. The physics of the groundwater storage-baseflow relationship can be represented by linear reservoir theory where outflow is directly proportional to storage:

$$O = K * S \qquad \text{(Equation 3)}$$

where:

O is the outflow from storage (L^3/T)

S is volume of water in storage (L^3)
K is the linear reservoir coefficient (T^{-1})
L denotes units of length and
T denotes unites of time.

This formula can be calibrated to a specific range of storage and groundwater management conditions. The flow in the Santa Ana River in the Chino Basin was decomposed into rising water from the Chino Basin and other components. The rising water component was subdivided into short-term storage water from seasonal recharge along the river in Management Zone 5, and persistent rising water caused by the regional groundwater gradient towards the River from all management zones. This decomposition was done using simulation model results from the **C**hino Basin **I**ntegrated **G**roundwater and **S**urface Water **M**odel (CIGSM) developed for the Chino Basin Water Resources Management Task Force (Montgomery Watson, 1995, and unpublished modeling results for calibration and planning simulations).

Historical Storage Losses to the Santa Ana River. Rising groundwater estimates were made for the period of model calibration 1960 to 1989, and the forecasting period of 1990 to 2040. Certain historical periods were studied to isolate the spatial effects of groundwater production patterns and hydrology on rising groundwater. For example, the period 1960 to 1977 represents the pre-Judgment period that has higher groundwater production than the period after 1978 that represents the period when the Basin was managed by Watermaster without basin-wide overdraft. Linear reservoir theory was used to develop a simple relationship of change in groundwater discharge to the Santa Ana River to incremental change in groundwater storage.

Hydrograph decomposition for the historical period was done using water balance tables from CIGSM for reaches of the Santa Ana River and its tributaries. Analysis of the hydrology of the period suggest that two periods could be used to develop a linear reservoir relationship:

- 1970 to 1977 representing a pre-Judgment period; and
- 1984 to 1989 representing a post-Judgment period.

The period 1970 to 1977 was a dry period following significant recharge along the river from the 1969 storms. The 1984 to 1989 period was also a dry period following the wet period from 1978 to 1983. Both of these periods exhibit recession flows typical of streams fed by groundwater systems. CIGSM model-estimated rising water was plotted against the model-estimated storage in the Chino Basin. The annual rising water estimates and respective storage estimates are shown graphically in Figures 2-34 and 2-35. Simple linear regressions were done for the 1974 to 1977 period and 1987 to 1989 period to estimate the linear reservoir coefficient (K) for the linear reservoir equation (Equation 3). The linear reservoir coefficient is the slope of the best-fit lines in Figures 2-34 and 2-35. The resulting linear reservoir coefficients are 0.0254 for the 1970 to 1977 period, and 0.0203 for the 1987 to 1989 period. Physically, the linear reservoir coefficient represents the fraction of the storage that annually becomes rising water. Thus, an increase in storage of 100,000 acre-ft in the 1987 will cause about 2,000 acre-ft of new rising water in the first year. Groundwater storage after the first year would be reduced to 98,000 acre-ft. In the second year, the storage would be reduced another 2.03 percent, or 1,970 acre-ft, and so on. The 0.0051 difference in linear reservoir coefficients for the pre- and post-Judgment periods is due in part to changes in groundwater production patterns, hydrology, and CIGSM modeling artifacts.

Future Storage Losses to the Santa Ana River. An estimate of the linear reservoir coefficient for the period 1990 through 2040 was estimated by comparing the total Santa Ana River flow at Prado Dam and groundwater storage for Alternatives 3 and 4 of the CBWRMS. Alternative 3 represents a specific groundwater management strategy that could be implemented. Alternative 4 is identical to Alternative 3 with the addition of a conjunctive use program and an increase in limits for local storage accounts. The

conjunctive use program has three cycles of build up in storage to approximately 300,000 acre-ft and subsequent pump-out periods. The increase in storage in local storage accounts is gradual and incremental throughout the period. The rising water losses from the conjunctive use storage and the increase in local storage accounts are simply the difference in Santa Ana River flow between these alternatives. Table 2-3 lists the differences in groundwater storage and Santa Ana River flow. The linear reservoir coefficient for future conditions is estimated to be about 0.0408, or 4.1 percent of storage – about double that of the 1984 to 1989 period. The increase in the linear reservoir coefficient was caused by changes in groundwater production patterns, hydrology, and CIGSM modeling artifacts.

Computation of Storage Losses to Santa Ana River. The linear reservoir equation can be used to estimate losses from groundwater storage accounts to the Santa Ana River:

$$q_t = K * (S_t + 0.5 * T *(I_t - Q_t)) \qquad \text{(Equation 4)}$$

where:

q_t	is the annual loss from a storage account in period *t* to *t+1* (acre-ft/yr)
K	is the linear reservoir coefficient
S_t	is water in a storage account at the end of period *t* (acre-ft)
I_t	is the water put into a storage account in period *t* to *t+1* (acre-ft/yr)
Q_t	is the water taken from the storage account for use in period *t* to *t+1* (acre-ft/yr)
T	duration of time between *t* to *t+1*, assumed to be one year

The volume of water in storage accounts at the end of a period is equal to:

$$S_{t+1} = S_t + T * (I_t - Q_t - q_t) \qquad \text{(Equation 5)}$$

Using a linear reservoir coefficient of 0.0201 and Equation 4, the total water lost from local storage accounts and cyclic storage since the Judgment became active in 1978 is estimated to be about 50,000 acre-ft or about 18 percent of the volume that Watermaster currently assumed was in storage. The time history of accumulating storage accounts and estimated losses to baseflow are listed in Table 2-4. Watermaster does not currently compute losses from storage accounts. This means that when water in storage accounts is produced, additional overdraft of the Basin will occur. Losses from conjunctive use projects could be very large. In the example in Table 2-3, three filling and withdrawal cycles were done over a 40-year period with each reaching a fill capacity of 300,000 acre-ft. The model estimated losses of over 300,000 acre-ft over three fill and extraction cycles – a loss of over one-third of the water stored. If these losses were not accounted for, the Basin would be overdrafted by 300,000 acre-ft over the 40-year period.

The losses described above were developed from modeling studies. Monitoring to verify these losses has not been done in the past nor is it practical in the future. The measuring errors associated with such a program would be larger than the probable losses from storage. The only practical ways to estimate such losses are to:

- Use a linear reservoir model as described above, or
- Calibrate a groundwater flow model over the period that water is held in cyclic, local, and conjunctive use storage and compare it to a simulation run with the same hydrology that did not have water in these storage accounts. The difference in groundwater discharge to the river would be the losses due to cyclic, local, and conjunctive use storage. Adjustments to storage accounts could be made retroactively or a new loss factor established for the next period.

GROUNDWATER PRODUCTION

Historical Groundwater Production Monitoring

Prior to 1975, groundwater production monitoring was not formally done by a single entity for the benefit of the Basin. Municipal and some industrial producers kept production records with some submitting annual production reports to the State Water Resources Control Board (SWRCB). Very few agricultural wells had meters and fewer kept records of production. During the period 1975 to 1978, production monitoring at agricultural wells improved slightly. Most of the agricultural production volumes for the period preceding 1978 are comprised of estimates provided by producers and are not based on direct measurements from in-line flow meters.

Since 1978, Watermaster has collected information to develop production estimates. Production estimates in the appropriative pool and overlying non-agricultural pool are based on totalizing in-line flow meter data provided to Watermaster on a quarterly basis by these producers. Watermaster aggregates these quarterly values to obtain annual production for these pools. Production estimates for the agricultural pool are based in part on totalizing in-line flow meter data, water duty methods, and hour-meter data combined with well efficiency tests. As with the other pools, reporting is done by the producers. However, not all agricultural pool producers provide Watermaster with estimates of their production. About one third of agricultural pool producers either did not file production reports or filed incomplete reports in fiscal year 1997/98 (telephone discussion with Jim Theirl, 1998).

Historical Groundwater Production

Table 2-4 contains estimates of annual groundwater production in the Chino Basin from three different sources: summaries of SWRCB filings and interviews with some producers; Watermaster estimates, and production estimates developed for calibration of CIGSM developed for the CBWRMS. The second column in Table 2-5 contains annual production estimates that were used to develop the safe yield in the Judgment. The third column contains Watermaster estimates of annual production that are based on production reports submitted to Watermaster by the producers. The fourth column contains annual production estimates that are based on SWRCB filings, production reports from producers, and water duty methods. In the latter case, water duty methods were used as a check on reported production and supplemented reported production data when production data was missing or under-reported at wells.

The safe yield of the Chino Basin was based on the hydrology of the period 1965 to 1974. The average annual groundwater production for that period from SWRCB filings and interviews was estimated at 152,100 acre-ft/yr. The engineer working on the historical production data knew there was *unaccounted for* production and assumed that actual production was 20 percent more than the estimate from SWRCB filings and interviews, or about 180,000 acre-ft/yr (Carroll, 1977). This estimate is close to the 189,400 acre-ft/yr average for the same period from the CBWRMS.

In Table 2-5, the period of Watermaster groundwater production estimates overlaps the period of CBWRMS production estimates. For their common period of record (1975 through 1989), the CBWRMS estimates are consistently higher. This occurs in part because some of the agricultural producers fail to report production or fail to provide production information to Watermaster. For the CBWRMS, water demands based on land use were compared to reported production. If the water demand for the land uses in a given area was greater than reported production, then reported production was increased to meet the demands based on land use. This method was validated in the CIGSM model calibration process (Montgomery Watson, 1993). In the latter years, the CBWRMS production estimates increasingly diverge from Watermaster estimates. For their common period of record, the average annual groundwater production was estimated at 147,900 acre-ft/yr by Watermaster and 174,000 acre-ft/yr by the CBWRMS – a difference of about 26,000 acre-ft/yr. Actual production is probably somewhere in between Watermaster and CBWRMS estimates.

Spatial and Temporal Changes in Groundwater Production

Table 2-6 lists Watermaster's estimates of Chino Basin production by pool for the period of fiscal year 1974/75 to 1997/98, and the relative amount of production by pool. Over this period, groundwater production has ranged from a high of 181,000 acre-ft/yr (1975/76) to a low of about 122,600 acre-ft/yr (1982/83), and has averaged about 147,100 acre-ft/yr. The distribution of production by pool has shifted since 1975 with the agricultural pool production dropping from about 55 percent in 1974/75 to 28 percent in 1996/97. During the same period, appropriative pool production increased from about 40 percent in 1974/75 to 68 percent in 1996/97. The increases in appropriative pool production have kept pace with decline in agricultural production. Production in the overlying non-agricultural pool declined from about 5 percent in 1974/74 to about 2 percent in the mid-1980s, rose to about 4 percent by 1990/91 and has remained at about 4 percent of total production thereafter.

Figure 2-29 is a plot that compares the change in total groundwater production in the Chino Basin to the change in urban and agricultural/other non-urban land uses. Prior to 1980, the decline in groundwater production appears proportional to the decline in agricultural and other non-urban land uses. After 1980, groundwater production appears to be relatively stable even though the decline in agricultural and other non-urban land uses is accelerating.

Figures 2-30 and 2-31 are similar to Figure 2-29 except they represent the Basin north of State Route 60 and south of State Route 60, respectively. North of State Route 60, the pattern of land use change is similar to the entire basin, but the groundwater production that was declining from 1960 to 1980 rose sharply after 1980. South of State Route 60, groundwater production was generally declining throughout the period of 1960 to 1990. The rate of decline in production in the southern half of the Basin after 1980 matches the rate of increase in production north of State Route 60, such that the total annual production in the Basin after 1980 is relatively constant (see Figure 2-29).

Figures 2-32 through 2-36 illustrate the location and magnitude of groundwater production at wells in the Chino Basin for years 1960, 1970, 1980, 1989 and 1997. These maps are based on production estimates developed in the *Chino Basin Water Resources Management Study* (Montgomery Watson, 1995) and by Watermaster. Two trends are evident in the period 1960 through 1998:

- In the southern half of the Basin there is an increase in the number of active wells and a decrease in the per well production. This is due to the land use transition from predominately irrigated agriculture uses to predominately dairy uses and due to a recent well inspection program, resulting in more wells of record.

- In the northern half of the Basin there is an increase in the number of wells producing over 2,000 acre-ft/yr. This is consistent with the land use transition from agricultural uses to urban uses and with the trend for increasing imported water costs.

Groundwater Production and Safe Yield

Recent and past studies have provided some insight into the influence of groundwater production in the southern end of the Chino Basin on the safe yield of the Basin. Three studies were done that quantified the impacts of proposed desalters in the lower Chino Basin on groundwater discharge to the Santa Ana River. The proposed desalters were first described in *Nitrogen and TDS Studies, Upper Santa Ana Watershed* (James M. Montgomery, Consulting Engineers, Inc., 1991). This study matched desalter production to meet future potable demands in the lower Chino Basin through the year 2015. The well fields were sited to maximize the interception of rising water and to induce streambed percolation in the Santa Ana River. The decrease in rising water and the increase in streambed percolation were projected to range from 45 to 65 percent of total desalter production.

Well field design studies for the SAWPA desalter provided estimates of the volume of rising water intercepted by the currently proposed desalter – scheduled for completion in March 2000 (Wildermuth, 1993). These studies used a very detailed model of the lower Chino Basin (rectangular 400-foot by 400-foot grid covering the lower Chino Basin) to evaluate the hydraulic impacts on rising water and groundwater levels at nearby wells. These studies showed the relationship of interception of rising water to well field location and well field capacity. The fraction of the desalter production composed of decreased rising water and the increased stream bed percolation water was estimated to range from 40 to 50 percent.

No formal studies and estimates of desalter well field interception of rising water were made during the *Chino Basin Water Resources Management Study* (Montgomery Watson, 1995). An informal estimate of the interception of rising water was made by Wildermuth (letter to Neil Cline, dated August 9, 1993). Wildermuth used the groundwater model developed in *Chino Basin Water Resources Management Study* for a well field similar to the SAWPA desalter well field and used the model calibration period of 1960 to 1989. This study estimated the interception of rising groundwater at about 80 percent of desalter production capacity.

These three studies suggest that the yield of the Basin could be increased by simply increasing the production near the river, and that for every two acre-ft of new, near-river production the safe yield could be increased by one acre-ft, that is the marginal change in safe yield with increased near-river production is about 0.5 acre-ft/yr per acre-ft/yr of production. The opposite is also true. That is, if production were to decrease in the southern half of the Basin, the safe yield will also decrease. Agricultural production is projected to decrease about 40,000 acre-ft/yr when current agricultural land use transitions to urban use. If the magnitude and spatial distribution of current agricultural production is not replaced with new production then the yield of the Chino basin will decrease by a comparable amount.

HISTORICAL AND CURRENT GROUNDWATER QUALITY

Historical Groundwater Quality Monitoring

Various entities have collected groundwater quality data in the past. Municipal and agricultural water supply entities have collected groundwater quality data to comply with Department of Health Services requirements under Title 22 or for programs that range from irregular study-oriented measurements to long-term periodic measurements. Groundwater quality observations have been made by the DWR, by

participants in the 1969 Judgment on the Santa Ana River (Orange County Water District *vs.* City of Chino *et al.*), by dischargers under order from the Regional Board, and by the County of San Bernardino. The DWR and the SBCFCD were very active in collecting groundwater quality data in the Chino Basin prior to the settlement of the Chino Basin adjudication. After the Judgment was entered in 1978, monitoring south of State Route 60 stopped almost completely except for the cities of Chino, Chino Hills, and Norco, and the Jurupa Community Services District (JCSD). Most of the pre-1978 measurements were digitized by the DWR. In 1986, Metropolitan Water District of Southern California (Metropolitan) conducted the first comprehensive survey of groundwater quality covering all constituents regulated in California Code of Regulations Title 22.

In 1989, Watermaster initiated a regular monitoring program for the Basin with groundwater quality data obtained in 1990 and periodically thereafter to the present. Watermaster's program relies on municipal producers and other government agencies supplying their groundwater quality data on a cooperative basis. Watermaster staff supplements this data with data obtained through a Watermaster sampling and analysis program in the area south of State Route 60. Water quality data are also obtained from special studies and monitoring that takes place under orders of the Regional Board. Watermaster has combined previously digitized groundwater quality data from all known sources into a database structure that is maintained at Watermaster's office.

Watermaster plans to begin the development of a new, more comprehensive water quality monitoring program to support the OBMP starting in July 1999. The program consists of two phases. The initial phase consists of collecting and analyzing groundwater quality samples at all producing wells in the over a three year period starting in July 1999. These data will be mapped and reviewed. Based on this review and Watermaster management goals in the OBMP, a long-term monitoring program will be developed The second phase consists of implementing the long term monitoring program and will start in July 2002.

Water Quality Conditions

Sources of water quality degradation can be classified into point and non-point sources. Point sources are confined to point discharges to the soil, groundwater, or stream systems. Examples include conventional wastewater and industrial discharges to streams or ponds, and leaky underground storage tanks. Non-point sources are areal discharges to soil, groundwater and surface waters, such as land application of waste and fertilizers and atmospheric deposition of contaminants to the soil and water bodies. The discussion below describes the water quality state of the Basin as it exists today for specific constituents of concern. The constituents described below are regulated for drinking water purposes in *California Code of Regulations, Title 22* or are regulated in the *1995 Water Quality Control Plan for the Santa Ana River Basin* (Basin Plan).

Figures 2-37a-h illustrate land uses in the Chino Basin in 1933, 1949, 1957, 1963, 1975, 1984, 1990 and 1993. These land use maps were developed from DWR land use surveys for 1933 through 1984, and from Southern California Association of Governments surveys for 1990 and 1993. The maps show a steady, dramatic change over time from agricultural to urban land uses. An exception to this occurs in the southern Chino Basin where dairies have moved in to replace irrigated and non-irrigated agriculture. These maps are useful in characterizing water quality degradation associated with non-point source loading from agriculture. The land uses shown in these maps are quantified in Table 2-7.

Total Dissolved Solids (TDS). TDS is regulated as a secondary contaminant in Title 22. The recommended drinking water maximum contaminant level (MCL) for TDS is 500 mg/L, however the upper limit is 1,000 mg/L. For irrigation uses, TDS should generally be less than 700 mg/L. The Regional Board has established TDS limitations for all municipal wastewater plants that discharge

recycled water to the Santa Ana River. A problem arises in that TDS concentrations increase through municipal use -- typically by about 150 to 250 mg/L. The TDS limitations for water recycling plants that discharge to the Santa Ana River in the Chino Basin are listed below:

Plant	TDS Limit (mg/L)
IEUA RP1	540
IEUA RP2	610
IEUA Carbon Canyon	555
IEUA RP4	505
Western Riverside Regional	625
City of Riverside	650
Jurupa Indian Hills	650

The TDS in source (drinking) water generally must be kept well below 500 mg/L (preferably less than 300 mg/L) to ensure that recycled water discharged to the Santa Ana River and its tributaries meets Regional Board limitations. The treatment cost to remove TDS from water is very expensive – about $500 to $700 per ton.

Table 2-9 provides the average TDS concentrations by well for five-year periods from 1961 to 1995. These wells are grouped by management zones. Figures 2-38, 2-39, and 2-40 show average TDS concentrations in groundwater measured at wells for the periods 1961 to 1965, 1971 to 1975, and 1991 to 1995. Historically, TDS has not been measured at wells on an annual basis. The choice of one year, say 1963 for example, might have only one-third as many TDS measurements at wells compared to a five-year period. Thus, averaging TDS over a five-year period was necessary to get adequate spatial coverage of measurements.

TDS concentrations in the northeast part of the Basin range from about 170 to about 300 mg/L for the period 1960 through 1990, with typical concentrations in the mid- to low-200s. TDS concentrations in excess of 200 mg/L indicate degradation from overlying land use. With few exceptions, areas with significant irrigated land use or dairy waste disposal histories overlie groundwater with elevated TDS concentrations. The exceptions are areas where point sources have contributed to TDS degradation, such as the former Kaiser Steel site in Fontana and the former wastewater disposal ponds near IEUA Regional Plant No. 1 (RP1) in South Ontario. The TDS anomaly from Kaiser is not shown on Figures 2-38, 2-39 and 2-40. A TDS anomaly from former municipal wastewater ponds can be seen in the east central part of Management Zone 2.

The impacts of agriculture on TDS in groundwater primarily are caused by fertilizer use on crops, consumptive use, and dairy waste disposal. The TDS impacts from the dairies located in the southern half of the Basin is reflected at least partially in Figures 2-39 and 2-40. The intensity of the TDS loading from dairy waste to the Basin is illustrated in Table 2-8 (Table 2-1 from *Final Task 6 Memorandum, Development of a Three-Dimensional Groundwater Model*, Montgomery Watson, 1994). This table shows the steady buildup of the dairy cattle population in the southern Chino Basin between 1949 and 1989. The total amount of TDS from manure discharged to the southern half of the Basin that will reach groundwater is estimated to be about 1,200,000 tons through 1989 and averages about 29,000 tons per year. The dairy loading numbers in Table 2-8 assume that half of the manure was hauled out of the Basin after 1973, which was a requirement of the Santa Ana watershed Water Quality Control Plan enacted in

1973. The amount of manure exported out of the Basin was never verified until the late 1990's. The TDS loading to groundwater from dairy waste disposal activities could be far greater than estimated in Table 2-8.

As irrigation efficiency increases, the impact of consumptive use on TDS in groundwater also increases. For example, if source water has a TDS concentration of 250 mg/L, and the irrigation efficiency is about 50 percent (flood irrigation), the resulting TDS concentration in the returns to groundwater will be 500 mg/L, exclusive of the mineral increments from fertilizer. If the irrigation efficiency were increased to 75 percent, the resulting TDS concentration in the returns to groundwater will be 1,000 mg/L, exclusive of the mineral increments from fertilizer. For modern irrigated agriculture, the TDS impacts of consumptive use are more significant than mineral increments from fertilizers.

TDS concentrations in groundwater have increased slightly or remained relatively constant in the northern parts of Management Zones 1, 2, and 3. TDS concentrations are significantly higher in the southern parts of Management Zones 1, 2, and 3, and all of Management Zone 5 where they typically exceed the 500 mg/L recommended MCL and frequently exceed the upper limit of 1,000 mg/L.

Nitrate. Nitrate is regulated in drinking water in Title 22 with an MCL of 10 mg/L (as nitrogen). Table 2-10 provides the average nitrate concentrations by well for 5-year periods from 1961 to 1995. These wells are grouped by management zones. Figures 2-41, 2-42, and 2-43 show the average nitrate concentrations in groundwater measured at wells for the periods 1961 to 1965, 1971 to 1975, and 1991 to 1995. Nitrate measurements in the surface water flows in the San Gabriel Mountains and in groundwater near the foot of these mountains are generally less than 0.5 mg/L (Montgomery Watson, 1993). Nitrate concentrations in excess of 0.5 mg/L indicate degradation from overlying land use. Similar to TDS, areas with significant irrigated land use or dairy waste disposal histories overlie groundwater with elevated nitrate concentrations. The primary areas of nitrate degradation are the areas formerly or currently overlain by:

- Citrus in the northern parts of Management Zones 1, 2 and 3; and
- Dairy areas in the southern parts of Management Zones 1, 2 and 3 and all of Management Zone 5.

Nitrate concentrations in groundwater have increased slightly or remained relatively constant in northern parts of Management Zones 1, 2 and 3 over the period 1960 to the present. These are areas formerly occupied by citrus and vineyard land uses (see Figures 2-37a-d), and nitrate concentrations underlying these areas rarely exceed 20 mg/L (as nitrogen). Over the same period, nitrate concentrations have increased significantly in the southern parts of Management Zones 1, 2 and 3, and all of Management Zone 5. These are areas where land use has progressively converted from irrigated/non-irrigated agriculture to dairy uses (see Figures 2-37e-h), and nitrate concentrations typically exceed the 10 mg/L MCL and frequently exceed 20 mg/L by 1991-1995.

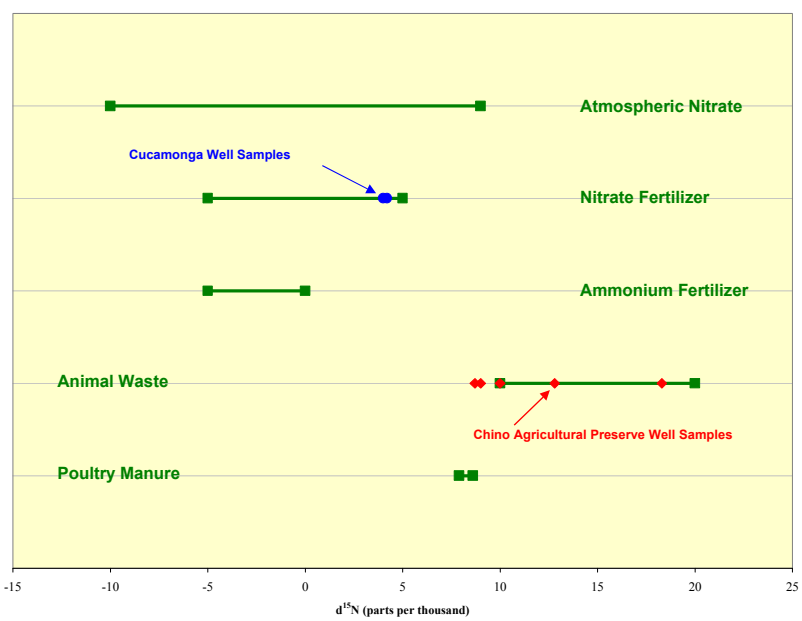
There are two stable isotopes of nitrogen: ^{14}N and ^{15}N. Within the nitrogen cycle, thermodynamic and kinetic processes occur which fractionate these isotopes in various nitrogen-bearing compounds. Most biologically-mediated reactions (*e.g.*, assimilation, nitrification, and denitrification) result in ^{15}N enrichment of the substrate and depletion of the product. Nitrogen isotope chemistry is a technique to help distinguish potential sources of nitrogen in the environment (Clark and Fritz, 1997). The enrichment of ^{15}N relative to atmospheric nitrogen is expressed as $\delta^{15}N$ and has units of parts per thousand (permil). The following table shows the ranges of nitrogen isotopes of potential sources of nitrate (Battaglin *et al.*, 1997):

Source of Nitrate	$d^{15}N$ of Nitrate (permil)
Atmospheric Nitrate	-10 to 9
Nitrate Fertilizer	-5 to 5
Ammonium Fertilizer	-5 to 0
Animal Waste	10 to 20
Poultry Manure	7.9 to 8.6

As part of the 1997 groundwater-monitoring program, samples were collected from six wells for nitrogen isotope analysis:

State Well Number	Region	Nitrate-N (mg/L)	$d^{15}N$ (permil)
01S07W14D01	Cucamonga – Former Citrus	3.2	4.0
01S07W14D02	Cucamonga – Former Citrus	4.0	4.2
02S07W34D	Chino Agricultural Preserve	106.0	12.8
03S07W05G	Chino Agricultural Preserve	77.3	18.3
02S07W20A	Chino Agricultural Preserve	64.5	10.0
02S07W16D	Chino Agricultural Preserve	63.6	8.7
02S07W16D - Duplicate		63.6	9.0

The samples from the wells in areas where the antecedent land use was predominantly citrus had nitrate values that were significantly below the maximum contaminant level (MCL) of 10 mg/L. Nitrate values in samples from the Chino Agricultural Preserve all exceeded the MCL by at least a factor of six. In addition, the $\delta^{15}N$ values for the Cucamonga wells were about 4 permil, while the $\delta^{15}N$ values for the Chino Agricultural Preserve wells ranged from 8.7 to 18.3 permil. The nitrogen isotope results are compared graphically with ranges from known sources in the figure below.



The high nitrate concentrations shown in Figure 2-43 probably depict the nitrate impacts from the agricultural waste disposal areas located in the southern half of the Basin.

Other Constituents of Potential Concern. Tables 2-11a through 2-11c summarize inorganic and organic constituents that have been analyzed for and detected in groundwater samples from wells in the Chino Basin through July 1998. Table 2-12 summarizes the information in Tables 2-11a through 2-11c for the constituents detected at or above their MCLs. This is a synoptic analysis and includes all available data, including data from several monitoring programs and studies. The water quality data reviewed in this synoptic analysis are derived from production wells and monitoring wells. Hence, the data do not represent a programmatic investigation of potential sources nor do they represent a randomized study designed to ascertain the water quality status of the Chino Basin. The data do represent the most comprehensive information available to date.

A large subset of this data was extracted from the California Department of Health Services (DHS) database (current through July 1998). For each constituent, the tables lists:

- the number of measurements at or above one-half the applicable MCL;
- the number of wells with measurements at or above one-half the applicable MCL;
- the number of measurements at or above the applicable MCL;
- the number of wells with measurements at or above the applicable MCL; and
- the applicable MCL.

The tables are organized as follows:

- Table 11a: Inorganic constituents, total trihalomethanes (THMs) and radioactivity with primary MCLs;
- Table 11b: Organic chemicals with primary MCLs;
- Table 11c: Inorganic constituents and organic chemicals with secondary MCLs, lead and copper rule, and California DHS Action Levels.

Table 12 summarizes the constituents that were detected at concentrations greater than one-half their MCL, and are grouped by chemical type. These values represent a mixture of data from monitoring and production well samples. Monitoring wells targeted at a potential source will likely have a greater concentration than a municipal or agricultural production well. Wells with constituent concentrations greater than one-half the MCL represent areas that warrant concern and inclusion in a long-term monitoring program. Groundwater in the vicinity of wells with samples greater than the MCL may be impaired from a beneficial use standpoint.

Inorganic Constituents. Five inorganic constituents were detected at or above their MCL in more than 20 wells:

- TDS;
- nitrate;
- fluoride;
- iron; and
- manganese.

TDS and nitrate have been discussed in previous subsections. Fluoride, iron, and manganese naturally exist in groundwater. Their concentrations depend on mineral solubility, ion exchange reactions, surface

complexations, and soluble ligands. These speciation and mineralization reactions, in turn, depend on pH, oxidation-reduction potential, and temperature. Fluoride occurs naturally in groundwater in concentrations ranging from less than 0.1 mg/L to 10-20 mg/L (Freeze and Cherry, 1979). Based on the available data, none of these constituents shows a spatial pattern throughout Chino Basin (see Figures 2-44, 2-45 and 2-46). However, site-specific monitoring wells may reveal point sources (*e.g.*, wells near landfills have shown relatively high concentrations of manganese).

In addition, perchlorate has recently been detected in several wells in the Chino Basin (Figure 2-47), in other basins in California and other states in the West. The probable reason that perchlorate was not detected in groundwater until recently is that analytical methodologies did not previously exist that could attain a low enough detection limit. Prior to 1996, the method detection limit for perchlorate was 400 µg/L. By March 1997, an ion chromatographic method was developed with a detection limit of 1 µg/L and a reporting limit of 4 µg/L.

Perchlorate (ClO_4^-) originates as a contaminant in the environment from the solid salts of ammonium perchlorate (NH_4ClO_4), potassium perchlorate ($KClO_4$), or sodium perchlorate ($NaClO_4$). The perchlorate salts are quite soluble in water. The perchlorate anion (ClO_4^-) is exceedingly mobile in soil and groundwater environments. It can persist for many decades under typical groundwater and surface water conditions, because of its resistance to react with other available constituents. Perchlorate is a kinetically stable ion, which means that reduction of the chlorine atom from a +7 oxidation state in perchlorate to a -1 oxidation state as a chloride ion requires activation energy or the presence of a catalyst to facilitate the reaction. Since perchlorate is chemically stable in the environment, natural chemical reduction in the environment is not expected to be significant.

At very high levels, perchlorate interferes with the function of the thyroid gland and the production of hormones necessary for normal human development. In the extreme cases, it can cause brain damage in fetuses and a potentially fatal form of anemia in adults. However, effects of chronic exposures to lower levels currently detected in groundwater are not known.

Ammonium perchlorate is manufactured for use as an oxygenating component in solid propellant for rockets, missiles, and fireworks. Because of its limited shelf life, inventories of ammonium perchlorate must be periodically replaced with a fresh supply. Thus, large volumes of the compound have been disposed of since the 1950s in Nevada, California, Utah, and likely other states. While ammonium perchlorate is also used in certain munitions, fireworks, the manufacture of matches, and in analytical chemistry, perchlorate manufacturers estimate that about 90 percent of the substance is used for solid rocket fuel

Perchlorate is of concern because of the existing uncertainties in:

- the toxicological database documenting its health effects at low levels in drinking water;
- the actual extent of the occurrence of perchlorate in ground and surface waters, which is compounded by some uncertainty in the validation of the analytical detection method;
- the efficacy of different treatment technologies for various water uses such as drinking water or agricultural application; and
- the extent and nature of ecological impact or transport and transformation phenomena in various environmental media.

The requisite toxicology data available to evaluate the potential health effects of perchlorate are extremely limited. The US Environmental Protection Agency (EPA) Superfund Technical Support Center issued a provisional reference dose (RfD) in 1992 and a revised provisional RfD in 1995. Standard assumptions for ingestion rate and body weight were then applied to the RfD to calculate the reported range in the groundwater cleanup guidance levels of 4 to 18 (µg/L). In 1997, the DHS and California EPA's Office of Environmental Health Hazard Assessment reviewed the EPA risk assessment reports for perchlorate. Consequently, California established its provisional action level of 18 µg/L. On August 1, 1997, DHS informed drinking water utilities of its intention to develop a regulation to require monitoring for perchlorate as an unregulated chemical. Legislative action to establish a state drinking water standard for perchlorate has been introduced but has not been brought to a vote (CA Senate Bill 1033).

Volatile Organic Chemicals. Six volatile organic chemicals (VOCs) were detected at or above their MCL in more than 10 wells:

- 1,1-dichloroethene;
- 1,2-dichloroethane;
- benzene;
- tetrachloroethene (PCE);
- trichloroethene (TCE); and
- vinyl chloride.

TCE and PCE were/are widely used industrial solvents. TCE was commonly used for metal degreasing and was also used as a food extractant. PCE is commonly used in the dry-cleaning industry. About 80 percent of all dry cleaners used PCE as their primary cleaning agent (Oak Ridge National Laboratory, 1989). The areal distributions of PCE and TCE are shown in Figures 2-48 and 2-49. 1,1-Dichloroethane, 1,1-Dichloroethene, *cis*-1, 2-dichloroethene, 1,2-dichloroethane, and vinyl chloride are degradation by-products of PCE and TCE and their areal distributions are shown in Figures 2-50 though 2-54.

The spatial distributions of TCE and PCE appear to be correlatable to identified point sources in the Chino Basin (see the following subsection and Figure 2-58.) The areal distributions of 1,2-dichloroethane and vinyl chloride appear to be more extensive. 1,2-Dichloroethane is used as a lead-scavenging agent in gasoline (Oak Ridge National Laboratories, 1989) and the greater areal distribution of 1,2-dichloroethane and vinyl chloride may reflect numerous minor releases from gasoline stations, automobile service stations, *et cetera*. This hypothesis appears to be corroborated, in part, by the distribution of benzene, which is a minor contaminant in gasoline (see Figure 2-55). Gasoline used in the United States contains between 0.8 and 2 percent benzene (Oak Ridge National Laboratories, 1989).

Pesticides/herbicides. Two were detected at or above their MCL in more than 10 wells:

- dibromochloropropane (DBCP); and
- lindane.

DBCP was used as a fumigant for citrus, other orchards and some field crops prior to being banned in 1987. The areal distribution of DBCP appears to be related to historical citrus crop production in Chino Basin (see Figures 2-37a-d and 2-56). Lindane is used as an insecticide on foliar plants and fruit and vegetable crops; its areal distribution is shown in Figure 2-57.

Point Sources of Concern

The previous water quality discussion described water quality conditions broadly across the entire basin. The discussion presented below describes the water quality anomalies associated with known point source discharges to groundwater. Figure 2-58 shows the location of various point sources and areas of water quality degradation associated with these sources.

Chino Airport. The Chino Airport is located approximately four miles east of the City of Chino and six miles south of Ontario International Airport, and occupies an area of about 895 acres. From the early 1940s until 1948, the airport was owned by the federal government and used for flight training and aircraft storage. The County of San Bernardino acquired the airport in 1948 and has operated and/or leased portions of the facility ever since. Since 1948, past and present businesses and activities at the airport include modification of military aircraft, crop dusting, aircraft-engine repair, aircraft painting, stripping and washing, dispensing of fire-retardant chemicals to fight forest fires, and general aircraft maintenance. The use of organic solvents for various manufacturing and industrial purposes has been widespread throughout the airport's history (Regional Board, 1990). From 1986 to 1988, a number of groundwater quality investigations were performed in the vicinity of Chino Airport. Analytical results from groundwater sampling revealed the presence of VOCs above MCLs in six wells downgradient of Chino Airport. The most common VOC detected above its MCL is TCE. TCE concentrations in the contaminated wells ranged from 6.0 to 75.0 µg/L. Figure 2-58 shows the approximate areal extent of TCE in groundwater in the vicinity of Chino Airport at concentrations exceeding its MCL as of 1990. The plume is elongate in shape, about 2,200 feet wide and extends approximately 8,000 feet from the airport's northern boundary in a south to southwestern direction.

California Institute for Men. The California Institute for Men (CIM) located in Chino is bounded on the north by Edison Avenue, on the east by Euclid Avenue, on the south by Kimball Avenue and on the west by Central Avenue. CIM is a state correctional facility and has been in existence since 1939. It occupies approximately 2,600 acres – about 2,000 acres are used for dairy and agricultural uses and about 600 acres are used for housing inmates and related support activities (Geomatrix Consultants, 1996). In 1990, PCE was detected at a concentration of 26 µg/L in a sample of water collected from a CIM drinking water supply well. Analytical results from groundwater sampling indicate that the most common VOCs detected in groundwater underlying CIM are PCE and TCE. Other VOCs detected include carbon tetrachloride, chloroform, 1,2-dichloroethene, bromodichloromethane, 1,1,1-trichloroethane, and toluene. The maximum PCE concentration in groundwater detected at an individual monitoring well (GWS-12) was 290 µg/L. The maximum TCE concentration in groundwater detected at an individual monitoring well (MW-6) was 160 µg/L (Geomatrix Consultants, 1996). Figure 2-58 shows the approximate areal extent of VOCs in groundwater at concentrations exceeding MCLs as of May 1996. The plume is approximately 1,000 feet wide and extends about 3,600 feet southwest.

General Electric Flatiron Facility. The General Electric Flatiron Facility (Flatiron Facility) occupied the site at 234 East Main Street, Ontario, California from the early 1900s to 1982. Its operations consisted primarily of the manufacturing of clothes irons. Currently, the site is occupied by an industrial park. The Regional Board issued an investigative order to General Electric in 1987 after an inactive well in the City of Ontario was found to contain TCE and chromium above drinking water standards. Analytical results from groundwater sampling indicated that VOCs and total dissolved chromium were the major groundwater contaminants. The most common VOC detected at levels significantly above its MCL is TCE, which reached a measured maximum concentration of 3,700 µg/L. Other VOCs periodically detected, but commonly below MCLs, include PCE, toluene, and total xylenes, (Geomatrix Consultants, 1997). Figure 2-58 shows the approximate areal extent of TCE in groundwater at concentrations exceeding MCLs, as of November 1997. The plume is approximately 3,000 feet wide and

extends about 8,400 feet south-southwest (hydraulically downgradient) from the southern border of the site.

General Electric Test Cell Facility. The General Electric Company's Engine Maintenance Center Test Cell Facility (Test Cell Facility) is located at 1923 East Avion, Ontario, California. Primary operations at the Test Cell Facility include the testing and maintenance of aircraft engines. A soil and groundwater investigation, followed by a subsequent quarterly groundwater-monitoring program, began in 1991 (Dames & Moore, 1996). The results of these investigations showed that VOCs exist in the soil and groundwater beneath the Test Cell Facility and that the released VOCs have migrated off site. Analytical results from subsequent investigations indicate that the most common and abundant VOC detected in groundwater is TCE. Other VOCs detected include PCE, *cis*-1,2-dichloroethene, 1,2-dicholoropropane, 1,1-dichloroethene, 1,1-dichloroethane, benzene, toluene and xylenes, among others. The historical maximum TCE concentration measured at an on-site monitoring well (directly beneath the Test Cell Facility) is 1,240 µg/L. The historical maximum TCE concentration measured at an off-site monitoring well (downgradient) is 190 µg/L (BDM International, 1997). Figure 2-58 shows the areal extent of VOC contamination exceeding federal MCLs as of March 1997. The plume is elongate in shape, about 1,000 to 1,200 feet wide and extends approximately 8,000 feet from the Test Cell Facility in a southwesterly direction.

Kaiser Steel Fontana Steel Site. Between 1943 and 1983, Kaiser Steel Corporation (Kaiser), operated an integrated steel manufacturing facility in Fontana. During the first 30 years of the facility's operation (1945-1974), a portion of the Kaiser brine wastewater was discharged to surface impoundments and allowed to percolate into the soil. In the early 1970s, the surface impoundments were lined to eliminate percolation to groundwater (Wildermuth, 1991). In July of 1983, Kaiser initiated a groundwater investigation that revealed the presence of a plume of degraded groundwater under the facility. In August of 1987, the Regional Board issued Cleanup and Abatement Order Number 87-121, which required additional groundwater investigation and remediation activities. The results of these investigations showed that the major constituents of the release to groundwater were inorganic dissolved solids and low molecular weight organic compounds. Wells sampled during the groundwater investigations measured concentrations of total dissolved solids (TDS) ranging from 500-1,200 mg/L and concentrations of total organic carbon (TOC) ranging from 1 to 70 mg/L. Figure 2-58 shows the approximate areal extent of the TDS/TOC groundwater plume as of November 1991. The plume is approximately 3,000 feet wide and extends about 17,000 feet southwest. As of November 1991, the plume had migrated almost entirely off the Kaiser site.

Milliken Sanitary Landfill. The Milliken Sanitary Landfill (MSL) is a Class III Municipal Solid Waste Management Unit located near the intersections of Milliken Avenue and Mission Boulevard in the City of Ontario. The facility is owned by the County of San Bernardino and managed by the County's Waste System Division. The facility was opened in 1958 and continues to accept waste within an approximate 140-acre portion of the 196-acre permitted area (GeoLogic Associates, 1998). Groundwater monitoring at the MSL began in 1987 with five monitoring wells as part of a Solid Waste Assessment Test investigation (IT, 1989). The results of this investigation indicated that the MSL has released organic and inorganic compounds to the underlying groundwater. At the completion of an Evaluation Monitoring Program (EMP) investigation (GeoLogic Associates, 1998), a total of 29 monitoring wells were drilled to evaluate the nature and extent of groundwater impacts identified in the vicinity of the MSL. Analytical results from groundwater sampling indicate that VOCs are the major constituents of the release. The most common VOCs detected are TCE, PCE, and dichlorodifluoromethane. Other VOCs detected above MCLs include vinyl chloride, benzene, 1,1-dichloroethane, and 1,2-dichloropropane. The historical maximum total VOC concentration in an individual monitoring well is 159.6 µg/L (GeoLogic Associates, 1998). Figure 2-58 shows the approximate areal extent of VOCs in groundwater at concentrations

exceeding MCLs as of April 1998. The plume is approximately 1,900 feet wide and extends about 2,000 feet south of the MSL's southern border (GeoLogic Associates, 1998).

Municipal Wastewater Disposal Ponds. Treated municipal wastewater has been disposed into ponds located near the current IEUA Regional Plant 1 (RP1) located in south Ontario and the former Regional Plant 3 (RP3) located in south Fontana. The ponds located just east of RP1, commonly called the Cucamonga ponds, were used to dispose of untreated effluent collected by the Cucamonga County Water District (CCWD) and IEUA. RP3 and its disposal ponds are located on the southwest corner of Beech and Jurupa Avenues in the City of Fontana. Discharge to the Cucamonga ponds and the ponds of RP3 ceased between the early 1970s and the mid-1980s. The areas downgradient of these recharge ponds typically have elevated TDS and nitrate concentrations. The locations of these ponds are shown in Figure 2-58. Contaminant plumes emanating from these ponds have never been fully characterized.

Upland Sanitary Landfill. The closed and inactive Upland Sanitary Landfill (USL) is located on the site of a former gravel quarry at the southeastern corner of 15th Street and Campus Avenue in the City of Upland. The facility operated from 1950 to 1979 as an unlined Class II and Class III municipal solid waste disposal site. In 1982, USL was covered with a 10-inch thick, low permeability layer of sandy silt over the entire disposal site (GeoLogic Associates, 1997). Groundwater monitoring at the USL began in 1988 and now includes three on-site monitoring wells (an upgradient well, a cross-gradient well, and a downgradient well) (City of Upland, 1998). The results of groundwater monitoring indicate that USL has released organic and inorganic compounds to underlying groundwater (GeoLogic Associates, 1997). Groundwater samples from the downgradient monitoring well consistently contain higher concentrations of organic and inorganic compounds than samples from the upgradient and cross-gradient monitoring wells. Analytical results from groundwater sampling indicate that VOCs are the major constituents of the organic release. All three monitoring wells have shown detectable levels of VOCs. The most common VOCs detected above MCLs are dichlorodifluoromethane, PCE, TCE, and vinyl chloride. Other VOCs that have been periodically detected above MCLs include methylene chloride, *cis*-1,2 dichloroethene, 1,1-dichloroethane, and benzene. The 1990-95 average total VOC concentration in the downgradient monitoring well is 125 µg/L (GeoLogic Associates, 1997). Figure 2-58 shows the approximate areal extent of VOCs in groundwater at concentrations exceeding MCLs as of April 1998. However, the plume is defined only by the three on-site monitoring wells. The plume extent may be greater than is depicted on Figure 2-58.

National Priorities List Sites. Three facilities in, or directly tributary to, the Chino Basin are on the current National Priorities List (NPL) of Superfund sites:

- Stringfellow;
- Dodson Brothers; and
- Pacific Polishing (Figure 2-58).

Elevated levels of TCE and its degradation by-products have been detected in groundwater in the vicinity of the Dodson Brothers Superfund site (*cf.* Tables 2-44 and 2-53).

TCE/PCE Anomaly – South of the Ontario Airport. A plume containing TCE and PCE exists south of the Ontario Airport. The plume extends from approximately State Route 60 on the north, Turner Avenue on the east to Schaeffer Avenue on the south and Vineyard Avenue on the west. Figure 2-58 shows the approximate areal extent of the plume. The plume appears to be approximately 6,000 feet wide and 9,000 feet long. The maximum reported TCE and PCE concentrations are 142 µg/L and 2 µg/L, respectively.

Role of the Vadose Zone in Future Water Quality

The vadose zone is the unsaturated part of the aquifer that lies between the water table surface and the land surface. The vadose zone has become larger and thicker over time as the groundwater levels in the Basin have declined due to overdraft. Some of the contaminants discharged to the land surface or into ponds remain in the vadose zone. The mechanisms for retention of contaminants within the vadose zone are complex, but are generally caused by sorption and precipitation. Some contaminants move down towards the saturated zone at much lower rates (a few feet per year) than they can move once they get to the saturated zone (a few feet per day). MWDSC completed a study of the TDS and nitrate impacts in the Chino Basin from a proposed 700,000 acre-ft storage program California (MWDSC, 1988). The outcome of this study suggested that the raising of groundwater levels associated with the increase in storage would mobilize TDS and nitrates in the vadose zone and cause serious water quality problems throughout the Basin. The proposed storage program did not add contaminants – it flushed contaminants already in the vadose zone into the saturated zone. This potential effect could not be verified with more advanced modeling in the CBWRMS due to problems with the model. Real-world experiments to verify the TDS and nitrate contamination are not practical for a basin as large as the Chino Basin.

As the agricultural land uses in the Chino Basin convert, the loading of contaminants to the vadose zone will be significantly reduced, as will percolation at the land surface that drives the contaminants down towards the saturated zone. This will have the effect of reducing the rate of vadose zone loading to the saturated zone.

SAFE YIELD

The safe yield of the Chino Basin was established in the 1978 Judgment to be 140,000 acre-ft/yr. The basis for this estimate is described by William J. Carroll in his testimony on December 19 and 20, 1977, during the adjudication process. Table 2-13 lists the hydrologic components developed by Carroll to estimate the safe yield of the Chino Basin. These components were developed for the period 1965 to 1974, a period that Carroll referred to as the *base period*. The hydrologic components listed in Table 2-13 are described below.

Deep Percolation of Precipitation and Surface Inflow – consists of the deep percolation of precipitation and streamflow. Carroll developed the estimate of 47,500 acre-ft/yr based on an extrapolation of the early Chino Basin modeling results from the DWR.

Deep Percolation of Artificial Recharge – consists of the percolation of local runoff in spreading basins. Carroll estimated that the local runoff recharged in SBCFCD-controlled facilities to be about 2,800 acre-ft/yr during the base period. The Etiwanda Water Company also recharged about 1,000 acre-ft/yr of Deer and Day Creek water in the Chino Basin during the base period.

Deep Percolation of Chino Basin Groundwater Used for Irrigation (domestic and agricultural) – defined as the fraction of water applied for irrigation that percolates through the soil and recharges underlying groundwater. Carroll estimated that about 15 percent of the water used for domestic irrigation would percolate to groundwater; and that 45 percent of the water used for agricultural irrigation would percolate to groundwater. The volume of percolation of Chino Basin groundwater used for irrigation over the base period was estimated by Carroll to be about 61,700 acre-ft/yr.

Deep Percolation of Imported Water Used for Irrigation (domestic and agricultural) – same as deep percolation of Chino Basin groundwater except that the water used for irrigation is imported to and used

over the Chino Basin. The volume of percolation of imported water used for irrigation over the base period was estimated by Carroll to be about 7,000 acre-ft/yr.

Recharge of Sewage – defined to be the percolation in ponds of wastewater discharged by municipal wastewater treatment plants. This component almost completely ceased during the base period and was known to be eliminated as a recharge source when the safe yield was estimated. The volume of sewage recharge over the base period was about 18,200 acre-ft/yr. The inclusion of recharge of sewage as a component of safe yield in the stipulated Judgment was therefore not hydrologically consistent with how the Basin was to be operated post-Judgment.

Subsurface Inflow – defined to be the groundwater inflow to the Chino Basin from adjacent groundwater basins and mountain fronts including:

Bloomington Divide (Riverside Basin)	3,500 acre-ft/yr
San Gabriel Mountain front	2,500 acre-ft/yr
Colton Rialto Basin	500 acre-ft/yr
Cucamonga Basin	100 acre-ft/yr
Claremont and Pomona Basins	100 acre-ft/yr
Jurupa Hills	500 acre-ft/yr
Total	**7,200 acre-ft/yr**
	say 7,000

Subsurface Outflow – defined as groundwater that rises to the ground surface in Prado Basin to become Santa Ana River flow. Estimates of subsurface outflow were based on studies by DWR, United States Geological Survey (USGS), and Carroll. Carroll estimated the subsurface outflow to average about 6,800 acre-ft/yr over the base period.

Extractions – consists of groundwater extractions from the Chino Basin. Carroll estimated the groundwater extractions to average about 180,000 acre-ft/yr during the base period.

In addition to these components, Carroll estimated the change in storage over the base period to be about 40,000 acre-ft/yr; that is, the groundwater in storage declined by about 400,000 acre-ft between 1965 and 1974. Carroll estimated the safe yield to be the equal to the average extraction over the base period minus the average annual overdraft during the base period:

safe yield = extraction - overdraft
= 180,000 - 40,000
= 140,000 acre-ft/yr

A more recent estimate the safe yield can be abstracted from the groundwater modeling work done for the *Chino Basin Water Resources Management Study -- Task 6 Memorandum Develop Three Dimensional Groundwater Model* (Montgomery Watson, 1994). The hydrologic components derived from the modeling results for a 30-year period -- October 1960 to September 1989 (water years 1961 to 1989) - are listed in Table 2-14. The safe yield based on the CBWRMS results (1961 to 1989) computed in a manner similar to Carroll is:

safe yield = extraction - overdraft
= 183,000 - 17,000

= 166,000 acre-ft/yr

The safe yield based on CBWRMS modeling results for the base period (1965 to 1974) used by Carroll would be:

safe yield = extraction - overdraft
= 189,000 - 20,000
= 169,000 acre-ft/yr

A more conceptually correct estimate of the safe yield would include a reduction for artificial recharge of imported water and other waters that are currently not part of the yield, such as recharge of reclaimed water. The adjusted estimates would then be:

Carroll's estimate 1965 to 1974	118,000 acre-ft/yr
CBWRMS estimate 1961 to 1989	151,000 acre-ft/yr
CBWRMS estimate 1965 to 1974	156,000 acre-ft/yr

Watermaster may decide to change the safe yield of the Basin based on new information such as that developed from the CBWRMS and subsequent studies. Safe yield is used to determine the need for replenishment obligation for individual parties to the judgment. New water from the capture and recharge of storm water, from induced recharge caused by increased southern basin production (or, conversely, the reduction of yield from reduced production in the southern Chino Basin), or from other sources will enhance the yield of the Basin and thereby reduce the cost of purchasing imported water for replenishment.

At the time the Chino Judgment was implemented (1978), about 41 percent of the safe yield was estimated to come from irrigation returns. Since that time, irrigated agriculture has declined and is projected to be almost completely gone by 2020. This will result in a decline in irrigation returns to groundwater and a potential decrease in the safe yield. In addition, San Bernardino County, Riverside County, and the US Army Corps of Engineers (USACE) have constructed flood control projects that capture and convey runoff to the Santa Ana River - effectively eliminating the groundwater recharge that formerly took place in the stream channels and flood plains in the Chino Basin. This also may have resulted in a decrease in the safe yield of the Chino Basin.

Water harvesting opportunities exist that can be used to offset the yield lost to urbanization and flood control improvements. Water harvesting consists of capturing and recharging runoff caused by urbanization. Most of the precipitation falling on undeveloped land or land in agricultural uses is lost to evapotranspiration. Runoff increases dramatically with urbanization due to drainage improvements, increased impervious land cover, and decreased evapotranspiration of rainfall. The potential yield from this additional runoff is numerically equal to the increase in runoff that occurs when the land is converted to urban uses. The actual yield is equal to the additional runoff that is captured and put to beneficial use. In the Chino Basin, the best and least expensive way to put this yield to beneficial use is groundwater recharge.

Urbanization also creates reclaimed water. Presently, most of this water is discharged to the Santa Ana River. IEUA currently plans to use some of their reclaimed water for direct uses, including non-potable industrial uses, irrigation, and groundwater recharge. Increasing the yield of the Chino Basin by increased capture of local runoff will improve the dilution of reclaimed water used for groundwater recharge and reduce the cost of mitigation requirements for such reclamation.

WATER DEMANDS AND WATER SUPPLY PLANS

Current and Future Water Demands

The purpose of this subsection is to describe the current and projected water demands and supplies for agencies that produce groundwater from the Chino Basin. This information will serve as the basis for identifying future water resources issues in the Chino Basin area. Updated forecasts of water demands and supplies were requested from each Chino Basin water agency and industrial producer. Requested data included demands, water supply plans by individual well or source, well construction and operating data, and water production and treatment costs. Many agencies provided updated information. Where responses were incomplete, previous information developed as part of the 1995 Chino Basin Water Resources Management Study (CBWRMS) was used. The planning period for this evaluation is 2000 to 2020.

Growth Projections. There are several indicators of potential growth within the Chino Basin study area. These include population, housing, employment, and land use. The Southern California Association of Governments (SCAG) periodically develops population, housing, and employment projections. SCAG prepares growth projections as part of its regional transportation planning for Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties. The most recent SCAG projection is SCAG-98, which was adopted in April 1998.

The SCAG-98 projection indicates the six-county region will grow from 15.6 million people in 1994 to 22.4 million in 2015. This represents an increase 6.7 million people between 1994 and 2015 and a growth rate of 43 percent. San Bernardino and Riverside counties are projected to grow at a rate that is more than double the regional average. San Bernardino County is projected to grow from 1,558,000 people in 1994 to 2,830,000 in 2020. Riverside County is projected to increase from 1,377,000 people in 1994 to 2,816,000 in 2020.

Population. Table 2-15 summarizes the population projections for the Chino Basin area by water purveyor. The SCAG projections were desegregated by city and census tract and combined by water purveyor service area. These projections indicate population will increase from 971,000 in 1994 to 1,631,000 in 2020. This is a growth rate of 68 percent or 2.6 percent per year. The population in some water service areas in the San Bernardino County portion of the Basin are projected to increase by as much as 125 percent.

Housing. Total housing is projected to increase from 284,000 units in 1994 to 496,000 in 2020, a growth rate of 75 percent. By comparing population and housing, the average occupancy is projected to decrease slightly from 3.4 to 3.3 persons per dwelling unit.

Employment. Employment is projected to increase from 316,000 jobs in 1994 to 702,000 jobs in 2020, a growth rate of 122 percent.

Water Demand Projections. Current water demands and supply projections form the basis for evaluating future water management programs in the Chino Basin area. Water demands are developed based on the water service areas shown in Table 2-16.

Water demand projections can be developed by several different methods. These include per capita, water duty and units of use approaches. The most frequently used methods are the per capita consumption method and the water duty method.

For this assessment, all water demands are based on information provided by the water agencies. In the absence of agency data, the assumptions in the CBWRMS have been used. These projections have been compared with the current SCAG projections. However, no adjustments to he demands have been made.

Projected water demands for the Chino Basin are presented in Table 2-16. This table indicates that Chino Basin area water demands will reach 348,000 acre-ft/yr in 2000 to 418,000 acre-ft/yr in 2020. Significant municipal water demand growth is expected to occur in the agricultural preserve area. This will result in increased demands for the Cities of Chino, Chino Hills and Ontario, and Jurupa Community Services District. Agricultural water demands are expected to decrease during the planning period as land is converted to urban uses.

Water Supply Plans

The principal water supplies in the Chino Basin area are groundwater pumped from the Chino Basin, other local groundwater and surface water, imported water purchased from Metropolitan and recycled water. The amounts of water utilized from each source are based on data provided by each water purveyor. If data was not provided, the supplies area based on projections developed for the Chino Basin Water Resources Management Study (1995). Each of these sources is discussed below. Table 2-17 presents projected water supply plans for appropriators in the Chino Basin area. Table 2-18 summarizes the water demands by major source categories. The growth in demand and general source plan is shown is shown graphically in Figure 2-60. Review of Table 2-18 and Figure 2-60 shows that there will be about 40,000 to 50,000 acre-ft/yr of Chino Basin production that will incur a replenishment obligation. The replenishment obligation can be met by the recharge of imported and reclaimed water, in-lieu replenishment involving imported water, and from water in local storage accounts. In the long run, the replenishment obligation of about 40,000 to 50,000 acre-ft/yr will need to be met with imported and recycled water. Thus the imported and recycled water components in Table 2-18 and Figure 2-60 should sum to a total of 40,000 to 50,000 acre-ft/yr higher.

Chino Basin Groundwater. The Chino Basin is the largest groundwater basin in the Upper Santa Ana Watershed. Water is reallocated from the Overlying Agricultural Pool to the Appropriative Pool when it is not put to use by the agricultural users. As agricultural production declines, the reallocations to the Appropriative Pool will increase. Total production from the Chino Basin is projected to range between 180,000 to 190,000 acre-ft/yr over the planning period. Production in excess of safe yield must be replaced through the purchase of replenishment water, which is imported into the Chino Basin, by the Watermaster.

Other Local Supplies. Other local water sources provide a portion of the water supplies for Chino Basin water agencies. These supplies include surface water and groundwater.

Surface Water. A number of water supply agencies, which produce groundwater from the Chino Basin, obtain a portion of their water supplies from local surface water sources. These agencies include the: City of Pomona, City of Upland, Cucamonga County Water District, Fontana Water Company, San Antonio Water Company, West End Consolidated Water Company, and West San Bernardino County Water District. The principal surface water sources include San Antonio Canyon, Cucamonga Canyon, Day Creek, Deer Creek, Lytle Creek and several smaller surface sources. For the most part, these surface water sources are fully developed and no significant additional supplies are anticipated to be developed in the future. Usage is expected to remain at 16,000-17,000 acre-ft/yr.

Other Groundwater. Other local groundwater supplies represent a significant supplemental source of water for Chino Basin water agencies. Other groundwater supplies in the study area include the Claremont Heights, Live Oak, Pomona and Spadra Basins in Los Angeles County, the Riverside South

and Temescal Basins in Riverside County, and the Colton-Rialto, Cucamonga, Lytle Creek Bunker Hill, and Riverside North Basins in San Bernardino County. Agencies using other local groundwater include: City of Pomona, City of Upland, Cucamonga County Water District, Fontana Water Company, San Antonio Water Company, Southern California Water Company, West End Consolidated Water Company, and West San Bernardino County Water District. These supplies may increase slightly in the future as additional wells are constructed. However, most of these sources are essentially fully developed. Descriptions of these groundwater basins were presented in the CBWRMS Final Report (1995). The aggregate supply from these basins is currently 63,000 acre-ft/yr and is projected to be 76,000 acre-ft/yr in 2020.

Imported Water. Two regional agencies are responsible for imported water deliveries within the study area: Metropolitan Water District of Southern California (Metropolitan) and San Bernardino Valley Municipal Water District (SBVMWD). Metropolitan is a wholesale water agency serving supplemental imported water to 27 members (city and water agencies) in portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura counties. This service area has a current population of more than 16 million people. Approximately one-half of the total water used throughout the entire Metropolitan service area is imported water purchased from Metropolitan to supplement the local water supplies in its service area. Metropolitan obtains imported supplies from the Colorado River and the State Water Project (SWP). The demand for direct delivery of imported water for the Chino Basin purchased from Metropolitan is projected to increase from about 68,000 acre-ft/yr in 1997 to 129,000 acre-ft/yr by 2020, an increase of about 90% percent. The demand for replenishment water in the Chino Basin could reach 40,000 acre-ft/yr by 2020 if reclaimed water is not used for replenishment or direct uses and water in local storage accounts is not available for use as replenishment.

SBVMWD is a wholesale water purveyor in the easternmost portion of the study area and adjacent portions of San Bernardino County. SBVMWD is a SWP Contractor having an entitlement of 102,600 acre-ft/yr. In addition, SBVMWD is responsible for basin management in the Bunker Hill basin. The City of Rialto and West San Bernardino County Water District obtain water from SBVMWD through its Baseline Feeder that supplies Bunker Hill groundwater (included in *other groundwater* above).

Recycled Water. There are several existing sources of recycled water in use within the Chino Basin study area. These are the Pomona Water Reclamation Plant (operated by the Los Angeles County Sanitation Districts), Regional Plants 1, 2 and 4, and Carbon Canyon Water Reclamation Plant operated by IEUA, Upland Hills Water Reclamation Plant operated by the City of Upland, CIM Water Reclamation Plant operated by the California Institution for Men at Chino, and Indian Hills Water Reclamation Plant operated by Jurupa Community Services District. For this section, only existing and planned recycled water uses that will be implemented in the next two years are included in the water supply plans. This is about 11,500 acre-ft/yr.

Summary. The plans summarized in this section represent the current non-OBMP water supply plans of each individual water agency, as qualified previously. Future evaluation of these plans may indicate problems relative to their long-term feasibility. Availability of imported water supplies will have a significant effect on plan feasibility.

WASTEWATER FLOWS, TREATMENT AND DISPOSAL

This section summarizes existing and proposed municipal wastewater treatment and disposal plans for the Chino Basin study area for the planning period of 2000 through 2020. Existing municipal wastewater treatment facilities are described briefly along with a review of present and projected wastewater flows. Future treatment and disposal plans for the study area are also discussed.

Wastewater Flow Projections

Wastewater flow projections are made using a combination of methods similar to water demand projections. Depending on the planning data available, wastewater flow projections are made using per capita-based, EDU-based, area-based, and water consumption-based methods. The per capita method uses projected populations and average unit wastewater flows per person (90-110 gallons per day per person). EDU-based projections use unit flows per equivalent dwelling unit (EDU), where an EDU is the average amount of sewage generated by a single-family residential household (about 270 gallons per day). EDUs are estimated for commercial and industrial land uses using fixture unit counts or estimated wastewater flows. Flow projections are computed by projecting future EDUs and multiplying by the unit flow per EDU. Area-based methods typically use unit flow factors for each land use type. Flows are computed by multiplying the unit factor for each land use type by the corresponding acreage and totaling the individual flows for each land use type. Water consumption-based methods compute wastewater flows based on the difference between water demand and water consumption. Water consumption is the amount of water that does not return to the sewer system and is a function of the particular land use type and water use group. Currently, most wastewater flow projections in the study area are based on either per capita or EDU methods. Figure 2-61 illustrates the projected wastewater flows for each service area described below.

LACSD Service Area. The Los Angeles County Sanitation Districts (LACSD) furnishes wastewater services for Pomona and Claremont. Using the SCAG-98 growth projections and a wastewater generation factor of 110 gpcd, the wastewater flows for this area are estimated to increase from 22,000 acre-ft/yr to 30,000 acre-ft/yr in 2020.

IEUA Service Area. IEUA develops ten-year wastewater forecasts for its service area in conjunction with its annual capital improvement plan (CIP). As part of its current CIP, IEUA also prepared a fifty-year projection of wastewater flows. These projections indicate wastewater flows will increase from 57,000 acre-ft/yr in 1997 to 112,000 acre-ft/yr in 2020. This represents an increase of 96 percent.

Riverside County Service Area. Wastewater collection for the portion of the study area in Riverside County is provided by several agencies including Jurupa Community Services District and Norco. Other portions are unsewered. Wastewater flows for the Riverside County area are estimated to increase from 10,000 acre-ft/yr in 1997 to 15,000 acre-ft/yr by 2020 based on projected population increases. This includes wastewater generated by unsewered areas. Additional wastewater from outside the study area is expected to be treated at the Western Riverside Regional Water Reclamation Plant. However, no estimates of these additional flows were received.

Treatment and Disposal

Seven agencies are responsible for wastewater treatment and disposal for their respective areas. In Los Angeles County, LACSD is the treatment and disposal agency. In western San Bernardino County, IEUA and the City of Upland perform this role. In the easterly portion of the study area, the City of Rialto provides this service. In Riverside County, several agencies are responsible for wastewater treatment, including the Cities of Riverside and Corona, and JCSD.

There are three basic wastewater service areas within the study area. These areas include:

- LACSD System (Los Angeles County)
- IEUA System (Western San Bernardino County)
- Riverside County

LACSD System. The LACSD provides regional wastewater collection and treatment for most of Los Angeles County. LACSD is divided into districts that handle wastewater management within their service areas. LACSD No. 21 provides this service for the Claremont, La Verne, and Pomona service areas. Urban and industrial wastewater flows from the Los Angeles County portion of the study area are collected by the cities of Claremont, La Verne, and Pomona. This wastewater is routed to LACSD No. 21 for treatment at LACSD's Pomona WRP and San Jose Creek WRP. With the exception of recycled water used by the City of Pomona from the Pomona WRP, all wastewater reaching the sewer system is exported out of the study area. The Pomona WRP has capacity of 15 MGD and is expected to operate at that level during the planning period.

IEUA System. IEUA has constructed a Regional Sewerage System within its service area to collect, treat and dispose of wastewater delivered by contracting local agencies. The contracting cities and water districts are responsible for wastewater collection within their individual service areas. A system of regional trunk and interceptor sewers that convey sewage to regional wastewater treatment plants is owned and operated by IEUA. IEUA's wastewater collection system is divided into two major service areas: the Northern Service Area and the Southern Service Area.

IEUA currently operates four wastewater treatment plants: Regional Plant No. 1 (RP1), Regional Plant No. 2 (RP2) Regional Plant No. 4 (RP4), and Carbon Canyon Water Reclamation Plant (CCWRP). A fifth regional plant, known as Regional Plant No. 3 (RP3), is no longer in service. One new treatment plant, Regional Plant No. 5 (RP5), is in the planning stages. All of these plants are or will be capable of producing effluent that meets Title 22 requirements for water reclamation. Figure 2-62 illustrates the projected flows and capacity staging of these plants. Each of these plants are described below

Regional Plant No. 1. Although RP1 is designed to treat 44 mgd, the capacity was downrated to 32 mgd in 1992 due to more stringent permit requirements. The plant is being operated at an interim capacity of 41 mgd while plant upgrades are completed. A 1996 Regional Board cease and desist order requires the plant to be restored to its design capacity by 1999. RP1 is expected to operate at near its design capacity and treat wastewater flows from its service area and excess flows from RP4 until 2014. A plant expansion to about 56 mgd is planned to be on-line by 2014 to meet increased flows from its service area.

Regional Plant No. 2. RP2 serves the City of Chino and surrounding areas. A 1994 cease and desist order by the Regional Board requires the plant to be flood protected or relocated. Consequently, the plant will be potentially abandoned and its capacity replaced by a new RP5 by 2001. Solids handling facilities will continue to operate at this site.

Regional Plant No. 4. RP4 is a 7-mgd wastewater treatment facility that recently began operation. The plant will be expanded to 14 mgd by 2008 and 21 mgd by 2021. Population growth and corresponding wastewater production in the northeastern region of the District, including portions of City of Fontana and Cucamonga County Water District will determine the rate of expansion.

Carbon Canyon Water Reclamation Plant. Carbon Canyon Water Reclamation Plant (CCWRP) became operational in May 1992. CCWRP is designed to produce recycled water that can be used for non-potable purposes including industrial and irrigation uses in the western region of the Chino Basin. The initial design capacity of 10.2 mgd is planned for increase to 15.3 mgd in the year 2014. Sludge generated at the CCWRP is treated at the RP2 sludge processing facilities and will be for the foreseeable future.

Regional Plant No. 5. Growth in the southern portion of the IEUA service area will require additional treatment capacity. IEUA plans to construct a new RP5 by 2001. The initial phase of this plant will be 12 mgd of which 5 mgd will replace capacity at RP2. The new RP5 is expected to serve the San

Bernardino Agricultural Preserve area as well as treating 3.6 mgd from southern Ontario. A second phase expansion to 18 mgd is projected to be completed by 2008 with a third phase expansion by 2021.

Western Riverside County Regional Wastewater Treatment System. The Western Riverside County Regional Wastewater Authority, a Joint Powers Authority, has constructed a regional wastewater treatment facility to serve portions of Jurupa CSD, Norco, Home Gardens Sanitary District and Western MWD. This facility is located in Western Riverside County near the intersection of McCarty Road and Hellman Avenue. This facility has an initial treatment capacity of 8.5 mgd. The treatment plant will be expanded to an ultimate capacity of 13.3 mgd. The facility provides tertiary filtration and nitrogen removal to meet projected discharge requirements. Effluent from this plant will be discharged to the Santa Ana River. Projections of flows to this plant are not available as of the date of this report.

SUMMARY OF GROUNDWATER LEVEL, STORAGE, PRODUCTION AND WATER QUALITY PROBLEMS

Groundwater Level Problems

Overall, groundwater levels have declined between 50 to 200 feet in the Chino Basin since the turn of the century. The western side of the Basin, notably Management Zones 1a and 1b, has experienced the greatest decline in groundwater levels. The City of Chino and CIM have recently experienced ground-surface fissures that are thought to be related to increased groundwater production in the vicinity of the City of Chino. Groundwater producers that affect groundwater levels in this area include the cities of Chino, Chino Hills, Ontario, Pomona, the Monte Vista Water District, CIM, and agricultural producers. The City of Chino Hills has reported loss of production at one well due to recently declining groundwater levels. The management steps to eliminate groundwater-level problems in this area are described below.

Ground Level Survey. Conduct a ground-level survey of the area in Management Zone 1. This would include a review of past surveys and new surveys. The survey results would be compared to historical surveys to determine the location, rate, and magnitude of subsidence in the Basin. Periodic surveys should be conducted afterwards to monitor for further subsidence.

Monitoring. Develop and implement a groundwater-level and quality monitoring program that can be used to observed groundwater trends. This program should be developed and implemented before a groundwater recharge/production management plan is developed for Management Zone 1 in order to define local groundwater flow systems for better management of recharge and production.

Balance Groundwater Production and Recharge. Balance groundwater production with recharge in Management Zone 1, or, if necessary, balance production and recharge more locally within Management Zone 1. This may require temporarily reducing production below the level at which balance occurs to bring groundwater levels up to a safe level. A *safe* level needs to be determined. Recharge of local or native and imported water should be increased as much as practical. Given that recharge in the area is maximized, production may still have to be reduced in Management Zone 1 and replaced with either production from Management Zone 2 or some other source of water.

Groundwater Storage

The Chino Basin has immense storage capacity. Since the Judgment was implemented, total groundwater storage appears to have stabilized. However, as noted earlier, the storage in the Basin has declined by about 1,000,000 acre-ft since 1933. Therefore, there is at least 1,000,000 acre-ft of unused storage capacity available in the Basin. Increasing storage has some costs. There will be losses to the Santa Ana River due to rising groundwater. The analysis previously presented suggests that the losses from local

and cyclic storage accounts due to rising groundwater during the period 1978 to 1997 could be as high as 50,000 acre-ft (or 18 percent of the volume that Watermaster assumes is in storage). Ignoring these losses will result in overdraft of the Chino Basin. A significant increase in groundwater storage, say on the order of 100,000s of acre-ft, may induce large groundwater losses to the Santa Ana River. In addition, a storage increase of this magnitude may have groundwater quality impacts due to flushing of contaminants within the vadose zone. The volume of safe storage from a water quality perspective is unknown. The management steps to mitigate the significant issues with groundwater storage are described below:

Develop Storage Accounting System that Includes Losses. Presently, Watermaster keeps track of transfers to and from local and cyclic storage accounts without accounting for groundwater losses. Watermaster should adopt a loss-estimating procedure and adjust the volume in storage accounts each year.

Water Quality Impacts from Conjunctive Use Programs. Mitigation measures need to be developed to protect producers in the event that large conjunctive-use programs cause unacceptable water quality impacts.

Groundwater Production

The primary issues for groundwater production are localized overdraft in Management Zone 1, and the potential changes in safe yield that can occur with changes in the location and magnitude of pumping. The location and amount of groundwater production generally appears to be balanced in the Basin except for Management Zone 1. Groundwater levels need to be increased in Management Zone 1 to minimize future subsidence and ground fissures, maintain production at a sustainable level, and improve groundwater quality. The management steps for this issue are identical to those for *Groundwater Levels.*

Groundwater production in the southern half of the Basin will need to be managed to ensure that safe yield is not reduced as agricultural areas convert to urban uses. Losses in safe yield due to decreases in agricultural production in the southern part of the Basin are distributed among the appropriators based on their initial share of safe yield. Thus, the loss in yield is translated throughout the Basin. Increasing production near the Santa Ana River could enhance exiting safe yield. The management steps for addressing this issue are listed below.

Optimization Studies. Conduct studies to optimize groundwater production patterns in southern Chino Basin. These studies will involve geologic investigations and modeling of southern Chino Basin.

Southern Basin Water Supply Plan. Develop a groundwater production and treatment plan that matches the emerging water demands of development in the southern Chino Basin with facilities necessary to provide water of appropriate quality.

Water Quality

The TDS and nitrate problems in the Basin are the most costly ones to deal with and are primarily non-point source related. By contrast, point-source dischargers of organic solvents and other contaminants are dealing with most of their related groundwater plumes. The cost of TDS and nitrate removal is estimated to be about $700 per acre-ft. The cost to remove solvents is generally under $100 per acre-ft. Figure 2-59 shows the locations of known point sources and areas with impaired water quality in the Chino Basin.

The source of the TDS and nitrate contamination in the northern part of the Basin has mostly disappeared. The primary sources of TDS and nitrate contamination in the southern part of the Basin are dairies and they will probably remain active for the next 20 years. TDS and nitrate degradation should continue in

the southern basin for the foreseeable future and the cost to treat contaminated groundwater will escalate over current costs due to past and continued animal waste disposal practices. The steps to manage groundwater quality problems in the Basin are described below.

Point-Source Management. Watermaster should work with the Regional Board, Department of Toxic Substances Control and other regulatory agencies to identify point-source discharge related problems, facilitate their solution, and where necessary, use its institutional influence to obtain prompt and satisfactory mitigation. In some cases, the solution to a point-source problem and a non-point source problem can be addressed through one coordinated capture and treat project with reduced cost to all parties.

Non-point Source Management. The groundwater contaminated from non-point sources in the northern and southern parts of the Basin will need to be treated through dilution, demineralization or some other process, so that the water can be put to beneficial use. This is absolutely necessary in the southern Chino Basin to maintain safe yield. The *Optimization Studies* and *Southern Basin Water Supply Plan* steps listed under *Groundwater Production* apply here as well. The export of dairy waste from the Basin should be maximized.

Safe Yield

All the problems listed above need to be addressed to maintain safe yield. In addition to those steps, maximizing the capture and recharge of storm water and reclaimed water could increase safe yield. The SBCFCD, Riverside County Flood Control and Water Conservation District (RCFCWCD), and the USACE have developed and continue to develop new flood control projects that efficiently convey flood waters out of the Chino Basin and reduce recharge. This has a negative impact on safe yield. Watermaster needs to participate in these flood control projects to maximize recharge. Watermaster and the Chino Basin Water Conservation District initiated a multiphase recharge master plan study and completed Phase 1 in May 1998. Phases 2 and 3 need to be completed.

SECTION 3
GOALS OF THE OBMP

This section presents the mission statement for the OBMP, the issues, needs and interests that were articulated by the stakeholders, and the goals of the OBMP. Each of these items was developed as part of the institutional process. These items were discussed in numerous public meetings and their final form is based on the consensus of those stakeholders that participated in the process.

MISSION STATEMENT

The stakeholders have met twice per month since the February 19, 1998 ruling by Judge Gunn, to develop the OBMP. As part of this process, the stakeholders defined a new paradigm from which they view their stewardship responsibilities, current and anticipated problems in the Basin, and the solution approaches to those problems. This new paradigm is described in the following mission statement and core values developed by the stakeholders:

> *The purpose of the Optimum Basin Management Program is to develop a groundwater management program that enhances the safe yield and the water quality of the Basin, enabling all groundwater users to produce water from the Basin in a cost-effective manner.*

The stakeholders have adopted the following core values associated with the mission statement.

Water Quality. All producers desire to produce water of a quality that is safe and suitable for the intended beneficial use.

Long View. All producers desire a long term, stable planning environment to develop local water resources management projects. The producers, independently and through Watermaster, will strive to take the long view in their planning assumptions and decisions to ensure a stable and robust management program.

Increased Local Supplies. All producers will, for an undetermined time into the future, be dependent on high quality imported water for direct uses and for groundwater replenishment. Because high quality imported supplies may not be available, the producers will strive to minimize their dependency on imported water and to increase their dependency on local supplies when economically justified.

Groundwater Storage. Unused groundwater storage capacity in the Chino Basin is a precious natural resource. The producers will manage the unused storage capacity to maximize the water quality and reliability and minimize the cost of water supply for all producers. The program will encourage the development of regional conjunctive use programs.

Storm Water Recharge. The producers will strive to increase storm water recharge and thereby maintain and enhance the safe yield and water quality.

Reclaimed Water Recharge. The safe yield of the Chino Basin will be enhanced through the recharge of reclaimed water. The producers will strive to maximize the recharge of reclaimed water to enhance the safe yield and water quality.

Cost of Groundwater Supplies. The producers are committed to finding ways to subsidize the cost of using poor quality groundwater in a cost-effective and efficient manner.

MANAGEMENT ISSUES, NEEDS, AND INTERESTS

As part of the OBMP scoping process, issues, needs and interest were solicited from the stakeholders in the Basin. These issues, needs and interests have been summarized in a tabular form in Tables 3-1 through 3-7, where each table refers to a class of issues, needs and interests that include:

- safe yield
- native and imported water recharge
- quality and quantity
- reclaimed water
- conjunctive-use storage
- costs
- human resources and administration

Attribution for the source of each issue, need, and interest is listed in these tables. In some cases, a specific issue, need and interest may show up in more than one class. These needs and interests were discussed at several scoping meetings and were used to focus problem identification, OBMP goals, and the resulting OBMP scope of work.

MANAGEMENT GOALS OF THE OBMP

In June 1998, the stakeholders began the process of developing management goals for the OBMP that address the issues, needs, and interests of the producers. The process involved the proposal of an initial set of goals followed by discussion and group editing at the bi-monthly meetings. The initial set of goals of the OBMP is listed below.

Goal No. 1 – Enhance Basin Water Supplies. This goal applies not only to local groundwater, but also to all sources of water available for the enhancement of the Chino Groundwater Basin. The following activities enhance basin water supplies:

- *Enhance recharge of storm water runoff*. Increasing the recharge of storm water in the Basin will increase the water supplies in the Chino Basin. The relatively low TDS and nitrate concentrations of storm flow will improve groundwater quality.
- *Increase the recharge of recycled water*. The recharge of recycled water above that required for replenishment obligations can be used for safe yield augmentation and/or conjunctive use.
- *Develop new sources of supplemental water*. New sources of supplemental water, including surface and groundwater from other basins, can be used to meet Chino Basin area demands, reduce dependency on Metropolitan supplies, and improve drought reliability.
- *Promote the direct use of recycled water*. Promoting the direct use of recycled water for non-potable uses will make more native groundwater available for higher-priority beneficial uses.
- *Promote the treatment and use of contaminated groundwater*. Groundwater in some parts of the Basin is not produced because of groundwater contamination problems and thus the yield of the Basin may be reduced. The yield of the Basin can be maintained and enhanced by the production and treatment of these contaminated waters.

- *Reduce groundwater outflow*. Increasing groundwater production near the Santa Ana River will increase the streambed percolation of the Santa Ana River into the groundwater basin, and reduce groundwater outflow from the Basin and thereby increase the supply of groundwater in the Basin.
- *Re-determine safe yield.* Recent studies suggest that the safe yield may be greater than the 140,000 acre-ft as stated in the Judgment. The activities listed above will cause the yield to increase further. Continuing to operate the Basin at 140,000 acre-ft/yr will cause groundwater in the Basin to be lost to the Santa Ana River. The safe yield will be re-determined on an as needed basis to maximize the current yield and to cause future increases in yield

Goal No. 2 – Protect and Enhance Water Quality. This goal will be accomplished by implementing activities that capture and dispose of contaminated groundwater, treat contaminated groundwater for direct high-priority beneficial uses, and encourage better management of waste discharges that impact groundwater. The following activities will protect and enhance water quality:

- *Treat contaminated groundwater to meet beneficial uses*. Groundwater in some parts of the basins is not produced because of groundwater contamination problems. Groundwater quality can be protected by intercepting contaminants before they spread. Intercepted groundwater could be treated and used directly for high priority beneficial uses or injected back to the aquifer.
- *Monitor and manage the Basin to reduce contaminants and to improve water quality*. Actively assisting and coordinating with the Regional Board, the EPA, and other regulatory agencies in water quality management activities would help improve water quality in the Basin.
- *Manage salt accumulation through dilution or blending, and the export of salt*.
- *Address problems posed by specific contaminants.*

Goal No. 3 – Enhance Management of the Basin. This goal will be accomplished by implementing activities that will lead to optimal management of the Chino Basin. The following activities will protect and enhance management of the Basin:

- *Develop policies and procedures that will encourage stable, creative and fair water resources management in the Basin*.
- *Optimize the use of local groundwater storage.* Policies and procedures for local storage, cyclic storage and other types of storage accounts will be created to maximize drought protection and improve water quality, and to create an efficient system to transfer water from producers with surplus water to producers that need water.
- *Develop and/or encourage production patterns, well fields, treatment and water transmission facilities and alternative water supply sources to ensure maximum and equitable availability of groundwater and to minimize land subsidence*.
- *Develop conjunctive-use programs with others to optimize the use of the Chino Basin for in-basin producers and the people of California*.

Goal No. 4 – Equitably Finance the OBMP. This goal is based on the following principles:

- *The primary source of revenue to finance the implementation will be the consumers of the Chino Basin groundwater.*

- *The consumers in the Chino Basin must be treated equitably by passing the cost of the OBMP on a per acre-foot basis or by other methods, based on formulas to be determined.*
- *Financial incentives and disincentives will be established to assure that existing groundwater is pumped out of the Basin and a higher quality of water is used to replenish the Basin.*
- *Opportunities for creativity will be provided to the producers so that they are motivated to use their assets and abilities in the implementation of the OBMP.*
- *Recover value from utilization of storage of supplemental water and from rising water outflow.*

The Special Referee and her engineer reviewed these goals and provided direction to the stakeholders. In particular, the Special Referee suggested that the goals and action items were too vague. The goals and action items were refined and produced in a tabular format. The goals setting process concluded on November 26, 1998. The final set of goals is listed in Table 3-8. Table 3-8 lists each goal, the impediments to each goal, action items to surmount each impediment and achieve the goal, and the implication of the individual action items. The stakeholders were asked to review the final set of goals and action items listed in Table 3-8 to make sure that their individual issues, needs, and interests were addressed by the management goals. The stakeholders concluded that the set of goals listed in Table 3-8 addressed their needs and interests.

SECTION 4
MANAGEMENT PLAN

INTRODUCTION

The Optimum Basin Management Program (OBMP) goals, impediments to the goals, action items to remove the impediments, and implications of the action items are summarized in Table 3-8. This section of the OBMP report describes the actions that, when implemented, will achieve the goals of the OBMP. Table 3-8 includes a column that cross-references the action items listed for each goal with OBMP program elements. The program elements described herein include:

- Program Element 1 – Develop and Implement Comprehensive Monitoring Program
- Program Element 2 – Develop and Implement Comprehensive Recharge Program
- Program Element 3 – Develop and Implement Water Supply Plan for the Impaired Areas of the Basin
- Program Element 4 – Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1
- Program Element 5 – Develop and Implement Regional Supplemental Water Program
- Program Element 6 – Develop and Implement Cooperative Programs with the Regional Water Quality Control Board, Santa Ana Region (Regional Board) and Other Agencies to Improve Basin Management
- Program Element 7 – Develop and Implement Salt Management Program
- Program Element 8 – Develop and Implement Groundwater Storage Management Program
- Program Element 9 – Develop and Implement Conjunctive-Use Programs

The scope of the program elements was developed by the Chino Basin stakeholders. Each program element contains a series of comprehensive actions and plans to implement those actions. It is anticipated that a specific implementation program will be the result of Phase II of the OBMP development process. It will include the specific details of how the plan will be implemented and funded, and by whom. Implementation of all program elements is necessary to achieve the goals of the OBMP. Because of overlap and synergies, some of the program elements were combined as they were developed. The following program elements were combined: 3/5, 6/7, and 8/9. The program elements are summarized in this section. Task Memorandums were prepared for each program element during development of the OBMP Phase I Report and are available from the Watermaster offices. They describe each program element in detail and generally include:

- need and function
- description of program element actions
- cost
- implementation entities
- implementation schedule for the short-term (first three years), mid-term (4th through 10th years) and-long term (11th through 50th years)

The emphasis in this section is on a description of OBMP actions, schedule and cost. The program element descriptions provide Watermaster and the Court with a means of comparing actions taken in OBMP implementation with progress in achieving the goals of the OBMP.

PROGRAM ELEMENT 1 – DEVELOP AND IMPLEMENT COMPREHENSIVE MONITORING PROGRAM

Need and Function

Program Element 1 – Develop and Implement a Comprehensive Monitoring Program contains monitoring activities that are action items explicitly listed in Table 3-8 and provides information required by other program elements of the OBMP.

The first impediment to *Goal 1 – Enhance Basin Water Supplies* can be stated as: "Unless certain actions are taken, safe yield of the Basin will be reduced … due to groundwater outflow from the southern part of the Basin." This impediment speaks to the reduction in groundwater production in the southern part of the Basin as agricultural land is converted to urban uses, and to increase outflow as groundwater storage is increased due to other management activities. The amount of safe yield lost due to these activities needs to be computed and used in the administration of the Judgment – otherwise the Basin will be overdrafted. The re-determination of safe yield and estimation of losses from groundwater storage programs require comprehensive water level mapping across the Basin, analysis of water level time histories at wells, and accurate estimations of groundwater production. The current groundwater level monitoring is not adequate. The primary problems with the current groundwater level monitoring program include poor areal distribution of wells in the monitoring program, short time histories, questionable data quality, and insufficient resources to develop and conduct a comprehensive program. Groundwater production estimates from the agricultural pool rely on water duty methods for most of the producers and some producers do not provide the Chino Basin Watermaster (Watermaster) with information upon which production estimates can be made. Rigorous groundwater level and production monitoring programs are described below.

The first impediment to *Goal 2 – Protect and Enhance Water Quality* can be stated as: "Watermaster lacks comprehensive, long-term information on groundwater quality." The primary uses of water quality information include, but are not limited to:

- locate and characterize water quality challenges in the Basin and formulate corrective management plans;
- provide an understanding of how the Basin works;
- determine whether water quality produced by a well is suitable for the desired use (*e.g.*, potable quality for potable use); and
- design treatment systems to improve water quality to a level to meet a desired use.

Currently, Watermaster obtains water quality data from all the appropriators for their active wells and from the Regional Board for wells monitored under their supervision (*e.g.*, landfill monitoring and other special water quality investigations). Watermaster has a limited groundwater quality monitoring program in the southern part of the Basin measuring general minerals and physical properties at about 60 wells. There is little historical or current water quality information for most of the 600 agricultural wells in the southern half of the Basin, for wells in the overlying non-agricultural pool, and for inactive appropriative pool wells. The water quality being produced at a majority of the wells in the Basin is unknown.

A salt budget approach has been proposed as a management tool for the Basin. The salt management steps included in *Program Element 7 Develop and Implement Salt Management Program* will be used by

the Watermaster and other stakeholders to reduce the rate of salt accumulation in the Basin. Groundwater quality monitoring will be used to help assess the state of salt in the Basin in the future after the salt management plans are implemented. The direction and cost of future water management activities in the Basin depends on the water quality. A comprehensive groundwater quality monitoring program is fundamental to management of the Basin. A rigorous groundwater quality monitoring program is described below.

The fifth impediment to *Goal 2 – Protect and Enhance Water Quality* can be stated as: "The Basin is not using as much high quality storm water as it could for recharge." The first step in determining how much storm water recharge is occurring is to monitor the volume of inflow and outflow that is occurring at existing facilities, the amount of storm water that is available for recharge in the absence of recharge facilities, and to estimate the associated water quality. Characterizing the water quality of local and imported waters used for recharge in the Basin is necessary to protect water quality for beneficial uses, assess salt balance, design treatment processes to produce water of a quality suitable for intended uses, and to minimize the cost of recycled water recharge. Engineering investigations can utilize these data to design new facilities, and modify/operate existing facilities.

Storage of water in the Basin for local or regional conjunctive use may cause outflow to the Santa Ana River and some of its tributaries in the Chino Basin to increase. The water quality of this outflow may cause water quality deterioration in the Santa Ana River and require mitigation. Watermaster needs to develop a long-term database to assess losses from storage, and surface water impacts in the Santa Ana River and its Chino Basin tributaries from groundwater management activities.

The second impediment to *Goal 3 – Enhance Management of the Basin* can be stated as: "Existing production patterns are not balanced, cause losses, can contribute to local subsidence, and water quality problems." The impediment speaks to a lack of local balance between groundwater recharge and production. The lack of information on how groundwater moves in the Basin can lead to production and replenishment patterns that cause loss of yield and other problems as stated in the impediment. Groundwater level, groundwater quality, and accurate production estimates are necessary to define the groundwater flow systems and to implement equitable and cost-effective management plans.

Monitoring Programs to Support Water Resources Management in the Chino Basin

Groundwater Level Monitoring Program. Watermaster began a process to develop a comprehensive groundwater level monitoring program in the spring of 1998. The process consists of two parts – an initial survey followed by long-term monitoring at a set of key wells. The initial survey was to consist of collecting groundwater level data at all wells in the Basin from which groundwater level measurements can be obtained for spring 1998, fall 1998, spring 1999, and fall 1999. Due to resource limitations at the Watermaster, the initial survey is partially complete and will not be completed until after fall 2001. The data from the initial survey will be mapped and reviewed. Based on this review and Watermaster management needs, a long-term monitoring program will be developed and implemented in the fall of 2001. Watermaster staff will conduct this program with minimal outside assistance. Watermaster staff expects that they will measure groundwater levels in the initial survey at about 400 wells in overlying agricultural pool and about 100 other wells from the other pools and unassigned monitoring wells. The long-term monitoring program will use about half of the wells used in the initial survey plus all wells in the other pools and unassigned wells monitored under the direction of the Regional Board and others. Keys well located in agricultural areas will be replaced as necessary if the original well must be destroyed when the agricultural land surrounding the well is converted to other use.

Groundwater Quality Monitoring Program. Watermaster will begin the development of a comprehensive water quality monitoring program in July 1999. As with the groundwater level monitoring program, the water quality monitoring program will consist of an initial survey and a long-term monitoring effort. The initial survey will consist of:

- collection of all water quality data from appropriators' wells that are tested by appropriators;
- collection of all water quality data from Regional Board for water quality monitoring efforts that are conducted under their supervision; and
- collection and analysis of at least one water quality sample at all (or a representative set of) other production wells in the Basin. Assumed maximum number of wells sampled by Watermaster staff in the initial survey is 600.

Re-sampling and analysis will be done at wells sampled by Watermaster if volatile organic compounds (VOCs) are detected. These data will be mapped and reviewed. Based on this review and Watermaster management goals in the OBMP, a long-term monitoring program will be developed and implemented in the fall of 2002. The long-term monitoring program will contain a minimum set of key wells that can be periodically monitored to assess water quality conditions in the Basin over time. Table 4-1 lists the analytes and the analytical costs for sampling 200 wells per year for three years (plus an estimated 10 more wells for verification re-sampling). The average annual analytical cost is about $185,000 per year and totals about $555,000 if all wells were sampled. Watermaster staff will be trained to obtain samples at these wells and will require a total of about 140 person-days per year. Outside services will cost about $60,000 per year. Water quality data for all operable wells in the other pools will be provided by the well owners in those pools.

Production Monitoring Program. All wells that produce more than 10 acre-ft/yr will have in-line totalizing flow meters. To accomplish this, about 600 agricultural wells will be equipped with in-line totalizing flow meters. Production records from wells owned by appropriators and overlying non-agricultural pool members will report quarterly as has been done in the past. Watermaster staff will read the meters of wells owned by agricultural pool members at least once a year during the period of mid-May through June. Watermaster staff will digitize all production records in Watermaster's database and use this information in the administration of the Judgment. The cost of the installing in-line flow meters in the overlying agricultural pool is summarized in Table 4-2 and totals about $810,000. It has been recommended by the overlying agricultural pool that Watermaster fund up to 50 percent of the cost, with the remaining funds coming from the individual producers.

In addition to the above, all producers will provide Watermaster on an annual basis a *water use and disposal survey* form that describes the sources of water used by each producer and how that water is disposed after use. The purpose of the form is to provide information to Watermaster that will enable accurate salt budget estimates as described in *Program Element 6 – Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management*, and for other water resources management investigations that may be undertaken by Watermaster in the future as part of the OBMP.

Surface Water Discharge and Quality Monitoring. The current program of measuring water quality at recharge basins should be expanded to all recharge and retention basins that contribute significant recharge to the Basin. Water level sensors will be installed in all recharge and retention basins that contribute significant recharge to the Chino Basin. These facilities were listed in Table 3 of the *Program Element 2 – Develop and Implement a Comprehensive Recharge Program* draft memorandum and are reproduced here in Table 4-3. A total of 16 new water-level sensors will be required at a total cost of

$192,000. Water level data acquisition and water quality sampling will be done by Watermaster staff. The annual cost of laboratory analysis and interpretation of water level and water quality data is about $45,000.

Watermaster needs to assess the existing surface water discharge and associated water quality monitoring programs for the Santa Ana River and its Chino Basin tributaries to determine the adequacy of the existing monitoring programs for characterizing historical ambient conditions and their utility in detecting water quality impacts from future Chino Basin management activities. If necessary, Watermaster could contract with the agencies conducting these programs to modify their programs to accommodate Watermaster. Ideally, a cooperative program involving all the interested agencies could be developed at a reduced cost for all. The cost of the initial assessment of surface water data for the Santa Ana River is about $15,000.

Ground Level Monitoring Program. Ground level surveys are proposed herein as an offshoot of the subsidence issues in Management Zone 1. The stakeholders are interested in determining if and how much subsidence has occurred in the Basin. Watermaster will conduct an analysis of historical ground level survey and remote sensing data to make this determination. The analysis consists of the following tasks:

- Historical survey data collected and/or on file by federal, state, and local agencies will be compiled, mapped, and reviewed to estimate total subsidence for as long a period as possible. Estimated cost to complete this review is about $15,000.
- Synthetic aperture radar (SAR) imagery will be used to assess the time history of subsidence in the Basin for the period 1993 though 1999. Estimated cost to develop this time history is about $20,000. It should be noted that the City of Chino has already conducted a similar investigation for most of the Basin and that the effort described herein is to expand on the work already done by the City.
- Based on the above information, a network of ground elevation stations in subsidence-prone areas will be developed and periodic surveys of these stations will be done. The frequency of periodic surveys will be established for the Basin as a whole with more frequent surveys done for some areas of the Basin. The estimated cost of this effort is not certain. It should be noted that the City of Chino has already conducted a similar survey within the City of Chino and that the effort described herein is to expand on the surveys done by the City to the entire Basin.

These tasks can be accomplished in the first year.

Well Construction, Abandonment and Destruction Monitoring. Watermaster maintains a database on wells in the Basin and Watermaster staff makes frequent well inspections. Watermaster sometimes finds a new well during routine well inspections. The near-term frequency of inspection is expected to increase due to the groundwater level, quality and production monitoring programs. Watermaster needs to know when new wells are constructed as part of its administration of the Judgment. Valuable information for use in managing the Chino Basin is usually developed when wells are constructed including: well design, lithologic and geophysical logs, groundwater level and quality data, and aquifer stress test data. Producers generally notify Watermaster when they construct a new well but seldom, if ever, provide the information listed above. Watermaster has not generally asked for these data. Well owners must obtain permits from the appropriate county and state agencies to drill a well and to put the well in use. Watermaster will develop cooperative agreements with the counties of Los Angeles, Orange, Riverside, and San Bernardino, and the California Department of Health Services (DHS) to ensure that the

appropriate entities know that a new well has been constructed. Watermaster staff will obtain well design, lithologic and geophysical logs, groundwater level and quality data, and aquifer stress test data.

The presence of abandoned wells is a threat to groundwater supply and a physical hazard. Watermaster staff will review its database, make appropriate inspections, consult with well owners, and compile a list of abandoned wells in the Chino Basin. The owners of the abandoned wells will be requested to properly destroy their wells following the ordinances developed by the county in which the abandoned well is located. Watermaster staff will update its list of abandoned wells annually and provide this list to the counties for follow-up and enforcement.

Cooperative Efforts with Appropriate Agencies to Implement Program

Groundwater Level Monitoring. Watermaster will develop a groundwater level measurement protocol for use by all cooperating entities. Groundwater levels will be obtained by the following entities:

- Overlying Agricultural Pool – Watermaster staff
- Overlying Non-agricultural Pool – pool member or Watermaster staff
- Appropriative Pool – pool member or Watermaster staff
- Other wells – Watermaster staff will obtain data from Regional Board or owners.

Groundwater Quality Monitoring. Watermaster will develop groundwater sampling and analysis protocols for use by all cooperating entities. Groundwater quality analyses will be obtained by the following entities:

- Overlying Agricultural Pool – Watermaster staff
- Overlying Non-agricultural Pool – pool member
- Appropriative Pool – pool member
- Other wells – Watermaster staff will obtain data from Regional Board or owners.

Proposed Production Monitoring Program. Watermaster will develop and implement an in-line meter installation program for the overlying agricultural pool. The installation program will take place over a three-year period starting in Watermaster fiscal year 1999/00. Groundwater production estimates and water use and disposal survey forms will be obtained by the following entities:

- Overlying Agricultural Pool – Watermaster will read meters and producers will prepare and submit water use and disposal survey forms
- Overlying Non-agricultural Pool – pool member will read the meters and prepare and submit the water use and disposal survey forms
- Appropriative Pool – pool member will read the meters and will prepare and submit the water use and disposal survey forms.

Surface Water Discharge and Water Quality Program. Watermaster will take the lead in completing the following activities:

- Chino Basin Water Conservation District (Conservation District) and Watermaster will jointly install water level sensors in all existing recharge and retention facilities that have potential for storm water recharge.
- Watermaster staff will obtain grab samples approximately every two weeks for all basins during the rainy season and have these samples analyzed.

- Watermaster will review the surface water discharge and associated water quality monitoring programs for the Santa Ana River and the lower Chino Basin tributaries, and compare what is available from these programs to what is needed for Watermaster investigations under the OBMP.

Ground Level Survey. Watermaster will conduct the analysis to estimate historical subsidence and to monitor future subsidence in the Chino Basin.

Monitoring of Well Construction, Abandonment and Destruction. Watermaster will take the lead in completing the following activities:

- Develop agreements with county and state agencies to notify each other regarding construction of new wells and to obtain construction related information.
- Watermaster staff will prepare a list of abandoned wells and request the owners of abandoned wells to properly destroy their wells.

The counties will follow-up to ensure that abandoned wells within their jurisdiction are properly destroyed.

Implementation Actions and Schedule

First Three Years (1999/00 to 2001/02). The following actions will be completed in the first three years commencing fiscal year 1999/00:

- Complete initial survey for the groundwater level program.
- Complete initial survey for groundwater quality program.
- Complete meter installation program for overlying agricultural pool.
- Complete ground level survey.
- Complete installation of water level sensors in recharge and retention facilities.
- Complete Santa Ana River surface water monitoring adequacy analysis.
- Start and continue surface water discharge and quality monitoring at recharge and retention facilities.
- Develop agreements with county and state agencies regarding notification of new well drilling.
- Well construction and related information will be requested as new wells are identified.
- A list of abandoned wells will be developed annually and the owners will be requested to properly destroy their abandoned wells.

Years Four to Ten (2002/03 to 2010/11). The following actions will be completed in years four through ten, commencing fiscal year 2002/03:

- Start and continue long-term groundwater level monitoring program, cause key wells to be relocated as necessary.
- Start and continue long-term groundwater quality monitoring program, cause key wells to be relocated as necessary.
- Continue production monitoring.

- Conduct remote sensing analysis using synthetic aperture radar or other techniques at least every ten years (2010/11) or sooner, if necessary.
- Participate, as necessary, in the Santa Ana River surface water monitoring.
- Continue surface water discharge and quality monitoring at recharge and retention facilities.
- Well construction and related information will be requested as new wells are identified.
- A list of abandoned wells will be developed annually and the owners will be requested to properly destroy their abandoned wells.

Years Eleven to Fifty (2011/12 to 2050/51). The following actions will be completed in years eleven to fifty, commencing fiscal year 2011/12:

- Continue long-term groundwater level monitoring program, cause key wells to be relocated as necessary.
- Continue long-term groundwater quality monitoring program, cause key wells to be relocated as necessary.
- Continue production monitoring.
- Conduct remote sensing analysis using synthetic aperture radar or other technique at least every ten years (2020/21, 2030/31, 2040/41, 2050/51) or sooner, if necessary.
- Participate as necessary in the Santa Ana River surface water monitoring.
- Continue surface water discharge and quality monitoring at recharge and retention facilities.
- Well construction related information will be requested as new wells are identified.
- A list of abandoned wells will be developed annually and the owners will be requested to properly destroy their abandoned wells.

PROGRAM ELEMENT 2 -- DEVELOP AND IMPLEMENT COMPREHENSIVE RECHARGE PROGRAM

Need and Function of the Program Element

The need for a comprehensive recharge program was described in the introduction to the Final Report for Phase 1 of the Chino Basin Recharge Master Plan (Wildermuth, 1998). Program Element 2 -- Develop and Implement Comprehensive Recharge Program contains action items explicitly listed in Table 3-8.

The first impediment to Goal 1 – Enhance Basin Water Supplies can be stated as: "Unless certain actions are taken, safe yield of the Basin will be reduced … due to groundwater outflow from the southern part of the Basin" speaks to poorly planned recharge where recharge of storm water and recycled water could be placed too low in the Basin to be recovered. Some recycled water projects that are currently being planned will increase recharge when groundwater production downgradient of these proposed recharge projects is decreasing. The result will be increased outflow to the Santa Ana River and no yield improvement. A comprehensive program must ensure that the locations of recharge and production are such that yield is maximized.

The second impediment to *Goal 1 – Enhance Basin Water Supplies* and the fifth impediment to *Goal 2 – Protect and Enhance Groundwater Quality* can be stated as: "The Basin is not using as much high quality storm water as it could for recharge." At the time the Chino Judgment was adopted (1978), about

41 percent of the safe yield was estimated to come from irrigation returns. Since that time, irrigated agriculture has declined and is projected to be almost completely converted to urban uses by 2020. This will result in a decline of irrigation returns to groundwater and a potential decrease in the safe yield. San Bernardino County, Riverside County, and the US Army Corps of Engineers (USACE) have constructed flood control projects that efficiently capture and convey storm flow to the Santa Ana River, effectively eliminating the groundwater recharge that formerly took place in the stream channels and flood plains in the Chino Basin. In most cases, no provisions were made to mitigate the loss of recharge from flood control projects. Also, there have been no mitigation efforts to preserve recharge when land use is converted from native and agricultural uses to urban uses. Thus, the safe yield may have decreased in the Chino Basin due to land use changes and flood control improvements. Water harvesting opportunities exist that can be used to offset the yield lost to urbanization and flood control improvements. Water harvesting consists of capturing and recharging new storm flow caused by urbanization. Most of the precipitation falling on undeveloped land or land in agricultural uses is lost to evapotranspiration. Storm flow increases dramatically with urbanization due to an increase in impervious land cover, decrease in evapotranspiration of rainfall, and construction of drainage improvements. The potential yield from this additional storm flow is numerically equal to the increase in storm flow that occurs when the land is converted to urban uses. The actual yield is equal to the additional rainfall-storm flow that is captured and put to beneficial use. In the Chino Basin, the best and least expensive way to put this new water to beneficial use is groundwater recharge.

Increasing the yield of the Chino Basin by increased capture of storm flow will improve ambient water quality and increase the assimilative capacity of the Chino Basin. Increasing the capture of storm flow will reduce the cost of mitigation requirements for recharge of recycled water. The Basin Plan assumes that a certain average annual quantity of storm flow will be recharged each year. The volume of recycled water that can be used in the Basin, without total dissolved solids (TDS) mitigation, is numerically-tied to the average annual quantity of storm flow that recharges the Basin. A decrease in the recharge of storm flow will result in a decrease in the volume of recycled water that will be permitted in the Basin without TDS mitigation. Likewise, an increase in the recharge of storm flow will result in an increase in the volume of recycled water that will be permitted in the Basin without TDS mitigation. Therefore, the volume of storm flow recharge from storm flow has a dramatic impact on the future and cost of recycled water recharge.

The annual replenishment obligation will grow from about 30,000 to 55,000 acre-feet per year (acre-ft/yr) over the next 20 to 30 years. Watermaster has access to spreading facilities with a current capacity of about 29,000 acre-ft/yr when imported water from Metropolitan is available. Assuming replenishment water is available seven out of ten years, the average annual recharge capacity of recharge facilities available to Watermaster is about 20,000 acre-ft year. The in-lieu recharge potential for the Chino Basin is about 57,000 acre-ft/yr and will remain constant over the next 20 to 30 years based on the water supply plan included in this OBMP. Assuming in-lieu replenishment water is available seven out of ten years, the average annual in-lieu recharge capacity available to Watermaster is about 40,000 acre-ft year. The replenishment obligation, available recharge capacity over the next 20 years is (acre-ft/yr):

Year	Replenishment Obligation	----------Recharge Capacity----------			Surplus Recharge Capacity
		Physical	In-Lieu	Total	
2000	31,000	20,000	40,000	60,000	29,000
2020	55,000	20,000	40,000	60,000	5,000

The surplus recharge capacity could be used up quickly by future replenishment needs and implementation of conjunctive-use programs. A modest conjunctive use program consisting of an annually occurring seasonal shift of imported demands and a dry year yield component that would use up 150,000 acre-ft of storage will require about 46,000 acre-ft of recharge capacity. New recharge capacity is needed immediately for even a modest conjunctive-use program. The availability of in-lieu recharge capacity listed above is not a certainty. In the present mode of basin management, in-lieu recharge capacity is available on an ad hoc basis and requires the cooperation of water supply agencies that have access to supplemental water. Watermaster needs to obtain enough recharge capacity to meet its replenishment obligations for ultimate demands on the Chino Basin. The safest and most conservative way to ensure that recharge capacity will be available is for Watermaster to develop new recharge capacity that will meet ultimate replenishment obligations. For an average annual recharge capacity of 55,000 acre-ft/yr, Watermaster will need an annual recharge capacity of about 80,000 acre-ft/yr (80,000~55,000/0.7). The new recharge capacity by management zone for the year 2020 is estimated to be about:

Management Zone 1	18,000 acre-ft/yr
Management Zone 2 and 3	34,000 acre-ft/yr
Total	52,000 acre-ft/yr

The allocation of recharge capacity to management zones is based on balancing recharge and production in each management zone with the year 2020 production pattern described in Program Elements 3 and 5. Figure 4-1 shows the existing spreading and storm water retention basins in the Chino Basin. Figure 4-1 also shows the preferred area, based on current knowledge, for new recharge basins in Management Zone 2 and 3. The preferred recharge area is rapidly developing. It is unlikely that Watermaster will be able to purchase lands already in urban use and construct new basins. Therefore, Watermaster needs to obtain new recharge sites in the preferred area immediately. Recharge capacity in Management Zone 1 can be obtained by expanding recharge capacity at the Montclair Basins, improving the Upland and Brooks Basins, and through groundwater injection. During Phase II of the OBMP, Watermaster will develop an implementation plan to secure a total physical recharge capacity of about 80,000 acre-ft/yr with recharge facilities sized and located that will balance the production and recharge.

Past Efforts by Watermaster and the Conservation District

The Conservation District and the Watermaster completed phase 1 of a three-phase work plan to improve recharge and establish a long-range recharge master plan for the Chino Basin. The three phases consist of:

Phase 1 - Initial Screening and Assessment. Conduct an assessment of how much storm flow is currently recharged and how much additional recharge could occur at new and existing spreading basin sites. From this assessment a list of promising spreading basins will be developed. Research questions will be developed for the promising sites and a detailed scope of work will be developed for Phase 2. Phase 1 was completed in January 1998 and is summarized below.

Phase 2 - Engineering Assessments of Promising Sites. Site-specific investigations, percolation rate monitoring and the preparation of cost estimates for developing and managing these basins will be developed in this phase. The institutional issues regarding ownership of facilities, management of non-Conservation District-owned facilities, disposition of water recharged, and Basin Plan modifications will be identified.

Principles of agreement will be developed that describe the institutional issues and means to resolve these issues through agreements. A list of recharge projects will be identified and prioritized based on need and cost effectiveness. A detailed scope of work will be developed for Phase 3.

Phase 3 - Develop an Implementation Plan. A plan to develop and manage spreading basins will be prepared. The plan will include existing and new basins and a schedule for spreading basin improvements based on developing recharge capacity to match need for increased groundwater yield at minimum cost.

The Phase 1 effort was completed in January 1998. The objective of the Phase 1 analysis of the Recharge Master Plan was to determine the potential for artificial recharge given the resources in the Chino Basin. This was accomplished through data collection, research, and a massive computational and engineering assessment. Existing storm water recharge in the Chino Basin was estimated to be about 12,000 acre-ft/yr. This 12,000 acre-ft is part of the existing safe yield. The potential storm water recharge was estimated to range from about 25,000 to 30,000 acre-ft/yr given proper routine maintenance at existing and then-current planned facilities. Subsequent investigations by the Conservation District suggest that the potential recharge is lower. Incorporating the Conservation District's recent work, the potential range is probably around 12,000 to 22,000 acre-ft/yr. Table 4-4 lists the existing flood control/spreading basins and annual average recharge estimates based on updated Phase 1 modeling results. Most basins are not maintained to optimize recharge and there is little quantitative information on basin conditions or current recharge performance. Recharge of storm flows at existing basins could reach about 28,000 acre-ft/yr under ultimate land use conditions. The investigation also showed that it was economical to construct recharge facilities in areas with low percolation rates (<0.25 ft/day) if the facilities were part of a flood retention project. The potential recharge capacity and cost for recharge of imported and recycled water were developed. Operational plans that specify the amount and scheduling of imported water and recycled water recharge were developed. About 17,000 acre-ft/yr of recycled water recharge capacity was developed. The potential for imported water recharge ranges from about 100,000 acre-ft/yr to 135,000 acre-ft/yr at existing basins and one new large facility. Based on the work done for Program Elements 3 and 5 of the OBMP, the imported water recharge capacity needs to be expanded from its current capacity of 29,000 acre-ft/yr to about 80,000 acre-ft/yr to accommodate Watermaster replenishment activities.

Phase 2 Scope of Work for Hydrogeologic and Engineering Investigations

The Phase 2 work, as recommended in the Phase 1 report, was not formally started. Phase 2 consists of eight tasks.

Task 1 Conduct Reconnaissance Analysis to Identify Existing Recharge Basins and Potential New Recharge Sites. The purpose of this task is to develop a list of existing basins that can be used to recharge storm water, recycled water and imported water; and to identify areas for new recharge facilities. Based on the results of this task, some existing basins and new sites with potential for recharge by spreading and injection will be studied in detail in subsequent tasks and others with little potential recharge will either be studied later or not considered as recharge sites. This task consists of the following subtasks:

1.1 Meeting(s) with San Bernardino County Flood Control District (SBCFCD), Riverside County Flood Control and Water Conservation District (RCFCWCD), Los Angeles County Public Works Department (LACPWD) (collectively, the flood control agencies), the USACE, the Conservation District and the Watermaster. The purpose of these meetings is to discuss the use of existing flood control/recharge basins, recharge potential of these basins, past

investigations, future flood control plans that could in include recharge, and institutional impediments to storm water recharge.

1.2 Meetings with planning agencies and the flood control agencies to inform these agencies of the need to set aside open space for recharge and to locate suitable areas for future recharge sites; to seek their cooperation in obtaining such lands, and to develop incentive programs to set aside land for recharge. A permanent basin-wide water conservation planning committee chaired by the Watermaster will be formed to facilitate the process of building and maintaining recharge facilities.

1.3 Develop a financing concept to provide capital for the improvement of existing facilities, construction of new facilities, operations and maintenance, and to mitigate adverse impacts of new spreading basins.

1.4 Review new hydrogeologic and facilities information that became available after completion of the Phase 1 analysis.

1.5 Evaluate Phase 1 computer simulation results to determine the location and magnitude of storm flow that is not being captured at existing facilities and that could be captured and recharged in either new facilities or from improved operations at existing facilities.

1.6 Develop a list of existing and proposed recharge facilities that merit detailed investigation. The priority list should be based on management issues (*e.g.*, subsidence and water quality), cost effectiveness, and for existing facilities, the availability of the facilities for recharge.

1.7 Conduct reconnaissance level feasibility investigation of using injection wells for recharge in Management Zone 1. The purpose of this recharge will be to increase the piezometric levels, reduce future subsidence, and improve water quality.

Task 2 Preliminary Assessment of the Capture of New Recharge. The objective of this task is to estimate the fate of artificial recharge. That is, to estimate the recharge benefits, areas of potential high groundwater, and losses to the Santa Ana River. The scenarios to be tested include recharge scenarios developed in the Phase 1 analysis (modified based on the results of Conservation District investigations and the results of Task 1). The *Rapid Assessment Model (RAM) Tool,* currently under development by the Watermaster, or *Chino Integrated Groundwater Surface Water Model (CIGSM)* are two models that could be used to make this assessment. It is not likely that the CIGSM would be used due to the time and expense to make it ready for use (see Program Elements 6 and 7 later in this section).

Task 3 Conduct Field Program. The purpose of this task is to develop fundamental information that can be used to assess the recharge potential of some existing and proposed basins, and to develop design information for new basins. The field program recommended for Phase 2 includes:

- obtaining and interpreting continuous cores for the upper 50 feet of sediment in existing facilities and the upper 100 feet of sediments from areas adjacent to existing and proposed basins;
- trenching to observe and interpret the near surface soil profiles;
- gradation tests of materials obtained from the trenches; and

- the installation of water level sensors identical to what Conservation District has installed in some of their basins.

Water level data will be collected at basins that are equipped with water level sensors. These data will be interpreted to produce percolation rates at each basin. The percolation rates will be correlated to soil properties and subsurface conditions to determine what is controlling recharge at a specific facility and to develop general design guidelines for the Chino Basin area. The field program is summarized in Table 4-5 covers 16 existing basins and up to three new surface water recharge facilities. Table 4-5 includes a cost estimate for this field program. Field programs for injection tests in Management Zone 1 will be developed in the work done in Program Element 4 – Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1.

Task 4 Develop Principles of Agreement. This task involves developing principles of agreement between SBCFCD, RCFCWCD, USACE, the Conservation District, and the Watermaster regarding the operation of existing and proposed storm flow management facilities. The goals of the principles are to maintain flood protection and maximize recharge. This work will involve the preparation of draft principles and many meetings. New technical information will need to be developed on an *ad hoc* basis in response to technical issues that will be involved in the principles. A set of principles will be developed with the Regional Board regarding TDS and nitrogen offset credits for recharge of recycled water.

Task 5 Develop Preliminary Operating Plans and Designs. Preliminary operating plans and facility improvements will be developed for all (new and proposed) recharge basins in the Chino Basin based on the results of Tasks 1 through 4. Preliminary capital and operating cost estimates will be developed.

Task 6 Estimate the Average Annual Recharge for Each Basin. Given the results of Tasks 1 through 5, the input data for the computer simulation models used in Phase 1 will be updated. The simulation models will be used to estimate the average annual recharge in each recharge basin. Estimates of imported water and recycled water recharge capacity will be updated. The priority list developed in Task 1 will be updated based on the results of this task.

Task 7 Develop Early Action Plan and Scope of Work for Phase 3. Given the results of Tasks 1 through 6, an early action plan and scope of work for Phase 3 will be developed. The early action plan, will include a list of high priority recharge projects that can be implemented with minimal additional analyses, and a list of lower priority projects that will require longer lead times to implement. These projects may include operating existing facilities to increase recharge, other non-controversial modifications to existing facilities, and construction of new recharge facilities. The scope of work will contain engineering design, environmental assessment and processing, and financing tasks. The scope of work will contain parallel tracks for the early action plan and the lower priority projects.

Task 8 Prepare Report. Technical memoranda will be prepared for Tasks 1 through 7. A final summary report will be prepared incorporating the task memoranda and a scope of work for Phase 3.

Cooperative Efforts with Appropriate Agencies to Implement Program

There are two fundamental levels of implementation appropriate for the comprehensive recharge program: one to develop the program, and one to construct, manage and operate the program. For development of the program, the implementing agencies include:

- the Watermaster, representing the producers who will benefit from the recharge and who will pay the cost of the plan development and implementation;

- the Conservation District, the flood control agencies, and the USACE who own the existing facilities and who (for the flood control agencies) will benefit from reduced flood control costs and improved storm water quality in the Santa Ana River and its tributaries;
- the planning agencies whose cooperation will be necessary to site new recharge facilities within their service areas; Inland Empire Utilities Agency (IEUA), Three Valleys Municipal Water District (TVMWD), and Western Municipal Water District (WMWD) as the provider of imported and recycled water for recharge; and producers that will utilize their own facilities for groundwater injection.

Watermaster will develop the recharge program for the Basin in the first four years of OBMP implementation. Watermaster will enter in to agreements with cooperative entities to implement the recharge program. Potential cooperative entities include Conservation District, the flood control agencies, USACE, Metropolitan Water District of Southern California (MWDSC), IEUA, TVMWD, and WMWD. These contracts will include specific performance goals and schedule. Watermaster will monitor these contracts very closely. If the cooperative entities fail to perform according to the terms of their contract, then Watermaster will terminate the agreements and either enter into an agreement with another cooperative entity or implement the program itself.

Implementation Actions and Schedule

First Three Years (1999/00 to 2001/02). The following actions will be completed in the first three years commencing fiscal year 1999/00:

- The Phase 2 scope of work should be completed within the first three years.
- Based on the results of the Phase 2 work, a list of high priority and low priority recharge projects will be identified. An action plan will be developed to implement the high priority projects as soon as possible and to implement the low priority projects as resources will allow.
- Task 1.1 and 1.2 should begin immediately, prior to the OBMP being submitted to the Court for approval.
- Watermaster advisory committee should form an *ad hoc* committee to start the coordination process and formalize the permanent basin-wide water conservation planning committee. Task 1.5 should also begin immediately.
- In year three, all high priority projects that involve re-operation of existing recharge/flood control facilities should be implemented, and Phase 3 should be started.
- Watermaster should begin the process of acquiring new recharge sites and easements identified in the Phase 2 and 3.

Years Four to Ten (2002/03 to 2010/11). The following actions will be completed in years four through ten, commencing fiscal year 2002/03:

Years four and five

- Complete Phase 3.
- Implement all high priority projects that involve construction and re-operation at existing facilities.

- Watermaster should continue the process of acquiring new recharge sites and easements identified in the Phase 2 and 3. By year five, recharge sites should have acquired to recharge at least 55,000 acre-ft/yr.
- Update the comprehensive recharge program in year 5.

Years five to ten

- Implement all high priority projects that involve the construction of new recharge facilities.
- Update the comprehensive recharge program in year 10.

Years Eleven to Fifty (2011/12 to 2050/51). The following actions will be completed in years eleven to fifty, commencing fiscal year 2011/12:

- Implement all other recharge projects based on need and available resources.
- Update the comprehensive recharge program every five years.

PROGRAM ELEMENT 3 – DEVELOP AND IMPLEMENT WATER SUPPLY PLAN FOR THE IMPAIRED AREAS OF THE BASIN

PROGRAM ELEMENT 5 – DEVELOP AND IMPLEMENT REGIONAL SUPPLEMENTAL WATER PROGRAM

Need and Function of the Program Elements

These program elements serve the OBMP goals listed in Table 3-8. The specific goals, impediments and action items are described below.

The first impediment in *Goal 1 – Enhance Basin Water Supplies* can be stated as: "Unless certain actions are taken, safe yield of the Basin will be reduced due to outflow from the southern part of the Basin." The fourth impediment in *Goal 2 – Protect and Enhance Water Quality* can be stated as: "Poor ambient groundwater quality limits direct use of groundwater and can lead to loss of Basin yield." Most of the agricultural land use in the southern part of the Basin will convert to urban uses over the next 20 to 30 years. Groundwater from the southern part of the Basin will have to be treated prior to use for these new land uses. Groundwater outflow to the Santa Ana River will occur if the decrease in agricultural groundwater production in the southern part of the Basin is not matched by an increase in municipal groundwater production in the same area. The increase in outflow will result in a decrease in safe yield that will reduce the initial rights of the producers in appropriative pool by about 74 percent. The increase in groundwater outflow to the Santa Ana River will cause an increase in river discharge and a degradation of water quality in the river. Currently, agricultural production in the southern part of the Basin is estimated using primarily water duty methods to be about 40,000 acre-ft/yr. Annual estimates of agricultural production are expected to be larger after in-line meters are in place. If the current level of groundwater production in the southern part of the Basin were to cease, the rising water discharge to the Santa Ana River could increase by approximately the numerical equivalent of the current production – about 40,000 acre-ft/yr. This new discharge would have an associated TDS concentration of about 1,300 milligrams per liter (mg/L) (almost twice the basin plan objective of 740 mg/L and 2.5 times the secondary drinking water MCL of 500 mg/L) and a nitrogen concentration of 30 mg/L-N (three times the basin plan objective of 10 mg/L-N and primary drinking water MCL of 10 mg/L-N). The Santa Ana River downstream of the Chino Basin is the primary drinking water supply for most of Orange County. Therefore, Santa Ana River water quality impacts caused by not producing Chino Basin groundwater will adversely affect the municipal water supplies in Orange County. The Regional Board has indicated that

any adverse impacts to the Santa Ana River water quality associated with increased outflows from Chino Basin groundwater will have to be completely mitigated – presumably by desalting recycled water discharges to the Santa Ana River.

The third impediment in Goal 1 – Enhance Basin Water Supplies can be stated as: "Because there is a lack of assimilative capacity for total dissolved solids and nitrogen in the Chino Basin, there are economic limitations on the recharge of recycled water." Most of the recycled water produced in the Basin is exported out of the Basin because of either lack of demand for direct use or economic limitations caused by the lack of assimilative capacity in the Chino Basin. The TDS and nitrogen objectives in the Santa Ana Watershed are under rigorous review and new water quality objectives and water recycling guidelines should be implemented in the next few years. Recharge of recycled water could be used to replenish over-production, supplement the yield of the Basin, and lower the demand for imported water from the Sacramento Delta. There are three treatment options that that can be used to enable the recharge of recycled water: desalting recycled water prior to recharge, desalting groundwater to offset the salt load in the recycled water, and blending recycled water with low TDS imported and/or storm waters.

The fourth impediment in *Goal 1 – Enhance Basin Water Supplies* can be stated as: "Because future demands are increasing and there are limitations on basin and traditional supplies, new sources of supplemental water need to be developed." Alternatives to the use of imported water from MWDSC need to be developed to meet future demands, improve reliability and minimize cost of supplies. The new supplies include recycled water, groundwater from adjacent basins, Santa Ana River water and other waters as can be identified and conveyed to the Chino Basin.

The third impediment in *Goal 2 – Protect and Enhance Water Quality* can be stated as: "There is ongoing legacy contamination in the vadose zone with TDS and nitrogen from agriculture." The vadose zone that underlies areas that were or are currently in agricultural use is likely to be degraded with TDS and nitrogen. The vadose zone will contribute to future TDS and nitrogen degradation of the saturated zone. The primary areas of concern are the areas that were formerly in citrus in the northern part of the Basin and the entire southern half of the Basin. There are two significant implications of legacy contamination in vadose zone: groundwater degradation from TDS and nitrogen will continue into the future long after the agriculture has left – even if extraordinary efforts are used to clean up degraded groundwater; and, groundwater treatment ranging from blending to desalting will be necessary far into the future to put the degraded groundwater to beneficial use.

There are other goals and impediments to goals that are listed for these program elements, but they are somewhat redundant with those listed above and are not described herein. Fundamentally, the goal of Program Elements 3 and 5 is to develop a regional, long range, cost-effective, equitable, water supply plan for producers in the Chino Basin that incorporates sound basin management. The water supply plan developed during Phase II of the OBMP process will include:

- a cost-effective plan to maximize the beneficial use of Chino Basin groundwater and the safe yield.
- a program to reliably meet the long-term water supply needs of area purveyors.
- an implementation program.

Water Demand Planning Assumptions

The planning assumptions and basic data used to develop and evaluate water supply plans are described below.

Available Water Supply from the Impaired Area. As urbanization of the agricultural areas of San Bernardino and Riverside counties in the southern half of the Basin occurs, the agricultural water demands will decrease and urban water demands will increase significantly. Future development in these areas is expected to be a combination of urban uses (residential, commercial, and industrial). The cities of Chino, Chino Hills, and Ontario, and the Jurupa Community Services District (JCSD) are expected to experience significant new demand as these purveyors begin serving urban customers in the former agricultural area. For planning purposes, the agricultural area is assumed to be fully developed by the year 2020.

Based on current estimates of overlying agricultural pool production, it is expected that at least 40,000 acre-ft/yr of groundwater will need to produced in the southern part of the Basin to maintain the safe yield. Actual replacement groundwater production required could be far greater than 40,000 acre-ft/yr if current agricultural production is greater than reported to Watermaster. Recall in the Section 2 discussion on Chino Basin production, that there was a difference in the agricultural production reported to Watermaster (based on water duty methods) and the production estimates developed in the CBWRMS based on water duty methods and water budget modeling, with Watermaster's estimates being about 26,000 acre-ft/yr lower for the period 1978 to 1989. Watermaster will install in-line meters on all wells over the next three years after which accurate estimates of agricultural production will be available. If these estimates show that agricultural production is higher than previously reported, then the groundwater production rates from the southern part of the Basin will have be increased to maintain yield.

Water Supply Plans. Water demands, supply projections for agencies that produce groundwater from the Chino Basin, and estimates of the safe operating yield of the Basin are the basis for evaluating the water supply plans presented in this analysis. Initial water supply plans were developed by Montgomery Watson in 1998 and modified by WE, Inc., based on information supplied by the municipal and industrial producers. The initial plans are shown in Table 2-17.

Based on the data presented in Section 2, the municipal and industrial demands are projected to increase 30 percent between 2000 and 2020. Several agencies will experience increases in demand exceeding 30 percent over the next 20 years, including the cities of Chino, Chino Hills, Norco, Ontario, Cucamonga County Water District (CCWD), Fontana Water Company (FWC), JCSD, and the West San Bernardino County Water District (WSBCWD). Forecasts from municipal and industrial entities indicate that water supply sources for the Chino Basin in 2020 will consist predominantly of Chino Basin wells through direct use or treatment and use, groundwater and treated surface water from other basins, and MWDSC supplies.

The demand data in Section 2 and individual water supply plans were used to quantify the future demand for each purveyor that will need to be satisfied from new water supply sources. Future sources for each purveyor were evaluated and classified into two categories: secure sources and non-secure sources. Secure sources are those with a high probability of being available throughout the planning period. These include existing and available supplies from Chino Basin wells, existing water and desalter plants (*i.e.*, WFA/JPA, CCWD, and TVMWD water treatment plants and Santa Ana Watershed Project Authority [SAWPA] Desalter), imported treated MWDSC water from the Weymouth treatment plant, and imported surface water from other basins. Non-secure sources are not currently available and must be developed to serve the Basin purveyors. These depend on a future event, such as the construction of a treatment plant or acquisition of a new water source.

Table 4-7 lists the 2020 demand projections, projected secure water supply sources including Chino Basin groundwater, production rights, over/under production, the water needed in the future, and the

replenishment obligations. The quantity of water that will be required by each water purveyor was found by subtracting the secure water supply for each purveyor from the purveyor's 2020 demand.

As shown in Table 4-6 of the 404,000 acre-ft/yr of total demand predicted in 2020, approximately 364,000 acre-ft/yr will be met from secure water sources with the remaining 40,000 acre-feet of demand being met from projects described in this program element. The breakdown of the 40,000 acre-ft/yr by purveyor from largest to smallest user is as follows:

Jurupa CSD	10,720 acre-ft/yr
City of Chino	9,540 acre-ft/yr
City of Ontario	8,400 acre-ft/yr
City of Chino Hills	5,600 acre-ft/yr
City of Norco	3,260 acre-ft/yr
Santa Ana River WC	2,170 acre-ft/yr
Swan Lake	350 acre-ft/yr
Total in 2020	40,040 acre-ft/yr

The demand in years 2005, 2010, and 2015 was predicted assuming a uniform increase in annual demand for each of the above purveyors. Table 4-7 lists the demands for these intermediate planning years.

For the purpose of this analysis, it was assumed that there is approximately 48,000 acre-ft/yr of agricultural production in the southern part of the Chino Basin in the year 2000, and that this production will reduce to about 8,000 acre-ft/yr in the year 2020. This decline in agricultural production must be matched by new production in the southern part of the Basin or the safe yield in the Basin will be reduced. The remaining 8,000 acre-ft/yr of production in the southern part of the Basin will be used by the State of California.

Potential Supplemental Water Supply Sources. An evaluation of potential future supplemental water supply sources is given in Table 4-8. Of these sources, the most viable is supplied through existing basin conventional water treatment plants that treat imported State Water Project (SWP) water from MWDSC. For the purposes of this analysis, it is assumed that future supplemental water supplies will come from expansion of the CCWD Lloyd Michael water treatment plant (WTP) and the WFA/JPA Agua de Lejos WTP.

Alternative Water Supply Plan Descriptions

Four initial water supply plan alternatives and ten subalternatives were developed. The initial alternatives consisted of various combinations of wells, desalters, water treatment plants, water and brine pipelines, and pumping stations. Purveyors that will require new water supplies include the cities of Chino, Chino Hills, Ontario, Norco, JCSD, Santa Ana River Water Company (SARWC), and Swan Lake. A fifth alternative was also developed that included three subalternatives for various levels of recycled water use. The water supply plans are described in detail in the Task Memorandum on file with the Watermaster for this Program Element. The initial alternatives that were evaluated included:

Alternative 1: Supplemental Water Deliveries Only

- Subalternative 1A: Supplemental Water Delivery – Agricultural Converts to Urban Uses
- Subalternative 1B: Supplemental Water Delivery – Agricultural Use Stays

Alternative 2: Groundwater Pump, Treat, and Serve Only

- Subalternative 2A-1: Regional Groundwater Pump, Treat, and Serve – Agricultural Converts to Urban Uses
- Subalternative 2A-2: Ad Hoc Groundwater Pump, Treat, and Serve – Agricultural Converts to Urban Uses
- Subalternative 2B-1: Regional Groundwater Pump, Treat, and Serve – Agricultural Use Stays
- Subalternative 2B-2: Ad Hoc Groundwater Pump, Treat, and Serve – Agricultural Use Stays

Alternative 3 – Conjunctive Use

- Subalternative 3A: Conjunctive – Agricultural Converts to Urban Uses
- Subalternative 3B: Conjunctive – Agricultural Use Stays

Alternative 4: Supplemental Water Delivery and Regional Groundwater Pump, Treat, and Serve

- Subalternative 4A: Supplemental Water Delivery and Regional Pump, Treat, and Serve – Agricultural Converts to Urban Uses
- Subalternative 4B: Supplemental Water Delivery and Regional Pump, Treat, and Serve – Agricultural Use Stays

Alternative 5: Reclaimed Water Delivery

- Subalternative 5A: Direct Non-Potable Reuse Only
- Subalternative 5B: Reclaimed Water Delivery for Spreading Only
- Subalternative 5C: Direct Non-Potable Reuse and Recharge of Reclaimed Water

Recommended Water Supply Plan for the OBMP

Considerable discussion of the alternative water supply plans occurred at the OBMP workshops in February through May of 1999. The discussions focused, in part, on the assumption and details of each alternative and cost. Based on technical, environmental, and cost considerations, the stakeholders selected Alternative 4A for detailed review and refinement. Alternative 6A was developed based on Alternative 4A and 5C, includes an accelerated desalting schedule and has no future supplemental water deliveries to the southern part of the Basin. The Alternative 6A water supply plan consists of the following key elements.

Groundwater Production Pattern. Groundwater production for municipal use will be increased in the southern part of the Basin to: meet the emerging demand for municipal supplies in the Chino Basin, maintain safe yield, and to protect water quality in the Santa Ana River. All new southern Basin production will require desalting prior to use. The cities of Chino, Chino Hills, Ontario and Norco, and the JCSD will maximize their use of groundwater from the southern part of the Basin prior to using other supplies. The SAWPA desalter, currently under construction will have to be expanded from 8 million

gallons per day (mgd) to 10 mgd by 2003. Two new desalters will be constructed – the *east* and *west* desalters. The east desalter will need to be on-line by late 2003 at a capacity of 14 mgd. The west desalter will need to be on-line by 2010 with a capacity of 7.5 mgd. Both these new desalters will be expanded in the future. The cost of the southern Basin desalting system will be shared by all Basin producers such that the agencies making direct use of this water above are not unfairly burdened with the cost of treating this water. It was demonstrated during discussions on this program element that equitable cost sharing could be achieved. It was also demonstrated that the groundwater production pattern in the Alternative 6A water supply plan was the least cost plan when lost safe yield and Santa Ana River water quality mitigation costs are avoided. The stakeholders came to an agreement on May 27, 1999 that the Alternative 6A water supply plan should be included in the OBMP.

The total replenishment obligation associated with this groundwater production pattern is 31,000 acre-ft/yr in the year 2000 and will increase to about 55,000 acre-ft/yr by the year 2020. The replenishment obligation can be satisfied using water in local storage, direct recharge of imported and recycled water, and by in-lieu exchange.

Imported Water. Imported water use will increase to meet emerging demands for municipal and industrial supplies in the Chino Basin area, Watermaster replenishment, and conjunctive use. Expanded use of imported water in the northern part of the Basin will have a lower priority than maintaining groundwater production in the southern part of the Basin.

Recycled Water. Recycled water use (direct use and recharge) will increase to meet emerging demands for non-potable water and artificial recharge. Under the current Basin Plan, all new recycled water use will require mitigation for TDS and nitrogen impacts. Recycled water use will be expanded as soon as practical. The two new desalters described above and the increase in storm water recharge will provide mitigation for the expanded use of recycled water.

Under Alternative 6A , two new desalters will be constructed and the SAWPA desalter currently under construction will be expanded immediately. The general location of these desalters, their respective well fields, product water pipelines, and delivery points are shown in Figure 4-2. Table 4-9 shows the timetable for the new desalters along with the salt removal capacity of these desalters. Table 4-10 contains the capital and annual costs for these facilities. An initial financing and cost sharing plan for this part of the OBMP will be developed during the Phase II OBMP process.

Implementation Requirements and Issues

Technical evaluation requirements and issues relating to facilities siting, facilities description and operations, and technical feasibility include:

- Basin exploration to assess ambient water quality and potential well field locations.
- Geotechnical and hydrogeological investigations.
- Siting investigations for desalters, wells, pipelines, and other facilities.
- Pump tests to determine viability of aquifer production.
- Modeling for safe yield impacts for alternatives identified in the OBMP.
- Preliminary engineering (reverse osmosis [RO] process design, facility layouts, pipeline alignments).
- Aquifer and groundwater quality monitoring.
- Santa Ana Regional Interceptor (SARI) capacity/availability.

- Analyses of the availability/capacity of existing infrastructure.
- Project phasing schedule.
- Construction delivery method (design-bid-build versus design-build).

Financial evaluation requirements and issues include:

- Economic feasibility analysis.
- Project financing plan.
- Interagency agreements/approvals/contracts.
- Potential impact on replenishment obligations.
- Cost/benefit analyses to evaluate incentives.
- Method of operation (agency operation versus contract operation).
- Future availability of MWDSC incentives.
- Sale of rising groundwater to Orange County.

California Environmental Quality Act (CEQA) and permitting requirements and issues include:

- Selection of implementing/lead agency.
- Preparation of necessary documents for CEQA/ National Environmental Policy Act (NEPA) compliance.
- Compliance with Basin Plan.
- Regulatory requirements/approvals from DHS and Regional Board Requirements.
- Interagency agreements/approvals/contracts.

Implementing Agencies

There are a number of specific responsibilities that must be defined when implementing any of the previously discussed alternatives. These responsibilities are listed in Table 4-11. One agency could assume all the responsibilities listed in Table 4-11; however, reality dictates that no single agency can typically meet all of these responsibilities. The following section provides a description of the agencies that could become the lead implementing agency for the construction, operation, and technical and financial support of the chosen water supply alternative.

Chino Basin Watermaster. Watermaster was created on January 27, 1978 by the San Bernardino County Superior Court after extensive negotiations between the municipal, industrial, and agricultural producers. The Chino Basin Watermaster is the entity charged with administering adjudicated water rights and managing groundwater resources within the Chino Basin. The Watermaster's primary responsibilities include: manage and control the replenishment of water supplies in the Basin, acquire and spread replenishment water as needed, approve and facilitate the storage of supplemental water in the Basin, and develop and implement an optimum basin management program to manage the Basin.

Inland Empire Utilities Agency. IEUA, formerly the Chino Basin Municipal Water District, serves 570,000 people and covers 242-square miles in the areas of Chino, Chino Hills, Fontana, Montclair, Ontario, Rancho Cucamonga, Upland and the Chino Agricultural Preserve. The Agency's major responsibilities are: wastewater treatment and disposal; supplemental water supply; industrial waste or non-reclaimable waste disposal; and water recycling. Under the *Regional Sewage Service Program*, the Agency operates three domestic wastewater treatment plants. The program enables local communities to take advantage of shared facilities and to further reduce costs by combining staffs and operations. Two

additional water recycling facilities will be on-line in the next 10 years to accommodate the growth of the area's industrial and residential communities, as well as to meet increasingly stringent environmental regulations.

Three Valleys Municipal Water District. In recognition of the need for additional sources of water for the growing region, the Pomona Area Water Committee was organized in 1945 for securing annexation to the MWDSC. Through the efforts of the committee, the District was formed on January 26, 1950 by public election. The District is a local government agency with a board of directors elected by the registered voters residing within the District's boundaries. The District's boundary includes approximately 133 square miles with a current population of 475,000. Approximately 126,600 retail customers are served by the local agencies to whom the District provides supplemental water.

Western Municipal Water District. Western Municipal Water District of Riverside County was formed in 1954 to bring supplemental water to growing western Riverside County. Western's district consists of a 510-square mile area of western Riverside County, with a population of nearly one-half million people. Western is in the heart of the Santa Ana Basin and within its district lies the communities of Jurupa, Mira Loma, Rubidoux, Riverside, Norco, Corona, Elsinore Valley, and Rancho California. A member agency of the Metropolitan Water District of Southern California, Western serves imported water directly to more than 10,000 retail customers who are located in the unincorporated and non-water bearing areas around Lake Mathews and portions of the city of Riverside. The District also serves ten wholesale customers with Colorado River and SWP water. In addition to its retail water service, the District has committed to retail sewer service to 2600 customers in the Lake Hill/Home Gardens area.

Santa Ana Watershed Project Authority. SAWPA is a joint powers agency that was originally formed to develop water and wastewater management plans for the Santa Ana River watershed. The agency is now responsible for regional water quality planning and implements projects at the request of its member agencies. Members of SAWPA include: IEUA, Eastern Municipal Water District (Riverside County), San Bernardino Valley Municipal Water District (SBVMWD), WMWD (Riverside County), and the Orange County Water District (OCWD). SAWPA owns and operates the Santa Ana Regional Interceptor (SARI) sewer brine disposal system that offers a means of exporting non-reclaimable wastewater from the southern portion of the Chino Basin (CBMWD Reclaimed Water Master Plan, 1993). In addition to the SARI, SAWPA, in cooperation with a number of other agencies who provided support and financial resources, constructed the Arlington Desalter to begin reversing the Arlington Basin's salinity. The Arlington Desalter produces approximately 6 mgd of drinking quality water. SAWPA also owns and operates the SAWPA Chino Desalter that, upon construction by the year 2000, will supply approximately 8 mgd of potable drinking water to JCSD, Chino, Chino Hills, and Norco.

Cooperative Efforts with Appropriate Agencies to Implement Program

Watermaster will assume the leadership role for developing and implementing the OBMP regional water supply plan (Alternative 6 described above) including the development of new desalting plants and the expansion of the new SAWPA desalter. Watermaster will enter into agreements with cooperative entities to implement the OBMP regional water supply plan. Potential cooperative entities include CCWD, IEUA, TVMWD, WMWD, SAWPA, WFA/JPA, and private entities. These contracts will include specific performance goals and schedule. If a cooperative entity fails to perform according to the terms of their agreement, then Watermaster will terminate the agreements and either enter into an agreement with another cooperative entity or implement the program itself.

The new desalting projects could be designed, built, operated and owned by IEUA, WMWD, SAWPA, or by private entity under long-term contract to supply water from the desalters. A private entity may be the preferred way to construct the east desalter because of rapid implementation requirements of that desalter.

CCWD, IEUA, TVMWD, and WFA/JPA will be responsible for providing imported supplies.

IEUA and WMWD will be responsible for expanding the recycled water use in the Basin.

Implementation Actions and Schedule

First Three Years (1999/00 to 2001/02). The following actions will be completed in the first three years commencing fiscal year 1999/00:

Preliminary Engineering – Year 1

- Basin exploration to assess current water quality and identify well field locations.
- Geotechnical and hydrogeological investigations.
- Siting investigations for desalters, wells, pipelines, and other facilities.
- Re-evaluation of potential purveyor water supplies/demands.
- Analysis of availability & capacity of existing infrastructure.
- Analysis of SARI capacity & availability.
- Concept design for new treatment facilities.
- Preparation of necessary documents for CEQA/NEPA compliance.
- Regulatory requirements/approvals from DHS and Regional Board Requirements.
- Conditional use and other permits from local agencies.
- Economic feasibility analysis.
- Project financing plan.
- Selection of implementing/lead agency.
- Interagency agreements/approvals/contracts.
- Method of operation (agency operation versus contract operation).

Design and Construction of East Desalter and
Design and Construction of Expansion of SAWPA Desalter – Years 2 and 3

- Purchase land for ultimate facilities.
- Pre-design investigations.
- Pump tests to determine groundwater production.
- Re-evaluation of purveyor water supplies/demands.
- Preliminary engineering.
- RO process design.
- Facility site layouts.
- Pump station design.
- Final design.
- Bidding and contract award.
- Construction.

- Start-up by 2003.

Years Four to Ten (2002/03 to 2010/11). The following actions will be completed in years four through ten, commencing fiscal year 2002/03

Design and Construction of Western Desalter

- Purchase land for ultimate facilities.
- Pre-design investigations.
- Pump tests to determine groundwater production.
- Re-evaluation of potential purveyor water supplies/demands.
- Geotechnical and hydrogeological investigations.
- Preliminary engineering.
- RO process design.
- Facility site layouts.
- Pump station design.
- Final design.
- Bidding and contract award.
- Construction
- Start-up by 2010

East, West, and SAWPA desalters:

- Operate facilities through period.
- Upgrade facilities as necessary to maintain state-of-the-art and to meet regulatory requirements.

Years Eleven to Twenty (2010/11 to 2019/20). The following actions will be completed in years eleven to twenty, commencing fiscal year 2010/11

Expansion of Eastern Desalter, and
Expansion of Western Desalter

- Pre-design investigations.
- Pump tests to determine groundwater production.
- Re-evaluation of potential water supplies/demands.
- Geotechnical and hydrogeological investigations.
- Preliminary Engineering.
- RO process design.
- Facility site layouts.
- Pump station design.
- Final design.
- Bidding and contract award.
- Construction.
- Start-up by 2015.

East, West, and SAWPA desalters:

- Operate facilities through period.

- Upgrade facilities as necessary to maintain state-of-the-art and to meet regulatory requirements.

PROGRAM ELEMENT 4 – DEVELOP AND IMPLEMENT COMPREHENSIVE GROUNDWATER MANAGEMENT PLAN FOR MANAGEMENT ZONE 1 (MZ1)

Need and Function

Program Element 4 – Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1 contains action items explicitly listed in Table 3-8.

The second impediment to *Goal 1 – Enhance Basin Water Supplies* can be stated as: "Unless certain actions are taken, piezometric levels in the deep aquifers of Management Zone 1 will continue to decline adding to the potential for additional subsidence and fissures, lost production capability and water quality problems. This impediment speaks to a localized subsidence and fissuring problem within the City of Chino and to a potentially larger and similar problem in the southern end of Management Zone 1 in the former artesian area. This part of the Basin contains a higher fraction of fine-grained materials that originated from sedimentary deposits in the Chino and Puente Hills. This area also consists of a multiple aquifer system. The upper aquifer(s) are moderately high in TDS and are often very high in nitrate. The City of Chino Hills has drilled a series of wells into the deeper aquifer(s) to obtain better quality water. The storage and hydraulic properties of the deeper aquifers are quite limited relative to the upper aquifer. The correlation of the recent groundwater production in the deep aquifers and the timing of the subsidence and fissuring, and a review of the hydrogeologic data from the area very strongly suggest that deep aquifer production is the likely cause of the subsidence. Figure 4-2 illustrates the location and magnitude of subsidence and fissuring in the City of Chino and Figure 4-3 shows the location of the this subsidence anomaly relative to Management Zone 1 and the former artesian area. The *Program Element 4 – Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1* task memorandum is on file and available from the Watermaster offices. It describes the subsidence problem in the Management Zone 1 area as it is currently understood in more detail.

MZ 1 Management Plan

The continued occurrence of subsidence and fissuring in Management Zone 1 is not acceptable and must be reduced to tolerable levels or completely abated. However, there is some uncertainty as to the causes of subsidence and fissuring and more information is necessary to distinguish among potential causes. An interim management plan must be developed and implemented to:

- minimize subsidence and fissuring in the short-term;
- collect the information necessary to understand the extent and causes of subsidence and fissuring; and
- formulate an effective long-term management plan.

MZ 1 Interim Management Plan. The interim management plan would consist of the following activities:

- Voluntarily modify groundwater production patterns in Management Zone 1 for a five-year period. For example, there is some indication that deep aquifer production beneath the City of Chino contributed to recent subsidence and fissuring in the area. Reduction or elimination of deep aquifer production beneath the area of subsidence and fissuring is a logical short-term mitigation strategy.

- Balance recharge and production in Management Zone 1. Based on preliminary engineering investigations with RAM tool, it appears that current levels of pumping and recharge are balanced. However, increases in pumping should be balanced with increases in recharge.
- Determine gaps in existing knowledge. Primarily, there is a lack of understanding of Management Zone 1 hydrogeology, of the nature and extent of subsidence and fissuring, and of the exact causes of subsidence and fissuring.
- Implement a process to fill the gaps in existing knowledge. This would include hydrogeologic, geophysical, and remote sensing investigations of Management Zone 1, as well as certain monitoring programs, such as piezometric, production, water quality, ground level, and subsidence monitoring.
- Formulate a long-term management plan. The long-term management plan will include goals, activities to achieve those goals, and a means to evaluate the success of the plan.

MZ 1 Long-Term Management Plan. The long-term management plan will be formulated during the interim management plan based on investigations, monitoring programs and data assessment. It will likely include modifications to groundwater pumping rates and the locations of pumping, recharge, and monitoring. The long-term management plan will be adaptive in nature – meaning monitoring and periodic data assessment will be used to evaluate the success of the management plan and to modify the plan, if necessary.

Cooperative Efforts with Appropriate Agencies to Implement Plan

The subsidence and fissuring problem appears to be currently focused in the City of Chino and the California Institution for Men (CIM). However, it is reasonable given the current knowledge, to expand the minimum area of concern to the entire former artesian area shown in Figure 4-3 and slightly beyond that area. Changes in pumping and recharge patterns in Management Zone 1, and more generally the area of concern, will most likely be part of the management plan. The producers in the area include the cities of Chino, Chino Hills, Ontario, Pomona and Upland, the Monte Vista Water District (MVWD), San Antonio Water Company (SAWC), Southern California Water Company (SCWC), the State of California (CIM, California Institution for Women [CIW]), and SAWPA. Watermaster may need to have entities that increase their production to provide for the recharge of an equivalent amount of water to maintain the balance of pumping and recharge. Watermaster will take the leadership role in the development and implementation of the Management Zone 1 management plan.

Implementation Actions and Schedule for the First Five Years

Year 1

- Establish a Management Zone 1 committee and develop interim management plan.

Years 2 to 5

- Implement the interim management plan, including appropriate monitoring.

Years 3 to 5

- Annual assessment of data from monitoring programs, and modification of monitoring programs if necessary.

Year 5

- Develop long-term management plan.

Implementation Actions and Schedule for Years Six to Ten.

Year 6

- Implement the long-term management plan.

Years 6 to 10

- Annual assessment of data from monitoring programs, and modification of management plan if necessary.

Implementation Actions and Schedule for Years Eleven to Fifty.

Assessment of data from monitoring programs every three years and modification of management plan if necessary.

PROGRAM ELEMENT 6 – DEVELOP AND IMPLEMENT COOPERATIVE PROGRAMS WITH THE REGIONAL BOARD AND OTHER AGENCIES TO IMPROVE BASIN MANAGEMENT

PROGRAM ELEMENT 7 – DEVELOP AND IMPLEMENT SALT MANAGEMENT PROGRAM

Need and Function

These program elements are needed to address some of the water quality management problems that have occurred in the Basin. These water quality problems are described in Section 2 *Current Physical State of the Basin* and Table 3-8 in Section 3 *Goals of the OBMP*. The specific water quality issues addressed by these program elements are listed below:

- The Special Referee has indicated that Watermaster needs to routinely demonstrate that implementation of the OBMP will lead to groundwater quality improvements. Watermaster should develop and use a method to determine water quality trends and to verify whether the OBMP is improving water quality.
- There is legacy contamination in the vadose zone from past agricultural activities (TDS and nitrogen) that will continue to degrade groundwater long into the future.
- Watermaster does not have sufficient information to determine whether point and non-point sources of groundwater contamination are being adequately addressed.
- There is ongoing salt and nitrogen loading from agriculture.

Demonstration of Water Quality Improvement

The TDS and nitrogen challenges in the Chino Basin are caused by agriculture and safe yield management. The TDS and nitrogen impacts from agriculture were described in Section 2. Table 4-12 shows in summary format how the TDS concentration in source supplies and fertilizer affect the TDS concentration in irrigation return flows to groundwater. The TDS concentration in the irrigation return flow is about four times higher than the TDS concentration in the irrigation supply. The majority of the increase in TDS concentration is caused by consumptive use and a negligible contribution from the fertilizer. The table also shows the affect of the use of dairy manure for fertilizer and soil improvement. The TDS contribution from manure is much larger than from commercial fertilizer, however the concentration increase from consumptive use is more significant particularly for source water TDS concentrations typical in the southern part of the Basin (>500 mg/L). Similar TDS concentration increases in irrigation return flows occur for other crop types such as citrus and grapes, both of which were significant in the past. Table 4-12 shows TDS concentrations for urban irrigation return flows for a

representative range in municipal source water TDS concentration. The range of TDS concentrations in urban irrigation returns is from about 1,200 to 1,800 mg/L with less than ten percent coming from fertilizers and the overwhelming majority of the TDS increase coming from consumptive use.

Figure 4-4 is a map that shows the general groundwater flow directions in the Chino Basin. The map contains velocity vectors that show direction and relative velocity of groundwater flow. One of the more interesting interpretations of this map is that groundwater generally flows away from the Santa Ana River. Small amounts of rising groundwater occur seasonally in Chino and Mill Creeks and are typically less than 11,000 acre-ft/yr. The only way significant amounts of groundwater can leave the Basin are through consumptive use, the discharge of recycled water to the Santa Ana River near Prado, and the discharge of brine to either the Santa Ana Regional Interceptor (SARI) or the Non-Reclaimable Waste Line (NRWL). The groundwater flow pattern shown in Figure 4-5 is largely influenced by production. If there were a significant reduction in groundwater production in the southern part of the Basin, then groundwater outflow to the Santa Ana River would increase and the safe yield would be reduced. The safe yield of the Basin depends on recharge of Santa Ana River water and minimal outflow of groundwater to the river. Without the recycled water discharges to the Santa Ana River near Prado dam and brine discharges to the SARI and the NRWL, the Chino Basin would almost be a completely closed system.

The vadose zone is the part of the aquifer that lies between the soil and the water table. The vadose zone is partially saturated and buffers the mineral salt loads entering from the soil. The buffering effect reduces the magnitude of the peak loads to the saturated zone and spreads out the loading of the saturated zone over a period of time that is longer than the soil loading. Salts in the vadose zone are being released to the saturated zone now and will continue to be released to the saturated zone for some time after the agricultural lands are converted to urban uses. The quantity of salt reaching groundwater should reduce in the future for two reasons:

- salt loading to the soil from agricultural will reduce over time
- less water will percolate through the vadose zone as the agricultural area becomes paved through urbanization (60 to 80 percent impervious).

If current rates of agricultural loading were to continue indefinitely, TDS and nitrate concentrations in groundwater could continue to rise. TDS projections for the Chino Basin that were made during the *Chino Basin Water Resources Management Study* (CBWRMS) suggested that the TDS concentrations would continue to rise in groundwater throughout most of the 50-year planning horizon of 1990 through 2040. These graphs are included in the Program Element 6 Task Memorandum on file and available from the Watermaster offices. In the CBWRMS, agricultural activities were assumed to decline to minimum levels by the year 2020. If and when the land use in the area is converted to urban uses, the source water TDS served to the new urban areas will be always less than 400 mg/L and the mineral salts from the source water will be mostly discharged in recycled water discharges to the Santa Ana River, brine line discharges (from new desalters) and increased rising groundwater flows to the Santa Ana River. The TDS concentration in groundwater will, after some period of time, decline slowly but should still remain significantly higher than be served as a municipal supply.

The Court will require Watermaster t develop and use a method to demonstrate that actions taken in the OBMP will improve groundwater quality. The question arises: how *do we assess progress towards improving groundwater quality if groundwater monitoring alone will continue to show degradation even after significant steps are taken to improve water quality?*

The alternatives available to the Watermaster range from groundwater quality monitoring alone to the application of numerical models in conjunction with monitoring. As mentioned above, if groundwater monitoring were the only metric for measuring improvement, then it will appear for many years that

construction of desalters and the export of dairy waste will have no benefit. The use of numerical models to assess progress in improving water quality is extremely expensive if their only use were to assess such progress.

A method that combines monitoring and a salt budget is more practical and cost-effective than large-scale modeling. The salt budget approach consists of a salt mass accounting in each management zone and the Basin as a whole. The magnitude of each inflow and outflow component would be estimated. The TDS and nitrogen concentration of each inflow and outflow component would be estimated. Water quality will improve if the flow-weighted concentration in the inflow is less than the flow-weighted concentration in the outflow.

$$[S\ I_k * C_k] / [S\ I_k] - [S\ O_j * C_j] / [S\ O_j] < 0 \quad \text{water quality is improving}$$

$$[S\ I_k * C_k] / [S\ I_k] - [S\ O_j * C_j] / [S\ O_j] > 0 \quad \text{water quality is degrading}$$

$$[S\ I_k * C_k] / [S\ I_k] - [S\ O_j * C_j] / [S\ O_j] = 0 \quad \text{water quality is not changing}$$

where: I_k is volumetric recharge component *k*
C_k is the TDS or nitrogen concentration associated with recharge component *k*
O_j is volumetric discharge component *j*
C_j is the TDS or nitrogen concentration associated with discharge component *j*

The inflow components include: precipitation, artificial recharge of storm flows, artificial recharge of recycled water, and applied water. The outflow components include: evapotranspiration, surface water outflow, recycled water export, groundwater export and brine export. The TDS and nitrogen mass increments added to water as it is applied to irrigated lands or to disposal land needs to be estimated. The inflow and outflow components used in this approach will produce average recharge and discharge from the Basin, that is, there will be no change in groundwater storage.

The salt budget will be computed for existing conditions to assess the current balance, hereafter referred to as the baseline case. An assessment of future water quality improvements that will occur from the OBMP will be made by changing the water and waste management assumptions in the baseline case to reflect OBMP implementation. The changes in the inflow and outflow components and their associated TDS and nitrogen concentration will be made and the salt budget equations would be re-solved. The relative improvement of water quality will be assessed by comparing the salt budget of the OBMP to the baseline plan. Later, during periodic OBMP updates, the salt budget will be computed based on the then current water quality (from monitoring programs) and the then current water and waste management plans. These periodic assessments will allow Watermaster to determine if the OBMP is improving water quality.

There are some limitations to the salt budget method and the use of such a method should be considered in light of all anticipated water quality assessment needs in the Basin. Table 4-13 presents a tabular comparison of future water quality information requirements with alternative methods and approximate costs to use those methods over the next 20 years. The CBWRMS developed a comprehensive set of models for the Chino Basin that is capable of assessing the impact of past and future water resources management activities on groundwater level, streamflow, and water quality. The *Chino Integrated Groundwater and Surface Water Model* (CIGSM) is extremely complex and expensive to maintain and use.

The salt budget method will cost about $80,000 to $100,000 to develop and use the first time. Subsequent uses, in either OBMP updates or *ad hoc* investigations, will involve developing new water quality input

data based on new monitoring data and revised water and waste management scenarios. Total cost over the next 20 years should range between $300,000 to $400,000. CIGSM is composed of series of models. In contrast to the salt budget method, CIGSM is very complex and difficult to use. The cost to re-calibrate CIGSM, to update the planning data, and to use the model to evaluate the initial OBMP is about $700,000 based on recent detailed estimates developed for the TIN/TDS Study (Wildermuth Environmental, 1999). The cost to use CIGSM over the next 20 years will run between $3,000,000 to $4,000,000.

Cooperative Efforts with the Regional Water Quality Control Board

Watermaster does not have sufficient information to determine whether point and non-point sources of groundwater contamination are being adequately addressed. Watermaster's past monitoring efforts have been largely confined to mineral constituents in the southern half of the Basin and to available monitoring data supplied by municipal and industrial producers. The Regional Water Quality Control Board (Regional Board) has limited resources to detect, monitor and cause the clean up of point and non-point water quality problems in the Chino Basin. The Regional Board commits its resources to enforce remedial actions when it has identified a potential responsible party. The Regional Board does not take action when the sources are not easily identified or when the sources are diffuse, such as non-point sources. Notable examples include the mercury problem in the east Ontario area and some solvent plumes in the lower Chino Basin. It is not a question of Regional Board willingness to in this area; it is the allocation of limited RWQCB resources. Watermaster can improve water quality management in the Basin by committing resources to:

- identify water quality anomalies through monitoring;
- assist the Regional Board in determining sources of the water quality anomalies;
- establish priorities for clean-up jointly with RWQCB; and
- remove organic contaminants through its regional groundwater treatment projects in the southern half of the Basin.

The last bulleted item requires some explanation. The well field for SAWPA desalter will eventually intercept a solvent plume of unknown origin that is emanating from the Chino airport area. There is a second solvent plume northeast of the Chino airport area that could be intercepted by the current desalter or another future desalter. This will require additional treatment for the water produced by the desalter. The desalter project can be used to clean up these plumes at some additional cost. The cost of cleaning up the solvent plumes at the desalters will be less than the cost of a dedicated solvent removal system. The additional cost should be paid for by the entity responsible for the solvent discharge. A similar process was used by the Regional Board and Kaiser Steel Corporation to mitigate a TDS plume in the north half of the Chino Basin.

TDS and Nitrogen (Salt) Management in the Chino Basin

TDS and nitrogen management will require minimizing TDS and nitrogen additions by fertilizers and dairy wastes, desalting of groundwater in the southern part of the Basin (for water supply purposes), and maximizing the artificial recharge of storm water. The latter two management components are included in Program Elements 3 and 2, respectively

The agricultural area in the southern part of the Chino Basin will gradually convert to urban uses over the next 20 to 30 years and, thus, in the long term, the TDS and nitrogen challenges from irrigated agriculture and dairy waste management will go away. The Regional Board will adopt new dairy waste discharge requirements in the summer of 1999. The requirements will include the following:

- Each dairy will develop and implement an engineered waste management plan that will contain dairy process water and on-dairy precipitation runoff for up to a 25-year, 24-hour storm
- Manure scraped from corrals must be exported from the dairy within 180 days
- All manure stockpiled in the Chino Basin as of December 1, 1999, will be exported from the Basin by December 1, 2001.
- No manure may be disposed of in the Chino Basin
- Some manure can be applied to land at agronomic rates if and only if in the opinion of the Executive Officer there is reasonable progress toward the construction of a new desalter in the Chino Basin.

The Santa Ana River Watershed Group (SARWG) is a stakeholder group made up of municipal, county, regional and federal agencies, and private individuals that are working through complex land use and environmental issues in the Santa Ana Watershed. One of their work products is a draft manure management strategy (MMS) for the Chino Basin. The primary component of MMS is the export of manure either as a raw or an improved material. The MMS describes the economics of manure management and the means to finance manure export.

The new dairy waste discharge requirements may have the unintended result of actually causing Santa Ana River quality to degrade. Some or all of the dairy farmers could move out of the Basin if they cannot afford to continue dairy operations as a result of the new waste discharge requirements. A rapid departure of the dairies will result in a rapid decline in groundwater production in the southern part of the Basin and a subsequent increase in poor quality rising water. The rising groundwater will degrade the river. As part of the OBMP, Watermaster will annually review the economics of dairy waste management in the Chino Basin and may contribute funds to subsidize the removal of manure from the Basin. In the first year of the OBMP implementation, Watermaster will contribute $150,000. Watermaster will closely monitor the activities of the Regional Board, SARWG and others whose actions will influence the amount of TDS and nitrogen entering the Basin.

The urban land use that will replace agriculture will require low TDS municipal supplies that in turn will produce lower TDS irrigation returns to groundwater than those generated by agriculture. The construction of desalters in the southern part of the Basin (as described in Program Elements 3 and 5) will extract and export huge quantities of salt from the Basin. Table 4-9 lists the salt removal capacity of desalters described in Program Elements 3 and 5. By 2020, the salt removal capacity of the desalters will reach over 80,000 tons per year. The dairy salt contribution is currently about 30,000 tons per year. It is premature to set salt reduction goals until the salt budget method described above is developed and the salt budget is assessed for the Basin. However, it seems reasonable to expect that the salt budget will be impacted favorably by the desalters and future land use conversions, and that Watermaster should expect a reduction in salt loading of about 80,000 to 100,000 tons of salt per year in the next 20 to 30 years.

Implementation Actions and Schedule

First Three Years (1999/00 to 2001/02). The following actions will be completed in the first three years commencing fiscal year 1999/00:

- Watermaster will form an ad hoc committee, hereafter *water quality committee*. The purposes of the *water quality committee* are to review water quality conditions in the Basin and to develop (with the Regional Board) cooperative strategies and plans to improve water quality in the Basin. The committee would meet regularly with

Regional Board staff to share information and to recommend cooperative efforts for monitoring groundwater quality and detecting water quality anomalies. The schedule and frequency of meetings will be developed with the Regional Board during the first year of the OBMP implementation.

- Watermaster will refine its monitoring efforts to support the detection and quantification of water quality anomalies. This may require additional budgeting for analytical work and staff/support.
- If necessary, Watermaster will conduct investigations to assist the Regional Board in accomplishing mutually beneficial objectives.
- Watermaster will seek funding from outside sources to accelerate detection and clean up efforts.
- Develop salt budget goals, develop the salt budget method described above and review all the OBMP actions.
- Watermaster will annually review the economics of dairy waste management in the Chino Basin and may contribute funds to subsidize the removal of manure from the Basin. In the first year of the OBMP implementation, Watermaster will contribute $150,000.

At the conclusion of the third year, the *water quality committee* will have met several times, developed and implemented a cooperative monitoring plan with the Regional Board, and developed a priority list and schedule for cleaning up all known water quality anomalies.

Years Four through Fifty (2002/03 to 2050/51). The following actions will be completed in years four through fifty, commencing fiscal year 2002/03:

- Continue monitoring and coordination efforts with the Regional Board.
- Annually update priority list and schedule for cleaning up all known water quality anomalies.
- Continue to seek funding from outside sources to accelerate clean up efforts.
- Implement projects of mutual interest.
- As part of periodic updates of the OBMP, re-compute the salt budget using the salt budget method. The salt budget method would be used to reassess future OBMP actions to ensure that salt management goals are attained.
- Annually review the economics of dairy waste management in the Chino Basin and consider contributing funds to subsidize the removal of manure from the Basin.

PROGRAM ELEMENT 8 – DEVELOP AND IMPLEMENT GROUNDWATER STORAGE MANAGEMENT PROGRAM

PROGRAM ELEMENT 9 – DEVELOP AND IMPLEMENT CONJUNCTIVE USE PROGRAMS

Need and Function

The first impediment to *Goal 1 – Enhance Basin Water Supplies* can be stated as: "Unless certain actions are taken, safe yield of the Basin will be reduced … (because) the current manner in which Watermaster manages cyclic and local storage accounts will cause overdraft." Watermaster is concerned about the magnitude of water lost from the Chino Basin from rising groundwater when groundwater is stored in the

local storage, cyclic, conjunctive use and other storage accounts. Watermaster is interested in determining how much water can be stored without significant loss from local accounts and in developing a procedure to equitably distribute these losses among entities that have storage accounts. Watermaster may consider setting limits for individual storage accounts for members of the overlying non-agricultural and appropriative pools that ensure reasonable and beneficial use of Chino Basin water.

The third impediment to *Goal 3 – Enhance Management of the Basin* can be stated as: "About 500,000 acre-ft of storage in the Chino Basin cannot be used due to water quality and institutional issues." The impediment speaks to two issues. The first issue is a concern by the producers of adverse water quality impacts if groundwater storage is significantly (see Section 2) increased. The second issue is the past inability of Watermaster, producers, and MWDSC to be able to agree on a conjunctive use program for the Chino Basin.

Parties to the Judgment can store un-pumped groundwater rights for various reasons that include:

Future use during shortage of other less expensive water supplies. Some parties to the Judgment have access to other sources of water that are less expensive than producing Chino Basin groundwater. The alternative water supplies available to these parties include imported water, local streamflow, and other groundwater basins. By not pumping their Chino Basin rights, they can then store water in the Chino Basin for later use when their other less expensive sources are scarce. This is conjunctive use.

Exchange or sell to other producers. Some parties to the Judgment produce less than their rights resulting from decreased demand, groundwater quality problems, or because they have access to other less expensive supplies. The un-pumped water pursuant to the Judgment can be exchanged or sold to other parties to the Judgment.

Temporary shortfall in production capacity. Some parties may not be able to use all their rights due to temporary shortfalls in production capacity caused by water quality or mechanical problems. The un-pumped water goes into local storage accounts until production capacity is recovered or increased.

As a means of efficiently managing their available water supply, each appropriative and overlying non-agricultural producer tries to minimize the cost of water from the sources of supply available to that producer. Some producers have multiple sources of supply and some have limited supplies. Some agencies are in a position, because of the sources of supply available to them, to accumulate water in local storage accounts in most years. Conversely, some agencies produce groundwater from the Chino Basin in excess of their rights and cannot make use of local storage accounts except through the purchase or lease of other water. There are two fundamental reasons why storage limits should be considered.

Ensure reasonable beneficial use. The accumulation of water in local storage accounts in quantities that cannot be put to a reasonable beneficial use is in conflict with Section 2 of Article X of the California Constitution. Therefore, if a local storage account maximum storage limit needs to be set, the limit should be based on the producer's ability to put the stored water to reasonable beneficial use.

Reduce groundwater losses to the Santa Ana River. The cumulative losses of water from local storage accounts can grow to be large and, thus, the ability to use the stored water to Chino Basin producers is lost. These losses could be minimized by storing water for shorter periods of time prior to use and by limiting the water put into storage accounts to an amount that can be put to reasonable beneficial use.

Estimate of the Water Lost from Storage

The accumulation of groundwater in storage without an increase in groundwater production will cause the baseflow to increase in the Santa Ana River and some of its tributaries (Chino Creek and Mill Creek). Investigations conducted by Watermaster in 1995 concluded that losses from water in local storage accounts and cyclic storage are about two percent per year of the water in storage. These losses could reach over four percent in the future if groundwater production patterns are not managed in the southern part of the Basin. Exhibit A in the Program Element 8 Task Memorandum (on file and available from the Watermaster offices) shows the estimated losses from each local storage account, the cyclic storage account, and the Basin as a whole for the 20-year post-Judgment period of 1978 to 1997. The total water lost from local storage accounts and cyclic storage for the 20-year period of 1978 through 1997 is about 50,500 acre-ft. If the water in these storage accounts is produced without accounting for the losses then the Basin will be overdrafted by an amount equal to the water lost from storage.

Storage Limit Concepts

Currently there is no existing aggregate limit for local storage accounts. Watermaster's Uniform Groundwater Rules and Regulations (UGRR) contains an aggregate threshold storage value of 100,000 acre-ft above which losses to rising water are to be computed and allocated to the storage parties on a pro rata basis. The UGRR does not specify whether the loss is to be computed for the increment of storage above 100,000 acre-ft or total storage. The 100,000 acre-ft threshold value is an arbitrary number. Some loss will occur when water is placed into local storage. Using 100,000 acre-ft as a threshold value ensures that up to 2,000 acre-ft/yr of unaccounted-for-losses from storage will occur every year. This water will not be in the Basin when the storage parties attempt to recover the stored water. If losses are not accounted for, then the Basin is not being operated in the safe yield mode as required by the Judgment. Therefore, regardless of how storage limits are set, Watermaster should deduct the rising water losses from planned storage for all local storage accounts and for the storage accounts of non-Judgment parties. There are several different ways to develop upper limits on the individual local storage accounts. Some of these are described below.

Limit based on the ability to use. In this concept, an upper limit is based on the storage party's ability to store and recover all the water in its account over a fixed period, say five years. The storage party would have to demonstrate that it has enough production capacity to recover all the water in storage over a five-year period. The fixed period would be the same for all storage parties. In this concept, each storage party would have to demonstrate to Watermaster that they have the ability to put a specific volume of water into storage and be able to recover that water, adjusted for losses, over a fixed period of time. Thus, the storage party will have the facilities in place for groundwater production. This type of limit ensures that the water is put to a reasonable beneficial use. For example, suppose an agency has Chino Basin production capacity of 25,000 acre-ft/year, an operating yield of 15,000 acre-ft/yr and the fixed period has been set at five years. Then they would be allowed to put 50,000 acre-ft into its local storage account. If an agency were to increase its Chino Basin production capacity then its local storage account limit could be increased by an amount equal to five times the increase in production capacity. The five-year period used above is arbitrary – Watermaster would need to determine the length of the fixed period.

Arbitrary limits. In discussions regarding storage limits in prior years, Watermaster considered setting storage limits based on a multiple of safe yield for overlying non-agricultural pool and a multiple of operating safe yield for the appropriative pool. Parties that have historically over-produced and that will continue to over-produce may not ever be able to use such a local storage account. Parties that under-produce will fill their accounts and may hold water in these accounts for long periods of time and incur

large storage losses. This has been the trend with the past operation of the local storage accounts. Upper limits based on this concept are arbitrary and may not provide for reasonable beneficial use of Chino Basin water. Storage limits based on a multiple of prior years production, an arbitrary volume equal for all parties, or any other arbitrary volume suffer from the same limitations.

Limit based on time water is in storage. In this concept, no volume limit would be set. Water could not be kept in storage for more than some fixed period of time, say ten years, regardless of the amount of water in storage. Water transferred from the local storage account for use by the storage party would be taken from the earliest water put into the local storage account. The storage party would be required to recover a volume of groundwater from its local storage account, sell or transfer a similar volume to another party, or sell a similar volume to Watermaster in order to reduce the quantity in its storage account by an amount equal to the water stored prior to the fixed period less losses to rising water. Simply stated, unused water from the first year would either be used or sold to Watermaster or other producer in the eleventh year, unused water from the second year would either be used or sold in the twelfth year, and so on if a ten year time limit is used.

Upper limit based on total storage and time water is in storage. This is a composite of the *ability to use* and *time in storage* concepts. In this case a volumetric upper limit would be set for each storage party based on the storage party's ability to store and recover water over a fixed period of time. A time constraint would be added such that water would not be kept in storage more than some fixed period of time.

In all the above storage limit concepts, the storage parties would sell their current year under-production to Watermaster or other parties to the Judgment each year that their local storage accounts are full. Watermaster, or parties to the Judgment, would then use this water to meet current replenishment obligations.

Implementation of Local Storage Account Limits

Watermaster's UGRR presently require an *initial determination of local storage requirements to be made*. Watermaster then allocates this storage to members of the appropriative and overlying non-agricultural pools when specific parties make an application for a local storage agreement. Watermaster must periodically review the status of the local storage accounts and adjust the local storage requirement as described in the UGRR. While not explicitly described in the Judgment or UGRR, local storage account limits based on the *ability to us*e, *time in storage,* or a composite of the two, are consistent with the Judgment and could be implemented with some changes in the UGRR.

Local storage account limits based on the *ability to use* require that each agency make a determination of their Chino Basin groundwater production capacity and submit that finding to Watermaster. Watermaster would determine the duration over which the volume in local storage accounts would be used. Storage account limits for each storage party would be computed as:

Storage Limit = duration of storage period * (Chino Basin production capacity – average operating yield)

The average operating yield would equal the average of previous years operating yield entitlements (*e.g.*, five year average). Watermaster could periodically, or upon petition by a storage party, review and adjust the storage limits.

Local storage account limits based on the *time in storage* require that Watermaster determine the time-in-storage limit. Watermaster could then go through production and local storage account records to determine if water must be either used or sold to Watermaster. Local storage account limits based on the composite of the *ability to use* and *time in storage* require the implementation steps described for both concepts.

Some storage parties may currently have more water in their local storage accounts than would be allowed in the storage limit concepts listed above. In this case, the storage party would not be allowed to put water into their local storage accounts and under-production would be purchased by Watermaster.

If, as a result of these storage limits, Watermaster is required to purchase more water than is required for replenishment, then either the storage party will be allowed to temporarily store additional water in its local storage account or Watermaster payments for that water may have to be temporarily deferred.

Water in local storage accounts is used for replenishment of overdraft either by the producer's that hold a local storage account, or is sold to other producers with replenishment obligations. It is possible that Watermaster could fulfill all replenishment obligations exclusively from local storage accounts for several years. Watermaster should fulfill the need for replenishment from increased production with imported water for those areas that have a critical need for imported water and use the water stored in local storage accounts for the rest of the replenishment obligation.

Storage Management Program

Since 1995, the producers have developed numerous storage management proposals. This storage management program described here was developed in April and May of 1999 and differs from the previous proposals that sought to assign all the readily-useful storage in the Basin up among producers. If successfully implemented, storage limits on individual storage accounts may not need to be considered by Watermaster. The proposal described herein will allow:

- Watermaster to develop conjunctive use programs that will benefit <u>all</u> the producers in the Basin;
- ensure that Basin water and storage are put to maximum beneficial use; and
- maintain the integrity of the Judgment.

Definitions. *Operational Storage Requirement* – The operational storage requirement is the storage or volume in the Chino Basin that is necessary to maintain safe yield. In the context of this storage management program, the operational storage is estimated to be about 5,300,000 acre-ft. An engineering analysis will be done to assess the operational storage requirement of the Basin as part of the implementation of this program.

Safe Storage – Safe storage is an estimate of the maximum storage in the Basin that will not cause significant water quality and high groundwater-related problems. In the context of this storage management program, the safe storage is estimated to be about 5,800,000 acre-ft. An engineering analysis will be done to assess the safe storage requirement of the Basin as part of the implementation this plan.

Safe Storage Capacity – The safe storage capacity is the difference between safe storage and operational storage requirement and is the storage that could be safely used by producers and Watermaster for storage programs. Based on the above, the safe storage capacity is about 500,000 acre-ft. The allocation and use of storage in excess of safe storage will preemptively require mitigation, that is, mitigation must be defined and resources committed to mitigation prior to allocation and use.

Key Elements

- No maximum storage limit will be placed on local storage accounts for a period of five years ending on June 30, 2004, and water that becomes eligible for storage can be stored.
- The need for storage limits will be re-evaluated in five years based on the ability of the storing party to use the water in storage (ability to use concept) and on Watermaster's need for storage programs that provide regional benefits.
- Storage is not assignable.
- All water in local storage and other storage accounts will incur losses at a rate of 2 percent of water in storage each year starting in fiscal year 2002/03.
- The storage loss rate and safe yield will be estimated in the year 2012/13 and every ten years thereafter.
- Watermaster will develop regional conjunctive-use programs to store supplemental water for MWDSC and other entities that can cause supplemental water to be stored in the Basin.
- The regional conjunctive-use programs will provide benefits to all producers in the Basin, the people of California and the nation. Watermaster's conjunctive-use programs will take priority over conjunctive-use programs developed by others.
- Storage committed to conjunctive-use programs may consist of two parts, storage within the safe storage capacity and storage in excess of safe storage. Storage in excess of safe storage capacity will preemptively require mitigation.
- The initial target storage for Watermaster's conjunctive-use program will be 150,000 to 300,000 acre-ft within the safe storage capacity.
- Cyclic storage will be folded into conjunctive-use storage.
- Watermaster's conjunctive-use program tentatively consists of the following elements:
  - complete the existing short term conjunctive-use project;
  - seasonal peaking program for in Basin use and dry year program to reduce the demand on Metropolitan to 10 percent of normal summer demand (requiring 150,000 acre-ft of storage);
  - dry-year export program; and
  - seasonal peaking export program.

Re-determination of Safe Yield and Storage Loss Rates. The safe yield and storage loss rate will be assessed every ten years starting in the year 2012/13. The ten-year period of 2002/03 to 2011/12 will be used to compute the safe yield and to estimate the storage loss rate.

Safe yield and storage loss rate determinations require accurate groundwater level and production data. Watermaster does not have accurate production data from agricultural producers. Watermaster estimates most of the production in the agricultural pool using a water duty method that does not meet the requirements of the Judgment. Program Element 1 of the OBMP includes a program to install meters and obtain production measurements from all wells in the Basin. It will take three years to fully meter all agricultural wells. Watermaster will have accurate production monitoring at all wells starting in year

2002/03. Watermaster is in the process of developing a groundwater level monitoring program for the Basin. This plan should be implemented in the year 1999/00.

The safe yield in the Judgment was developed over the period 1965 to 1974 using the procedure described in Section 2 of the OBMP report. The safe yield will be re-determined in year 2012/13 using the ten-year period 2002/03 to 2011/12 because it will contain accurate production data and groundwater level data. A ten-year period is proposed to be consistent with the method used in the engineering work for the Judgment and is the minimum necessary to estimate a safe yield.

Re-determination of the storage loss rate will require the use of a numerical flow model. The *RAM Tool* developed by Watermaster will be modified and used for this purpose. The model would be used as follows:

- Calibrate the RAM tool for the safe yield period. In the calibration process, the hydrology for the period 2002/03 to 2011/12 will be developed including deep percolation of applied water and precipitation, unmeasured storm water recharge, subsurface inflow from adjacent basins, and uncontrolled discharges from the Basin (rising water).
- Once calibrated, the water supply plans of the producers and other storage entities will be modified to assume that no water would be put into storage accounts. The model will be rerun with this assumption and the results would be compared to the calibration run to determine losses from storage and the storage loss rate.
- The storage loss rate would be set based on the relationship of water in storage and associated losses.

Watermaster's new groundwater level and production monitoring are crucial to this effort.

Implementation Actions and Schedule

First Three Years (1999/00 to 2001/02). The following actions will be completed in the first three years commencing fiscal year 1999/00:

- Receive Court approval of OBMP.
- Evaluate need to modify Watermaster UGRR to reflect the storage management plan.
- Determine the operational storage requirement and safe storage.
- Begin formal implementation of comprehensive monitoring programs described in Program Element 1 (including groundwater level, groundwater quality, production, and surface water monitoring in the Santa Ana River).
- Complete the existing short-term conjunctive-use pilot project with MWDSC.
- Conduct engineering and environmental analyses, other feasibility efforts, and negotiate agreements to:
- implement a conjunctive-use program that includes seasonal peaking for in Basin use and dry year program to reduce the demand on MWDSC to 10 percent of normal summer in-Basin demand (requiring 150,000 acre-ft of storage);
- implement a conjunctive-use program for dry-year export; and
- implement a seasonal peaking program for export.

Years Four through Ten (2002/03 to 2008/09). The following actions will be completed in years four through ten, commencing fiscal year 2002/03:

- Continue monitoring as described in Program Element 1.
- Begin construction of facilities to implement the conjunctive-use projects listed in *years one through three*, in year 2003/04.
- Commence conjunctive-use operations.
- Start assessing losses in year 2002/03.

Years Eleven through Fifty (2009/10 to 2048/49). The following actions will be completed in years eleven through fifty, commencing fiscal year 2009/10:

- Continue monitoring as described in Program Element 1.
- Continue conjunctive-use operations.
- In year 2012/13, compute safe yield and storage loss rate for period 2002/03 through 2011/12, and reset safe yield and storage loss rates for the next the next ten-year period 2012/13 to 2021/22. Reassess storage management plan and modify Watermaster UGRR, if needed.
- In year 2022/23, compute safe yield and storage loss rate for period 2012/13 through 2021/22, and reset safe yield and storage loss rates for the next the next ten-year period 2022/23 to 2031/32. Reassess storage management plan and modify Watermaster UGRR, if needed.
- In year 2032/33, compute safe yield and storage loss rate for period 2022/23 through 2031/32, and reset safe yield and storage loss rates for the next the next ten-year period 2042/43 to 2041/42. Reassess storage management plan and modify Watermaster UGRR, if needed.
- In year 2042/43, compute safe yield and storage loss rate for period 2032/33 through 2041/42, and reset safe yield and storage loss rates for the next the next ten-year period 2052/53 to 2051/52. Reassess storage management plan and modify Watermaster UGRR, if needed.

PROGRAM COST AND EARLY IMPLEMENTATION PLAN

Table 4-14 contains a 20-year cost projection for implementation of the OBMP. The 20-year cost of OBMP implementation is about $400,000,000. The following program elements will be implemented entirely by Watermaster:

- Program Element 1 – Develop and Implement Comprehensive Monitoring Program
- Program Element 4 – Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1
- Program Element 6 – Develop and Implement Cooperative Programs with the Regional Water Quality Control Board, Santa Ana Region (Regional Board) and Other Agencies to Improve Basin Management
- Program Element 7 – Develop and Implement Salt Management Program
- Program Element 8 – Develop and Implement Groundwater Storage Management Program

Watermaster has committed to fund these program elements in their entirety through Watermaster assessments and through grants obtained directly by Watermaster. The Watermaster budget for fiscal 1999-2000 provides funding necessary to begin the efforts described in these program elements. The cost of the first three years is about $2,900,000 and average annual cost for the next 20 years is about $480,000.

The following program elements will be started by Watermaster in fiscal 1999-2000 and will be completed by others by agreement with Watermaster:

- Program Element 2 – Develop and Implement Comprehensive Recharge Program
- Program Element 3 – Develop and Implement Water Supply Plan for the Impaired Areas of the Basin
- Program Element 5 – Develop and Implement Regional Supplemental Water Program

The Watermaster budget for fiscal 1999-2000 provides funding necessary to begin the planning processes for these program elements. For Program Element 2, Watermaster's projected budget includes funds for completion of Phases 2 and 3 of the recharge master plan of $430,000 to be spent in the first three years of OBMP implementation. For Program Elements 3 and 5, the Watermaster budget contains funds to start the planning process and to define the scope of the facilities at enough detail so that agreements can be done for others to build and operate the facilities required in these program elements. Watermaster has budgeted about $650,000 for this process over the first three years of OBMP implementation. These agreements will be described in Part 2 of the OBMP report documents.

The Watermaster budget includes funds to begin the planning process for Program Element 9 – Develop and Implement Conjunctive-Use Programs. Watermaster has budgeted about $430,000 for this process over the first three years of OBMP implementation. The stakeholders envision that the cost of conjunctive use will be borne by outside interests that will store water in the Chino Basin.

OBMP PROGRESS REPORTS AND PROGRAM UPDATES

Watermaster will report progress on the OBMP in its annual report to the Court. Watermaster will formally review and update the OBMP at a frequency of five years or less.

LEGAL QUESTIONS AND ISSUES

The Judgment prescribes the process by which the Watermaster Board receives recommendations from the producers and is empowered to make decisions. To address the unresolved legal questions and issues identified below, the items will be brought to the individual pool committees for discussion and consideration. The pools in turn will develop their positions and recommendations for discussion and consideration by the Advisory Committee. The Advisory Committee will meet to discuss and consider the questions. The Advisory Committee's recommendations will be forwarded to the Watermaster Board for its consideration and implementation. Should the Watermaster Board disagree with the Advisory Committee recommendation, it has several options based on the Judgment and past practice. These options are:

If the Advisory Committee vote is equal to or greater than 80 percent:

1. Ask the Advisory Committee to reconsider the question based on a Board recommendation.

2. If the Advisory Committee does not wish to reconsider the matter, the Watermaster Board may ask the Court to consider the matter.

If the Advisory Committee vote is less than 80 percent:

1. Hold a hearing on the matter and develop written findings and conclusions.

During implementation of the OBMP, all unresolved legal questions and issues listed below will be addressed through the process described above. A schedule to address these items will be developed, and Watermaster will prepare written findings and conclusions to be submitted to the Court as part of the implementation process. This will be done regardless of the Advisory Committee vote or Watermaster findings and conclusions in an effort to more effectively keep the Court apprised of the OBMP implementation progress.

Watermaster recommends this manner of addressing legal questions and issues pursuant to the Judgment and in keeping with the Plaintiff's Post Trial Memorandum filed with the Court on July 12, 1978. At 4:13-20 in Paragraph B. 2. Watermaster Organization and Powers, of the Post Trial Memorandum it states:

> "At the same time, the Watermaster Advisory Committee was created and given broad powers to review, advise and consent to the actions of the Watermaster, subject to more detailed actions by the pool committees formed to advise, consent and administer the affairs of the several pools established under the Physical Solution. In these many provisions, there is a balance created to assure the protection of the private rights of the parties and the general public interest in the preservation of the resource. (emphasis added)."

The process described above will be used to address the legal questions and issues listed below.

- Transfers of water within and from the overlying non-agricultural pool
- Clarification and/or expansion of definitions of types of water in Judgment
- Evaluation of Judgment provisions and rules and regulations affected by the OBMP

These questions and issues will be resolved in the first three years of the OBMP implementation.

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Appendix D

Other Water Rights Information and Agreements

This item is being provided on compact disc.

- Big Bear Judgment (San Bernardino Valley Municipal Water District v. Big Bear Municipal Water District; City of Big Bear Lake; Big Bear Community Services District, Case No. 268619)

Appendix D

Other Water Rights Information and Agreements

These items are being provided on compact disc.

- Big Bear Judgment (San Bernardino Valley Municipal Water District v. Big Bear Municipal Water District; City of Big Bear Lake; Big Bear Community Services District, Case No. 268619)
- Lytle Creek Judgment (City of San Bernardino v. Fontana Water Co. et al.)

Big Bear Judgment

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ORIGINAL FILED
JAN 27 1992
COUNTY CLERK, CENTRAL DISTRICT
SAN BERNARDINO COUNTY

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT (a municipal water district of the State of California), Plaintiff,	No. 268619
v.	
BIG BEAR MUNICIPAL WATER DISTRICT (a municipal water district of the State of California); **CITY OF BIG BEAR LAKE** (a municipal corporation of the State of California); **BIG BEAR COMMUNITY SERVICES DISTRICT** (a community services district of the State of California); and DOES 1 - 500, Defendants.	FIRST AMENDED COMPLAINT FOR INJUNCTION and DECLARATORY RELIEF

COMES NOW San Bernardino Valley Municipal Water District, a municipal water district of the State of California, and for cause of action against defendants alleges the following:

1. Plaintiff is a municipal water district of the State of California organized and existing under the Municipal Water

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District Law of 1911, sections 71000 and following of the California Water Code.

2. Included among the powers held by plaintiff as such municipal water district are:

(a) The power to commence, maintain, intervene in, and compromise, in the name of the district, any action or proceeding involving or affecting the ownership or use of water or water rights within the district, used or useful for any purpose of the district, or a common benefit to lands within the district or inhabitants of the district. (Water Code sec. 71751.)

(b) The power to commence, maintain, intervene in, defend and compromise, in the name of the district, or as a class representative of the inhabitants, property owners, taxpayers, water producers or water users within the district, or otherwise, and to assume the costs and expenses of any and all actions and proceedings now or hereafter begun to determine or adjudicate all or substantially all of the water rights of a basin or other hydrologic unit overlain, in whole or in part, by the district, as between owners of or claimants to such rights, to prevent any interference with water or water rights used or useful to the lands, inhabitants, owners, operators, or producers within the district, or to prevent the diminution of the quantity or quality of the water supply of the district or such basin, or to prevent unlawful exportation of water from the district or such basin. (Water Code sec. 71757.)

3. Defendant Big Bear Municipal Water District (hereinafter sometimes called Big Bear) is a municipal water district of the

State of California organized and existing under the Municipal Water District Law of 1911, sections 71000 and following of the California Water Code. It is governed by its board of directors and all powers of the district are exercised by or under the control of said board.

4. Defendant City of Big Bear Lake (hereinafter sometimes called City) is a municipal corporation of the State of California. It is governed by its city council and all powers of the city are exercised by or under the control of said council.

5. Defendant Big Bear Community Services District (hereinafter sometimes called Community District) is a community services district of the State of California organized and existing under the Community Services District Law, sections 61000 and following of the California Government Code. It is governed by its board of directors and all powers of the district are exercised by or under the control of said board.

6. All of the land within the boundaries of Big Bear, City and Community District are located in or near Big Bear Lake and Upper Bear Creek in the County of San Bernardino, State of California.

7. San Bernardino Valley Water Conservation District (hereinafter sometimes called the Conservation District) is a water conservation district of the State of California organized and existing under the Water Conservation District Law of 1931, sections 74000 and following of the California Water Code.

8. Bear Valley Mutual Water Company (hereinafter sometimes called Bear Valley) is a corporation organized and existing

under the laws of the State of California. It is a mutual water company, as provided in section 2705 of the California Public Utilities Code. Bear Valley's service area is entirely within the County of San Bernardino, State of California, and it does business only within said county. Bear Valley is not a public utility under the jurisdiction of the California Public Utilities Commission.

9. North Fork Water Company, Lugonia Water Company and Redlands Water Company (hereinafter sometimes called the Prior Right Companies) are corporations organized and existing under the laws of the State of California. Each is a mutual water company, as provided in section 2705 of the California Public Utilities Code. Their service areas are entirely within the County of San Bernardino, State of California, and they do business only within said county. They are not public utilities under the jurisdiction of the California Public Utilities Commission.

10. There exists in the County of San Bernardino, State of California, the San Bernardino Basin Area, which consists of that portion of the watershed of the Santa Ana River upstream from Bunker Hill Dike and downstream from the foothills of the San Bernardino Mountains, all as shown on Appendix A attached hereto. Appendix A is hereby incorporated herein. (Appendix A is the same map which is attached to the Western Judgment [described in Paragraph 21 hereof], except that the following have been added: Bear Creek, Big Bear Dam, Big Bear Lake and the location of the Redlands, Mentone and Reservoir Sub-basins. The

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boundaries of the plaintiff district are shown as they existed in 1969 when the Western Judgment was entered.)

11. Beneath the surface of the San Bernardino Basin Area are deposits of gravel, detritus and other rock and soils, which contain voids into which water from the surface percolates from time to time. This porous material ranges up to 1200 feet in depth and is confined at its downstream (southwestern) end by Bunker Hill Dike, an underground barrier created by faulting; it constitutes a large natural underground water reservoir (hereinafter sometimes called the San Bernardino Basin). For over a century this underground reservoir and the Santa Ana River and its tributaries have been used by various persons for the storage and extraction of water for beneficial purposes. The San Bernardino Basin and the Santa Ana River and its tributaries within or upstream from plaintiff are of common benefit to the lands within, and inhabitants of, plaintiff.

12. The ground surface of the San Bernardino Basin Area slopes generally in a westerly direction, ranging from an elevation of approximately 1950 feet above sea level at the mouth of the Santa Ana River canyon to an elevation of approximately 980 feet above sea level near the Bunker Hill Dike. The elevation of the bedrock underlying the underground water reservoir similarly declines generally in a westerly direction. The easterly portion of the San Bernardino Basin contains various sub-basins which, particularly at times of low groundwater levels, are separated from the remainder of the basin by faulting of the underground strata and materials. Three of such sub-basins are the Reservoir Sub-basin, the

Mentone Sub-basin, and the Redlands Sub-Basin; their general location is shown on Appendix A.

13. Big Bear Lake is an artificial lake located within the watershed of the Santa Ana River in the County of San Bernardino, State of California. It is formed by Big Bear Dam, which impounds the waters of Upper Bear Creek, a tributary of the Santa Ana River. The location of Big Bear Lake and Big Bear Dam are shown on Appendix A.

14. The owners of lands overlying the San Bernardino Basin have overlying rights to the use of the waters thereof. The owners of lands lying within plaintiff district and bordering the Santa Ana River and its tributaries have riparian rights to the use of the waters thereof. By reason of their storage of water into, and/or extraction of water from, the San Bernardino Basin and the Santa Ana River and its tributaries, and by reason of the beneficial use thereof, many of the persons described in paragraph 11 hereof have acquired appropriative rights to the waters of said underground basin and to the waters of the Santa Ana River and its tributaries. All of said overlying, riparian and appropriative rights are prior and paramount to the water rights, if any, of defendants in or to the waters of said underground basin or the Santa Ana River or any of its tributaries.

15. This action is filed and prosecuted in the exercise of the statutory rights of plaintiff set forth in paragraph 2 hereof and as *parens patriae* of, and on behalf of, the inhabitants and lands within plaintiff and the owners of the prior and paramount water rights alleged in paragraph 14.

16. In a state of nature, the waters of Bear Creek flow downstream within the San Bernardino Mountains to their confluence with the Santa Ana River. The Santa Ana River, including the tributary flow of Bear Creek, then flows down to the base of the San Bernardino Mountains, where it enters the San Bernardino Basin Area. The river then flows across the San Bernardino Basin Area to the Bunker Hill Dike in the southwest corner thereof, and from there it flows to and through Riverside and Orange Counties and on to the Pacific Ocean. The Santa Ana River and the tributaries which enter it above the Bunker Hill Dike constitute one of the two principal sources of the groundwater in the San Bernardino Basin. The other principal source is precipitation falling on the San Bernardino Basin Area.

17. In the latter part of the eighteenth century, and particularly in the nineteenth century, many persons settled in and near the San Bernardino Basin Area, and they made increasing use of the waters of the Santa Ana River and the San Bernardino Basin, primarily for agricultural and domestic purposes. By 1900 much of the surface flow of the Santa Ana River at the base of the San Bernardino Mountains had been appropriated by the Prior Right Companies and the predecessors of Bear Valley. Their use of said water was principally agricultural and occurred in the eastern portion of the San Bernardino Basin Area. A large percentage of the water thus applied to the lands of their stockholders was not actually consumed and instead sank into the San Bernardino Basin, including certain of its sub-basins, as return flow. It was thereafter extracted and used by

said companies and their stockholders and by other persons. Said waters continue to be diverted by said companies and their successors and the return flow from their operations continues to contribute to the groundwater supply underneath the San Bernardino Basin Area, and continues to be available for extraction and beneficial use. Most of said use of water by said companies and their stockholders has occurred and continues to occur in the summer growing season, whereas most of the surface flow at other times of the year is not so appropriated and instead flows across the surface of, or percolates into, the San Bernardino Basin.

18. In 1884 the predecessors of Bear Valley constructed a dam on Bear Creek, thereby creating a lake by which to regulate the flow of the creek and increase the amount of water usable by the predecessors of Bear Valley and the Prior Right Companies and their stockholders.

19. Said dam has since been replaced by a more modern structure in approximately the same location; it serves essentially the same purpose as the original structure. Whenever the water level of the lake has been suitable, it has been used by persons in and near Big Bear for recreational and other purposes, subject to the right of Bear Valley and the Prior Right Companies to require release of water from the lake pursuant to their pre-existing appropriative rights. The dam and the bed of the lake are now owned by Big Bear, but the right to appropriate the waters of Upper Bear Creek continues to be owned by Bear Valley and the Prior Right .paCompanies. Big Bear Dam and Big Bear Lake are shown on Appendix A.

20. For many years prior to 1969 and thereafter, the Conservation District has slowed and impounded the waters of the Santa Ana River and its tributaries downstream from the San Bernardino Mountains in the eastern portion of the San Bernardino Basin Area, thereby causing large quantities of such water to percolate into the San Bernardino Basin. Without such action by the Conservation District, most of such water would not have percolated into the groundwater basin and would instead have passed as surface flow beyond Bunker Hill Dike. The water which has thus percolated has been extracted and beneficially used by the owners of overlying, riparian and appropriative rights in the San Bernardino Basin Area.

21. In 1963, Orange County Water District (created by the Orange County Water District Act, Cal. Stats. 1933, c. 924, as amended, West's Cal. Water Code Appendix, sec. 40) commenced a general adjudication of the water rights of the Santa Ana River Watershed in San Bernardino, Riverside and Orange Counties. ("Orange County Water District v. City of Chino," Superior Court for Orange County No. 117628.) Approximately 2,500 defendants in San Bernardino and Riverside Counties were served with the complaint. Some of the defendants cross-complained, and approximately 1,500 persons and entities in Orange County were served as cross-defendants. These 4,000 parties expended many millions of dollars in preparing for trial. In 1969, the litigation was settled pursuant to a stipulation for judgment executed by the four major public water agencies involved, namely, Orange County Water District, San Bernardino Valley Municipal Water District (plaintiff herein), Western Municipal

Water District of Riverside County and Chino Basin Municipal Water District. A judgment based on said stipulation was entered on April 17, 1969. At that time there was also pending in the Superior Court for Riverside County a lawsuit entitled "Western Municipal Water District of Riverside County v. East San Bernardino County Water District," No. 78426. Contemporaneously with the stipulation for judgment in the Orange County Water District case, and as part of the overall settlement of water rights along the Santa Ana River, the plaintiffs in Case No. 78426 executed a stipulation for judgment with San Bernardino Valley Municipal Water District (a defendant in said case and the plaintiff herein). Judgment based on said stipulation (hereinafter sometimes called the Western Judgment) was entered on April 17, 1969.

22. The principal underlying premise of the Western Judgment was that the safe yield of the San Bernardino Basin was then being exceeded and that there could be no additional extractions of water from the basin without damaging and eventually exhausting the basin. Thereafter the Watermaster appointed by the Court more precisely calculated the safe yield, and that calculation was and continues to be correct. Based on said calculation, the Western Judgment reduced and limited the extractions which may be made from the basin without replenishment by means of imported water.

23. On February 4, 1977, a judgment pursuant to stipulation was entered in "Big Bear Municipal Water District v. North Fork Water Company" (Case No. 165493 in the Superior Court for San Bernardino County). Said judgment is hereinafter sometimes

called the Big Bear Judgment. The stipulating parties included Big Bear, Bear Valley, the Prior Right Companies and the Conservation District. Said stipulated judgment is a contract as well as a judgment. The stipulating parties and their counsel were fully familiar with the Western Judgment and its underlying premise that the San Bernardino Basin had been in a state of overdraft and that preserving its hydrologic integrity would require imported water to replenish any reduction in the natural supply. Said parties and their counsel were also familiar with the contribution to the safe yield of the basin which was historically provided by the waters of Upper Bear Creek and Big Bear Lake, including the contribution made by return flow from the application of such water by the stockholders of the Prior Right Companies and Bear Valley. They intended that no action by Big Bear pursuant to the Big Bear Judgment would have the effect of creating an overdraft of the basin, and the holders of the prior and paramount rights alleged in Paragraph 14 hereof were expressly made beneficiaries of the Big Bear Judgment. This action is brought on behalf of the holders of the prior and paramount rights alleged in Paragraph 14 hereof, not only to protect and enforce said rights as such, but also to protect and enforce the rights of said persons as third party beneficiaries of the Big Bear Judgment.

24. To preserve the hydrologic integrity of the basin, the Big Bear Judgment provides for "Basin Make-up Water" and an account for that purpose was established. Among other things, Exhibit "D" to the judgment contemplated that 50% of the water released from the lake by Big Bear would be consumed by the

stockholders of Bear Valley and the Prior Right Companies and that the other 50% would be added to the groundwater basin as return flow. The judgment also contemplated that 51% of all water spilled from the lake would percolate into the San Bernardino Basin and that the other 49% would pass over the basin and across the Bunker Hill Dike as surface flow. The judgment ordered that these assumptions be followed in maintaining the Basin Make-up Account (also known as the Basin Compensation Account).

25. The foregoing percentages adopted in the Big Bear Judgment, although well intended, are erroneous. The portion of the water released from the lake and applied by said stockholders which is actually consumed is larger than 50%, and the portion thereof which percolates into the basin as return flow is smaller than 50%. Similarly the portion of the waters spilling from the lake which percolates into the basin is not 51%. By using the erroneous percentages set forth in Paragraph 24 hereof, the Big Bear Judgment significantly misstates the contribution to the San Bernardino Basin which would be made by releases and spills from Big Bear Lake. Big Bear relies on the erroneous percentages in the Big Bear Judgment and on the resulting inaccurate balances in the Basin Compensation Account. As a result, when water is retained in the lake, Big Bear does not admit the true extent of its obligation to provide sufficient water from other sources to compensate for the resulting loss to the San Bernardino Basin. Big Bear threatens to continue to rely on said erroneous percentages and will do so unless restrained by this Court.

26. The three-member Watermaster appointed by the Court to carry out the Big Bear Judgment has made a number of changes in the method for calculating the Basin Compensation Account which have not been authorized by the Court and which have had the effect of misstating the quantity either of releases from Big Bear Lake or of imported water which would be necessary to maintain the safe yield of the San Bernardino Basin. Big Bear's nominee on the Watermaster panel has participated in said changes, and Big Bear relies on said changes to reduce its obligation to maintain the safe yield. Big Bear threatens to continue to rely on said changes and will do so unless restrained by this Court. Said changes include, among others: (a) a three-year "waiver" of the percentages referred to in Paragraph 24 hereof on the purported justification that high groundwater levels near Bunker Hill Dike indicate that there is excess water in the basin, when in fact the eastern portion of the basin is more shallow and needs the water which either releases from Big Bear Lake or imported water would provide, especially for certain sub-basins such as Redlands, Mentone, and Reservoir Sub-basins; (b) an arbitrary allowance of 100% of certain releases from the lake, contrary to the terms of the judgment.

27. Big Bear has retained water in Big Bear Lake which otherwise would have contributed to the basin, on the purported ground that substitute water has been delivered to it pursuant to stock it has acquired in Bear Valley, which substitute water is then spread in the San Bernardino Basin Area. In fact, the water so taken and spread is winter water which would have been

spread by the Conservation District anyway; the basin gets no new compensating water for the loss of the water retained in the lake. Big Bear threatens to continue to retain water in Big Bear Lake on the ground that it is only taking water it is entitled to take pursuant to its stock in Bear Valley. Big Bear will continue to do so unless restrained by this Court.

28. Each of the defendants has made appropriations of the waters of Upper Bear Creek and Big Bear Lake, and Big Bear has made appropriations of the waters of San Bernardino Basin, all of which appropriations have thereby reduced the supply to the San Bernardino Basin Area. Said appropriations are without right and are contrary to the prior and paramount rights of persons entitled to extract water from the San Bernardino Basin. Defendants threaten to continue their said appropriations and to increase them. They will do so unless restrained by this Court.

29. As a result of the practices of the defendants as above alleged, the supply to, and therefore the safe yield of, the San Bernardino Basin will be reduced and the basin will suffer irreparable damage. Plaintiff and the overlying, riparian and appropriative water right owners on behalf of whom this action is brought will be irreparably injured. Plaintiff and said water right owners have no adequate remedy at law.

30. A controversy concerning water rights in and to the waters of Big Bear Lake and of the Santa Ana River and its tributaries and groundwater basins, including Bear Creek, Big Bear Lake, the main stem of the Santa Ana River and the underground reservoir underneath San Bernardino Basin Area, exists between plaintiff on the one hand and defendants on the

other hand. Plaintiff contends that defendants have no right to appropriate waters from any of said sources and that their diversion, extraction, storage and use of said waters is without right. Plaintiff further contends that if any of said defendants has any right to divert, extract, store or use water from said sources, said right is inferior to the prior and paramount rights of the persons and entities on behalf of whom plaintiff sues herein. Defendants and each of them contest and dispute said contentions of plaintiff.

31. Each of the defendants sued herein as Doe 1 through Doe 500, inclusive, is connected in some way with the facts alleged herein. As the nature of such connection is ascertained, plaintiff will ask leave of Court to file appropriate amendments alleging the same, and identifying the respective Does by their true names.

WHEREFORE plaintiff prays:

A. That the Court issue its injunction against defendants, including Big Bear, City and Community District, enjoining and prohibiting their diversion, extraction, storage or use of water from Big Bear Lake or from the Santa Ana River or any of its tributaries or groundwater basins, unless commensurate replenishment to preserve the hydrologic integrity of the San Bernardino Basin is provided.

B. That pending trial of this action, the Court issue a preliminary injunction against defendants enjoining and prohibiting any of the diversions, extractions, storage or use described in paragraph A hereinabove;

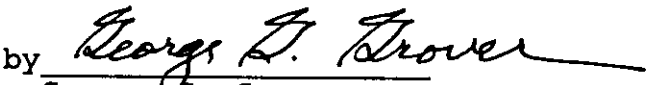
////

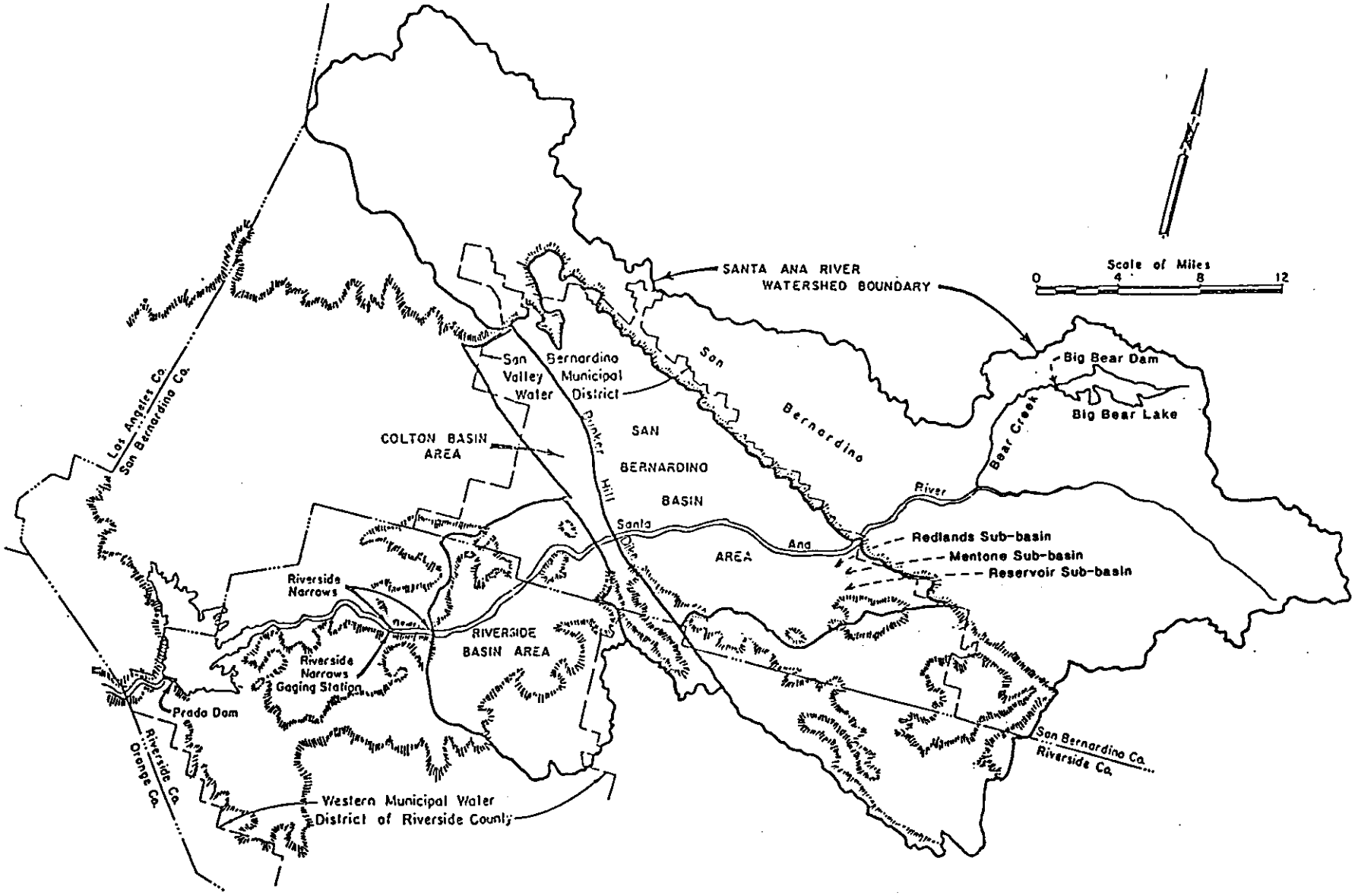
C. That the Court determine, declare and adjudge that the contentions of plaintiff in paragraph 30 above are valid and that the defendants' contrary contentions are invalid.

D. That the Court award plaintiff its costs of suit and such other and further relief as is just.

Respectfully,

JAMES W. DILWORTH
GEORGE G. GROVER
Attorneys for Plaintiff
San Bernardino Valley
Municipal Water District

by 
George G. Grover



MAP SHOWING

SAN BERNARDINO BASIN AREA, COLTON BASIN AREA, AND RIVERSIDE BASIN AREA SITUATED WITHIN SAN BERNARDINO COUNTY; RIVERSIDE BASIN AREA WITHIN RIVERSIDE COUNTY; BUNKER HILL DIKE; RIVERSIDE NARROWS; AND BOUNDARIES OF SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT & WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY.

APPENDIX A

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SAN BERNARDINO VALLEY
MUNICIPAL WATER DISTRICT

ORIGINAL FILED

DEC 31 1991

COUNTY CLERK, CENTRAL DISTRICT
SAN BERNARDINO COUNTY

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT (a municipal water district of the State of California), Plaintiff, v. **BIG BEAR MUNICIPAL WATER DISTRICT** (a municipal water district of the State of California); **CITY OF BIG BEAR LAKE** (a municipal corporation of the State of California); **BIG BEAR COMMUNITY SERVICES DISTRICT** (a community services district of the State of California); and DOES 1 - 500, Defendants.	No. 268619 COMPLAINT FOR INJUNCTION and DECLARATORY RELIEF

COMES NOW San Bernardino Valley Municipal Water District,a municipal water district of the State of California, and for cause of action against defendants alleges the following:

1. Plaintiff is a municipal water district of the State of California organized and existing under the

Municipal Water District Law of 1911, sections 71000 and following of the California Water Code.

2. Included among the powers held by plaintiff as such municipal water district are:

(a) The power to commence, maintain, intervene in, defend and compromise, in the name of the district, any action or proceeding involving or affecting the ownership or use of water or water rights within the district, used or useful for any purpose of the district, or a common benefit to lands within the district or inhabitants of the district. (Water Code sec. 71751.)

(b) The power to commence, maintain, intervene in, defend and compromise, in the name of the district, or as a class representative of the inhabitants, property owners, taxpayers, water producers or water users within the district, or otherwise, and to assume the costs and expenses of any and all actions and proceedings now or hereafter begun to determine or adjudicate all or substantially all of the water rights of a basin or other hydrologic unit overlain, in whole or in part, by the district, as between owners of or claimants to such rights, to prevent any interference with water or water rights used or useful to the lands, inhabitants, owners, operators, or producers within the district, or to prevent the diminution of the quantity or quality of the water supply of the district or such basin, or to prevent unlawful exportation of water from the district or such basin. (Water Code sec. 71757.)

3. Defendant Big Bear Municipal Water District (hereinafter sometimes called Big Bear) is a municipal water district of the State of California organized and existing under the Municipal Water District Act of 1911, sections 71000 and following of the California Water Code. It is governed by its board of directors and all powers of the district are exercised by or under the control of said board.

4. Defendant City of Big Bear Lake (hereinafter sometimes called City) is a municipal corporation of the State of California. It is governed by its city council, and all powers of the city are exercised by or under the control of said council.

5. Defendant Big Bear Community Services District (hereinafter sometimes called Community District) is a community services district of the State of California organized and existing under the Community services District Law, sections 61000 and following of the California Government Code. It is governed by its board of directors and all powers of the district are exercised by or under the control of said board.

6. All of the land within the boundaries of Big Bear, City and Community District are located in or near Big Bear Lake and Upper Bear Creek in the County of San Bernardino, State of California.

7. San Bernardino Valley Water Conservation District is a water conservation district of the State of California organized and existing under the Water Conservation District Law of 1931, sections 74000 and following of the California Water Code. It

is sometimes hereinafter called the Conservation District.

8. Bear Valley Mutual Water Company (hereinafter sometimes called Bear Valley) is a corporation organized and existing under the laws of the State of California. It is a mutual water company, as provided in section 2705 of the California Public Utilities Code. Bear Valley's service area is entirely within the County of San Bernardino, State of California, and it does business only within said county. Bear Valley is not a public utility under the jurisdiction of the California Public Utilities Commission.

9. North Fork Water Company, Lugonia Water Company and Redlands Water Company (hereinafter sometimes called the Prior Right Companies) are corporations organized and existing under the laws of the State of California. Each is a mutual water company, as provided in section 2705 of the Public Utilities Code. Their service areas are entirely within the County of San Bernardino, State of California, and they do business only within said county. They are not public utilities under the jurisdiction of the Public Utilities Commission.

10. There exists in the County of San Bernardino, State of California, the San Bernardino Basin Area, which consists of that portion of the watershed of the Santa Ana River upstream from Bunker Hill Dike and downstream from the foothills of the San Bernardino Mountains, all as shown on Appendix A attached hereto. Appendix A is hereby incorporated herein.

11. Beneath the surface of the San Bernardino Basin Area are deposits of gravel, detritus and other rock and soils,

which contain voids into which water from the surface percolates from time to time. This porous material ranges up to 1200 feet in depth and is confined at its downstream (southwestern) end by Bunker Hill Dike, an underground barrier created by faulting; it constitutes a large natural underground water reservoir (hereinafter sometimes called the San Bernardino Basin). For over a century this underground reservoir has been used by various persons for the storage and extraction of water for beneficial purposes. The Santa Ana River and its tributaries and the San Bernardino Basin are of common benefit to the lands within, and inhabitants of, Plaintiff.

12. The ground surface of the San Bernardino Basin Area slopes generally in a westerly direction, ranging from an elevation of approximately 1950 feet above sea level at the mouth of the Santa Ana River canyon to an elevation of approximately 980 feet above sea level at the Bunker Hill Dike. The elevation of the bedrock underlying the underground water reservoir similarly declines generally in a westerly direction. The easterly portion of the San Bernardino Basin contains various sub-basins which, particularly at times of low groundwater levels, are separated from the main basin by faulting of the underground strata and materials. Two of such sub-basins are the Reservoir Basin and the Redlands Basin; their general location is shown on Appendix A.

13. Big Bear Lake is an artificial lake located within the watershed of the Santa Ana River in the County of San Bernardino, State of California. It is formed by Big Bear

Dam, which impounds the waters of Upper Bear Creek, a tributary of the Santa Ana River. The location of Big Bear Lake and Big Bear Dam are shown on Appendix A.

14. The owners of lands overlying the San Bernardino Basin have correlative rights to the use of the waters thereof. The owners of lands bordering the Santa Ana River and its tributaries have riparian rights to the use of the waters thereof. By reason of their storage of water into, and/or extraction of water from, the San Bernardino Basin and the Santa Ana River and its tributaries, and by reason of the beneficial use thereof, many of the persons described in paragraph 11 hereof have acquired appropriative rights to the waters of said underground basin and to the waters of the Santa Ana River and its tributaries. All of said overlying, riparian and appropriative rights are prior and paramount to the water rights, if any, of defendants Big Bear, City and Community District in or to the waters of said underground reservoir or the Santa Ana River or any of its tributaries.

15. This action is filed and prosecuted in the exercise of the statutory rights of plaintiff set forth in paragraph 2 hereof and as parens patriae of, and on behalf of, the inhabitants and the owners of said prior and paramount water rights.

16. In a state of nature, the waters of Upper Bear Creek flow downstream within the San Bernardino Mountains to their confluence with the Santa Ana River, and the Santa Ana River, including the tributary flow of Upper Bear Creek, then flows down to the base of the San Bernardino Mountains, where it

enters the San Bernardino Basin Area. The river then flows across the San Bernardino Basin Area to the Bunker Hill Dike in the southwest corner thereof, and from there it flows to and through Riverside and Orange Counties and on to the Pacific Ocean. The Santa Ana River and the tributaries which enter it above the Bunker Hill Dike constitute one of the two principal sources of the groundwater in the San Bernardino Basin. The other principal source is precipitation falling on the San Bernardino Basin Area.

17. In the latter part of the eighteenth century, and particularly in the nineteenth century, many persons settled in and near the San Bernardino Basin Area, and they made increasing use of the waters of the Santa Ana River and the San Bernardino Basin, primarily for agricultural and domestic purposes. By 1900 much of the surface flow of the Santa Ana River at the base of the San Bernardino Mountains had been appropriated by the Prior Right Companies and Bear Valley. Their use of said water was principally agricultural and occurred in the eastern portion of the San Bernardino Basin Area. A large percentage of the water thus applied to the lands of their stockholders was not actually consumed and instead sank into the San Bernardino Basin, including certain of its sub-basins, as return flow. It was thereafter extracted and used by said companies and their stockholders and by other persons. Said waters continue to be diverted by said companies and the return flow from their operations continues to contribute to the groundwater supply beneath the San Bernardino Basin Area, and continues to be available for extraction and beneficial use. Most of said

use of water by said companies and their stockholders has occurred and continues to occur in the summer growing season, whereas most of the surface flow at other times of the year is not so appropriated and instead flows across the surface of, or percolates into, the San Bernardino Basin.

18. In 1903 Bear Valley constructed a dam on Upper Bear Creek in order to regulate the flow of the creek and thereby increase the amount of water usable by Bear Valley and the Prior Right Companies and their stockholders. The dam brought about the creation of Big Bear Lake behind the dam. Whenever the water level of the lake has been suitable, it has been used by persons in and near Big Bear for recreational and other purposes, subject to the right of Bear Valley and the Prior Right Companies to require release of water from the lake pursuant to their pre-existing appropriative rights.

19. Said dam has since been replaced by a more modern structure in approximately the same location; it serves essentially the same purpose as the original structure. The dam and the bed of the lake are now owned by Big Bear, but the right to appropriate the waters of Upper Bear Creek and the lake continues to be owned by Bear Valley and the Prior Right Companies. Big Bear Dam and Big Bear Lake are shown on Appendix A.

20. For many years prior to 1969 and thereafter, the Conservation District has slowed and impounded the waters of the Santa Ana River and its tributaries downstream from the San Bernardino Mountains in the eastern portion of the San Bernardino Basin Area, thereby causing large quantities of such

water to percolate into the San Bernardino Basin. Without such action by the Conservation District, most of such water would not have percolated into the groundwater basin and would instead have passed as surface flow beyond Bunker Hill Dike. The water which has thus percolated has been extracted and beneficially used by the owners of overlying, riparian and appropriative rights in the San Bernardino Basin Area.

21. In 1963, Orange County Water District (created by the Orange County Water District Act, Cal. Stats. 1933, c. 924, as amended, West's Cal. Water Code Appendix, sec. 40) commenced a general adjudication of the water rights of the Santa Ana River Watershed in San Bernardino, Riverside and Orange Counties. (Orange County Water District v. City of Chino et al., Superior Court for Orange County No. 117628.) Approximately 2,500 defendants in San Bernardino and Riverside Counties were served with the complaint. Some of the defendants cross-complained, and approximately 1,500 persons and entities in Orange County were served as cross-defendants. These 4,000 parties expended many millions of dollars in preparing for trial. In 1969, the litigation was settled pursuant to a stipulation for judgment executed by the four major public water agencies involved, namely, Orange County Water District, San Bernardino Valley Municipal Water District (plaintiff herein), Western Municipal Water District of Riverside County and Chino Basin Municipal Water District. A judgment based on said stipulation was entered on April 17, 1969. At that time there was also pending in the Superior Court for Riverside County a lawsuit entitled "Western Municipal Water District of Riverside County v. East

San Bernardino County Water District," No. 78426 Contemporaneously with the stipulation for judgment in the Orange County Water District case, and as part of the overall settlement of water rights along the Santa Ana River, the plaintiffs in Case No. 78426 executed a stipulation for judgment with San Bernardino Valley Municipal Water District (a defendant in said case and the plaintiff herein). Judgment based on said stipulation (hereinafter sometimes called the Western Judgment) was entered on April 17, 1969.

22. The principal underlying premise of the Western Judgment was that the safe yield of the San Bernardino Basin was then being fully put to use and that there could be no additional extractions of water from the basin without exceeding the safe yield and thereby damaging and eventually exhausting the basin. Thereafter the Watermaster appointed by the Court more precisely calculated the safe yield, and that calculation was and continues to be correct. Based on said calculation, the Western Judgment limits the extractions which may be made from the basin without replenishment by means of imported water.

23. On February 4, 1977, a judgment pursuant to stipulation was entered in "Big Bear Municipal Water District v. North Fork Water Company et al." (Case No. 165493 in the Superior Court for San Bernardino County). The stipulating parties included Big Bear, Bear Valley and the Prior Right Companies. Those parties and their counsel were fully familiar with the Western Judgment and its underlying premise that the existing annual extractions from the San Bernardino

Basin were equal to its safe yield, and they sought to preserve the integrity of the basin. Said parties and their counsel were also familiar with the contribution to the safe yield of the basin which was historically provided by the waters of Upper Bear Creek and Big Bear Lake, including the contribution made by return flow from the application of such water by the stockholders of the Prior Right Companies and Bear Valley. They intended that no action by Big Bear pursuant to the 1977 judgment (hereinafter sometimes called the Big Bear Judgment) would have the effect of creating an overdraft of the basin.

24. To preserve the integrity of the basin, the Big Bear Judgment provides for "Basin Make-up Water" and an account for that purpose (sometimes referred to as the Basin Compensation Account) was established. Among other things, Exhibit "D" to the judgment provided that 50% of the water diverted at the base of the San Bernardino Mountains by Bear Valley and the Prior Right Companies would be deemed to have been consumed by their stockholders' operations and that the other 50% would be deemed to have been added to the groundwater basin as return flow. The judgment also provided that 51% of all water from Upper Bear Creek and Big Bear Lake would be deemed to pass over the basin and across the Bunker Hill Dike as surface flow.

25. The foregoing percentages adopted in the Big Bear Judgment, although well intended, are erroneous. The portion of the water applied by said stockholders which is actually consumed is larger than 50%, and the portion thereof which percolates into the basin as return flow is smaller than 50%. Similarly the portion of the waters of Upper Bear Creek

and Big Bear Lake which would pass over the basin as surface flow is not 51%. By using the erroneous percentages set forth in Paragraph 24 hereof, the Big Bear Judgment significantly understates the contribution to the San Bernardino Basin which would be made by releases from Big Bear Lake. Big Bear relies on the erroneous percentages in the Big Bear Judgment and on the resulting inaccurate balances in the Basin Compensation Account. As a result, when water is retained in the lake, Big Bear does not provide sufficient water from other sources. Big Bear threatens to continue to rely on said erroneous percentages and will do so unless restrained by this Court.

26. The three-member Watermaster appointed by the Court to carry out the Big Bear Judgment has made a number of changes in the method for calculating the Basin Compensation Account which have not been authorized by the Court and which have had the effect of understating the quantity of releases from Big Bear Lake or imported water necessary to maintain the safe yield of the San Bernardino Basin. Big Bear's nominee on the Watermaster panel has participated in said changes, and Big Bear relies on said changes to reduce its obligation to maintain the safe yield. Big Bear threatens to continue to rely on said changes and will do so unless restrained by this Court. Said changes include: (a) a three-year "waiver" of the percentages referred to in Paragraph 24 hereof on the purported justification that high groundwater levels near Bunker Hill Dike indicate that there is excess water in the basin, when in fact the eastern portion of the basin is more shallow and needs the

water which releases from Big Bear Lake or imported water would provide, especially to certain sub-basins such as Redlands and Reservoir sub-basins; (b) arbitrary allowance of 100% of certain releases from the lake, contrary to the terms of the judgment.

27. Big Bear has retained water in Big Bear Lake which historically would have contributed to the basin on the purported ground that substitute water has been taken pursuant to stock it has acquired in Bear Valley, which substitute water is then spread in the San Bernardino Basin Area. In fact, the water so taken and spread is winter water which would have been spread by the Conservation District anyway; the basin gets no new compensating water for the loss of the water retained in the lake. Big Bear threatens to continue to retain water in Big Bear Lake on the ground that it is only taking water it is entitled to take pursuant to its stock in Bear Valley. Big Bear will continue to do so unless restrained by this court.

28. Each of the defendants has made appropriations of the waters of Upper Bear Creek and Big Bear Lake, thereby reducing the supply to the San Bernardino Basin Area. Said appropriations are without right and are contrary to the prior and paramount rights of persons entitled to extract water from the San Bernardino Basin. Defendants threaten to continue their said appropriations and to increase them. They will do so unless restrained by this Court.

29. As a result of the practices of the defendants as above alleged,the supply to the San Bernardino Basin will be

reduced below its safe yield and the basin will suffer irreparable damage. Plaintiff and the overlying, riparian and appropriative water right owners on behalf of whom this action is brought will be irreparably injured. Plaintiff and said water right owners have no adequate remedy at law.

30. A controversy concerning water rights in and to the waters of the Santa Ana River and its tributaries and groundwater basins, including Upper Bear Creek, the main stem of the Santa Ana River and the underground reservoir beneath San Bernardino Basin Area, exists between plaintiff on the one hand and defendants on the other hand. Plaintiff contends that defendants Big Bear, City and Community District have no right to appropriate waters from any of said sources and that their diversion, extraction and use of said waters is without right. Plaintiff further contends that if any of said defendants has any right to divert, extract or use water from said sources, said right is inferior to the prior and paramount rights of plaintiff and also inferior to the prior and paramount rights of the persons and entities on behalf of whom plaintiff sues herein. Defendants and each of them contest and dispute said contentions of plaintiff.

WHEREFORE plaintiff prays:

A. That the Court issue its injunction against defendants Big Bear, City and Community District enjoining and prohibiting their diversion, extraction, or storage of water from the Santa Ana River or any of its tributaries or groundwater basins, unless replenishment to the San Bernardino Basin is provided.

B. That pending trial of this action, the Court issue a preliminary injunction against defendants enjoining and prohibiting the diversions, extractions, and storage described in paragraph A hereinabove;

C. That the Court determine, declare and adjudge that the contentions of plaintiff in paragraph 30 above are valid and that the defendants' contrary contentions are invalid.

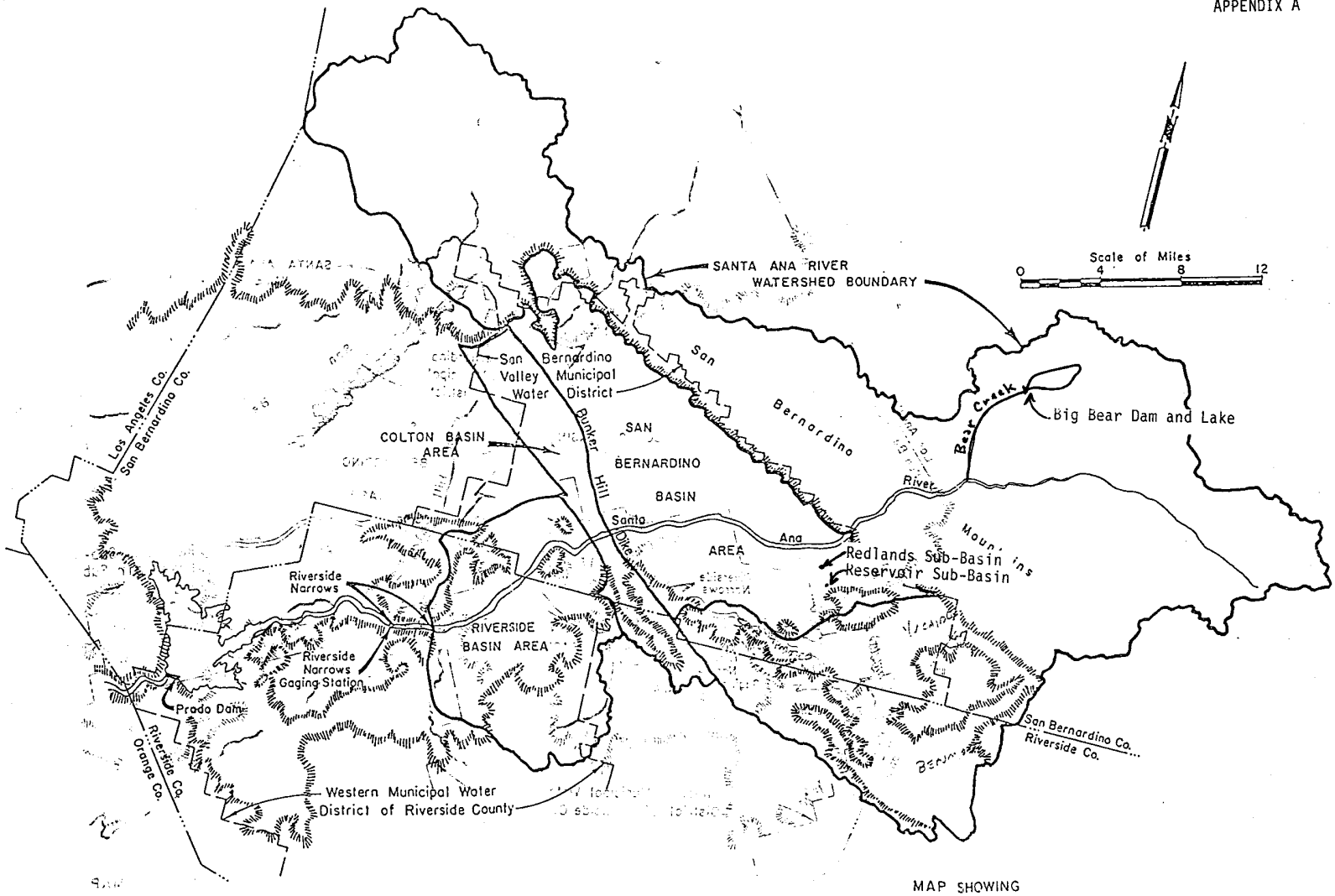
D. That the Court award plaintiff its costs of suit and such other and further relief as is just.

Respectfully,

JAMES W. DILWORTH
GEORGE G. GROVER
Attorneys for Plaintiff
San Bernardino Valley
Municipal Water District

by George G. Grover

George G. Grover



MAP SHOWING

SAN BERNARDINO BASIN AREA, COLTON BASIN AREA, AND RIVERSIDE BASIN AREA SITUATED WITHIN SAN BERNARDINO COUNTY; RIVERSIDE BASIN AREA WITHIN RIVERSIDE COUNTY; BUNKER HILL DIKE; RIVERSIDE NARROWS; AND BOUNDARIES OF SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT & WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY.

Lytle Creek Judgment

Copy

OF

Certified Copy

OF

JUDGMENT

Rendered in the Superior Court of San Bernardino County, California, on January 28th, 1924, in Action No. 17030 and Entitled:

"City of San Bernardino vs. Fontana Water Co. et al."

Recorded in Book 829, Page 293 of Deeds, San Bernardino County Records

Judgment

In the Superior Court of the State of California in and for the County of San Bernardino

CITY OF SAN BERNARDINO,
a municipal corporation,

Plaintiff,

vs.

FONTANA WATER COMPANY, a corporation, FONTANA UNION WATER COMPANY, a corporation, FONTANA POWER COMPANY, a corporation, FONTANA FARMS COMPANY, a corporation, FONTANA COMPANY, a corporation, LYTLE CREEK WATER AND IMPROVEMENT COMPANY, a corporation, CITIZENS LAND AND WATER COMPANY OF BLOOMINGTON, a corporation, RIVERSIDE HIGHLAND WATER COMPANY, a corporation, RANCHERIA WATER COMPANY, a corporation, MUTUAL LAND AND WATER COMPANY OF RIALTO, a corporation, TERRACE WATER COMPANY, a corporation, THE GAGE CANAL COMPANY, a corporation, RIVERSIDE TRUST COMPANY, LIMITED, a corporation, RIVERSIDE

No. 17030

ORANGE COMPANY, LIMITED, a corporation, CITY OF COLTON, a municipal corporation, GATE CITY ICE AND PRE-COOLING COMPANY, a corporation, COLTON CITY WATER COMPANY, a corporation, MEEKS AND DALEY WATER COMPANY, a corporation, FONTANA LAND COMPANY, a corporation, JOHNHUB WATER COMPANY, a corporation, FONTANA DEVELOPMENT COMPANY, a corporation, NORTH COLTON WATER COMPANY, a corporation, LAWSON WELL COMPANY, a corporation, ALTA VISTA WATER COMPANY, a corporation, CLARA VISTA WATER COMPANY, a corporation, ORCHARD MUTUAL WATER COMPANY, a corporation, EAST RIVERSIDE WATER COMPANY, a corporation, JAMES BARNHILL, JOHN DOE, RICHARD ROE, SAM BLACK, JOE WHITE, SAM WHITE, CHARLES WHITE, TOM BROWN, SARAH BROWN, CHARLES BROWN, MARY BROWN, CHARLES LOW and JOHN LOW, and RIALTO DOMESTIC WATER COMPANY, a corporation,

Defendants.

WHEREAS there has been filed in this action a stipulation for judgment, duly executed by and on the part of the plaintiff above named and by and on the part of each and all of the following named defendants in this action, to-wit: Fontana Water Company, a corporation;

Fontana Union Water Company, a corporation; Fontana Power Company, a corporation, Fontana Farms Company, a corporation; Fontana Land Company, a corporation, Lytle Creek Water and Improvement Company, a corporation; Citizens Land and Water Company of Bloomington, a corporation; Riverside Highland Water Company, a corporation; Rancheria Water Company, a corporation; Mutual Land and Water Company of Rialto, a corporation; Terrace Water Company, a corporation; City of Colton, a municipal corporation; Rialto Domestic Water Company, a corporation; and James Barnhill (said Barnhill being erroneously sued herein, under the name of "W. W. Barnhill"),

NOW THEREFORE, by reason of said stipulation, and pursuant to the terms and provisions thereof,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED by the Court as follows:

I.

This action is hereby dismissed as to each and all of the defendants, other than those above named as parties to said stipulation; and each and all cross-complaints or cross-actions, filed or pending by or between any of the parties to said stipulation, above named are dismissed.

II.

As between the plaintiff and each and all of the defendants, above named, as parties to said stipulation, and as to each and all of said defendants as between themselves, excepting as set forth in Paragraph XXI hereof, it is further

ADJUDGED AND DECREED, as follows:

III.

That an inch of water, as the term is used herein, shall mean such quantity of water, in continuous flow, as will supply one-fiftieth part of a cubic foot of water per second of time.

IV.

That from time immemorial, there has flowed, and now flows, in Lytle Creek Canyon, in San Bernardino County, California, a natural stream, known as "Lytle Creek," and there exists below the mouth of said canyon, a certain pressure pipe line, belonging to said Power Company, and the cement intake diverting water into said pipe line, is situate on the west side of said stream, very near the mouth of said canyon, and at a distance of about 1662 feet north of a point in the north boundary of the Muscupiabe Rancho, between stations 48 and 49 thereof, where said boundary intersects the center line of Riverside Avenue, as delineated on the map showing subdivision of the lands of the Semi-Tropic Land and Water Company, (said location of said intake having been sometimes heretofore erroneously designated in the pleadings herein and elsewhere, as being about 2375 feet north of said point of intersection), said Map being recorded in the office of the County Recorder of said County, in Book 6 of Maps, page 12 thereof; and said Power Company, for more than five years last past, has been and now is diverting from said creek, at said intake, by means of said pipe line, the waters of said Creek, flowing at said intake not exceediig 3000 inches, and is conducting said waters to the power house of said Power Company, situated on Farm Lot 66, designated on said Map, which waters,

upon being discharged from said Power House, belong to and are distributed to sundry parties, for their use, in proportion to their rights and interests therein.

V.

That in the San Bernardino Valley in said County, there exists, and lies below, and to the southeast of the mouth of said canyon, an area of land herein designated as "Lytle Creek Region" which, for the purposes of this decree, is defined and described as follows:

Commencing at a point in the center line of Mill Street, in the City of San Bernardino, in said County, situate 300 feet east of the center line of Mt. Vernon Avenue; thence north 400 feet; thence west to the center line of Mt. Vernon Avenue; thence running north along the center line of Mt. Vernon Avenue, to the intersection thereof with the center line of Fourth Street, (said street being identical with Foothill Boulevard); thence running west along the center line of Fourth Street, to a point where the center line of Fourth Street would intersect the center line of Muscott Avenue, if said Avenue were extended south; thence running north to the point of intersection of center line of Muscott Avenue with center line of Base Line; thence running west along center line of Base Line, to the southeast corner of Section 31, Township 1 North, Range 4 West, S. B. B. & M.; thence running north to the southwesterly boundary of the right of way of Atchison, Topeka and Santa Fe Railway Company (on which right of way are located the main railroad tracks of said Railroad Company, running from said City, through Cajon Pass); thence following along said southwesterly boundary of said right of way, to the point of intersection thereof, with the State Highway

at Verdemont; thence following said Highway to the point of intersection thereof, with the north line of Township 1 North, Range 5 West, San Bernardino Base and Meridian; thence running west, along the north line of Township 1 North, Range 5 West, San Bernardino Base and Meridian, to the northwest corner of said last mentioned township; thence running southeasterly to a point situate five feet east of the most easterly point of said intake of said pipe line of said Power Company, thence running southeasterly and following upon and along a line parallel with the east side of that certain cement canal, formerly known as the "Semi-Tropic Canal" (the intake of which canal is identical with said intake of said pipe line), and at all points five feet distant in a northeasterly direction from the east side of said Canal, to a point where said line would intersect the northwesterly line of Farm Lot 68, designated on said Map, if said northwesterly line of said Lot were projected southwest; thence along said northwesterly line of said Lot, to the foot of the ridge or bluff known as the "Rialto Bench," thence running southeasterly along the foot of said bluff, to a point where the foot of said bluff intersects the center line of said Mill Street; running thence east, along the center line of Mill Street, to the place of beginning.

VI.

That whenever there shall be discharge from said Power House, surplus water in excess of the quantity at the time required to satisfy the domestic and irrigation needs of the respective parties, entitled to receive and use water discharged from said Power House, all of such surplus water, so discharged, shall be used for

replenishing the underground water sources of said Lytle Creek Region, and to that end, shall be delivered by said Power Company, to and upon the wash of said Lytle Creek, by a cement conduit, at the highest point on the westerly margin of said wash, to which such water can reasonably be conducted by gravity flow from said Power House. Such replenishment work, as to the water so delivered upon said wash, shall be performed under the supervision and direction of the Committee hereinafter mentioned.

VII.

That all water flowing at said intake of said pipe line of said Power Company, between the 15th day of December, and the 15th day of the next succeeding month of April, of each year hereafter elapsing, shall be diverted and applied in the manner and in accordance with the priorities hereinafter set forth, to-wit:

First: To supply to said pipe line 2000 inches of water, or such larger quantity as may, at the time, be required and taken for immediate use for irrigation or domestic purposes, by the parties entitled to receive and use water discharged from said Power House, not exceeding the extent of their respective rights to such water.

Second: To supply additional water to said pipe line, to the extent of an aggregate amount of 3000 inches, (inclusive of the water specified in the next preceding subdivision "First"), except and provided that all or any part of such additional water shall be allowed to flow past said intake, into the wash or channel of said creek, for replenishing the underground water of said

Region, whenever so requested in writing by the said Improvement Company, except during periods:

(a) When the quantity of water flowing in said creek at said intake, exceeds 4000 inches, in which event such excess water may be diverted through said pipe line, until the total quantity of water, diverted therethrough, amounts to 2500 inches, or

(b) When the quantity of water, flowing in said creek, at said intake exceeds 5000 inches, in which event, such excess water may be diverted through said pipe line, until the total quantity of water, diverted therethrough, amounts to 3000 inches.

Third: All water, so permitted to pass said intake, shall be used, as far as reasonably practicable, for replenishing the underground water contained in the entire area of the Lytle Creek Wash, situate below said intake, provided that at all times, so far as is reasonably practicable, the upper portion of said wash shall be so replenished with water until no more water can be sunk therein, before such replenishment is performed on the portion of said wash lying south of Highland Avenue, or lying east of the west boundary of the lands in said Region now owned by the Muscoy Water Company.

Fourth: If, at the end of five years, from date hereof, said Improvement Company or their successors in interest, decide that the water producing capacity of wells, situate south of an east and west line drawn through said Power House, and north of said Highland Avenue, would be benefited and increased by conducting at said intake, into said pipe line, a quantity of water not exceeding 3000 inches, then and in that event, all of the water flowing at said intake, shall at all times

thereafter, be turned into said pipe line, to the extent of said 3000 inches, instead of permitting a portion of such waters to flow past said intake, as aforesaid, and at said Power House, all surplus water, in excess of the quantity at the time required to meet the then requirements of the respective parties, entitled to receive and use water discharged from said Power House, shall be used in accordance with, and be subject to the provisions of Paragraph VI hereof.

VII-a

That no water shall ever be conducted by any party hereto, from that certain tract of land, situated in said San Bernardino County, described as follows:

Beginning at a point on the center line of hereinbefore mentioned Muscott Avenue, said point being situate one-half mile north of said Base Line; running thence south to the center line of said Fourth Street; running thence west, along said center line of Fourth Street, to the point of intersection thereof with the center line of the right of way, for electrical transmission line, of Southern Sierras Power Company; running thence northwesterly along said center line of said right of way, to a point where said center line of said right of way would intersect a line drawn due west from said point of beginning; thence running east to said point of beginning.

VIII.

That in order to conserve, in the most economical and effectual method, all waters which, under the provisions hereof, are from time to time to be used for replenishing the underground water sources of said Region, and also, for further replenishing the underground water

supply of said Region, to conserve, so far as may be reasonably practicable, the surplus, or flood waters, of streams or canyons tributary to said Region, a committee of five persons shall annually be appointed in the month of September of each year, which committee shall have full charge and direction of such water conservation work, and of all expenditures relating thereto, provided that, in case of disagreement or difference of opinion, the power of such committee shall be exercised by concurrence of a majority of its members. One of the members of said committee shall be so appointed by said Improvement Company; one by said Citizens Company; one by said Union Water Company, one by said Mutual Company, Rancheria Water Company, Riverside Company and said City of San Bernardino; and one by said Terrace Water Company, James Barnhill and City of Colton, and each of said members shall serve for one year, and until his successor is appointed and no member of said committee shall receive any compensation for serving thereon. Vacancies on said committee shall also be filled by appointment, to be made in like manner as aforesaid, by the party or parties which made the appointment of the member whose place so becomes vacant, and any person appointed to fill such vacancies shall fill out the unexpired term of his predecessor. Subject to the provisions hereof, said committee is hereby authorized to, from time to time, install any water conservation works, including the construction of dams, ditches, cuts, obstructions, and shafts on land in said Lytle Creek Wash, lying north of Fourth Street, (said street being identical with Foothill Boulevard) and also in and along any canyon, the waters of which are tributary to said Region, and take all other steps,

as in its uncontrolled discretion may be deemed expedient, in order to accomplish the underground conservation of such waters, provided that nothing herein shall be construed as authorizing said committee to trespass upon the property or rights of any party or to do any act that would infringe upon or impair or interfere with the right of any party to the use of any water to which such party shall be entitled. The expense of installing such system and maintaining the same, and carrying on said work of water conservation, shall be borne and paid, subject to the provisions hereof, by the Fontana Companies, Citizens Company, Riverside Company, Improvement Company, Mutual Company, Rancheria Water Company, Rialto Domestic Water Company, City of Colton, City of San Bernardino, Terrace Water Company, and James Barnhill, in the same proportions that the maximum quantity of water which each of said eleven parties (or group of parties), is allotted hereunder, the right to pump from said Region, bears to the aggregate maximum quantity of water which all of said parties are alloted hereunder the right to pump from said Region, provided that in the event of any other person or corporation joining in said conservation work, and paying a proportion of the expense thereof, the proportions of said expense to be borne by said parties, as hereinbefore set forth, shall be correspondingly and equitably reduced. Said committee, in the month of October of each year, and from time to time thereafter, as they may deem proper, shall make an estimate of the amount of money at the time required to be paid to said committee by said eleven parties hereto above named, in order to meet the expense for conservation work as aforesaid, at the

time being undertaken, or in contemplation by said committee.

Said committee shall thereupon present to each of said eleven parties, a bill for the proportionate amount so to be paid by such party, and if any party shall fail to pay such bill, within thirty days after it shall be so presented to such party, then said committee may bring, and it shall be its duty to bring, suit against such party for the amount of such bill, together with costs, including a reasonable attorneys' fee to be fixed by the court in which such suit shall be brought.

Any and all lands, owned by any of said specified parties who are to bear the expense of said conservation work as aforesaid, situate in said Lytle Creek Region, and lying north of said "Fourth Street," and not suitable for the growing of crops thereon, may be used at any and all times for spreading water thereon, and sinking and conserving water therein, by means of dams, obstructions, ditches, cuts and shafts, or by taking such other steps as may be deemed expedient by said committee, provided however, that such water conservation work shall not be done in such a manner as to injure or interfere with the use of any pumping plant, structure or other improvement, situate on any land where such work is performed.

IX.

That the maximum quantity of water which said plaintiff, City of San Bernardino, shall be, and is entitled to take from said Region, and use beyond the confines thereof, is such quantity of water, which when added to the water said plaintiff is entitled to have delivered to it, from said Lytle Creek, will amount in the

aggregate, (inclusive of said Lytle Creek Water) to 325 inches of water, and said plaintiff shall not be entitled to divert, at any time, from said Region, an amount of water in excess of said 325 inches. Of said quantity of water, 225 inches and no more may be pumped or diverted from that certain tract of land in said Region, comprising 10.09 acres, and forming a part of tract known as the "McKenzie Tract" (said tract of 10.09 acres being more particularly described in that certain deed running from William L. McKenzie, and others, to said plaintiff, and recorded in Book 109 of Deeds, at page 303 thereof, in the office of the County Recorder of said San Bernardino County), and none of said 225 inches shall ever be diverted by plaintiff from any other portion of said Region.

Said plaintiff is also the owner of the right to take, divert and use water from that portion of the San Bernardino Valley, lying east of the easterly boundary line of said Lytle Creek Region and east of a line beginning at the point of intersection of the State Highway with the south boundary line of Section 34, Township 2 North, Range 5 West, S. B. B. & M., and running thence to the northwest corner of said Section 34, and north of the center line of Mill Street, extended east to Sterling Avenue, and from streams tributary to said portion of said valley, situate in said portion of said valley, either from the surface flow of such streams, or from wells bored or to be bored in said portion of said valley, to such extent as may be reasonably necessary to supply the needs of said city and its inhabitants with water for supplying needs and purposes within said City. The right of said plaintiff to take water from the surface flow of Lytle Creek, to the extent of 100 inches, shall

not be affected or diminished by any claims of the Fontana Companies, or any of them to salvage water, by reason of any water of Lytle Creek being conducted or conveyed in or through pipe lines, or conduits of any kind.

X.

That, subject to the provisions of this paragraph, the maximum quantity of water which said Rialto Domestic Water Company shall be, and is entitled to take from said Region and use beyond the confines thereof, is such quantity of water which, when added to the water said Company is entitled to have delivered to it from said Lytle Creek, will amount in the aggregate (inclusive of said Lytle Creek Water) to 143.22 inches of water, and said Company shall not be entitled to divert, at any time from said Region, an amount of water in excess of said quantity hereinbefore in this paragraph specified. Of said quantity of water, 100 inches and no more may be pumped from said Region by said Company, provided that:

(a) None of said 100 inches of water shall be taken from any well or water development situate south of a line located parallel to, and situate three-fourths of a mile north of, Highland Avenue.

(b) The right of said Company to so pump and take said one hundred inches of water, shall be exercised only to such extent as shall be necessary to supply the City of Rialto, and the inhabitants thereof, with water for municipal and domestic uses and purposes, and for the irrigation of flowers, trees and lawns, within said City, and then only during such times as the 43.22 inches of water (now supplied by said Company to the

inhabitants of said City) is inadequate, or unsuitable for such purposes or uses.

(c) None of said 100 inches of water shall, at any time, be used outside of the now, or hereafter existing corporate limits of said City of Rialto, except to the extent that said 43.22 inches is now being used outside said City.

(d) Nothing in this Paragraph X contained shall be construed as vesting in said Company the right to take any portion of said 100 inches of water from any well or water development, without the consent of the owner of the land on which such well or water development is situated.

(e) The right to pump and take said 100 inches of water from said region shall be exercised only in the event such right shall be transferred to the City of Rialto.

(f) The water derived from said 100 inches water right, other than water supplied for fire hydrants, sewers, stores and buildings, not used for dwellings, shall not be furnished to the inhabitants of said City of Rialto, except through meters and when charged for at meter rates.

XI.

That the maximum quantity of water which said Improvement Company shall be, and is entitled to take from said Region, and use beyond the confines thereof, is, such quantity of water, which when added to the water said Company is entitled to have delivered to it from said Lytle Creek, will amount in the aggregate (inclusive of said Lytle Creek Water), to 1026.23 inches, and said Improvement Company shall not be en-

titled to divert at any time, from said Region, an amount of water in excess of said quantity in this paragraph hereinbefore specified. 'Of said quantity of water, only 700 inches may be pumped and diverted from said Region, by said Improvement Company, except during such periods when the quantity of water said Company is deriving from said Lytle Creek, is temporarily reduced to a quantity of less than 326.23 inches, during which periods additional water may be pumped and diverted from said Region by said Company, but only to an extent sufficient to supply such deficiency of said Lytle Creek Water, and only so long as such deficiency continues. Said pumping of said 700 inches of water by said Improvement Company shall be confined to the Ferguson Ranch, (said Ranch being the real property described in that certain deed, dated November 20th, 1908, and executed by Fontana Development Company, and recorded in the office of the County Recorder of said San Bernardino County, in Book 429 of Deeds, page 103 thereof), and said Company is not entitled to pump any water from any other part of said Region.

XII.

That the maximum quantity of water, which said Mutual Company shall be, and is entitled to take and conduct from said Region, and use beyond the confines thereof, is 125 inches of water, and said Mutual Company shall not be entitled to divert at any time, from said Region, an amount of water in excess of said 125 inches, all of which said quantity of water may be pumped by said Company from said Region, but all of said water shall be taken from wells, or water de-

velopments situate south of Highland Avenue, and north of Base Line.

XIII.

That the maximum quantity of water which said Riverside Company shall be, and is entitled to take from said Region, and use beyond the confines thereof, is 450 inches of water, and said Riverside Company shall not be entitled to divert at any time, from said Region, an amount of water in excess of said 450 inches, all of which said quantity of water may be pumped or diverted by said Company from said Region, but all of said water shall be taken from wells or water developments situate south of Highland Avenue, and north of Base Line.

XIV.

That the maximum quantity of water which said Rancheria Water Company shall be, and is entitled to take from said Region, and use beyond the confines thereof, is 120 inches of water, and said Company shall not be entitled to divert at any time from said Region, an amount of water in excess of 120 inches, all of which said quantity of water may be pumped or diverted by said Company from said Region, but all of said water shall be taken from wells or water developments, situate south of Highland Avenue, and north of said Fourth Street.

XV.

That the maximum quantity of water which said Citizens Company shall be, and is entitled to take from

said Region, and use beyond the confines thereof, is 1300 inches of water, and said Citizens Company shall not be entitled to divert, at any time, from said Region, an amount of water in excess of said 1300 inches, all of which said quantity of water may be pumped or diverted by said Company from said Region, provided that:

(a) No more than 200 inches shall ever be diverted or pumped by said Citizens Company, from that part of said Ferguson Ranch specified in that certain deed, executed by the Semi-Tropic Land and Water Company, to the Rialto Irrigation District, and recorded in the office of the County Recorder of said San Bernardino County, in Book 187 of Deeds, at page 213 thereof, and

(b) No more than 585 inches shall ever be diverted from said Region by said Citizens Company, from the northeast quarter of Section 36, Township 1 North, Range 5 West, S. B. B. & M., and

(c) No more than 150 inches shall ever be diverted or pumped by said Citizens Company, from that certain tract of land, situate in said Region, described as follows, to-wit:

Commencing at a point on the Base Line two thousand and fifty feet east of the southwest corner of Township 1 North, Range 4 West, San Bernardino Base and Meridian, and running thence due east 250 feet; thence north 14 degrees west, 344 feet; thence north 24 degrees 10 minutes West, 839.7 feet; thence north 39 degrees, 56 minutes west, 1096 feet; thence due west 674 feet; thence south 8 degrees, 20 minutes east, 500 feet; thence south 34 degrees, 15 minutes east, 1119 feet; thence south 58 degrees, 35 minutes east, 998-7/10 feet, to the place of beginning.

(d) None of the remaining quantity of said 1300 inches of water shall ever be diverted or pumped by said Citizens Company, from any lands in said Region, lying to the north of Base Line, but nothing herein contained shall be construed as obligating said Citizens Company, to divert any specific quantity of water from lands lying north of Base Line, to the end that any quantity of water may be diverted by said Company, from lands in said Region lying south of Base Line, so long as such quantity, when added to the quantity of water which said Company may be then contemporaneously taking from said Region, from lands north of Base Line, shall not exceed in the aggregate, said maximum quantity of 1300 inches of water; provided however, that in the event of said Company diverting at any time from said Region, a total quantity of water, exceeding 1100 inches, then all of such excess water shall be taken by said Company from lands in said Region lying south of a line drawn parallel to, and situate 2500 feet south of Base Line.

(e) Said Citizens Company shall never be entitled to divert any water from that certain tract of land situate in said Region, and described as follows:

Beginning at the southeast corner of the northeast quarter of the northeast quarter of Section 36, Township 1 North, Range 5 West, San Bernardino Base and Meridian; running thence west, 11.89 chains to a post, thence north 3 degrees 10 minutes west, 20 chains to a post on the north line of said Section, thence east 1 chain, thence south 32 degrees east, 8.32 chains to a post; thence south 2 degrees west, 2.06 chains to a post; thence south 54 degrees east, 4.59 chains to a post; thence south 83 degrees east, 4.40 chains to the east line

of said Section, thence south 8.48 chains to the place of beginning.

XVI.

The maximum quantity of water which James Barnhill (sued herein under the erroneus name of "W. W. Barnhill"), shall be, and is entitled to take from said Region, and use beyond the confines thereof, is seventy-five inches of water and said Barnhill shall not be entitled to divert, at any time, from said Region, an amount of water in excess of said 75 inches, all of which said quantity of water may be pumped by him from said Region, but all of said water shall be taken from wells, or water developments, situate south of the existing right of way of Atchison, Topeka and Santa Fe Railway Company (on which said right of way are located the railroad tracts extending from said City of San Bernardino, to the City of Rialto), and north of said Mill Street.

XVII.

That the maximum quantity of water, which said Terrace Water Company shall be, and is entitled to take from said Region, and use beyond the confines thereof, is 150 inches of water, and said Terrace Water Company shall not be entitled to divert, at any time, from said Region, an amount of water in excess of said 150 inches, but all of said water shall be taken from wells or water developments, situate south of said right of way of said Railway Company mentioned in the next preceding paragraph hereof, and north of said Mill Street. All of said water may be pumped.

XVIII.

That the maximum quantity of water which said City of Colton shall be, and is entitled to take from said

and its tributaries, and from said Lytle Creek Region, and conduct from said Region, and use beyond the confines thereof, shall amount to an aggregate quantity of 3480.78 inches, and said Fontana Companies shall never be entited either collectively or separately to divert, beyond said confines, at any time from said water sources, or any of them, an amount of water in excess of said quantity in this paragraph hereinbefore specified. Of said 3480.78 inches of water, 1300 inches and no more may be pumped and diverted from said Region, by said Fontana Companies, provided that:

(a) No more than three hundred inches shall ever be pumped from the next hereinafter described tract of land, and said 300 inches shall be pumped from no other place; said tract being that certain tract, in said Region, described as follows:

That portion of the Southwest portion of the Muscupiabe Rancho, described as follows:

Beginning at station O of the north boundary of the Muscupiabe Rancho, which point is situate near the northeasterly bank of Lytle Creek, and near the mouth of Lytle Creek Canyon;

Thence following and along the northerly boundary of said Muscupiabe Ranch, South 67 degrees, 52 minutes East, thirty-five and fifty-three hundredths (35.53) chains to station 1 of said Muscupiabe Rancho; thence south 48 degrees, 14 minutes west, fifty-six and seventy-six hundredths (56.76) chains to the southwesterly corner of Farm Lot Ten (10) designated on the Map showing SUBDIVISION OF LANDS BELONGING TO SEMI-TROPIC LAND AND WATER COMPANY, recorded in Book 6 of Maps, at page 12, in the office of the County Recorder of said San Bernardino County;

Region, and use beyond the confines thereof, is 600 inches of water, and said City shall not be entitled to divert, at any time, from said Region, an amount of water in excess of said 600 inches, all of which said quantity of water may be pumped by said City from said Region, but all of said water shall be taken from wells or water developments situate south of the last mentioned right of way of said Railway Company, and north of said Mill Street, and none of said water shall be used west of the highway, running approximately north and south, situate on the Rialto Bench, and known as "Rancho Avenue."

XIX.

As used herein, (1) the term "Fontana Companies," refers to Fontana Water Company, Fontana Union Water Company, Fontana Power Company, Fontana Farms Company, and Fontana Land Company; (2) the term "Citizens Company" refers to the Citizens Land and Water Company of Bloomington; (3) the term "Riverside Company" refers to the Riverside Highland Water Company; (4) the term "Improvement Company" refers to the Lytle Creek Water and Improvement Company; (5) the term "Mutual Company" refers to the Mutual Land and Water Company of Rialto; (6) the term "Power Company" refers to the Fontana Power Company, and (7) the term "Union Water Company" refers to Fontana Union Water Company.

XX.

That the maximum quantity of water which said Fontana Companies shall be, and are collectively entitled to take from the surface and sub-surface waters of said Lytle Creek, and from said Lytle Creek Canyon,

Thence north 24 degrees, 43 minutes west, eighty-four and twenty-four hundredths (84.24) chains to a point in the north boundary of said Muscupiabe Rancho; said point being identical with the north corner of Farm Lot One (1), designated on said Map; thence, following and along the north boundary of the Muscupiabe Ranch, south fifty-one degrees, thirty minutes east, eleven and fifty-hundredths (11.50) chains to Station 49 thereof;

Thence, south 63 degrees, 00 minutes east, 40 chains to Station 0 of said Muscupiabe Rancho, the place of beginning.

Containing two hundred twelve and nineteen hundredths (212.19) acres.

(b) No more than 200 inches shall ever be pumped and diverted from said Region, from that certain tract of land in said Region, described as follows:

Commencing at a point on Line 2-3 of the northeasterly boundary of the southwest portion of the Rancho Muscupiabe, said point being north 45 degrees, 0 minutes west, one hundred thirty-seven and three-tenths chains from the southeast corner of Section 25, Township 1 North, Range 5 West, San Bernardino Base and Meridian; thence following the northeasterly boundary line of lands heretofore conveyed by the Fontana Development Company, to the Lytle Creek Water and Improvement Company, by deed recorded in Book 429 of Deeds, page 103, south 71 degrees, 13 minutes west, thirty-four and twenty-eight hundredths chains; thence still following said boundary north eighty-two degrees, fifty-nine minutes west, eighteen and seventy-three hundredths chains, for a point of beginning; thence from said point of beginning north fifty-four degrees,

fifteen minutes west, eighty-three and four hundredths chains; thence south 35 degrees, 45 minutes west, along the boundary line of the land conveyed by the Fontana Development Company to the Fontana Union Water Company, by deed recorded in Book 505 of Deeds, page 274, to the northwesterly corner of Lot 64, of Map showing subdivision of lands belonging to the Semi-Tropic Land and Water Company, as per plat recorded in Book 6 of Maps, page 12, of the records of said County, including the western portion of the Muscupiabe Grant, as per plat recorded in Book 7 of Maps, page 23, of the records of said County; thence from said northwesterly corner of said Lot 64, easterly and along the northeast line of Lots 64, 66, 68, 70, 72, 74 and 76, to the westerly point of land conveyed by the Fontana Development Company to the Lytle Creek Water and Improvement Company, by deed recorded in Book 429 of Deeds, page 103, et. seq.; thence following the north boundary of said tract south 82 degrees, 59 minutes east, twenty-six and twenty-seven hundredths chains, more or less, to point of beginning.

(c) None of the remaining 800 inches, or any portion of said 1300 inches of water, shall ever be pumped by said Fontana Companies, or any of them, from any portion of said Region lying to the south, or southeasterly of a line drawn from the southeast corner of Farm Lot 68, designated on said Map, to that certain point situate on the boundary of said Muscupiabe Rancho, designated or known as "Stake No. 3" (which said last mentioned point is situate very near to the northeast corner of Section 22, Township 1 North, Range 5 west, S. B. B. & M.); thence running due east to the southwesterly boundary of said right of way of

said Atchison, Topeka and Santa Fe Railway Company, hereinbefore mentioned, save and except that 150 inches of said 1300 inches of water may be pumped or diverted from lands in said Region lying below or to the south or southeasterly of said line.

(d) No water, pumped in said Region by any of said Fontana Companies, shall ever be conducted east of the west boundary of the lands in said Region now owned by the Muscoy Water Company, a corporation, provided however, that if any of the said Fontana Companies shall exercise the right to substitute for 150 inches of the surface waters of said Lytle Creek other water (said right being specifically provided for in that certain judgment rendered by the Superior Court of said San Bernardino County, in Action numbered 9383 in said Court, a copy of which judgment is recorded in the office of the County Recorder of said County, in Book 369 of Deeds at page 323 thereof, which said judgment is based upon that certain contract, dated October 26, 1891, wherein John L. Campbell granted to the Semi-Tropic Land and Water Company, the right to make such substitution of such water), then and in that event, such substituted water, not exceeding 150 inches, may be conducted anywhere.

(e) No water, except the 300 inches permitted to be pumped hereunder, from the tract of land described in Subdivision (a) of this Paragraph XX, shall ever be pumped and diverted by any of said Fontana Companies, from said Region, except and provided that whenever the quantity of water which said Fontana Companies are deriving from said Lytle Creek, at said intake, when added to any water that shall at the time be actually pumped from said tract (there shall be no

obligation to pump any water from said tract), shall amount in the aggregate to less than 2500 inches, then, so long as such deficiency shall continue, said Fontana Companies may take and divert from said Region from any or all of said other areas hereinbefore specified (but not more from any one of said areas than the maximum that they are entitled to take from such tract as hereinbefore stated) such quantity of water as may be necessary to make up such deficiency and maintain such aggregate supply of 2500 inches.

(f) Said quantity of 2500 inches and said maximum quantity of 3480.78 inches of water, hereinbefore referred to in this Paragraph XX, both relate exclusively to water which said Fontana Companies are entitled to take for their own use for irrigation and other beneficial purposes, beyond the confines of said Region.

XXI.

Nothing herein contained shall settle, bind or affect any question, matter or right existing between any of said Fontana Companies only, the purpose of this decree being to define and adjudicate the rights involved herein, of each and all of the respective parties hereto, other than said Fontana Companies, and also to adjudicate the collective rights of all of said Fontana Companies, constituting one group of defendants, without affecting any right which any of said Fontana Companies may have against any other of said Fontana Companies.

XXII.

That, except as provided in Paragraph XXIV hereof, no well shall ever be sunk hereafter by any party to

this action, within a distance of 200 feet of the north boundary line of said Ferguson Ranch, and it is further decreed that none of said Fontana Companies shall be entitled to hereafter pump any water in said Lytle Creek Canyon, at any time when such water is not needed for irrigation purposes.

XXIII.

Nothing contained herein shall be construed as permitting or shall permit, any water to be diverted from said Region, or from any water sources herein menitoned, at any time when the water so diverted is not reasonably needed for some useful or beneficial purpose, and it shall not be deemed a useful or beneficial purpose within the meaning of this paragraph, to use water:

(a) For irrigating, between the 15th day of November and the 15th day of March, of the next succeeding year, any grain or cereal crop, unless such crop is growing in an orchard;

(b) For saturating or causing water to sink in lands, lying outside of the said Region and canyon, for the purpose of accomplishing underground storing of water, or of adding to the water contained in such lands, nor for excercising unreasonable irrigation of crops or trees growing thereon.

XXIV.

That none of the parties to this action shall ever be entitled hereafter, to sink any well within a distance of 500 feet from any other well, owned, or operated by any other party to this action, except for substituting a new well in lieu of any now existing well, within said distance, for the sole purpose of maintaining, but not in-

creasing, the quantity of water now taken by such existing well, within such distance, provided however, that if it is desired to sink such new well within said distance, then such new well shall be always located as near as reasonably practicable to the existing old well for which it is to be substituted, as aforesaid.

XXV.

That each and all of the parties to this action, when taking any water from any water source mentioned herein, shall install, and at all times maintain respectively, at every point at which such water is so taken, such measuring box or weir or other measuring device, as will show readily and accurately the quantity of water at the time being taken at such point, which box and weir or other device, shall be installed and maintained as directed by, and to the satisfaction of said committee on water conservation, and shall at all times be open to inspection by an member of said committee, and by any party to this action.

XXVI.

Nothing herein contained shall be construed as vesting any new right in any of the parties hereto, to enter upon and take water from any water development or well situate on any property of any other party hereto, but the provisions of this paragraph shall not impair or affect any existing right of any party hereto.

XXVII.

That the rights of each and all of the said parties to pump water from said Region, as hereinbefore specified and defined are, as between said parties, equal and cor-

relative, without any priority or superiority of right, except as hereinbefore specifically stated or provided as to a particular interest or right, as between particular specified parties.

XXVIII.

That every provision of this decree in favor of, or applying to any party hereto, shall also apply to, and inure to the benefit of, and also bind each and all of the heirs, legal representatives, successors and assigns of such party.

XXIX.

That nothing herein decreed shall impair, abridge, or affect any existing right of any party hereto, which is now established by decree of court, or by other record, to have delivered, or to share in water from the surface flow of said Lytle Creek, except as may hereinbefore be otherwise specifically provided. Nothing herein decreed shall impair, abridge or affect any existing right of any party hereto to practice water conservation by sinking water in said Lytle Creek Canyon.

XXX.

That each and all of the parties hereto, and the agents and employees of each of them, are hereby perpetually restrained and enjoined from doing any act or thing in violation of the provisions of this decree.

XXXI.

None of the several maximum quantities of water which the parties hereto are respectively entitled to take from said Region, and use beyond the confines thereof, as herein specified, shall be increased or affected by the

future acquiring of additional lands in said Region by any of said parties; provided, however, anything to the contrary herein contained notwithstanding, should any party hereto hereafter purchase from any other party hereto the herein specified right to divert water of such other party, such purchasing party shall be entitled to exercise such purchased right of diverting water from said Region, in addition to the right allotted hereunder to such purchasing party.

XXXII.

No objection shall ever be made by any of said parties as to the interest or right of any party, as hereinbefore specified and defined, or as to the validity of this judgment in so specifying or defining such interest or right, on the ground that such interest or right, as so specified or defined, is not consistent with or warranted by the pleadings relative thereto; and if, in any case, it shall appear that any such interest or right, as so specified and defined, is in fact not consistent with or warranted by such pleading as actually filed, then such pleading shall be deemed and treated as amended, to conform to and sustain such interest and right as hereinbefore specified and defined.

XXXIII.

Each of said parties waives all right of appeal from this judgment, and no appeal shall be taken by any party or parties from this judgment or any part thereof.

XXXIV.

No party to this judgment shall be entitled to recover costs from any other party.

Dated: January 28th, 1924.

BENJAMIN F. WARMER,
Judge.

Endorsed:
Filed Jan. 28, 1924

HARRY L. ALLISON, Clerk
By M. L. ALDRIDGE, Deputy.

Docketed: Jan. 30, 1924, at 1:35 o'clock P. M.

Entered: Jan. 28, 1924, Book 41, Page 154.

HARRY L. ALLISON, Clerk
By R. M. SCHMIDT, Deputy Clerk

STATE OF CALIFORNIA,
COUNTY OF SAN BERNARDINO, } ss.

I, HARRY L. ALLISON, County Clerk and ex-officio Clerk of the Superior Court, do hereby certify the foregoing to be a full, true and correct copy of the original on file in my office.

Witness my hand and seal of the Superior Court, this 14th day of Feb., 1924.

HARRY L. ALLISON, County Clerk.
By R. M. SCHMIDT, Deputy.

Recorded at request of Leonard, Surr & Hellyer, Feb. 16, 1924, at 28 minutes past 9.00 A. M., in Book 829, Page 293, of Deeds, Records San Bernardino County.

FULTON G. FERAUD, County Recorder.

By IRENE MCINERNY, Deputy Recorder.
Fee $13.50.

I hereby certify that I have correctly tanscribed this instrument on the records in the office of the Recorder of San Bernardino County.

R. EASTON, Copyist.

Compared:
M. ALEXANDER,—R. EASTON.

Appendix E

2007 Integrated Regional Water Management Plan and 2011 Regional Water Management Plan

These items are being provided on compact disc.

- 2007 Integrated Regional Water Management Plan
- 2011 Regional Water Management Plan

2007 Integrated Regional Water Management Plan

Upper Santa Ana River Watershed

Integrated Regional Water Management Plan

November 2007

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1 Introduction

1.1 Background

In 2005, the Upper Santa Ana Water Resources Association (Association) members met and agreed to develop an Integrated Regional Water Management Plan (IRWM Plan) to address water management issues for the communities of the Upper Santa Ana River (SAR) watershed. The Association is composed of agencies in the Upper SAR watershed that share a common concern for the region's water resources. The list of Association member agencies is presented in Appendix D. San Bernardino Valley Municipal Water District (Valley District), a major regional water agency, agreed to lead the planning effort and applied for and received a grant from the California Department of Water Resources (DWR) to prepare this plan. An objective of developing the proposed IRWM Plan is to identify, define, and establish strategies to capitalize on all water management opportunities that are present today or may become available in the region in the future. With careful and thoughtful integrated planning, the participation of water managers and stakeholders, and the development of robust water management strategies and implementation tools, the region's water entities can improve their water supply reliability and self-reliance for future water supplies. Implementation of the IRWM Plan will help the fast-growing region, which is dependent upon the San Bernardino Basin and imported water from the State Water Project (SWP) to reduce its dependence on imported water, while providing reliable, good quality water for economic growth and enhancing the wellbeing of the residents of the Upper SAR region.

1.1.1 Overview of Plan Area

1.1.1.1 Santa Ana River Watershed

The SAR is the largest stream system in Southern California. It begins high in the San Bernardino Mountains where snowmelt and rainfall flow more than 100 miles southwesterly to

The Santa Ana River System originates high in the San Bernardino Mountains. (Photo by Ryan Gilmore).

discharge into the Pacific Ocean between Newport Beach and Huntington Beach. The SAR watershed covers over 2,650 square miles of urban, rural, agricultural, and forested terrain and the more populated urban areas of San Bernardino, Riverside, and Orange Counties, as well as a small portion of Los Angeles County. Figure 1-1 depicts the SAR watershed and its relationship to the IRWM Plan Area.

The IRWM Plan Area is the Upper SAR watershed and encompasses Big Bear Lake and the headwaters of the SAR until it reaches the Riverside Narrows and includes the cities and communities of San Bernardino, Yucaipa, Redlands, Beaumont, Cherry Valley, Calimesa, Highland, Rialto, Colton, Fontana, Grand Terrace, and Loma Linda. Figure 1-2 shows the region. The region covers 824 square miles, approximately 32 percent of the total SAR watershed, and is located in San Bernardino and Riverside Counties. The climate in the region is characterized by relatively hot, dry summers and cool winters with intermittent precipitation.

There are numerous tributaries that contribute flow to the main stem of the SAR in the Plan Area including Bear Creek, Keller Creek, Plunge Creek, Mill Creek, San Timoteo Creek, Yucaipa Creek and Mission Zanja Creek (tributaries to San Timoteo Creek), City Creek, East Twin Creek (a tributary to City Creek), Lytle Creek, Cajon Wash (a tributary to Lytle Creek), and Warm Creek (a tributary to Lytle Creek) (see Figure 1-2).

Figure 1-1
Santa Ana River Watershed

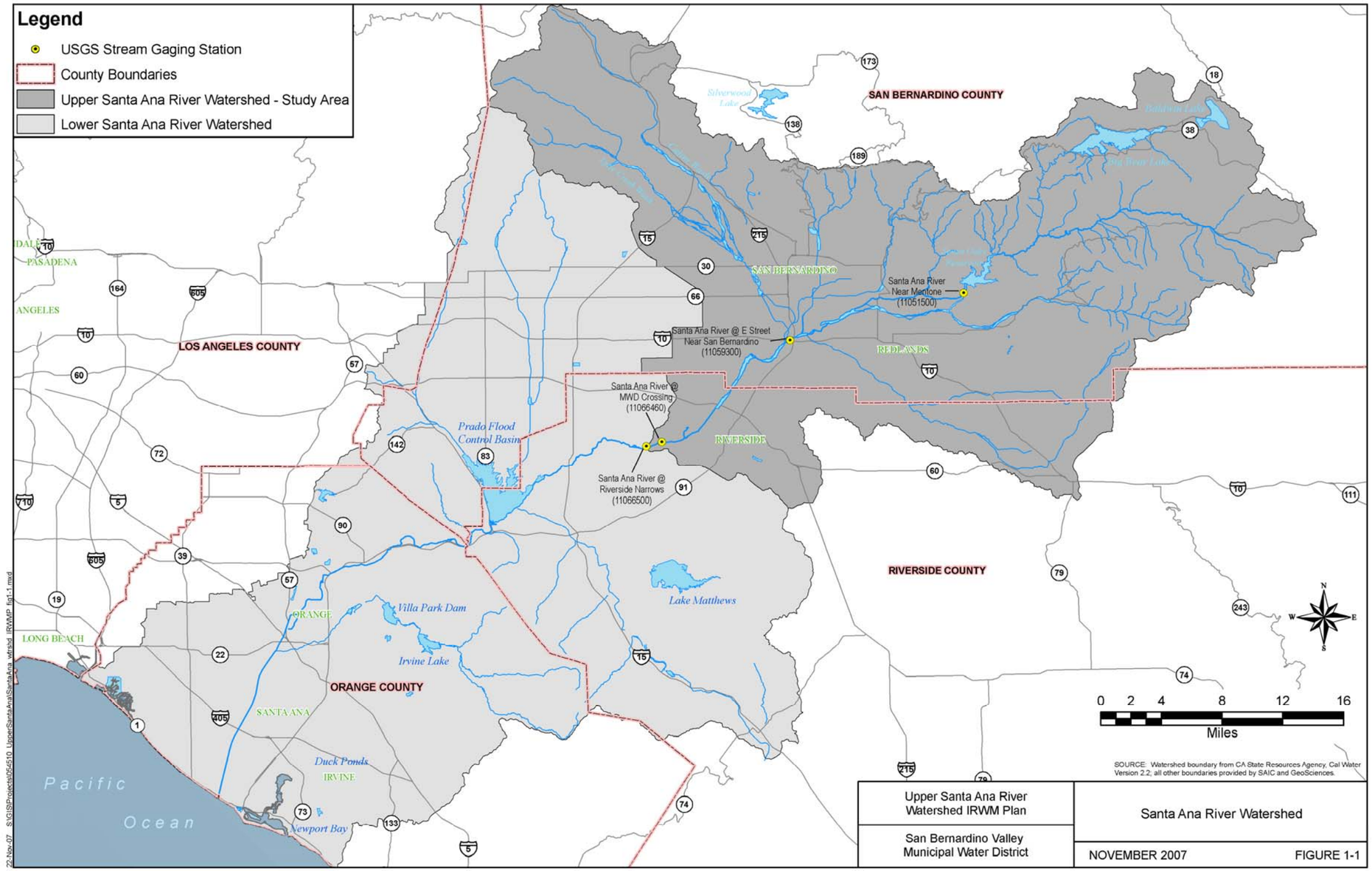
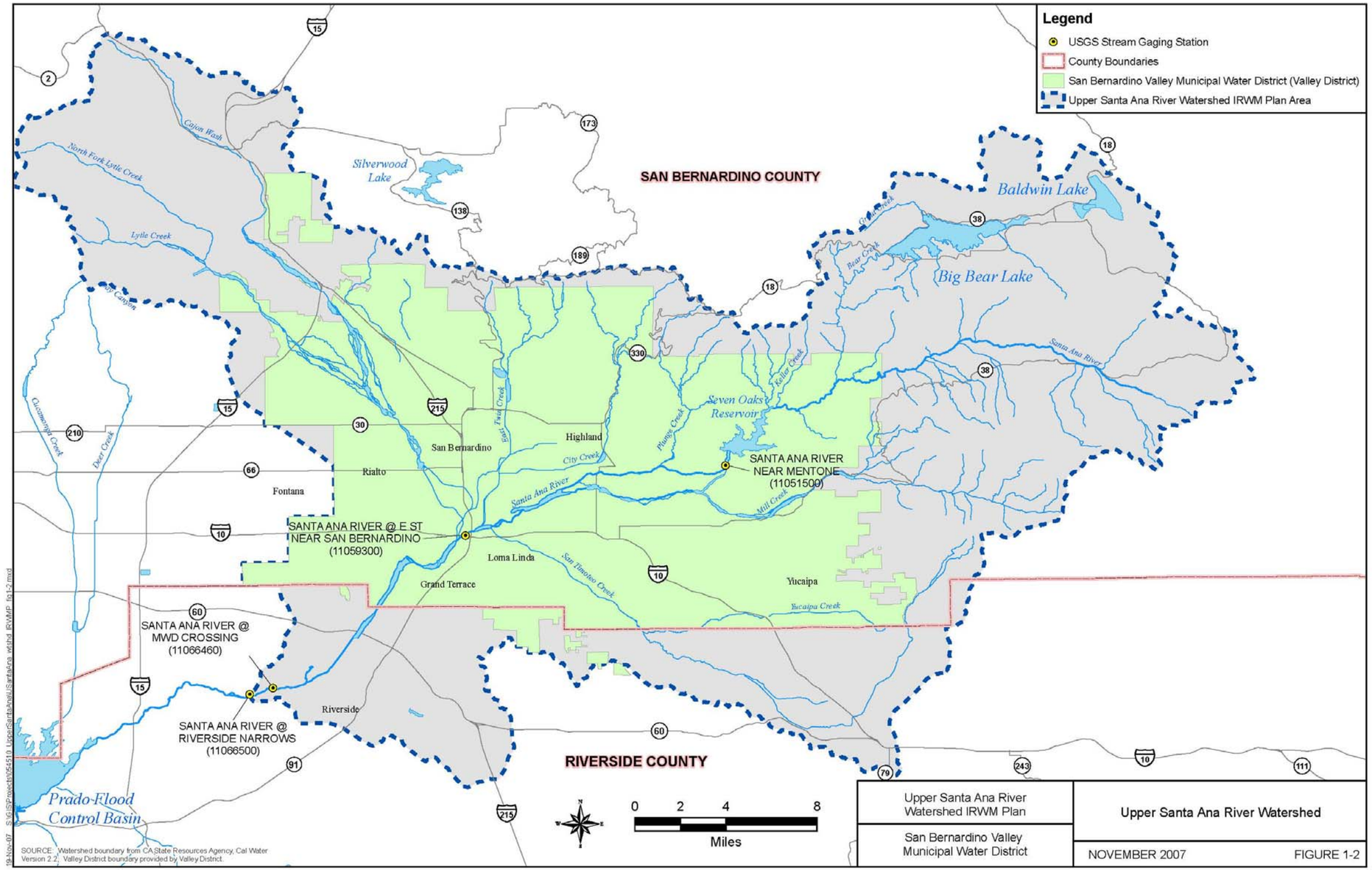


Figure 1-2
Upper Santa Ana River Watershed



1.2 Integrated Regional Water Management Plan

Management of water resources in the region takes place within a complex legal and institutional framework. Development of the IRWM Plan, a comprehensive and coordinated regional water management plan for the Upper SAR, involves the cooperation of many parties interested in water management, including water purveyors in the region. The development of an IRWM Plan is initiated by encouraging all stakeholders to participate in the planning process. The planning process includes stakeholder participation; consideration of historic plans; and compliance with institutional constraints, orders, accords, and government laws and judgments.

In 2005, nine members of the Association met and formed a Regional Water Management Group for the purpose of developing an IRWM Plan. The Regional Water Management Group is now called the Technical Advisory Group (TAG), with the regional lead agency, Valley District, coordinating development of the IRWM Plan. The TAG members actively participated in development of the IRWM Plan. Members of the TAG include:

- Valley District – Lead Agency
- City of Big Bear Lake Department of Water and Power
- City of Redlands Municipal Utilities Department
- City of Riverside Public Utilities Department
- East Valley Water District
- San Bernardino Municipal Water Department
- San Bernardino Valley Water Conservation District (SBVWCD)
- San Bernardino County Flood Control District
- San Gorgonio Pass Water Agency
- West Valley Water District
- Yucaipa Valley Water District
- Water Resource Institute, California State University, San Bernardino
- San Timoteo Watershed Management Authority (STWMA)
- Fontana Union Water Company

In the initial stages of the planning process for the IRWM Plan, the TAG identified a list of stakeholders. In general, the stakeholders for this planning process are described by four categories: (1) members of the TAG as listed above, (2) other regional stakeholders and water agencies located in the Upper SAR watershed region, (3**)** watershed-based stakeholders located in the SAR

watershed that are part of the larger integrated planning for the region discussed in the Santa Ana Watershed Project Authority (SAWPA) Plan, and (4) federal and State of California (State) agencies that were encouraged to participate throughout development of the IRWM Plan.

The TAG has encouraged local agencies to be active in the development of the IRWM Plan and to participate in the planning process. Specific steps taken by the TAG to inform and encourage stakeholders' participation are discussed below.

Early in the planning process, the TAG assembled a list of stakeholders and a letter was sent to each one informing them of the planning process and encouraging them to participate. Stakeholders were invited to participate in the TAG's bi-monthly face-to-face meetings and by conference calls. The TAG meetings focused on discussion of regional water management issues of the basin. TAG members and other participating agencies reviewed the work in progress and provided comments on the development of the plan. The agendas for the TAG meetings were posted on Valley District's website in advance so all agencies, other stakeholders, and interested parties could participate throughout the planning process in discussion of the issues in which they were interested. A copy of the draft IRWM Plan was sent to all stakeholders for review and comment.

This IRWM Plan was developed in coordination with Western, San Jacinto River Watershed Council, and SAWPA

Other Regional Water Agencies and Stakeholders

- San Bernardino County Board of Supervisors
- Riverside County Board of Supervisors
- Beaumont-Cherry Valley Water District
- Bear Valley Mutual Water Company
- Big Bear Municipal Water District
- City of Beaumont
- City of Calimesa
- City of Colton
- City of Fontana
- City of Loma Linda
- City of Rialto
- Marygold Mutual Water Company
- Muscoy Mutual Water Company
- Regents of the University of California (Regents)
- Riverside Highland Water Company
- Riverside Flood Control and Water Conservation District
- South Mesa Water Company
- Orange County Flood Control District
- Terrace Water Company
- Western Heights Mutual Water Company
- Fontana Water Company

Watershed-Based Stakeholders

- SAWPA and its member agencies (Eastern Municipal Water District, Inland Empire Utilities Agency, Orange County Water District (OCWD), Valley District, and Western Municipal Water District (Western))
- Beaumont Basin Watermaster
- Western-San Bernardino Watermaster
- California Resource Connections, Inc.

State and Federal Stakeholders

- California Department of Fish and Game
- California Department of Public Health
- California Department of Toxic Substances Control
- California Department of Water Resources
- Regional Water Quality Control Board (RWQCB)
- Southern California Edison
- State Water Resources Control Board (SWRCB)
- U.S. Army Corps of Engineers (USACE)
- U.S. Forest Service

and will become part of the SAWPA regional plan for the SAR watershed. A representative from SAWPA participated in the TAG meetings and actively engaged in the discussions. A representative from Western was also invited and attended the regular meetings of the TAG. The San Jacinto Watershed Council, although not an active participant in the TAG, has been briefed on the development of the plan and received a copy of the draft IRWM Plan for their review and comment.

1.2.1 Santa Ana Watershed Project Authority

SAWPA is a regional agency that has a major role in water resources planning in the SAR watershed. SAWPA was formed in 1968 as a planning agency and was transformed in 1972 through a change in its mission to plan and build facilities that would protect the water quality of the SAR watershed. SAWPA is a Joint Powers Authority, classified as a Special District (government agency) in which it carries out functions useful to its member agencies. SAWPA's vision is to have a sustainable SAR watershed that supports economic and environmental vitality as well as an enhanced quality of life. Its regional leadership is a model of collaboration and cooperation utilizing integrated solutions. To that extent, SAWPA has developed an IRWM Plan for the entire SAR watershed as well as a regional groundwater management plan and an urban water management plan (UWMP).

SAWPA's planning activities generally address water management and water supply reliability issues for the ever-growing population of the watershed. SAWPA works with planners, water experts, and other government agencies to identify issues and challenges of the region. To resolve the many water-related problems, SAWPA works with water planners to ensure there is enough water in the future; with regulators to ensure that the water is safe and clean; and with all other stakeholders (including the concerned public) to develop collaborative, regional solutions to the area's water needs.

SAWPA is working with its member agencies to update its IRWM Plan for the entire SAR watershed and is an active participant in the planning process for the Upper SAR Watershed IRWM Plan. The information from the Upper SAR Watershed IRWM Plan will be incorporated into SAWPA's integrated regional plan for the watershed.

1.3 Other Integrated Regional Water Management Activities in the Watershed

Integrated regional water management activities occurred in the SAR watershed as early as the 1960s. In 2002, SAWPA developed an Integrated Watershed Plan (IWP) for the Santa Ana watershed that was updated in 2005 as an IRWM Plan (IWRMP June 2005). In 2006, Western also prepared an IRWM Plan for its service area. SAWPA's IRWM Plan, Western's IRWM Plan, and the San Jacinto Watershed Component of the Santa Ana IWP are particularly related to the development of this IRWM Plan. In 2002, STWMA developed the San Timoteo Watershed Management Program (STWMA 2002). It was updated in 2005 as an IRWM Plan for the San Timoteo watershed (STWMA 2005). These plans are described below.

1.3.1 Santa Ana Watershed Project Authority IRWM Plan

Water users in the SAR watershed have worked together for decades to develop an integrated regional approach to water management for the entire watershed. In 2002, SAWPA developed a phased planning process called the *Santa Ana Integrated Watershed Plan (IWP)*. In 2005, the IWP was updated as an IRWM Plan (SAWPA Plan) to cover the entire SAR watershed. This broad planning document is the framework for water management in the watershed and is largely based upon the planning efforts of its member agencies. The SAWPA Plan is a "macro-level" plan that is consistent with DWR's California Water Plan Update (Bulletin 160) and State Water Resources Control Board's (SWRCB) Strategic Plan, Watershed Management Initiative, and the basin planning process. The SAWPA Plan builds upon local agencies' initiatives and programs and emphasizes integrated regional water management.

The IRWM Plan for the Upper SAR watershed is a complementary planning process that will be incorporated into the SAWPA Plan. "Zooming" in on a "micro-level" reveals that the Upper SAR watershed has several unique water management challenges and issues. The purpose of this planning process is to focus on these local issues and to assess water management opportunities in greater detail. This collaborative "grassroots" process will address some of the long-term water management strategies of the Upper SAR watershed and will greatly contribute to protecting and enhancing reasonable and beneficial uses of the watershed's water resources. This planning process is a part of the overall SAR water management planning process and is in agreement with past and current SAWPA regional planning initiatives.

1.3.2 Western Municipal Water District IRWM Plan, November 2006

Western's area consists of a 510-square-mile area primarily in western Riverside County with a population of over 500,000 people. Western relies on SWP and Colorado River water to augment its local water supplies. During drought years, these imported water sources will suffer from increased demands and increasingly poor water quality. Colorado River water may have salinity in excess of 800 milligrams per liter (mg/L) in dry years. Such water quality will not meet the water quality objectives of the Regional Water Quality Control Board (RWQCB) and will thus make Colorado River water unsuitable for use without desalination treatment. Western's IRWM Plan is focusing on putting water from all sources to maximum beneficial use. This includes storage of imported water, when it is available, to augment its dry year supplies.

It is the mission of Western to provide water supply, wastewater disposal, and water resource management to the public in a safe, reliable, environmentally sensitive, and financially responsible manner. Given the significant loss of water wells in the region due to water quality issues and the uncertainty of supplemental supplies flowing from the Colorado River, implementing an IRWM Plan is imperative to Western. The objectives of the plan are built on the identification of the water management issues and solutions and refinement of the plan through a consensus of appropriate stakeholders. A number of water management strategies have been considered to meet the objectives defined for Western's IRWM Plan.

Western has already started identifying and implementing regional projects that will create cleaner, more reliable water supplies and optimize the use of imported water to reduce reliance on imported water during drought periods. The projects include the recently completed Arlington desalter enhancement to provide 6,000 acre-feet of drinking water to the city of Norco; March Air Reserve Base Wastewater Treatment Plant improvement to enhance treatment capacity and improve conveyance lines to deliver reclaimed water for irrigation purposes; and the non-potable water conveyance system, which will bring 6,000 acre-feet of surplus water from the Riverside groundwater basin annually, redirecting it to beneficial uses. Western and Valley District share a long history of working cooperatively to address the imbalance between available water supplies and the demands of a growing population in the Inland Empire area of Southern California (the urbanized portions of San Bernardino and Riverside Counties). Valley District and Western sit on the Watermaster Committee for the Orange County Judgment (Orange County Water District v. City of Chino, et al., Case No. 117 628), and together make up the two-member Watermaster Committee for the Western Judgment (Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426).

Western is a stakeholder in the Upper SAR region because of its share in managing the water resources of the Bunker Hill Basin.

1.3.3 The San Jacinto Watershed Component of the Santa Ana Integrated Watershed Plan

The San Jacinto IRWM Plan focuses on specific water management issues that address the unique and complex needs of the 732-square-mile San Jacinto watershed. The plan is a component of the Santa Ana IWP. The proposed San Jacinto Component Plan is a complementary planning effort that will build upon the work already completed by stakeholders participating in the SAWPA planning process. SAWPA's Santa Ana IWP adequately addresses management issues within the Santa Ana watershed as a whole. The San Jacinto Creek watershed component would carefully consider unique water quality, habitat, National Pollutant Discharge Elimination System (NPDES) projects, need for additional reclaimed water management, and potential impacts of total maximum daily load (TMDL) requirements that specifically affect the residents (human, avian, animal, fish, plant, or insect) of the San Jacinto Creek sub-watershed. This planning effort will address issues that are specific to the San Jacinto Creek watershed and integrate the solution strategies with the Santa Ana IWP. The sheer size of the SAR watershed and the array of water resources naturally lend themselves to a large regional solution that integrates a number of watershed issues.

Riverside County has been identified as one of the fastest growing counties in the United States. This growth caused Riverside County to revise its General Plan in 2002. Further integration of water management strategies and coordination between competing interests would benefit the watershed as a whole and would allow for more orderly development in Riverside County and overall protection of the San Jacinto watershed consistent with the proposed IRWM Plan for the San Jacinto Creek watershed.

1.3.4 The San Timoteo Watershed Management Authority IRWM Program

The STWMA was formed in January 2001 by the Beaumont-Cherry Valley Water District (BCVWD), the City of Beaumont (Beaumont), the South Mesa Water Company, and the Yucaipa Valley Water District (YVWD). The purpose of the STWMA is to prepare and implement a water resources management program for the San Timoteo watershed and the waters tributary thereto in order to conserve local water supplies, improve surface and groundwater quality and quantity, protect and enhance groundwater storage and recreational resources, preserve open space, protect wildlife habitat and wetlands, protect and enhance agriculture, and develop and enhance the region's water resources for the benefit of the public. The water resources management program is to include watershed

and basin monitoring; groundwater storage, banking, and conjunctive use; stormwater capture and management; recycled water programs and projects; wetlands, wildlife, and open space protection; water quality protection and enhancement; and water conservation and efficiency.

The STWMA formed a stakeholder group to develop a watershed-scale integrated water resources management program that will provide a safe and reliable water supply for all water users in the watershed. The San Timoteo Watershed Management Program (STWMP) was completed in March 2002 and was documented in the San Timoteo Watershed Management Program, Phase 1 Report (March 2002). The Phase 1 investigation inventoried the water resources in the STWMA service area and described the occurrence and quality of these waters. The current and future water demands of the member agencies were described based on planning information provided by the STWMA member agencies and the City of Banning (Banning). The water and recycled water master plans and the UWMPs of the agencies were reviewed to assess how STWMA member agencies and Banning were planning to meet their water demands and dispose of or reuse their recycled water. This research revealed daunting water resource management challenges and opportunities.

Currently, the proven local water supplies for the area are about 32,000 acre-feet per year and ultimate demand will be about 99,000 acre-feet per year; that is, the STWMA service area will need to develop 67,000 acre-feet per year of new supplies. The STWMP was designed to ensure that the additional 67,000 acre-feet per year of water will be there when it is needed.

The STWMP accomplishes consideration and integration of multiple management strategies through eight management initiatives or program elements that are as follows:

- Program Element 1 – Develop and Implement a Comprehensive Monitoring Program for Groundwater Level, Groundwater Quality, Production and Diversion, Subsidence, Surface Water Discharge, and Surface Water Quality. Status – developed and implemented.

- Program Element 2 – Develop and Implement a Comprehensive Surface Water Management and Recharge Program. Status – program developed with some facilities implemented.

- Program Element 3 – Develop and Implement a Regional Supplemental Water Master Plan for the STWMA Area. Status – Plan is in early development.

- Program Element 4 – Develop and Implement a Salt Management Program. Status – developed and implemented.

- Program Element 5 – Establish a Groundwater Management Entity. Status – developed and implemented.
- Program Element 6 – Develop Conjunctive-Use Programs. Status – no progress.
- Program Element 7 – Develop and Implement a Habitat and Recreation Program for the San Timoteo Creek Watershed. Status – no progress.
- Program Element 8 – Develop and Implement a Financial Plan to Enable the STWMP. Status – no progress.

The water resources management program and projects within the STWMP include improved water supply reliability, water quality protection and improvement, groundwater management, flood management, stormwater capture and management, water recycling, recreation and public access, environmental and habitat protection and improvement, wetlands enhancement and creation, and ecosystem restoration, as part of implementing the above program elements. These program elements and projects will enhance recharge of native and recycled water, maximize the direct use of recycled water, and optimize the use of imported water for direct use, recharge, and conjunctive use. The estimated cost of STWMP implementation ranges from $200 to $300 million.

STWMA updated the STWMP in 2005 to conform to the then IRWM Plan requirements. STWMA and its member agencies continue to work together and with adjacent water management entities to implement its IRWM Plan. The STWMA IRWM Plan is available for review at www.stwma.org.

1.4 Previous Related Work

1.4.1 State Water Resources Control Board Orders

In 1989 (WR 89-25) and again in 1998 (WR 98-08), the SWRCB included the SAR in its Declaration of Fully Appropriated Streams (Declaration). Per this Declaration, the river was considered fully appropriated year-round. In 1989, the California Water Code prevented the SWRCB from accepting any new applications to appropriate water from watercourses listed in the Declaration.

In 1991, Valley District submitted an application on behalf of itself and Western to appropriate up to 100,000 acre-feet annually from the SAR (First Application). At that time, the river was categorized as fully appropriated. However, in May 1995, the SWRCB adopted procedures for reviewing the fully appropriated stream status and Valley District subsequently submitted a petition to revise the Declaration (First Petition) together with the 1991 First Application.

The First Petition was followed in 1999 by a similar petition by Orange County Water District (OCWD). The SWRCB held hearings on the petitions in December 1999. Valley District provided evidence that demonstrated that urbanization, the resultant increased runoff, and increased releases of treated wastewater had increased flows in the SAR. Additionally, the operation of Seven Oaks Dam would increase the availability of water for diversion during wet years. Based on evidence in the hearing record, the SWRCB amended the Declaration in Order WR 2000–12 and allowed the water right applications submitted by Valley District and OCWD to be processed (SWRCB 2000). Order WR 2000-12 did not determine the specific amount of water available for appropriation by petitioners.

In May 2001, Valley District and Western jointly submitted a second application to appropriate another 100,000 acre-feet of water annually (Second Application) in addition to the 100,000 acre-feet per year previously requested under the First Application, along with a second petition to revise the Declaration (Second Petition). The Second Petition and Second Application were based on updated hydrologic analyses submitted during the 1999 hearings. These analyses indicated that in certain years more than 200,000 acre-feet of water is available for appropriation in the SAR. Based on the hydrologic evidence, the SWRCB issued Order WR 2002-06, which revised the Declaration pursuant to the Second Petition (and similar petitions by other parties) and accepted the following applications for processing:

- The Valley District and Western application (the Second Application) requesting a right to use a maximum of 100,000 acre-feet annually for direct delivery, recharge, or exchange;

- The Chino Basin Watermaster application requesting a right to divert 97,000 acre-feet per year to groundwater storage;
- The City of Riverside application proposing direct diversion of 75 cubic feet per second (cfs) throughout the year for a total maximum direct diversion of 41,400 acre-feet per year; and
- Four minor applications for diversions of up to 102 acre-feet annually throughout the year from the west and east forks of Cable Creek within the SAR watershed.

Order WR 2002-06 did not determine the specific amount of water available for appropriation or whether the amount of water available for appropriation is sufficient to approve the applications. As in Order WR 2000-12, prior to any potential approval of the applications, the SWRCB requires that applications meet all necessary obligations under the California Environmental Quality Act (CEQA).

1.5 Overview of Governing Laws, Judgments, and Agreements

This section briefly describes some of the governing laws, judgments, and agreements that are in place and have significant influence on water management in the region. The intent of these brief descriptions is to provide the readers a general overview of these documents. For a complete understanding of the agreements and judgments, please see the actual documents, which have been reproduced in Appendix A.

1.5.1 Integrated Regional Water Management Planning Act

In 2002, the California Legislature passed Senate Bill 1672, the Integrated Regional Water Management Planning Act, and the Governor signed it into law. The Bill added Part 2.2 (commencing with Section 10530) to Division 6 of the Water Code: Conservation, Development and Utilization of State Water Resources.

The Integrated Regional Water Management Planning Act authorized a "regional water management group" to prepare and adopt a regional plan in accordance with certain procedures that addresses programs, projects, reports, or studies relating to water supply, water quality, flood protection, or related matters, over which any local public agency that is a participant in that group has authority to undertake.

The law requires DWR, the SWRCB, and the State Department of Health Services to include in any set of criteria used to select the projects and programs for grant funding "…a criterion that provides a benefit for qualified projects or programs."

To comply with the requirements of the law, DWR and SWRCB prepared standards (also referred to as IRWM Guidelines) for preparation of IRWM Plans. In addition, they established set criteria for selection of the projects and programs to be funded under Chapter 8 of Proposition 50, the Integrated Regional Water Management Implementation Grant Program. The guidelines state that, "The intent of the IRWM Grant Program is to encourage integrated regional strategies for management of water resources and to provide funding, through competitive grants, for projects that protect communities from drought, protect and improve water quality, and improve local water security by reducing dependence on imported water."

This IRWM Plan is prepared in compliance with the Integrated Regional Water Management Planning Act and DWR and SWRCB Guidelines and the intent of the grant program.

1.5.2 Groundwater Management Planning Act

In 2002, Senate Bill 1938, Groundwater Management Planning Act of 2002, was enacted into law. This law amended AB3030, which authorizes a local agency to prepare and implement a groundwater management plan. This law requires a local agency that elects to develop a groundwater management plan to follow specific requirements, including public notification and public involvement process as summarized below.

- Make available to the public a written statement describing the manner in which interested parties would be allowed to participate in the development of the plan.

- For the purposes of qualifying as a groundwater management plan and for receiving State funds administered by DWR for the construction of groundwater projects or groundwater quality projects, prepare and implement a plan that includes certain basin management objectives (BMOs) and components and adopt certain monitoring protocols.

- The law requires the local agency to submit a copy of the plan to DWR, in an electronic format, if practicable, approved by the DWR, and DWR would be required to make copies available to the public.

- Prior to adopting a resolution of intention to draft a groundwater management plan, a local agency shall hold a hearing after publication of notice on whether to adopt a resolution of intention to draft a groundwater management plan pursuant to this part for the purposes of implementing the plan and establishing a groundwater management program. At the conclusion of the hearing, the local agency may draft a resolution of intention to adopt a groundwater management plan pursuant to this part for the purposes of implementing the plan and establishing a groundwater management program. Upon written request, the local agency shall provide any interested person with a copy of the resolution of intention.

- The local agency shall prepare a groundwater management plan within two years of the date of the adoption of the resolution of intention. If the plan is not adopted within two years, the resolution of intention expires, and no plan may be adopted except pursuant to a new resolution of intention adopted in accordance with this chapter.

- After a groundwater management plan is prepared, the local agency shall hold a second hearing to determine whether to adopt the plan. Notice of the hearing shall be given pursuant to Section 6066 of the Government Code. The notice should include a summary of the plan and shall state

> that copies of the plan may be obtained for the cost of reproduction at the office of the local agency. At the second hearing, the local agency shall consider protests to the adoption of the plan. At any time prior to the conclusion of the hearing, any landowner within the local agency may file a written protest or withdraw a protest previously filed.

Senate Bill 1938 does not require local agencies to prepare a groundwater management plan for the basins that are managed through adjudications. These long-standing adjudications govern the water rights and management of the basins. Any groundwater management planning would need to conform with the provisions of those adjudications and would require agreement and approval of the parties in those adjudications. The basins in the Upper Santa Ana watershed are adjudicated "in gross." The agencies in the region, however, decided to prepare the plan because they strongly support the intent of the law that states, "It is the intent of the Legislature to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions. The preparation of certain basin management objectives will assist local agencies in optimizing local resources while protecting groundwater and surface water resources. The preparation of basin management objectives also will facilitate an understanding of the basin or subbasin, thereby allowing local agencies, individually and cooperatively, to meet local, regional, and state water needs through conjunctive management, while ensuring that no particular water supply is jeopardized."

A purpose of this IRWM Plan is to meet the intent and requirements of Senate Bill 1938.

1.5.3 Orange County Judgment

In 1963, the OCWD filed suit against substantially all water users in the area tributary to Prado Dam seeking adjudication of water rights on the SAR. The litigation ultimately involved over 4,000 served water users and water agencies, the four largest of which were OCWD, Valley District, Western, and the Chino Basin Municipal Water District (now the Inland Empire Utilities Agency). Given the magnitude of the potential litigation, these four districts and other parties developed a settlement that was approved by the Orange County Superior Court in a stipulated judgment entered on April 17, 1969 (Orange County Judgment). The Orange County Judgment imposes a physical solution that requires parties in the Upper SAR watershed to deliver a minimum quantity and quality of water to points downstream, including Riverside Narrows and Prado Dam. A provision of the Orange County Judgment related to conservation establishes that once the flow requirements are met, the upper area parties "…may engage in unlimited water conservation activities, including spreading, impounding, and other methods, in the area above Prado reservoir." The Orange County Judgment is administered by the five-member SAR Watermaster that reports annually to the

court and the four representative agencies. Valley District, Inland Empire Utilities Agency, and Western nominate one member each to the Watermaster; OCWD nominates two members; and members are then appointed by the court.

1.5.4 Western Judgment

The Western Judgment, entered simultaneously with the Orange County Judgment, settled rights within the Upper SAR watershed in part to ensure that those resources upstream of Riverside Narrows would be sufficient to meet the flow obligations of the Orange County Judgment at Riverside Narrows. Toward this end, the Western Judgment generally provides for the following:

- A determination of safe yield of the San Bernardino Basin Area (SBBA),
- Establishment 64,872 acre-feet rights that can be extracted from the SBBA by plaintiff parties. This is equal to 27.95 percent of safe yield,
- An obligation of Valley District to replenish any extractions from SBBA by non-plaintiffs in aggregate in excess of 167,228 acre-feet(equal to 72.05 percent of safe yield),
- An obligation of Western to replenish the Colton and Riverside Basins if extractions for use in Riverside County in aggregate exceed certain specific amounts, and
- An obligation of Valley District to replenish the Colton and Riverside basins if water levels are lower than certain specific water level elevations in specified wells.

Like the Orange County Judgment, the Western Judgment identifies regional representative agencies to be responsible, on behalf of the numerous parties bound thereby, for implementing the replenishment obligations and other requirements of the judgment. The representative entities for the Western Judgment are Valley District and Western. Valley District and Western are principally responsible for providing replenishment of the groundwater basins if extractions exceed amounts specified in the judgment or as determined by the Watermaster. For the purposes of this replenishment obligation, Valley District acts on behalf of all defendants (Non-Plaintiffs) dismissed from the Western Judgment and, similarly, Western acts on behalf of the Plaintiffs and other dismissed parties within Western. Plaintiff parties with specific rights to produce 27.95 percent of the safe yield from the SBBA are the City of Riverside, Riverside Highland Water Company, Meeks & Daley Water Company, and the Regents of the University of California (Regents). The Western Judgment is administered by the two-person Western-San Bernardino Watermaster—one

person nominated each by Valley District and Western, and both appointed by the court.

Like the Orange County Judgment, the Western Judgment contemplates that the parties will undertake "new conservation," which is defined as any increase in replenishment from natural precipitation resulting from operation of works and facilities that did not exist in 1969. The Western Judgment specifies that the parties to the judgment have the right to participate in any new conservation projects and, provided their appropriate shares of costs are paid, rights under the judgment are increased by the respective shares in new conservation (72.05 percent by Valley District and 27.95 by Western).

1.5.5 The Beaumont Basin Judgment

In February 2003, the STWMA filed suit in Riverside County Superior Court to adjudicate pumping and storage rights in the Beaumont Basin. The STWMA and the major pumpers developed a Stipulated Agreement to resolve the lawsuit. In February 2004, the Stipulated Agreement was approved by the Court.

This Stipulated Agreement established pumping rights among the two major classes of pumpers—overlying and appropriative pumpers. The overlying pumpers were assigned fixed rights with some flexibility to vary their maximum use during any five-year period. The safe yield established in the Stipulated Agreement is 8,650 acre-feet per year. The total of the overlying producers' rights is equal to the safe yield. Collectively, the overlying pumpers produce substantially less than their aggregate rights. Appropriators' rights are stated as a percentage or fraction of water in the safe yield that is not used by the overlying pumpers. The Stipulated Agreement provides for the orderly transition of land use and associated water uses through detailed provisions that require the assignment of rights from an overlying pumper to an appropriator when the appropriator provides service to the lands of the overlying pumper.

The Stipulated Agreement declares that there is a temporary surplus of water in the basin of 160,000 acre-feet. The temporary surplus can be used by the appropriators during the first ten years of the Stipulated Agreement. The appropriators will store the unused portion of the temporary surplus for use in subsequent years. The intent of removing the temporary surplus is to create additional evacuated storage space in the basin for use in storing supplemental water. The Stipulated Agreement gives control of the evacuated storage space in the basin and the overall management of storage to the Watermaster.

1.5.6 1961 Rialto Basin Judgment

The Rialto-Colton Basin was adjudicated in the Lytle Creek Water & Improvement Company vs. Fontana Ranchos Water Company, et. al., San

Bernardino County Superior Court Action 81264, entered on December 22, 1961. Limits on groundwater extractions are based on the average of the spring-high water level elevations of three wells within the basin. The pro rata water productions by each party (City of Colton, City of Rialto, Fontana Union Water Company, Citizen Land and Water Company, and Lytle Creek Water Improvement Company) are based on the "spring-high water level" in the three index wells as described below:

Above 1002.3 feet	Unlimited
Between 1002.3 and 969.7 feet	As imposed by the judgment
Below 969.7 feet	Reduced by 1% for every foot the average is below 969.7

At the request of the stipulating parties, Valley District monitors compliance with the decree and has since the early 1990s.

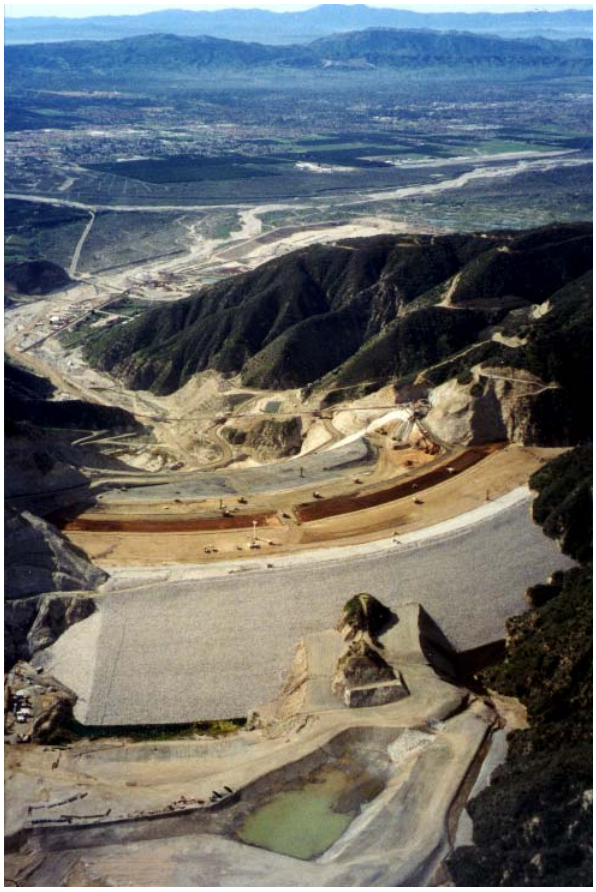
1.5.7 Cooperative Agreement to Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basin

Water agencies within the Santa Ana River watershed recognize the importance of protecting the quality of its groundwater resources. In July 2007, many of these agencies (Parties) entered into an agreement with the RWQCB for purposes of monitoring and improving water quality within the SAR Region. The agreement is limited in scope and specifically addresses Salinity Objectives.

Generally, the agreement requires that the Parties analyze the effects on water quality of recharging imported water into groundwater basins. This analysis will be compiled into a report and submitted to the RWQCB every three years (Triennial Water Quality Report). In addition, any new project that will include the recharge of imported water must analyze its effects prior to implementation. A copy of this agreement is provided in Appendix A.

1.5.8 Seven Oaks Accord

On July 21, 2004, Valley District, Western, the City of Redlands, East Valley Water District, Bear Valley Mutual Water Company (Bear Valley Mutual), Lugonia Water Company, North Fork Water Company, and Redlands Water Company signed a settlement agreement known as the Seven Oaks Accord (Accord). The Accord calls for Valley District and Western to recognize the prior rights of the water users for a portion of the natural flow of the SAR. In exchange, the water users agree to withdraw their protests to the water right application submitted by Valley District on behalf of itself and Western. All the parties to the Accord have agreed to support the granting of other necessary permits to allow Valley District and Western to divert water from the SAR. By



View from upstream of Seven Oaks Dam under construction

means of the Accord, Valley District agreed to modify its water right applications to incorporate implementation of the Accord. Additionally, the Accord calls for Valley District to develop and manage a groundwater spreading program that will maintain groundwater levels at a number of specified wells owned and operated by the other parties. This integrated management of the basin will be adopted within five years of SWRCB approval of the water right applications. A copy of the Accord is shown in Appendix A.

Management of water resources in the Valley District/Western service area takes place within a complex legal and institutional framework as will be discussed in the next section. Development of a comprehensive, coordinated regional water management plan will involve the cooperation of many parties interested in water management in addition to the signatories of the Accord. The Accord provides the framework and a cooperative environment for major water entities in the Upper SAR watershed to prepare a plan for the integrated management of the region's surface water and groundwater resources. This IRWM Plan enhances and refines the current management and planning activities within the region and develops regional water management strategies and the framework for their implementation.

1.5.9 Agreement Relating to the Diversion of Water from the Santa Ana River System Among Western Municipal Water District of Riverside County, Valley District and City of Riverside

In July 2004 a Settlement Agreement Relating to the Diversion of Water from the Santa Ana River System (the Seven Oaks Accord) was signed. The agreement requires Valley District and Western to develop a groundwater spreading program in cooperation with other parties, "That is intended to maintain groundwater levels at the specified wells at relatively constant levels, in spite of the inevitable fluctuations due to hydrologic variation." Other requirements of the Seven Oaks Accord are as follows:

i) The groundwater management plan shall identify target water-level ranges in the specified "index wells" subject to the requirement that

such spreading will not worsen high groundwater levels in the Pressure Zone.

ii) Thresholds of significance in terms of SAR water diverted by Valley District and Western and spreading by all parties should be observed. See Appendix I of the Accord (sidebar).

iii) The determination as to whether a certain groundwater management action will "worsen" high groundwater levels in the Pressure Zone is made through the use of the integrated surface and groundwater models.

iv) An "integrated management program" must be "adopted" within five years of the date the SWRCB grants a permit to Valley District/Western to divert water from the SAR. Valley District and Western have presented their data to the SWRCB and were told that any permit "terms" would be available in late 2007.

v) Water users agree to limit spreading to conform to an annual management plan.

1.5.10 Local Institutional Considerations

1.5.10.1 Santa Ana River-Mill Creek Cooperative Water Project Agreement

The SAR-Mill Creek Cooperative Water Project Agreement (informally known as the Exchange Plan) is an agreement among 9 agencies and water companies in eastern San Bernardino Valley executed in May 1976. The 9 parties to the Exchange Plan are as follows:

- Redlands Water Company, Bear Valley Mutual, Crafton Water Company, North Fork Water Company [East Valley Water District], Lugonia Water Company, City of Redlands, San Bernardino Water Conservation District (SBVWCD), YVWD, and the Valley District;

In an effort to avoid pumping costs and to lower the overall cost of water, the parties have agreed to the exchange of water from the SAR, Mill Creek, and the SWP. The agreement is described as a "bucket-for-bucket exchange," whereby a party to the agreement provides a "bucket" of their water to a second, higher elevation party, and the second party provides a "bucket" of water from an alternate, lower elevation source back to the original party. To facilitate exchanges, parties to the agreement share their existing facilities. However, specific facilities (called Cooperative Water Project facilities) were built and are operated by Valley District in part to accommodate Exchange Plan deliveries. Given the three water sources and the available facilities, there are multiple delivery possibilities. Examples of exchanges that occur under the Exchange Plan include two-level exchanges, three-level exchanges, and water banking with

DWR. In a two-level exchange, two water sources are used; for example, SAR water is delivered to Mill Creek water users, and, in return, an equal amount of SWP water is delivered to SAR water users. In a three-level exchange, three sources are used. For example, Mill Creek water is delivered to the Yucaipa area, an equal amount of SAR water is then delivered to Mill Creek water users, and finally SWP water is delivered to SAR water users. To bank water within the SWP, a party entitled to local water exchanges their water when the local water is available and then takes SWP water at a later date.

1.5.10.2 Big Bear Lake Operations

Bear Valley Dam, which forms Big Bear Lake, is the only major dam that affects runoff into Seven Oaks Dam. Big Bear Lake is a water conservation reservoir presently owned by the Big Bear Municipal Water District (Big Bear Municipal). Big Bear Lake is located on Bear Creek, a tributary to the SAR. The lake has a drainage area of about 38 square miles.

Bear Valley Mutual and its predecessors constructed, owned, and operated Big Bear Lake as a supplemental water supply reservoir to meet the irrigation water supply demand within the Bear Valley Mutual service area in the easterly end of the San Bernardino Valley. Historical irrigation releases during dry periods sometimes caused low water levels in Big Bear Lake.

As recreation uses of Big Bear Lake became more important, Big Bear Municipal sought to control the water levels in the lake. On February 4, 1977, a stipulated judgment was entered in San Bernardino County Superior Court for Case No. 165493 *Big Bear Municipal Water District vs. North Fork Water Co. et al.* Big Bear Municipal obtained the opportunity to furnish “in-lieu” water from several other named sources other than Big Bear Lake to meet the water supply demands of Bear Valley Mutual. Big Bear Municipal was allowed to retain an amount of water in Big Bear Lake equal to the amount of water furnished in-lieu to Bear Valley Mutual. Big Bear Municipal explored and implemented the alternate sources. Providing water from these alternate in-lieu sources resulted in water being retained in Big Bear Lake to stabilize the water levels in the lake.

On May 1, 1987, Big Bear Municipal adopted operating criteria for Big Bear Lake that contain conditions regarding when Big Bear Municipal will release water from Big Bear Lake and when Big Bear Municipal will acquire in-lieu water for Bear Valley Mutual.

On February 16, 1995, the SAR Water Quality Control Board adopted Order No. 95-4, which requires that Big Bear Municipal make releases from Big Bear Lake through Bear Valley Dam to provide water for preservation of fish in Bear Creek.

On February 1, 1996, Big Bear Municipal and Valley District entered into an agreement that provides for Valley District to furnish all in-lieu water that Big Bear Municipal needs to meet the water supply demands of Bear Valley Mutual.

As a result of the stipulated Judgment, Big Bear Lake is now maintained at higher levels for recreational uses. The lake will spill (i.e., need to release water because the reservoir is full) more often than occurred under the historic irrigation supply operation. However, inflow to the SAR during irrigation months may be less than historic irrigation releases. Inflow to the SAR during winter months may be greater than under the historic operation of Bear Valley Dam. The changes in the operation of Big Bear Lake from an irrigation water supply reservoir to a recreation reservoir result in changes in the timing and amounts of water Big Bear Lake and Bear Creek contribute to the SAR.

1.5.10.3 Settlement Agreement with San Bernardino Valley Water Conservation District

Within the settlement agreement dated August 9, 2005, Valley District, Western, and the SBVWCD have agreed to work cooperatively to develop an annual groundwater management plan. A copy of the agreement is provided in Appendix A.

1.5.10.4 Memorandum of Understanding (MOU) with the City of Riverside

In September 2005, Valley District, Western, and the City of Riverside entered into an MOU. The MOU stated that the intent of Valley District/Western is to work cooperatively with the City of Riverside to devise institutional and physical arrangements through which the city could directly benefit from “new conservation” undertaken as part of the Western Judgment and the pending Valley District/Western water right applications. The MOU states, “The Parties (Valley District, Western, and the City of Riverside) shall engage in good-faith negotiations with the goal of reaching a long-term agreement relating to the purchase, storage, and sale to Riverside by Western of imported water stored in the SBBA, and relating to storage, transport and delivery of conservation water from the Seven Oaks Dam...”

1.5.10.5 Institutional Controls and Settlement Agreement (ICSA)

The City of San Bernardino Municipal Water Department (SBMWD) is a party to a consent decree lodged with the United States District Court, Central District of California, Western Division (Court), on August 18, 2004. The Consent Decree obligates SBMWD to operate and maintain a system of wells and treatment plants known as the Newmark Groundwater Contamination Superfund Site (Newmark Site). The Newmark Site specifically treats groundwater contaminated with trichloroethylene (TCE) and perchloroethylene (PCE). The

SBMWD is required by the terms of the Consent Decree, entered on March 23, 2005, to enact institutional controls and implement an ordinance providing for the protection and management of the Interim Remedy set forth in the Record of Decisions and Explanation of Significant Differences prepared by the U.S. Environmental Protection Agency.

The City of San Bernardino Ordinance No. MC-1221, approved in March 2006, establishes the management zone boundaries within the City of San Bernardino for water spreading and water extraction activities. The Consent Decree requires the City of San Bernardino to implement an ordinance to ensure that activities occurring in the management zone do not interfere or cause pass-through of contaminants from the Newmark and Muscoy Operable Units. The Interim Remedy requires the extraction of contaminated groundwater from the Bunker Hill Groundwater Basin and within the Newmark and Muscoy Operable Units, and treatment of the groundwater to meet all State and federal permits and requirements for drinking water. A permit by the SBMWD pursuant to the provisions outlined in the ordinance should first be obtained for any spreading (artificial recharge) or extracting (well pumping) within the Management Zones, as defined in the ordinance.

An ICSA has been executed to develop and adopt a successor agreement, titled Institutional Controls Groundwater Management Program (ICGMP), between the following parties:

(1) City of San Bernardino Municipal Water Department

(2) Valley District

(3) Western Municipal Water District

(4) City of Riverside

(5) West Valley Water District

(6) East Valley Water District

(7) City of Colton

(8) Riverside Highland Water Company

The parties listed above will not be subject to the provisions of City of San Bernardino Ordinance No. MC-1221 as long as each is a party to the ICSA and, subsequently, the ICGMP Agreement.

1.5.10.6 Settlement Agreement between City of San Bernardino and City of Riverside and Riverside Water Company

In November 1922, after a Supreme Court of the State of California decision, the City of San Bernardino (Plaintiff) and the City of Riverside and Riverside Water Company (Defendants) negotiated a settlement agreement to take, divert, and use

water from the “San Bernardino Artesian Basin,” Lytle Creek, Warm Creek, and Devil Canyon Creek. The agreement was approved by the San Bernardino County Superior Court in a stipulated judgment that constituted authorities and rights of the parties for taking, diverting, and using the water. The court also established a provision for daily record keeping of all the diversions and use of water by all said parties.

1.6 Purpose and Need for the IRWM Plan

The primary purpose of this IRWM Plan is to assist local agencies with developing tools for optimizing management and the use of the region's water resources while protecting the groundwater basins from water quality degradation and the threat of liquefaction. The implemented IRWM Plan will reduce reliance on imported water during the drought periods and optimize the use of both native and imported supplies to help meet water demands even during extended periods of below-average precipitation. Basin management objectives, an integral component of the IRWM Plan, will facilitate formulation of specific strategies and projects to meet local and regional drought-year water needs through conjunctive management, while ensuring that no particular water supply resource is jeopardized. The purpose of the plan as stated above is consistent with the intent and requirements of the Integrated Regional Water Management Planning Act and Groundwater Management Planning Act of 2002 described in Section 1.5. Below are the specific needs for developing this plan.

1.6.1 Uncertainty of Imported Water Alone to Meet Long-Term Needs

The water purveyors within the region will rely on imported water from the SWP to meet a portion of their water needs through groundwater recharge and direct deliveries into the future. Valley District's annual entitlement to SWP water is 102,600 acre-feet. Other SWP contractors in the region include SGPWA. There is uncertainty of SWP delivery capability in dry years and the expected SWP water deliveries are less than anticipated when the contracts were signed. In November 2005, DWR released the "Public Review Draft" of "The State Water Project Delivery Reliability Report 2005." This report presents water delivery capability of the SWP under various hydrologic conditions. Modeling was used to estimate the SWP water delivery capabilities. Table 1-1 summarizes the results of the SWP modeling efforts conducted for the report.

Table 1-1
SWP Dry Year Delivery as a Percentage of SWP Table A Entitlement

Study	Average 1922-94	Lowest Single-Year Delivery 1977	Lowest Two Consecutive Year Delivery 1976-77	Lowest Six Consecutive Year Delivery 1987-92
– 2005 Level of Demand	68%	4%	41%	42%
– 2030 Level of Demand	77%	5%	40%	42%
Public Draft of the State Water Project Delivery Reliability Report, 2005.				

The modeling results indicate that in a six-year dry period, SWP delivers less than half of its contractors' entitlements and in a 1977 drought-year type, SWP

can deliver only about five percent of its contractors' entitlements. Based partly on these projected SWP deliveries, the water purveyors within the region desire to improve their local and regional water supply reliability during future droughts and, therefore, have prepared this plan to manage their groundwater basins conjunctively with other sources in an effort to optimize their use.

The California Aqueduct conveys water from Northern California into the Region.

In addition, the Seven Oaks Accord calls for Valley District/Western to cooperatively develop an integrated groundwater management plan that is intended to maintain groundwater levels at a number of specified wells owned and operated by the other parties. The Accord requires that this integrated management program be adopted within five years of SWRCB approval of the Valley District/Western water right applications. This IRWM Plan will satisfy these requirements of the Accord for preparation and adoption of an integrated groundwater management plan for the SBBA.

1.6.2 Threat of Liquefaction in the Pressure Zone

Liquefaction is a form of seismically induced ground failure. In cohesionless, granular material having low relative density, such as loose sandy sediment, seismically induced vibrations can disturb the particle framework, leading to increased compaction of the material and reduction of pore space between the grains. If the sediment is saturated, water occupying the pore spaces resists this compaction and exerts pore pressure that reduces the contact stress between the sediment grains. With continued shaking, transfer of intergranular stress to pore water can generate pore pressures great enough to cause the sediment to lose its strength and change from a solid state to a liquid state, called liquefaction. This mechanical transformation can cause various kinds of ground failure at or near the ground surface.

The liquefaction process typically occurs at depths less than 50 feet below ground surface. Diminished susceptibility to liquefaction as depth increases is caused by an increase in overburden pressure and induration of sedimentary deposits. The depth to groundwater and distance to the causative fault affect the relative susceptibility to liquefaction. Much of the San Bernardino Valley is located in an area of liquefaction susceptibility. The most likely scenario for significant liquefaction to occur in the San Bernardino Valley would be as a

result of an earthquake on the adjacent San Andreas, San Jacinto, or Cucamonga faults (Matti and Carson 1991).

The main zones of elevated liquefaction susceptibility within the San Bernardino Valley are associated with shallow groundwater that occurs under the modern floodplains of Cajon Creek, Warm Creek, and the SAR. Recently deposited Holocene sediments that would be expected to have lower penetration resistance and higher susceptibility than older sediments underlie these areas. However, even the older Holocene and uppermost Pleistocene sediments have elevated susceptibilities comparable to those in the younger deposits. This fact accounts for zones of high and moderately high susceptibility that extend away from the modern floodplains and into adjacent areas underlain by older deposits (Matti and Carson 1991).

In the southern part of the SBBA, on the northeast side of the San Jacinto fault, there are approximately 1,200 feet of unconsolidated and partly consolidated water-bearing deposits. In the area between Warm Creek and the SAR, the upper confining member of this aquifer acts to restrict vertical flow, causing semi-confined conditions in the upper 50 to 100 feet of saturated materials (Dutcher and Garrett 1963). This area is considered the Pressure Zone of the SBBA and is also referred to as the Area of Historic High Groundwater. Historically, this scenario resulted in perched, very shallow groundwater conditions, at times rising to ground surface level, which increased the potential for liquefaction and locally flooded buildings in the City of San Bernardino. Groundwater pumping since the early 1900s increased the minimum depth to groundwater in this area to 50 feet by the 1960s but, during the 1970s and 1980s, groundwater was locally within 10 feet of the ground surface beneath the City of San Bernardino (CDMG 1976, Matti and Carson 1991).

In the past, groundwater levels in the Pressure Zone rose high enough under these semi-confined conditions to cause rising water and increase the potential for liquefaction. High groundwater levels in this area have damaged building foundations, flooded basements and utility structures, and increased the potential for liquefaction in this seismically active region. The Pressure Zone is located wholly within the City of San Bernardino. In the 1930s and 1940s, some wells in the Pressure Zone flowed artesian as shown below. Over the long-term, however, groundwater levels in the Pressure Zone are dropping with the depth to groundwater increasing.

The San Bernardino Basin area has unusually high groundwater levels in its history. This photo shows an artesian well.

High groundwater in the Pressure Zone is further aggravated by the direction of groundwater flow in the Bunker Hill Basin, which is generally in a southwesterly direction from the San Bernardino Mountains to the San Jacinto fault. The fault zone generally runs perpendicular to the groundwater flow and acts as a barrier, or partial barrier, causing the groundwater to "dam up" behind the fault and rise upward toward the land surface.

An objective of this IRWM Plan is to develop tools that might be used by water agencies to manage the groundwater levels in the Pressure Zone to reduce the risk of liquefaction in the area. Specific BMOs will be developed to manage the basin in order to reduce the associated risks.

1.7 IRWM Plan Planning Process

As the lead agency, Valley District facilitates meetings and coordinates preparation of the draft and final IRWM Plan. The district is organizing meetings and facilitating exchange and sharing of data and information among its members. Valley District has also signed a contract with DWR to receive a grant for preparation of the IRWM Plan and to provide contract administrative functions. Members of the Association who participate in the planning process and develop the IRWM Plan represent their respective agencies and provide comments on the planning process, studies, and the draft IRWM Plan. They also provide status reports to their agency boards. The final IRWM Plan will be presented to each agency's governing board or council for adoption.

1.7.1 Technical Advisory Group Member Agencies

In 2005, the TAG was formed to act as the "Regional Management Group" for preparing the IRWM Plan. The TAG consists of 14 members (see Section 1.2). Descriptions of each of the member agencies participating in the IRWM Plan preparation and their water management activities in the region are provided in Section 1.8.

1.7.2 Public Participation

The TAG developed and implemented the public involvement process to ensure that the public was also informed about the development of the IRWM Plan. This process included regularly scheduled meetings of the TAG throughout the IRWM Plan process that allowed the public recurring opportunities to provide its input. The public was given the opportunity to participate in the planning process in the following ways:

- Attending public meetings of the TAG. TAG meetings were designed to be public meetings. Notice was given in local publications about the meetings and how to get timely and up-to-date information about the planning process.

- Availability of the public draft of the plan was announced in local newspapers. The draft plan was made available to the public for review and comment. Comments were reviewed by the TAG and were incorporated as appropriate.

- The public was invited to provide written comments to Valley District throughout the planning process.

- The public was invited to attend all of the public hearings conducted during the planning process. Notice of these hearings was published in

two local newspapers prior to the scheduled meeting time. Each hearing notice included an agenda and the time and location of the hearing. Members of the TAG were at the hearings to answer questions, solicit input, and increase public awareness of the proposed IRWM Plan. Proof of Publication for each hearing can be found in Appendix D. Meeting minutes and board resolutions relating to the IRWM Plan development and adoption process are also included in Appendix D.

- The TAG held four public hearings, as follows:

  1. On May 9, 2005, Valley District, as the lead agency, conducted a public hearing to brief the public of its intent to act as the lead agency on behalf of the Association for purposes of submitting applications and entering into an agreement(s) to receive a planning grant and/or an implementation grant pursuant to the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, Water Code Section 79560 *et seq.*, (Proposition 50).

  2. On March 15, 2006, Valley District, as lead agency, held a public hearing and adopted a resolution of intent to prepare an IRWM Plan.

  3. On April 5, 2006, Valley District, acting as the lead agency, held a public hearing (after publication of a notice that included the schedule and location of the hearing) to inform the public of its adoption of a resolution of intent to prepare an IRWM Plan. The focus of the meeting was to brief the public and interested parties about the planning process, schedule, content, and how the public could provide input in developing the water management plan. Interested parties and the general public were encouraged to attend the hearing and provide comments to Valley District. At this hearing, the lead agency also described the manner in which interested parties could participate in developing the IRWM Plan.

  4. In December 2007, Valley District, acting as the lead agency, will hold a public hearing after publishing a notice of intent to hold a hearing to receive comments on the public draft of the IRWM Plan and the intent to adopt the plan. The notice will include a summary of the plan and state the means of providing copies of the plan to interested parties. Member agencies of the TAG will participate in this hearing.

- Each agency who participated in the TAG published a notice informing the public of its intention to participate in the planning process and held a public meeting to determine whether to adopt a resolution to engage in preparation of the agency's IRWM Plan, as documented in Appendix D.

- Throughout the development of the IRWM Plan, members of the TAG presented quarterly, or more frequent, status updates to their governing boards or board subcommittees at regularly scheduled meetings. These public meetings included a posted agenda item for the IRWM Plan. The public was encouraged to participate in these meetings.

- The governing bodies of the participating agencies scheduled a discussion of the draft plan in their regular meetings, provided information to the public regarding the content of the draft plan, and received comments prior to adopting the IRWM Plan. The TAG also coordinated the development of the IRWM Plan with SWRCB and DWR. The final IRWM Plan will be submitted to DWR and SWRCB, pursuant to the guidelines.

- The San Bernardino Valley Municipal Water District Advisory Commission on Water Policy (Advisory Commission) has been established to advise Valley District on water policy issues within its service area. The water purveyors and governmental entities in Valley District's service area have representatives on the Advisory Commission. During the preparation of the IRWM Plan, the Advisory Commission met on a regular basis, and the staff and consulting team briefed the Advisory Commission on development of the IRWM Plan. The Advisory Commission members showed a great level of interest in development of the IRWM Plan and provided guidance on the issues. The public was invited to these meetings and participated in the discussions.

SBVMWD Advisory Commission on Water Mission Statement

"It shall be the function of the Commission to study and make recommendations to the Board of Directors on matters of water policy for the District. The Commission shall study such matters of water policy as are submitted to it by the Board for Consideration and may study such other matters of water policy as the Commission deems appropriate." SBVMWD Ordinance No. 61, July 6, 1987.

- The Advisory Commission held a public meeting on October 18, 2007, to receive public comments on the Draft IRWM Plan.

In summary, the Advisory Commission and the TAG encouraged public participation in preparation of the IRWM Plan to ensure the public's comments were considered in decisions about water management in the region.

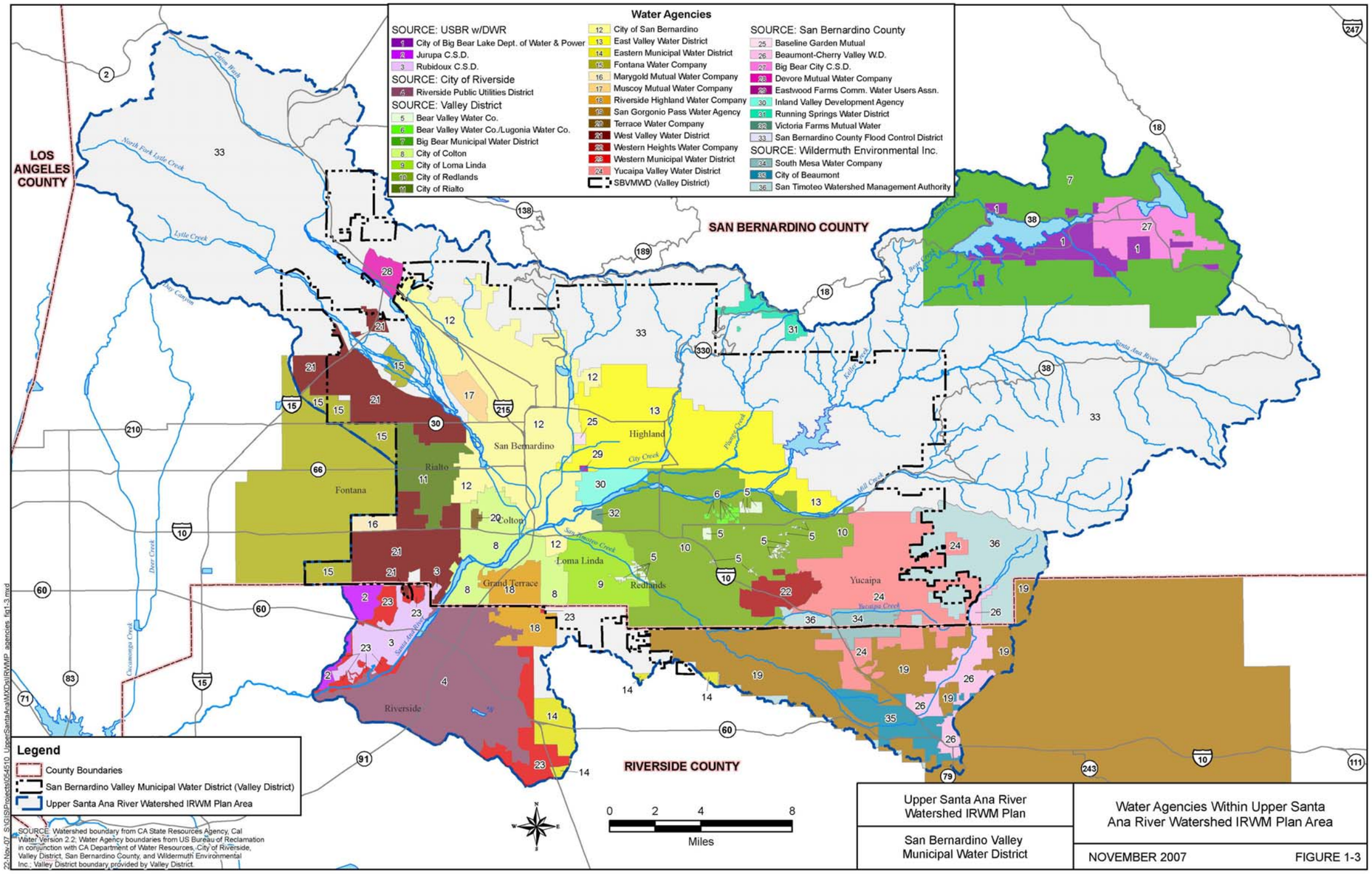
1.7.3 Dispute Resolution Process

The TAG was effectively used as a tool for the resolution of water management issues in the basin. Discussion of issues in the TAG meetings, an open and transparent process, resulted in a cooperative relationship between water users of the basin. The management process for the SBBA involves the creation of the Basin Technical Advisory Committee (BTAC). It is anticipated that the BTAC will provide a forum for discussion and early resolution of water issues in the region. If the dispute cannot be resolved at this level, it will be elevated to the policy level (Advisory Commission, Board of Directors, City Councils, etc.).

1.8 Water Agencies in the Region

Numerous agencies provide water services to communities within the IRWM Plan Area. Figure 1-3 shows the boundaries of water agencies within the region. A brief description of each member of the TAG as well as other water purveyors in the region is presented below.

Figure 1-3
Water Agencies in the Region



1.8.1 San Bernardino Valley Municipal District

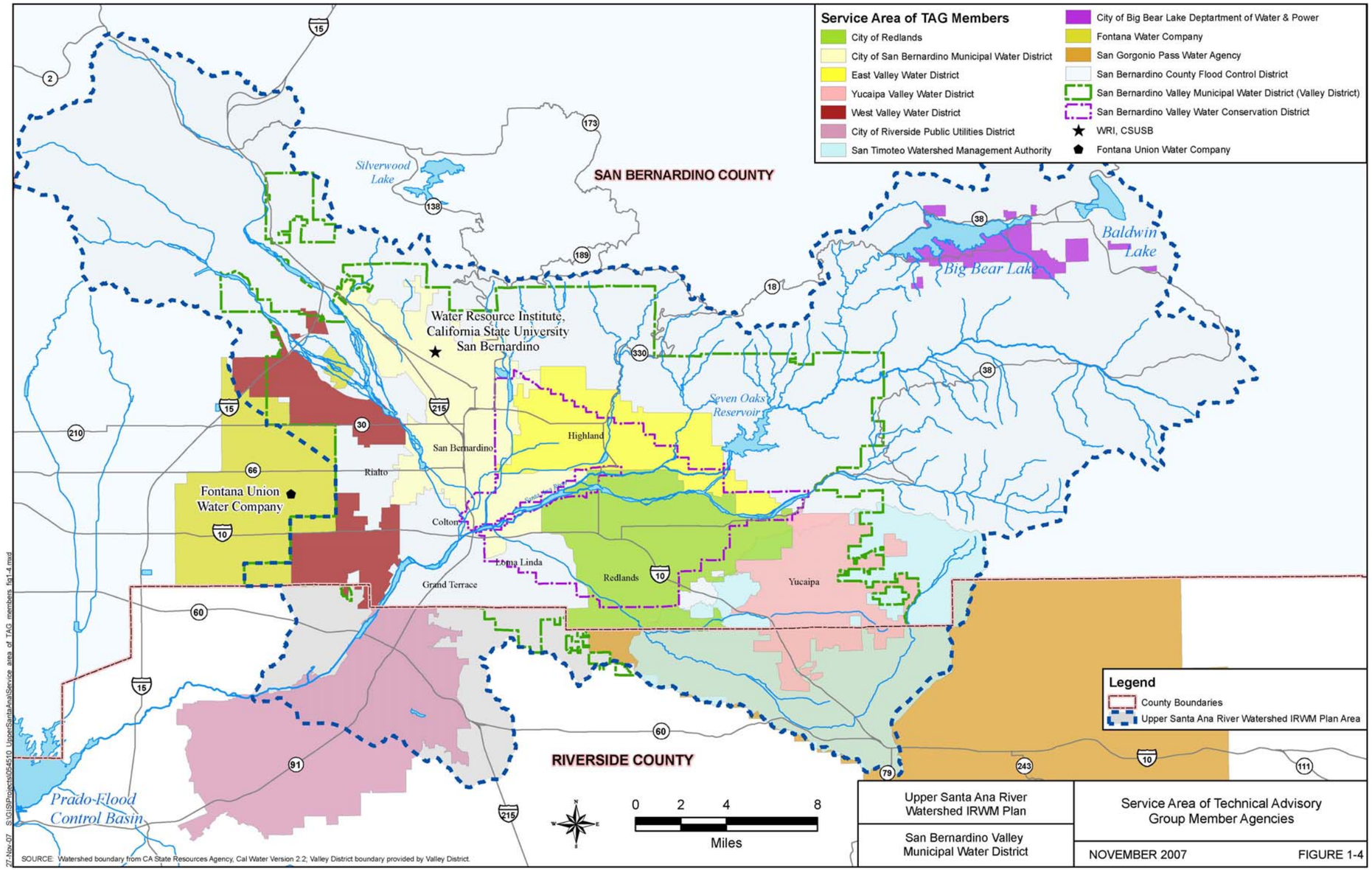
Valley District was formed in 1954, under the Municipal Water District Act of 1911 (California Water Code Section 71000 et seq.) as a regional agency to plan a long-range water supply for the San Bernardino Valley. It imports water into its service area through participation in the SWP and manages groundwater storage within its boundaries. Its enabling act includes a broad range of powers to provide water, wastewater and stormwater disposal, recreation, and fire protection services. Valley District does not deliver water directly to retail water customers.

Valley District covers about 325 square miles mainly in southwestern San Bernardino County, about 60 miles east of Los Angeles, and has a population of about 600,000. It spans the eastern two-thirds of the San Bernardino Valley, the Crafton Hills, and a portion of the Yucaipa Valley and includes the cities and communities of San Bernardino, Colton, Loma Linda, Redlands, Rialto, Fontana, Bloomington, Highland, East Highland, Grand Terrace, Mentone, and Yucaipa. A map illustrating Valley District's service area and the locations of other members of the TAG are shown in Figure 1-4.

Valley District is responsible for long-range water supply management, including importing supplemental water, and is responsible for most of the groundwater basins within its boundaries and for groundwater extraction over the amount specified in the aforementioned judgments. It has specific responsibilities for monitoring groundwater supplies in the San Bernardino and Rialto-Colton Subbasin and maintaining flows at the Riverside Narrows on the SAR. It fulfills its responsibilities in a variety of ways, including importing water through the SWP for direct delivery and groundwater recharge and coordinating water deliveries to retail agencies throughout its service area.

Valley District cooperates in a program to help replenish groundwater, using both SWP water and local runoff. It takes delivery of SWP water at the Devil Canyon Power Plant Afterbay, which is located just within its northern boundary. Water is conveyed 17 miles eastward to various spreading grounds and agricultural and wholesale domestic delivery points in the San Bernardino Basin. Water is also conveyed westward for direct delivery in the Colton-Rialto Subbasin.

Figure 1-4
Service Area of Technical Advisory Group Member Agencies



In the 1960s, the over-commitment of water in the SAR watershed led to lawsuits between water users in the upper and lower watersheds regarding the use of both surface flows and groundwater. The lawsuits culminated in 1969 in the Orange County and Western Judgments as they were previously described. Under the terms of the settlements, Valley District became responsible for providing a specified SAR base flow to Orange County and maintaining the safe yield of the SBBA. If the conditions of either judgment are not met by the natural water supply, including new conservation, Valley District is required to deliver supplemental water to offset the deficiency. The judgments resolved the major water rights issues that had prevented the development of long-term, region-wide water supply plans and established specific objectives for the management of the groundwater basins.

Valley District is legally required to maintain a flow equivalent to approximately 15,250 acre-feet per year at the Riverside Narrows on the SAR. This requirement is currently met with about 25,000 acre-feet per year of treated wastewater from the Cities of San Bernardino, Colton, and Rialto that is discharged to the SAR. Valley District has contracts with the Cities of San Bernardino and Colton that obligate a portion of their treated wastewater flows to meet this requirement. As a result of this discharge and normal streamflow in the SAR, Valley District has never had to use imported water to augment flows in the SAR. In addition, under terms of the adjudication, as of the end of the 2003-2004 water year, Valley District had 275,423 acre-feet in credit for flows in excess of requirements during prior years. It could, if needed, use these water credits to meet this part of its legal obligation during dry years, subject to a minimum annual flow of 12,420 acre-feet at the Riverside Narrows.

In March 2006, Valley District and DWR entered into an agreement and signed a contract to receive funding for the preparation of the IRWM Plan. Valley District, as the regional lead agency, is responsible for the IRWM Plan completion.

1.8.2 San Bernardino Valley Water Conservation District

The mission of the SBVWCD is to ensure that recharge of the Bunker Hill groundwater basin is accomplished in an environmentally and economically responsible way using local native surface water to the maximum extent practicable.

The SBVWCD and its predecessors have conducted water conservation (groundwater recharge) activities since 1912 or earlier in two areas that overlie the Bunker Hill groundwater basin in the San Bernardino Valley. These areas are at the upper end of the SAR wash area and on Mill Creek just upstream of the confluence with the SAR (collectively, the wash area). The SBVWCD diverts

surface water flows during both storm and normal runoff from the SAR and Mill Creek and channels the flows into two separate systems of recharge basins where it percolates into the groundwater basin for later pumping and use by local entities and private producers.

The SBVWCD's boundaries encompass more than 78.1 square miles and include portions of the communities of San Bernardino, Loma Linda, Redlands, and Highland, as well as the unincorporated county area of Mentone and various county "islands" within the incorporated cities.

1.8.3 City of Redlands

For more than 90 years, the City of Redlands has been providing high-quality drinking water to the Redlands and Mentone areas. Currently, the city has 21,000 water service connections. The city completed and adopted an UWMP in 2005.

More than 75,000 residents in Redlands, Mentone, parts of Crafton Hills and San Timoteo Canyon, and a small part of San Bernardino depend on the Redlands Municipal Utilities Department to provide water service to their homes and businesses. By supplying a blend of local groundwater, local surface water, and water imported from the SWP, the Redlands Municipal Utilities Department meets its customers' daily demands, which average 25 million gallons per day and peak at 48 million gallons per day.

The city also owns and operates a sewer collection system and a six million-gallon-per-day water reclamation plant that produces water for use at the Southern California Edison Mountainview Power Plant and by other irrigation users.

1.8.4 West Valley Water District

West Valley Water District (West Valley) is located mainly within southwestern San Bernardino County and to a lesser amount within northern Riverside County. It is part of the greater San Bernardino-Riverside-Ontario metropolitan area. It is situated in the San Bernardino Valley and within the SAR watershed.

The principal service area of West Valley is approximately 29.5 square miles, with an additional 5.2 square miles within its sphere of influence. The majority of its service area lies within Valley District's boundaries. West Valley currently has 18,000 water service connections. West Valley completed and adopted an UWMP in 2005.

1.8.5 East Valley Water District

East Valley Water District is a special district formed in 1954 through an election by local residents who wanted water service by a public water agency. Originally called the East San Bernardino County Water District, it was formed to provide domestic water service to the then unincorporated and agriculturally based communities of Highland and East Highland. Later, as the population increased, the need for a modern sewer system to replace the septic tanks became apparent. The residents voted to give East Valley Water District the responsibility for their sewer system, as they had done earlier with their water service.

Over the years, some of the service area was annexed to the City of San Bernardino, but water service remained with the district, primarily due to logistics and cost. In 1987, the City of Highland incorporated. Now, the district's previously agriculture-dominated area is urbanized, and few orange groves remain. Before September 2000, the service area was approximately 28.5 square miles. An annexation in September 2000 increased the service area by approximately five square miles and includes the Greenspot area. The district services approximately 65,000 persons. All services are financed solely by rates; customers pay only for the benefits and services they receive. The district currently has 21,827 water service connections.

The forefathers of the East Valley Water District, anticipating a higher demand and a larger customer base, obtained water rights that date back over 100 years for the use of surface water from the SAR. Today, this surface water meets one-quarter of the district's water needs. The district completed and adopted an Urban Water Management Plan in 2005.

1.8.6 San Bernardino Municipal Water Department

SBMWD meets its customers' needs by providing high-quality service in water supply, water reclamation, and geothermal heating.

SBMWD produces all of its own water, using 60 wells located in 45 square miles of water service area and delivering it to more than 40,000 service connections through 551 miles of water mains. The City of San Bernardino reclaims over 30 million gallons of water each day, using innovative and cost-effective methods to make the reclaimed water safe for the environment and for reuse. The city completed and adopted an UWMP in 2005.

1.8.7 Yucaipa Valley Water District

YVWD is a special district that provides water supply, treatment, and distribution; recycled water supply and distribution services; and wastewater

collection and treatment. Formed in 1971, it acquired many of the private water companies serving the Yucaipa Valley. Its most recent consolidations of water services occurred with the acquisition of the Harry V. Slack Water Company in 1987 and the Wildwood Canyon Mutual Water Company in 1992. YVWD currently satisfies the majority of its water demands from groundwater supplied through district-owned wells located throughout the service area. An extensive distribution system provides water storage and transmission throughout YVWD's 18 pressure zones. The only supply of surface water is provided through the Oak Glen Water Filtration Plant. Additional water sources that are expected to be available to the district in the near future include imported water through the SWP and recycled water from its wastewater treatment plant. The district completed and adopted an UWMP in 2005.

1.8.8 City of Riverside

The City of Riverside Public Utilities (RPU) Department provides potable water, non-potable water, recycled water, and electricity to the City of Riverside and was established in 1895 (electricity) and 1913 (water). The City of Riverside currently serves water to a population of 287,800 through 62,985 service connections within an area of 73.9 square miles. RPU is committed to providing the highest quality water and electric services at the lowest possible rates to benefit the community. RPU completed and adopted a Water Supply Plan in 2004 and an UWMP in 2005.

RPU produced 79,275 acre-feet of water between July 2005 and June 2006. As of 2005, RPU's annual water export rights in Bunker Hill basin were about 52,033 acre-feet. Export rights may increase with acquisition of additional rights in mutual water companies. RPU produces water from other basins – Rialto-Colton, Riverside North, and Riverside South. Annual total water demand is expected to increase from 77,767 acre-feet in 2005 to an estimated 104,374 acre-feet by 2030. RPU plans to develop additional water resources to meet future growth in demand. By 2030, available and planned water resources to meet demand would total about 116,421 acre-feet per year.

1.8.9 Water Resources Institute /California State University, San Bernardino

The Water Resources Institute /California State University San Bernardino (WRI-CSUSB) was established by the faculty senate in 1999. The senate and the university administration recognized that water is one of the most precious resources in its service area (San Bernardino and Riverside Counties) and set out to make water an area of distinction at this campus.

The WRI-CSUSB operates an extensive water resource archive that includes maps; aerial photographs; newspaper articles; water and environmental reference

books; and federal, State, and local government documents, studies, and reports. This archive is gradually being digitized to make it more accessible to users. It also includes water and environmental data and metadata, thus expanding the concept of an archive beyond the original concept of hard copies of old documents.

The WRI-CSUSB is an interdisciplinary center for research, policy analysis, and education. The full-time staff is engaged in a variety of partnerships providing technical assistance to public and private water stakeholders. The WRI-CSUSB specializes in integrated watershed projects promoting land use practices that minimize the impact of development on watershed functions. The WRI-CSUSB manages the Alluvial Fan Task Force for DWR by working with stakeholders in the watershed on resource-efficient guidelines for developing on alluvial fan floodplains. The WRI-CSUSB assists the Local Government Commission with presenting the Ahwahnee Water Principles for Resource Efficient Land Use to elected officials and developers on the connection between land use and water. The WRI-CSUSB partners with California Resources Connection, Inc. on the Inland Empire Sustainable Watershed Program developing Green Building Practices and Model Ordinances to overcome obstacles in resource-efficient land use.

1.8.10 San Bernardino County Flood Control District

The San Bernardino County Flood Control District (SBCFCD) was formed as a special district in April 1939 after the 1938 floods in the County of San Bernardino. The SBCFCD's functions include flood protection from major streams, flood control planning, storm drain management, debris removal programs, right-of-way acquisition, flood hazard investigations, and flood operations. The SBCFCD has numerous Master Plans of Drainage (MPD) for various areas within the county. An MPD is a coordinated plan of flood control improvements for an area based on its future planned development. It identifies existing flood control facilities that are inadequate to convey the 100-year peak storm flows, including needed improvements to existing facilities and new facilities that need to be constructed to provide an adequate level of flood protection. Since its inception, the SBCFCD has worked with United States Army Corps of Engineers (USACE) to develop federally funded major flood control facilities in the county. It manages its activities through six physical flood control zones. The budget projections are also determined for each zone through an annual budget study with most of the zones also having a 10-year plan. SBCFCD is also participating with Inland Empire Utilities Agency and Chino Basin Water Conservation District on the Chino Basin Recharge Improvement Project.

1.8.11 San Gorgonio Pass Water Agency

The San Gorgonio Pass Water Agency (SGPWA) was established in 1961 by the California State Legislature. Its boundaries extend through the cities of Calimesa, Beaumont, and Banning, and the Riverside County areas from Cherry Valley to Cabazon. The service area includes the incorporated cities of Calimesa, Beaumont, and Banning, and the communities of Cherry Valley, Cabazon, and the Banning Bench.

SGPWA, one of 29 State Water Contractors, purchases water from the State of California and sells it to local retail water agencies. Water is imported into the service area by the California Aqueduct. The final link of the SWP to the Pass region, the East Branch Extension, was completed in 2003. Phase 2 of the East Branch Extension is expected to be completed by 2011. Phase 2 will bring the capacity of the Extension to 17,300 acre-feet, which is the Agency's official allotment of SWP water. 17,300 acre-feet of water is enough to supply approximately 35,000 families each year.

SGPWA operates the Little San Gorgonio Creek Recharge Facility on Orchard Street in Cherry Valley. The facility includes six ponds in which SWP water is placed to percolate into the ground to recharge the Beaumont groundwater basin. The facility was partially funded by a Prop 13 grant from the State and SAWPA. SWP water is pumped to the facility via the East Branch Extension. The Cherry Valley Pump Station, located at the corner of Orchard Street and Taylor Street, is the terminal pump station on the Extension.

1.8.12 City of Big Bear Lake Department of Water and Power

The City of Big Bear Lake Department of Water and Power (BBLDWP) is nestled in the San Bernardino Mountains at approximately 6,750 feet above sea level. With more than 15,000 customers, BBLDWP is dedicated to providing the City of Big Bear Lake, Moonridge, Fawnskin, Sugarloaf, Lake William, and portions of Erwin Lake and Rimforest with a safe, reliable source of water for public health and safety.

BBLDWP's water supplies come from snow and rain that percolates into the groundwater basin. As of 2006, the BBLDWP service area is in its sixth year of drought and water efficiency is more important than ever for meeting water demands of the service area. BBLDWP does not use lake water for public health and safety and no additional water is imported into the Big Bear Valley.

Key components of the water system include adequate source capacity (wells) and storage capacity (reservoirs) to meet peak holiday and weekend demands; replacement of old, leaky, undersized steel mainlines to provide adequate fire

flow; and ongoing/recurring rehabilitation of older system components (buildings, reservoirs, pumps, motors, etc.) to ensure reliable service.

BBLDWP maintains 50 wells, 13 booster stations, 17 reservoirs, 16 chlorination stations, 20 sample stations, approximately 170 miles of water main pipeline, and a complex pressure-reducing network.

BBLDWP has an aggressive water conservation program that has significantly reduced summertime consumption over the past several years. Community outreach programs keep customers informed on current water conditions, and the Technical Review Team monitors, evaluates, and analyzes well and water consumption data on a continual basis. BBLDWP's five-member Board of Commissioners is appointed by the City of Big Bear Lake's City Council and is made up of policy makers committed to safeguarding its water resources. BBLDWP is dedicated to fiscal responsibility while focusing its resources on improving the infrastructure and ensuring that the current and future water needs of the community are met. BBLDWP prepared an UWMP that was adopted in April 2006.

1.8.13 Fontana Union Water Company

Fontana Union Water Company (Fontana Union) is a mutual water company and does not directly deliver water to domestic customers. Fontana Union has long-standing adjudicated vested rights to Lytle Creek surface and subsurface flows and Lytle Creek Basin groundwater, as well as groundwater rights in Rialto Basin and "No Man's Land." It delivers its available water to its shareholders in accordance with its Articles of Incorporation, Bylaws, and mutual water company law. Fontana Union is 97 percent owned by Cucamonga Valley Water District and San Gabriel Valley Water Company. Fontana Water Company, a division of San Gabriel Valley Water Company, diverts and produces water pursuant to its rights as Fontana Union's agent in accordance with a court-approved agreement. Under that court-approved agreement, Fontana Union allocates its Chino Basin pumping rights to Cucamonga Valley Water District, and Cucamonga also retains the option of taking delivery of its share of Fontana Union's other water sources.

1.8.14 San Timoteo Watershed Management Authority

STWMA was formed in January 2001 by BCVWD, Beaumont, the South Mesa Water Company, and the YVWD. The purpose of the STWMA is to prepare and implement a water resources management program for the San Timoteo watershed and the waters tributary thereto in order to conserve local water supplies, improve surface and groundwater quality and quantity, protect and enhance groundwater storage and recreational resources, preserve open space, protect wildlife habitat and wetlands, protect and enhance agriculture, and

develop and enhance the region's water resources for the benefit of the public. The water resources management program is to include watershed and basin monitoring; groundwater storage, banking and conjunctive use; stormwater capture and management; recycled water programs and projects; wetlands, wildlife, and open space protection; water quality protection and enhancement; and water conservation and efficiency.

1.8.15 Bear Valley Mutual Water Company

Bear Valley Mutual was formed in 1903 by the citrus growers of the Redlands/Highland area to give them a dependable water supply under their control. Bear Valley Mutual has pre-1914 water rights to the first 88 cfs of surface flow of the SAR. Bear Valley Mutual has appropriative rights on Bear Creek and a storage right in Big Bear Lake, as well as ownership of all the water inflow to the lake.

1.8.16 Beaumont-Cherry Valley Water District

BCVWD was formed in 1919 under the Wright Act of 1897 (Water Code Section 20000,et seq.) The District serves approximately eight square miles located in Riverside and San Bernardino Counties. BCVWD owns approximately 2,800 acres along Little San Gorgonio and Noble Creeks and holds pre-1914 water rights to both streams, which amounts to 3,000 miner's inches of water (approximately 45,000 acre-feet of right). The District has 20 wells in the Beaumont and Edgar Canyon Basins and currently serves about 30,000 consumers through 9,000 metered connections.

1.8.17 Big Bear Municipal Water District

Big Bear Municipal was formed in 1964 by the people of Big Bear Valley with the express purpose of stabilizing the level of Big Bear Lake. In January 1977, as a result of a stipulated judgment, Big Bear Municipal purchased title to the dam, reservoir lands lying beneath the lake, and the surface recreation rights to Big Bear Lake. As discussed above, Bear Valley Mutual has ownership rights to all water entering Big Bear Lake.

Big Bear Municipal is responsible for the following:

- Stabilization of the level of Big Bear Lake by managing the amount of water released to Bear Valley Mutual,
- Watershed/water quality management,
- Recreation management,

- Wildlife habitat preservation and enhancement, and
- Bear Valley Dam and Reservoir maintenance.

The judgment allows Big Bear Municipal to maintain a higher water level in the lake by delivering water to Bear Valley Mutual from an alternate source of water instead of from the lake. This alternate source of water is sometimes referred to as "in-lieu" water and mainly comes from the SWP. If Big Bear Municipal does not wish to purchase “in-lieu” water, it must deliver water from the lake to satisfy Bear Valley Mutual’s demands. Studies performed for Bear Valley Mutual have estimated average lake releases to be 4,279 acre-feet per year.

1.8.18 City of Colton Public Utilities Department

The City of Colton’s Public Utilities Department (Colton Public Utilities) provides water service within the City of Colton along with electric and wastewater service. Water sources include groundwater from the SBBA and the Rialto-Colton subbasin. Colton Public Utilities serves water to approximately 9,000 customers.

1.8.19 City of Loma Linda

The City of Loma Linda obtains groundwater from within the Bunker Hill subbasin area. Production facilities include six production wells, four above-ground steel reservoirs, and two in-ground pre-stressed concrete storage reservoirs, with a combined storage capacity of 14 million gallons. The reservoirs provide storage to the city's five different pressure zones. There are six pressure-reducing stations in the distribution system that lower water pressure from one zone to another to provide constant regulated pressure. To transfer water between zones, there are six booster stations located in the different zones. Loma Linda also has an “emergency” connection to the City of San Bernardino to meet its supplemental needs. The city’s population is approximately 20,000. Loma Linda also provides wastewater service.

1.8.20 City of Rialto

Residents of the City of Rialto obtain water from three purveyors: the Utilities Department of the City of Rialto (Rialto), West Valley, and Fontana Water Company (FWC). Rialto provides water service for approximately 12,000 connections. Generally, these are the more developed portions of the city (West Valley provides the water in the remaining areas).

Rialto obtains water from the Rialto-Colton groundwater subbasin, Lytle Creek Groundwater subbasin, SBBA, and the “Chino wells” (these wells are not located within the adjudicated boundaries of Chino Basin). In recent years, most of these

sources have been impacted by groundwater contamination (most significantly, perchlorate contamination of the Rialto-Colton subbasin and the Chino wells). Rialto has adopted a "zero tolerance" policy for perchlorate, meaning that they will not serve water with any perchlorate even if it meets all of the public health standards. Rialto has installed treatment systems on some wells and is pursuing installation of additional treatment systems. In 2003, the City of Rialto declared a water shortage emergency in accordance with California Water Code Sections 350-359. Rialto operates wastewater service within the city and has recently initiated deliveries of recycled water to the California Department of Transportation. Rialto also produces and transports water to Marygold Mutual Water Company (Marygold) under a cooperative agreement that expires in 2008. Surface water treatment of Lytle Creek water is provided by a treatment plant operated by West Valley. Rialto owns a portion of the capacity of that plant.

1.8.21 Fontana Water Company

FWC, a division of San Gabriel Valley Water Company, is a public utility regulated by the California Public Utilities Commission. FWC's service area covers approximately 52 square miles with boundaries including the San Gabriel Mountains to the north and the Riverside County Line to the south. FWC serves most of the City of Fontana and parts of Rancho Cucamonga, Ontario, and Rialto. FWC serves a population of approximately 158,000 with over 45,000 active service connections. Each year FWC produces between 45,000 – 50,000 acre-feet of water from water supply sources that include surface water from Lytle Creek and State Water Project water, which is treated at FWC's Sandhill Water Treatment Plant and groundwater from the Lytle, Rialto, No-Mans Land, and Chino Basins. FWC diverts and receives Lytle Creek surface water and produces groundwater in the Lytle, Rialto, and No-Mans Land Basins as an agent for Fontana Union, which holds extensive water rights to these sources of supply pursuant to longstanding court judgments.

1.8.22 Marygold Mutual Water Company

Marygold serves customers generally located in the unincorporated community of Bloomington. Marygold obtains water from the Chino Basin (Marygold has rights to the appropriative pool of Chino Basin) and the SBBA. Water from the SBBA is currently produced and transported by Rialto under a cooperative agreement that expires in 2008.

1.8.23 Muscoy Mutual Water Company

Muscoy Mutual Water Company (Muscoy) serves the majority of the unincorporated community of Muscoy. The SBMWD serves the remainder of the Muscoy community. The community is located between the cities of San Bernardino and Rialto. All water produced by Muscoy is from the SBBA.

1.8.24 Regents of the University of California

The Regents have rights to water from the SBBA, which is used by the University of California Riverside (UCR). The water is delivered to UCR by the Riverside Public Utilities Department.

1.8.25 Riverside Highland Water Company

The Riverside Highland Water Company (Riverside Highland) serves both domestic and irrigation water in San Bernardino and Riverside Counties. Riverside Highland provides water to over 3,800 customers in the community of Grand Terrace located on the Riverside Mesa south of the SAR and a portion of the Highgrove area of Riverside County. RPU owns shares in Riverside Highland and has export rights to 333 acre-feet per year of Bunker Hill groundwater through those shares. Riverside Highland obtains water from the Lytle Creek subbasin, the SBBA, the Rialto-Colton subbasin, and the Riverside North Basin.

1.8.26 Other Water Purveyors in the Region

Other water purveyors in the region include the following:

- South Mesa Water Company serves water to part of the City of Calimesa.
- Terrace Water Company services an area located between the service areas of Colton Public Utilities and West Valley.
- Western Heights Mutual Water Company serves the southeast portion of the City of Redlands and a portion of the City of Yucaipa.
- Eastwood Farms Community Water Users Association provides water to a small portion of the City of Highland.
- Arroyo Verde Mutual Water District provides water to a small portion of the City of Highland.
- Victoria Farms Mutual Water Company serves a population of approximately 1,000.
- Inland Valley Development Agency is a joint powers authority comprised of San Bernardino County and the Cities of San Bernardino, Colton, and Loma Linda. Formed in 1990, the agency is responsible for the redevelopment of the non-aviation portion of the San Bernardino International Airport. A water integration agreement between the agency

and the City of San Bernardino calls for the city taking over ownership and operation of the agency's water system.

- Devore Mutual Water Company serves an area near the intersection of Interstate 15 and Interstate 215.

- Running Springs Water District serves the community of Running Springs.

- Arrowhead Park County Water District serves an area adjacent to the Running Springs Water District.

- Big Bear City Community Services District provides water service for unincorporated areas near Big Bear Lake.

- The City of Riverside owns stock in several mutual water companies including the Meeks & Daley Water Company. Ownership interests in the Meeks & Daley Company entitle the City of Riverside to export rights of about 3,000 acre-feet from the Bunker Hill Basin. As of December 2007, the City of Riverside owns about 38.642 percent of the total shares of the Meeks & Daley Water Company. Meeks & Daley Water Company was incorporated on September 1, 1885, and is the successor company to three Mutual Water Companies - Meeks & Daley Water Company, Agua Mansa Water Company, and the Alta Mesa Water Company. Meeks & Daley Water Company provides water to the stockholders for agricultural purposes. To fund operating expenses, the company assesses all shareholders twice per year based on the number of shares owed on the date of the assessment.

  The company owns water rights in the Bunker Hill Basin and pumps water from a series of wells located within that basin, transporting this water through the Riverside and Gage Canals. At the end of the canal systems, Meeks & Daley Water Company operates a pipeline and pump station to deliver irrigation water to users in the southern portion of the City of Corona.

  With the construction of additional delivery facilities in 1996, Meeks & Daley Water Company began delivering water to OCWD under the Orange County Water Transfer Project, with water delivered to the SAR for storage behind Prado Dam and subsequent release and groundwater recharge downstream. Riverside owns 59 percent of the Gage Canal Company stock. This company owns surface water rights to the SAR.

1.9 Contents of the IRWM Plan

Chapter 1, **Introduction**, presents the background of the IRWM Plan, explaining the plan area and why it was selected, and describing the relationship between the IRWM Plan and other planning efforts occurring within the plan area or region. Previous water resources planning work that has influenced the plan is briefly reviewed along with the laws, judgments, and agreements that shape the existing conditions and institutional arrangements found in the region. Finally, this chapter lays out the purpose, need, and intent of the IRWM Plan, and the planning process used by the primary water agencies in the region to develop the plan.

Chapter 2, **Description of the Integrated Regional Water Management Plan Area,** provides a description of the existing physical and institutional conditions in the plan area. This chapter describes the water-related infrastructure, physical (climate, hydrology, groundwater, environment, water quality), and socioeconomic conditions that shape the region and influence plan development and implementation.

Chapter 3, **Water Budget for Integrated Regional Water Management Plan Region**, provides an overview of the published water budgets for the region, describes the data source(s), presents water demands and supplies, and anticipated future water demands and supplies conditions for each of the subareas within the region.

Chapter 4, **Develop Integrated Regional Water Management Plan,** describes the process used to develop the IRWM Plan and how the IRWM Plan is intended to serve as a roadmap for the management of water resources to ensure long-term, reliable water supplies. It defines the water management objectives and the water management strategies along with the specific projects and programs that will be required to help the region meet the stated objectives. This chapter also presents a process for actively managing the SBBA, the largest underground storage “reservoir” in the region.

Chapter 5, **Integrated Regional Water Management Plan Implementation**, describes implementation of the IRWM Plan including the identification of specific capital facilities, projects, and management actions to be implemented to help meet the established water management objectives. This chapter provides a realistic discussion of the obstacles that are likely to be encountered when implementing the IRWM Plan, and also discusses the impacts and benefits for the IRWM Plan and what is likely to occur if the plan is not put into place. The sources of funding and the institutional structures to be used to implement the plan are presented.

The report concludes with Chapter 6, **Data Management and Monitoring, Technical Analyses, and Plan Performance,** which describes the existing tools and techniques for data management and technical analyses conducted to evaluate planning alternatives, and determine the technical and scientific merit of the recommended actions. It also describes how data will be collected, managed, and reported in the future and how this information will be used to track the performance for each of the proposed projects and the overall IRWM Plan. The chapter discusses how the information and subsequent technical analysis will be used to update the plan as circumstances change and how the community will adopt the IRWM Plan.

Chapters 7 and 8 provide a glossary of terms and references, respectively. To keep the plan succinct and readable, much of the more detailed or technical information is presented in the appendices and the reader is directed to these materials for more information.

1.10 Meeting DWR Integrated Regional Water Management Plan Standards

DWR in collaboration with SWRCB has developed standards for preparation of IRWM Plans. Table 1-2 shows how the Upper Santa Ana River Watershed Integrated Regional Water Management Plan meets these standards.

Table 1-2
Upper Santa Ana IRWMP and State IRWM Plan Standards

Item from Minimum IRWM Plan Standards	Reference (Chapter, Section, Figure, Table #s of the IRWM Plan)
Adopted IRWM Plan	Plan will be adopted in December 2007
Regional Description, Study Period, and Appropriateness of Area for IRWM Plan	Sections 2.1 and 2.11
Formation of a Regional Water Management Group (TAG)	Section 1.7.1
Water Management Objectives and How They Were Developed	Sections 4.1, and 4.2
Water Management Strategies and How They Were Developed	Section 4.2
Integration of Water Management Strategies	Section 5.1
Regional Priorities and How They Were Developed	Section 5.3.5
Implementation Plan and Responsible Agencies	Sections 5.3.1 through 5.3.3
Impacts and Benefits of Regional Effects.	Section 5.6
Impacts and Benefits to Disadvantaged Communities and Other Resources.	Section 2.5.1
Technical Analysis to Develop IRWM Plan and Monitoring Systems to Measure Plan Performance	Chapter 6 and Section 4.2.1.6
Data Management, Data Dissemination, and Integration into SWAMP and GAMA	Section 6.2
Financing for Project Implementation and O&M	Section 5.4
Relationship between Local Planning and IRWM Plan	Sections 2.3, 2.4, 2.5, and 4.2.3.3
Plan Implementation Schedule	Section 5.3.4
Stakeholder Involvement and Coordination among Participating Agencies and with State and Federal Agencies	Sections 1.7.1.and 1.7.2
Public Outreach Activities Specific to Individual Stakeholder Groups	Sections 1.7.1 and 1.7.2
Processes that have been or will be Used to Facilitate Stakeholder Involvement and Communication during Plan Implementation	Sections 4.2.1.3.5 and 1.7.3
Partnerships Developed during the Planning Process Discussed	Sections 4.1, 4.2.1.3.2, and 4.2.1.3.5
Disadvantaged Communities were Identified and Environmental Justice Concerns Addressed.	Section 2.5, Table 2-4, and Figure 2-3

2 Description of the Integrated Regional Water Management Plan Area

2.1 Location

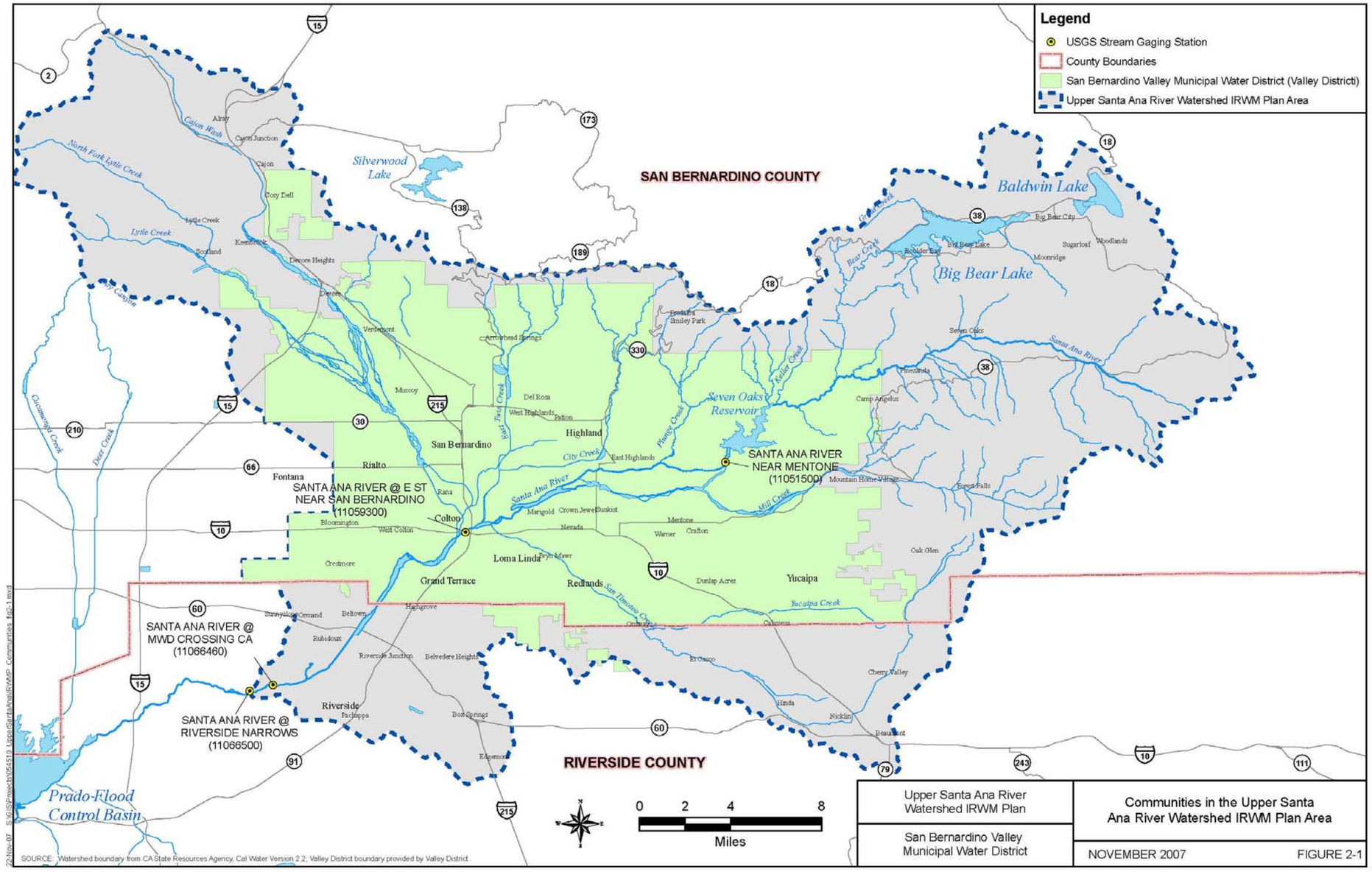
The Santa Ana River (SAR) is the largest stream system in Southern California. The headwaters originate in the San Bernardino Mountains and are discharged to the Pacific Ocean approximately 100 miles to the southwest between Newport Beach and Huntington Beach. The SAR watershed covers over 2,650 square miles of widely varying forested, rural, and urban terrain and covers the more populated urban areas of San Bernardino, Riverside, and Orange Counties, as well as a lesser portion of Los Angeles County. Disputes over the use of water in the SAR led to the subdivision of the watershed into the Upper SAR watershed and Lower SAR watershed at Prado Dam.

2.1.1 General Integrated Regional Water Management Plan Region

The Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IRWM Plan) Area (Region) covers 852 square miles, approximately 32 percent of the total SAR watershed, and is primarily located in San Bernardino and Riverside Counties. The Region includes Big Bear Lake, the cities and communities of San Bernardino, Yucaipa, Redlands, Highland, Rialto, Mentone, Colton, Grand Terrace, Loma Linda, Beaumont, and Riverside (Figure 2-1). This region was selected for the IRWM Plan in large part because of the following factors:

- Rapid population growth in the area and the potential for continued rapid growth in the future.
- Significant institutional issues, hydrological characteristics, and court judgments separate the Upper SAR watershed from the downstream portion of the watershed at the Riverside Narrows just upstream from Prado Dam. The Orange County Water District v. City of Chino, et al., Case No. 117628 (Orange County Judgment) and the Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426 (Western Judgment), which were discussed in more detail in Chapter 1, have significant influence on water management of the Upper SAR and dictate, to some degree, how water resources should be managed in the Upper SAR watershed.

Figure 2-1
Communities in the Upper Santa Ana Region



- The Upper SAR watershed is a region with unique physical characteristics. The Upper SAR has a widely variable hydrology, a demography that includes a high rate of population growth and urban development, and challenging water management issues, including the need to make use of local water supplies to make the region self-sufficient. The agencies in the Region plan to coordinate and manage among them the groundwater spreading and pumping and to establish a cooperative, integrated plan that will reduce or eliminate historical water right conflicts among the water agencies in the Upper SAR watershed.

- Groundwater basins in the Upper SAR watershed are generally separated from the lower basin. The groundwater basin in which most Region-related activities take place is the San Bernardino Basin Area (SBBA), which is composed of the Bunker Hill and Lytle Creek subbasins. A discussion of groundwater basins within the Region is presented later in this chapter.

The Region is defined by the area that contributes surface runoff to the Riverside Narrows at U.S. Geological Survey (USGS) Gage 11066500. The USGS has operated this site as a continuous record gaging station since March 1970. Specific conductance, temperature, and total dissolved solids (TDS) are collected bi-monthly. There are numerous tributaries that contribute flow to the main stem of the SAR in the region, including Mill Creek, City Creek, Plunge Creek (a tributary of City Creek), Mission Zanja Creek (located just upstream of the San Timoteo Creek), San Timoteo Creek, East Twin Creek, Warm Creek, and Lytle Creek.

2.2 Climate

Climate in the Region is characterized by relatively hot, dry summers and cool winters with intermittent precipitation. The largest portion (73 percent) of average annual precipitation occurs during December through March and rainless periods of several months are common in the summer. Precipitation is nearly always in the form of rain in the lower elevations and mostly in the form of snow above about 6,000 feet mean sea level (msl) in the San Bernardino Mountains. Mean annual precipitation ranges from about 12 inches in the vicinity of Riverside, to about 20 inches at the base of the San Bernardino Mountains, to more than 35 inches along the crest of the mountains. The long-term (water years 1883-84 through 2001-02)[1] mean annual precipitation recorded at the San Bernardino County Hospital Gage is 16.4 inches. The historical record indicates that a period of above-average or below-average precipitation can last more than 30 years, such as the recent dry period that extended from 1947 to 1977. Historical streamflow statistics for the SAR at the Metropolitan Water District of Southern California (Metropolitan) Crossing (located near the Riverside Narrows) show that flows vary widely from year to year. The median annual flow for SAR at Metropolitan Crossing is 75,900 acre-feet per year. During water years 1969-1970 through 2000-2001, annual flows have ranged from a high of 301,000 acre-feet to a low of 9,800 acre-feet. These data are indicative of highly variable streamflows.

Three types of storms produce precipitation in the SAR Basin: general winter storms, local storms, and general summer storms. General winter storms usually occur from December through March. They originate over the Pacific Ocean as a result of the interaction between polar Pacific and tropical Pacific air masses and move eastward over the basin. These storms, which often last for several days, reflect orographic (i.e., land elevation) influences and are accompanied by widespread precipitation in the form of rain and, at higher elevations, snow. Local storms cover small areas, but can result in high intensity precipitation for durations of approximately six hours. These storms can occur any time of the year, either as isolated events or as part of a general storm, and those occurring during the winter are generally associated with frontal systems (a “front” is the interface between air masses of different temperatures or densities). General summer storms can occur in the late summer and early fall months in the San Bernardino area, although they are infrequent.

The Region has an annual precipitation that ranges from 12 inches in low areas to 40 inches along the crest of the mountains.

[1] A water year runs from October through September of the following year. For example, water year 2000- 2001 begins on October 1, 2000, and ends on September 30, 2001.

2.3 Population

2.3.1 Historic Population and Housing Growth in the Plan Area

The Region covers part of the two-county area of San Bernardino and Riverside. Population figures for 1990 and 2000 for Riverside and San Bernardino Counties are presented in Table 2-1. Over the decade of the 1990s, both counties experienced substantial increases in population—32.6 percent for Riverside County (with an average rate of 3.3 percent annually) and over 21 percent for San Bernardino County (2.1 percent annually). The population of the two-county Region increased by over 681,400 persons or over 26 percent (2.6 percent annually) during this time period.

Table 2-1
Riverside and San Bernardino County Population, 1990 and 2000

Area	Population		Change: 1990-2000	
	1990	2000	Number	Average Annual Percent
Riverside County	1,170,413	1,551,943	381,530	3.3%
San Bernardino County	1,418,380	1,718,312	299,932	2.1%
Source: U.S. Census 1990 and 2000.				

In the period from 1990–2000, housing units in Riverside and San Bernardino counties grew 15.6 percent.

The number of housing units contained in the two counties grew from about 1,026,200 in 1990 to 1,186,000 in 2000. This increase of 15.6 percent took place at an average annual rate of 1.5 percent.

Population of the San Bernardino Valley Municipal Water District's (Valley District) service area between 2000 and 2005 grew by 56,000 or 10.5 percent, which is about a 2 percent growth annually. Population of the IRWM Plan Area grew by 21,200 from 2000 to 2005.

2.3.2 Future Population Growth in the Region and Valley District Service Area

The Southern California Association of Governments (SCAG) adopted the "2001 RTP Socioeconomic Forecast" in November 2006 that includes population projections for consecutive five-year increments from 2000 to 2025 for various geographic areas (SCAG 2001). Table 2-2 presents these data for Riverside and San Bernardino Counties. The counties are projected to

experience average annual growth rates of 3.4 percent and 2 percent, respectively, between 2000 and 2025.

Table 2-2
SCAG County Population Projections, 2010-2025

Area	Population						Change: 2000-2025		
	2000[a]	2005	2010	2015	2020	2025	Number	Percent	Average Annual Percent
Riverside	1,551,943	1,842,690	2,077,800	2,347,300	2,620,500	2,876,300	1,324,357	85%	3.4%
San Bernardino	1,718,312	1,919,145	2,059,400	2,229,700	2,397,700	2,558,700	840,388	48.9%	2%

[a]Based on 2000 U.S. Census information.

Estimates of future populations were developed for this plan using U.S. Census 2000 block-level data. The service area boundaries were overlaid digitally on census maps using a Geographic Information System (GIS). Where census blocks were split by service area boundaries, the proportion of the census block contained in the service area was calculated and used to prorate the population of the particular census block to the respective service area.

The Valley District service area had a population of 585,000 in 2000, of which approximately 583,482 lived in San Bernardino County. The remaining persons lived in Riverside County. The population contained in the Valley District service area comprises about 34 percent of the population of San Bernardino County and less than 0.1 percent of the Riverside County population.

Over the period 2000 to 2025, and using SCAG county-level population projections, the number of residents in the service areas of Valley District and the IRWM Plan area is projected to increase by approximately 199,500 and 297,800, respectively (Table 2-3).

Table 2-3
Population of Plan Area and Valley District Service Area, 2000-2025

Service Area	2000[a]	2005	2010	2015	2020	2025	Change: 2000-2025	
							Number	Percent
Valley District	585,003	641,004	680,100	719,800	751,200	784,500	199,497	34.1
San Bernardino County	1,718,312	1,919,145	2,059,400	2,229,700	2,397,700	2,558,700	840,388	48.9
IRWM Plan Area	870,866	892,048	958,400	1,034,400	1,101,700	1,168,700	297,834	34.2

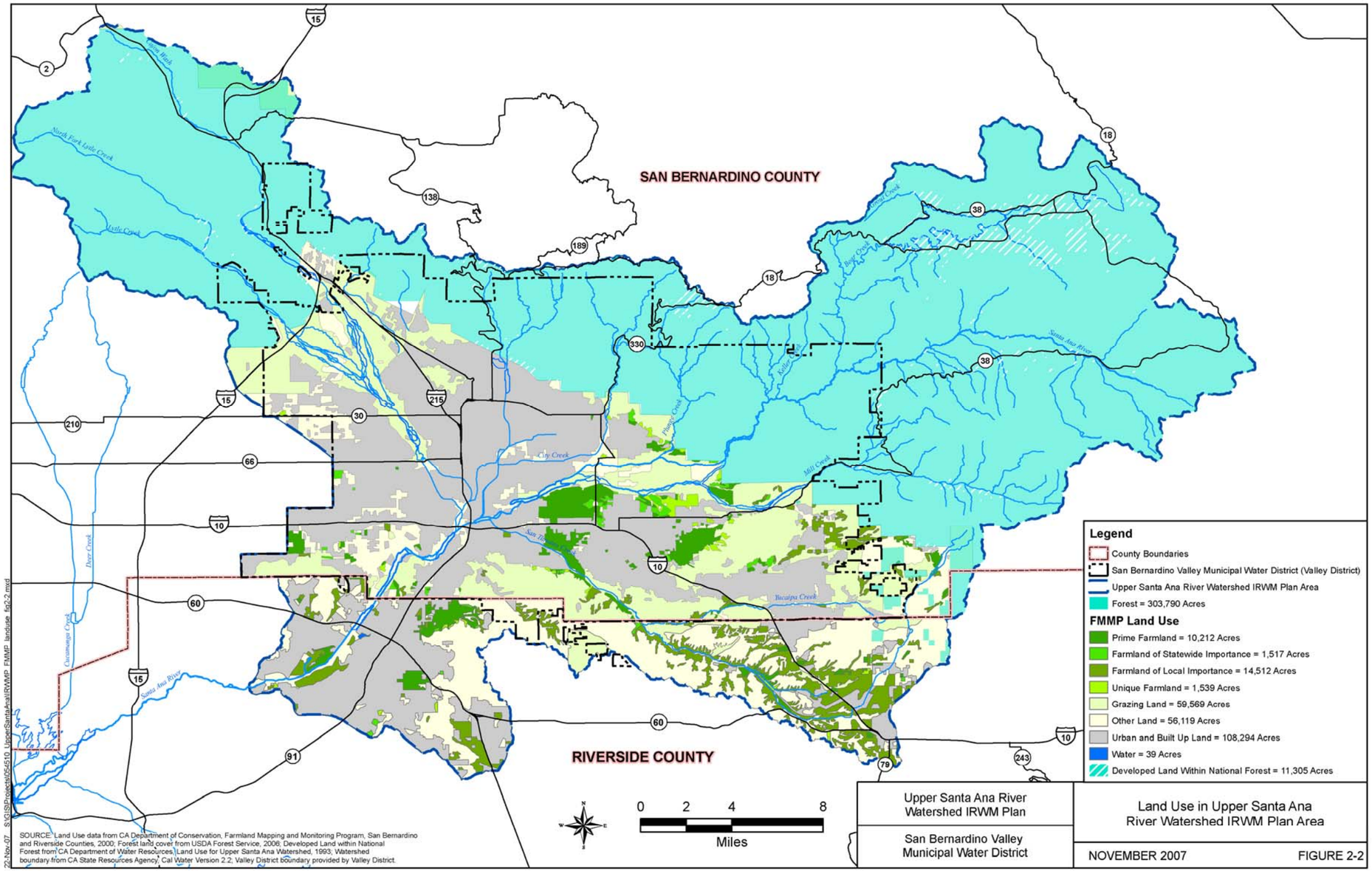
[a.] Based on 2000 U.S. Census information for the service area populations as of April 2000.

2.4 Land Use and Agricultural Lands Stewardship

Figure 2-2 presents the 2005 land use within the Region. The total area of the Region is 549,570 acres, of which 303,790 acres, or about 55 percent, are covered by the national forest located in the easterly and northerly areas of the Region. In addition to the national forest, native vegetation covers about 86,400 acres or about 16 percent of the Region. Agriculture acreage is being replaced by urban areas, and agriculture only represents a little over two percent of the land use of the Region today. Urban areas are about 15 percent of the Region. The large areas of agricultural land use are south of the SAR.

A number of local land use agencies have approved general plans and specific plans in the Region. These plans are relevant to this IRWM Plan. These local land use planning agencies play a major role in zoning and land use decisions in the Region. The California Government Code contains statutes addressing the subject of the applicability of local land use controls on planning and construction of public water facilities. However, it is generally the practice of Valley District and other local agencies to voluntarily comply with the standards specified in applicable local land use and building code regulations.

Figure 2-2
Land Use



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2.5 Economic Condition and Social and Cultural Composition of the Region

Food preparation and service, teaching, and construction jobs are the fastest growing employment opportunities in the Region.

Like most communities in Southern California, the Upper Santa Ana region has seen a continued increase in population and change in the economic base as agricultural and vacant land is replaced with residential housing, leading to urban and service sector jobs. The fastest growing jobs projected between 2001 and 2008 include food preparation and service, teaching, and construction, all generally showing more than a 25 percent increase. Services, retail trade, government, and manufacturing constitute the majority of jobs in the area, followed by construction, transportation, and wholesale trade. Employment growth in San Bernardino County is the third highest in the State of California (State), with a relatively low current unemployment rate of about 4.6 percent. Population estimates doubled between 1970 and 1990, increased better than 20 percent between 1990 and 2000, and continued to rise at a 14 percent rate from 2000 to 2005. San Bernardino County and Riverside County now rank fourth and fifth in county population in California, respectively. Continued residential and job growth is expected in the area.

Much of the population growth of the Upper Santa Ana region since the 1970s is linked with the economies of Los Angeles and Orange Counties because they are within commuter range, and the housing prices in the Upper Santa Ana region are more affordable. Also, population growth over the past three decades is attributed to a marked increase in immigration from Mexico, Latin America, and the Pacific Rim.

2.5.1 Composition of Population and Tribe

Most of the Region is considered economically disadvantaged. An economically disadvantaged community is defined by the State as a community with a median annual household income of 80 percent or less than the State median annual household income. In 2000, the State's annual median family income was $47,493. Figure 2-3 shows the economically disadvantaged communities in the Region. Table 2-4 presents median annual family incomes in service areas for various water purveyors. Communities within the service areas of the City of Rialto, City of San Bernardino, East Valley Water District (East Valley), and a number of mutual water companies are considered economically disadvantaged. Water management strategies evaluated and considered for the IRWM Plan are designed to improve water supply reliability and water quality for these communities in the Region. The disadvantaged communities are dispersed throughout the Plan Area, and are served water by different water purveyors. The location of disadvantaged communities relative to project locations determines the range and extent of benefit a given project provides to an individual disadvantaged community.

Figure 2-3
Economically Disadvantaged Communities

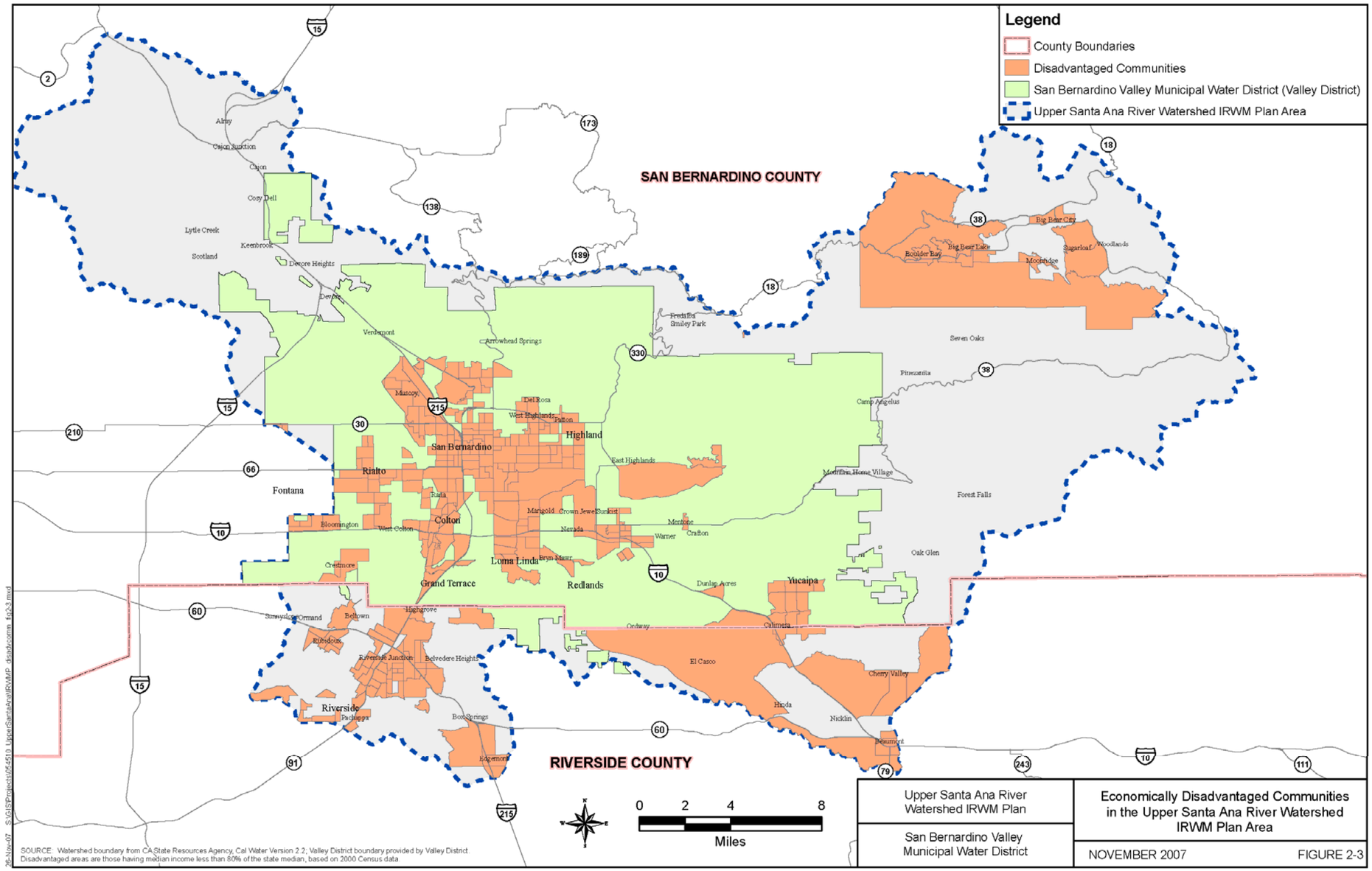


Table 2-4
Median Annual Household Income for Water Purveyor and Water Agency Service Areas

Service Area	Median Income 2000	Percent of State Median 2000
Baseline Garden Mutual	24,274	51%
Bear Valley Mutual Water Company	48,838	103%
Bear Valley Mutual Water Co./Lugonia Water Company	51,717	109%
Beaumont-Cherry Valley Water District	44,004	93%
Big Bear City Community Services District	38,165	80%
Big Bear Municipal Water District	32,764	69%
City of Beaumont	34,543	73%
City of Big Bear Lake Department of Water and Power	37,044	78%
City of Colton	41,506	87%
City of Loma Linda	43,353	91%
City of Redlands	53,413	112%
City of Rialto	39,072	82%
City of San Bernardino	38,310	81%
Devore Mutual Water Company	63,074	133%
East Valley Water District	54,337	114%
Eastern Municipal Water District	49,717	105%
Eastwood Farms Community Water Users Association	20,334	43%
Fontana Water Company	54,256	114%
Inland Valley Development Agency	22,917	48%
Jurupa Community Services District	53,679	113%
Marygold Mutual Water Company	30,160	64%
Muscoy Mutual Water Company	28,328	60%
Riverside Highland Water Company	51,834	109%
Riverside Public Utilities District	46,349	98%
Rubidoux C.S.D.	41,827	88%
Running Springs Water District	64,330	135%
San Gorgonio Pass Water Agency	39,091	82%
San Timoteo Watershed Management	50,849	107%
South Mesa Water Company	37,683	79%
Terrace Water Company	43,299	91%
Victoria Farms Mutual Water	36,069	76%
West Valley Water District	51,961	109%
Western Heights Water Company	73,029	154%
Western Municipal Water District	47,277	100%
Yucaipa Valley Water District	61,135	129%
Valley District	**39,354**	**83%**
State	**47,493**	**100%**

Source: U.S. Census Bureau, Census 2000

For example, the larger, regional projects provide water supply reliability and/or water quality benefits to a water provider's service area or the Plan Area in total. While these projects do not specifically target disadvantaged communities, the benefits of the project may extend to one or more disadvantaged communities.

In addition there are individual projects located within the disadvantaged communities that directly benefit those areas by improving water supply reliability and/or water quality to the targeted disadvantaged community.

Various tribes of Native Americans inhabited the Region in the past. Today, the San Manuel Band of Mission Indians and Morongo Band of Mission Indians are present in the region. Ethnic data for 2000 (Source: 2000 Census PL94) include 44 percent White, 39.2 percent Hispanic, 8.8 percent African American, 0.57 percent Native American, and 7.43 percent others.

2.6 Major Water-Related Infrastructure in Region

The water-related infrastructure of the Upper SAR watershed reflects the complex water history of the Region. The predecessors of many of the water agencies that are participating in this plan were constructing ditches in the 1800s. The water rights and facilities established at that time have helped determine the structure of today's water agencies and the arrangement of today's infrastructure. After State Water Project (SWP) facilities were extended into the Region in the early 1970s, State Water Contractors receiving deliveries from the East Branch, Valley District, San Gorgonio Pass Water Agency (SGPWA), and Metropolitan constructed pipelines to take advantage of the imported water. Figure 2-4 shows the major water-related infrastructure in the Region.

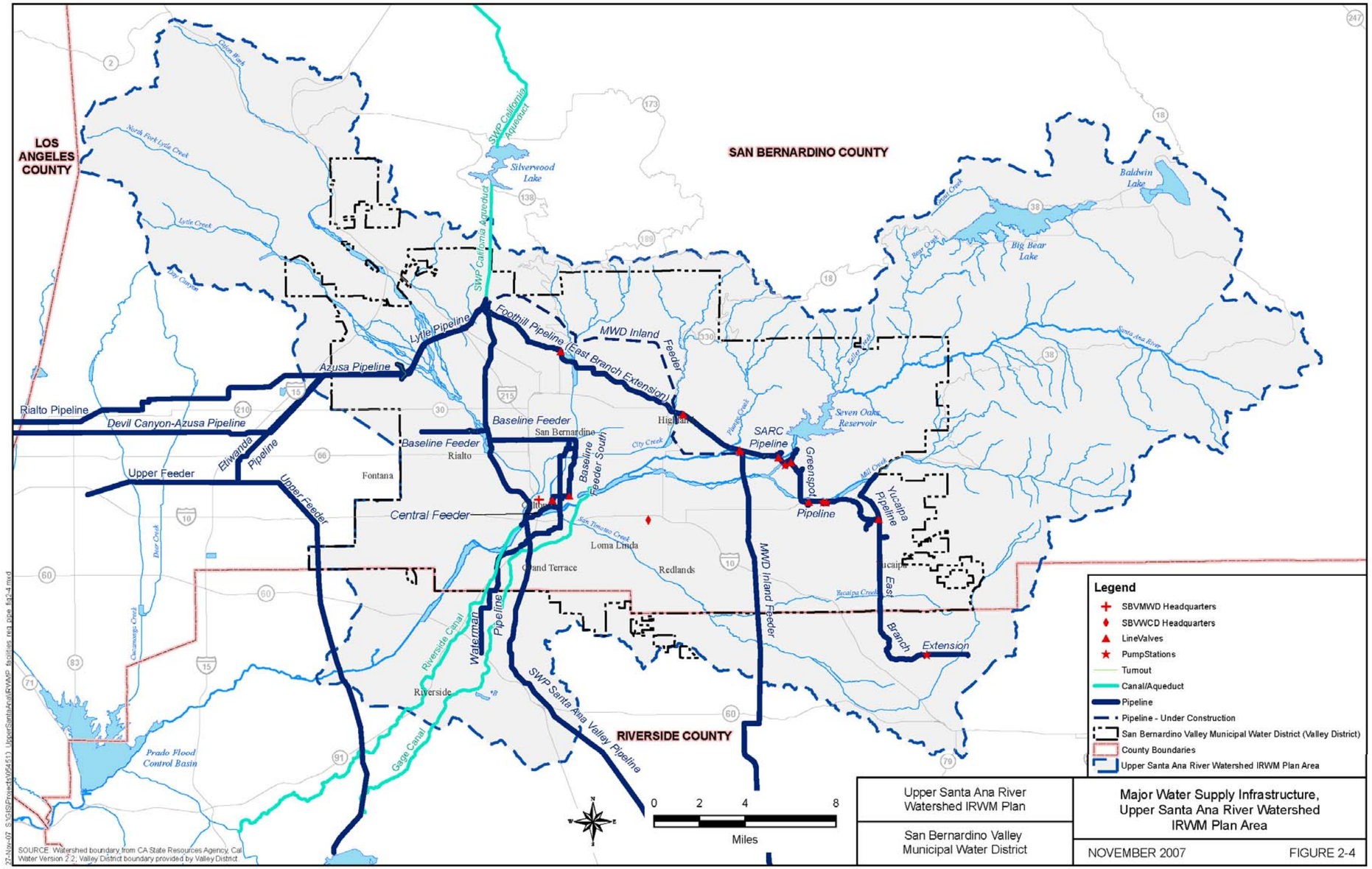
2.6.1 State Water Project Facilities

SWP water is imported into the Upper SAR watershed via the East Branch of the California Aqueduct. At the Devil Canyon Power Plant, located at the foot of the San Bernardino Mountains near Interstate 215, SWP water can be delivered in several directions in State facilities or in transmission systems belonging to three State Water Contractors.

The SWP Santa Ana Pipeline extends south, roughly paralleling Lytle Creek and on to Lake Perris. Deliveries can be made to Metropolitan member agencies including Western Municipal Water District (Western), Eastern Municipal Water District, and the San Diego County Water Authority.

The East Branch Extension of the SWP is a combination of facilities built by the Valley District and the State and funded by Valley District and SGPWA. Valley District operates these facilities for the State and for SGPWA. The East Branch Extension makes deliveries from Devil Canyon east along the foothills of the San Bernardino Mountains and as far as SGPWA. Portions of the East Branch Extension, including the Foothill Pipeline, are used to implement the Santa Ana River-Mill Creek Cooperative Water Project Agreement (Exchange Plan). This agreement provides for a three-level exchange that allows Valley District to deliver water to the Yucaipa area by exchanging SAR and Mill Creek water among ten agencies. In the past, the Foothill Pipeline was also used to deliver local water to Devil Canyon Afterbay and on to Metropolitan, the West Valley Water District (West Valley), and Fontana Water Company (FWC). The State is currently evaluating an increase in the capacity of the East Branch Extension.

Figure 2-4
Major Water-Related Infrastructure



2.6.2 State Water Contractors Facilities

Four State Water Contractors have facilities in the Region: Valley District, SGPWA, Metropolitan, and the San Gabriel Valley Municipal Water District.

Metropolitan's Inland Feeder will ultimately extend from Devil Canyon to Diamond Valley Lake when the tunnels within the San Bernardino Mountains are complete. Currently, the Foothill Pipeline is being used to make deliveries of SWP water to the completed portions of the Inland Feeder for delivery to Diamond Valley Lake.

Metropolitan's Rialto Pipeline is used to make deliveries from Devil Canyon to Metropolitan's F.E. Weymouth Treatment Plant in the San Gabriel Valley and to its Robert B. Diemer Treatment Plant, which supplies treated water to Western and Eastern Municipal Water District . In addition, the Rialto Pipeline makes deliveries to surface water treatment plants owned by Metropolitan's member agencies and to groundwater recharge facilities.

The San Gabriel Valley Municipal Water District's Devil Canyon-Azusa Pipeline is used primarily to make deliveries for replenishment of the Main San Gabriel Basin for the accounts of Alhambra, Azusa, Monterey Park, and Sierra Madre. Valley District owns capacity in this pipeline. Through this pipeline, Valley District can deliver SWP water to the western portion of its service area including West Valley and FWC as well as the Cactus Spreading Basins.

Many of Valley District's facilities have been integrated into the SWP and were described in the previous section. In addition, Valley District has three pipelines that are not integrated into the SWP. These are the Baseline Feeder, Baseline Feeder Extension South, and the Central Feeder.

The Baseline Feeder is a 48-inch pipeline that serves potable water from the San Bernardino Basin Area (SBBA) to the City of Rialto, West Valley, and Riverside-Highland Water Company. It is possible that the current hydraulic grade of this pipeline (1370 msl) will be reduced to match the Lower Zone (1249 msl) of the City of San Bernardino. The Baseline Feeder Extension South Pipeline is a 78-inch pipeline that was constructed north/south in alignment from the vicinity of 9th Street and Waterman Avenue in San Bernardino, south past the Antil area where there is a major concentration of production wells, and on to the vicinity of the SAR. This pipeline has been integrated into the Lower Zone of the City of San Bernardino and will ultimately serve water from the SBBA throughout Valley District's service area and on to Riverside County.

Valley District is currently constructing a portion of the Central Feeder, in an east/west alignment in San Bernardino Avenue from Opal Avenue Westerly to Texas Street in Redlands. The Central Feeder Pipeline may eventually be

extended and connected to the Baseline Feeder Extension South Pipeline and possibly to the Santa Ana Valley Pipeline.

2.6.3 Regional Water Supply Infrastructure

The SBBA is a major source of water supply for agencies in San Bernardino and Riverside Counties. The three major transmission systems used to deliver water to the City of Riverside are the Gage Canal, Waterman Pipeline, and the Riverside Canal. The Gage Canal is owned by the Gage Canal Company. As of 2005, the City of Riverside owned approximately 59 percent of the Gage Canal Company. The canal extends from the SAR near Loma Linda to the Arlington Heights area. The Gage Canal is used to deliver both potable and irrigation water.

The Riverside Canal is a 12-mile canal extending from the City of Colton to Jefferson Street in the City of Riverside. Non-potable water from Colton and Riverside North Groundwater Basin is conveyed in the Flume Pipeline to the Riverside Canal.

2.6.4 Regional Flood Control Infrastructure

The Upper SAR watershed consists of many tributaries flowing to the SAR. These tributaries are in various states of development from natural stream to concrete-lined channels. Many of the streams flow through heavily developed areas. The San Bernardino County Flood Control District (SBCFCD) operates and maintains many of these tributary systems deemed "regional" (750 cubic feet per second or greater of flow and/or 640 acres or greater of watershed) as well as portions of the SAR.

The San Timoteo flood channel is a concrete-lined flood channel.

2.7 Surface Hydrology

Surface hydrology of the Region is comprised of the SAR and its tributaries. A number of surface reservoirs in the Region are operated primarily for agricultural and urban water use, but are also regulated for instream flows and recharge of groundwater basins. The following sections describe the surface hydrology of the Region.

2.7.1 Natural Runoff

Runoff records provide information on the characteristics of flow in the SAR and its tributaries. Such records are available for a number of stream gaging stations located on the mainstem of the SAR and throughout the SAR watershed. The SAR runoff records demonstrate the highly variable nature of river flow, with large floods and long periods of extremely low flow. Three gaging stations provide streamflow data for the Upper SAR. Mentone Gage (USGS record 11051500) is representative of SAR flow near Seven Oaks Dam. There are two other USGS gaging stations located downstream of Seven Oaks Dam, but within the Upper SAR basin—the "E" Street Gage (USGS Gage 11059300) located in the City of San Bernardino at river mile (RM) 57.69 and the Metropolitan Water District Crossing Gage (Metropolitan Crossing) (USGS Gage 11066460) located at RM 45.7 near Riverside Narrows. Table 2-5 provides the annual median,[1] maximum, and minimum streamflow recorded at the River Only Mentone, "E" Street, and Metropolitan Crossing gages. (See Figure 2-1.)

Flow in the SAR is highly variable from year to year. Flow in the SAR increases downstream due to inflows from tributaries, rising water,[2] and treated water from wastewater treatment plants (WWTPs). SAR flows at the "E" Street Gage include flows from Mill Creek and San Timoteo Creek but not from Lytle and Warm Creeks, which enter the SAR below the "E" Street Gage. SAR flows at the Metropolitan Crossing include inflows from Lytle and Warm Creeks, two large public WWTPs, and rising water.

Flows in excess of about 70,000 acre-feet per year have a frequency of occurrence of only 10 percent at the River Only Mentone Gage, whereas this same flow has a frequency of occurrence of over 60 percent at the Metropolitan Crossing Gage. Additionally, in the upstream areas, minimum annual streamflows are generally much smaller than minimum annual flows in the downstream areas.

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1 Median is a measure of central tendency, as is mean (average). The median represents the 50th percentile, i.e., if data are sorted from highest value to lowest value, the median value is the value in the exact center of the range. The median is a more appropriate measure of central tendency than the mean when data are highly skewed.

2 Rising water is used to describe noticeable increases in streamflow in reaches where a subsurface restriction forces groundwater to the surface.

Table 2-5
Upper SAR Median, Maximum, and Minimum Annual Flow (in acre feet)

	Median Annual Flow	Maximum Annual Flow	Minimum Annual Flow
River Only Mentone [a]	7,991	204,812	9
"E" Street [b]	25,525	319,976	0
Metropolitan Crossing [c]	75,934	301,004	9,979

Source: USGS gage data.
[a.] USGS Gage 11051500. Period of record is WY 1911-12 through WY 1999-00.
[b.] USGS Gage 11059300. Period of record is WY 1938-39 through WY 1953-54, WY 1966-67 through WY 2000-01.
[c.] USGS Gage 11066460. Period of record is WY 1969-70 through WY 2000-01.

The largest monthly flows typically occurred in February and March, and the lowest monthly flows typically occurred between August and October. Although streamflow increases downstream, the timing of flows (i.e., when the monthly maximums and minimums occur) is similar to the timing of flows observed at the Mentone Gage.

There are numerous tributaries that contribute flow to the mainstem of the SAR in the Region, including Mill Creek, City Creek, Plunge Creek (a tributary of City Creek), Mission Zanja Creek (located upstream of San Timoteo Creek), San Timoteo Creek, East Twin Creek, Warm Creek, and Lytle Creek. The flow (under 100-year flood conditions[1]) contributed by each of these tributaries is provided in Table 2-6. As a reference, during a 100-year flood event, Seven Oaks Dam would release up to 5,000 cubic feet per second (cfs) (U.S. Army Corps of Engineers (USACE) 1988).

Table 2-6
Tributary Flow Contribution to the SAR (100-Year Flood Event Discharge in cfs)

Tributary	Inflow	River Mile
Mill Creek	19,500	68.67
City Creek & Plunge Creek (Combined)	5,000	62.87
Mission Zanja Creek	3,500	59.08
San Timoteo Creek	15,500	58.44
East Twin Creek	18,000	58.14
Lytle Creek & Warm Creek (Combined)	70,000	56.74

Source: USACE 2000.

[1] A flood as defined under the Standard Flood Insurance Policy is a general and temporary condition of partial or complete inundation of normally dry land areas from overflow of inland or tidal waters or from the unusual and rapid accumulation of runoff of surface waters from any source. A 100-year flood refers to a flood level with a 1 in 100 percent chance of being equaled or exceeded in any given year.

Urbanization taking place in the valley areas of the SAR Basin has resulted in increased responsiveness of the basin to rainfall. The increase in impervious surfaces (such as roofs, roads, parking lots, etc.) and constructed drainages to remove surface water from urban areas has resulted in decreased groundwater infiltration and increased runoff from urban areas. These actions have reduced the lag time between peak rainfall and peak runoff (i.e., constructed drainage systems move water from the urban areas to the river faster than this water would move if the land was not developed).

Compared to a basin without the influence of urbanization, the same rainfall occurring over an urbanized segment of the basin will result in higher peak discharges, a shorter lag-time to the peak discharge, and an overall larger volume of water entering the local drainage channels. Because the SAR Basin is experiencing rapid growth, increased urbanization of the basin is expected to continue; therefore, this trend in increased discharge and decreased lag times between peak rainfall and peak streamflow is expected to continue in the future.

2.7.2 Imported Water

Imported water from the SWP is available to the study area through Valley District and the SGPWA. Valley District is the fifth largest State Water Contractor, with an annual entitlement of 102,600 acre-feet. Valley District lies on the East Branch of the California Aqueduct and takes delivery of SWP water at the Devil Canyon Power Plant. From this location, Valley District can deliver water to the west via the San Gabriel Valley Municipal Water District Pipeline (Valley District owns capacity in this pipeline) or to the east through the East Branch Extension of the SWP. SGPWA is downstream of Valley District on the East Branch of the California Aqueduct.

Water availability through the SWP is intermittent and subject to frequent shortages. As a result, Valley District's "Rules for Service" require that all of its customers have a 100 percent backup for any amount of water they order from the SWP.

Redlands Wastewater Treatment Plant

2.7.3 Wastewater

There are 14 publicly owned WWTPs located above Prado Dam downstream of the Narrows (SAR Watermaster 2003). Nine of these plants contribute to surface flow of the SAR. Between 1970 and 2000, the total volume of treated wastewater contributions to SAR flows increased from 44,000 acre-feet per year to 169,000 acre-feet per year (SAR Watermaster 2003).

Three wastewater treatment plants (Redlands, Beaumont, and Yucaipa) discharge to the SAR and its tributaries upstream of the

City of San Bernardino, but these discharges generally do not flow continuously to the SAR at "E" Street (SAR Watermaster 2003). Two plants, the Rapid Infiltration and Extraction (RIX)[1] WWTP in the City of Colton and the Rialto WWTP in the City of Rialto, discharge directly to the SAR via a discharge channel at RM 53.46. Wastewater discharges from these plants have hydraulic continuity to the SAR above Riverside Narrows. Combined wastewater discharge from these two plants has risen from around 22,000 acre-feet per year in water year 1970-1971 to 57,750 acre-feet per year in water year 2000-2001 (SAR Watermaster 2003). The combined wastewater discharge is expected to increase to about 59,000 acre-feet per year, with both facilities operating at their respective design capacities. (See Table 2-7.)

Table 2-7
Treated Wastewater Discharged Directly to the SAR above Riverside Narrows

Facility	Current Discharge (acre-feet per year)	Potential Future Discharge (acre feet per year)
RIX	49,407 [a]	44,900
Rialto	8,346 [a]	14,200
Total Discharges Directly to the SAR in the Project Area	57,753	59,000

Notes:
[a.] Based on 2000-2001 water year data reported in the Thirty-Second Annual Report of the SAR Watermaster (SAR Watermaster 2003).

Despite the likelihood that WWTP discharges will increase in the future, not all of the treated water may enter the SAR. Several cities and utilities are in the process of developing plans to recycle water, which could decrease discharges to the river. For example, the City of San Bernardino is currently evaluating a program to sell approximately 18,000 acre-feet per year of tertiary effluent (of a total potential discharge of approximately 44,900 acre-feet per year) from the RIX facility. Valley District contracted with the City of San Bernardino to ensure that the RIX facility continues to release quantities of treated effluent to the SAR adequate to fulfill Valley District's obligations to provide 15,250 acre-feet of baseflow each year at the Riverside Narrows as called for in the Orange County Judgment.

[1] The RIX WWTP went into operation in 1996 and provides tertiary treatment to all of the effluent from the Colton and San Bernardino Water Reclamation Plants. Prior to 1996, effluent from these plants entered the SAR just above and just below "E" Street, respectively.

2.7.4 Surface Water Quality

The SAR Basin is within the boundaries of the Santa Ana Regional Water Quality Control Board (SARWQCB). The SARWQCB has divided the mainstem of the SAR into six reaches. Reaches 1 through 6 have reach numbers beginning at the Pacific Ocean and increasing upstream. Reaches 3 through 6 are located in the Upper SAR Basin. These reaches are described in more detail below, from upstream to downstream.

2.7.4.1 Reach 6 (RM 70.93 and Above)

This reach includes the river upstream of Seven Oaks Dam where flows consist largely of snowmelt and storm runoff and water tends to be of excellent quality (SARWQCB 1995).

2.7.4.2 Reach 5 (RM 70.93 to RM 57.68)

This reach extends from Seven Oaks Dam to the Bunker Hill Dike (San Jacinto fault), which marks the downstream edge of the Bunker Hill groundwater basin. This reach tends to be dry except during storm flows. The lower end of this reach sometimes has rising groundwater and San Timoteo Creek flows on an intermittent basis (SARWQCB 1995).

2.7.4.3 Reach 4 (RM 57.68 to RM 49.00)

This reach includes the SAR from Bunker Hill Dike downstream to Mission Boulevard Bridge in Riverside. The bridge is the upstream limit of rising groundwater resulting from the constriction at Riverside Narrows. Until about 1985, most water in the reach percolated to the local groundwater leaving the lower part of the reach dry. However, flows in the lower end of this reach may now intermittently contain rising groundwater and flows from San Timoteo Creek.

2.7.4.4 Reach 3 (RM 49.00 to RM 30.50)

This reach includes the SAR from Mission Boulevard Bridge in Riverside to Prado Dam. At the Riverside Narrows, rising groundwater feeds several small tributaries including Sunnyslope Channel, Tequesquite Arroyo, and Anza Park Drain (SARWQCB 1995).

The SARWQCB states that the quality of the SAR is a function of the quantity and quality of the various components of the flows (SARWQCB 1995). Three components make up the flow of the water in the SAR: (1) storm flows, (2) baseflow, and (3) non-tributary flow. The relative proportion of these components varies throughout the year.

The first component, storm flows, results directly from rainfall, usually occurring between the months of December and April. Much of the rainfall and surface water runoff from the storms is captured and percolated into the groundwater basins. The quality of storm flow water is highly variable.

Baseflow makes up the second component of water flow in the SAR, a large portion coming from the discharge of treated wastewater into the river in addition to rising groundwater in the basin. This baseflow includes the non-point source discharges as well as the uncontrolled and unregulated agricultural and urban runoff. Water quality objectives are set in relation to the baseflow in the river, not to the total flow in the river (see Table 2-8). The intent of these objectives is to protect the river's groundwater recharge beneficial use. Compliance with these objectives is verified by annual measurement of the baseflow quality.

The quantity and quality of baseflow is most consistent during the month of August. At that time of year the influence of storm flows and non-tributary flows is at a minimum and volumes of rising water and non-point source discharges tend to be low.

The major component of baseflow in August is municipal wastewater. For these reasons, this period has been selected by the SARWQCB as the time when baseflow will be measured and its quality determined. To determine whether the water quality and quantity objectives for baseflow in Reach 3 of the SAR are being met, the SARWQCB collects a series of grab and composite samples during August of each year. The results are compared with the continuous monitoring data collected by USGS and data from other sources.

The SARWQCB sets discharge requirements on wastewater discharges, the major source of baseflow in the SAR. Waste discharge requirements are developed on the basis of the limited assimilative capacity of the river. Non-point source discharges, generally from urban runoff and agricultural tailwater, are regulated by requiring compliance with Best Management Practices (BMPs), where appropriate.

The third component of flow in the SAR that influences water quality is characterized by the SARWQCB as non-tributary flow. Non-tributary flow is generally imported water released in the upper basin for recharge in the lower basin (SARWQCB 1995).

Table 2-8
SAR Basin Surface Water Quality Objectives (WQO)*

Inland Surface Streams Upper SAR Basin	Water Quality Objectives milligrams per liter (mg/L)						
	Total Dissolved Solids (TDS)	Hardness ($CaCO_3$)	Sodium (Na)	Chloride (Cl)	Total Inorganic Nitrogen (TIN) [a]	Sulfate (SO_4)	Chemical Oxygen Demand (COD)
Reach 2 - 17th Street in Santa Ana to Prado Dam	650 [b]	---	---	---	---	---	---
Reach 3 - Prado Dam to Mission Blvd. - Baseflow	700	350	110	140	10[a]	150	30
Reach 4 - Mission Blvd. in Riverside to San Jacinto Fault	550	---	---	---	10	---	30
Reach 5 - San Jacinto Fault in San Bernardino to Seven Oaks Dam	300	190	30	20	5	60	25
Reach 6 - Seven Oaks Dam to Headwaters	200	100	30	10	1	20	5

Source: SARWQCB 1995.
[a.] Total nitrogen, filtered sample.
[b.] Five-year moving average.
* A number of amendments to the WQOs of the Basin Plan have been proposed. However, these proposed amendments do not include changes to the WQOs applicable to Reaches 3 through 6 of the SAR (SARWQCB 2004).

2.7.4.5 Water Quality Measurement Activities

A recent USGS study conducted by the National Water Quality Assessment Program entitled, *Concentrations of Dissolved Solids and Nutrients in Water Sources and Selected Streams of the Santa Ana Basin, California, October 1998-September 2001*, examined concentrations of TDS and nutrients in selected Santa Ana Basin streams as a function of water source. The principal water sources considered in the study were mountain runoff, wastewater, urban runoff, and storm flow. The USGS study of water quality conditions in the SAR and tributaries focused on TDS and nutrient conditions representative of baseflow water of mountain sites, baseflow of the valley floor, and storm flow.

The USGS reports that streams on the Santa Ana Basin generally have increasing dissolved minerals as one goes downstream. This effect is due to the fact that water is used, recycled, and used again. The magnitude or amount of TDS concentration rises with each use of water. The USGS report notes that rising groundwater also enters basin streams in some reaches, and their sampling indicated that some of the highest TDS (and in some cases nitrates) may occur at sites on the valley floor that are dominated by rising groundwater. Nitrate concentrations are higher in Santa Ana Basin streams receiving treated wastewater than in streams without treated wastewater. The principal source of nitrate is fertilizer from historic agricultural operations.

While there are basin plan objectives for multiple constituents, water quality monitoring has focused on two constituents, TDS and nitrogen. These constituents have been reported at levels at or near regulatory standards and have thus been the focal point of regulatory activities.

Table 2-9 provides a summary of the available historical surface water quality data for TDS and nitrogen at points along the SAR.

Table 2-9
Average Historic Surface Water Quality for Locations on the SAR (1990-2001)

Water Quality Constituent	Metropolitan Crossing Gage (Reach 3)*	RIX-Rialto Effluent Outfall (Reach 4)*	Mentone Gage (Reach 5)*
TDS	560 [a]	520 [b]	230 [a]
TDS Basin Plan Objective by Reach	700	550	300
Total Inorganic Nitrogen (TIN)	7.3 [a]	8.5 [b]	0.3 [a]
TIN Basin Plan Objective by Reach	10 [c]	10	5

Source: USGS gage data. Data for River Only Mentone Gage begins in October 1998. Data for Riverside Narrows Gage begins in August 1997.
[a.] USGS 2004.
[b.] The TDS and TIN values assigned for RIX-Rialto are the maximum values that occurred during 2001-2002 as reported in Table 4.4-9 of the City of San Bernardino Municipal Water Department RIX Facility Recycled Water Sales Program Preliminary Environmental Impact Report (PEIR), March 2003.
[c.] Total nitrogen, filtered sample.
[*] Proposed amendments to the Basin Plan do not include changes to the water quality objectives in Reaches 3 through 6 of the SAR (SARWQCB 2004).

2.7.4.6 Imported Water Quality

Water is imported to the SAR Basin from the Colorado River via the Colorado River Aqueduct (CRA), owned and operated by Metropolitan, and from Northern California via SWP facilities. The TDS level in the CRA water averages approximately 700 mg/L and, during drought years, can increase to above 900 mg/L (Metropolitan and USBR 1999). Salinity projections for wet year conditions show TDS values between 650 and 800 mg/L (Metropolitan and USBR 1999). SWP water is suitable for most beneficial uses due to its low TDS levels of 200 to 300 mg/L (California Department of Water Resources (DWR) 2003a). However, TDS levels of SWP water can vary due to drought conditions, flood events, reservoir management practices, and salt input from local streams.

2.8 Geologic Setting and Groundwater Systems

The IRWM Plan Area lies on the south slope of the Transverse Ranges Geologic Province. The Transverse Ranges are an east-west trending series of steep mountain ranges and valleys. The east-west structure of the Transverse Ranges is oblique to the normal northwest trend of coastal California, hence the name *Transverse*. The province extends offshore to include San Miguel, Santa Rosa, and Santa Cruz Islands. Its eastern extension, the San Bernardino Mountains, has been displaced to the south along the San Andreas fault. Intense north-south compression is squeezing the Transverse Ranges. As a result, this is one of the most rapidly rising regions on earth.

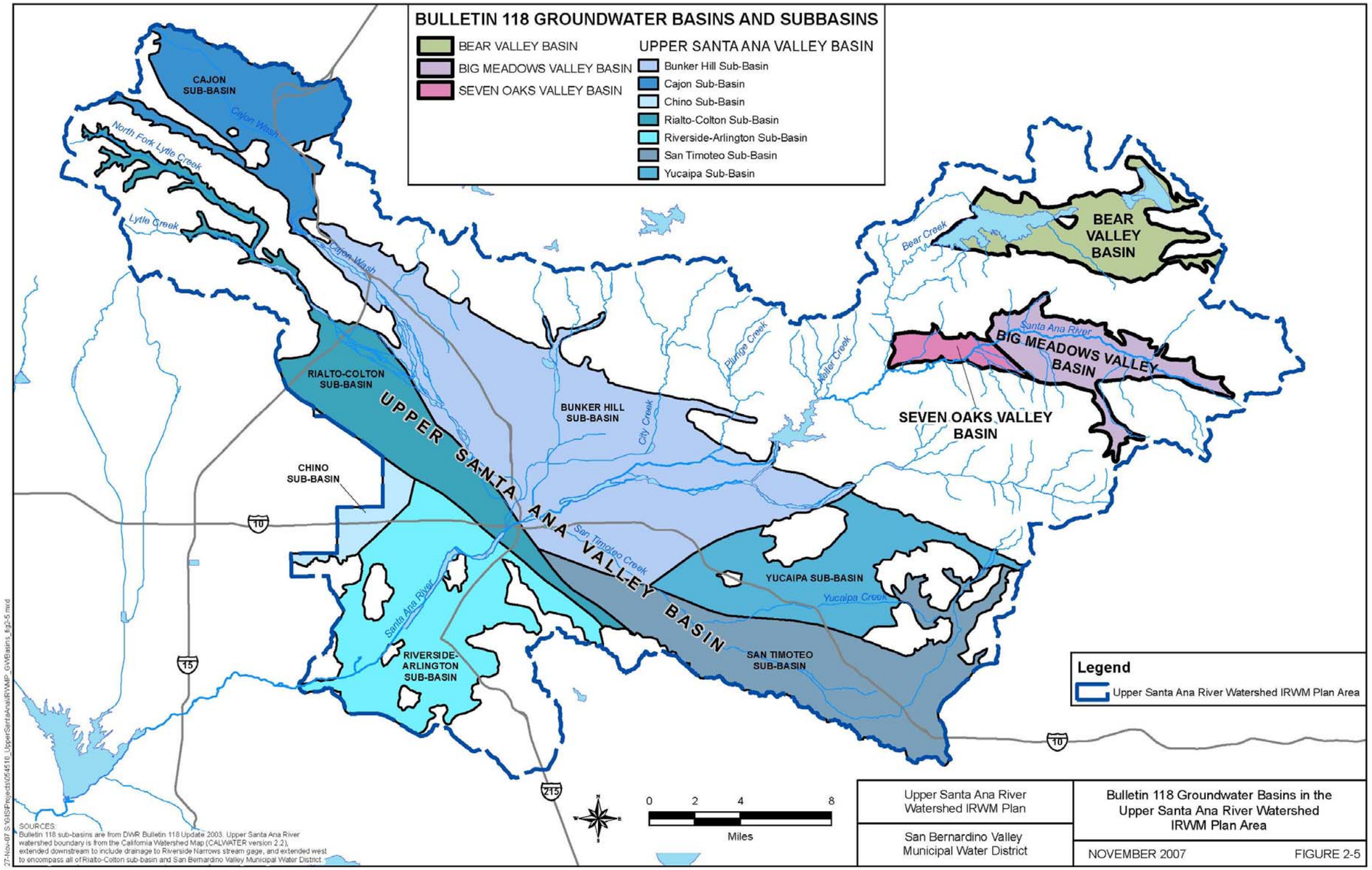
2.8.1 Groundwater Basins in the Upper Santa Ana Region

DWR Bulletin 118 shows four groundwater basins within the Region. They include Bear Valley, Big Meadows, Seven Oaks Valley, and the Upper Santa Ana Valley. The first three basins are small, with a combined storage capacity of approximately 66,000 acre-feet. The Upper Santa Ana Valley Groundwater Basin consists of nine subbasins: Bunker Hill, Rialto-Colton, Riverside-Arlington, San Timoteo, San Jacinto, Cajon, Yucaipa, Chino, and Cucamonga. Cucamonga subbasin is entirely outside this IRWM Plan Area and will not be discussed in the plan. Very small portions of the Chino and San Jacinto subbasins are within the IRWM Plan Area. Because of the small contribution of these two subbasins in overall groundwater management of the planning area, they will not be discussed in the plan. Portions of the San Timoteo and Riverside-Arlington subbasins are within the planning area. Bunker Hill, Rialto-Colton, Yucaipa, and Cajon subbasins are entirely within the Plan Area. Bunker Hill subbasin is the largest groundwater basin in the Upper SAR watershed. The storage capacity of this subbasin is 5,976,000 acre-feet (Table 2-10). A brief description of the groundwater basins and subbasins of the plan area is presented below. The basins and subbasins of the Region are mapped by DWR for Bulletin 118 as shown in Figure 2-5.

Table 2-10
Groundwater Basins in Upper Santa Ana Region

Groundwater Basin	DWR Groundwater Basin Number	Surface Area – (acres)	Groundwater Storage Capacity - 1000 acre-feet
Upper Santa Ana Valley:	8-02		
Bunker Hill Subbasin	8-02.06	89,600	5,976
Cajon Subbasin	8-02.05	23,200	—
Rialto-Colton Subbasin	8-02.04	30,100	2,517
Riverside-Arlington Subbasin	8-02.03	58,600	243
San Timoteo Subbasin	8-02.08	73,100	2,010
Yucaipa Subbasin	8-02.07	25,300	808
Bear Valley	8-09	19,600	42
Big Meadows	8-07	14,200	10
Seven Oaks Valley	8-08	4,080	14

Figure 2-5
Bulletin 118, Groundwater Basins in the Upper Santa Ana Region



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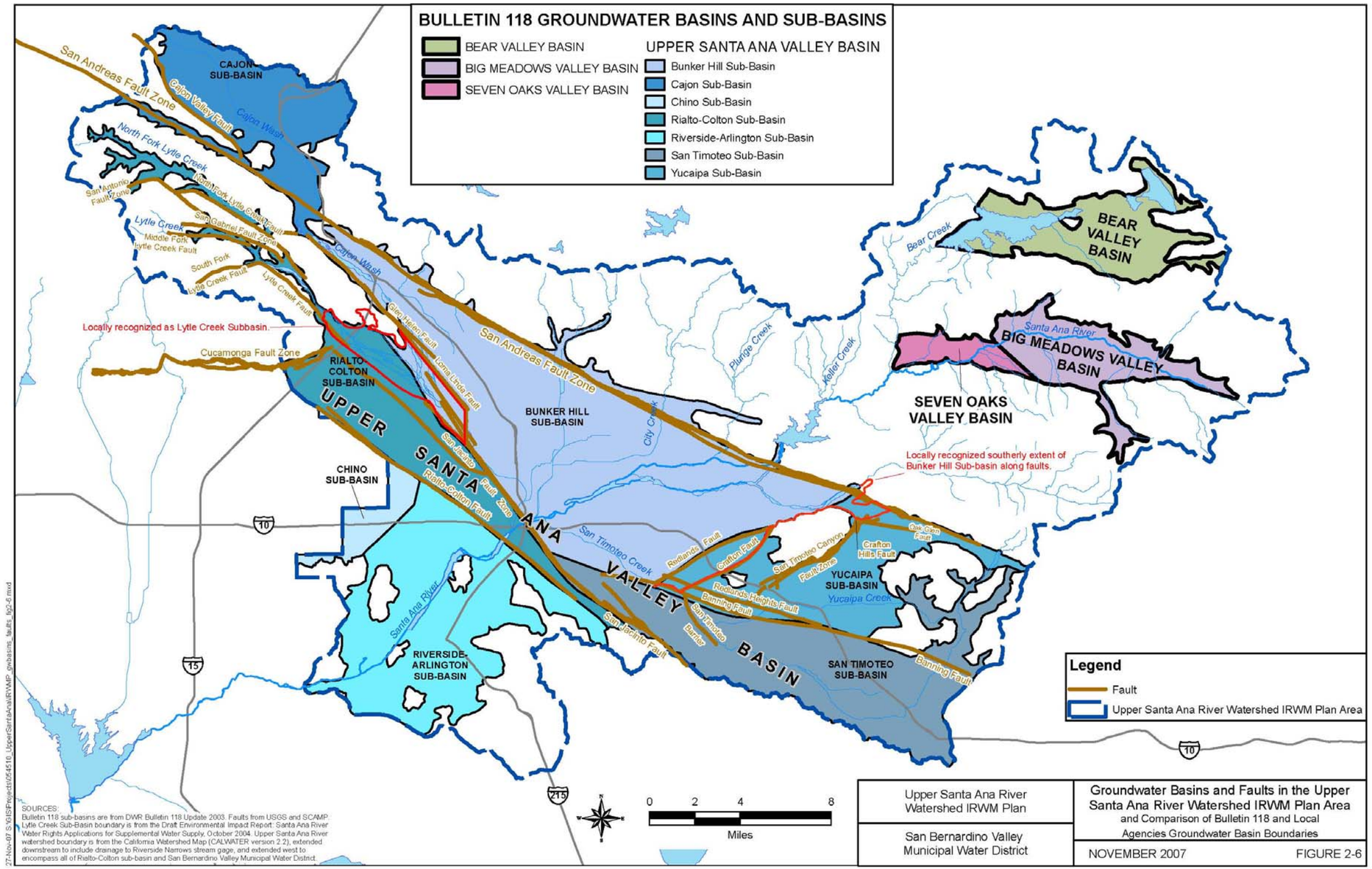
2.8.1.1 Upper Santa Ana Valley

Bunker Hill Subbasin (DWR 8-02.06)

The Bunker Hill subbasin consists of the alluvial materials that underlie the San Bernardino Valley. The basin is bordered on the northwest by the San Gabriel Mountains and Cucamonga fault zone; on the northeast by the San Bernardino Mountains and San Andreas fault zone; on the east by the Banning fault and Crafton Hills; and on the south by a low, east-facing escarpment of the San Jacinto fault and the San Timoteo Badlands (see Figure 2-6). Alluvial fans extend from the base of the mountains and hills that surround the valley and coalesce to form a broad, sloping alluvial plain in the central part of the valley. Within the central portion of the valley, relatively continuous clay produces confining conditions to underlying water-bearing sediments resulting in artesian flowing wells, high groundwater, and, historically, marshlands. The SAR, Mill Creek, and Lytle Creek are the main tributary streams in the subbasin (SBVWCD 2000). Groundwater recharge in the Bunker Hill subbasin is performed by the San Bernardino Valley Water Conservation District (SBVWCD), Valley District, and others. The Groundwater Management Plan in this IRWM Plan is the mechanism to be used to manage recharge and extractions to minimize liquefaction threats and maximize yield. The Western-San Bernardino Judgment (1969) combines the Bunker Hill subbasin with additional areas and classifies it as the SBBA. More discussion of the SBBA is included later in this report.

Figure 2-6
Groundwater Basins and Faults in the Region



Rialto-Colton Subbasin (DWR 8-02.04)

The Rialto-Colton subbasin underlies a portion of the upper Santa Ana Valley in southwestern San Bernardino County and northwestern Riverside County. This subbasin is about 10 miles long and varies in width from about 3.5 miles in the northwestern part to about 1.5 miles in the southeastern part. Figure 2-7 shows the location of the subbasin and pertinent features. This subbasin is bounded by the San Gabriel Mountains on the northwest, the San Jacinto fault on the northeast, the Badlands on the southeast, and the Rialto-Colton fault on the southwest. The SAR cuts across the southeastern part of the basin. The basin generally drains to the southeast, toward the SAR. Warm and Lytle Creek drains join near the southeastern boundary of the basin and flow to meet the SAR near the center of the southeastern part of the subbasin.

Water-bearing alluvium consists of gravel, sand, silt, and clay. Holocene-age alluvial deposits are found beneath the current courses of Lytle and Cajon Creeks. These Holocene deposits are typically less compacted and weathered than older deposits and have higher permeability (DWR 1970). Alluvial deposits of Pliocene and Pleistocene age are composed of somewhat compacted and weathered deposits of gravel, sand, silt, and clay in discontinuous lenticular bodies. The coarsest material occurs near the mouth of Lytle Creek and the material becomes finer toward the southeast where the coarsest gravels contain few cobbles.

The water-bearing units are grouped into three units—an upper, middle, and lower unit. Figure 2-8 shows the relationship of these water-bearing units. There are no distinct confining beds that separate the units. The upper unit includes the river deposits and alluvial fan deposits that grade to older river-channel deposits near the SAR. The upper unit ranges in thickness from a feather edge in the northwestern part of the basin to about 300 feet. The upper water-bearing unit was unsaturated in the northwestern part of the basin and was saturated in the southeastern part. The middle water-bearing unit exists throughout the basin and consists primarily of coarse-to-medium sand and interbedded fine sand and clay. The clay beds are more extensive in the northwestern part of the basin, southeast of Barrier J. The middle water-bearing unit is the main source of water to wells in the basin and is about 240 to 600 feet thick. The lower water-bearing unit exists throughout the basin, southeast of Barrier J and consists of interbedded sand and clay. This unit ranges from about 100 to 400 feet thick (Woolfenden 2001). Similar to the Bunker Hill subbasin, consolidated deposits underlie the lower water-bearing unit and form the base of the groundwater basin.

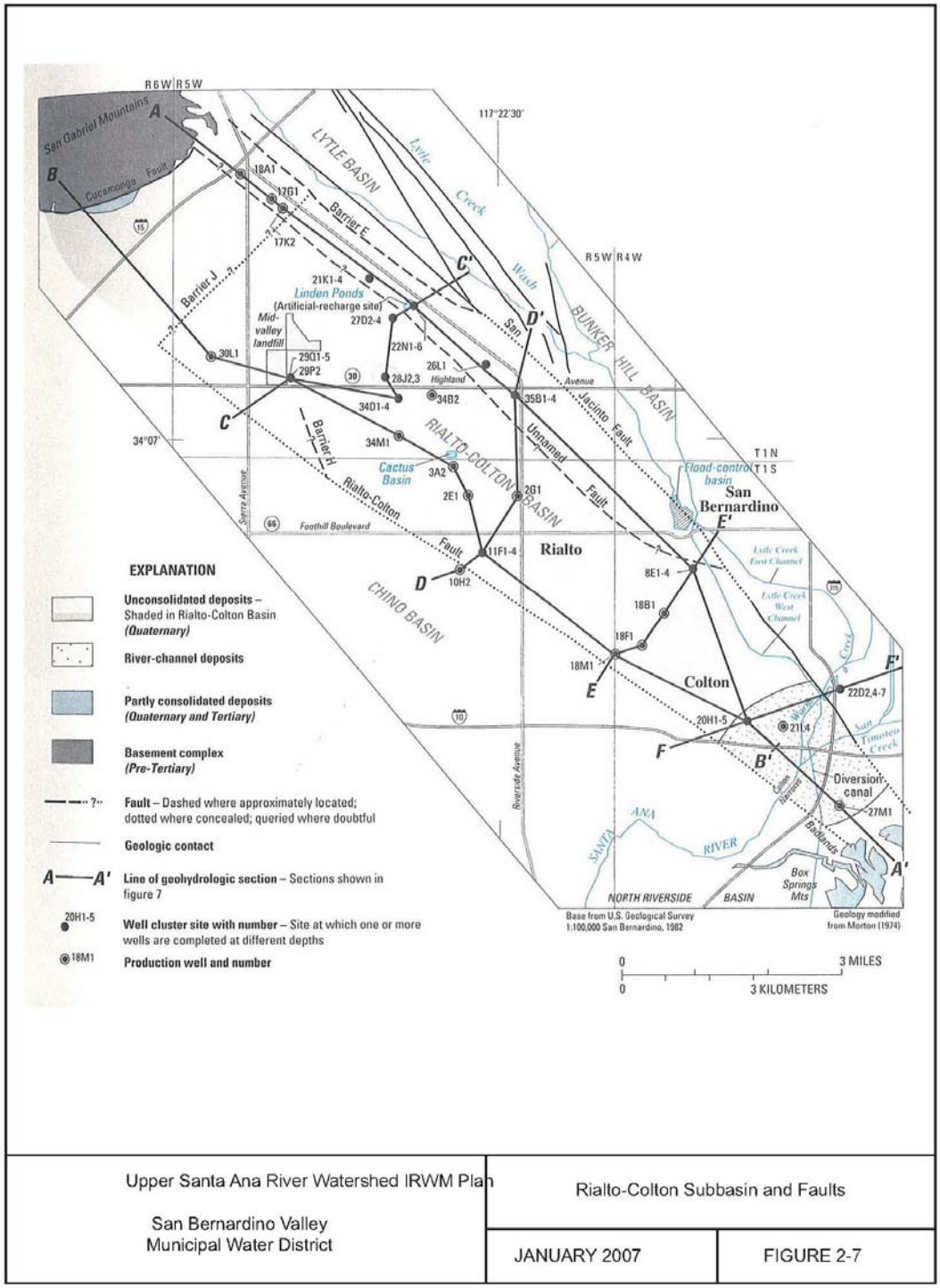
Groundwater within the subbasin is primarily unconfined to semi-confined (Wildermuth 2000). Specific yield ranges from about 6 percent northwest of Rialto to about 16 percent near Colton (DWR 1934).

The San Jacinto fault, its extension Barrier E, an unnamed fault that parallels the San Jacinto fault, and the Rialto-Colton fault are northwest-trending partial barriers to groundwater movement in this subbasin (DWR 1934, DWR 1970, Wildermuth 2000). Groundwater may flow relatively unrestricted in the shallow parts of the flow system; however, the faults generally become more restrictive at depth. The San Jacinto fault displaces water levels about 50 feet in older deposits, but is not a barrier in the youngest materials, particularly beneath the SAR (DWR 1970). Groundwater flows across the fault from the Bunker Hill subbasin in the vicinity of Warm Creek and the SAR, within the river deposits and upper water-bearing unit. Barrier E (Dutcher and Garrett 1963) forms the northeastern boundary of the basin. Groundwater flows across the section of Barrier E from the Lytle Creek subbasin between Barrier J and the San Gabriel Mountains (Woolfenden 2001). At depth, the fault displaces groundwater elevations by about 25 to 50 feet (Wildermuth 2000). The Rialto-Colton fault is a barrier to groundwater flow along much of its length, especially in its northern reaches where groundwater elevations can reach about 400 feet higher within the Rialto-Colton subbasin than in the Chino subbasin to the west (Wildermuth 2000). Groundwater flows across the fault in the river deposits and in the upper and middle water-bearing units in the southeastern part of the basin (Woolfenden 2001). Barrier J (Dutcher and Garrett 1963) is a northeast-trending, southward step in groundwater elevation of about 100 feet in the northern part of the subbasin that may be a barrier to groundwater movement southward (Dutcher and Garrett 1963, Wildermuth 2000) or may be a groundwater cascade (DWR 1970).

The principal recharge areas are Lytle Creek , Reche Canyon in the southeastern part, and the SAR in the south-central part. Lesser amounts of recharge are provided by percolation of precipitation to the valley floor, underflow, and irrigation and septic returns (DWR 1970, Wildermuth 2000). Underflow occurs from fractured basement rock (DWR 1970, Wildermuth 2000) and through the San Jacinto fault in younger SAR deposits at the south end of the subbasin (Dutcher and Garrett 1958) and in the northern reaches of the San Jacinto fault system (Wildermuth 2000).

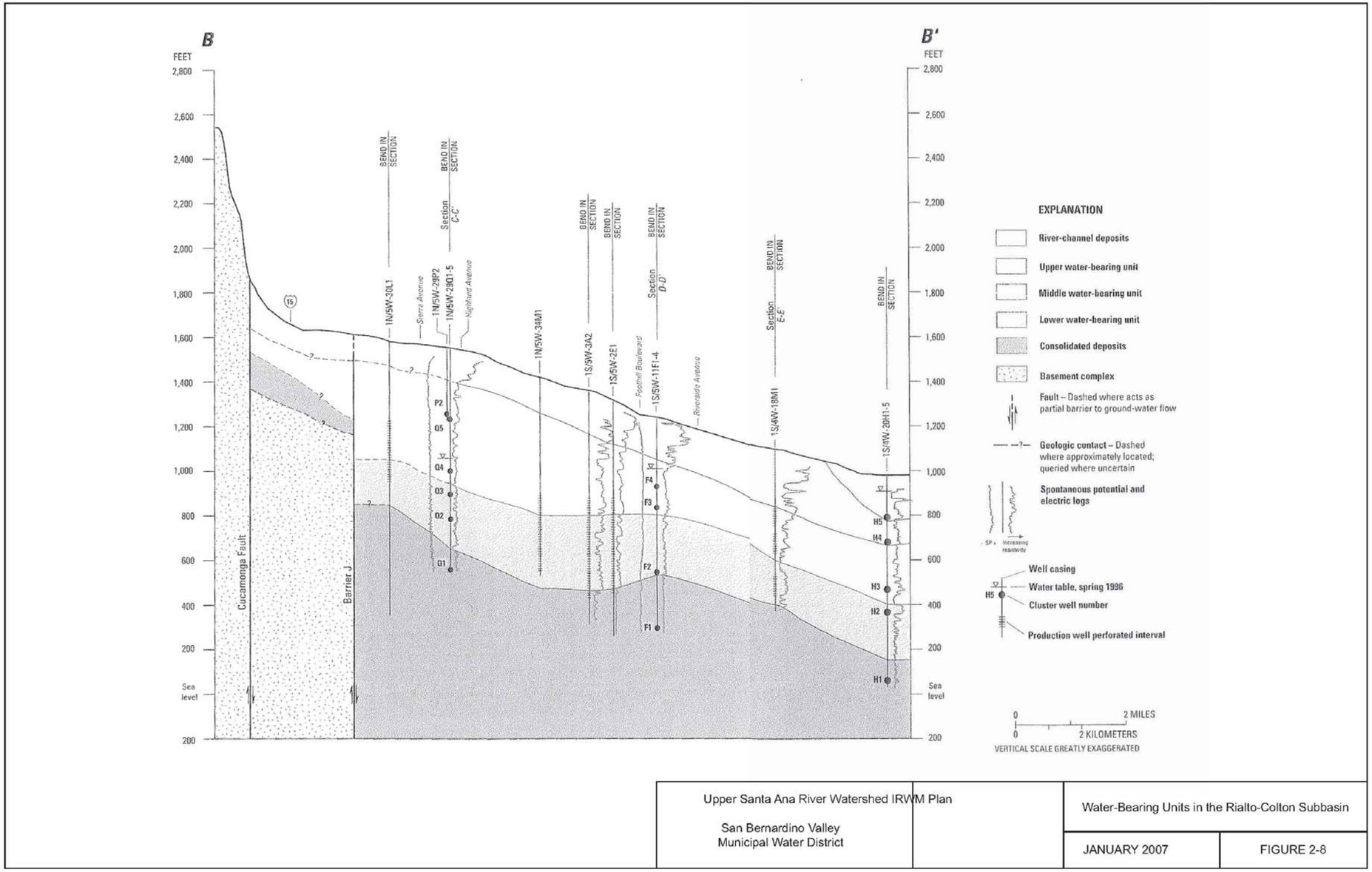
Groundwater recharge has been augmented through the use of two spreading basins, the Linden Ponds and the Cactus Basin. Figure 2-9 shows the locations of the basins. Groundwater modeling simulations showed that artificial recharge at the Cactus Basin may be more effective than recharge at Linden Ponds (no longer available as a spreading ground) at raising water levels in a greater part of the basin and that the imported water can be captured by production wells (Woolfenden 2001).

Figure 2-7
Rialto-Colton Subbasin and Faults



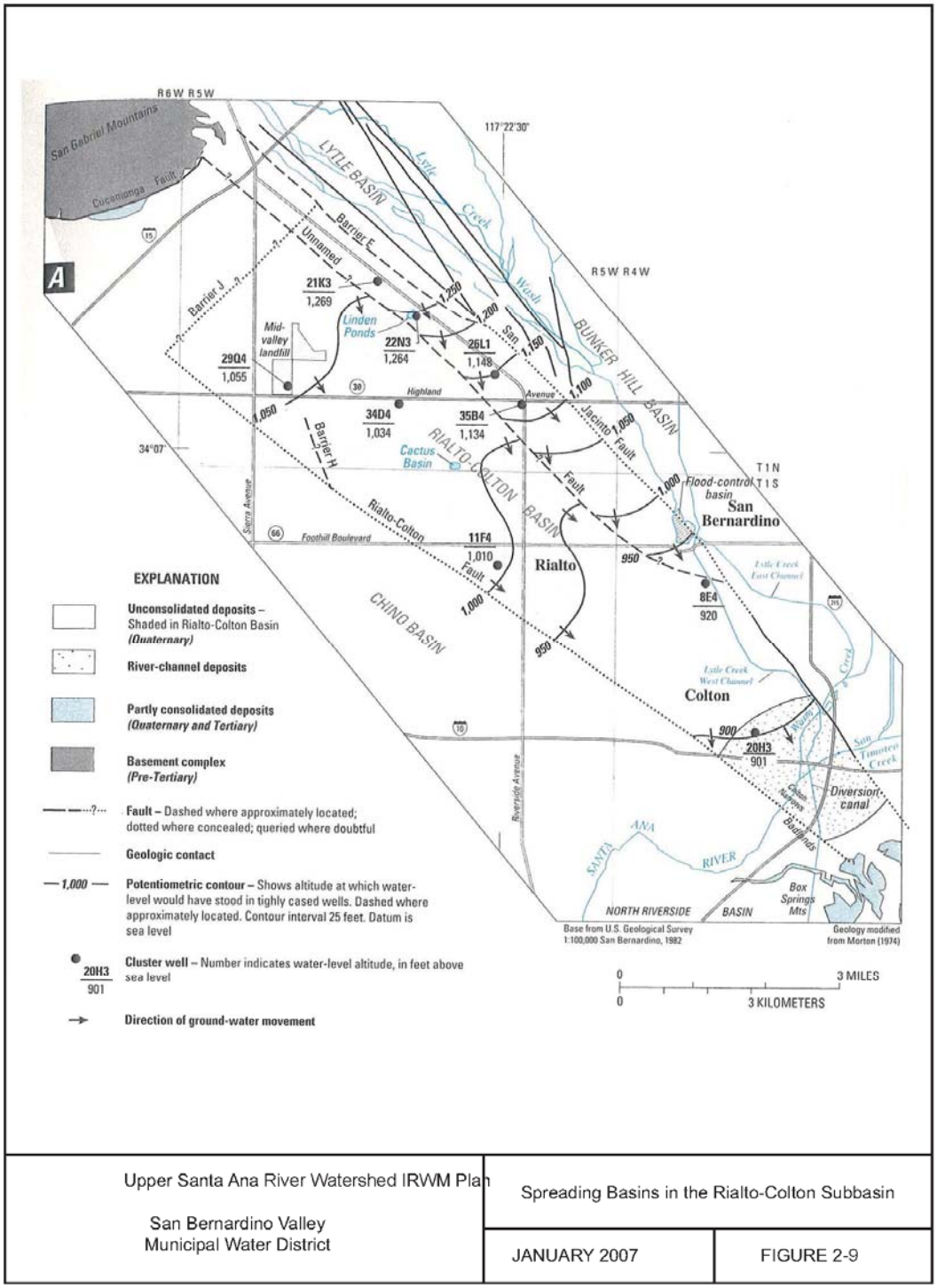
Upper Santa Ana River Watershed IRWM Plan San Bernardino Valley Municipal Water District	Rialto-Colton Subbasin and Faults
	JANUARY 2007 / FIGURE 2-7

Figure 2-8
Water-Bearing Units in the Rialto-Colton Subbasin



Source: USGS, 2002

Figure 2-9
Spreading Basins in the Rialto-Colton Subbasins



Upper Santa Ana River Watershed IRWM Plan San Bernardino Valley Municipal Water District	Spreading Basins in the Rialto-Colton Subbasin	
	JANUARY 2007	FIGURE 2-9

Source: USGS, 2002

Cajon Subbasin (DWR 8-02.05)

The Cajon subbasin underlies Cajon Valley and Lone Pine Canyon, mostly in Cajon Pass, which is the boundary between the San Gabriel and San Bernardino Mountains. This subbasin is bounded by the Upper Mojave River Valley Groundwater Basin on the north along a surface drainage divide and the Bunker Hill subbasin of the Upper Santa Ana Valley Groundwater Basin on the south. The subbasin is bounded by impermeable rocks of the San Gabriel Mountains on the west and the San Bernardino Mountains on the east. Cajon and Lone Pine Creeks drain the valley southward as tributaries to the SAR. Annual precipitation throughout the subbasin ranges from 23 inches to 33 inches. The San Andreas fault zone crosses the southern part of the subbasin and cuts up Lone Pine Canyon. Springs are found along the trace of the fault zone indicating it is a barrier to groundwater. Lost Lake is a spring-fed sag pond formed in older alluvium where there is a step in the fault trace.

The chief water-bearing material in the Cajon subbasin is alluvium. Holocene-age alluvium consists of relatively unweathered sand, silt, and gravel deposited in active creek beds (DWR 1970). Older Pleistocene-age alluvium is found as alluvial fan deposits derived from the bordering mountains. Recharge is derived from percolation of precipitation, return irrigation water, and streamflow.

Riverside-Arlington Subbasin (DWR 8-02.03)

The Riverside-Arlington subbasin underlies part of the SAR Valley in northwest Riverside County and southwest San Bernardino County. This subbasin is bounded by impermeable rocks of Box Springs Mountains on the southeast, Arlington Mountain on the south, La Sierra Heights and Mount Rubidoux on the northwest, and the Jurupa Mountains on the north. The northeast boundary is formed by the Rialto-Colton fault, and a portion of the northern boundary is a groundwater divide beneath the community of Bloomington. The SAR flows over the northern portion of the subbasin. Annual average precipitation ranges from about 10 to 14 inches.

Groundwater in the subbasin is found chiefly in alluvial deposits. Quaternary-age alluvial deposits in the subbasin consist of sand, gravel, silt, and clay deposited by the SAR and its tributaries. Near the City of Riverside, the upper 50 feet of deposits are principally clay; however, deposits near the neighborhood of Arlington have considerable sand and little clay. At the northern end of the subbasin, coarser gravels with cobbles four to six inches in diameter are common. Based on data from wells, a minimum specific yield of 15 percent was assigned to unweathered gravels at the extreme northern end of the subbasin. The specific yield increases sharply to 18 percent near the SAR, then increases gradually to a maximum of 20 percent near the neighborhood of Arlington (DPW 1934).

The Rialto-Colton fault to the northeast separates the Riverside-Arlington subbasin from the Rialto-Colton subbasin. The fault is a barrier to groundwater flow along its length, especially in its northern reaches (Wildermuth 2000). A groundwater divide in the alluvium separates the Riverside portion from the Arlington portion of the subbasin (DPW 1934). The Riverside-Arlington subbasin is replenished by infiltration from SAR flow, underflow past the Rialto-Colton fault, intermittent underflow from the Chino subbasin, return irrigation flow, and deep percolation of precipitation (DPW 1934, Wildermuth 2000).

San Timoteo Subbasin (DWR 8-02.08)

The San Timoteo subbasin underlies Cherry Valley and the City of Beaumont in southwestern San Bernardino and northwestern Riverside Counties. The subbasin is bounded to the north and northeast by the Banning fault and impermeable rocks of the San Bernardino Mountains, Crafton Hills, and Yucaipa Hills; on the south by the San Jacinto fault; on the west by the San Jacinto Mountains; and on the east by a topographic drainage divide with the Colorado River hydrologic region. The surface is drained by Little San Gorgonio Creek and San Timoteo Canyon to the SAR. Average annual precipitation ranges from 12 to 14 inches in the western part to 16 to 18 inches in the eastern part of the subbasin.

Holocene-age alluvium, which consists of unconsolidated clay, silt, sand, and gravel, is the principal water-bearing unit in this subbasin. The alluvium, which is probably thickest near the City of Beaumont (DPW 1934), thins toward the southwest and is not present in the central part of the subbasin.

The Pliocene-Pleistocene-age San Timoteo Formation consists of alluvial deposits that have been folded and eroded. These deposits are widely distributed and principally composed of gravel, silt, and clay, with comparatively small amounts of calcite-cemented conglomerate. The clasts are chiefly granitic, with lesser amounts of volcanic and metamorphic pebbles and cobbles (DPW 1934). The total thickness of the San Timoteo Formation is estimated to be between 1,500 and 2,000 feet, but logs of deep wells near the central part of the subbasin indicate water-bearing gravels to depths of only 700 to 1,000 feet (DPW 1934).

The Banning and Cherry Valley faults and two unnamed faults in the northeast part of the subbasin offset impermeable basement rocks, stepping down to the south (DWR 1965a, 1967b). Water levels change across the Banning fault, dropping 100 to 200 feet to the south (DWR 1967b, Dutcher and Fenzel 1972). In the western part of the subbasin, water levels drop to the south about 75 feet across the Loma Linda fault and about 50 feet across the San Timoteo barrier (Dutcher and Fenzel 1972). In the northeastern part of the subbasin, water levels drop to the south across two unnamed faults (DWR 1965a, 1967b). Each of these faults appears to disrupt groundwater movement in the subbasin.

Groundwater is replenished by subsurface inflow and percolation of precipitation, runoff, and imported water. Runoff and imported water are delivered to streambeds and spreading grounds for percolation (DWR 1967a, 1970). Groundwater is found in alluvium in the San Timoteo Formation. Estimated specific yields in the subbasin range from 3 percent for fine materials to 35 percent for coarser materials (DWR 1970), with an average of about 11 percent (DWR 1967b).

Yucaipa Subbasin (DWR 8-02.07)

The Yucaipa subbasin underlies the southeast part of San Bernardino Valley. It is bounded on the northeast by the San Andreas fault, on the northwest by the Crafton fault, on the west by the Redlands fault and the Crafton Hills, on the south by the Banning fault, and on the east by the Yucaipa Hills. The average annual precipitation ranges from 12 to 28 inches. This part of the San Bernardino Valley is drained by Oak Glen, Wilson, and Yucaipa Creeks south and west into San Timoteo Wash, a tributary to the SAR.

Groundwater is found chiefly in alluvium, with lesser quantities in the San Timoteo Formation and fractured bedrock beneath the alluvium (Moreland 1970). Specific yield is estimated to vary from less than 4 percent northeast of Yucaipa, to a maximum of about 10 percent in the southeastern part of the subbasin (DPW 1934). Alternatively, specific yield is estimated to range from about 6 to 22 percent (DWR 1967a), with the average for the subbasin being about 10 percent (DWR 1979).

Alluvial deposits in the subbasin are divided into older and younger units. The Holocene-age younger alluvium consists of unconsolidated boulders, gravel, sand, silt, and clay (Moreland 1970). This unit forms a thin veneer and is mostly above the water table (Moreland 1970). The middle to late Pleistocene age older alluvium consists of boulders, gravel, sand, silt, and clay (Moreland, 1970), and holds the primary source of groundwater in the subbasin. Clays present in this section are due to weathering and soil formation during accumulation of the deposits (DPW 1934).

The Pliocene-Pleistocene age San Timoteo Formation consists of alluvial deposits that have been folded and eroded. These deposits are widely distributed and principally composed of gravel, silt, and clay, with comparatively small amounts of calcite-cemented conglomerate. The clasts are chiefly granitic, with lesser amounts of volcanic and metamorphic pebbles and cobbles (DPW 1934). The total thickness of the San Timoteo Formation is estimated to be between 1,500 and 2,000 feet, but logs of deep wells near the central part of the subbasin indicate water-bearing gravels to depths of only 700 to 1,000 feet (DPW 1934).

Dominant recharge to the subbasin is from percolation of precipitation and infiltration within the channels of overlying streams, particularly Yucaipa and Oak Glen Creeks; underflow from the fractures within the surrounding bedrock beneath the subbasin; and artificial recharge at spreading grounds. Four artificial recharge facilities with a total capacity of about 56,500 acre-feet per year were noted in 1967 (DWR 1967b). By increasing the spreading acreage along Oak Glen Creek by 25 to 50 acres, the capability exists to spread 7,000 to 14,000 acre-feet of surface water annually to recharge the Yucaipa subbasin (Yucaipa Valley Water District (YVWD) 2000a).

2.8.1.2 Lytle Creek Subbasin

Lytle Creek subbasin is adjoined on the west by the Rialto-Colton subbasin along the Lytle Creek fault, and on the east and southeast by the Bunker Hill subbasin along the Loma Linda fault and Barrier G. The northwestern border of the subbasin is delineated by the San Gabriel Mountains, and runoff from the mountains flows south/southeast through Lytle and Cajon Creeks into the basin.

The Lytle Creek tributary to the Santa Ana River contributes significantly to groundwater recharge.

Lytle Creek subbasin is not mapped in DWR Bulletin 118-2003; however, the subbasin is an integral part of the Upper Santa Ana Valley Groundwater Basin and a major recharge area for both the Bunker Hill and Rialto-Colton subbasins. Historically, local agencies have recognized Lytle Creek subbasin as a distinct groundwater subbasin. It is important to note that the water rights in Lytle Creek are set forth in long-standing court judgments governing the rights of the parties in that basin. For purposes of this report, the Bunker Hill and Lytle Creek subbasins are generally considered as one groundwater basin—the SBBA. However, the three separate water-bearing zones and intervening confining zones of the Bunker Hill subbasin are not observed in the Lytle subbasin. Sediments within the Lytle subbasin are, for the most part, highly permeable, and the aquifer has a high specific yield. High permeability and specific yield tend to result in an aquifer that responds rapidly to changes in inflow (precipitation and streamflow) and outflow (groundwater pumping, streamflow, and subsurface outflow).

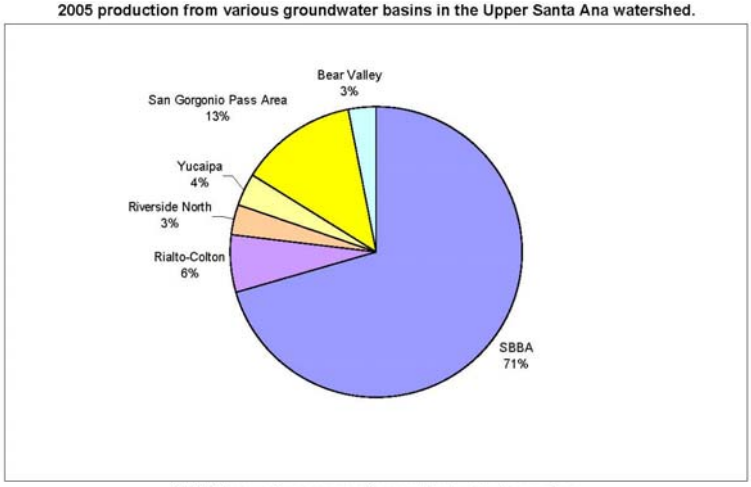
Numerous groundwater barriers are present within Lytle Creek subbasin, resulting in six compartments within the subbasin. Barriers A through D divide the northwestern portion of the subbasin into five sub-areas and the southeastern

portion of the subbasin comprises the sixth sub-area. Barrier F divides the northwestern sub-areas from the southeastern sub-area. Studies have shown that the groundwater barriers are less permeable with depth (Dutcher and Garrett 1963). When groundwater levels are high during wet years, more leakage occurs across the barriers than when groundwater levels are lower (i.e., during dry years). The amount of pumping in each sub-area, in large part, controls the movement of groundwater across the barrier within the older alluvium but not the younger alluvium (Dutcher and Garrett 1963).

2.8.1.3 San Bernardino Basin Area

The 1969, Western-San Bernardino Judgment defines an area known as the SBBA. This area is defined as the "…area above Bunker Hill Dike [San Jacinto fault], but excluding certain mountainous regions and the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins" (Figure 2-10). The SBBA is the focus of this IRWM Plan and plays a central role in the water supply for communities within the Region. The SBBA traditionally refers to two groundwater subbasins—Bunker Hill and Lytle Creek. The Western-San Bernardino Watermaster provides a careful accounting of the SBBA on an annual basis. If pumping in the area exceeds the safe yield of the basin, then water must be imported to offset the amount exceeding the safe yield. If pumping in the area is below the safe yield, then the basin accrues "credits" in a like amount.

2005 production from various groundwater basins in the Upper Santa Ana watershed.

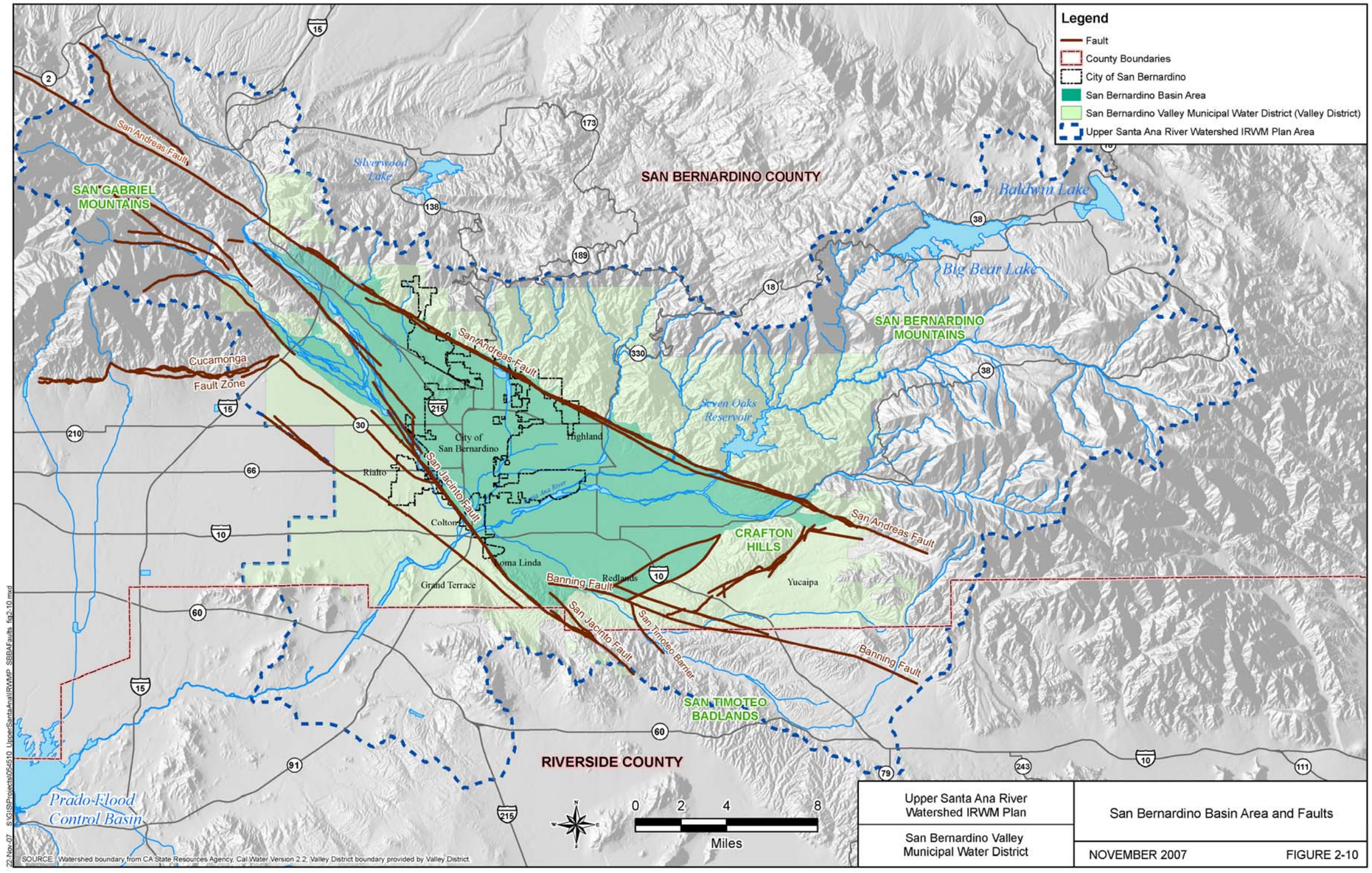


SBBA is a major source of groundwater for the region.

The SBBA has a surface area of approximately 140.6 square miles and lies between the San Andreas and San Jacinto faults. The basin is bordered on the northwest by the San Gabriel Mountains and Cucamonga fault zone; on the northeast by the San Bernardino Mountains and San Andreas fault zone; on the east by the Banning fault and Crafton Hills; and on the south by a low, east-facing escarpment of the San Jacinto fault and the San Timoteo Badlands. Alluvial fans extend from the base of the mountains and hills that surround the valley and coalesce to form a broad, sloping alluvial plain in the central part of the valley. The Pressure Zone, which is within the SBBA, is described in more detail in this chapter because of high groundwater levels that historically have been of concern in the Region.

Per the provisions of the Western-San Bernardino Judgment, Valley District and Western are responsible for managing the SBBA. The judgment does not allow extractions to exceed the long-term natural safe yield without replacing the incremental amount over the safe yield with water from an outside source.

Figure 2-10
San Bernardino Basin Area



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Geologic Structure of SBBA

Although mountain belts tend to be associated with the uplift of rock material to several miles in height, they are bordered by regions of subsidence called foreland sedimentary basins. These basins are wedge shaped in the cross-section, with a depth that gradually increases away from the mountain front. The SBBA is a foreland basin and receives sediment eroded from the San Bernardino Mountains. The foreland basin refers to the area of intake or recharge where most recharge occurs by direct percolation of SAR water. The SBBA foreland basin is characterized by highly permeable sands and gravel with few clay and silt deposits.

The San Andreas fault zone impedes movement of groundwater, producing springs and a groundwater-level change that marks the fault trace along the northern boundary of the subbasin. The San Jacinto fault forms a strong barrier to the lateral southwest flow of groundwater. The water table rises on the upstream side of the San Jacinto fault nearly to the surface below the course of the SAR. The combination of alluvial material with a high water table in a seismically active area creates a hazard for liquefaction. The Redlands and Banning faults also impede groundwater movement along the borders of the subbasin (DWR 1986).

Geologic Units of SBBA

The water-bearing material in the subbasin consists of unconsolidated alluvial deposits and consolidated sediments. Most municipal and agricultural supply wells obtain water from the unconsolidated alluvial deposits. Figure 2-11 shows the relationship of the sediments in the basin (USGS 2006).

The unconsolidated alluvial deposits consist of sand, gravel, and boulders interspersed with deposits of silt and clay. The deposits are divided into older (Pleistocene) and younger (Holocene) alluvium and Holocene river-channel deposits. Near the mountain front, the unconsolidated deposits tend to be coarse-grained and poorly sorted, becoming finer-grained and better sorted downstream. The older alluvium consists of continental, fluvial deposits, ranging in thickness from some tens of feet to more than 800 feet. The younger alluvium is about 100 feet thick, composed mainly of floodplain deposits. The relatively recent river channel deposits are less than 100 feet thick but are among the most permeable sediments in the SBBA and contribute to large seepage losses from streams (Danskin et. al. n.d.). Wells yield up to 5,000 gallons per minute (gpm) and average about 1,245 gpm. Specific yield of these deposits ranges from 7 to 21 percent and averages 13 percent (WE 2000).

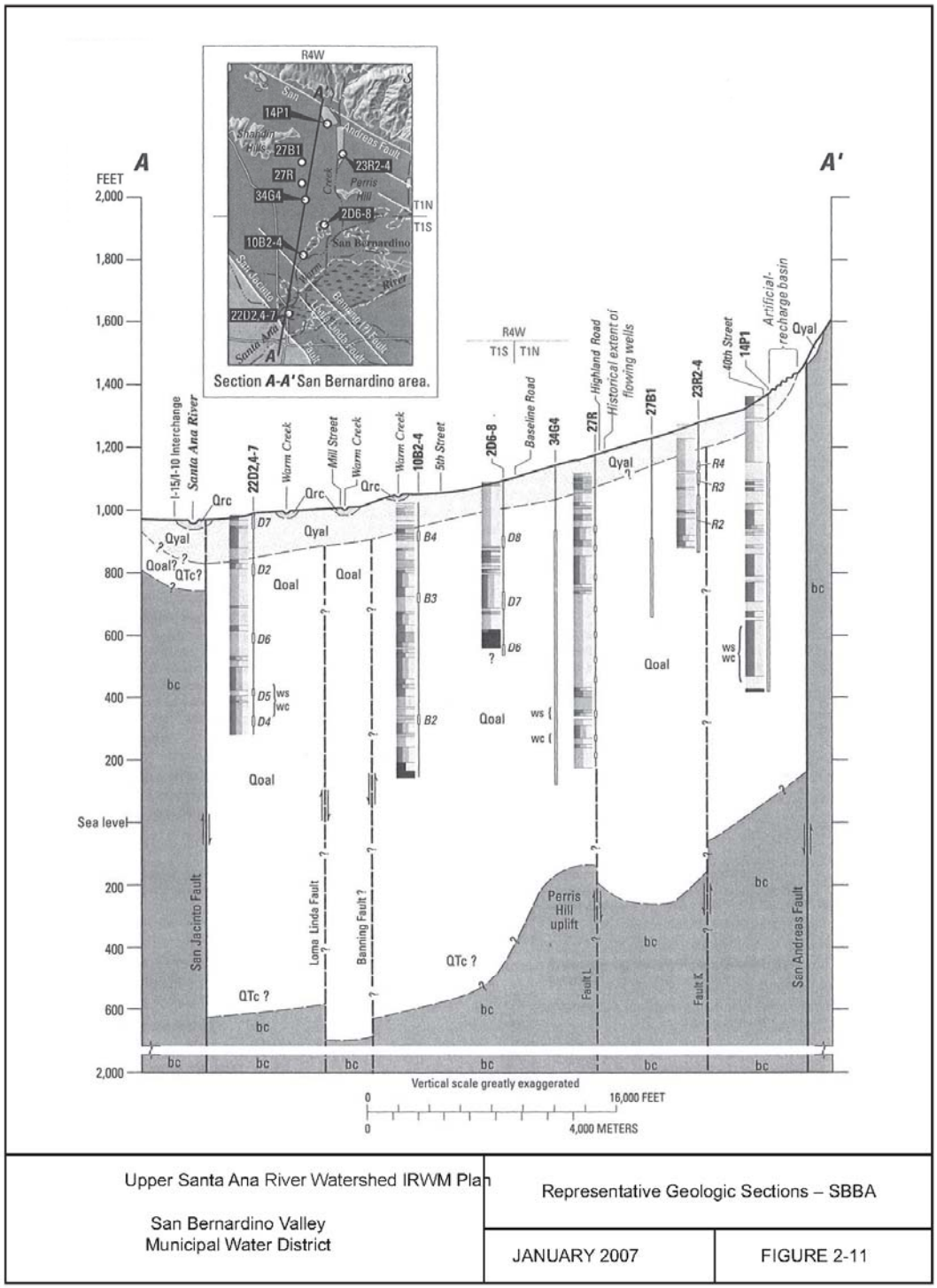
Within the unconsolidated alluvial deposits are three (upper, middle, and lower) fine-grained sequences that are separated by coarse-grained sediment. Both the

upper and middle fine-grained layers are present in the central portion of the valley and cover about 25 square miles. The upper fine-grained deposits (clay and silt) are part of the younger alluvium and are exposed on ground surface near the San Jacinto fault but, to the north, are covered by coarser-grained sediments. The clay layer may be locally eroded and replaced with coarse sand and gravel. Boreholes drilled in the vicinity of the SAR and the San Jacinto fault indicate a predominance of coarse sand and gravel, not fine-grained silt and clay. The middle fine-grained sequence is part of the older alluvium and is present at a depth of about 350 feet below ground surface (bgs). The sequence is as much as 300 feet thick and consists of interbedded silt, clay, and sand and thins towards the margins of the basin. Although previously conceived as a moderately clay unit, geophysical logs show this fine-grained sequence to consist of relatively continuous zones of silt and sand (Danskin 2006). Little is known about the lower fine-grained interval because most production wells do not penetrate to that depth.

The consolidated sedimentary rocks crop out mainly in the southern part of the San Bernardino area between the San Jacinto fault and Crafton Hills and underlie unconsolidated deposits throughout most of the valley. In the badlands, these sedimentary rocks are referred to as the San Timoteo Formation and are composed of partly lithified, non-marine alluvial and lacustrine sediments ranging in age from late Tertiary to early Quaternary. Well yields are moderate from the more permeable layers and are generally less than 500 gpm (Dutcher and Garrett 1963). Both the unconsolidated and consolidated sediments rest on and abut basement complex, which, for the purposes of this report, are considered to be essentially non-water bearing.

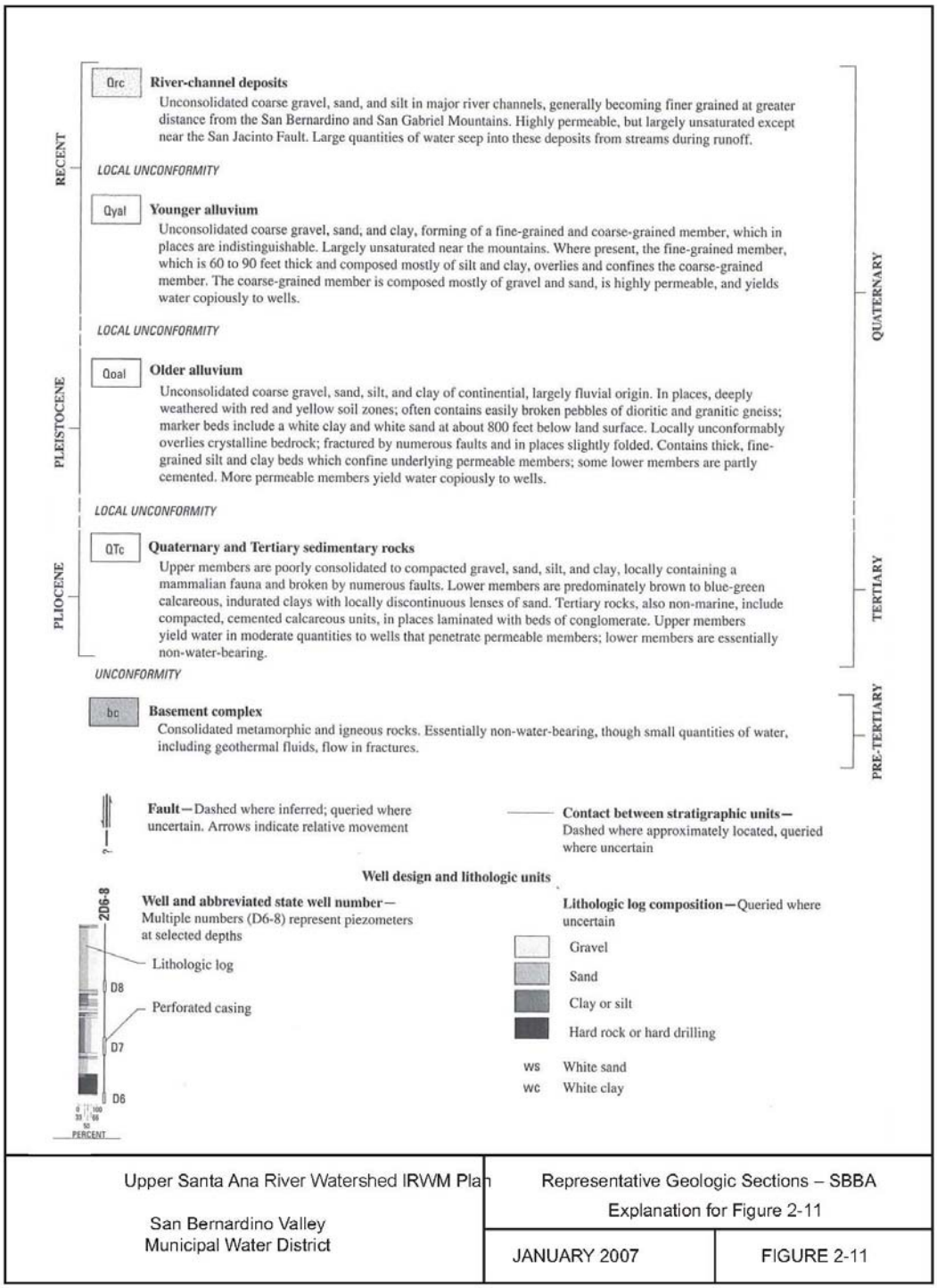
Faults in the area have both vertically and horizontally offset these geologic units.

Figure 2-11
Representative Geologic Sections – SBBA



Upper Santa Ana River Watershed IRWM Plan San Bernardino Valley Municipal Water District	Representative Geologic Sections – SBBA	
	JANUARY 2007	FIGURE 2-11

Source: USGS, 2002, Water Resources Investigative Report 02-4243



Upper Santa Ana River Watershed IRWM Plan San Bernardino Valley Municipal Water District	Representative Geologic Sections – SBBA Explanation for Figure 2-11
	JANUARY 2007 / FIGURE 2-11

Aquifer Systems of SBBA

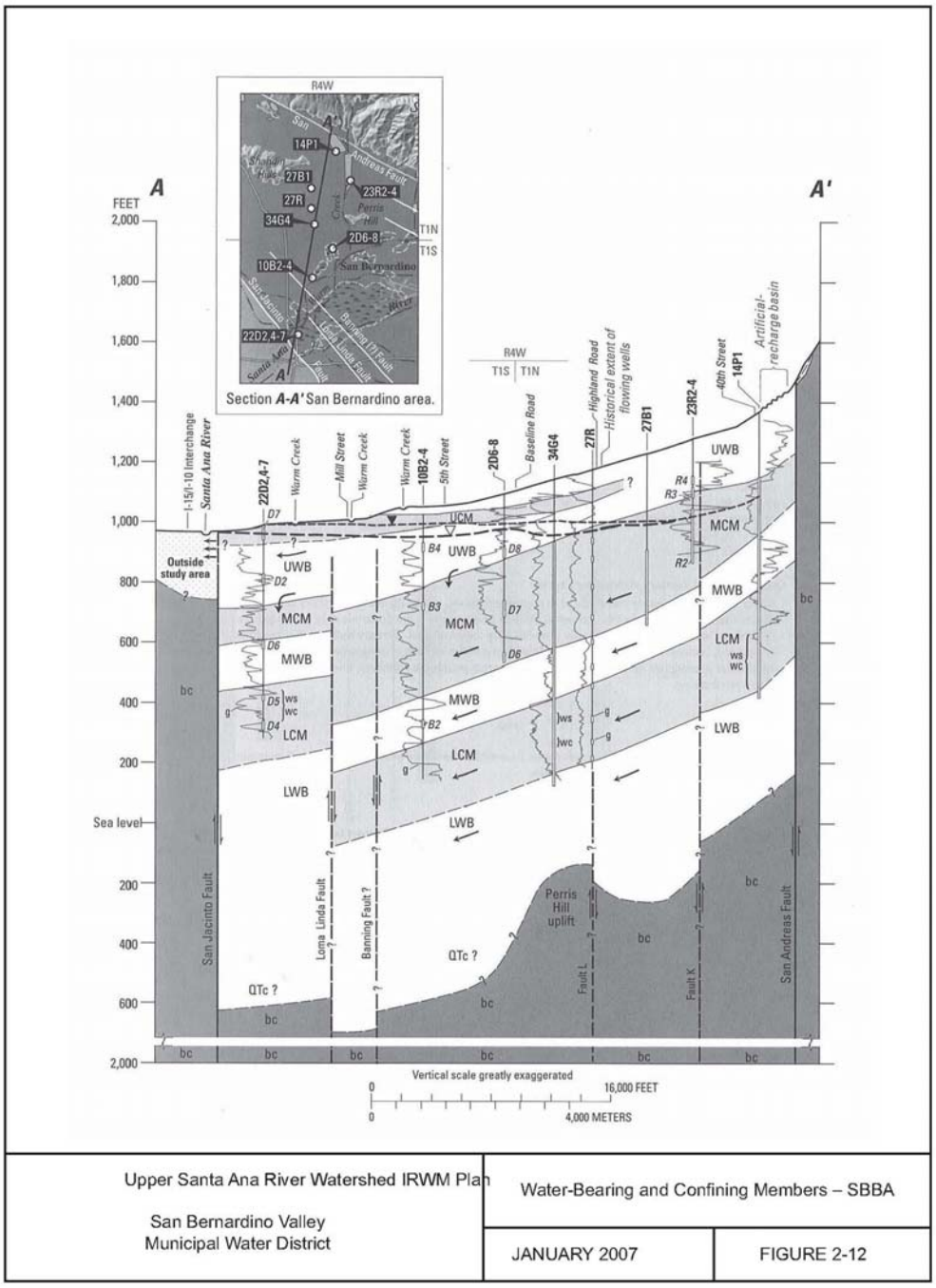
Dutcher and Garrett (1963) divided the SBBA alluvial sediments into the upper, middle, and lower water-bearing members that are separated by the upper, middle, and lower confining members (fine-grained sequences). Figure 2-12 shows a profile of the water-bearing and confining members (Danksin et. al., 2006). The aquifer system of the SBBA is generally unconfined, however, with water moving vertically between the multiple water-bearing layers. The confining members are more accurately described as very leaky aquitards[1] of finer-grained sediments.

The upper confining member is a near-surface deposit with low hydraulic conductivity. The upper confining member extends over a relatively large area from the San Jacinto fault to Highland Road, but only produces confining conditions in a relatively small area referred to as the "Pressure Zone" (see Figure 2-13). As shown in Figure 2-12, the upper confining member is effectively at land surface between the San Jacinto fault and Banning fault and would prevent recharge from precipitation from reaching the upper water-bearing member. In the area between Warm Creek and the SAR, the upper confining member acts to restrict vertical flow causing semi-confined conditions within the upper water-bearing member. North of the Banning fault to about Highland Road, the upper confining member is covered with coarse sediments. Perched water may occur in these areas and springs or seeps may occur where the contact is exposed at ground surface. In the vicinity of the SAR and San Jacinto fault, the upper confining member appears to have been eroded and replaced with coarse sand and gravel. In these areas, the coarse-grained sediments are essentially part of the upper water-bearing member and allow recharge or discharge of water from the upper water-bearing member.

The upper water-bearing member is not usually filled with groundwater. Near the foothills, as shown in Figure 2-12, the member is essentially dry as the groundwater levels are below the base of the unit. Localized areas of perched groundwater may be present as recharge percolates through the sediments. Within the central portions of the valley, the member becomes fully saturated as water moves from the upper portions of the valley to lower elevations. The upper water-bearing aquifer is likely full along the course of the SAR.

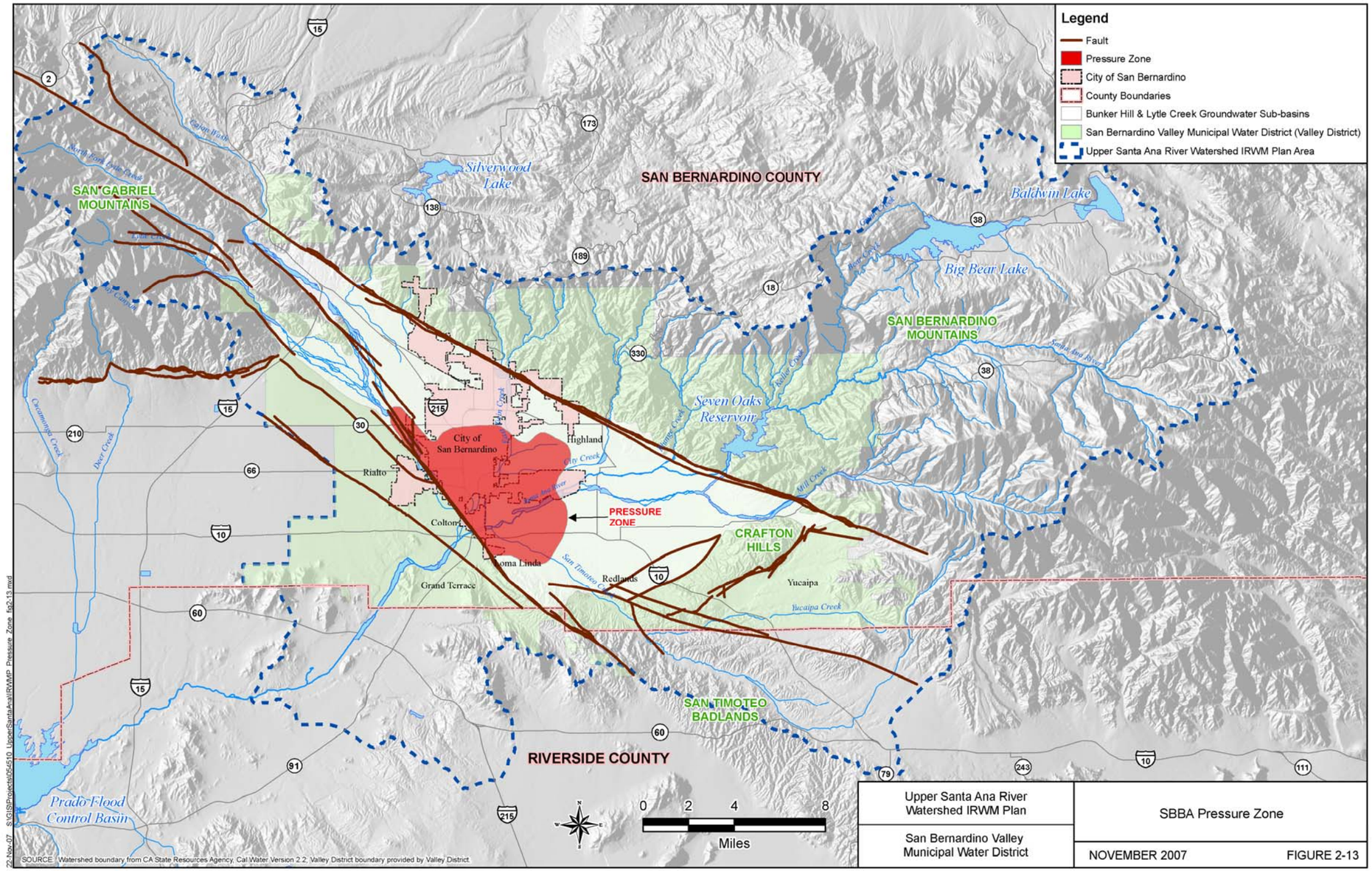
[1] An aquitard is a low-permeability sedimentary unit that can store groundwater and also transmit it slowly from one aquifer to another (Fetter 1988). An aquitard is generally considered to be a barrier or partial barrier to movement of groundwater because water tends to move substantially slower through aquitards than aquifers.

Figure 2-12
Water-Bearing and Confining Members – SBBA



Source: USGS, 2002, Water Resources Investigative Report 02-4243

Figure 2-13
SBBA Pressure Zone



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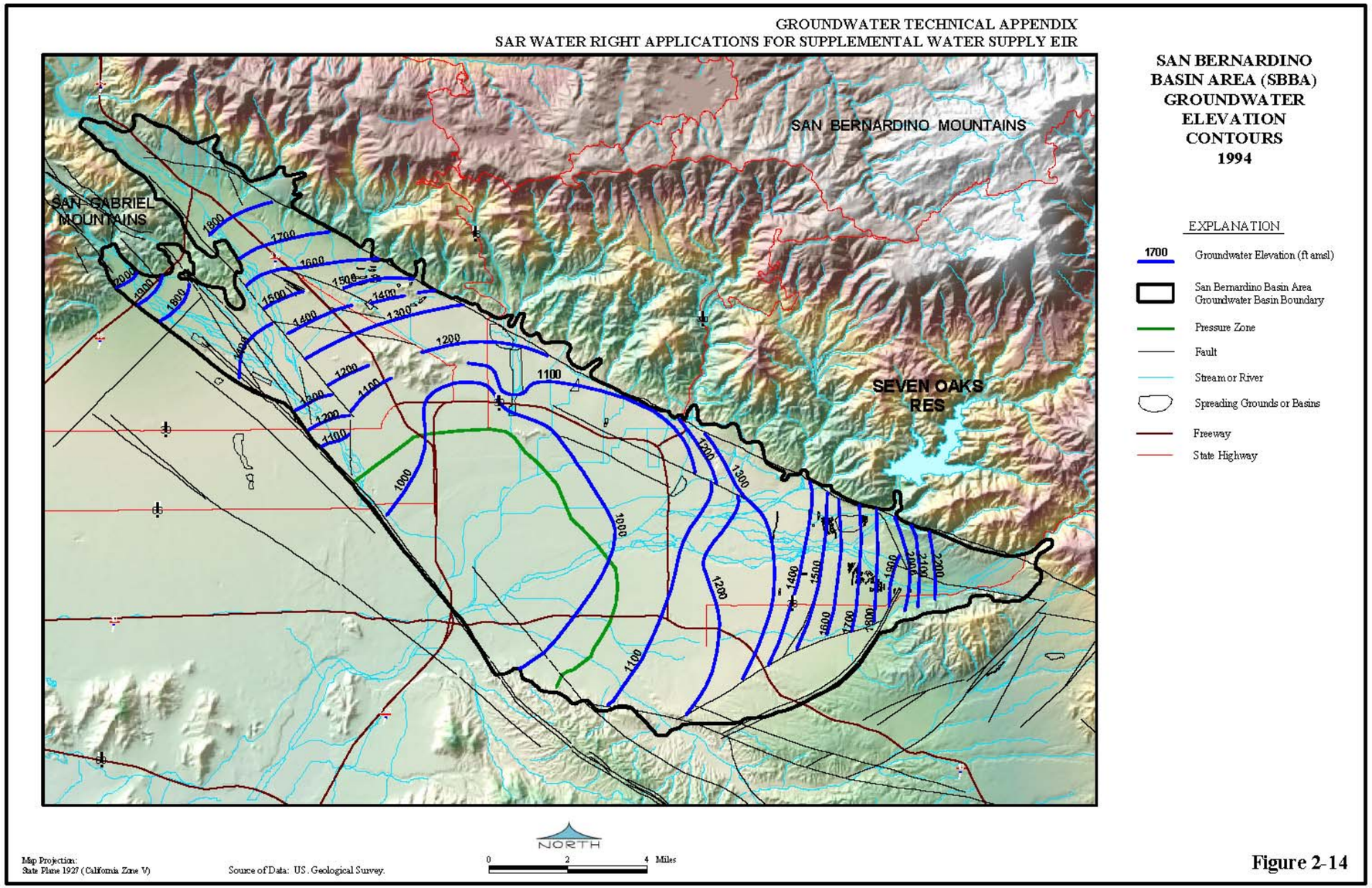
The upper and middle water-bearing members provide most of the water to municipal and agricultural wells. Flow meter testing in three production wells shows that most of the water is extracted from the shallow, younger deposits (Izbicki et. al., 1998). In the central part of the SBBA, these water-bearing members are separated by as much as 300 feet of interbedded silt, clay, and sand (the middle confining member). This middle confining member produces confined conditions over the central part of the basin (referred to locally as the "confined area"), but thins and becomes less effective toward the margins of the basin (Dutcher and Garrett 1963). As shown in Figure 2-12, USGS shows that the middle confining bed extends to the northern edge of the basin. Other sections prepared for the basin show that the middle confining member pinches out before reaching the edge of the basin (Numeric Solutions 2006). Although the middle confining member is not as permeable as the adjacent water-bearing zones, this unit consists primarily of continuous sand and silt (not silt and clay as is found in most aquitards), and there is water production from this zone in many wells (Danskin et al. 2006). It appears that groundwater recharge to the middle water-bearing aquifer is from vertical leakance through the middle confining member and near the fringes of the valley where the upper and middle aquifers may merge.

The lower confining and lower water-bearing members are not typically penetrated by most production wells and play a smaller role in the valley-fill aquifer, mainly due to deeper depth and generally lower permeability. The lower water-bearing member may be consolidated older alluvium or part of the consolidated sediments (Danskin, et. al. 2006).

The areal pattern of groundwater flow is from areas of recharge along the base of the mountains to areas of discharge where the SAR crosses the San Jacinto fault and has remained relatively unchanged over the period of record. Groundwater elevation contours shown in Figure 2-14 illustrate this flow regime in the Bunker Hill subbasin. However, vertical groundwater movement has changed through time due to groundwater extraction and artificial recharge. Groundwater pumping has occurred from increasingly deeper depths, altering the natural vertical movement of groundwater by progressively draining deeper zones of groundwater (Danskin et. al. n.d.).

Recharge to the Bunker Hill subbasin historically has resulted from infiltration of runoff from the San Gabriel and San Bernardino Mountains in areas where the upper confining member is absent or from the forebay. The SAR, Mill Creek, and Lytle Creek contribute more than 60 percent of the total recharge to the groundwater system (USGS 1989). Lesser contributors include Cajon Creek, San Timoteo Creek, and most of the creeks flowing southward out of the San Bernardino Mountains. The subbasin is also replenished by deep percolation of

Figure 2-14
SBBA Groundwater Contours



Percolation from streams, such as Devil Canyon Creek above, is the major source of recharge in the SBBA.

water from precipitation and resulting runoff, percolation from delivered water, and water spread in streambeds and spreading grounds.

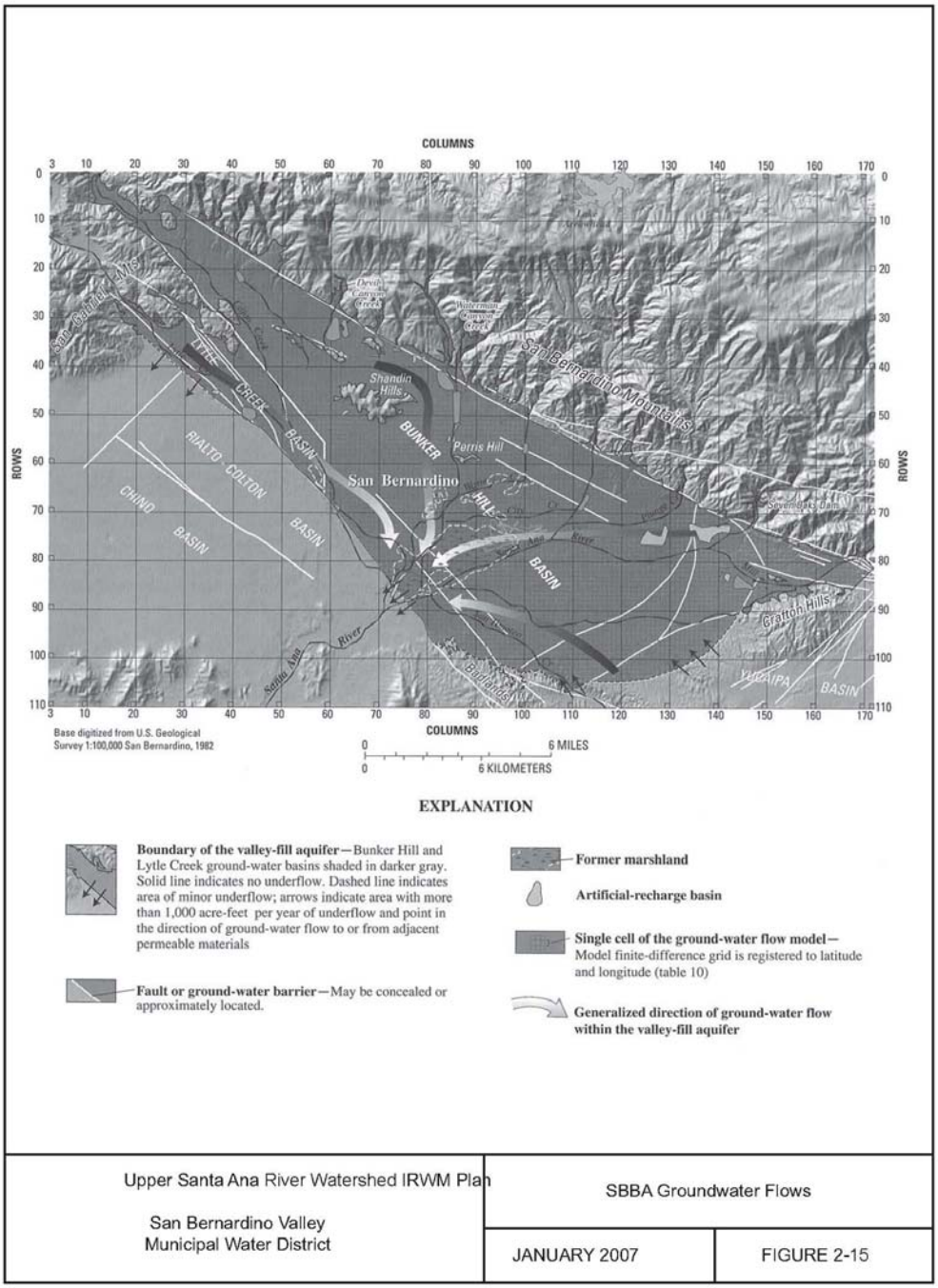
Percolation from streams (such as the SAR, Lytle Creek, Cajon Creek, Devil Canyon Creek, East Twin Creek, Warm Creek, City Creek, Plunge Creek, and Mill Creek) is the major source of recharge in the SBBA. Recharge occurs both in the stream channels and in nearby artificial recharge basins. As a result of the highly permeable river channel deposits and the artificial recharge operations, nearly all of the flow in the smaller streams (Devil Canyon, Waterman, East Twin, Plunge, and San Timoteo Creeks) is recharged to the upper and middle aquifers close to the mountain front.

During floods, the major streams (SAR, Mill Creek, and Lytle Creek) transmit large volumes of water over a short period, resulting in some surface water exiting the basin without contributing to groundwater recharge. Recharge to the SBBA also results from underflow (subsurface inflow), direct infiltration of precipitation, return flow, infiltration from underground sanitary sewer lines and storm drains, and artificial recharge of imported water. Subsurface inflow to the SBBA occurs across the Crafton fault and through the poorly transmissive materials comprising the Badlands, across a small section of unconsolidated deposits north of the Crafton Hills, and through materials beneath the Cajon Creek and Lytle Creek channels. Figure 2-15 shows the areas of underflow into the basin. Total underflow for 1945 to 1998 averaged about 5,000 acre-feet per year (Danskin et. al. 2006). Annual values have declined from a maximum of about 7,000 acre-feet in 1945 to about 4,000 acre-feet in 1998, predominately as a result of declining water levels in the Yucaipa subbasin. With the exception of unusually wet years, recharge from direct precipitation on the valley floor is minimal. An additional source of recharge is that derived from return flow of water pumped from and used locally within the SBBA. Hardt and Hutchinson (1980) estimated return flow to be 30 percent of total extractions, except for wells that export groundwater directly out of the San Bernardino area.

Subsurface outflow from the basin occurs only in the upper 100 feet of the younger alluvium through a breach in the San Jacinto fault, carved by the SAR (Danskin, et. al. 2006). Outflow also occurs through Barrier E at two locations, near the SAR and near Barrier J where Lytle Creek emerges from the San Gabriel Mountains. Subsurface outflow near the Barrier J fault is into the Rialto-Colton

subbasin. Figure 2-15 shows the location of the subsurface outflow from the basin.

Figure 2-15
SBBA Groundwater Flows



Upper Santa Ana River Watershed IRWM Plan San Bernardino Valley Municipal Water District	SBBA Groundwater Flows	
	JANUARY 2007	FIGURE 2-15

Source: USGS, 2002, Water Resources Investigative Report 02-4243

2.8.1.4 Bear Valley Groundwater Basin 8-9

This groundwater basin underlies Bear Valley and is bound by crystalline rocks of the San Bernardino Mountains in southern San Bernardino County. Big Bear Lake, which lies in the western portion of the valley, receives runoff from Grout Creek to the northwest, Van Dusen Canyon to the northeast, Sawmill Canyon and Sand Canyon to the southeast, Knickerbocker and Metcalf Creek to the south, and North Creek to the southwest. Baldwin Lake, which is typically dry, lies in the northeast portion of the valley and receives occasional runoff from Van Dusen Canyon to the northwest and Shay Creek to the south (GEOSCIENCE 2001). Average annual precipitation to the valley ranges from 23 to 29 inches.

Groundwater in the Bear Valley Groundwater Basin is found primarily in the unconsolidated alluvial deposits. The water-bearing deposits in the valley have been separated into upper, middle, and lower aquifers (GEOSCIENCE 1999). The upper and middle aquifers are the primary water producers. In addition, wells completed in underlying bedrock produce as much as 300 gpm (GEOSCIENCE 1999).

A groundwater divide exists between Big Bear Lake and Baldwin Lake in the vicinity of the Big Bear Airport (GEOSCIENCE 1999). Faults are mapped cutting Pleistocene alluvium but it is not known if these are barriers to groundwater movement.

Recharge of this basin is likely from percolation of precipitation and runoff and underflow from fractured crystalline rocks.

2.8.1.5 Big Meadows Valley Groundwater Basin 8-7

This basin underlies a mountain valley in the upper reach of the SAR. The basin is bounded on the west by Seven Oaks Valley Groundwater Basin along the Slide Peak fault (Rogers 1967) and elsewhere by impermeable crystalline rocks of the San Bernardino Mountains. The valley is drained by the SAR and receives an average annual precipitation ranging from 24 to 36 inches. Groundwater in the basin is found in alluvium that typically consists of clay, silt, sand, and gravel. Alluvial material appears to reach about 400 feet in thickness in some parts of the basin. The Slide Peak, Santa Ana, and San Gorgonio faults are mapped as cutting through basin materials (Rogers 1967); however, it is not known whether these faults impede groundwater movement.

2.8.1.6 Seven Oaks Valley Groundwater Basin 8-08

This basin underlies a mountain valley in the upper reach of the SAR. The basin is bounded on the east by Big Meadows Valley Groundwater Basin along the Slide Peak fault (Rogers 1967) and elsewhere by impermeable crystalline rocks

of the San Bernardino Mountains. The valley is drained by the SAR and receives an average annual precipitation ranging from 24 to 36 inches. Groundwater in the basin is found in alluvium that typically consists of clay, silt, sand, and gravel that reaches at least 50 feet thick. The Slide Peak and Santa Ana faults are mapped as cutting through basin materials (Rogers 1967); however, it is not known whether these faults impede groundwater movement.

Recharge is probably derived principally from percolation of precipitation and streamflow in the SAR.

2.9 Groundwater Management in the Region

Conjunctive use of surface water and groundwater is a long-standing practice in the Region. Part of the potable water used in the Region is imported from sources in the Sierra and Northern California through the SWP. Several reservoirs are operated primarily for the purposes of storing surface water for domestic and irrigation use, but groundwater basins are also recharged from the outflow of some reservoirs. The concept is to maintain streamflow over a longer period of time than would occur without regulated flow and thus provide for increased recharge of groundwater basins. Most of the larger basins in this Region are managed with many conjunctive use projects being developed to optimize and manage water supply. Numerous groundwater spreading grounds have been developed to recharge the groundwater basins when adequate surface water supply is available. Management of the water level in the SBBA, in general, and the Pressure Zone, in particular, is a focus of the groundwater management of this IRWM Plan. Management of the SBBA is discussed in more detail in Chapter 4.

Numerous groundwater spreading grounds have been developed to recharge the groundwater basins.

2.9.1 Recharge Area Programs

The SBVWCD and its predecessors have conducted groundwater recharge activities since 1912 in the Bunker Hill groundwater subbasin. Artificial recharge of imported water to the SBBA began in 1972. Because of the extremely permeable sand and gravel deposits, maximum instantaneous recharge rates are high. Based on a recharge efficiency rate of 95 percent, the total quantity of artificial recharge in the basin averaged about 7,400 acre-feet per year from 1972 to 1992. Because of the size of several of the recharge basins and exceptionally permeable material, a larger quantity of water could be imported and recharged along the base of the San Bernardino Mountains, if necessary (i.e., recharge basin capacity and infiltration rates are not currently limiting the amount of imported water recharged). Any additional recharge and extraction should be carefully planned and implemented to avoid liquefaction and unacceptable decreases in groundwater levels in the basins.

Numerous existing groundwater recharge facilities (spreading grounds or spreading basins) are located in the SBBA, Rialto-Colton, and Yucaipa subbasins. The locations of these facilities are shown in Figure 2-16, and selected characteristics are summarized in Table 2-11. Existing turnouts serve each recharge facility, with the exception of the Cactus Spreading and Flood Control Basins, which would be served by the Cactus Basins Pipeline proposed by Valley District. A description of each spreading ground follows.

Figure 2-16
Location of Spreading Grounds in the Region

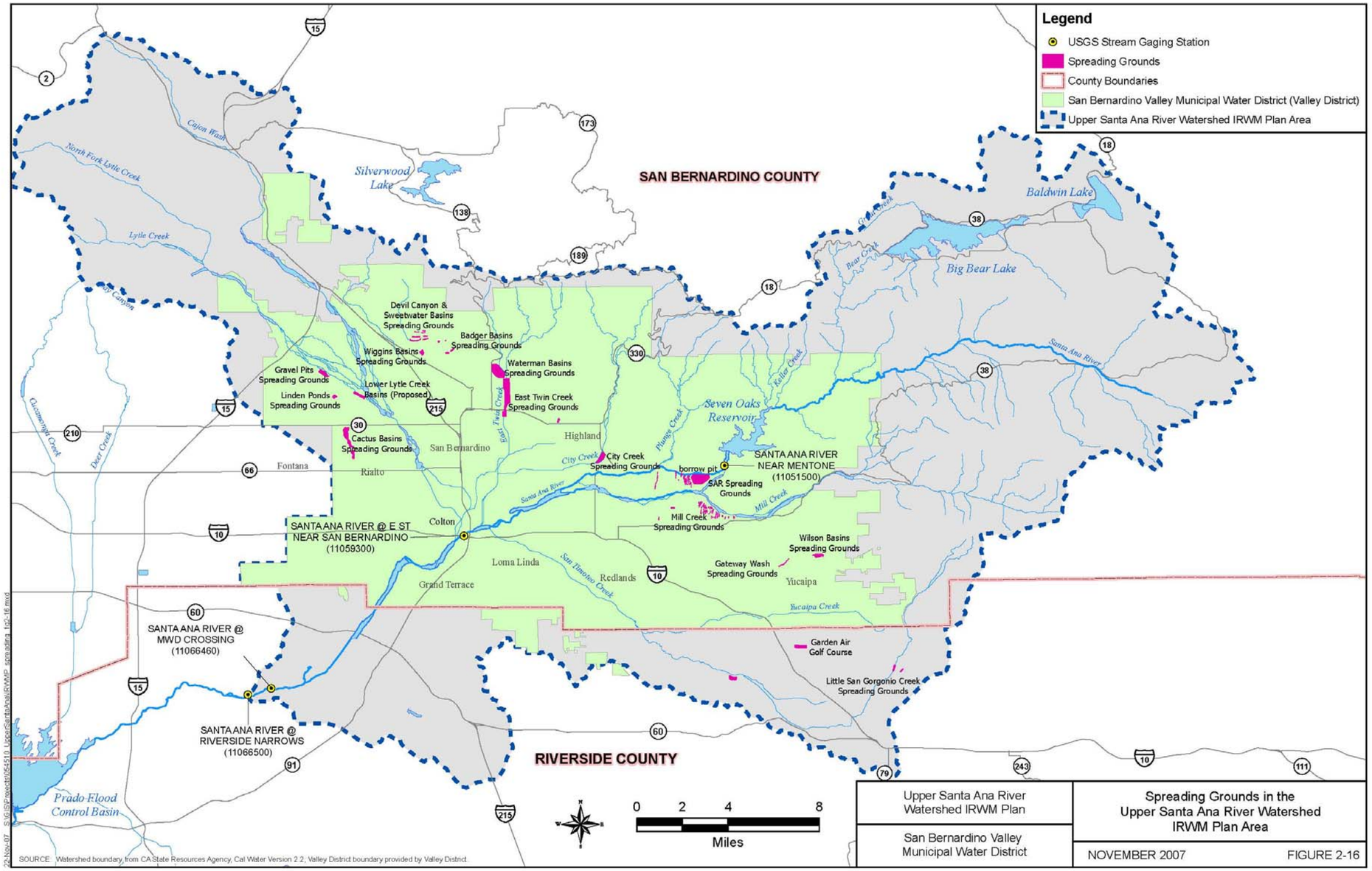


Table 2-11
Recharge Facilities

Facility Name	Owner or Operator	Conveyance Used to Serve Facility: Turnout Name & Capacity (cfs)	Recharge Facility Characteristics[a]: Active Recharge Facility Area[b] (acres)	Percolation Rate[c] (feet/day)	Monthly Capacity (acre-feet)	Groundwater Basin (and Subbasin) Recharged[d]
SAR Spreading Grounds	SBVWCD	Foothill Pipeline Santa Ana Low Flow (288) Santa Ana Intake (200 Max)	64[d]	3	12,000	SBBA (Bunker Hill)
Devil Canyon and Sweetwater Basins	SBCFCD[f]	Foothill Pipeline Sweetwater (37)	30	1.5	1,350	SBBA (Bunker Hill)
Lytle Basins	Lytle Creek Water Conservation Association	Fontana Power Plant Constructed drainage channel	Variable	1.5	Variable	SBBA (Lytle Creek)
City Creek Spreading Grounds	SBCFCD	Foothill Pipeline City Creek (60)	75	1.5	3,375	SBBA (Bunker Hill)
Patton Basins	SBCFCD	Foothill Pipeline Patton (12)	3	0.3	27	SBBA (Bunker Hill)
Waterman Basins	SBCFCD	Foothill Pipeline Waterman (135)	120	0.5	1800	SBBA (Bunker Hill)
East Twin Creek Spreading Grounds	SBCFCD	Foothill Pipeline Waterman (135)	32	1.5	1440	SBBA (Bunker Hill)
Badger Basins	SBCFCD	Foothill Pipeline Sweetwater (22)	15	0.5	225	SBBA (Bunker Hill)
Mill Creek	SBVWCD	Greenspot Pipeline Mill Creek Spreading (50) Mill Creek Intake (110)	66	3	6,000	SBBA (Bunker Hill)
Cactus Spreading and Flood Control Basins	SBCFCD	San Gabriel Valley MWD Lytle Pipeline Lower Lytle Creek (55)	46	1.5	2,070	Rialto-Colton
Wilson Basins	SBCFCD	East Branch Exten. Wilson Basins (30)	12	1	360	Yucaipa subbasin
Garden Air Creek	Valley District	East Branch Exten. Garden Air Creek (16)0	n/a	n/a	n/a	San Timoteo subbasin

[a] Values are from tabulation on map contained in Water Right Application by Valley District and Western to appropriate water from the SAR or by engineering evaluation of spreading grounds.

[b] Recharge facility area is the geographical extent of each basin that can be inundated for recharge.

[c] Estimated percolation rate. This is the estimated rate at which water can percolate into the ground through the basin, expressed in feet per day. The values used have generally been computed from the annual recharge capacity. These rates are typically about one-half of the percolation rates presented by the USGS (1972). The use of the small percolation rates is reasonable in that it would involve longer-term percolation rates that are typically smaller than short-term rates.

[d] Note that there may be flow out of the subbasin or basin identified. For example, a report by Geoscience Support Services, Inc. (1992) estimated that only 36 percent of the water recharged in the upper Lytle Creek area remains in the Lytle Creek subbasin, while most of it flows to the Rialto-Colton subbasin.

[d]Recharge facility area based upon 4/11/03, SBVWCD Report: "SBVWCD Basin Storage Capacity for SAR and MC." Or by estimating using GIS.

2.9.1.1 SAR Spreading Grounds

The SAR spreading grounds, located downstream of Seven Oaks Dam on the alluvial fan of the SAR, are operated by the SBVWCD. The SAR spreading grounds include a borrow pit that was a source of materials used in the construction of Seven Oaks Dam.

The percolation rate for the SAR spreading grounds is approximately 3 feet per day, which results in a recharge rate (based on 64 acres) of about 6,000 acre-feet per month, or about 97 cubic feet per second (cfs). Absorptive capacity is estimated by multiplying the active area of the recharge facility by the estimated percolation rate. Water delivered to the SAR spreading grounds recharges the Bunker Hill subbasin of the SBBA (Table 2-11).

2.9.1.2 Devil Canyon and Sweetwater Basins

The Devil Canyon and Sweetwater Basins, located northwest of the California State University, San Bernardino campus, are operated by the SBCFCD and have an active spreading area of 30 acres. The estimated long-term percolation rate for the site is about 1.5 feet per day, which results in a recharge rate of about 1,350 acre-feet per month, or about 23 cfs. The Devil Canyon and Sweetwater Basins recharge the Bunker Hill subbasin of the SBBA (Table 2-11).

2.9.1.3 Lytle Creek Subbasin

Gravel Pits and spreading grounds have been used for recharge of the subbasin for over 80 years. Significant groundwater recharge occurs in the gravel pits adjacent to Lytle Creek. However, evaluating recharge potential can be more complicated for recharge in a gravel pit than in a spreading facility dedicated to recharge.

2.9.1.4 The City Creek Spreading Grounds

The spreading grounds located along City Creek, between State Highway 30 and Boulder Avenue, are operated by SBCFCD. These spreading grounds have an active spreading area of about 75 acres and an estimated percolation rate of about 1.5 feet per day, which results in a recharge rate of about 3,375 acre-feet per month, or about 57 cfs. The City Creek spreading grounds recharge the Bunker Hill subbasin of the SBBA.

2.9.1.5 Patton Basins

The Patton Basins are located along Sand Creek, north of East Highland and west of the Patton State Hospital. The Patton Basins have an active spreading area of about 3 acres and an estimated percolation rate of about 0.3 foot per day. This

equates to a recharge rate of about 27 acre-feet per month, or about 1 cfs. Recharge at this site contributes to the Bunker Hill subbasin of the SBBA.

2.9.1.6 Waterman Basins

The Waterman Basins are located northeast of Wildwood Park and north of 40th Street in the City of San Bernardino. These basins are operated by SBCFCD, have an active spreading area of about 120 acres, and have an estimated percolation rate of about 0.5 foot per day. This percolation rate equates to a recharge rate of about 810 acre-feet per month, or about 14 cfs. However, the absorptive capacity used in the Allocation Model is 30 cfs, based on historic use. The Waterman Basins recharge the Bunker Hill subbasin of the SBBA (Table 2-11).

2.9.1.7 East Twin Creek Spreading Grounds

The East Twin Creek spreading grounds are located south of 40th Street, immediately south of the Waterman Basins, and are operated by SBCFCD. These spreading grounds have an area of about 32 acres and an estimated percolation rate of about 1.5 feet per day, which results in a recharge rate of about 225 acre-feet per month, or about 4 cfs. However, the absorptive capacity used in the Allocation Model is 24 cfs, based on historic use. The East Twin Creek spreading grounds recharge the Bunker Hill subbasin of the SBBA (Table 2-11).

2.9.1.8 Badger Basins

The Badger Basins, located in the Sycamore Flood Control Basin immediately east of the California State University, San Bernardino campus, are operated by the SBCFCD and have an active spreading area of about 15 acres. The estimated percolation rate for this site is 0.5 foot per day, which results in a recharge rate of about 225 acre-feet per month, or about 4 cfs. The Badger Basins recharge the Bunker Hill subbasin of the SBBA (Table 2-11).

2.9.1.9 Mill Creek Spreading Grounds

The Mill Creek spreading grounds are located south of the main channel of Mill Creek, about one mile upstream of the confluence with the SAR, and are operated by the SBVWCD. The Mill Creek spreading grounds have an active spreading area of about 66 acres and an estimated percolation rate of about 3 feet per day. This equates to a recharge rate of about 6,000 acre-feet per month. Recharge at this site contributes to the Bunker Hill subbasin of the SBBA (Table 2-11).

2.9.1.10 Cactus Spreading and Flood Control Basin

The Cactus recharge basins are located within the central portion of the Rialto-Colton subbasin. The basins are operated by the SBCFCD. Artificial recharge operations have an active spreading area of about 46 acres. The estimated percolation rate for this site is 1.5 feet per day.

2.9.1.11 Wilson Basins

The Wilson Basins are located northeast of the intersection of Oak Glen Road and Bryant Street, just north of the City of Yucaipa, and are operated by SBCFCD. The Wilson Basins have an active spreading area of about 12 acres and an estimated percolation rate of about 1 foot per day, which results in a recharge rate of about 360 acre-feet per month, or about 6 cfs. The Wilson Basins recharge the Yucaipa Basin.

2.9.1.12 Garden Air Creek

Garden Air Creek is a tributary of San Timoteo Canyon Creek. There are no plans for a formal spreading facility at this location and recharge will be accomplished by percolation from existing natural channels, up to a rate of 16 cfs. Although the turnout is outside Valley District and inside the boundary of SGPWA, the recharge area is in the San Timoteo Canyon region, and thus inside the Valley District service area boundary. This delivery will recharge the San Timoteo Basin.

2.9.1.13 Linden Ponds

Though no longer in existence the Linden Ponds were located between the San Jacinto fault and an unnamed fault in the northeastern portion of the Rialto-Colton subbasin. The basins were operated by the SBCFCD. Imported water was recharged between 1982 and 1994. Artificial recharge operations had an active spreading area of about 46 acres. The estimated percolation rate for this site was 1.5 feet per day.

2.9.2 SAR Natural Recharge

Most groundwater recharge occurs in the natural channels of the Upper SAR. However, evaluating the actual recharge potential for a natural channel is more complicated. The recharge rate depends on the wetted area, which varies substantially in a natural channel depending on flow conditions. The area of the “active” channel of the SAR (defined by the area on aerial photographs with limited vegetation) has been estimated to be about 79 acres, while the area from the mouth of the canyon to Sterling Avenue (i.e., to about the San Bernardino International Airport or former Norton Air Force Base), including overflow lands, is about 2,110 acres (Danskin et al. n.d.).

Danskin et al. estimated the potential percolation rate to be about four feet per day. Consistent with the percolation rates for spreading grounds included in the applications, a percolation rate of two feet per day is used here as the long-term percolation rate that might be achieved in the channel. Using the two-feet–per-day rate, the recharge rate may be about 4,740 acre-feet per month (or about 80 cfs) for the active channel from the mouth of the canyon to Sterling Avenue, and about 126,600 acre-feet per month (or about 2,128 cfs) if the overflow lands are included. Percolation in the river could recharge the Bunker Hill subbasin of the SBBA and the Rialto-Colton subbasin. In a similar analysis, USACE (1997) estimated that recharge in the active channel to Sterling Avenue would be approximately one cfs per wetted acre, which approximates to 79 cfs.

The maximum recharge area (including overflow lands) for SAR reaches from Sterling Avenue to Lower Warm Creek and from Lower Warm Creek to the San Bernardino/Riverside County line (Danskin et al. n.d.). No recharge rate is provided, however, because those reaches overlie an area where the upward flow of groundwater into the stream channel is greater than the downward recharge of streamflows. It was estimated that there was a net recharge of approximately 95 cfs from Sterling Avenue to Prado Dam (USACE 1997).

2.9.3 Groundwater Discharge from SBBA

Groundwater discharge from the SBBA occurs from (1) rising water, (2) subsurface outflow, and (3) groundwater extractions. Rising water primarily occurs in the lower reaches of Warm Creek, when groundwater rises above the level of the ground surface or channel bottom and contributes to surface flows. The quantity of groundwater discharge into the creek for the period 1945 to 1992 was determined to be highly variable, with a maximum discharge exceeding 40,000 acre-feet per year and a minimum discharge of zero for 16 consecutive years, from 1963 to 1978 (Danskin et al. n.d.).

Subsurface outflow occurs across the San Jacinto fault and Barrier E at two locations, in the vicinity of the SAR at the Colton Narrows and where Lytle Creek emerges from the San Gabriel Mountains north of Barrier J. In the vicinity of the SAR at the Colton Narrows, subsurface outflow occurs in the younger alluvium. For the period 1936 to 1949, subsurface outflow in this area was estimated to range from 14,300 to 23,700 acre-feet per year (Dutcher and Garrett 1963). Subsurface outflow north of Barrier J was estimated to be approximately 4,000 acre-feet per year (Dutcher and Garrett 1963) and between 2,700 and 4,200 acre-feet per year during water years 1935 to 1960 (DWR 1970b).

While streamflow and subsurface outflow contribute to basin discharge, groundwater extraction is the primary discharge of groundwater from storage. Extracted water is used for agricultural, municipal, and industrial purposes. Most

pumping is located near major streams, including the SAR, Lytle Creek, Warm Creek, and East Twin Creek. This areal distribution of pumpage reflects the exceptionally permeable deposits that underlie the stream channels and the abundant nearby recharge (Danskin et al. n.d.). As the area has become urbanized, the quantity of agricultural pumpage has declined considerably, presently accounting for less than 20 percent of the gross pumpage (Danskin et al. n.d.). However, overall pumpage has increased in the basin due to increased pumping for municipal and industrial purposes. Prior to 1940, gross pumpage in the basin was less than 110,000 acre-feet per year, while current pumping has reached as high as about 200,000 acre-feet per year (Western-San Bernardino Watermaster 2002).

2.9.4 Groundwater Storage

Estimates of the change in groundwater volume, or storage, in the SBBA are made annually by both Valley District and the SBVWCD from which a cumulative change in basin storage is calculated. The approach employed by Valley District calculates the change in storage for nine sub-areas: Cajon, Devil Canyon, Lytle Creek,, Pressure Zone, City Creek, Redlands, Mill Creek, Reservoir, and Divide. Calculating the change in storage for the SBBA is accomplished by summing the individual values for each of the sub-areas (Table 2-12).

Table 2-12
Summary of Groundwater Storage Capacities and Basin Surface Area

Basin	Storage Capacity (af)	Surface Area (acres)
SBBA	5,976,000	90,000
Rialto–Colton	2,517,000	30,100
Yucaipa	783,000 – 1,230,000	25,300
San Timoteo	2,010,000	73,100
Source: DWR, 2003b.		

The first change in storage calculation was completed for the years 1934 to 1960 by DWR (DWR 1970b). The values were calculated using the Specific Yield Method and a mathematical model developed by TRW, Inc. (TRW 1967). In 1980, Valley District updated the change in storage calculation to include the years 1961 to 1980. In the early 1990s, Valley District created a new change in storage model using software developed by Environmental Systems Research Institute (ESRI). In years of low precipitation, infiltration (direct from precipitation and surface streams) decreases while groundwater extractions increase, thereby causing the cumulative storage to decrease. The cumulative change in storage is cyclical based upon weather conditions. For example, 1934

through 1949 and 1979 through 1987 were wet periods, which produced increases in storage, while 1950 through 1978 was a dry period, resulting in decreased storage.

In general, the far eastern and northwestern portions of the Bunker Hill subbasin show the largest decreases, while the rest of the subbasin shows mostly stable or increasing groundwater elevations.

Groundwater in the Bunker Hill subbasin generally flows in a southwesterly direction from the San Bernardino Mountains to the Colton Narrows. The San Jacinto fault generally runs perpendicular to the groundwater flow and acts as a partial barrier resulting in water level differences across the fault. This phenomenon also contributes to the high groundwater located within the City of San Bernardino, commonly referred to as the Pressure Zone. Figure 2-13 depicts depth to groundwater contours throughout the SBBA, Rialto-Colton subbasin, and Yucaipa subbasin, including those reflecting shallow groundwater conditions in the Pressure Zone. In the past, water levels in the Pressure Zone were raised high enough to cause artesian conditions.[1]

For the basin as a whole, there can be wide fluctuations in the average depth to groundwater from year to year, with annual changes as high as almost 40 feet. However, for the most part, annual changes register less than 20 feet (+ or -), with only six years exceeding this range. There are, however, noticeable variations in behavior across subbasins.

The Lytle Creek subbasin (Figure 2-6) contains Lytle Creek, with extensive headwaters in the adjacent mountain areas and a river channel comprised of deep, porous alluvial deposits. Due to the presence of Lytle Creek and its relatively small size, this subbasin exhibits far greater and more extreme changes than any other subbasin of the SBBA. In 40 of 68 years, the annual average change in depth to groundwater exceeds 20 feet, with 8 years showing changes greater than 50 feet, and 3 years showing changes greater than 100 feet.

The Bunker Hill and Lytle Creek subbasins are generally considered as one groundwater basin, the SBBA. However, the three separate water-bearing zones and intervening confining zones of the Bunker Hill subbasin are not observed in the Lytle Creek subbasin. Sediments within the Lytle Creek Basin are, for the most part, highly permeable and the aquifer has a high specific yield. High permeability and specific yield tend to result in an aquifer that responds rapidly to changes in inflow (precipitation and streamflow) and outflow (groundwater pumping, streamflow, and subsurface outflow). Water levels in the Lytle Creek subbasin have fluctuated in excess of 200 feet over relatively short periods (less than 5 years) and in select wells (e.g., FWC's Well F34A). From 1934 to 2002,

depth to groundwater as measured in various wells in the basin has ranged from approximately 8 feet in the south-central portion of the basin to over 500 feet in the north-central portion of the basin (SBVMWD 2003).

Lytle Creek subbasin is adjoined on the west by the Rialto-Colton subbasin, along the Lytle Creek fault, and on the east and southeast by the Bunker Hill subbasin, along the Loma Linda fault and Barrier G. The northwestern border of the subbasin is delineated by the San Gabriel Mountains, and runoff from the mountains flows into the Rialto-Colton subbasin. Numerous faults that act as barriers to groundwater flow create six compartments within the basin. Barriers A through D divide the northwestern portion of the basin into five sub-areas and the southeastern portion of the basin comprises the sixth sub-area. Barrier F divides the northwestern sub-areas from the southeastern sub-area. Studies have shown that the groundwater barriers are less permeable with depth (Dutcher and Garrett 1963). When groundwater levels are high during wet years, more leakage occurs across the barriers than when groundwater levels are lower (i.e., during dry years). The amount of pumping in each sub-area, in large part, controls the movement of groundwater across the barriers (Dutcher and Garrett 1963).

2.9.5 Groundwater Quality

Groundwater quality varies among the subbasins of the Upper SAR due to geology and faulting patterns and recharge points, and from anthropogenic sources of contamination.

Perchlorate treatment facilities, similar to the West Valley Water District plant above, treat groundwater for use in the Region.

2.9.5.1 San Bernardino Basin Area

Groundwater in the SBBA is generally a calcium-bicarbonate type, containing equal amounts (on an equivalent basis) of sodium and calcium in water near the land surface and an increasing predominance of sodium in water from deeper parts of the valley-fill aquifer. A TDS range of 150 to 550 mg/L, with an average of 324 mg/L, is found in public supply wells (DWR 2003). Electrical conductivity (EC) is a measure of total dissolved ionic constituents. EC has been measured within a range of 95 to 2,920 microMhos (µMhos) with an average of 523 µMhos.

The inorganic composition of the groundwater may be affected by geothermal water emanating from faults and fractures in the bedrock surface underlying the aquifer. For example, concentrations of fluoride that exceed the public drinking

[1] Conditions where groundwater levels rise above the land surface in confined aquifers.

water standard have limited the use of groundwater extracted near some faults and from deeper parts of the aquifer.

In some public supply well locations in the SBBA, some inorganics (primary and secondary), radiological constituents, nitrates, pesticides, Volatile Organic Compounds (VOCs), Synthetic Organic Compounds (SOCs), and Perchlorate were found above the maximum contaminant level (MCL) (Table 2-13).

Table 2-13
Prevalence of Contaminants in SBBA Wells

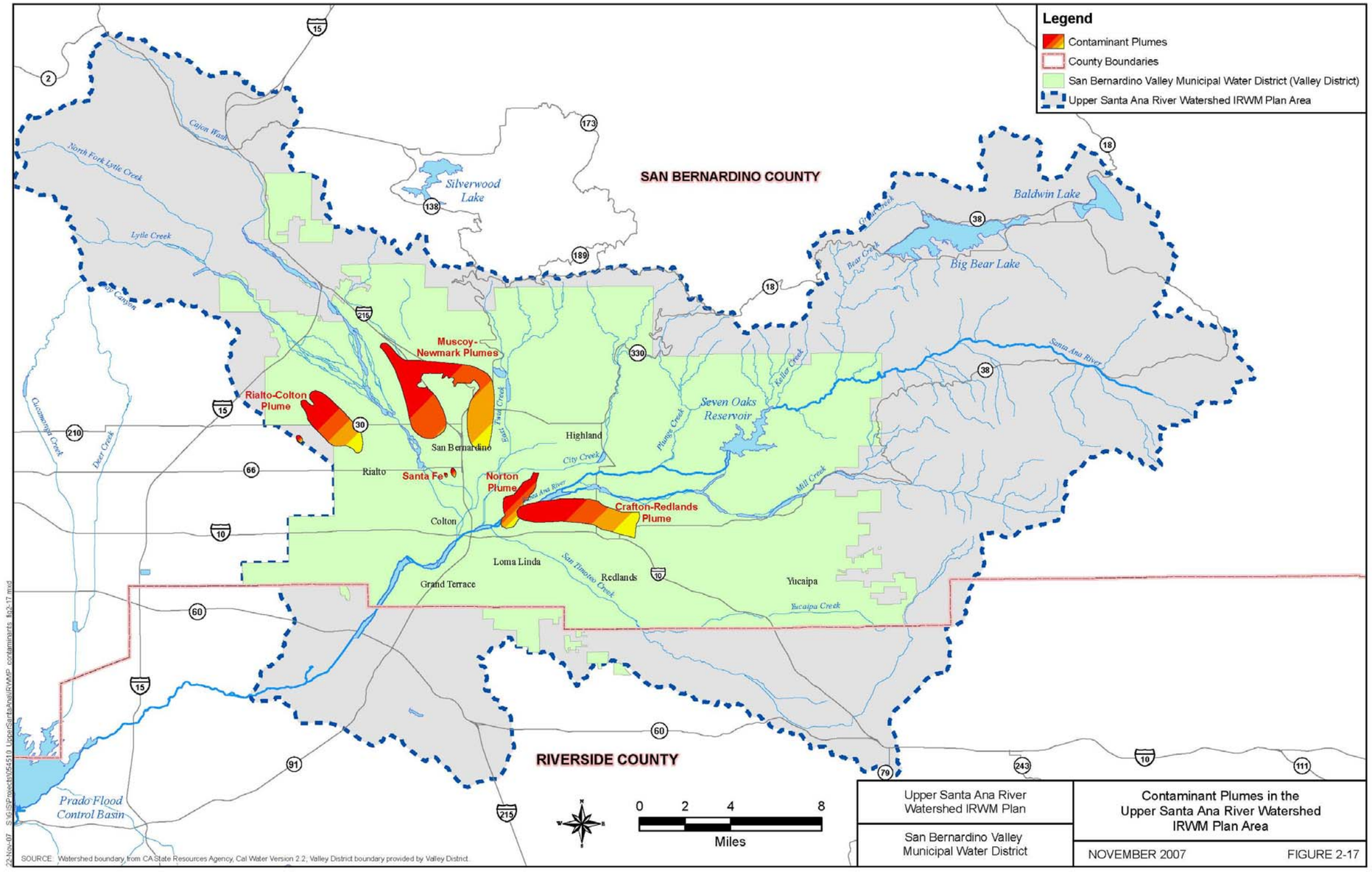
Constituent	No. Wells Sampled	No. of Wells with a Concentration Above MCL
Inorganics (primary)	212	13
Radiological	207	34
Nitrates	214	34
Pesticides	211	20
VOCs and SOCs	211	32
Inorganics (secondary)	212	25
Perchlorate	369	156 (1)

Source: DWR 2003. and Geoscience
1. No MCL has been established for Perchlorate. But “action level” is 4ug/l.

The SBBA is affected by five major groundwater contaminant plumes (Figure 2-17). Plumes in the basin include (1) the Crafton-Redlands plume, with TCE and lower levels of perchloroethylene (PCE) and debromochloropropane (DBCP); (2) the Norton Air Force Base TCE and PCE plume, stretching 2.5 miles from its source and contaminating 100,000 acre-feet of groundwater; (3 and 4) the Muscoy and Newmark plumes near the Shandon Hills, which are Superfund sites with TCE and PCE; and (5) the Santa Fe plume with PCE, TCE, and 1,2 dichloroethylene (1,2-DCE) contamination.

Within the City of San Bernardino, the Newmark plume and the Muscoy plume consist primarily of PCE. The plumes have impacted San Bernardino water supply wells. Under the federal Superfund Program, the U. S. Environmental Protection Agency (EPA) has implemented cleanup of these plumes, including use of groundwater extraction and treatment using granulated activated carbon. The treated water is then used to supplement the City of San Bernardino’s potable water supply. It appears that cleanup efforts will be adequate to protect 32 down-gradient water supply wells (Santa Ana River Watershed Project Authority (SAWPA) 2002). However, groundwater model simulations suggest that containment of the plume will need additional extraction wells that will result in pumping of at least 14,000 acre-feet per year (Danskin, et al 2006).

Figure 2-17
Contaminant Plumes in SBBA



The Norton Air Force Base plume, located just to the southwest of the former installation in the City of San Bernardino, is a major contaminant plume, consisting primarily of TCE and PCE. The plume has impaired 10 wells owned by the City of Riverside and the City of San Bernardino. Cleanup efforts by the Air Force, consisting of soil removal, soil gas extraction, and groundwater treatment, have significantly reduced this plume. The treatment plants now operate in a standby mode (SAWPA 2002).

Two commingled plumes, comprising the Crafton-Redlands plume, have impacted water supply wells for the cities of Riverside, Redlands, and Loma Linda, including Loma Linda University wells. One plume contains TCE and the other perchlorate; both are in the upper 300 to 400 feet of groundwater. TCE has been measured in water supply wells at over 100 parts per billion (ppb), over 20 times the MCL of 5 ppb. Currently, however, water supply well concentrations are around 7 ppb. Perchlorate is present in water supply wells at concentrations up to 77 ppb.

As required by the SARWQCB, the Lockheed Martin Corporation (Lockheed) has prepared contingency plans to address impacts of the plume on water supply wells. These include blending, treatment, and/or providing alternative water supply sources. The plumes are currently being captured by the City of Riverside's Gage Well Field. Lockheed has installed granular activated carbon treatment units at some of the gage wells to remove TCE and has installed ion exchange units on some of these wells for the removal of perchlorate (SAWPA 2002).

The Santa Fe groundwater plume consists primarily of 1,2-DCE, TCE, and PCE; this plume is currently being monitored (ERM 2001).

Separately from the foregoing remediation efforts, FWC currently operates and maintains a groundwater remediation project at its Plant F10 pursuant to a long-term agreement with San Bernardino County, the owner and operator of the Mid Valley Sanitary Landfill and corresponding Clean-Up and Abatement Order issued to San Bernardino County by the RWQCB. The 5,000 gpm treatment plant utilizes liquid phase granular activated carbon to treat for volatile organic compounds including, but not limited to, PCE, TCE, 1,1-DCE, and cis-1,2-DCE. The plant treats and removes those contaminants from groundwater extracted from both the Rialto-Colton and No-Mans Land subbasins.

2.9.5.2 Rialto-Colton Groundwater Subbasin

In public supply well samples in the Rialto-Colton subbasin, the average TDS is 264 mg/L, with a range of 163 to 634 mg/L (DWR 2003). Other source samples show an average TDS of 230 mg/L and a range of 201 to 291 mg/L. This is a

lower TDS range than the groundwater in the Bunker Hill subbasin, where TDS levels from 1995 through 1997 ranged as high as 1,000 mg/L along the SAR. The San Jacinto fault markedly affects the groundwater chemistry in the basin. The TDS in groundwater downstream from the San Jacinto fault is greater than that in the surface water found in the Bunker Hill outflow area.

Of 38 public supply wells sampled, two were over the MCL for nitrates, and in three wells, secondary inorganics, VOCs, and SOCs exceeded the MCL (Table 2-14). Most reported NO_3 concentrations are less than 22.5 mg/L, with a few samples ranging from 45 to 90 mg/L. Most of the wells sampled did not contain constituents over the MCL concentration.

More than 143 water source wells in Riverside and San Bernardino Counties alone now exceed 4 ppb of perchlorate contamination (California Department of Health Services 2003a). In the Valley District service area, the City of Rialto, the City of Colton, West Valley, and FWC have shut down or restricted the use of 20 wells due to perchlorate contamination in the Rialto-Colton subbasin, where concentrations reach above 4 ppb (SARWQCB 2003b).

Table 2-14
Prevalence of Contaminants in Rialto–Colton Subbasin Wells

Constituent	No. Wells Sampled	No. Wells with a Concentration Above an MCL
Inorganics (primary)	38	0
Radiological	40	0
Nitrates	38	2
Pesticides	40	0
VOCs and SOCs	40	3
Inorganics (secondary)	38	3
Perchlorate	38	7 (1)

Source: DWR 2003 and Geoscience.
1 No MCL has been established for Perchlorate. But “action level” is 4 ug/L

2.9.5.3 Riverside-Arlington Groundwater Subbasin

The Riverside subbasin contains groundwater that is predominantly calcium or sodium bicarbonate. Of the water sampled from 46 wells, TDS ranged from 210 to 889 mg/L, with an average of 463 mg/L (see Table 2-15) (DWR 2003). From other sources, TDS has been found to range from 320 to 756 mg/L. This is a higher TDS range than in the Rialto–Colton and Bunker Hill subbasins.

In some of the sampled public supply wells, MCLs were exceeded for inorganics (primary and secondary), radiological constituents, nitrates, pesticides, VOCs, and SOCs. Nitrate (as NO_3) concentrations of greater than 20 mg/L were detected as early as the 1940s, probably due to historical land use, including citrus production. NO_3 was the constituent found most frequently in the sampled wells, followed by pesticides. Only a few wells were found to have concentrations of primary and secondary inorganics.

Table 2-15
Prevalence of Contaminants in Riverside Subbasin Wells

Constituent	No. Wells Sampled	No. Wells with a Concentration Above an MCL
Inorganics (primary)	48	2
Radiological	48	11
Nitrates	51	21
Pesticides	50	19
VOCs and SOCs	50	8
Inorganics (secondary)	38	3
Source: DWR 2003		

2.9.5.4 Yucaipa Groundwater Subbasin

Most of the recent groundwater samples from the Yucaipa subbasin indicate a calcium bicarbonate-type groundwater, generally meeting drinking water standards, with little variation across the basin. Groundwater has higher mineral concentrations, but otherwise is similar to the surface water in the area. The average TDS from public supply wells is 322 mg/L, with a range of 200 to 630 mg/L. This is similar to average TDS values of 343 mg/L and 334 mg/L estimated from other sources (DWR 2003). The TDS estimates in the Yucaipa subbasin are lower than the Riverside subbasin and slightly higher than the Rialto-Colton and Bunker Hill subbasins.

Table 2-16 contains data from wells sampled for various pollutants (DWR 2003). Some samples contained concentrations above the MCL. This was true for one sample with primary inorganics, VOCs, and SOCs; four samples with pesticides and secondary inorganics; and 12 samples with nitrates. As in the Riverside subbasin, nitrates were found more than any other constituent in the sample well set.

Table 2-16
Prevalence of Contaminants in Yucaipa Subbasin Wells

Constituent	No. Wells Sampled	No. Wells with a Concentration Above an MCL
Inorganics (primary)	43	1
Radiological	44	1
Nitrates	46	12
Pesticides	43	4
VOCs and SOCs	44	1
Inorganics (secondary)	43	4
Source: DWR 2003.		

2.9.5.5 San Timoteo Groundwater Subbasin

The mineral character of groundwater beneath San Timoteo Canyon is sodium bicarbonate; calcium bicarbonate in the alluvium of Little San Gorgonio Creek; calcium bicarbonate in younger alluvium near Beaumont; and sodium bicarbonate in older deposits. Water samples from 24 public supply wells have an average TDS content of approximately 253 mg/L, with a range of 170 to 340 mg/L. The TDS range is lower than in the Riverside, Bunker Hill, and Yucaipa subbasins and comparable to the Rialto–Colton subbasin. Out of 27 sampled wells, one well contained secondary inorganics above the MCL (Table 2-17). Otherwise, no contaminants were found (DWR 2003).

Table 2-17
Prevalence of Contaminants in San Timoteo Subbasin Wells

Constituent	No. Wells Sampled	No. Wells with a Concentration Above an MCL
Inorganics (primary)	27	0
Radiological	26	0
Nitrates	28	0
Pesticides	27	0
VOCs and SOCs	27	0
Inorganics (secondary)	27	1
Source: DWR 2003.		

2.9.5.6 Cajon Subbasin

The mineral character of groundwater within the Cajon subbasin has an average TDS content of about 130 mg/L, with a range of 99 to 155 mg/L. The TDS range is lower than in the Riverside, Bunker Hill, and Yucaipa subbasins, and comparable to the Rialto–Colton subbasin. Only two public supply wells have been sampled. No exceedance of MCL in drinking water has been reported.

2.10 Ecological and Environmental Resources

2.10.1 San Bernardino National Forest Land and Resource Management Plan

The U.S. Forest Service (USFS) has jurisdiction over land uses in the San Bernardino National Forest. The *San Bernardino National Forest Land and Resource Management Plan of 1988* (USDA Forest Service 1988) directs the management of the forest. Its goal is to provide a management program that reflects a mix of activities that allows both the use and protection of forest resources; fulfills legislative requirements; and addresses local, regional, and national issues.

The San Bernardino National Forest is divided into 15 management areas based on (1) combinations of watersheds that have similar characteristics, (2) wilderness areas, and (3) potential wilderness areas. The Seven Oaks Dam and adjacent areas are located in the Central Section of the San Gorgonio District of the Santa Ana Management Area. Much of the area in this district is classified as the Santa Ana Recreation Area, a designation designed to provide continued protection of the recreation values for which it was established.

The management for this area emphasizes (1) fire management, (2) recreation (dispersed recreation opportunities in the lower SAR area), and (3) other integrated activities (including wildlife management and non-motorized recreation).

2.10.2 U.S. Bureau of Land Management (BLM) Area of Critical Environmental Concern

The BLM designated an Area of Critical Environmental Concern (ACEC) in the SAR in 1994. The purpose of the ACEC designation is to protect and enhance the habitat of federally listed species occurring in the area while providing for the administration of valid existing rights (BLM 1996). The species of concern in the SAR area include the SAR wooly-star, the Slender-Horned spineflower, and the San Bernardino kangaroo rat. The BLM manages over 1,100 acres that are part of the ACEC. Although the establishment of the ACEC is important in regard to conservation of sensitive habitats and species in this area, the administration of valid existing rights supersedes BLMs conservation abilities in this area. Existing rights include a withdrawal of federal lands in this area for water conservation through an act of Congress, February 20, 1909 (Pub. L. 248). The entire ACEC is included in this withdrawn land and may be available for water conservation measures such as the construction of percolation basins, subject to compliance with the act.

The San Bernardino Kangaroo rat is a species of concern in the SAR area. (Photo, courtesy of NPS).

2.10.3 U.S. Army Corps of Engineers Wooly-Star Preserve Area

To protect significant populations of the SAR wooly-star (a federally protected plant species), lands within the corridor of the SAR and portions of the alluvial fan terraces were set aside as a conservation area. The Wooly-Star Preserve Area (WSPA) is a 764-acre area located west of the Greenspot Bridge that crosses the SAR. The WSPA was established by mitigation in the 1990s by the USACE and local sponsors to address impacts related to the construction of Seven Oaks Dam.

2.10.4 Western Riverside County Multi-Species Habitat Conservation Plan

The Multi-Species Habitat Conservation Plan (MSHCP) is a comprehensive, multi-jurisdictional plan that focuses on the conservation of species and their habitats in western Riverside County. The plan area includes all unincorporated land in Riverside County west of the crest of the San Jacinto Mountains to the Orange County line, as well as the jurisdictional areas of a number of cities. The MSHCP established a conservation area of more than 500,000 acres and focuses on the conservation of 146 species.

2.10.5 SAR Corridor

The SAR corridor is defined as the area located within the incised channel of the river. Persistent aquatic and riparian habitats are present immediately downstream of the Seven Oaks Dam plunge pool; in oxbows; in fault zones; in areas with manmade or natural water sources, such as a tributary confluence or a storm drain outfall; in areas with perched water tables; and downstream of river mile (RM) 54.5, where groundwater emerges and flows on the surface of the riverbed (USACE 2000). Much of the habitat within the project area provides optimal foraging opportunities and several areas provide adequate breeding areas for raptors. Trees found in the riparian woodlands provide perches for foraging over the scrub and grassland.

Except during the winter months of December through March, surface flows in the SAR between Seven Oaks Dam and the San Bernardino International Airport are generally absent, and the riverbed is a braided, dry channel. Riparian habitat from Cuttle Weir to the airport is uncommon and limited to a few patches.

Downstream from the airport, surface flows are more prevalent and large areas of contiguous, well-developed riparian habitat as well as giant reed (*Arundo donax*) infestations along the banks of the SAR are common. Just downstream of the region are Prado Flood Control Basin and Prado Dam. Approximately 2,150 acres of land upstream of Prado Dam are owned by Orange County Water District (OCWD), the local sponsor for Prado Dam. Within this area are

approximately 465 acres of constructed wetlands as well as large areas of mature riparian habitat, naturally occurring wetlands, and deepwater habitats.

The vegetation communities discussed above provide wildlife habitat throughout most of the SAR corridor. In general, wildlife within the area is extremely diverse and abundant due to the amount of natural open space and diversity of habitat types from the active river channels to the uppermost flood terraces. While a few wildlife species depend entirely on a single habitat type, the mosaic of all the vegetative communities within the study area and adjoining areas constitutes a functional ecosystem for a variety of wildlife species.

The SAR contains a variety of riverine conditions and habitat types that support a number of fish species throughout nearly the entire river when winter and spring flows are present. Portions of the SAR, such as the segment that traverses the alluvial fan, are dry during most of the year and, consequently, offer only temporary habitat for fish.

The scrub, woodland, and riparian habitats in the SAR corridor provide foraging and cover habitat for song birds including year-round residents, seasonal residents, and migrating individuals. The overall condition of these communities in the corridor is good and mostly undisturbed. In addition, portions of the SAR and its tributaries provide a perennial water source for birds.

The SAR wash is a state-designated Significant Natural Area. Approximately 27 sensitive plant and animal species are known to occur in the wash. About 760 acres of BLM land within the Upper SAR wash area downstream from the Greenspot Bridge have been designated by BLM as an ACEC because of the presence of the federally listed species, SAR wooly-star, and the San Bernardino kangaroo rat (U.S. Fish and Wildlife Service (USFWS) 1988).

Wildlife corridors link areas of suitable habitat that are separated by unsuitable habitat such as rugged terrain, development, or changes in vegetation. Riverbeds often provide a favorable passageway for wildlife movement to otherwise disconnected areas. Historically, the SAR bed was likely to have supported substantial regional wildlife movement. In addition, the SAR floodplain may have acted as a hub for wildlife movement with many major tributaries converging in a relatively short section of the river. In recent years, however, loss of habitat due to development on the floodplain and surrounding lowlands, as well as construction of Seven Oaks Dam, are likely to have greatly reduced the amount of regional movement through the corridor.

3 Water Budget for Integrated Regional Water Management Plan Region

The water budget for the Integrated Regional Water Management Plan (IRWM Plan) Area (Region) compares the supply and demand for the Region. The water supply and water demand data that comprise the water budget are used in the development of integrated water management strategies that will be used to manage both supplies and demands into the future.

The data presented in this report are based upon water demand figures provided by each water agency in the Region. Actual demand figures for each agency may be different based upon the water agency's water right(s) recognized by the State of California (State).

3.1 Review of Previously Published Water Budgets

The San Bernardino Valley Municipal Water District (Valley District) compiled a water budget for its 352-square-mile service area in its Regional Water Facilities Master Plan (1995). The original Valley District water budget, with some modifications, was used by the Santa Ana Watershed Project Authority (SAWPA) as the basis for water budget tables in the SAWPA Integrated Water Resources Plan (2002). In 2004, Valley District and Western Municipal Water District (Western) updated the water budget by incorporating projections from the 2000 Urban Water Management Plans (UWMPs) in the Valley District/Western Santa Ana River (SAR) Water Right Application Draft Environmental Impact Report (DEIR) (2004).

3.2 Data Sources

The IRWM Plan water budget relies primarily on the 2005 update of the UWMPs within the Region. Table 3-1 provides a list of the water agencies within the Region and the UWMPs that were used in this analysis. Not all water agencies have completed the update of their UWMPs, and not all agencies are required to publish a UWMP (agencies that provide water to less than 3,000 connections and less than 3,000 acre-feet per year are not required to publish a UWMP). For these agencies, the necessary data for the water budget were obtained from the Western-San Bernardino Watermaster Report (see Chapter 2). For the purpose of preparing the water demands and supplies, the Region's water agencies were divided into four groups: (1) Non-Plaintiffs (water agencies in San Bernardino County of the Western Judgment (Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426),

(2) Plaintiffs of the Western Judgment (water agencies in Riverside County), (3) water agencies outside the Western Judgment and located in the San Gorgonio Pass Water Agency (SGPWA) service area, and (4) water agencies outside the Western Judgment and located in the San Bernardino Mountains area.

Table 3-1
Data Utilized in the Water Budget

Water Agency	2005 UWMP	Other Documents
Non-Plaintiffs of the Western Judgment		
Colton, City of		Watermaster, SCAG
East Valley Water District	X	
Fontana Water Company	X	2005 Master Plan, Pers. Comm.
Loma Linda, City of		2002 UWMP
Marigold Mutual WC		Rialto, WVWD 2005 UWMP
Muscoy Mutual WC		2005 Community Plan
Redlands, City of - Water Utility	X	
Rialto, City of	X	Updated in 2006
San Bernardino MWD	X	
Terrace Water Co.		Watermaster
West Valley Water District	X	Personal Communication
Yucaipa Valley Water District[1]	X	
Other/Private[2]		Watermaster
Plaintiffs of the Western Judgment		
Meeks and Daley WC		Watermaster
Riverside-Highland WC	X	Watermaster
Riverside Public Utilities	X	Watermaster
San Gorgonio Pass Area		
Beaumont Cherry Valley WD	X	2006 LAFCO Report
Banning, City of[3]	X	2006 LAFCO Report
Cabazon Water District[3]		2006 LAFCO Report
South Mesa Water Company	X	2006 LAFCO Report
Yucaipa Valley Water District[1]	X	2006 LAFCO Report
San Bernardino Mountains Area		
Big Bear City CSD		2000 UWMP
City of Big Bear Lake DPW	X	
Big Bear Municipal WD		Personal Communication

[1]Yucaipa Valley Water District overlies the SGPWA and the Valley District. Yucaipa Valley WD includes Western Heights WC and Oak Valley.
[2]Includes Devore WC, Crafton WC, Inland Valley Development Company, Mount Vernon WC, Pioneer Mutual WC, Pharaoh-Powell Mutual WC, Redlands WC, Tennessee WC, California Portland Cement Company, Corridor Land Company, El Rivino Country Club, and Elsinore Valley MWD.
[3]Agencies outside of the Santa Ana River Watershed but inside the SGPWA service area.

3.2.1 Applied Water Demands

The applied water demands developed for the water budget are based on the demand projections provided by each individual agency. If demand projections were unavailable for an agency, a per-capita applied water demand was calculated using Southern California Association of Governments (SCAG) data along with the water demands published by Western-San Bernardino Watermaster. Projections for the water users that do not belong to a city or water agency are based on historical demand trends using historical data compiled by the Watermaster. The applied water demands from 2005 to 2030 are summarized in Table 3-2.

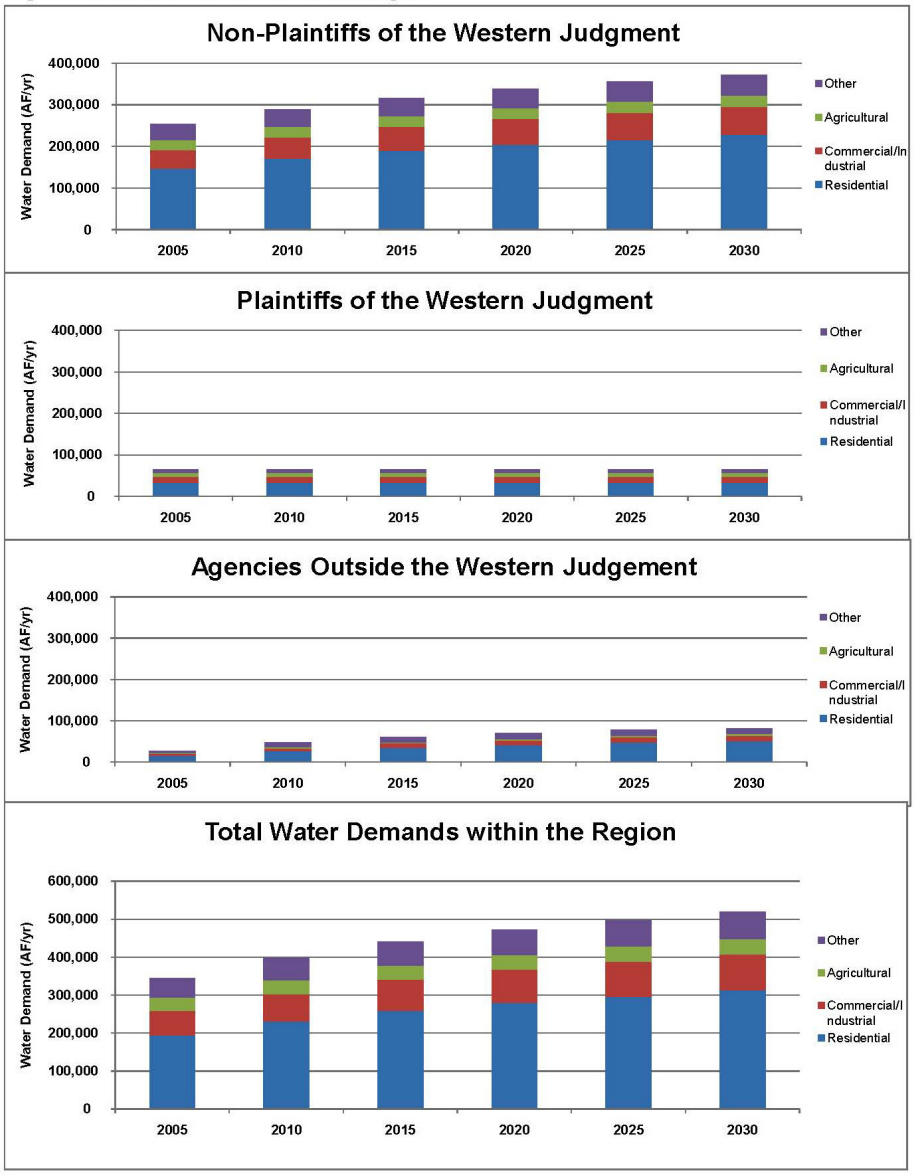
The Urban Water Management Planning Act requires that water demands be broken down into water use categories. The categories selected for this Region are Residential, Commercial/Industrial, Agricultural, and Other. The Other category includes uses such as unaccounted-for system losses, water sales to other agencies, and water used in construction. Figure 3-1 displays the total water demands in the region and breaks them down by water use. The projected total demand in the Region is expected to increase by about 50 percent from 349,200 acre-feet in 2005 to 519,700 acre-feet in 2030 (See Table 3-2).

Table 3-2
Future Applied Water Demands in the Region (Acre-Feet per Year)

Water Agency	2005	2010	2015	2020	2025	2030
Non-Plaintiffs of the Western Judgment						
Colton, City of	11,900	13,500	14,800	16,100	17,300	17,300
East Valley Water District	27,000	30,400	34,200	35,900	35,900	35,900
Fontana Water Company[1]	31,300	37,200	39,600	39,600	39,600	39,600
Loma Linda, City of	7,600	8,800	9,400	9,900	10,200	10,600
Marygold Mutual WC	0	0	1,500	1,500	1,500	1,500
Muscoy Mutual WC	2,100	2,100	2,100	2,100	2,100	2,100
Redlands, City of - Water Utility	45,500	50,600	55,000	59,500	61,500	65,300
Rialto, City of	14,300	13,300	13,900	13,900	13,900	13,900
San Bernardino MWD	47,500	54,800	61,900	67,700	73,500	73,500
Terrace Water Co.	900	900	900	900	900	900
West Valley Water District	25,300	30,000	33,700	39,000	45,000	56,400
Yucaipa Valley Water District[2]	13,900	13,200	15,600	17,300	19,400	20,000
Other/Private[3]	28,600	28,300	28,000	27,700	27,400	27,100
Subtotal	**255,900**	**283,100**	**310,600**	**331,100**	**348,200**	**364,100**
Plaintiffs of the Western Judgment[4]						
Meeks and Daley WC	7,800	7,800	7,800	7,800	7,800	7,800
Riverside-Highland WC	4,300	4,300	4,300	4,300	4,300	4,300
Riverside Public Utilities	52,200	52,200	52,200	52,200	52,200	52,200
Regents of California	500	500	500	500	500	500
Subtotal	**64,800**	**64,800**	**64,800**	**64,800**	**64,800**	**64,800**
San Gorgonio Pass Area						
Beaumont Cherry Valley WD	8,800	22,300	27,900	29,300	30,000	30,500
Banning, City of	9,500	12,500	15,500	18,500	21,600	24,600
Cabazon Water District	1,000	4,000	8,000	12,000	16,000	16,000
South Mesa Water Company	2,500	2,700	3,200	3,600	3,700	4,300
Yucaipa Valley Water District[2]	1,800	5,400	6,100	7,100	7,300	8,600
Subtotal	**23,600**	**46,900**	**60,700**	**70,500**	**78,600**	**84,000**
San Bernardino Mountains Area						
Big Bear City CSD	1,300	1,400	1,500	1,600	1,600	1,600
City of Big Bear Lake DPW	2,600	2,900	3,200	3,500	3,900	4,200
Big Bear Municipal Water District	1,000	1,000	1,000	1,000	1,000	1,000
Subtotal	**4,900**	**5,300**	**5,700**	**6,100**	**6,500**	**6,800**
TOTAL	**349,200**	**400,100**	**441,800**	**472,500**	**498,100**	**519,700**

[1]The demands shown for Fontana Water Company are their projected supplies from the Region, not FWC total demand. Portions of the supplies will be delivered outside the Region.
[2]Includes Western Heights WC and Oak Valley and overlies both SGPWA and Valley District.
[3]Includes Bear Valley Mutual WC, Devore WC, Crafton WC, Inland Valley Development Company, Mount Vernon WC, Pioneer Mutual WC, Pharaoh-Powell Mutual WC, Redlands WC, Tennessee WC, California Portland Cement Company, Corridor Land Company, El Rivino Country Club, Elsinore Valley MWD, San Gabriel Valley Water Company, and Reche Canyon Mutual WC.
[4]The demands for the Plaintiffs are their adjusted rights to the SBBA, not the total demand of the Plaintiff water agencies

Figure 3.1. Water Demands within the Region



3.2.1.1 Increase in Water Demand in Dry Years

During drought periods, water demands increase due to the increased irrigation demands for agriculture and landscaping. The demands outlined in Table 3-2 and Figure 3-1 are the average water demands projected by the water agencies. For the purposes of the modeling of the San Bernardino Basin Area (SBBA) analysis, water demands were assumed to increase in "critically dry" years by four percent (California Department of Water Resources (DWR) Bulletin

160-93). Critically dry years were defined to be the driest 20 percent of years using the SAR annual flows near Mentone from 1962 to 2000.

3.2.1.2 Reduced Demand Due to Conservation

Conservation reduces water demand in ways that are not easily measured. Demand is reduced through changed consumer behaviors and more water-efficient fixtures like ultra-low-flow toilets and showerheads. These savings happen gradually over time as non-conserving fixtures are replaced with newer water-efficient models. The agencies within the Region implement a prescribed set of urban water conservation best management practices (BMPs) according to the Urban Water Planning Act. The current water demands reflect the effect of water conservation projects that are implemented by the purveyors. However, in general, demand projections of the UWMPs do not include estimates of conservation due to the implementation of future water conservation programs.

3.2.2 Water Supplies

The following sections provide a description of each water supply within the Region, the projected demands on each supply, and an estimate of the available water supply based on data presented in UWMPs and the Western-San Bernardino Watermaster report. The majority of the groundwater basins in the Region are adjudicated. The projected demands on each water supply were based on the UWMPs. The projected water supplies of water purveyors were scaled to meet the projected demand. This was necessary to make a realistic projection of demand on shared water supplies within the Region.

3.2.2.1 San Bernardino Basin Area

The San Bernardino Basin Area (SBBA) was adjudicated by the Western Judgment in 1969. The judgment established the natural safe yield of the SBBA to be a total of 232,100 acre-feet per year for surface water diversions and groundwater extractions. Surface water is diverted from Mill Creek, Lytle Creek, and the SAR. The average surface water diversions in the SBBA for direct use from 1968 to 2000 were 39,000 acre-feet per year. It was determined in the Western Judgment that the Plaintiffs have a 64,862 acre-feet per year share of the safe yield, which equates to 27.95 percent of the safe yield. The Plaintiffs include the City of Riverside (the successor to the Riverside Water Company and the Gage Canal Company), Riverside Highland Water Company, Meeks & Daley Water Company, and the Regents of the University of California (Regents).

The Non-Plaintiffs' (agencies within San Bernardino County) rights are 167,238 acre-feet which equates to 72.05 percent of the safe yield. If the Non-Plaintiff extractions exceed the safe yield of the SBBA, Valley District is obligated to import and recharge a like amount of water into the SBBA. The Western-San Bernardino Watermaster produces an annual report calculating the total

extractions and comparing it to the safe yield. If the total extractions are less than the safe yield, it results in a "credit." If the total extractions are more than the safe yield, it results in a replenishment obligation. Table 3-3 and Figure 3-2 outline the projected increase in demands for the local surface water and groundwater in the SBBA and provide an estimate of how much replenishment will be needed in the future. According to the 2006 Annual Western-San Bernardino Watermaster Report, Valley District has 256,000 acre-feet of credit accumulated in the SBBA.

The SBBA is forecasted to supply over 60 percent of the future water demand within the Region. Computer models were used to help determine whether the available surface water (local surface water and imported water) and groundwater supplies would meet ultimate demands (2030). Based on the modeling results (described in Chapter 4.3), if the State Water Project (SWP) is as reliable as DWR estimated in 2005 (77%) and the Valley District's water rights application on the SAR is approved, the SBBA storage can be maintained to meet the 2030 demands.

Table 3-3
Projected SBBA Local Surface Water Diversions and Groundwater Extractions
(Acre-Feet per Year)

Water Agency	2005[1]	2010	2015	2020	2025	2030
Non-Plaintiffs						
Colton, City of	5,600	*7,000*	*7,700*	*8,300*	*9,000*	*9,000*
East Valley Water District	26,100	21,400	25,200	27,000	27,000	27,000
Fontana Water Company	17,300	*18,000*	*18,000*	*18,000*	*18,000*	*18,000*
Loma Linda, City of	6,600	8,800	9,400	9,900	10,200	10,600
Marygold Mutual WC	*0*	*0*	*1,500*	*1,500*	*1,500*	*1,500*
Muscoy Mutual WC	2,100	2,100	2,100	2,100	2,100	2,100
Redlands, City of - Water Utility	*37,500*	*39,100*	*42,000*	*45,000*	*47,000*	*50,300*
Rialto, City of	*11,400*	*9,300*	*9,900*	*9,900*	*9,900*	*9,900*
San Bernardino MWD	49,900	53,900	61,000	66,900	72,700	72,700
Terrace Water Co.	*800*	*900*	*900*	*900*	*900*	*900*
West Valley Water District	*10,900*	*12,800*	*14,800*	*17,600*	*21,100*	*30,700*
Other/Private[2,3]	*22,200*	*20,200*	*19,900*	*19,600*	*19,300*	*19,000*
Subtotal	**190,400**	**193,500**	**212,400**	**226,700**	**238,700**	**251,700**
Plaintiffs (Based on Adjusted Rights[5])						
Meeks & Daley WC	7,800	7,800	7,800	7,800	7,800	7,800
Riverside-Highland WC	4,300	4,300	4,300	4,300	4,300	4,300
Riverside Public Utilities	52,200	52,200	52,200	52,200	52,200	52,200
Regents of California	500	500	500	500	500	500
Subtotal	**64,800**	**64,800**	**64,800**	**64,800**	**64,800**	**64,800**
Total Groundwater and Surface Water Demand	**255,200**	**258,300**	**277,200**	**291,500**	**303,500**	**316,500**
Safe Yield	**232,100**	**232,100**	**232,100**	**232,100**	**232,100**	**232,100**
Extractions above Safe Yield	**23,200**	**26,300**	**45,200**	**59,500**	**71,500**	**84,500**
Return flow from Extractions above the Safe Yield[6]	**8,400**	**9,500**	**16,300**	**21,400**	**25,700**	**30,400**
Replenishment Obligation[7]	**14,800**	**16,800**	**28,900**	**38,100**	**45,800**	**54,100**

Italic = Estimated value. Projected demands in the SBBA were not specified in UWMPs.

[1]The extractions for 2005 are based on the Western-San Bernardino Watermaster 2006 Annual Report.
[2]Includes Devore WC, Crafton WC, Inland Valley Development Company, Mount Vernon WC, Pioneer Mutual WC, Pharaoh-Powell Mutual WC, Redlands WC, and Tennessee WC.
[3]In 2005 Other/Private includes a portion a Bear Valley Mutual Water Company (BVMWC) demands. BVMWC stock is owned by the City of Redlands and East Valley WD. After 2005 it was assumed that BVMWC are included in the City of Redlands and East Valley WD projections, as they purchase rest of the shares.
[4]Adjusted rights are based on the natural safe yield of the SBBA and were effective in 1972. Prior to 1972, extractions were limited to the "base rights," which were the average extractions during the base period from 1959 to 1963.
[5]The Western Watermaster assumes a 36 percent return flow from extractions above the safe yield.
[6]The Replenishment Obligation is the Extractions above the Safe Yield minus the Return Flow from the extractions. above the Safe Yield.

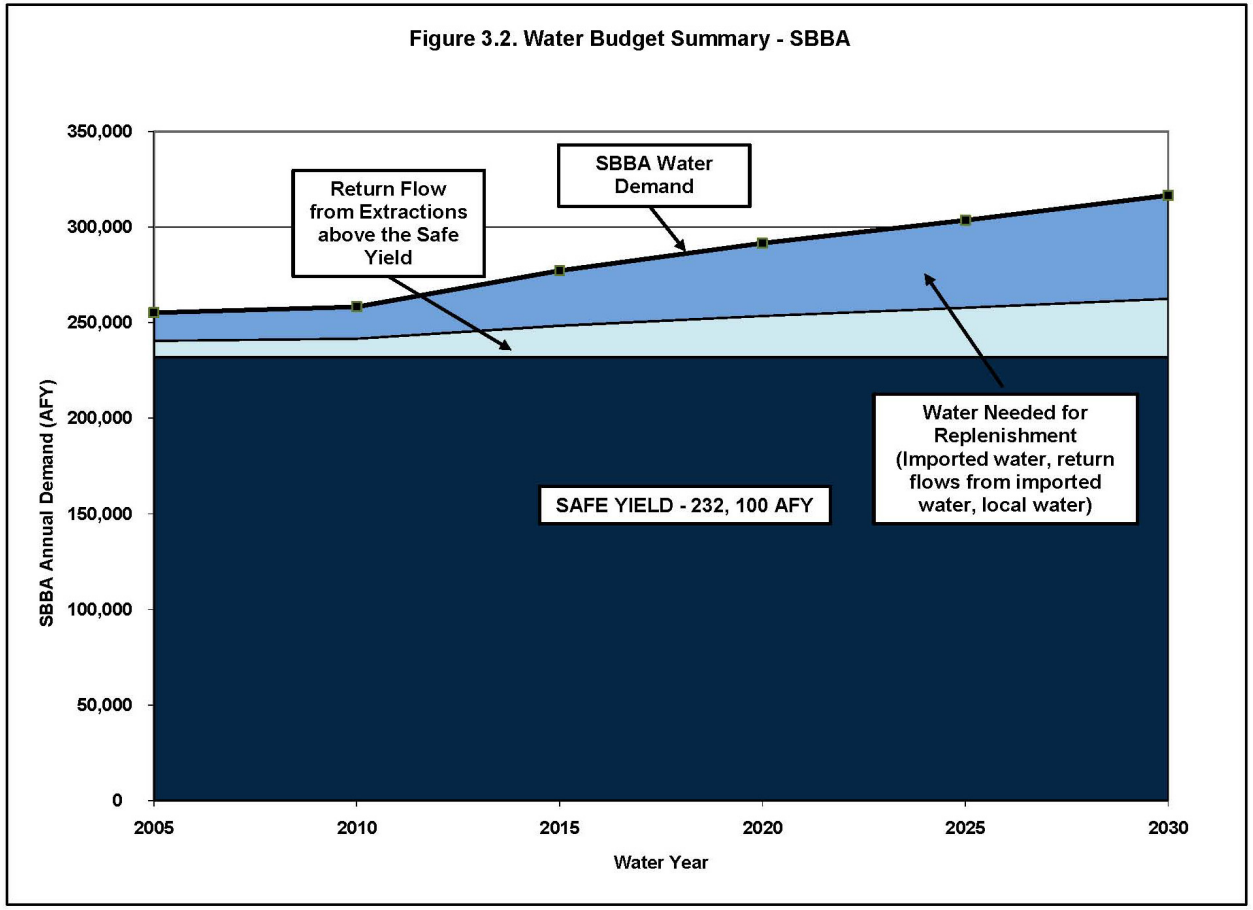


Figure 3.2. Water Budget Summary - SBBA
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
SBBA Annual Demand (AFY)
2005
2010
2015
2020
2025
2030
Water Year
Return Flow from Extractions above the Safe Yield
SBBA Water Demand
Water Needed for Replenishment (Imported water, return flows from imported water, local water)
SAFE YIELD - 232, 100 AFY

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3.2.2.2 Colton Basin Area

The groundwater extractions in the Colton Basin Area are governed by the Rialto Basin Decree and the Western Judgment. The Western Judgment uses the terminology "Colton Basin Area"; however, this basin is also known as the Rialto-Colton Basin. Fontana Water Company (FWC), City of Rialto, City of Colton, and West Valley Water District are subject to the Rialto Basin Decree, entered on December 22, 1961, by the Superior Court for the County of San Bernardino. Entitlement extractions for any given water year (October 1 to September 30) are affected by groundwater elevations between March and May for three specific "index" wells (Duncan Well, Willow Street Well, and Boyd Well). Under specified conditions, groundwater extractions may be limited during certain months.

The Western Judgment requires Valley District to maintain the average lowest static water levels in three index wells in the Colton Basin Area and Riverside North Basins above 822.04 feet mean sea level (msl). If the water levels fall below 822.04 feet msl, Valley District is obligated to recharge the basin with imported water or reduce extractions. Extractions for use in Riverside County are limited to 3,381 acre-feet per year.

The safe yield for the Colton Basin Area was not defined by the Western Judgment or the Rialto Basin decree. Extractions during the five-year base period of the Western Judgment, 1959 to 1963, were, on average, 11,731 acre-feet per year. Extractions have averaged 17,300 acre-feet per year from 1996 to 2005. Since 1971, when the Watermaster reports began, the water levels in the three index wells have never fallen below 822.04 feet. In 2006, the average lowest static level was 878.74 feet msl for the three index wells. Projected extractions in the Colton Basin Area are found in Table 3.4.

Since the safe yield has not been determined for the Colton Basin Area, the average extraction from 1996-2005 of 17,300 acre-feet per year was used as the available supply from the Colton Basin Area in the water budget summary.

Table 3-4
Projected Extractions in the Colton Basin Area (Acre-Feet per Year)

Water Agencies	**2005[1]**	**2010**	**2015**	**2020**	**2025**	**2030**
Colton, City of	4,100	4,100	4,500	4,900	5,300	5,300
Rialto, City of	1,600	2,000	2,000	2,000	2,000	2,000
West Valley Water District	2,200	3,500	4,500	5,900	8,200	10,000
Fontana Water Company	7,300	8,000	8,000	8,000	8,000	8,000
Other/Private[2]	2,100	2,100	2,100	2,100	2,100	2,100
Total	17,300	17,600	19,000	20,800	23,500	25,300
Historical Average (1996-2005)	17,300	17,300	17,300	17,300	17,300	17,300

[1]The extractions for 2005 are based on the 2006 Western-San Bernardino Watermaster Annual Report.
[2]Includes San Gabriel Valley WC and Reche Canyon Mutual WC.

3.2.2.3 Riverside North Basin

Groundwater extractions in the Riverside North Groundwater Basin (the portion of the Riverside Basin in San Bernardino County) are governed by the Western Judgment. Extractions for use in San Bernardino County are unlimited, provided that water levels at three index wells in the Rialto-Colton and Riverside North Basins stay above 822.04 feet msl. (Extractions from the Riverside North Basin for use in Riverside County are limited to 21,085 acre-feet per year.)

Total extractions during the five-year base period of the Western Judgment, 1959 to 1963, were, on average, 33,729 acre-feet per year. Historically, average static low measurements have never been below 822.04 feet and in 2006 were 878.74 feet msl. Because the safe yield of the Riverside North Basin has not been determined, the average historical extraction from 1996 to 2005 of 30,100 acre-feet per year was used as the available supply of the Riverside North Basin. Because the agencies in Riverside County are limited to 21,085 acre-feet per year, the available supply used in the water budget summary is the amount for the Non-Plaintiffs of 9,000 acre-feet per year. Table 3-5 lists the projected demands on the Riverside North Basin. If this increased production causes the water levels to drop, water agencies would have to either restrict use or Valley District would need to recharge the basin with imported water.

Table 3-5
Projected Extractions in the Riverside North Basin (Acre-Feet per Year)

Water Agencies	**2005[1]**	**2010**	**2015**	**2020**	**2025**	**2030**
Colton, City of	2,100	2,400	2,700	2,900	3,100	3,100
Rialto, City of	-0	1,000	1,000	1,000	1,000	1,000
West Valley Water District	1,300	2,900	3,700	4,800	5,000	5,000
Agencies in Riverside County[2]	11,200	21,100	21,100	21,100	21,100	21,100
SBMWD – RIX Overextraction[3]	5,000	6,000	6,000	6,000	6,000	6,000
Other/Private[4]	5,000	6,000	6,000	6,000	6,000	6,000
TOTAL	**29,100**	**38,400**	**39,500**	**40,800**	**41,200**	**41,200**
Historical Average (1996-2005)	30,100	30,100	30,100	30,100	30,100	30,100

[1]The extractions in 2005 are based on the 2006 Western-San Bernardino Watermaster Report
[2]Agencies in Riverside County have the adjusted right of 21,085 AF in the Riverside North basin.
[3]The Rapid Infiltration and Extraction (RIX) facility overlies the Riverside North Basin. In order to ensure that the secondary effluent applied to ground does not percolate to the groundwater and it is fully recovered, it is necessary that extractions exceed the amount of water applied. At present, this water is discharged from the RIX outfall into the SAR. In the long-term, the over-extractions rates will be approximately 10 percent more than that recharged (Watermaster 2003 pg. 14).
[4]Includes California Portland Cement Company, Corridor Land Company, El Rivino Country Club, and Elsinore Valley MWD.

3.2.2.4 Yucaipa Groundwater Basin

Yucaipa Valley Water District (YVWD) estimates the safe yield of the Yucaipa Groundwater Basin to be 10,000 acre-feet per year (YVWD 2005 pgs. 2-6). YVWD accounts for the majority of the demand on the Yucaipa Groundwater Basin. The City of Redlands Municipal Utilities Department and South Mesa Water Company also extract water from the Yucaipa groundwater basin to a lesser extent. YVWD demands are projected to increase from 15,700 acre-feet in 2005 to 28,600 acre-feet by 2030. In order to meet demands above the groundwater safe yield, YVWD plans to recycle water and import surface water from Mill Creek, SAR, and the SWP through transfer and exchange agreements with the City of Redlands and Valley District. YVWD's new water treatment plant became operational in 2007. There is potential to increase spreading of water in the Wilson Creek spreading grounds and also to utilize the Oak Glen Creek stream channel for additional recharge. By maximizing the existing spreading grounds and expanding spreading acreage along Oak Glen Creek (25 to 50 acres), the capability exists to spread from 7,000 to 14,000 acre-feet of surface water annually into the Yucaipa Basin.

Table 3-6
Projected Extractions in the Yucaipa Basin (Acre-Feet per Year)

Water Agencies	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Redlands, City of – Municipal Utilities Department	1,000	1,000	1,000	1,000	1,000	1,000
South Mesa Water Company	2,500	2,700	2,000	2,300	1800	1,800
YVWD	12,600	7,800	7,800	7,800	7,800	7,800
TOTAL	**16,100**	**11,500**	**10,800**	**11,100**	**10,600**	**10,600**
Safe Yield	**10,000**	**10,000**	**10,000**	**10,000**	**10,000**	**10,000**

3.2.2.5 Other Groundwater and Surface Water Supplies

3.2.2.5.1 San Gorgonio Pass Area Groundwater Basins

The supplies available in the SGPWA are based on the "2006 Report on the Water Supply Conditions in the San Gorgonio Pass Region" submitted to LAFCO by SGPWA and the San Timoteo Watershed Management Authority (STWMA). This report concluded that the retail agencies in the region will be able to supply the projected demands to 2030 as long as the agencies aggressively develop local supplies and recycled water, complete the East Branch extension, and secure additional supplies outside the SGPWA service area.

The available groundwater supplies in the San Gorgonio Pass region are found in Table 3-7. The available supplies were based on Table 7 of the 2006 LAFCO report.

Table 3-7
Projected Extractions of Other Groundwater and Surface Water Supplies (Acre-Feet per Year)

Water Agencies	2005	2010	2015	2020	2025	2030
San Gorgonio Pass Area Groundwater Supplies[1]						
Edgar Canyon Basin	1,800	1,800	1,800	1,800	1,800	1,800
Beaumont Basin	24,700	24,700	8,700	8,700	8,700	8,700
Banning Storage Unit	2,500	2,700	3,000	3,200	3,500	3,700
Banning Canyon	5,000	5,000	5,000	5,000	5,000	5,000
Cabazon Storage Unit	1,000	6,000	6,000	6,000	6,000	6,000
Local Enhancements	700	8,100	10,100	11,500	12,900	13,600
Supplies	**35,700**	**48,300**	**34,600**	**36,200**	**37,900**	**38,800**
Big Bear Valley Groundwater						
City of Big Bear Lake D.W.P	2,500	2,800	2,200	2,500	2,800	3,100
Big Bear City C.S.D	1,300	1,400	1,500	1,600	1,600	1,600
BBV Groundwater Subtotal	**3,800**	**4,200**	**3,700**	**4,100**	**4,400**	**4,700**
Big Bear Lake						
Big Bear Municipal W.D.[2]	1,000	1,000	1,000	1,000	1,000	1,000
No Man's Land Groundwater						
Fontana Water Company	3,700	3,600	3,600	3,600	3,600	3,600
Rialto, City of	1,200	1,000	1,000	1,000	1,000	1,000
TOTAL PROJECTED SUPPLIES	**44,400**	**57,100**	**42,900**	**44,900**	**46,900**	**48,100**

[1]The SGPA groundwater available supplies are based on Wildermuth Demand and Supply data LAFCO 2006, Table 7.

[2]Surface water from Big Bear Lake used for snow making

3.2.2.5.2 Big Bear Valley Groundwater

Big Bear Community Services District (BBCSD) supplies all its water from groundwater in Big Bear Valley. The City of Big Bear Lake Department of Water and Power (BBLDWP) also produces groundwater in Big Bear Valley. The projected extractions from Big Bear Valley groundwater are found in Table 3-7. The reduction in demand in 2015 is due to the planned additional recycled water supply becoming available after 2010.

Water from Big Bear Lake is used for snowmaking at local ski resorts. Most of the melted snow from the resorts flows back into the lake.

3.2.2.5.3 Big Bear Lake

Big Bear Municipal Water District has a contract with Bear Mountain/Snow Summit to sell water from Big Bear Lake for snowmaking. The contract allows the sale of up to 1,300 acre-feet per year and no more than 11,000 acre-feet for any 10-year period. Currently, the sales of water for snowmaking have not exceeded 1,000 acre-feet per year. The projected extractions from Big Bear Lake are found in Table 3-7.

3.2.2.5.4 No Man's Land

FWC and City of Rialto extract water from a small unadjudicated groundwater basin between the Chino Basin and the Colton Basin Area known as "No Man's Land." FWC plans to extract 3,600 acre-feet per year from the basin. The City of Rialto plans also extract water from No Man's Land. Projected extractions from "No Man's Land" are found in Table 3-7.

3.2.2.6 State Water Project Water

SWP water is delivered from Northern California to Valley District. Valley District has the fifth largest SWP contract, with a maximum Table A amount of 102,600 acre-feet per year through 2035. To help assess the reliability of SWP supplies, DWR published the 2005 State Water Project Delivery Reliability Report. In this report, various hydrologic studies were conducted on the expected deliveries (expressed as percentage of entitlement) that would be available during different hydrologic years from 1922 to 1994. DWR ran two modeling studies, Study 4 and Study 5. Study 4 estimated the SWP deliveries based on 2005 demand levels with a repeat of the hydrology from 1922 to 1994. Study 4 estimated that, on average, 68 percent of the Table A SWP amounts would be delivered based on 2005 demand levels. Study 5 estimated SWP deliveries based on 2025 demand (which was assumed to be the full Table A amount). Study 5 estimated that, on average, 77 percent of the Table A SWP amounts would be delivered based on 2025 demand levels. The existing facilities and environmental constraints are the same between the two studies; the difference in reliability is the result of not limiting the deliveries to the 2005 demand levels for Study 5. (Example: in a repeat of the hydrology in 1956, Study 4 estimates the 2005 demand to be 3,639 thousand acre-feet (TAF).

Therefore, the deliveries are limited to 3,639 TAF. In 1956, with Study 5, the deliveries are not limited by the demands and the full amount of 4,133 TAF could be delivered). For this analysis, the reliability of the SWP is based on Study 5, which reflects the projected availability of SWP water not limited by 2005 demand levels. Therefore, Valley District's Table A amount of 102,600 acre-feet is estimated to be 77 percent reliable, or, on average, Valley District could receive 79,000 acre-feet per year of the Table A amount.

The water agencies in the Valley District service area forecast approximately 34,200 acre-feet per year for SWP deliveries in 2030, outlined in Table 3-8, based upon UWMP projections. Valley District is estimated to need approximately 54,100 acre-feet per year to meet the replenishment obligations in the SBBA with the projected demands in 2030 (Table 3-3). Replenishment may also be required for the Colton Basin Area and the Riverside North groundwater basins depending on the future water levels. Valley District would have 44,800 acre-feet per year of available SWP water to use for replenishment from its Table A amount after the SWP deliveries in 2030. The shortfall in 2030 may be met by the Valley District's water rights application on the SAR.

The other state water contractor in the Region is SGPWA. SGPWA has a contracted Table A amount of 17,300 acre-feet per year but is currently limited to importing 8,650 acre-feet per year until the next phase of the East Branch Extension is completed. Beaumont-Cherry Valley Water District and the City of Banning plan to purchase additional water from SGPWA and are investigating acquiring SWP water from other contractors' Table A amounts through SGPWA. The need for SWP water in the San Gorgonio Pass to meet the projected demands is higher than the current SGPWA Table A amount. Table 3-8 summarizes the forecasted demand for direct deliveries of SWP water and Table 3-9 is the available SWP supplies to the Region based on state water contractors' Table A amounts. Crestline-Lake Arrowhead Water Agency (CLAWA) is outside of the Region but provides 66 acre-feet per year water to the City of Big Bear Lake Department of Water and Power.

Table 3-8
Projected Deliveries of State Water Project (Acre-Feet per Year)

Water Agencies	2005	2010	2015	2020	2025	2030
SBVMWD						
East Valley WD	800	9,000	9,000	9,000	9,000	9,000
Fontana Water Company	3,000	5,000	5,000	5,000	5,000	5,000
Redlands, City of, Water Utility	0	3,000	4,000	5,000	5,000	5,000
San Bernardino MWD	2,000	2,000	2,000	2,000	2,000	2,000
West Valley Water District	1,300	7,000	7,000	7,000	7,000	7,000
Yucaipa Valley Water District	0	2,900	4,000	4,500	6,100	6,200
Subtotal	**7,100**	**28,900**	**31,000**	**32,500**	**34,100**	**34,200**
SGPWA (Portions of the SGPWA deliveries will be delivered for recharge)						
Banning, City of	0	4,000	8,800	9,300	9,300	9,300
Beaumont-Cherry Valley	0	6,000	6,800	6,800	6,900	6,900
Cabazon Water District	0	0	2,000	6,000	10,000	10,000
South Mesa Water Company	0	0	1,100	1,100	1,700	2,200
Yucaipa Valley Water District	500	2,300	3,600	4,700	4,800	6,100
Subtotal	**500**	**12,300**	**22,300**	**27,900**	**32,700**	**34,500**
CLAWA						
City of Big Bear Lake DWP	100	100	100	100	100	100
Subtotal	**100**	**100**	**100**	**100**	**100**	**100**
Total Deliveries	**7,700**	**41,300**	**53,400**	**60,500**	**66,900**	**68,800**

Table 3-9
Available State Water Supplies Based on Table A Amounts (AFY)

Water Agencies	Table A Amount	Average Reliability (77%)	Multi-Year Drought Reliability (39%)	Single-Year Drought Reliability (21%)
Valley District	102,400	79,000	40,000	21,500
SGPWA[1]	17,300	13,300	6,700	3,600
CLAWA to BBLDWP[2]	100	100	100	100
Total	**119,800**	**92,400**	**46,800**	**25,200**

[1]SGPWA plants to acquire an additional 21,000 AF of Table A amount for City of Banning and BCVWD.
[2]Crestline-Lake Arrowhead Water Agency supplies 66 acre-feet per year to BBLDWP.

3.2.2.7 Recycled Water

The projected use of recycled water is summarized by water agency in Table 3-10. Recycled water use is forecasted to increase from 9,200 acre-feet per year in 2005 to 35,700 acre-feet per year in 2030. The Orange County Judgment

(Orange County Water District v. City of Chino, et al., Case No. 117628) stipulated that Valley District shall be responsible for the delivery of an average annual supply of 15,250 acre-feet of "base flow" at the Riverside Narrows. Valley District has an agreement with the City of San Bernardino that at least 16,000 acre-feet of treated wastewater effluent will continue to discharge from its sewage treatment plant into the Santa Ana River to meet Valley District's obligation under the Orange County Judgment.

The City of Rialto delivers 85 acre feet per year of recycle water to the California Department of Transportation (Caltrans) (not shown on the table) and may increase to 2,260 acre feet in the future.

Table 3-10
Projected Use of Recycled Water (Acre-Feet per Year)

Water Agencies	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Banning, City of	0	1,500	1,800	2,200	2,500	2,800
Beaumont Cherry Valley WD	0	5,800	7,000	7,100	7,200	7,200
City of Big Bear Lake DWP	0	0	1,000	1,000	1,000	1,000
Fontana Water Company	0	2,600	5,000	5,000	5,000	5,000
Redlands, City of – Water Utility[6]	7,000	7,500	8,000	8,500	8,500	9,000
San Bernardino MWD	0	800	800	800	800	800
South Mesa Water Company	0	0	100	100	200	200
Yucaipa Valley WD	1,300	2,500	3,800	5,000	5,500	6,000
West Valley Water District	900	3,700	3,700	3,700	3,700	3,700
Total	**9,200**	**24,400**	**31,200**	**33,400**	**34,400**	**35,700**

[1]The recycled water by the City of Redlands would otherwise percolate into the SBBA. In the water budget summary this was not counted as a new supply. The recycled water that would otherwise discharge into surface streams and flow out of the Region was counted as new supply.

3.2.3 Water Budget Summary

The current balance between supply and applied demand for the Region is presented as the summary of the water budget in Table 3-11 to 3-15 and Figure 3-3. Based on this analysis, the water supplies within the Valley District and San Bernardino Mountains area are adequate to meet the demands through 2025. This is assuming the SWP reliability published in the 2005 State Water Project Delivery Reliability Report and the Valley District/Western Municipal Water District water rights applications for the SAR are approved. Additional water from the water rights applications is denoted as Seven Oaks Supply in Table 3-11. The amount available from the water rights application may be higher or lower and depends on the conditions placed on the applications by the State Water Resources Control Board. Additional conservation of 8,400 acre-feet will be needed to ensure supply reliability for 2030.

Table 3-11
Water Budget Summary for Valley District and San Bernardino Mountains (Acre-Feet per Year) for an Average Year

	2005	2010	2015	2020	2025	2030
SBBA Surface Water	39,000	39,000	39,000	39,000	39,000	39,000
Big Bear Surface Water	1,000	1,000	1,000	1,000	1,000	1,000
Seven Oaks Supply	0	0	10,800	10,800	10,800	10,800
Surface Water	**40,000**	**40,000**	**50,800**	**50,800**	**50,800**	**50,800**
SBBA Groundwater	193,100	193,100	193,100	193,100	193,100	193,100
SBBA Return Flows from Extractions above safe yield[2]	8,400	9,500	16,300	21,400	25,700	27,000
SBBA return flow from SWP deliveries[3]	1,000	5,000	5,400	5,800	5,800	5,800
Rialto-Colton Groundwater	17,300	17,300	17,300	17,300	17,300	17,300
Riverside North Groundwater	9,000	9,000	9,000	9,000	9,000	9,000
Yucaipa Groundwater	10,000	10,000	10,000	10,000	10,000	10,000
Other Groundwater	8,700	8,800	8,300	8,700	9,000	9,300
Groundwater	**247,500**	**252,700**	**259,400**	**265,300**	**269,900**	**271,500**
Imported Water[4]	**34,600**	**48,400**	**52,800**	**65,400**	**77,300**	**79,100**
Recycled Water[5]	**3,500**	**12,100**	**18,100**	**20,500**	**21,500**	**22,500**
Additional Conservation[6]	**0**	**0**	**0**	**0**	**0**	**8,400**
Total Supplies	**325,600**	**353,200**	**381,100**	**402,000**	**419,500**	**435,700**
Total Demands	**-325,600**	**-353,200**	**-381,100**	**-402,000**	**-419,500**	**-435,700**
Shortfall	**0**	**0**	**0**	**0**	**0**	**0**

[1]Water rights applications are pending. The supplies of the project depend on conditions placed on the applications by the State Water Resources Control Board. The 15,000 acre-feet are estimated based on the agreements in the Seven Oaks Accord and the Conservation District Settlement and are only preliminary estimates until the applications are approved. The Water Rights EIR estimates the average annual diversions could range from 10,000 to 27,000 acre-feet per year. The Plaintiffs portion is 27.95% and the Non-Plaintiffs portion is 72.05% or 10,800 acre-feet per year.
[2]The watermaster estimates 36% return flows from extractions above the safe yield of the SBBA. This is estimated in Table 3-3.
[3]The Watermaster estimates a 36% return from the direct deliveries of SWP in the SBBA. Only the direct deliveries to East Valley Water District and the City of Redlands were used in the calculations, as the other agencies that project to receive SWP water do not overly the SBBA.
[4]The amount of SWP water used in the given year is the minimum between (a) the difference between the applied demand and the surface water, groundwater, recycled water, and future Seven Oaks Supply and (b) the available Table water found in Table 3-10.
[5]The recycled water supply does not include recycled water from the City of Redlands, because it would otherwise percolate into the basin. The recycled water included would otherwise be discharged into surface streams and out of the Region, and therefore can be counted as new supply.
[6]Additional conservation was limited to five percent of the total demand.

Table 3-12
Water Budget Summary for San Gorgonio Pass Water Agency Area

	2005	2010	2015	2020	2025	2030
Groundwater	22,700	25,500	24,500	24,700	25,000	25,200
Imported Water	200	6,000	13,300	13,300	13,300	13,300
Recycled Water	0	7,300	8,900	9,400	9,900	10,200
Local Enhancement Projects	700	8,100	10,100	11,500	12,900	13,600
Additional Conservation[1]	0	0	3,000	3,500	3,900	4,200
Total Supplies	**23,600**	**46,900**	**59,800**	**62,400**	**65,000**	**66,500**
Total Demands	**-23,600**	**-46,900**	**-60,700**	**-70,500**	**-78,600**	**-84,000**
Shortfall	**0**	**0**	**-900**	**-8,100**	**-13,600**	**-17,500**

[1]Additional conservation was limited to five percent of the total demand.

Table 3-13
Region-Wide Water Budget Summary for Average Year (Acre-Feet per Year)

	2005	2010	2015	2020	2025	2030
Surface Water	40,000	40,000	50,800	50,800	50,800	50,800
Groundwater	270,900	286,300	294,000	301,500	307,800	313,700
Imported Water	34,800	54,400	66,100	78,700	90,600	92,400
Recycled Water	3,500	19,400	27,000	29,900	31,400	32,700
Additional Conservation	0	0	3,000	3,500	3,900	12,600
Total Supplies	**349,200**	**400,100**	**440,900**	**464,400**	**484,500**	**502,200**
Total Demands	**-349,200**	**-400,100**	**-441,800**	**-472,500**	**-498,100**	**-519,700**
Shortfall	**0**	**0**	**-900**	**-8,100**	**-13,600**	**-17,500**

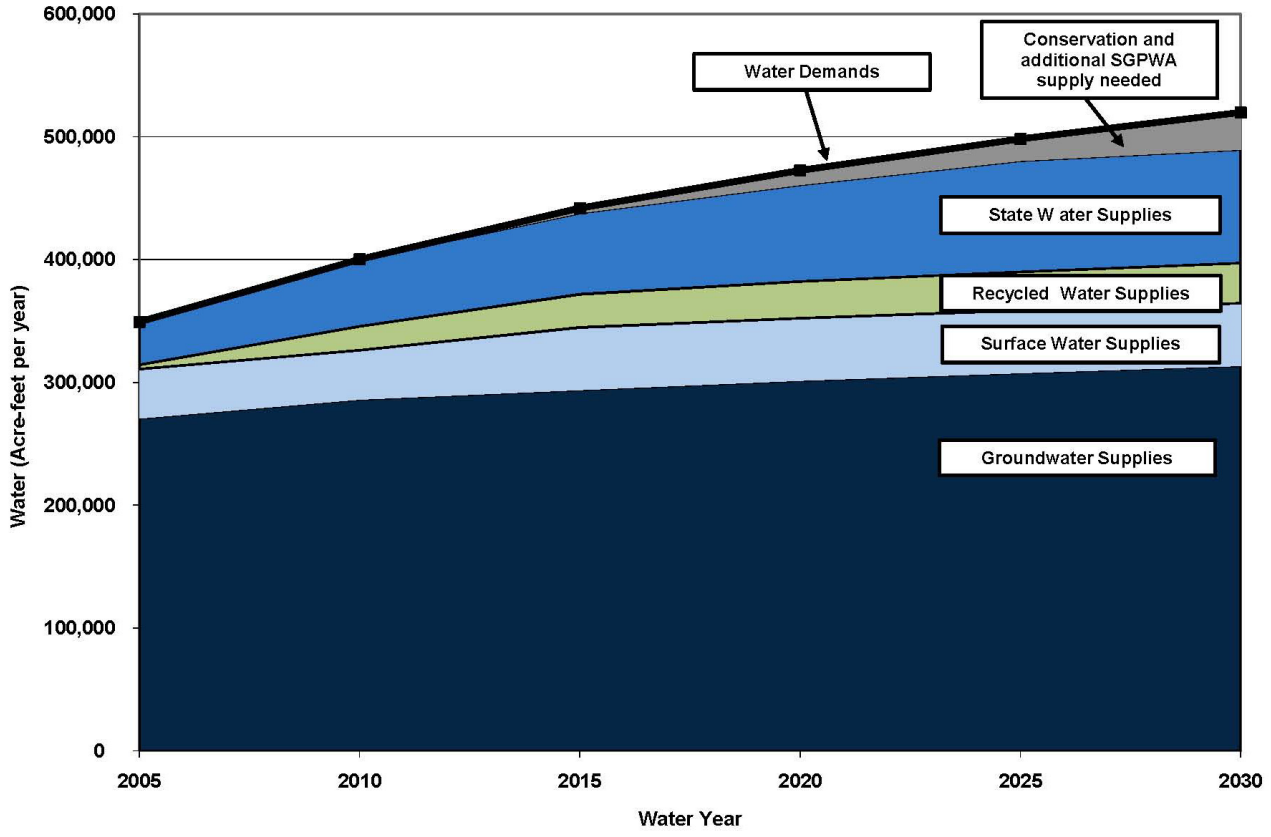
Table 3-14
Region-Wide Water Budget Summary for Multi-Year Drought (Acre-Feet per Year)

	2005	2010	2015	2020	2025	2030
Surface Water	30,000	30,000	30,000	30,000	30,000	30,000
Groundwater	289,700	304,000	335,100	362,400	371,000	372,200
Imported Water	26,000	46,700	46,700	46,700	46,700	46,700
Recycled Water	3,500	19,400	27,000	29,900	31,400	32,700
Additional Conservation	0	0	3,000	3,500	3,900	12,600
Total Supplies	**349,200**	**400,100**	**438,800**	**469,000**	**479,100**	**481,600**
Total Demands	**-349,200**	**-400,100**	**-441,800**	**-472,500**	**-498,100**	**-519,700**
Shortfall	**0**	**0**	**-3,000**	**-3,500**	**-19,000**	**-38,100**

Table 3-15
Region-Wide Water Budget Summary for a Single-Dry Year (Acre-Feet per Year)

	2005	2010	2015	2020	2025	2030
Surface Water	20,000	20,000	20,000	20,000	20,000	20,000
Groundwater	300,600	335,600	366,700	378,000	380,000	381,200
Imported Water	25,100	25,100	25,100	25,100	25,100	25,100
Recycled Water	3,500	19,400	27,000	29,900	31,400	32,700
Additional Conservation	0	0	3,000	3,500	3,900	12,600
Total Supplies	**349,200**	**400,100**	**438,800**	**453,000**	**456,500**	**459,000**
Total Demands	**-349,200**	**-400,100**	**-441,800**	**-472,500**	**-498,100**	**-519,700**
Shortfall	**0**	**0**	**-3,000**	**-19,500**	**-41,600**	**-60,700**

Figure 3.3. IRGMP Region - Water Budget Summary

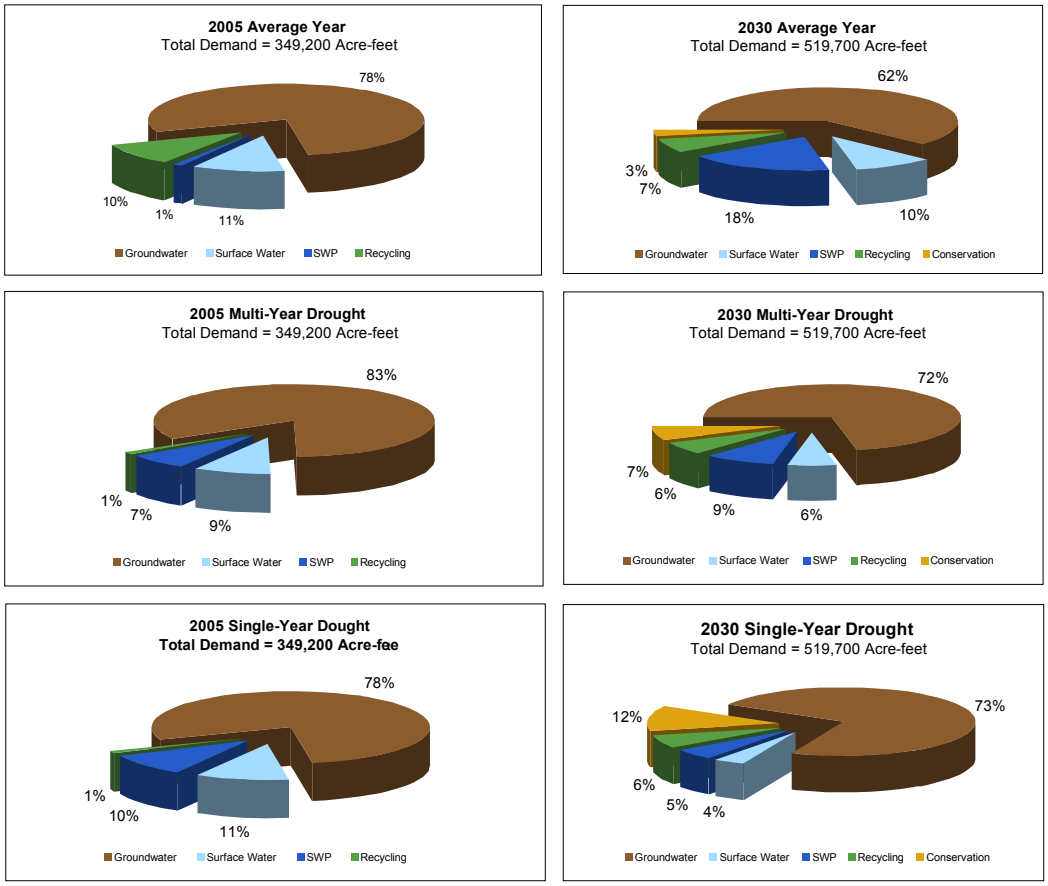


Most of the shortage after 2015 shown in the overall water budget in Table 3-13 is within the SGPWA. In Table 3-13, the supply and demands for the SGPWA area are broken out separately. SGPWA is attempting to purchase supplemental water to meet their projected shortage in supply. By 2030, it is estimated that demands may outpace the current supplies by about 21,700 acre-feet per year.

During multi-year and single-year droughts, the Region is more reliant upon the groundwater. Based on groundwater modeling of the SBBA (described in Chapter 4), during a dry period, agencies typically increase their groundwater extractions to overcome any deficiency in local surface water and imported water supplies. Computer modeling suggests that groundwater extractions in the SBBA can increase by 40 percent (190,000 to 280,000 acre-feet) to meet the demands in drought years if imported water is captured and stored when it is available in "wet years."

Figure 3-4 below shows the percentage of supply used to meet the demand in an average year, single-year drought, and multiple-year drought for the entire region. The breakdown of the amount of supplies by category is found in Tables 3-13 to 3-15.

Figure 3-4
Water Supply Summary



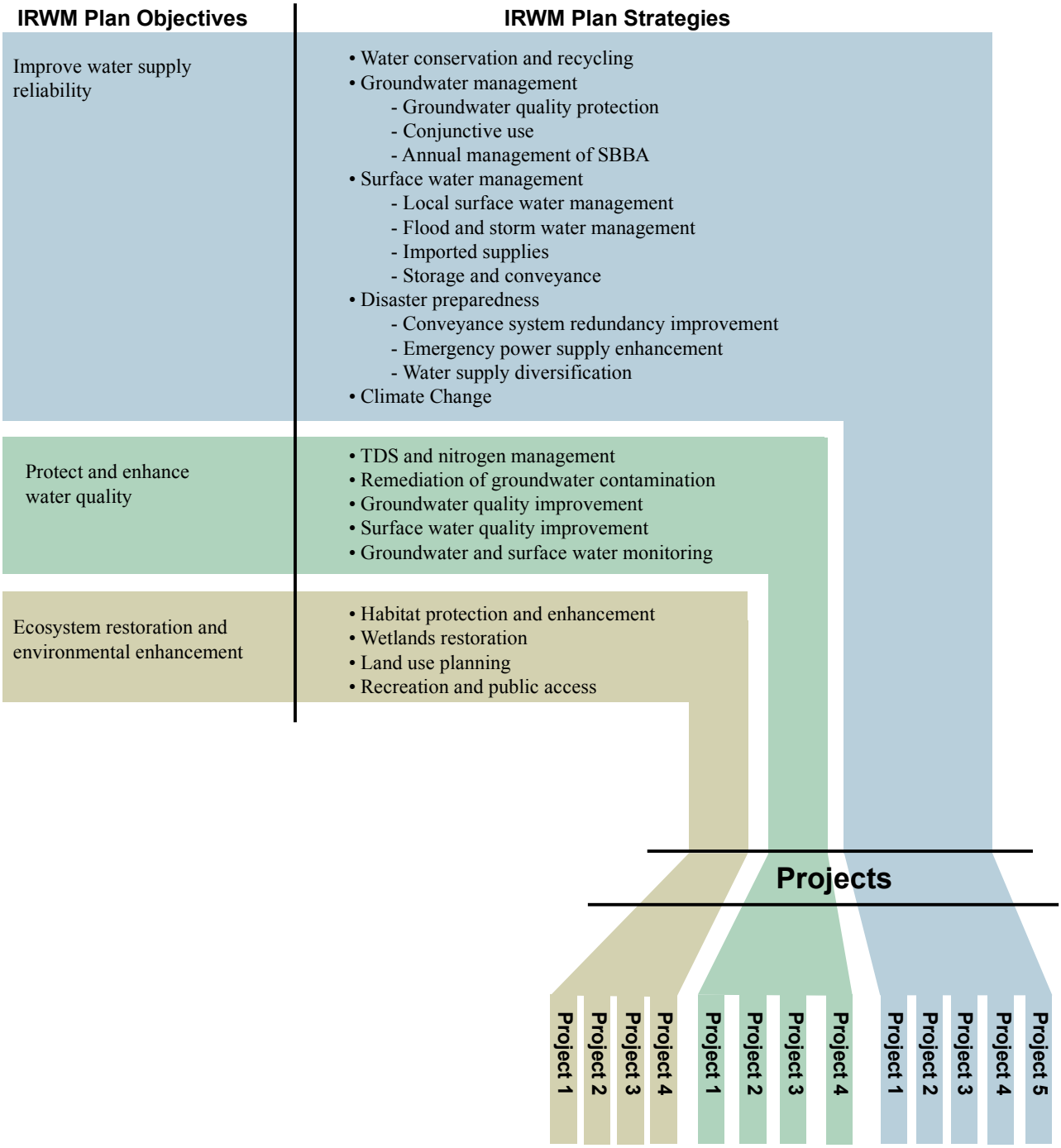
4 Develop Integrated Regional Water Management Plan

4.1 Introduction

This chapter provides the planning framework for water management activities in the Upper Santa Ana River (SAR) watershed region. The Integrated Regional Water Management Plan (IRWM Plan) is a roadmap for the management of water resources to ensure long-term, reliable water supply availability for the region. The first step in developing this roadmap is the formulation of water management objectives. The water management objectives are the overarching statements that define water management goals for the region. The objectives define the desired outcome from implementation of the plan. Specific objectives for management of water resources have been developed and will be discussed in this chapter.

Upon formulation of the objectives, specific water management strategies are examined and evaluated in support of the objectives. Water management strategies are the action plans and the ways of achieving the stated objectives. Evaluation of various water management strategies results in formulation of related feasible projects that would be implemented in the region to achieve the region's water management objectives. Figure 4-1 illustrates the process. This figure also summarizes water management objectives and strategies considered in this IRWM Plan. For the IRWM Plan, water management strategies and specific projects will be further optimized to eliminate undesired effects from implementing the projects on water resources of the region. It should be mentioned that some of the water management strategies listed by the California Department of Water Resources (DWR) under IRWM Plan Guidelines are considered as not being applicable in the region and have not been discussed in the plan. This includes the sea water desalting strategy. The following sections describe this planning process in more detail.

Figure 4-1
Objectives and Strategies



4.2 Water Management Objectives, Strategies, and Projects (California Water Code §§ 79562.5 and 79564)

The water management objectives are broad statements that drive the water management planning in the region. As stated earlier, water management in the study area is currently governed by a complex set of constraints, court decisions, judgments, and agreements. However, the IRWM Plan process facilitated a cooperative environment in which the existing institutional constraints do not limit the water managers from implementing decisions that optimize the use of available resources. In other words, the water management objectives for the study area must be consistent with the objectives stated in these historic documents, while meeting the vision of the water leaders in the region for managing their water resources. Other considerations in formulating the water management objectives for the region include California Water Code, Section 7956.2.5(b), which requires an Integrated Water Management Plan to address the objectives and conflicts of the region covered by the plan.

Groundwater is a major source of water supply for the Upper Santa Ana Region.

Because groundwater is a major source of water supply and plays a significant role in meeting water needs of the region, groundwater management has been blended into the IRWM Plan to ensure a balanced approach to management of the water resources of the region, while seeking solutions that benefit all stakeholders. Consistent with the Groundwater Management Planning Act, Basin Management Objectives (BMOs) have been formulated for the groundwater basins and for the San Bernardino Basin Area (SBBA).

The consulting team and the Technical Advisory Group (TAG) have reviewed various court judgments and water management agreements currently in place within the region to formulate objectives that are consistent with the existing water management framework. The TAG evaluated a broad range of objectives over several bi-weekly meetings to ensure consistency with the existing objectives of the agencies that have a vested interest in the water resources of the Upper Santa Ana River watershed. The comprehensive list of objectives was categorized into the broader set of objectives that are intended to be as follows:

- Consistent with the governing laws, judgments, and agreements that govern the water management in the region. These laws, agreements, and judgments were discussed in Chapter 2.

- In harmony with the vision of water leaders for management of the region's water resources.
- Consistent with local agencies' water management objectives.
- Fulfilling the planning standards of the California Water Code.

Two sets of objectives have been identified and discussed by the TAG and other water leaders in the region. These objectives are as follows:

- A set of broad water management objectives to guide a wide range of water management activities of the region. Formulation of these objectives is also required by the Integrated Regional Water Management Planning Act.

    1. **Water Supply Reliability Improvement.** Because surface water management and groundwater resources management of the region are critical and inseparable components of water supply reliability**, surface water management and groundwater management** are considered a subset of the broader water supply reliability objective,

    2. **Water Quality Protection.**

    3. **Ecosystem Restoration and Environmental Improvement.**

- A set of **BMOs** for management of the groundwater basins and, particularly, for the SBBA. Establishment of the BMOs for groundwater basins is one of the requirements of the Groundwater Management Planning Act. These BMOs include **reducing the risk of liquefaction** in the pressure Zone and **avoiding impacts to and from the contaminant plumes**.

The objectives, water management strategies, and associated programs and projects to achieve the above objectives are described in detail in this chapter. It should be noted that most of the strategies and projects discussed below serve more than one objective and provide multiple benefits. For the purpose of organizing these strategies, however, they are categorized under one specific objective.

4.2.1 Improve Water Supply Reliability

Improving water supply reliability is the primary objective of the IRWM Plan. This objective is formulated to ensure that a reliable water supply is available for the region through 2030. As mentioned earlier, an important subset of this

objective is surface water and groundwater management. Given the variability of the State Water Project (SWP) supplies, another of the region's water supply reliability goals is to optimize the use of SWP supplies to be able to reduce its reliance on the SWP during drought periods. Various water management strategies and projects are identified and evaluated to achieve water supply reliability objectives.

To evaluate the performance of the water management strategies (as they are implemented) in achieving the water supply reliability goal of the region, the TAG considered the "performance criteria" for water supply reliability as established in the Urban Water Management Plan (UWMP) Act. These criteria include evaluation of the following:

- Reliable water supply for a minimum of a 25-year period,
- Meeting average year water demands through 2030,
- Meeting single-year drought water demands,
- Meeting multi-year drought water demands,
- Preparing a water shortage (up to 50 percent loss) contingency plan, and
- Preparing for catastrophic interruption in water supplies.

The Upper SAR watershed has adequate water resources to accommodate most hydrologic events and water agencies have substantially invested in facilities and institutions to protect those resources. Local agencies have been planning and implementing facilities needed to improve water supply reliability by improving management of water resources of the region as demonstrated by the ongoing implementation of the San Bernardino Valley Municipal Water District (Valley District) Regional Water Facilities Master Plan and Santa Ana Watershed Project Authority's (SAWPA's) IRWM Plan for the watershed. That said, those resources are subject to a number of challenges, including drought, contamination, climate change, and aging infrastructure. Furthermore, substantial residential and commercial growth in the region is increasing the demands placed on available water, requiring careful planning and management of the region's water resources.

The following sections will describe water management strategies for meeting the region's water supply reliability objective.

4.2.1.1 Water Conservation Strategies and Projects

Over the past 30 years, water conservation and water demand management has grown to be a significant sector of California's water supply picture. Indeed, new technology and application of other proven technologies have "produced" substantial real water savings for both the agricultural and urban sectors. In many communities in Southern California, per capita water use has decreased, allowing the same water supply to serve more people and industries.

Today, many water conservation measures are cost-effective for agencies, especially those that depend on imported water supplies. Furthermore, when one considers energy usage and the current incentives to save energy through water-energy conservation partnerships, even more water saving efforts become cost-effective.

4.2.1.1.1 Irrecoverable vs. Recoverable Water Savings

Depending upon the water conservation measure and its relative location, a water conservation measure can actually reduce real water use. Real water is saved when discharges are reduced to a salt sink or ocean, or actual water consumption is reduced (i.e., through reduction of evapotranspiration) by managing landscape irrigation or changing irrigated lawn with more water-saving plants. In this case, the real water savings would be made through reduction of an irrecoverable loss (evapotranspiration).

On the other hand, in a system where excess water and treated wastewater are discharged to a river and potentially used again by downstream municipal, agricultural, or industrial users, there may not be significant system-wide water savings from water conservation. In such situations, the overall water demand may not be significantly reduced. Replacing older or less efficient toilets with more efficient ones and reducing the effluent discharge to the river where it would have been reused is a good example. Saving recoverable water, however, has a number of benefits. Improving water supply reliability for local purveyors, implementing the conservation project, saving energy on transportation, reducing the cost of water treatment, and improving water quality are all substantial benefits of water conservation in a recoverable system.

4.2.1.1.2 Best Management Practices

In 1991, nearly 100 urban water agencies and environmental groups signed a Memorandum of Understanding (MOU), pledging to develop and implement a series of Best Management Practices (BMPs) for water conservation. The California Urban Water Conservation Council (CUWCC) was thus created to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations, and private industry. There are now 384 members and signers to the MOU (www.cuwcc.com). CUWCC members

voluntarily pledge to implement a series of BMPs within a reasonable time frame and coverage. Members must periodically report the status of their BMP work to the CUWCC for verification. Only those BMPs that are cost-effective for the water retailer or wholesaler need to be implemented. Members have tools to estimate and show that a measure would not be as cost-effective and can receive a pass on that particular BMP. Thus, successful implementation of all BMPs and credit for actively participating in the CUWCC process need not be a "complete" implementation of all BMPs.

The table in Figure 4-2 shows the 14 BMPs that the CUWCC currently endorses. The CUWCC is constantly reviewing new technologies and strategies to improve water conservation. New BMPs are added for new water saving methods and existing BMP requirements are adjusted for effectiveness. This active BMP review and adoption process has kept this list the state-of-the-art in proven water saving measures.

The CUWCC maintains a self-reporting database on the status of BMP implementation by water agency member. This information includes recorded use and results of each BMP, the money invested in each BMP, and the estimated or calculated water savings for each of those measures by water purveyor. This information is then summarized and aggregated to present a total water conservation picture for the collective membership on an annual basis. The CUWCC database can be accessed at http://bmp.cuwcc.org.

Not all BMPs are such that their benefits are quantifiable or measurable. For example, BMP #12 requires the water agency to designate a staff member to manage the agency's water conservation programs (water conservation coordinator). BMPs #1, #2, #5, #6, #9, #9A, and #14 are generally considered to have measurable benefits. (BMP #9A is the installation of ultra-low-flush toilets within the Commercial, Industrial, and Institutional sectors).

Figure 4-3, data compiled by CUWCC, estimates the statewide current net annual water savings from those BMPs that can be quantified. These values have also accounted for plumbing code changes. Since the MOU only requires participation when water conservation measures are cost-effective, the resultant water savings shown in Figure 4-3 represents substantial savings that is within the economic reach.

Figure 4-2
Best Management Practices

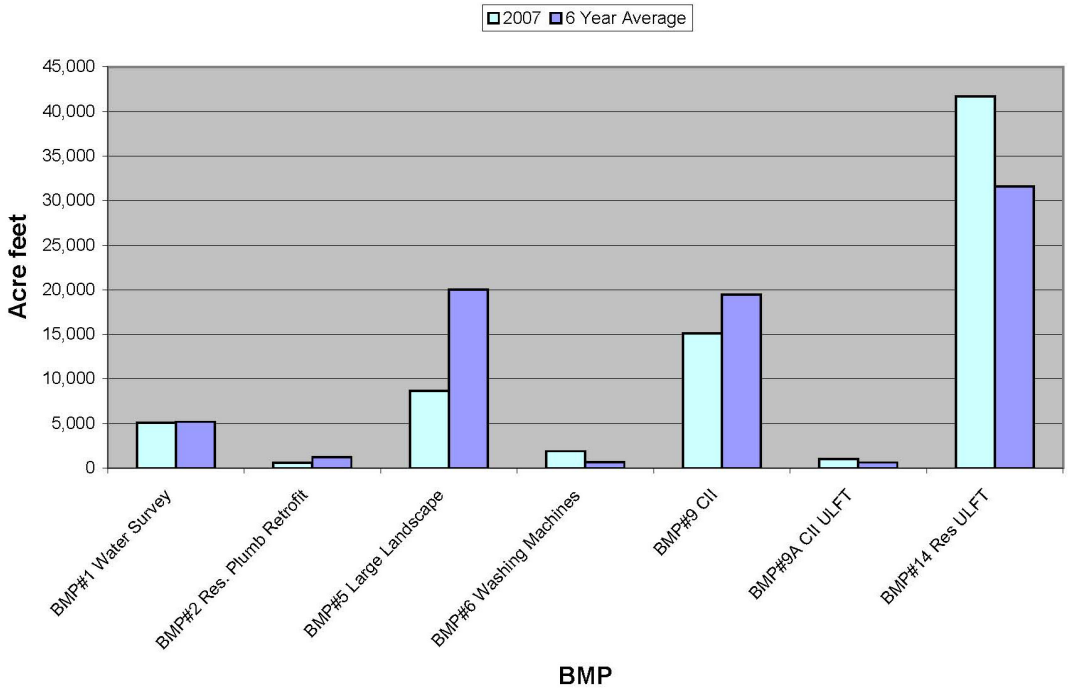
California Urban Water Conservation Council
Annual Report Year 2005

Table 1: Council MOU Urban Water Conservation Best Management Practices

#	BMP	Requirements
1	Water Survey Programs for Single and Multi Family Residential Customers	Survey 15% of residential singe-family and 15% of multi-family customers within 10 years.
2	Residential Plumbing Retrofit	Retrofit 50% of residential housing constructed prior to 1992 with low-flow showerheads, toilet displacement devices, toilet flappers and aerators; or achieve 75% saturation of the water agency service area and be able to prove it statistically.
3	System Water Audits, Leak Detection and Repair	Audit the water utility distribution system regularly and repair any identified leaks; check yearly to see that water loss is less than 10%.
4	Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections	Install meters in 100% of existing unmetered accounts within 10 years; bill by volume of water use; assess feasibility of installing dedicated landscape meters.
5	Large Landscape Conservation Programs and Incentives	Prepare water budgets for 90% of commercial and industrial accounts with dedicated landscape meters; provide irrigation surveys to 15% of mixed-metered customers.
6	High-Efficiency Washing Machine Rebate Programs	Provide cost-effective customer incentives, such as rebates, to encourage purchase of machines that use 40% less water per load. Number of clothes washers required is based on the total dwelling units x .048; up to a third fewer machines required if all of them are super high-efficiency (6.0 or less water factor).
7	Public Information Programs	Water utilities to provide active public information programs to promote and educate customers about water conservation.
8	School Education Programs	Provide active school education programs to educate students about water conservation and efficient water uses.
9	Conservation Programs for Commercial, Industrial, and Institutional Accounts	Provide a water survey of 10% of these customers within 10 years and identify retrofitting options; OR reduce water use by an amount equal to 10% of the baseline use within 10 years.
10	Wholesale Agency Assistance Programs	Provide financial incentives to water agencies and cities to encourage implementation of water conservation programs
11	Conservation Pricing	Eliminate non-conserving pricing policies and adopt pricing structure such as uniform rates or inclining block rates, incentives to customers to reduce average or peak use, and surcharges to encourage conservation.
12	Conservation Coordinator	Designate a water agency staff member to have the responsibility to manage the water conservation programs.
13	Water Waste Prohibition	Adopt water waste ordinances to prohibit gutter flooding, single-pass cooling systems, non-recirculating systems in all new car wash and commercial laundry systems, and non-recycling decorative water fountains.
14	Residential Ultra-Low-Flush Toilet Replacement Programs	Replace older toilets for residential customers at a rate equal to that of an ordinance requiring retrofit upon resale.

Source: California Urban Water Conservation Council

Figure 4-3
Statewide Annual Water Savings from Implementation of Selected BMPs



Source: California Urban Water Conservation Council

4.2.1.1.3 Urban Water Management Plans

In 1983, the California legislature enacted the Urban Water Management Planning Act (Water Code Sections 10610-10658). It states that every retail water supplier providing 3,000 acre-feet of water annually or supplying water to 3,000 customers or more must file a UWMP with DWR. The requirement is designed to ensure thoughtful planning for future water reliability. Water purveyors must submit an updated plan and have that plan deemed complete by DWR every five years. The statute requires quite a detailed assessment, including an analysis of Demand Management Measures (DMMs). DMMs are the **same actions** as BMPs under the CUWCC MOU. UWMP reporting under the Act is actually simplified for CUWCC members reporting their progress in implementation of BMPs.

4.2.1.1.4 Potential Water Conservation Strategies for Upper Santa Ana River

Table 4-1 summarizes the general implementation of DMMs for the water purveyors in the Upper SAR watershed, and thus, which water conservation measures are, at least at some level, being used within each agency. The data for this table have been compiled from agency UWMPs. The table does not show the magnitude of the investment or the level of effort involved in the measure.

Table 4-1
Upper Santa Ana River Water Agencies Implementation of BMPs

Water Agency	2005 UWMP	Demand Management Measure Implementation													
		Residential Water Surveys	Residential Plumbing Retrofits	System Water Audits Leak Detection and Repair (2)	Metering (2)	Large Landscape Conservation Program	High Efficiency Washing Machine Rebate Program	Public Information Program	School Education Program	Conservation Program (3)	Wholesale Agency Program	Conservation Pricing	Water Conservation Coordinator	Water Waste Prohibition	Residential Ultra-low flush Toilet Replacement
East Valley Water District	X	N	N	Y	Y	N	N	Y	Y	Y	N	N	N	Y	N
Fontana Water Company	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y
Loma Linda, City of	2002 UWMP	N	Y	Y	Y	N	N	Y	Y	N	N	Y	N	Y	N
Redlands, City of - Water Utility	X	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y
Rialto, City of	X	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y
San Bernardino MWD	X	Y	N	Y	Y	N	N	Y	Y	N	N	N	N	Y	N
West Valley Water District	X	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Yucaipa Valley Water District	X	N	N	Y	Y	N	N	Y	N	N	N	Y	Y	Y	N
Riverside Public Utilities	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Beaumont Cherry Valley W.D.	X	N	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	N	N
Big Bear City C.S.D.	2000 UWMP	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
City of Big Bear Lake D.P.W.	X	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y
Crestline-Lake Arrowhead W.A.	X	N	N	Y	Y	N	N	Y	Y	Y	N	Y	Y	Y	N
Rubidoux C.S.D.	X	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y

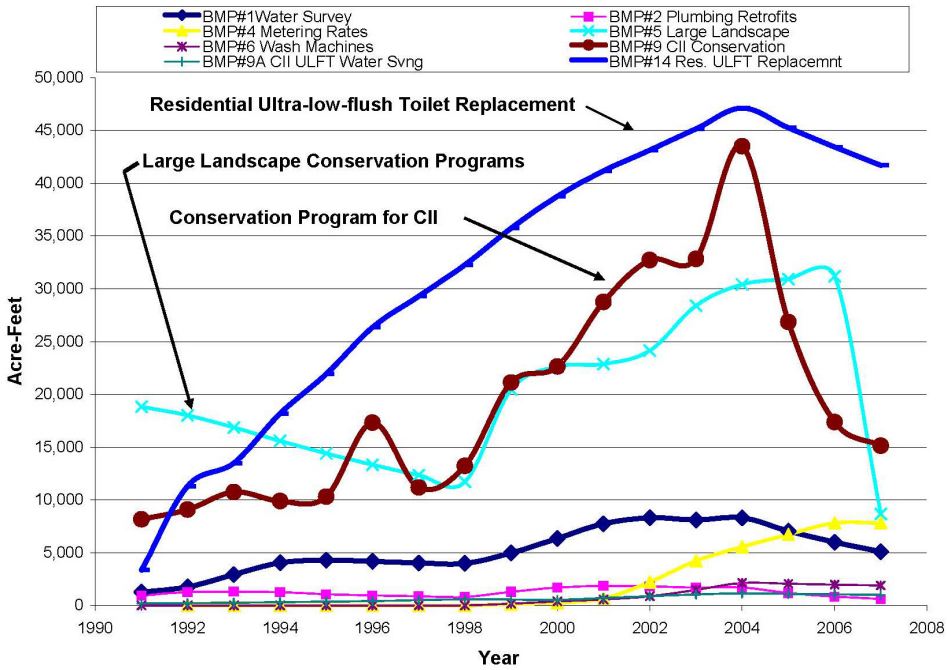
Each agency is implementing some of the measures, but some agencies are implementing most of the measures. There is potential to further enhance water savings efforts within the Upper SAR watershed communities and improve water supply reliability within the region.

Two factors are important in evaluating the feasibility of water use efficiency measures: the quantity of the potential water savings and the cost-effectiveness of the water saving measures. Both factors must be considered to determine when a particular BMP is cost-effective for implementation.

Figure 4-4 shows the annual water savings for quantifiable or measurable BMPs from 1991 through 2007 using the CUWCC data.

While the magnitude of the water savings would clearly be a function of the effort or investment in the particular BMP, the graph indicates three or four BMPs have produced some significant water over the past several years: BMP #14 – Residential Ultra-Low-Flush Toilet Replacement, BMP #9 – Conservation Programs for Commercial Industrial and Institutional Accounts, BMP #5 – Large Landscape Conservation Programs, and BMP #1 – Water Survey Programs. For areas with less aggressive water conservation efforts, further review may suggest that investment in these BMPs could have potential for significant conservation.

Figure 4-4
Annual Estimated Water Savings from BMPs

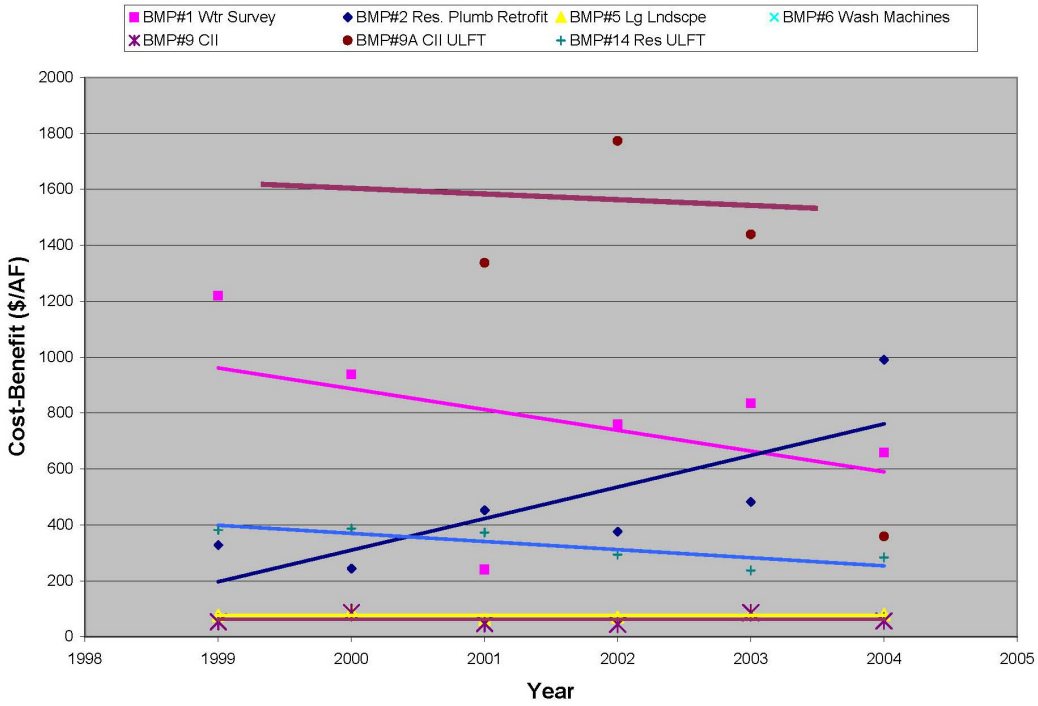


Source: California Urban Water Conservation Council

One should note that BMP #14, Ultra-Low-Flush Toilet Replacement, may be even more efficient by the recent trend during the past few years in using High-Efficiency Toilets (HETs), those that require 1.3 gallons per flush instead of 1.6 gallons. This change in technology would make the general process of toilet and/or water fixture replacement more efficient but not necessarily alter the methodology of the BMP.

To examine which water conservation measures would be most cost-effective to implement, one can compare the CUWCC data summaries on total expenditures for a particular BMP with the total estimated water savings from that BMP. Figure 4-5 shows the ratio of total dollar investment (cost) over the total annual estimated water savings for the measurable BMPs for the period 1999 through 2004.

Figure 4-5
BMP Cost per Acre-Foot



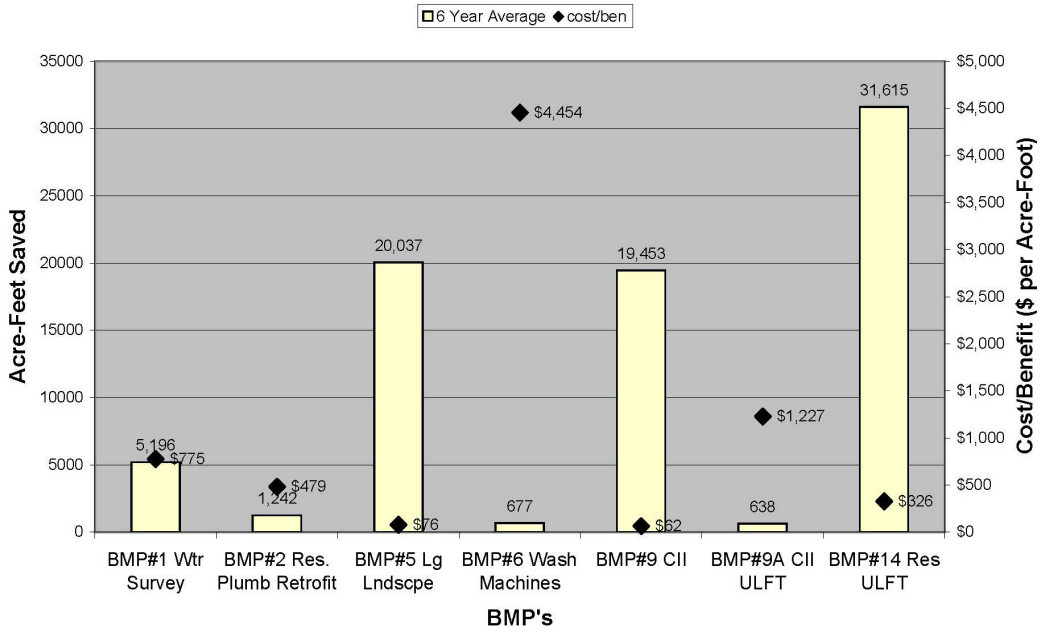
Source: California Urban Water Conservation Council

The lower lines on the graph suggest the more cost-effective water saving measures. The higher points on the graph show measures that are comparably more expensive to implement. BMPs #5 – Large Landscape Conservation Programs, #9 – Conservation Programs for Commercial, Industrial, and Institutional Accounts, #14 – Residential Ultra-Low-Flush Toilet Replacement

Program, and #2 – Residential Plumbing Retrofit, appear to be the most cost-effective measures based on the aggregated CUWCC data.

Figure 4-6 combines both quantity and cost-effectiveness (the information from Figures 4-4 and 4-5) on one graph. Clearly, the past investments in BMPs #5, #9, and #14 seem to carry the best rewards both in quantity of water and cost.

Figure 4-6
BMP Benefit and Cost/Benefit



Source: California Urban Water Conservation Council

4.2.1.1.5 Examples of Successful Water Conservation Programs

Evidence about which program would be beneficial is often best characterized by the case study experiences of other water purveyors. Water conservation programs for The Metropolitan Water District of Southern California (Metropolitan) have been reviewed to examine its current water conservation program activities.

Metropolitan Water District of Southern California – Metropolitan is a water wholesaler for a majority of the Southern California area. Metropolitan submits an annual report of its activities, including water conservation programs and accomplishments, to the State Legislature. From its February 2007 report, Metropolitan offers the following current water conservation programs:

- **High-Efficiency Toilets** – Metropolitan offers a $165 incentive for HETs, which use even less water than Ultra-Low-Flow Toilets (ULFTs). It has provided incentives for about 14,000 HETs to date. (Related to BMP #14.)

- **High-Efficiency Clothes Washers** – Metropolitan retrofitted more than 175,000 residential clothes washers since the incentive program began in 1995. As a direct result of grant funding and an increased incentive, high-efficiency clothes washers are currently being installed at a rate of about 30,000 retrofits per year. (BMP #6.)

- **"Smart" Irrigation Controller Rebate** – This year Metropolitan also had a concerted effort to reach residential customers with water-saving technology tips. "Smart" irrigation controllers, many of which use a combination of weather and historical data to automatically adjust irrigation schedules, have been a particular focus. Nearly 5,000 residential controllers have been retrofitted since the inception of the program. (This irrigation efficiency measure relates to BMP #5.)

- **Synthetic Turf Program** – Metropolitan continues to seek turf alternatives to conventional warm season grasses through a pilot program for large landscape areas. (This also relates to BMP # 5.)

- **Commercial/Industrial/Institutional Progra**m – To address this niche of water saving opportunities, Metropolitan developed its current CII program, which includes two components (BMP #9):

    - **Rebates --** fixed rebates for common fixture retrofits or installations.

    - **Process Improvements** – customized financial incentives for water-use process improvements on a pay-for-performance basis, which is typically applied to manufacturing and industrial applications.

- **California Friendly Landscape Program** encourages native and drought-resistant plants within landscapes to reduce water consumption. (BMP #5.)

4.2.1.1.6 Conclusions and Recommendations

The following conclusions and recommendations have been formulated based on the water conservation data gathered by CUWCC and other agencies' experiences.

Water Conservation projects have significant water and energy saving benefits, both in recoverable and non-recoverable water systems.

BMPs #5, #9, and #14 appear to be the most attractive to water agencies because of potential significant water saving measures and high benefit-cost ratio. Current programs of other water agencies generally support activities in BMPs #5, #9, and #14.

Other BMPs with non-measurable water savings should be considered on a case-by-case basis if they could support other tangible benefits, including a balanced water conservation approach.

Water purveyors in the Upper SAR Region should consider developing a program for evaluation and implementation of feasible water conservation strategies. Initial program steps should focus on large-scale implementation of BMPs #5, #9, and #14.

Water purveyors in Upper Santa Ana should consider obtaining a water use efficiency grant for a feasibility study of regional water conservation programs.

These conservation strategies are essential for better stewardship of our resources and would improve water supply reliability, reduce energy use and cost, and provide a means for dealing with potential climate changes.

4.2.1.1.7 Planned Water Conservation Projects in Upper Santa Ana Region

As discussed above the following BMPs may have the greatest conservation potential in the region:

- BMP #5 - Large Landscape Conservation Programs
- BMP #9 - Conservation programs for Commercial, Industrial, and Institutional
- BMP #14 - Residential Ultra-Low Flush Toilet replacement

The degree of effectiveness of the conservation programs varies by communities. It is therefore recommended that the following conservation projects be undertaken in the region to better scope the scale and size of potential conservation projects:

- **Regional Water Conservation Feasibility Study** to document the feasibility of implementation of various BMPs in the region and to develop conservation programs for implementation. It is suggested that Valley District take a lead role on this project.

- **Water Conservation Demonstration Garden** to educate and encourage citizens in low water use California Friendly landscape. This is a cooperative program between Valley District and the Water Resources Institute - California State University, San Bernardino (WRI-CSUSB).

- **Smart Irrigation Controller Program** currently being developed by Valley District.

- **Model institutional water conservation makeover** to demonstrate water conservation in various institutions in the region. This is a cooperative program between Valley District and the WRI-CSUSB.

4.2.1.2 Water Recycling Strategies and Projects

Water recycling projects improve water supply reliability and can contribute to improvement of water quality of the streams. To the extent that treated wastewater from the water treatment facilities in the Upper SAR watershed is currently released to the SAR and used by downstream water users, water recycling may not add to the overall water supplies of the SAR watershed. Tangible local water supply reliability and water quality benefits could be realized, however, through implementation of water recycling strategies. These benefits include the following:

- Recycled water is available throughout the year and is independent of hydrologic cycles. Improved water supply reliability will be achieved at the local level by the agency that is implementing the project by substituting potable water used for non-potable purposes with recycled water.

- Water recycling reduces the release of treated wastewater (and generally warmer water) to the streams and therefore reduces the nutrient load of the receiving water. This contributes to improvement of water quality and water temperature in the stream.

- Depending on the purveyor's source water, water recycling may reduce energy use for conveyance (i.e., conveyance of SWP or Colorado River water) and water treatment. This may also reduce the water delivery system's cost to the customers.

Costs associated with water recycling include additional treatment and separate conveyance and distribution systems. Water purveyors generally conduct a feasibility study to evaluate the costs and benefits of water recycling projects prior to commitment of funding and design of the facilities for water recycling projects.

A number of water purveyors in the Upper SAR watershed are planning to expand or construct new water recycling facilities. Summaries of the planning efforts for water recycling programs are presented below.

4.2.1.2.1 Beaumont-Cherry Valley Water District

The City of Beaumont treats all its wastewater to meet Title 22 regulations for recycled use. As of 2005, about two million gallons per day (mgd) (all flows) were discharged to Cooper Creek, which is a tributary to San Timoteo Creek. In partnership with the Beaumont-Cherry Valley Water District (BCVWD), Beaumont is upgrading its wastewater treatment plant (WWTP) capacity to four mgd and installing a recycled water pumping station and recycled water

pipelines. Also as of 2005, about 18 to 20 miles of recycled water pipeline were "in the ground." These lines serve irrigation systems in parks and common areas in Pardee Sundance, Three Rings Ranch, Oak Valley Greens, Pardee Tournament Hills, and elsewhere. Pipelines also extend to the Oak Valley and the two PGA West golf courses. The district is in a unique position, as there is more demand for recycled water than available supply.

BCVWD intends to serve recycled water, to the extent possible, for non-potable uses and as permitted by law. This would make potable water, now used for irrigation, available for new development. As new development occurs, the new projects would include appropriate piping systems to permit the use of recycled water for irrigation of street medians, greenbelts, schools, parks, and common areas. In the future, the recycled water system could be expanded to irrigate cherry and other fruit orchards. This concept then envisions limiting the use of quality potable water to potable water purposes to the extent practical. Surplus recycled water will be available during certain times of the year when normal irrigation demands are reduced. During these times, the surplus will be piped to spreading basins for surface spreading of recycled water for groundwater recharge.

4.2.1.2.2 City of Big Bear Lake Department of Water and Power and Big Bear Community Services District

Currently, neither City of Big Bear Lake Department of Water and Power (BBLDWP) nor Big Bear Community Services District (BBCSD) use recycled water within their service areas; however, this is slated to change. In 2004 and 2005, the Big Bear Area Regional Wastewater Agency (BBARWA), working along with BBLDWP and BBCSD, cooperated in the preparation of a Draft Recycled Water Master Plan for the Big Bear Valley. The Master Plan, whose implementation will result in benefits to all three agencies, includes reduction of the valley's dependence on limited groundwater supplies, extension of available water resources, and provision of valuable economic and environmental benefits to the valley's communities.

The objective of the Recycled Water Master Plan is to investigate the feasibility of using recycled water throughout Big Bear Valley. It provides a comprehensive planning document that outlines a phased road map for incremental implementation of facilities to achieve the listed benefits. The recycled water supply implementation is divided into four improvement phases at the WWTP, each phase in 500 acre-foot increments. The plan has identified numerous opportunities for recycled water use, with emphasis placed on groundwater recharge. It is anticipated that this plan will be implemented such that completion of the first phase and deliveries of recycled water will occur in 2011.

4.2.1.2.3 Fontana Water Company

Currently, Fontana Water Company (FWC) is working cooperatively with the City of Fontana for FWC to design and construct the first phase of a recycled water program. Once recycled water becomes available and the necessary infrastructure is constructed, FWC will be the purveyor of recycled water to those customers within its service area who can make use of such water. In the first phase of the recycled water program, FWC will provide approximately 1,700 acre-feet of recycled water to schools, parks, commercial customers, and Community Facilities Districts' landscape irrigation locations in the southern portion of the City of Fontana within FWC's service area. Ultimate build-out in FWC's service area will enable FWC to provide approximately 5,000 acre-feet of recycled water. FWC supports the use of recycled water where its use is appropriate and where recycled water is available.

Recycled water will be supplied by the Inland Empire Utilities Agency's (IEUA) RP-4 regional WWTP. This plant produces disinfected and filtered tertiary-treated recycled water suitable for outdoor irrigation, industrial uses, and groundwater recharge. RP-4 has a current capacity of 7 mgd and is being expanded to 14 mgd (scheduled for completion in mid-2007). Not all of the plant's production will be available for purchase by FWC because other users are also served by the WWTP.

4.2.1.2.4 City of Redlands Municipal Utilities Department

Beginning in 2005, most effluent from the City of Redland's WWTP has met Title 22 standards for recycled water. In 2005, approximately 60 percent of the recycled water was used for industrial purposes, with the remainder used for groundwater recharge. The City of Redlands requires some new commercial development to provide dual plumbing for irrigation systems and to accommodate the use of recycled water as it becomes available. Through the use of financial incentives, the city expects industrial recycled water use to reach 6000 acre-feet per year by 2010.

4.2.1.2.5 City of Rialto and West Valley Water District

The City of Rialto is investigating the expansion of its existing tertiary treatment plant and reclaimed water system as a way to supplement the city's water supply. The existing tertiary treatment plant wastewater flows are approximately 7.5 mgd (9,000 acre-feet per year). The city currently discharges the majority of its flows to the SAR, but is under no obligation to continue this practice.

The City of Rialto has constructed a hydropneumatic booster station and approximately 7,000 feet of 10-inch-diameter transmission water line to provide the California Department of Transportation (Caltrans) with recycled water for 42,000 feet of landscape irrigation for Interstate-10. Caltrans has been using 1.0

mgd of recycled water during the summer months and 0.5 mgd during the winter for an annual total of 850 acre-feet. Currently, there are no other users of the recycled water.

Rialto recently prepared a Wastewater Master Plan that investigated recycled water systems as a way to supplement the city's water supply and reduce the need to purchase water. The plan analyzed the feasibility of converting a currently unused water main that extends several miles up Riverside Avenue and identified potential landscape irrigation customers (San Bernardino Park, Convalescent Hospital, the Senior Center, a baseball field, and a recreation center). A Proposition 50 grant funded the construction of recycled water lines that tie into the unused water main. The city is also investigating the use of package plants in the north end of the city and has identified potential users of recycled water that could result in approximately 2,250 acre-feet of annual demand.

All of the wastewater collection and treatment within the West Valley Water District (West Valley) is handled by the City of Rialto. West Valley utilizes non-potable raw SWP water and decanted backwash water from the Oliver P. Roemer Water Filtration Facility to supply the El Rancho Verde Golf Course. Records show that the golf course consumed 1,357 acre-feet in 2003. West Valley identified other additional potential users of recycled water that could result in approximately 3,700 acre-feet of annual demand. Most of these new users are currently supplied with potable water.

4.2.1.2.6 City of Riverside

The City of Riverside Public Works Department operates and maintains the Riverside Regional Water Quality Control Plant (RRWQCP). The daily average wastewater inflow to the RRWQCP is 33 mgd. The plant capacity is 40 mgd, with the ultimate planned capacity of 60 mgd. The service area of the RRWQCP extends beyond the Riverside Public Utilities (RPU) service area to include the areas served by Jurupa, Rubidoux, and Edgemont Community Services District. Tertiary-treated effluent (recycled water) is discharged into the SAR and the Hidden Valley Wetlands (the wetlands provide additional nitrogen removal.) RRWQCP is required to discharge 15,250 acre-feet per year, adjusted for quality, to meet downstream obligations to Orange County Water District (OCWD). Some recycled water is used for landscape irrigation and commercial purposes.

RPU petitioned the State Water Resources Control Board (SWRCB) for a wastewater change to reduce permitted discharge to the SAR by 11,000 acre-feet per year in connection with the citywide recycled water program. The envisaged recycled water program includes landscape irrigation, agriculture irrigation, and other commercial and industrial purposes. Under its proposed Recycled Agricultural Water Program, RPU would design and construct a distribution

system to serve existing agricultural operations, wholesale users, and other agencies.

4.2.1.2.7 San Bernardino Municipal Water Department

The San Bernardino Municipal Water Department (SBMWD) operates the San Bernardino Water Reclamation Plant serving the cities of San Bernardino, Highland, and Loma Linda, property that was formerly Norton Air Force Base, East Valley, Patton State Hospital, and portions of the unincorporated areas of San Bernardino County. All the wastewater at the San Bernardino Water Reclamation Plant is treated to the secondary level. The secondary-treated effluent is sent to the Rapid Infiltration Extraction (RIX) Facility and treated to tertiary levels, then released into the SAR. In mid-2006, the San Bernardino Water Reclamation Plant re-activated its tertiary treatment facility and diverts approximately 0.75 mgd or 840 acre-feet per year of water from the influent stream to RIX for treatment to Title 22 standards for landscaping applications at the City of San Bernardino Municipal Golf Course and Caltrans located adjacent to Interstate 215. SBMWD estimates that in the future the reclamation plant's service area will be able to potentially recycle an additional 2.25 mgd or 2,519 acre-feet per year of water for use within its service area (SBMWD 2005). Valley District and SBMWD are initiating a master plan study to evaluate the treatment of more secondary effluent at the existing water reclamation plant, reducing flows to the RIX. For additional planned recycling by San Bernardino, see the RIX Facility section below.

4.2.1.2.8 Yucaipa Valley Water District

Yucaipa Valley Water District (YVWD) treats recycled water meeting Title 22 requirements through its Henry N. Wochholz Wastewater Treatment Facility. The facility has a rated capacity of 4.5 mgd and is undergoing an expansion and upgrade to a capacity of 6.7 mgd. Currently, treated effluent is conveyed through a land outfall and discharged to San Timoteo Creek. Three customers along the existing land outfall are receiving recycled water for irrigation purposes. Dual plumbing is being installed in new developments. Delivery amounts are expected to grow to about 6,700 acre-feet by 2020 or about 24 percent of total agency water demands. Ultimately, YVWD expects to deliver about 8,000 acre-feet per year of recycled water (YVWD 2005).

In addition, a new water reclamation plant (WRP) is planned to serve the Oak Valley development. This WRP will provide both wastewater treatment and a source of recycled water for the Oak Valley area. The Yucaipa Wastewater Master Plan identifies the capacity of the new WRP at 4 mgd required to serve the needs of Oak Valley and other areas of the district from where wastewater could flow by gravity to the new WRP. Based on the projected capacities

contained in the Yucaipa Wastewater Master Plan for both treatment plants, there are approximately 11 mgd of wastewater available for recycling (YVWD 2005).

4.2.1.2.9 Rapid-Infiltration Extraction Facility

The RIX facility treats secondary-treated wastewater from the Colton and San Bernardino plants. The RIX facility treats the wastewater to tertiary levels for release into the SAR. The RIX facility was designed as a 40-mgd plant, but as of 2005, operates at 27 mgd. The RIX facility releases 16,000 acre-feet per year in agreement with Valley District to meet the downstream obligations to Orange County. In 2003, SBMWD released a Programmatic Environmental Impact Report evaluating the sale of up to 18,000 acre-feet per year of excess effluent to potential buyers downstream. SBMWD has previously determined that the use of recycled water from the RIX facility to offset water demands within its service area is not feasible at this time. The RIX facility is located at an elevation and distance from SBMWD's service area that makes it economically impractical to utilize recycled water (SBMWD 2005). This could change if the water is not sent to the RIX facility.

Table 4-2 summarizes the proposed water recycling projects of the region.

Table 4-2
Upper Santa Ana River Water Agencies Recycling Water Programs

Water Agency	Recycling Plant	Recycled Water Production Capacity	Description
Beaumont Cherry Valley WD	City of Beaumont WWTP	2 MGD	Current expansion will upgrade production to 4 mgd.
City of Big Bear Lake DWP & Big Bear City CSD	Big Bear Area Regional Wastewater Agency Plant	1.63 MGD	Future construction plans aim to produce 500AFY by 2011, and 1000AFY by 2015.
Fontana Water Company	IEUA Regional treatment Plant 4	7 MGD	FWC needs additional infrastructure to deliver recycled water in its service area.
City of Redlands Municipal Utilities Department	City of Redlands WWTP	6 MGD	Recycled water used for basin recharge and industrial purposes.
Rialto, City of & West Valley WD	City of Rialto Water Treatment Plant	12.0 MGD	Recycled water used for landscape irrigation on the I-10. City plans to expand use of recycled water.
Riverside Public Utilities	Riverside Regional Water Quality Control Plant	40 MGD	Applied for a change in permit to recycle up to 41,400 ac-ft/yr.
San Bernardino MWD	San Bernardino Water Reclamation Plant	0.75 MGD	Construction of a tertiary plant at the existing San Bernardino Water Reclamation Plant to recycle water for landscape irrigation.
Yucaipa Valley Water District	Henry N. Wochholz WWTP	6.7 MGD	New plant at Oak Valley will increase total recycled water availability to 12,000 ac-ft/yr.
San Bernardino MWD, City of Colton, City of Loma Linda, County of San Bernardino, and East Valley Water District	Rapid Infiltration and Extraction	40 MGD	All the water from the RIX is currently released into the Santa Ana River. The City of San Bernardino is exploring selling part of its portion of the recycled water.

4.2.1.3 Groundwater Management Strategies and Projects

Improving groundwater management will significantly contribute to the sustainability of water resources in the region. The IRWM Plan is intended to provide strategies to improve management of the groundwater resources of the Upper SAR watershed. Management of groundwater resources includes conjunctive use of surface water and groundwater resources as well as management of groundwater levels and water quality. Three BMOs have been considered for management of groundwater basins as described below.

Maximize Conjunctive Use and Increase Ability to Collect and Recharge Storm and Flood Water

Integration of flood and stormwater management strategies with recharge and conjunctive use opportunities contributes to water supply reliability in the region. The San Bernardino Valley area has been significantly urbanized over the past several decades and the area continues to grow with numerous in-fill development projects. As the amount of impervious surface increases with urbanization, the runoff, and, therefore, storm and flood flows are also increasing. Without adequate flood control systems to capture and contain these surface waters for recharge, the opportunities for water supply, water quality, and environmental improvement are greatly lessened or lost. Therefore, formulating strategies to capture storm runoff and use it for recharge of the groundwater basins will provide both flood management and water supply benefits to the region.

Some of the water-related judgments and agreements in the region, including the Western Judgment (Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426), Orange County Judgment (April 17, 1969 Orange County Superior Court Judgment), and the Rialto Decree focus on ensuring the reliability of the water supply by controlling and carefully monitoring annual groundwater extractions. If a certain "threshold" is exceeded, some of these judgments and agreements require that the groundwater basin(s) be recharged from an "outside" source such as the SWP. A key to increasing future water supply reliability will be to increase conjunctive management of the surface water and groundwater resources of the region.

Reduce the Risk of Liquefaction

The most significant considerations in groundwater management in the SBBA are reducing the risk of liquefaction in the Pressure Zone due to high groundwater levels and avoiding impacts to and from the various groundwater contaminant plumes. Those two considerations are recognized as BMOs for the basin. All management strategies must satisfy these two constraints.

A significant portion of the SBBA—generally, the downtown and southern portions of the City of San Bernardino—is an area of historically high groundwater. This high groundwater combined with the thick layer of sand in the aquifer may create a risk of liquefaction in an earthquake. Liquefaction occurs only during an earthquake in areas of water-saturated, sandy soil. Given the large extent of sandy soils under the City of San Bernardino, the most practical way to reduce this risk is to reduce groundwater levels through basin management. Many of the facilities in the San Bernardino Valley Municipal Water District's (Valley District) Master Plan (CDM 1995) and some of the Santa Ana watershed Project Authority (SAWPA) proposed facilities are intended to assist in managing groundwater levels in this liquefaction-susceptible area. Due to the public safety threats associated with liquefaction, reducing the risk of liquefaction has been recognized within the BMOs for the SBBA. The objective of managing groundwater levels to reduce the risk of liquefaction is consistent with the Groundwater Management Planning Act and the California Water Code requirement that BMOs should be developed to manage water levels in the basin.

The Cuttle Weir is a concrete and rock diversion structure owned by the San Bernardino Valley Water Conservation District and is used to divert water from the Santa Ana River to the Conservation District's Santa Ana River Spreading Grounds for artificial recharge of the SBBA. The Seven Oaks Dam can be seen in the background. The good quality Santa Ana River water is used to recharge SBBA, hence improving water supply reliability and improving SBBA groundwater quality.

To meet this objective, strategies were identified and evaluated during the planning process. Most of these strategies serve multiple objectives and contribute to groundwater management, water quality objectives, and water supply reliability for the region. The region generally relies on local surface water, groundwater, recycled water, and the SWP for its water supplies.

Groundwater basins, in general, and the SBBA, in particular, are the primary sources of water supply for most of the water purveyors in the region. It is noteworthy to mention that the local agencies in the region have limited surface storage facilities for carryover storage and they rely on groundwater storage for seasonal as well as year-to-year water storage and regulation. Therefore, management of surface water, groundwater, groundwater quality improvement, and imported water are intrinsically interrelated and interconnected. It was recognized early in the planning process that water supply reliability, groundwater management, and the water quality objectives

of the plan can be met by performing a comprehensive evaluation and developing conjunctive water management.

Protect Groundwater Quality

The goal of this BMO is to protect the quality of the region's groundwater resources. Groundwater management is currently influenced by the presence of contamination plumes. Most of these plumes resulted from historic military and industrial operations in the region. The following plumes have been identified:

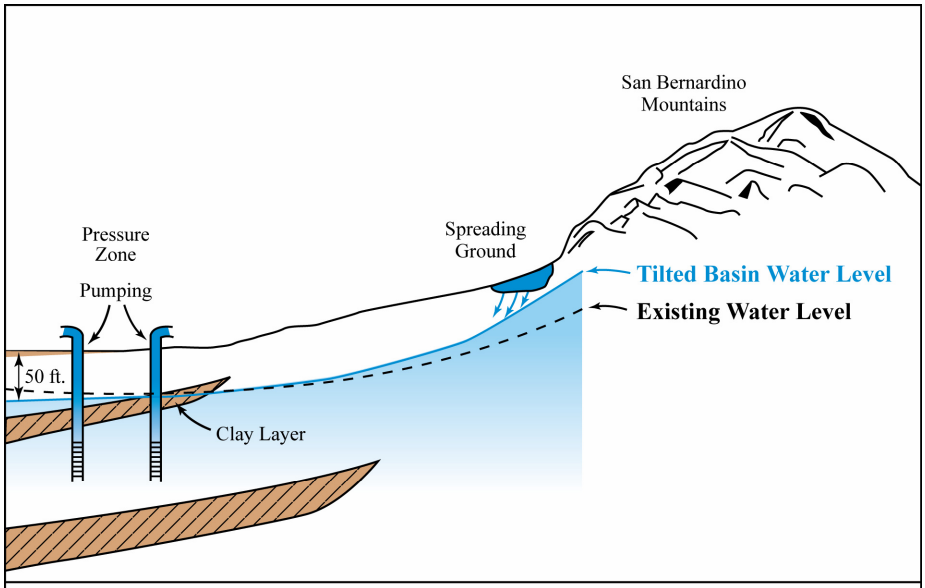
1. Newmark-Muscoy Superfund (trichloroethylene [TCE])
2. Redlands-Crafton (TCE, Perchlorate)
3. Santa Fe Plume (TCE)
4. Former Norton Air Force Base (TCE)
5. Rialto-Colton Subbasin (PCE, TCE, 1,1-DCE, cis-1,2-DCE, perchlorate)
6. No-Mans Land (PCE)

Management strategies are developed to not only avoid any adverse impacts that would cause these plumes to spread further but also to develop projects that will accelerate the cleanup of these plumes. These strategies are evaluated using computer models. Avoiding any impacts to and from the plumes, and their removal when possible, is considered a BMO for the region. This BMO is also consistent with the Groundwater Management Planning Act requiring BMOs to be formulated to address groundwater quality issues of the basin.

4.2.1.3.1 Groundwater Management Strategies

The region currently relies primarily on groundwater to meet its water needs and will continue to do so in the future. The SBBA is by far the largest source of groundwater for the region. When the basin is too full, high groundwater conditions occur in the Pressure Zone. The high groundwater levels are a concern because they increase the risk of liquefaction. High groundwater conditions also limit opportunities for recharge and/or groundwater banking in the basin. A "tilted basin" concept (see Figure 4-7) was suggested by some of the water leaders in the region as a way to maximize groundwater banking and manage the water levels in the SBBA.

Figure 4-7
Tilted Basin



Tilted Basin Concept

Management of groundwater levels under the tilted basin concept consists of recharging the basin at the "rim spreading grounds" and shifting the pumping, to the degree possible, to the Pressure Zone. The rim spreading grounds are located at the base of the San Bernardino Mountains and have high permeability soil. The "travel time" for the water to move from the rim recharge basins to the Pressure Zone is long enough to allow for seasonal regulations as well as conjunctive management of the basin. Under the tilted basin concept, groundwater levels could be generally higher in areas outside the Pressure Zone, while the water levels may be lower within the Pressure Zone. Considerable technical activities were undertaken during the planning process to:

- Develop analytic tools for basin management such as groundwater and surface water models. These models are discussed in Appendix C.
- Assess "baseline" conditions.
- Develop operational strategies for management of the groundwater basins, including groundwater levels and quality considerations.
- Develop groundwater production and artificial recharge strategies.
- Develop a process for management of the SBBA. This process is discussed in detail in this chapter.

- Develop a groundwater monitoring plan for collection, storage, and use of groundwater level and quality data, as well as assessment of the groundwater management strategies and their impacts on groundwater levels.

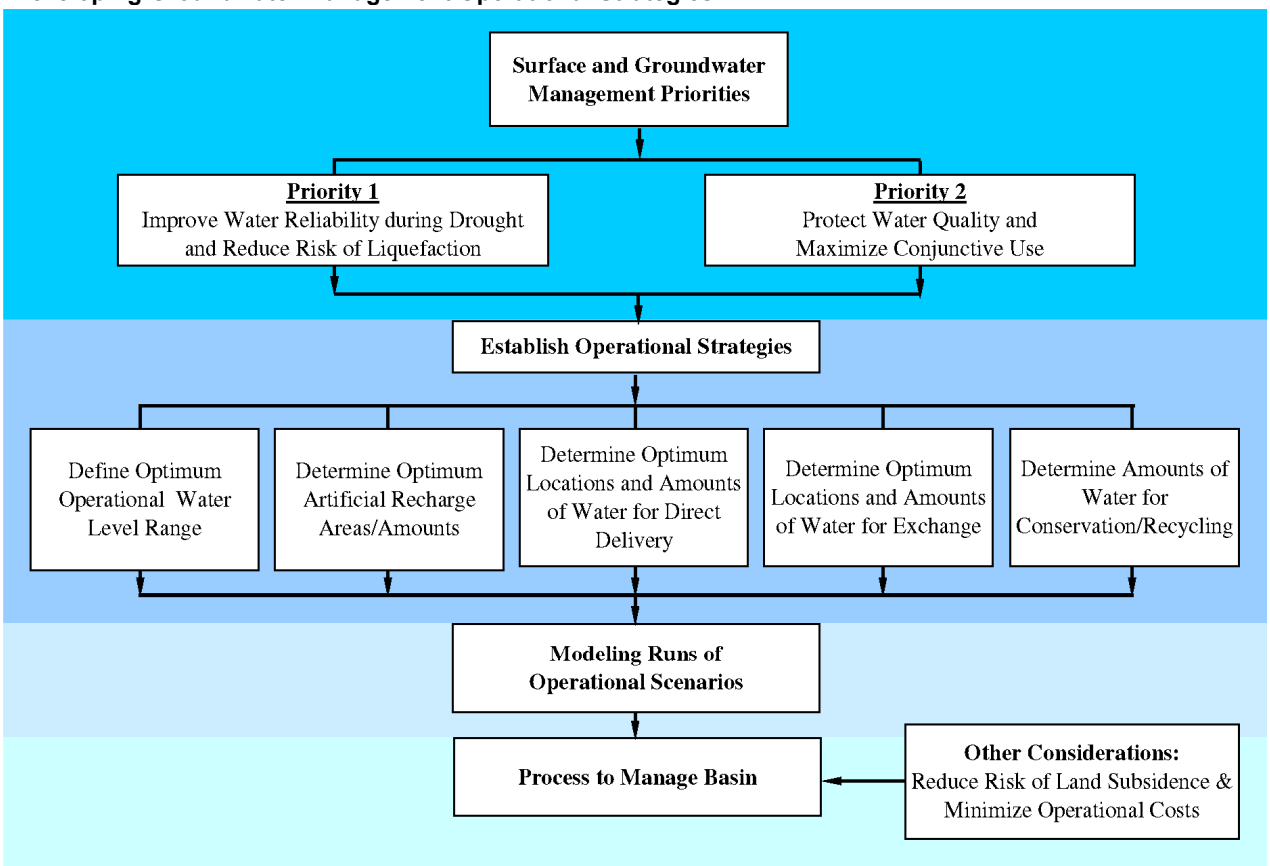
As stated earlier, management of the groundwater levels to reduce the risk of liquefaction and protect groundwater quality are key BMOs. Figure 4-8 shows operation strategies for managing groundwater resources of the SBBA. As shown, operational strategies are established during the planning process to ensure established BMOs (listed as Priority 1 and Priority 2) are met and that planned projects and programs are consistent with the goals of the BMOs and will contribute to attainment of the objectives. Considerable resources were used to develop tools for understanding and management of this basin. A groundwater model has been developed and further refined to simulate the behavior of the aquifers under different operational scenarios. A detailed discussion of groundwater modeling efforts is presented in Appendix C.

The key model outputs include groundwater levels and resulting groundwater directions. The model is used to design appropriate levels of groundwater conjunctive management strategies while meeting stated BMOs. The model runs were to identify the range ("book-ends") and provide information such as the following:

- Suitable places for managed groundwater recharge;
- Amount of water to be recharged in each managed recharge area;
- Key groundwater monitoring locations;
- Groundwater pumping, including location and number of the production wells; and
- Programs and projects to facilitate pumping, treatment, and the use of contaminated groundwater.

Development of the water management strategies and associated projects to meet the BMOs requires a clear understanding of the SBBA hydrogeology and groundwater flows and directions under various operational scenarios. Groundwater modeling studies are performed and water level contours are prepared for operation of the basin assuming a range of conjunctive use operations. Operations of existing and future recharge facilities and production wells can be further refined through these modeling studies. Using modeling study results, additional facilities are formulated to implement the conjunctive use strategies.

Figure 4-8
Developing Groundwater Management Operational Strategies



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Two specific BMOs mentioned earlier must be met as the IRWM Plan is being implemented. These BMOs are specifically designed for management of the water level and water quality in the Bunker Hill and Lytle Creek Basins.

To achieve the objective of reducing the risk of liquefaction, the groundwater level(s) in the Pressure Zone would be reasonably managed to maintain at least 50 feet below ground surface (bgs). This objective will be implemented through optimization of groundwater recharge and groundwater production activities and monitoring of key "index wells" throughout the year. Implementation strategies may include increasing production in the Pressure Zone and reducing recharge in the areas that may contribute to the speedy rise of the water level in the Pressure Zone.

4.2.1.3.2 Groundwater Quality Protection Strategies

A key water quality objective in the Bunker Hill Basin is minimizing adverse impacts from and to groundwater contaminant plumes. The IRWM Plan recommends specific strategies that would facilitate and expedite clean up while meeting the above water quality objective. These strategies consist of (1) formulating and implementing a program to increase groundwater pumping and cleanup in the plume areas, and (2) designing conjunctive use strategies that ensure avoidance of impacts to and from the contaminant plumes.

Bunker Hill Basin Regional Water Supply Program

In the mid-1990s, Valley District completed a Regional Water Facilities Master Plan for its service area that identified a regional transmission system to deliver high groundwater from the Bunker Hill Basin Pressure Zone to the surrounding communities. Since then, Valley District has constructed some of these facilities. Facilities within the City of San Bernardino have been incorporated into the SBMWD's Lower Zone distribution system. The SBMWD may then operate Valley District's facilities as a part of the city's Lower Zone.

The proposed Bunker Hill Regional Water Supply Program consists of design and construction of facilities for regional production, treatment, and distribution of treated water in the basin. Groundwater from the Newmark plume would be conveyed to treatment facilities and distributed to interested agencies within and outside the Valley District's service area. This program will provide water supply reliability by accelerating the cleanup of groundwater plumes, and improve the management of the groundwater levels in the Pressure Zone.

Facilities needed to implement this program include:

- Groundwater production wells and collection system;
- Regional wellhead treatment facilities; and
- Potable water storage, transmission, and pumping facilities.

Additional detailed discussion of this program and associated facilities can be found in Appendix E.

4.2.1.3.3 Conjunctive Use Strategies

As mentioned previously, the design of conjunctive use programs should ensure avoidance of impacts to and from the contaminant plumes and minimize the increased risk of liquefaction. With this criterion and the "tilted basin" concept in mind, four conjunctive use scenarios have been evaluated for this plan. The first scenario is the base level conjunctive use. The baseline level conjunctive

use is intended to demonstrate how conjunctive management of the region's surface and groundwater resources (groundwater, local, and imported surface water supplies) will help the region meet its water demand through 2030. The next three scenarios are designed to examine the response of the basin when an additional 40 thousand acre-feet (TAF), 90 TAF, and 140 TAF conjunctive use programs are implemented. The intent of these studies is to characterize the book-ends for water banking in the SBBA under the "tilted basin" concept. The model runs were prepared with consideration of the following:

- Hydrologic base period is from 1962 through 2000.
- Basin storage must be maintained to comply with existing adjudications, i.e., no long-term storage depletion—basin storage at the end of the modeling run period would be "equivalent" to the storage at the start of the modeling period.
- Water levels within the Pressure Zone would be within acceptable ranges.
- Water levels outside the Pressure Zone may be higher.
- Avoiding impacts to and from known groundwater contaminant plumes.

Conjunctive use operation of the SBBA should also comply with numerous other agreements and MOUs. Compliance with these documents will be verified during real-time operation of the SBBA and are discussed in more detail in Section 4.2.1.3.5.

Modeling studies were conducted for the four scenarios and are described below. A summary of the assumptions of the four modeling studies is presented in Figure 4-9.

The groundwater model developed as part of this planning effort does not include the terms and conditions set forth in the Seven Oaks Accord and the Riverside Agreement. The modeling runs developed for the IRWM Plan provide valuable information, however, on how to manage the groundwater basins within the framework of all existing legal constraints. Future proposed conjunctive use projects will be analyzed using a groundwater model to ensure their compliance with the terms and conditions of the various legal agreements in the basin.

Baseline Scenario – The baseline scenario assumes compliance with the existing adjudication constraints and includes the diversion rights of Senior Water Right Claimants, Valley District's Replenishment Obligations, and SBVWCD. Future water demand within

Figure 4-9
Groundwater Modeling Assumptions

Scenario	Hydrologic Base Period	Model Assumptions							
		Groundwater Pumping[1]	Valley District's Replenishment Obligation[2]	SBVWCD Diversion[3]	Diversion by Senior Water Rights Claimants[4]	SAR Water Right Applications[5]	Maximum Additional Yield		
							40,000 acre-ft/yr	90,000 acre-ft/yr	140,000 acre-ft/yr
Baseline 1	1962-2000 (wet, avg, dry)	x	x	x	x	x			
A		x	x	x	x	x	x		
B		x	x	x	x	x		x	
C		x	x	x	x	x			x

1 Based on 2005 Urban Water Management Plans pumping data

2 Replenishment obligation is based on Western Judgment and is safe yield minus annual production

3 SBVWCD diversions are based on Valley District/SBVWCD settlement agreement

4 Limited to 88 cfs, see Seven Oaks Accord

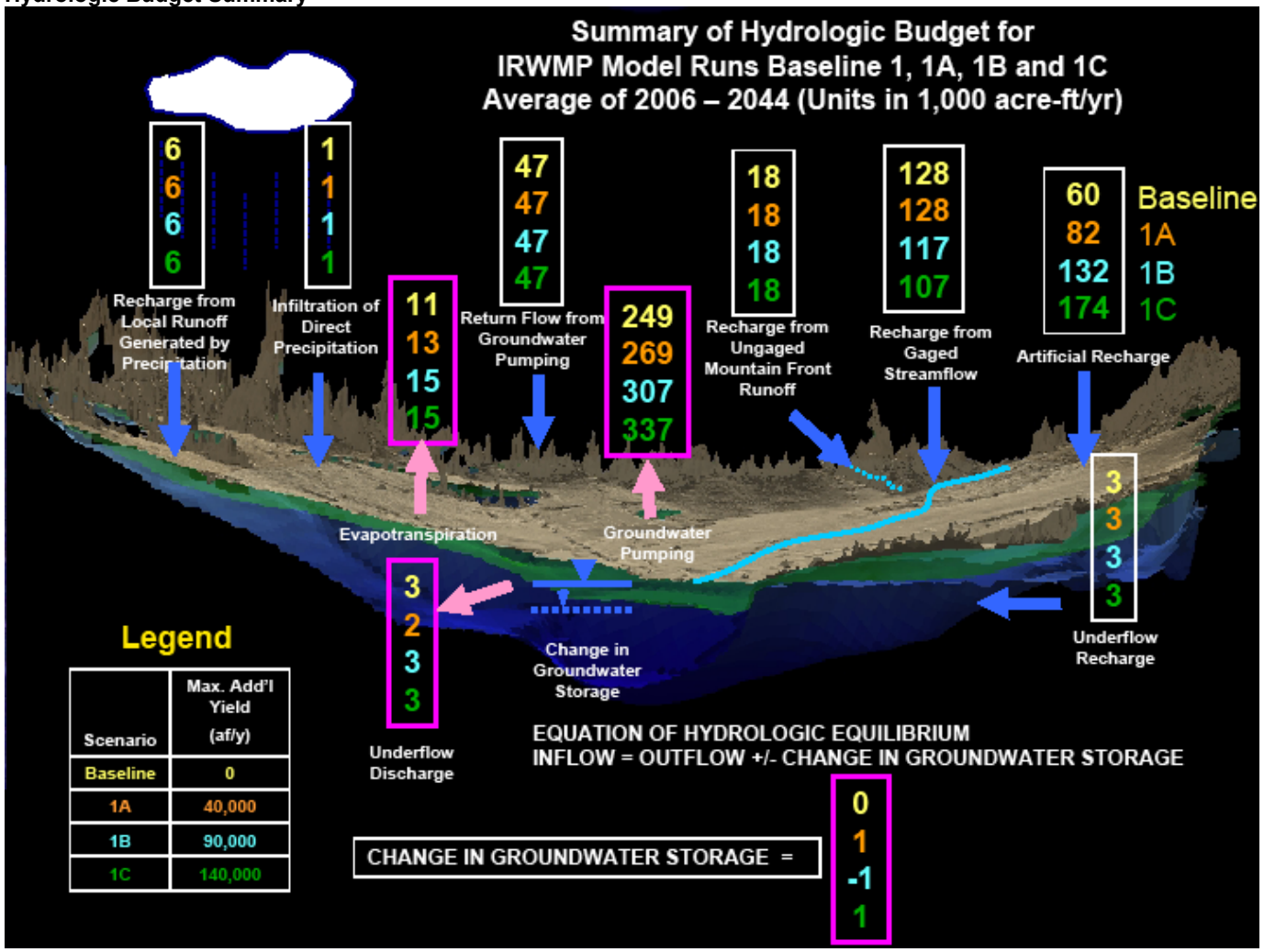
5 Assumes SAR water rights applications are approved by SWRCB

the region is estimated using data presented in UWMPs prepared by the water purveyors as presented in Chapter 3. To meet the water demand, it is assumed that Valley District will use newly conserved SAR water, as is defined in water right applications, and its SWP Table A allotment, as available, for recharge and direct delivery to the treatment plants.

The modeling studies have been conducted to document the performance of the basin when local surface water and SWP supplies are used to replenish the basin by Valley District as required by the adjudication. Modeling studies are designed to cover a 39-year period (1962-2000), which includes the wet years such as 1969 and 1980 and the driest period of 1987 through 1992. This modeling scenario is intended to show how the base conjunctive use project can be used to meet future water needs of the region. This scenario was used in preparation of the water budget (Chapter 3).

The results of the base scenario suggest that the region can meet its water needs through 2030, while achieving the BMOs. The results also indicate that the available surface water for recharge and the SWP supplies, assuming a 77 percent allocation, are adequate to offset the pumping demand on SBBA, and that at the end of the 39-year modeling run the basin storage is the same as the beginning of the period (see Figures 4-9 and 4-10) The IRWM Plan consulting team has evaluated any potential impact of conjunctive use operation upstream of the SBBA (U.S. Forest Service (USFS) land) to ensure the operation will not impact the groundwater level and associated ecosystem of the USFS land. Facilities needed to implement the base conjunctive use scenario include those that are necessary to bring SAR water to the treatment facilities and spreading grounds and are discussed in the Local Surface Water Management section.

Figure 4-10
Hydrologic Budget Summary



Scenario A – This scenario is intended to show the performance of a project with potential 40 TAF additional conjunctive use per year. The level of conjunctive use presented with this scenario is intended to evaluate the feasibility of a 40 TAF conjunctive use project. The other modeling run assumptions used for this scenario were similar to the base scenario.

The modeling studies indicate that this level of conjunctive use operation is feasible and the stated BMOs are also met. The facilities needed to implement this level of conjunctive use include:

- A well field consisting of 20 production wells and connecting pipeline,
- Treatment facilities,
- Pipeline to connect the well field to the treatment and distribution facilities, and
- Improvement in existing groundwater managed recharge basins.

Scenario B – This scenario is for an additional 50 TAF per year conjunctive use opportunity (for a total of 90 TAF per year over the Base Scenario). Additional facilities needed to implement this level of conjunctive use include:

- A well field consisting of 30 additional production wells (50 total),
- Treatment facilities for production wells pumping from the plumes, and
- Conveyance facilities.

Scenario C – This scenario is for an additional 50 TAF per year of conjunctive management over Scenario B for the total conjunctive use of 140 TAF per year. Additional facilities needed to implement this incremental level of conjunctive use include:

- A well field consisting of 30 additional production wells (80 total),
- Treatment facilities for production wells pumping from the plumes,
- Conveyance facilities, and
- Additional spreading grounds.

4.2.1.3.4 Yield of Conjunctive Use Strategies

The yield of conjunctive use strategies listed above is calculated using the groundwater model based on water demands for the basin. Model runs A, B, and

C represent the conjunctive use scenarios discussed in the previous section. Table 4-3 below shows the yield of three conjunctive use scenarios for a single drought year and a three-year drought period (1990 year type is used for Upper SAR watershed as the driest single year and 1988 to 1990 is used as the three-year drought period).

Table 4-3
Summary of Potential Additional Yield for the SBBA

Terms	Period	Baseline Run [acre-ft]	Run A [acre-ft]	Run B [acre-ft]	Run C [acre-ft]
Groundwater Pumping	2032	271,987	301,987	381,987	421,987
	2033	277,330	307,330	367,330	387,330
	2034	289,105	329,105	409,105	449,105
	Total	838,422	938,422	1,158,422	1,258,422
Conjunctive use Additional Yield	Single Year Drought 2034 (1990)	N/A	40,000	120,000	160,000
	3-Year Drought 2032-2034 (1088-1990)	N/A	100,000	320,000	420,000

Single-year drought 2034 (hydrologic year 1990)
Three-year drought 2032-2034 (hydrologic years 1988-1990)

As shown in the above table, for the single drought year, the additional yield for the conjunctive use would be 40,000 acre-feet, 120,000 acre-feet, and 160,000 acre-feet for Model Runs A, B, and C, respectively. The yield during a three-year drought would be 100,000 acre-feet (or 33 TAF per year), 320,000 acre-feet (or 106 TAF per year), and 420,000 acre-feet (or 140 TAF per year) for Model Runs A, B, and C, respectively.

Specific facilities needed to implement the conjunctive use program discussed above are summarized in Table 4-4.

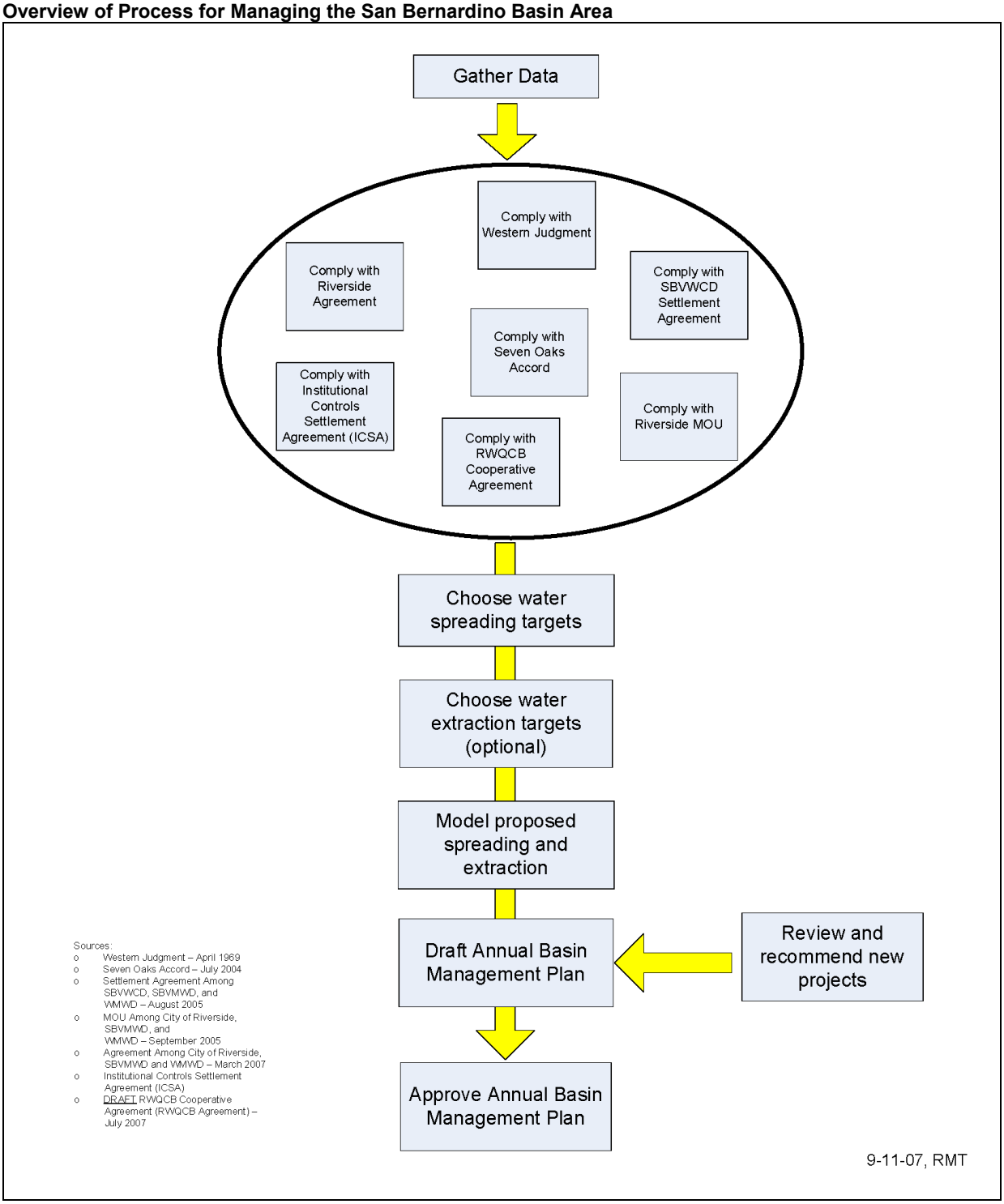
Table 4-4
Facilities Needed to Implement Various Conjunctive Use Program Scenarios

Conjunctive Use Scenario	Facilities Needed
Baseline	Facilities to divert SAR water per water rights application
1A	20 new extraction wells and conveyance facilities
1B	30 additional extraction wells (in addition to 1A) and conveyance facilities
1C	30 additional extraction wells (in addition to 1B) and conveyance facilities

4.2.1.3.5 Process for Managing the SBBA

Implementation of the conjunctive use operation in the SBBA must meet the requirements of various judgments, agreements, and MOUs developed and agreed upon by water entities in the region. To effectively manage the SBBA in real time, the TAG drafted a basin management process for a coordinated and comprehensive management plan of the SBBA. This process will be submitted to the Board of Directors of Valley District and Western Municipal Water District (Western) for review and approval. The process is outlined in Figure 4-11.

Figure 4-11
Overview of Process for Managing the San Bernardino Basin Area



Governance

The Western Judgment identifies regional representative agencies to be responsible, on behalf of the numerous parties bound thereby, for implementing the replenishment obligations and other requirements of the judgment. The representative entities for the Western Judgment are Valley District and Western. Valley District is solely responsible for providing replenishment of the SBBA if extractions exceed the safe yield of the basin. The court-appointed Watermaster includes representatives from Valley District and Western. The proposed basin management process could be under the authority of the Valley District and Western Boards of Directors with inputs from other significant producers. (See Figure 4-12.)

Basin Technical Advisory Committee

The annual basin management plan for any given year will be formulated by a Basin Technical Advisory Committee (BTAC) and forwarded onto the Valley District and Western Boards of Directors for review and approval. The BTAC will be comprised of staff representatives from plaintiffs and non-plaintiffs of the Western Judgment, as listed below:

BTAC Membership

i) Western

ii) City of Riverside

iii) Valley District

iv) Bear Valley Mutual Water Company (Bear Valley Mutual)

v) East Valley Water District (East Valley)

vi) City of Loma Linda

vii) City of Redlands

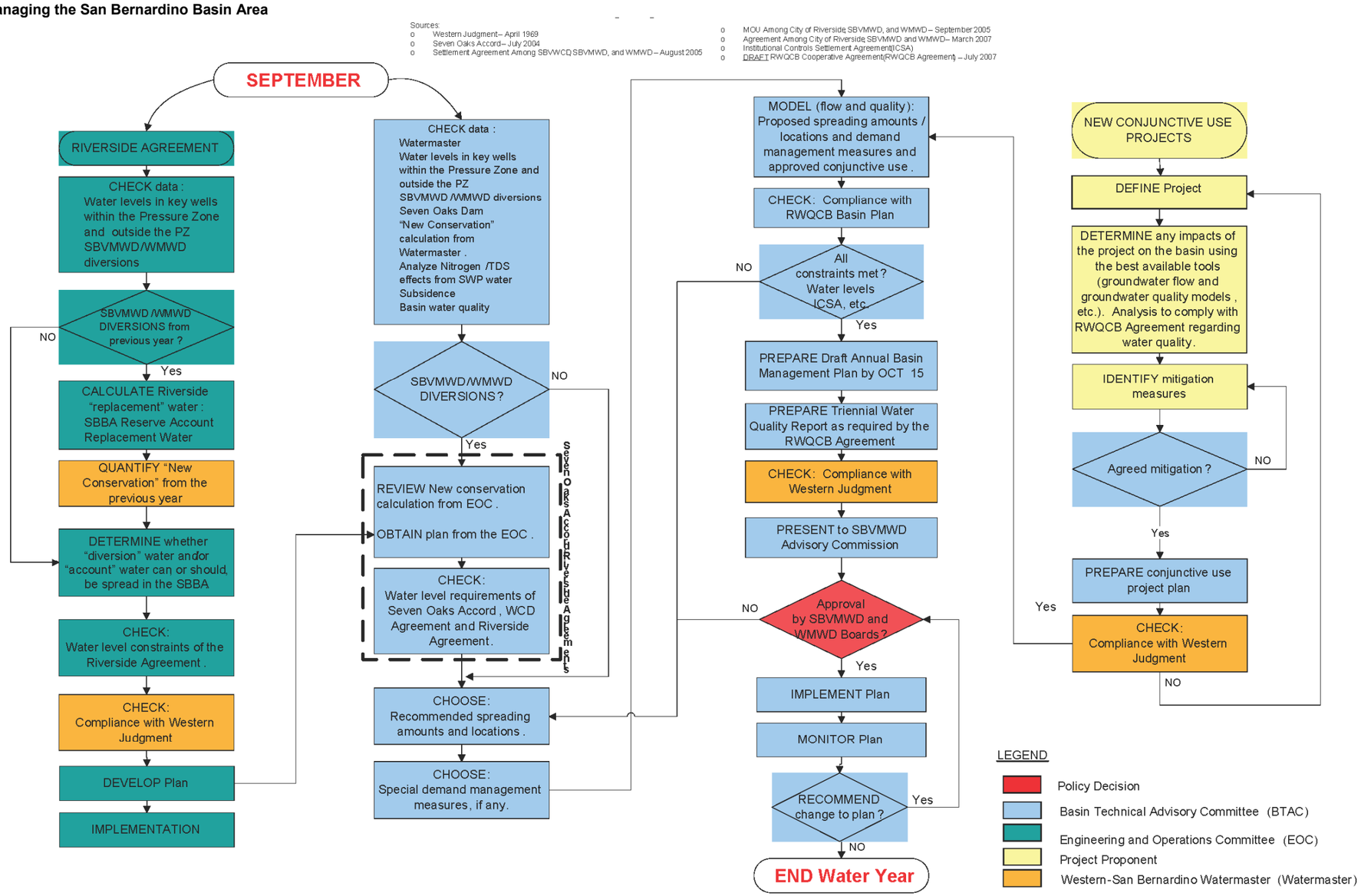
viii) San Bernardino Municipal Water Department

ix) SBVWCD

x) West Valley Water District (West Valley)

The BTAC will meet as needed to effectively operate the SBBA on a real-time basis and to address technical issues related to basin management. The BTAC members will cooperatively work together and will strive to make decisions by consensus.

Figure 4-12
Process for Managing the San Bernardino Basin Area



Overall Basin Management Strategy

The BMOs formulated for the SBBA are the driving force in developing strategies for the basin management plan. The BMOs are as follows:

- Improve water supply reliability during droughts,
- Protect water quality,
- Reduce risk of liquefaction, and
- Avoid impact from and to the contaminant plumes.

To ensure adequate reliable water supply for the communities in the Upper SAR watershed during a prolonged drought, the overall basin management strategy will be to operate the basin under the "Tilted Basin Concept" such that the basin would begin a drought period in "as full as possible" condition. Keeping the basin relatively full and operating a conjunctive management program according to the "Tilted Basin Concept" also provides the added flexibility to reduce imports from the SWP when water quality is less desirable. This overarching management strategy will be followed by the BTAC as they draft the basin management plan. Some of the specific management strategies that could contribute to improving water supply reliability during a drought are as follows:

- Retailers could take direct deliveries of SWP water when available instead of producing water from their wells. This reduces the amount of water withdrawn from the groundwater basin, which is equivalent to recharging the basin. This strategy will require participation by the water agencies and may require the construction of new water treatment plants or upgrades to existing plants.
- Recharge as much SWP water as possible when available. This will likely result in spreading water in wet years, which has not occurred as much in the past. It may also require upgrading the existing spreading grounds.
- Prepare, to the extent possible, for the high groundwater condition that may be created by maintaining a "full basin" when a wet year arrives.
    - Implement an agreement(s) with groundwater producers within the Pressure Zone to maximize production from the Pressure Zone as much as practicable during unacceptably high groundwater level conditions.

- Construct additional facilities to pump and convey large quantities of water from the Pressure Zone for use outside the Pressure Zone.

The San Bernardino Basin Area Management Plan will be developed in consideration of this overall management strategy and the BMOs.

Basin Management Requirements

The annual basin management plan for the SBBA will meet the requirements identified in the following legal documents:

1. Western Judgment – April 1969
2. Seven Oaks Accord – July 2004
3. Settlement Agreement between SBVWCD, Valley District, and Western – August 2005
4. MOU between City of Riverside, Valley District, and Western – September 2005
5. Agreement between City of Riverside, Valley District, and Western – March 2007
6. Institutional Controls and Settlement Agreement (ICSA) Agreement and its subsequent amendments

A summary of the pertinent basin management information from each of these documents is provided below.

1) Western Judgment

a) **Natural Safe Yield** - established at 232,100 acre-feet per year. The Plaintiffs' (Western entities) rights are capped at 27.95 percent of the natural safe yield, or 64,862 acre-feet, notwithstanding any Additional Extraction Agreements or "new conservation," as defined in the judgment. The Non-Plaintiffs' (Valley District entities) rights are unlimited provided that an equal amount of basin replenishment occurs to offset any amount that the Non-Plaintiff production exceeds—72.05 percent of the natural safe yield, or 167,238 acre-feet. An annual report, entitled *Annual Report of the Western-San Bernardino Watermaster*, provides an "accounting" of basin extractions.

b) **Replenishment** – Valley District is responsible for replenishing the SBBA for that amount of Non-Plaintiff extractions exceeding 167,238 acre-feet. The replenishment obligation may be met by any of the following means:

i) Return flow from excess extractions;

ii) Replenishment provided in excess of that required;

iii) Amounts extracted without replenishment obligations (i.e., Additional Production Agreement);

iv) That amount of water extracted below the natural safe yield; and

v) Return flow from imported water.

c) **New Conservation** is defined in the 1969 Judgment as "any increase in replenishment from natural precipitation which results from operation of works and facilities not now in existence." The judgment contemplated that the parties would develop facilities that would result in the capture of more natural runoff. Construction of the Seven Oaks Dam within the SAR has provided such an opportunity, and Valley District and Western are seeking to obtain a water right from the SWRCB and to construct the facilities necessary to capture SAR water that was not historically captured. The parties under the Western Judgment will have their adjusted extraction rights increased to include a proportionate share of any New Conservation, provided that each Plaintiff party pays its proportionate share of the costs to develop said New Conservation.

2) Seven Oaks Accord

a) **Groundwater Spreading/Management Program** (GMP) – Requires Valley District and Western to develop and manage a groundwater spreading program in cooperation with other parties, "That is intended to maintain groundwater levels at the specified wells at relatively constant levels, in spite of the inevitable fluctuations due to hydrologic variation." Specific requirements of the Seven Oaks Accord are as follows:

i) GMP shall identify target water-level ranges in the specified "index wells" subject to the requirement that such spreading will not worsen high groundwater levels in the Pressure Zone.

ii) Thresholds of significance in terms of SAR water diverted by Valley District and Western and spreading by all parties should be observed (see sidebar). See Appendix I of the Accord.

iii) The determination as to whether a certain groundwater management action will "worsen" high groundwater levels in the Pressure Zone is made through the use of the integrated surface and groundwater models.

iv) GMP must be "adopted" within five years of the date the SWRCB grants a permit to Valley District/Western. To date, Valley District and Western have not received the permit.

v) Redlands, East Valley, and Bear Valley Mutual agree to limit spreading to conform to the annual GMP.

3) San Bernardino Valley Water Conservation District Settlement Agreement

a) Annual Groundwater Management Plan – Valley District and Western will consult with SBVWCD in the development of the GMP.

b) An interim GMP could be developed prior to the completion of the model being developed for the San Bernardino Basin Area.

c) GMP objectives to be achieved simultaneously include:

i) Maximize the quantity of water spread in the SAR spreading grounds.

ii) Establish and maintain a shallowest target of 50 feet depth to water within the Pressure Zone.

iii) Maintain groundwater levels in the Forebay Area within 10 feet of the levels that would have occurred in the absence of SAR diversions by Valley District and Western. Quantifying the difference between diversions and no diversions will be accomplished using the groundwater flow model developed for the SBBA.

iv) Otherwise avoid significant impacts on the environment.

d) Set as a goal to coordinate the San Bernardino Consent Decree management plan with the GMP.

e) No spreading will take place without authorization by the GMP.

4) Riverside MOU

a) Basin Management Account – Established with funds and future revenues from the SBVWCD "to fund recharge efforts in the basin."

b) Valley District and Western are required to exercise SBVWCD water rights in a manner that:

Thresholds of Significance and Mitigation Measures to be Included in Applicants' EIR

1. Threshold of Significance: Reduction in Groundwater Levels at Index Wells Outside the Pressure Zone

A reduction in groundwater levels outside the Pressure Zone is significant if the analysis in this EIR, using the integrated surface water and groundwater model developed by the project proponents, predicts that the project would reduce static groundwater levels at one or more index wells, on average, by more than 10 feet during a repetition of the 39-year base period hydrology, as compared to static water levels in the absence of the project.

2. Threshold of Significance: Increase in Groundwater Levels at Index Wells Within the Pressure Zone

An increase in groundwater levels in the Pressure Zone is significant if the analysis in this EIR, using the integrated surface water and groundwater model developed by the project proponents, predicts that the project would increase static groundwater levels at one or more index wells in the Pressure Zone, on average, by more than 10 feet during a repetition of the 39-year base period hydrology, as compared to static water levels in the absence of the project.

3. Mitigation Measure: Targeted Spreading to Maintain Groundwater Levels

To avoid a significant effect on groundwater levels at one or more index wells located outside the Pressure Zone, the project proponents shall spread sufficient water to maintain static groundwater levels at the affected index wells to reduce this project impact to a less-than-significant level.

4. Mitigation Measure: Limitation on Spreading to Prevent High Groundwater Levels

To avoid a significant effect on groundwater levels in the Pressure Zone, the project proponents shall curtail their spreading or direct other parties engaged in the spreading of water to replenish the San Bernardino Basin to curtail their spreading to reduce this project impact to a less-than-significant level.

i) Maintains groundwater levels for the benefit of the production wells in the geographic area historically served by the SBVWCD at relatively constant levels.

ii) Maximizes the use of native water supplies to replenish the SBBA without causing high groundwater problems in the artesian zone and without causing the migration of contaminant plumes that would result in significant degradation of the water quality in any domestic well.

c) Valley District will spread sufficient water to ensure that groundwater supplies necessary to support the safe yield of the SBBA are maintained pursuant to the Western Judgment.

5) Riverside Agreement

a) This agreement establishes the Seven Oaks Dam Water Diversions Engineering and Operations Committee (EOC) to develop and implement procedures to:

i) Maintain the groundwater levels in the Index Wells at relatively constant levels, in spite of fluctuations due to hydrologic variation.

ii) Minimize such fluctuations (reduce highs and lows).

iii) Provide water "accounts" to Riverside to offset the loss of recharge to the SBBA and/or Riverside North due to Western/Valley District SAR water diversions.

(1) "Reserve Account" is initially established as 38 percent of the total volume of water diverted from the SAR by Valley District and Western pursuant to the SWRCB water right permit. To be recharged in the SBBA either directly or through an exchange.

(2) "Replacement water" varies from 0 to 6 percent of the flow at the E Street Bridge. Water to be recharged into the Riverside North basin.

iv) Develop recommendations to the Western Judgment Watermaster regarding the classification of diverted SAR water as either New Conservation or existing safe yield of the SBBA.

b) EOC will meet no later than six months after the SWRCB grants permits to Valley District and Western to develop the initial procedures. Ongoing, the EOC will meet no later than October 1 of each year. The EOC shall meet on a regular basis to effectively operate, on a real-time basis, a program to achieve the objectives listed above. EOC decisions will be implemented once approved by the EOC and will be provided to the BTAC for inclusion in the Annual San Bernardino Basin Area Management Plan. The tasks of the EOC could be covered at the BTAC

meetings, realizing that most of the members of the BTAC have no standing in this agreement and the decisions of the EOC are not subject to review by BTAC or any of the BTAC members.

c) Water levels at the index wells outside the Pressure Zone must be maintained at no lower than 10 feet, on average, during a repeat of the 39-year base period. Valley District will commence spreading to maintain these levels.

d) If the 12-month rolling averages of the Backyard Well ports D4, D5, and D6 are 50 feet bgs or greater, Valley District and Western will recharge water from the Reserve Account.

6) Consent Decree, City of San Bernardino March 23, 2005

a) The City of San Bernardino Municipal Water Department (SBMWD) is a party to a consent decree lodged with the United States District Court, Central District of California, Western Division (Court), on August 18, 2004. The Consent Decree obligates the SBMWD to operate and maintain a system of wells and treatment plants known as the Newmark Groundwater Contamination Superfund Site (Newmark Site). The Newmark Site specifically treats groundwater contaminated with TCE and perchloroethylene (PCE).

b) The SBMWD is required by the terms of the Consent Decree, entered on March 23, 2005, to enact institutional controls and implement an ordinance providing for the protection and management of the Interim Remedy set forth in the Record of Decisions and Explanation of Significant Differences prepared by the Environmental Protection Agency (EPA).

7) City of San Bernardino Ordinance No. MC-1221 and Institutional Controls Settlement Agreement (ICSA)

a) Ordinance No. MC-1221 – This ordinance establishes the management zone boundaries within the City of San Bernardino for water spreading and water extraction activities.

i) The Consent Decree requires that the City of San Bernardino adopt and enforce an ordinance to ensure that activities occurring in the management zone, including, but not limited to, development, digging, drilling, boring or reconstruction of wells, extraction of groundwater from wells, and spreading of recharge water, do not interfere or cause pass-through of contaminants from the Newmark and Muscoy Operable Units. The ordinance was approved on March 20, 2006, by the Mayor and City Council.

ii) The Interim Remedy requires the extraction of contaminated groundwater from the Bunker Hill Groundwater Basin and within the

Newmark and Muscoy Operable Units, and treatment of the groundwater to meet all State of California (State) and federal permits and requirements for drinking water.

iii) Unless a permit issued by the SBMWD pursuant to the provisions outlined in the ordinance is first obtained, it shall be unlawful for any person, as principal, agent, or employee to spread (artificial recharge) or extract (well pumping) within the Management Zones as defined in the ordinance.

b) Institutional Controls Settlement Agreement (ICSA)

i) An agreement (ICSA) has been executed to develop and adopt a successor agreement, titled Institutional Controls Groundwater Management Program (ICGMP), between the following parties:

(1) City of San Bernardino Municipal Water Department

(2) San Bernardino Valley Municipal Water District

(3) Western Municipal Water District

(4) City of Riverside

(5) West Valley Water District

(6) East Valley Water District

(7) City of Colton

(8) Riverside Highland Water Company

ii) The parties identified above will not be subject to the provisions of City of San Bernardino Ordinance No. MC-1221 as long as each is a party to the ICSA and, subsequently, the ICGMP Agreement.

Development of Annual San Bernardino Basin Area Management Plan

Considering the provisions of the above judgments and agreements, the following process is suggested for the preparation of an Annual SBBA Management Plan. This process is intended to be flexible and changed as needed. The main purpose in suggesting a process is to ensure that the SBBA Management Plan is in compliance with the provisions of the applicable judgment and agreements and to provide a cooperative forum among the water agencies to engage in developing solutions.

As part of the first annual SBBA Management Plan, BTAC will work toward defining the term “conjunctive use” and draft a conjunctive use policy that may be used for the basin. The policy will define issues such as (1) imported water, (2) imported water delivery, (3) the groundwater recharge system, (4) usable groundwater storage capacity, (5) “water loss factor,” (6) expiration date for the

imported water, (7) groundwater recovery rights, (8) groundwater extraction capacity, and (9) recovered water delivery.

A. **Prepare** Annual SBBA Management Plan. The plan will be prepared considering the following:

   a. **Review** the Watermaster data:

      i. Recharge

      ii. Extractions

      iii. Credits

The BTAC may have to rely on preliminary production information compiled by the Watermaster because the Watermaster reports typically lag the calendar year.

   b. **Analyze** nitrogen and TDS effects from imported water. Prepare conjunctive use operation criteria to ensure the use of SWP water for recharge will not cause water quality degradation in Bunker Hill Basin.

   c. **Quantify** "new conservation."

      i. Develop recommendations to the Western Judgment Watermaster regarding the classification of diverted SAR water as either New Conservation or existing safe yield of the SBBA.

   d. **Check** Valley District/Western/Riverside SAR diversions from the previous year.

   e. **Check** Seven Oaks Dam operations data.

      i. Debris pool.

      ii. Current elevation.

   f. **Check** water levels.

      i. Check water levels in the Pressure Zone (establish and maintain 50 feet to water level in the Pressure Zone).

      ii. Check water levels outside the Pressure Zone. Ensure water levels at the index wells outside the Pressure Zone are maintained at no lower than 10 feet, on average, during a repeat of the 39-year base period.

   g. **Review** the amount of "replacement" water agreed to by the EOC to be "deposited" into the Riverside "accounts" based upon the Valley District/Western/Riverside diversions from the previous year.

i. SBBA Reserve Account: 38 percent of the total volume of water diverted from the SAR by Valley District and Western pursuant to a SWRCB permit or license. To be recharged in the SBBA either directly or through an exchange.

ii. Replacement water volume calculation: Replacement water is the lost recharge opportunities in Riverside North Basin due to diversion of New Conservation water from SAR. This replacement water is estimated to vary, depending on SAR hydrology, from 0 to 6 percent of the flow at the E Street Bridge. Replacement water to be recharged into the Riverside North Basin.

h. **Determine** whether water will be spread from the SBBA Reserve Account in the coming year.

i. Calculate the 12-month rolling averages of the Backyard Well ports D4, D5, and D6. If it is 50 feet bgs or deeper, Valley District/Western will recharge water from the Riverside Reserve Account in the coming year.

i. **Review** constraints of various agreements on Valley District/Western/Riverside diversions. If SAR diversions were made in the previous year, check the following:

i. Maintain groundwater levels in the forebay area (use wells from Seven Oaks Accord and Riverside Agreement, "Index Wells") within 10 feet of the levels that would have occurred in the absence of SAR diversions by Valley District/Western**.**

ii. Maintain groundwater levels in the Seven Oaks Accord, Valley District, and Riverside Agreement wells at relatively constant levels, in spite of the inevitable fluctuations due to hydrologic variation.

1. Identify target water level ranges for the Seven Oaks Accord index wells subject to the requirement that such spreading will not worsen high groundwater levels in the Pressure Zone.

2. Review Seven Oaks Accord thresholds of significance.

3. Maintain water levels in the Riverside Agreement wells outside the Pressure Zone at no lower than 10 feet, on average, during a repeat of the 39-year base period.

4. Minimize fluctuations (highs and lows).

j. **Review** spreading amounts and locations chosen by the EOC and choose other spreading amounts and locations based upon the following:

   i. Maximize the quantity of water spread in the SAR spreading grounds.

   ii. Water spread for conjunctive use projects, if any.

      1. Water banking.

      2. Exchange.

      3. Establish "accounts" in the basin.

         a. Expiration?

         b. Define assumed losses due to evaporation and evapotranspiration.

   iii. Riverside Reserve Account (see 2 and 3 above).

k. **Choose** special demand management measures (if any).

   i. Extra pumping to dewater a particular area.

   ii. Extra pumping to dewater due to a wet year.

   iii. Suggest conservation measures.

      l. **Check compliance with the Regional Water Quality Control Board (RWQCB) Agreement**

B. **Model:** The groundwater models for the SBBA can be used to model the proposed SBBA Management Plan developed above to ensure that all of the constraints are met.

a. Maintain 50 feet to water level in the Pressure Zone.

b. Check target water level ranges in the Seven Oaks Accord index wells.

c. Check water level requirements from Riverside Agreement.

d. Check water level requirements from SBVWCD Agreement.

e. Determine any impacts on the environment.

f. Prepare groundwater flow map to determine any impacts on the Consent Decree.

g. Determine any impacts on any other contamination cleanup projects.

h. Determine if there are any subsidence impacts.

i. Adjust SBBA Management Plan, as necessary, in an attempt to remove any impacts and re-run model. Continue this trial-and-error process until all of the constraints are met.

C. **Prepare** triennial water quality report.

D. **Adopt** Annual SBBA Management Plan. The Annual SBBA Management Plan must be adopted by the Board of Directors of the Valley District and Western.

E. **Monitor** plan throughout the year. The operation of the SBBA will be monitored and groundwater level and quality data will be collected and reviewed throughout the year to ensure basin behavior is consistent with the SBBA Management Plan desired outcome(s). If unexpected impact is observed, the conjunctive use operation will be modified to ensure the impact is mitigated.

F. **Review** implementation of the Annual SBBA Management Plan at the end of the year. Compare the anticipated water levels with actual field observations. This would provide valuable information for developing an adaptive management plan for development of the basin management plan for the following year.

G. **Adapt** the process, as necessary, to maintain its effectiveness.

Suggested Calendar for Preparation and Implementation of the Annual Basin Management Plan (water year)

MONTH	ACTION ITEM(S)
OCT	1) Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells. **2) <u>BTAC MEETING</u>** o Develop recommendation regarding the classification of diverted SAR water as either New Conservation or existing safe yield of the SBBA. o Review Watermaster data. o Check water levels in the Pressure Zone. o Calculate Riverside Reserve Account. o Determine whether water will be spread from Reserve Account in the coming year. o Check groundwater levels in the Forebay Area. o Check water levels in the Seven Oaks Accord wells. o Check water levels in the Riverside Agreement wells. o Review Valley District Change in Storage Calculation. o Review SBVWCD Change in Storage Calculation. o Review hydrologic index (SBVWCD Engineering Investigation). o Choose spreading amounts and locations. o Choose demand management measures. o Model spreading amounts for the year.
NOV	1) Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells. **2) <u>BTAC MEETING</u>** o Finalize/Implement Groundwater Management Plan. o Present to Valley District and Western Boards of Directors.
DEC	Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells.
JAN	Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells.
FEB	Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells.
MAR	1) Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells. **2) <u>BTAC MEETING</u>** o Review water levels and plan. o Review Valley District Change in Storage Calculation.
APRIL-SEPT.	Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells.

4.2.1.3.6 The Potential Impact of the Agreement on Cooperating Agencies' Ability to Beneficially Use SWP Water for Groundwater Recharge

Background

The Santa Ana Regional Water Quality Control Board (SARWQCB) is charged by statute with adopting water quality objectives as may be required to protect the beneficial uses of water within the region. In particular, the long-term conjunctive use of groundwater requires that the quality of water in groundwater basins be managed to meet the water quality objectives for nitrogen and total dissolved solids (TDS) [collectively, the "Salinity Objectives" adopted by the SARWQCB in the 1995 Water Quality Control Plan for the Santa Ana River Basin as amended in 2004 by R8 2004-0001 (Basin Plan)].

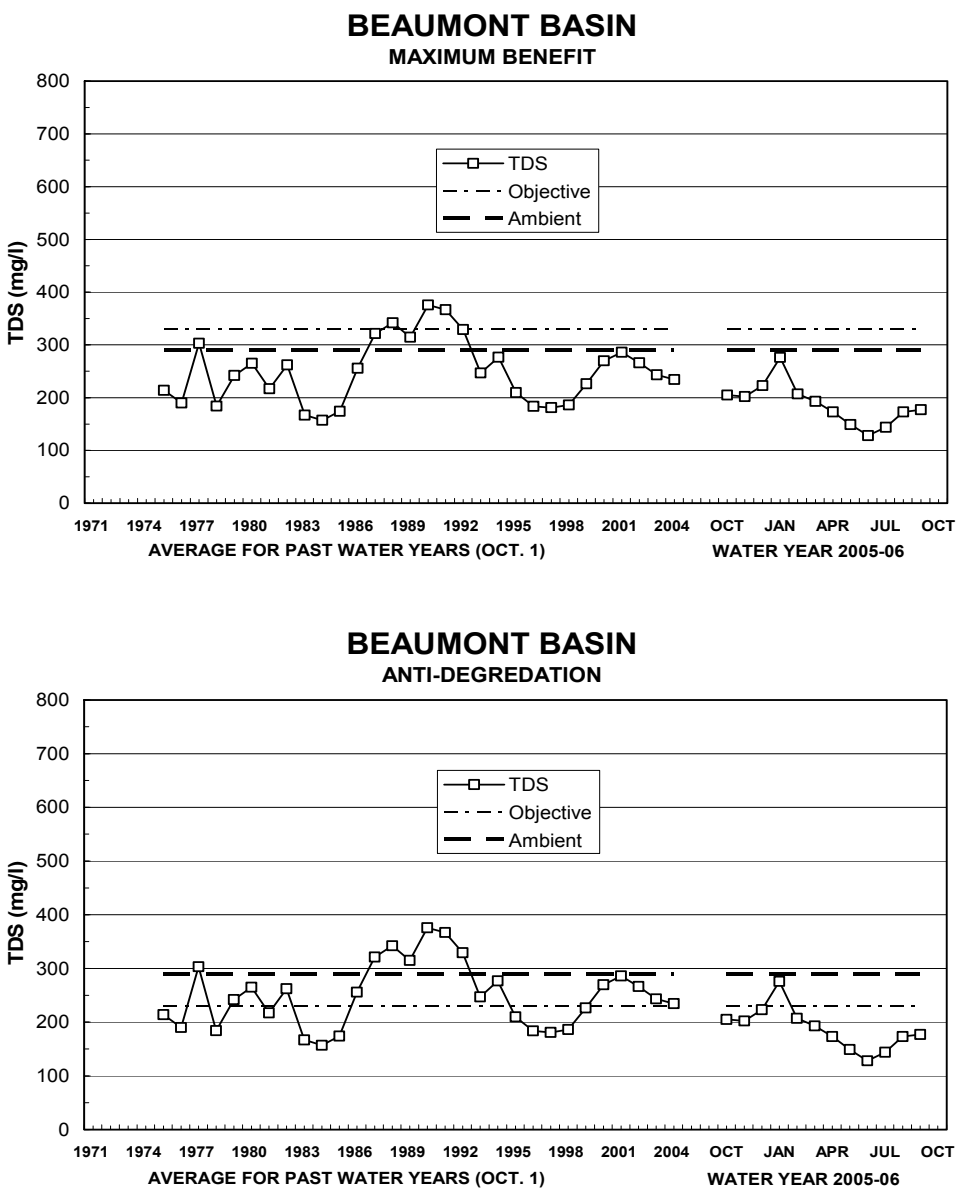
In June 2007, water entities in the Upper SAR watershed (cooperating agencies) and the SARWQCB entered into the Cooperative Agreement to "Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basins." This Agreement is intended to allow the water entities to monitor and improve water quality within the Santa Ana region in a manner that is consistent with both adopted water quality objectives and the needs of the inhabitants of the region for a reliable supply of water. Specifically, the Agreement addresses the use of imported water for groundwater recharge and compliance with Basin Plan Salinity Objectives for individual groundwater management zones.

Implementation of the Agreement could prevent the groundwater recharge of SWP water in some groundwater basins when TDS of imported water is too high. The purpose of this section is to evaluate the potential impact of this draft Agreement on cooperating agencies' ability to beneficially use SWP water for groundwater recharge. The analysis below qualitatively estimates potential impacts. Actual conjunctive use operations and potential impact of the Agreement will be based on annual monitoring and preparation of the Triennial Water Quality Report as required by the Agreement.

Potential Impact

To estimate the potential impact of the Agreement on use of SWP for recharge, TDS and nitrate of SWP water is compared with the TDS and nitrate of the groundwater management zones. Figures 4-13 through 4-16 compare Basin Plan Salinity Objectives to SWP annual TDS levels. For this analysis, it is assumed that SWP water can be utilized for recharging groundwater basins when the level of TDS or nitrate nitrogen of SWP water is equal to or less than the ambient level of a specific groundwater management zone. In other words, this analysis enables us to understand when and to what extent SWP water can be used for groundwater recharge without treatment in any of the six groundwater management zones with the limited available data.

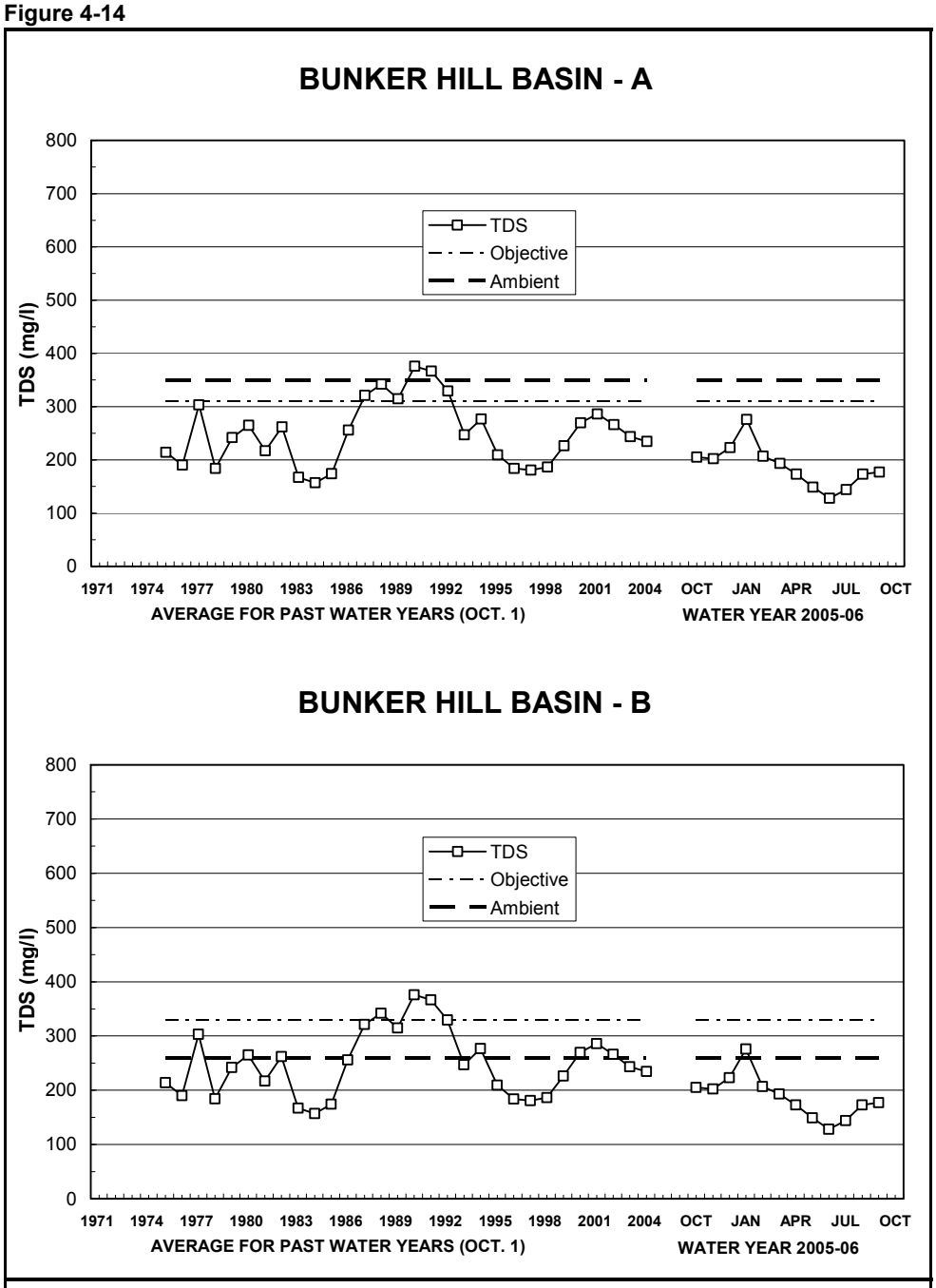
Figure 4-13



HISTORICAL TDS FOR EAST BRANCH AT SILVERWOOD LAKE AND BASIN OBJECTIVES

GEI / B-E AUGUST 2007

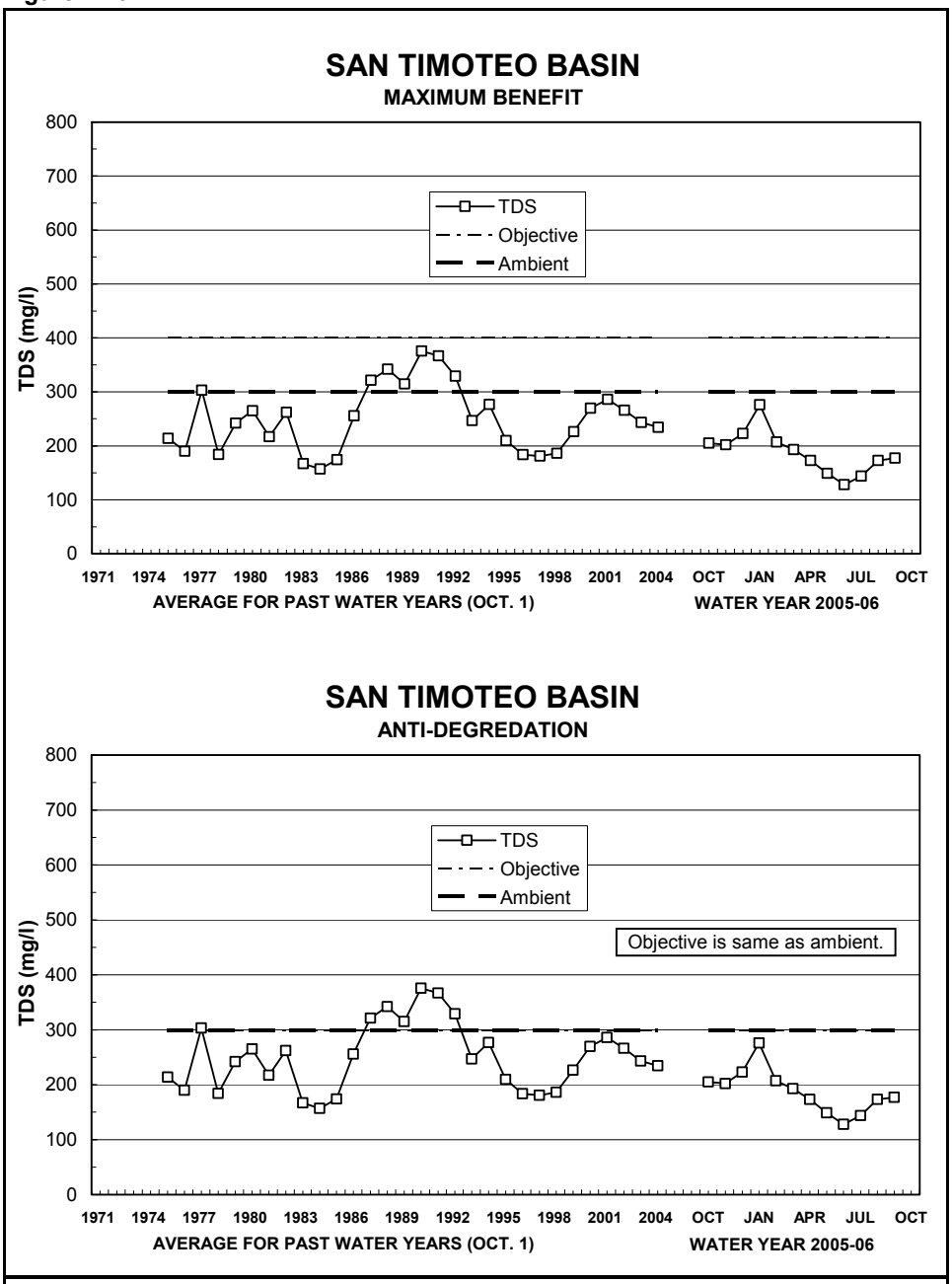
Figure 4-14



HISTORICAL TDS FOR EAST BRANCH AT SILVERWOOD LAKE AND BASIN OBJECTIVES

GEI / B-E AUGUST 2007

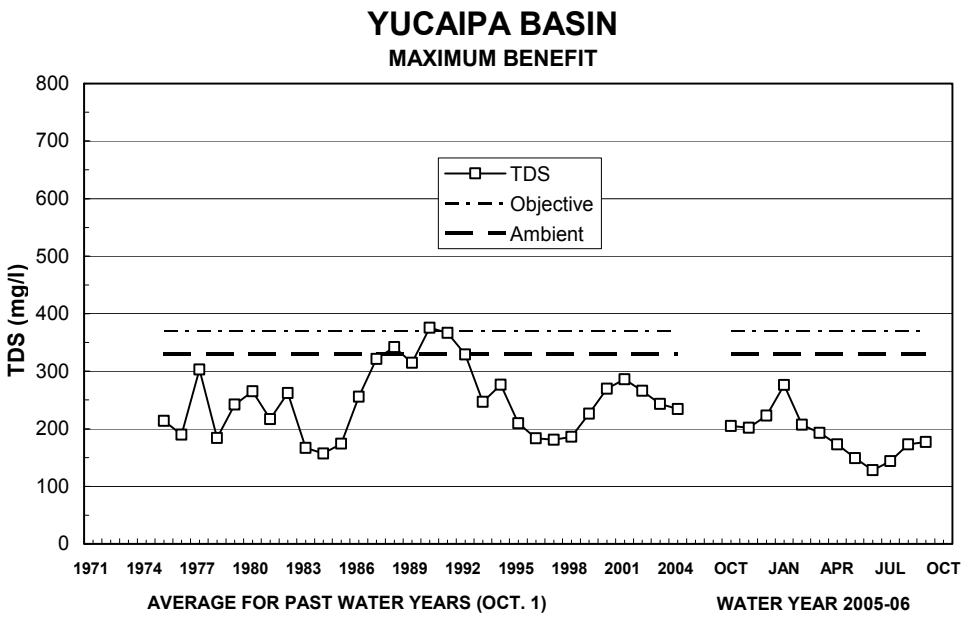
Figure 4-15

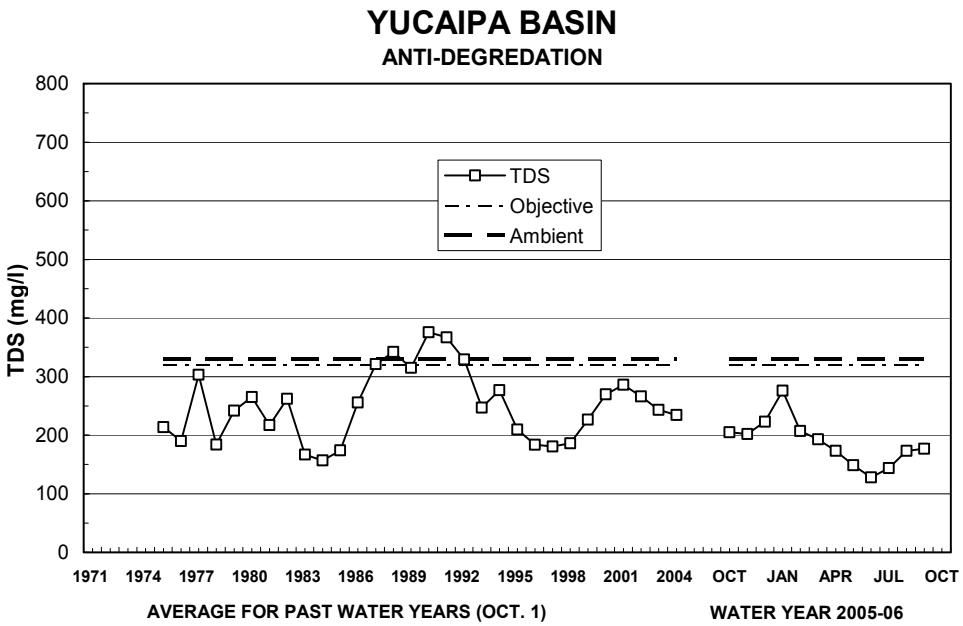


HISTORICAL TDS FOR EAST BRANCH AT SILVERWOOD LAKE AND BASIN OBJECTIVES

GEI / B-E AUGUST 2007

Figure 4-16





HISTORICAL TDS FOR EAST BRANCH AT SILVERWOOD LAKE AND BASIN OBJECTIVES

GEI / B-E AUGUST 2007

The Basin Plan delineates six groundwater management zones in the San Bernardino Valley and Yucaipa/Beaumont Plains: Bunker Hill – A, Bunker Hill – B, Lytle, San Timoteo, Yucaipa, and Beaumont. For each groundwater management zone, TDS and nitrogen nitrate Water Quality Objectives, ambient water quality, and estimated assimilative capacities are defined. [Basin Plan (Tables 5-3 and 5-4)].

Untreated SWP East Branch water quality data (TDS and nitrogen nitrate) are available from 1975 through 2005. The data are collected by Metropolitan at the Devil Canyon Afterbay Turnout. Ambient TDS and nitrogen nitrate data are available for the six groundwater management zones.

A review of historic yearly and monthly SWP water quality information indicates that the level of nitrogen-nitrate found in SWP water does not limit or otherwise control the ability to use SWP water to recharge any of the six groundwater management zones since the highest recorded nitrogen level found in SWP water is less than the lowest ambient level found in all six groundwater management zones. The Beaumont Groundwater Management Zone has the *lowest* measured ambient nitrogen nitrate level at 2.6 mg/L. This is substantially higher than the highest recorded nitrogen nitrate level of 0.7mg/L measured in SWP water.

Although nitrogen nitrate is not expected to impact the ability to use SWP water, the level of TDS in SWP water could limit the use of the water for groundwater recharge.

Figures 4-13 through 4-16 compare yearly SWP water TDS levels (for the period 1975 through October 2006) with 2004 ambient basin conditions. The analysis of yearly data reveals that during some dry-year and multiple dry-year periods, all basins, to varying degrees, would exceed the TDS limits set by the RWQCB. Likewise, the analysis of monthly data reveals that all basins, to varying degrees, could exceed the TDS limits during summer and fall months. The two basins that could exceed the limits the most are the Bunker Hill Basin – B and Lytle Basin. Bunker Hill Basin - A would exceed the TDS limits only in limited conditions such as a period similar to 1990 to 1992.

4.2.1.3.7 Findings and Recommendations

Findings

Review of Figures 4-13 through 4-16 indicates the following:

- The basins exceed the TDS limits during dry, or drought, periods. During the 1975 to 2004 period, SWP water TDS exceeded the ambient TDS in 1977 and during the 1987 to 1992 drought period or about 23 percent of the study period. These are the dry years when SWP

deliveries typically are substantially cut. Computer modeling indicates that the SWP can deliver only four percent of its Table A amount in a drought year such as 1977. In a drought period such as 1987 to 1992, the SWP reliability is about 46 percent. Assuming that the limited amount of SWP water available during drought periods could be used by direct delivery, there may be little impact to groundwater recharge operations.

- During the late summer and fall months of some years, TDS of the SWP water may exceed the TDS limits.

Recommendations

1. Since, historically, the TDS of SWP water rarely exceeds the TDS limits, the region may want to consider suggesting that the RWQCB allow the region to maintain a "salt account" for the basins. When the TDS of SWP water is lower than the limit, a credit would be given. When the TDS of SWP water is higher than the limit, a debit would be taken. As long as the balance of the account is greater than, or equal to, zero, no mitigation would be required. If the account were to fall below zero, the region would have to implement some sort of mitigation measures to get the account back to a positive balance.

2. The SWP contractors in the region could attempt to use the SWP water for recharge in the winter, spring, and early summer months when the TDS is its lowest and try to maximize direct deliveries in late summer and fall when TDS is the highest.

The above recommendation strategies will considerably limit the impacts of implementation of the cooperative agreement on conjunctive use and groundwater recharge in the region. The above strategies will be implemented and their effectiveness will be examined periodically. There may be times in the future that SWP supplies must be used for groundwater recharge with the likelihood of significant degradation from TDS, and there may also be impacts to wastewater treatment plants. In such cases, other strategies such as desalting plants should be evaluated.

4.2.1.3.8 Facilities Needed for Dewatering the Pressure Zone

This evaluation was conducted to determine if additional pumping and conveyance facilities are needed to dewater the SBBA Pressure Zone in extreme wet years to avoid risk of liquefaction in the area. Liquefaction typically occurs in recent (Holocene to late Pleistocene) deposits of silt, sand, and gravel. Most liquefaction occurs where the depth to groundwater is less than 50 feet; this depth is traditionally considered adequate for most investigations of liquefaction potential (Martin and Lew 1999). For purposes of this investigation, areas with

depth to groundwater of less than 50 feet in the Pressure Zone were evaluated. Groundwater model runs were conducted for this evaluation.

Areas where depth to groundwater was less than or equal to 50 feet below the land surface were delineated using the groundwater model results from Baseline Run 1. Annual potential liquefaction area as a percentage of the Pressure Zone area ranges from zero in a dry year (hydrologic year 1992) to 6.0 percent in a wet year (hydrologic year 1986), with an annual average of 2.3 percent. The area with potential for liquefaction in a wet year such as 1986 (year with the greatest potential liquefaction area) was mapped. This area is located in the eastern portion of the Pressure Zone near the Santa Ana River and City Creek areas, and is away from the City of San Bernardino. Therefore, potential liquefaction, even in the extreme wet years, is considered minimal.

During the model simulation period from 2006 through 2044, groundwater pumping from the Pressure Zone area was assumed to be 117,434 acre-feet in year 2010 to 149,717 acre-feet in 2044, with an annual average of 133,959 acre-feet per year. The greatest historical pumping from the Pressure Zone was 141,892 acre-feet in year 2000. A review of existing operational production wells and apparatus in the Pressure Zone indicates that the sum of the instantaneous pumping rate in the Pressure Zone is 180,526 gallons per minute (gpm). Assuming these wells can pump 70 percent of their instantaneous pumping rates, they would yield 184,000 acre-feet per year. This amount is significantly higher than the historic pumping and the pumping assumed for Baseline Run 1. Therefore, it can be concluded that there are enough existing wells and apparatus in the Pressure Zone to control the water levels given the conditions assumed for Baseline Run 1.

4.2.1.4 Surface Water Management Strategies and Projects

Improving surface water management will significantly contribute to the sustainability of water resources in the region. Management of surface water resources includes strategies such as use of SAR conservation water, use of water from the local streams, and flood and stormwater management. Integration of flood and stormwater management strategies with recharge and conjunctive use opportunities contributes to surface water and groundwater management as well as water supply reliability in the region as discussed below.

4.2.1.4.1 Local Surface Water Management

This strategy outlines the use of local surface water from the SAR and tributaries such as Mill Creek. Completion of the Seven Oaks Dam on the SAR provided the opportunity for Valley District and Western to jointly file two applications with the SWRCB to appropriate water from the SAR. The applications seek the right to divert up to 200,000 acre-feet per year of local water to help improve the water supply reliability of the region. In support of water right applications and associated facilities, Valley District and Western have prepared and completed an environmental documentation for the project. Seven Oaks Dam is a flood control structure with limited carryover storage. Because the SAR hydrology is highly variable, the available water will vary in any year from zero to 200,000 acre-feet. Therefore, efficient use of SAR water will require conjunctive management and groundwater banking in the region. Other possible uses of the SAR water include direct delivery and exchange with outside agencies. The use of seasonal storage at the Seven Oaks Dam will not affect flood protection provided by the facilities to downstream communities.

Valley District, Western, and City of Riverside financed the costs of feasibility studies, design, and construction of improvements to the Seven Oaks Dam to allow conservation storage. Implementation of conservation storage projects, which include modification of the intake structure and relocation of the access road, would require compliance with the National Environmental Policy Act in order to evaluate any potential impact of proposed conservation pool on the USFS lands.

To implement this strategy, existing facilities would be used, to the extent possible, to divert and convey newly appropriated water from the SAR. However, additional facilities are needed to connect existing facilities to diversion facilities and recharge areas so that supplemental water supplies can efficiently be used in the region. New project-related facilities will be constructed in four construction areas, as described below.

The SAR. Water diverted from the SAR should be conveyed to areas of use. Additional facilities will be needed to connect diversion points to the existing

facilities. Most of the water diverted from the SAR would be conveyed through the proposed Plunge Pool Pipeline, Low Flow Connector Pipeline, or the Morton Canyon Connector II Pipeline. The Plunge Pool Pipeline will connect the SAR to Valley District's Foothill Pipeline and then to the Metropolitan's Inland Feeder Pipeline in the next phases of the project.

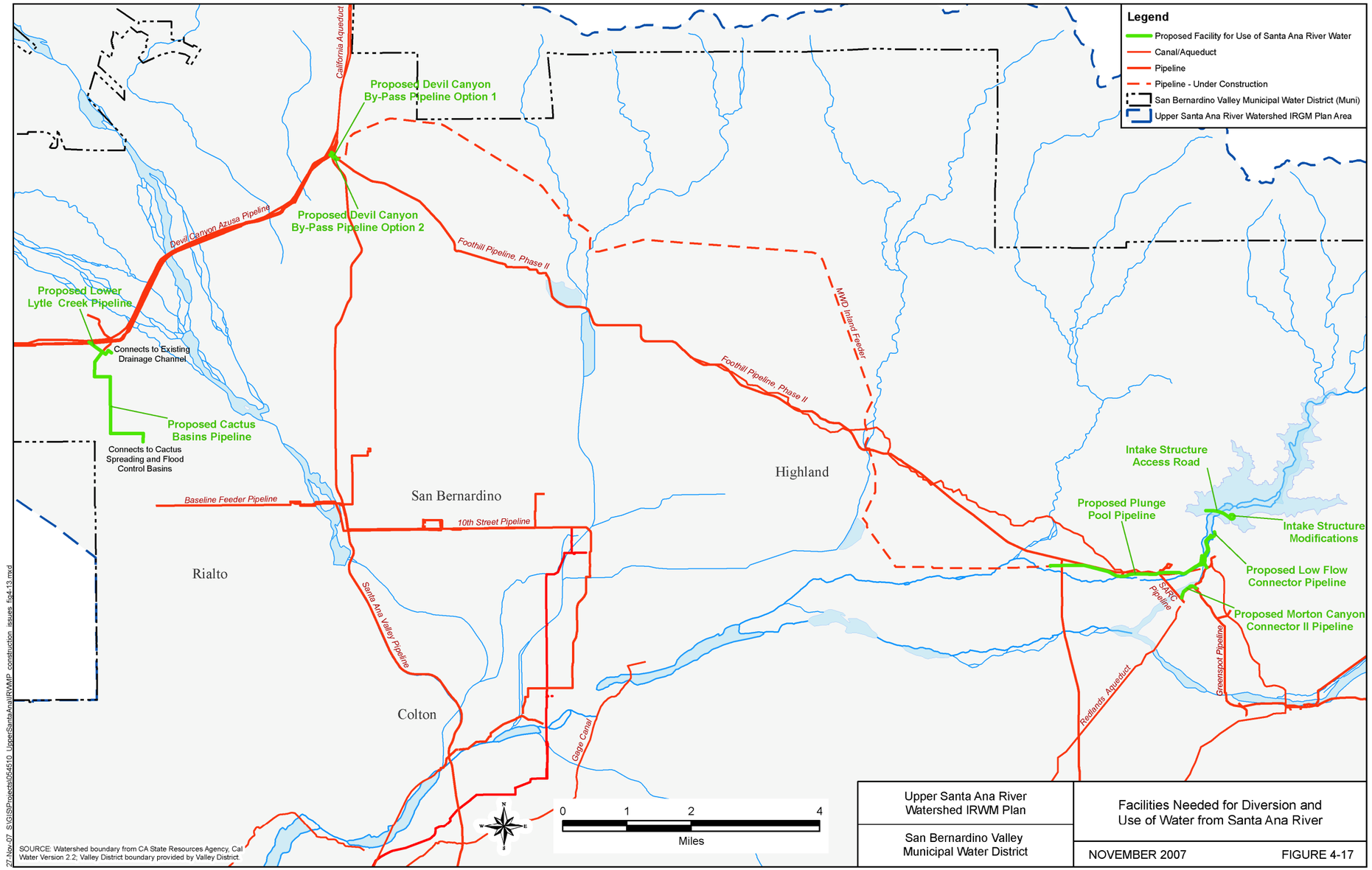
The Devil Canyon. The SAR water conveyed by Valley District's Foothill Pipeline will enter the Devil Canyon Bypass Pipeline. This pipeline will connect to both the Lytle Pipeline and the California Aqueduct.

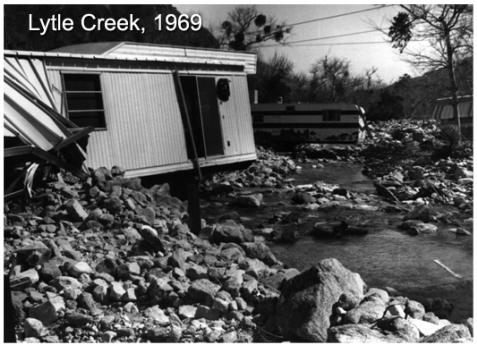
The Lytle Creek. The SAR water conveyed through the Lytle Pipeline will reach Lytle Creek basins. The water could also be conveyed to West Valley and FWC water treatment facilities, as well as to the Cactus Spreading and Flood Control Basins through the Cactus Basin Pipeline.

The Seven Oaks Dam and Reservoir. The specific facilities in this area include modification of the intake structure of the Seven Oaks Dam and relocation of the access road serving the intake structure. Modification of the intake structure is needed to allow for proper regulation of the flood flows. A Technical Feasibility Study for these facilities is underway. It appears that the above modifications can marginally increase the yield of the SAR. The feasibility study is intended to show the benefit-cost ratio of these facilities.

The facilities listed above will make possible conveyance of water from the Seven Oaks Dam to groundwater spreading grounds and the water treatment facilities in the region. Figure 4-17 shows the location of the construction areas and the proposed facilities for the use of native water in the region. Detailed descriptions of the facilities can be found in Appendix E.

Figure 4-17
Proposed Facilities for the Use of Santa Ana River Water





It is critical to explore strategies to improve flood protection and manage stormwater. (Photos courtesy of the San Bernardino County Museum.)

4.2.1.4.2 Flood and Stormwater Management Strategies

Historically, the SAR Wash was a natural floodplain and alluvial fan that provided a place to convey frequent devastating flood waters and to deposit sediment. The alluvial deposit provided excellent conditions for establishing settling basins for percolating surface water to the groundwater basin, providing a significant source of water supply for the Upper SAR watershed. Substantial new commercial and residential development has occurred in the region and significant additional development is forecasted for the Upper SAR watershed. In anticipation of this development and the potential loss of open space and increase in impervious surfaces such as roads and buildings that accompany such development, it is critical to explore strategies to improve flood protection and manage stormwater. Flood and stormwater management strategies are designed to:

- Reduce peak flood flow in the streams,
- Improve groundwater recharge within the channel,
- Provide additional recharge through improvement of the detention basins, and
- Increase channel capacities of stormwater management facilities to safely convey stormwater.

The stormwater strategies can reduce flood damage, increase groundwater recharge and water supply, and improve water quality of the streams by reducing discharge of debris, sediment, and urban pollutants to the streams. The San Bernardino County Flood Control District (SBCFCD) operates and maintains a system of channels and detention basins to manage stormwater throughout the region. SBCFCD's objective is to provide 100-year flood protection for the communities in the region. Significant improvements to the regional facilities are needed to ensure the flood control system can provide 100-year protection today and in the future as additional development occurs in the area.

Two types of strategies have been formulated to address the flood and stormwater management issues of the Upper SAR watershed.

Strategies to Reduce Flood Flows in the SAR and Tributaries

Construction of the Seven Oaks Dam contributes significantly to management and control of flood flows in the SAR. Additional facilities are planned for

diversion and conveyance of the flows to spreading grounds. Construction of these facilities and improvement of the spreading grounds to accept additional flood flows are considered the next step for reducing flood flows downstream. The facilities required to implement this strategy are described in Section 4.2.1.5.1.

Strategies for Management of Stormwater

Stormwater management strategies consist of programs to improve and expand the detention basins and improve the flood control channels.

SBCFCD plans and designs the improvements needed for flood detention facilities. These improvements include excavation and removal of the sediment from the existing basins, expansion of the existing basins, and design and construction of new retention basins. The objective is to increase the holding capacity of the basins in order to increase recharge and reduce peak flood flows downstream. Projects to achieve this objective include Randall Basin Project; Cactus Basins 3, 4, and 5; and Cable Creek Debris Basin.

SBCFCD plans to improve flood control channels to increase channel capacity, increase opportunities for recharge, and maintain the integrity of the system. These improvements include channel enlargement, channel works, and channel lining. Projects formulated under this strategy include Sand/Warm Confluence and Upper Warm Channel. Other channel improvement projects are planned in the Upper SAR watershed area, but they do not have the multiple benefits expected from the Sand/Warm Confluence and Upper Warm Creek project since they would be concrete-lined conveyance systems.

SBCFCD is also developing plans to certify and potentially improve flood control levees in order to maintain the integrity of the system. These improvements include hard lining, rebuilding, lengthening, and repairing levee facilities. Projects are currently being formulated in conjunction with the Federal Emergency Management Agency (FEMA) certification effort.

A detailed description of the stormwater management projects is presented in Appendix E.

State Water Project water is treated and distributed to some urban areas in the Upper Santa Ana Region.

4.2.1.5 Imported Supplies

Imported supplies to the region include the SWP supply. Imported water is delivered directly or through Metropolitan. Western receives SWP supplies through Metropolitan. San Gorgonio Pass Water Agency (SGPWA) has a "Table A" allotment of 17,300 acre-feet, and Valley District has a SWP "Table A" allotment of 102,600 acre-feet per year. Reliability of the SWP supplies varies considerably from about 5 percent to 100 percent depending on the water-year type. To evaluate the SWP water supply reliability, the SWP Delivery Reliability Report (Public Review Draft, November 15, 2005) was reviewed. The report presents the results of five operational studies that simulate the SWP operations under 2003 and 2025 water demand scenarios. For the purpose of this water supply reliability discussion, the updated study with 2025 level of demand is used (Study 5). These studies were conducted specifically to document the SWP delivery reliability. SWP water supply available to Valley District for direct delivery and recharge for each year was calculated based on reliability values presented in Study 5. On average, SWP water supply reliability is presented as 77 percent of the Table A allotment to as low as 4 percent. However, SWP delivery may vary from full Table A allotment. For example, the Valley District Table A delivery capability may vary from 102,600 acre-feet in wet years to 5,100 acre-feet in dry years, such as 1997.

As mentioned earlier, to improve water supply reliability, Valley District is planning for conjunctive management of groundwater as well as banking of SWP supplies when available. Strategies for the use of Valley District's SWP supplies include direct delivery of SWP water to water treatment facilities and use of water for groundwater recharge.

A key to improving long-term water supply reliability is for all SWP contractors in the region to fully utilize their SWP supplies when available and store or bank to build reserves for drought periods. Facilities required for the use of SWP water include additional conveyance to water treatment facilities in the region.

As a component of the water supply reliability study, Valley District is also conducting sensitivity analyses for SWP and local surface water supply reliability. The analyses include:

- SWP reliability of 60 percent and 50 percent of Table A allotment (instead of 77 percent).
- SAR flows of 90 percent of long-term average flows.

Modeling studies were conducted to document the potential impacts of reduced SWP and local supply reliability on groundwater levels. The purpose of the sensitivity analyses was to provide general information to water managers as to the potential impacts of hydrologic (climate change) and operational changes in water supply facilities on the region's water supply reliability.

Major regional conveyance facilities connect purveyors' water supply systems.

4.2.1.5.1 Conveyance, Storage, and Emergency Interties

Conveyance, storage, and interties are essential elements of water supply reliability. Conveyance strategies are needed to convey the water supply to the place of use. Storage feasibilities provide operational flexibility for daily and seasonal operation of the water system. Interties are essential to providing for system redundancy and emergency operations. The elements of conveyance, storage, and intertie strategies include the following:

- **Regional conveyance facilities** are major pipelines, pump stations and turnouts, and associated facilities critical to water supply reliability of water purveyors in the region. A number of additional conveyance facilities are planned for the region, including Central Feeder Pipeline Phase 2, City Creek Crossing, Riverside Corona Feeder, associated pumping stations, and Waterman Pump Station.
- **Interties** are planned to improve supply reliability through integration of water supply and distribution systems and to have conveyance redundancy for water supply during major catastrophic failure of a conveyance system. Planned interties include Raub Emergency Supply Intertie and Waterman-Gage Intertie.

Storage reservoirs regulate water production and distribution while providing emergency storage for the communities.

Storage facilities are planned for seasonal and operational storage and system flexibility and to provide water during emergencies and major disasters. Planned storage projects include:

- San Bernardino Reservoir
- Citrus Reservoir (Mentone Reservoir)
- Sunrise Ranch Emergency Reservoir
- Zanja Emergency Storage
- Redlands Reservoir

4.2.1.6 Performance Evaluation of Water Supply Reliability Strategies

This section evaluates the performance of the water supply reliability strategies (when implemented) in improving the region's water supply reliability. In evaluating performance of the water supply reliability strategies, criteria established for development of the UWMP have been considered. These criteria, listed below, are intended to be used to examine the performance of water supply reliability strategies and to ensure water supply needs of the region are met:.

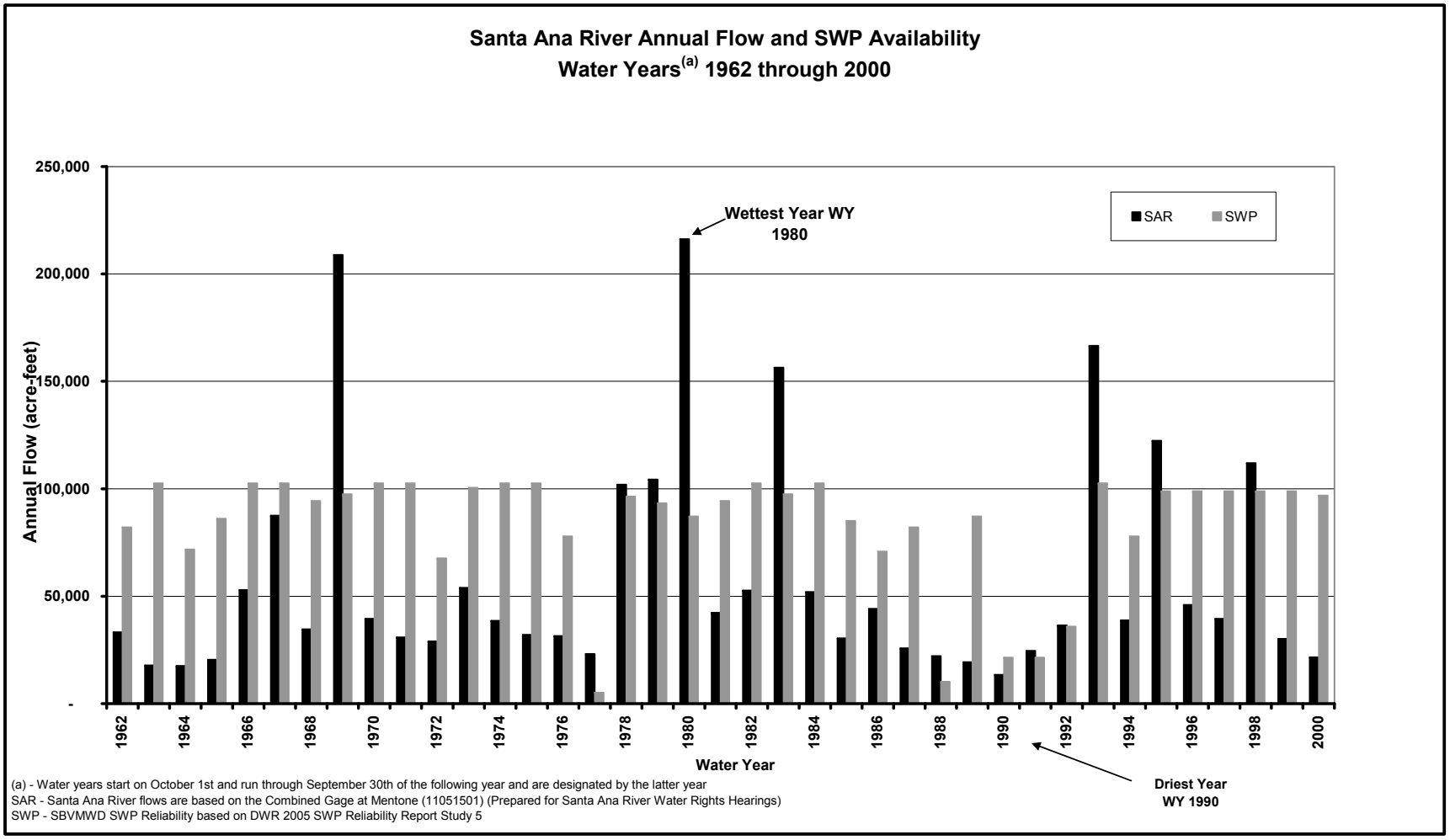
- Meeting average water year for the next 25 years,
- Meeting water needs during a single-year drought,
- Meeting water needs during a multi-year drought,
- Water shortage (up to 50 percent loss) contingency plan, and
- Catastrophic interruption in water supplies.

In addition to the above criteria, meeting peak demand water needs of the local purveyors within the Valley District service area may also be evaluated. Valley District initiated a study to review and evaluate how the above requirements can be met within the region. Below is a summary discussion to demonstrate how the region will meet its water needs as characterized above during the next 25 yearss.

As stated earlier, SAR flows are highly variable. Figure 4-18 shows the annual flows of the river from 1962 through 2000 and its range from over 200,000 acre-feet per year in 1980 to less than 15,000 acre-feet per year in 1992. The Seven Oaks Dam is operated as a flood control facility. Therefore, timely capture and use of SAR flows for recharge of the groundwater basin would provide significant water supply reliability benefits.

Chapter 3 presents the water budget for the region through 2030. The water budget assumed that SAR and SWP water will be used conjunctively with existing supplies used by the purveyors. Modeling studies were conducted for the water budget (base scenario) to examine how the water demand can be met using the SBBA as a reservoir to store, bank, and regulate the water resources of the region. The results of the modeling indicate the following:

Figure 4-18
Santa Ana River Annual Flow and SWP Availability



Note: Graph prepared for Valley District/Western Water Rights Applications Hearings

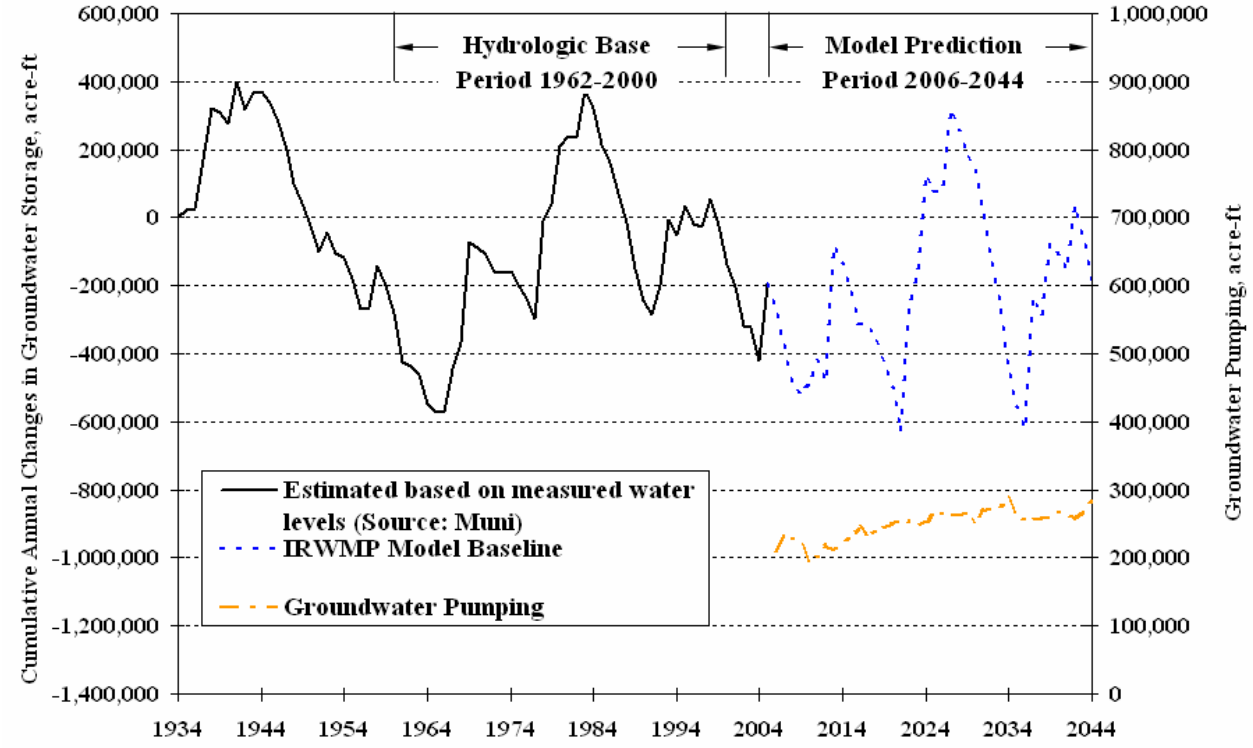
- **Average Year**: Modeling studies assumed that the SAR conservation water will be available to the region (Water Right Applications will be approved by the SWRCB), and SWP water supply reliability is as defined by DWR studies. Under the baseline conjunctive use operation scenario and water demand through 2030, the groundwater storage at the beginning and end of the 39-year study period was 200,000 acre-feet below the full basin (for this discussion, full basin is defined as storage at the 1993 level). This means on average the existing water supply is adequate to meet the demand in the region during the next 20 years, assuming published SWP reliability of 77 percent and that there will not be any long-term depletion of storage in the SBBA. This study was conducted for the Valley District service area and does not include the SGPWA service area, which will have a shortage in 2030.

- **Multi-Year Drought Period**: The modeling studies mimic the 1962 to 2000 period. The period of 1987 to 1992 is the driest recorded period for the SAR. During this period, maximum draw down of the SBBA occurred at approximately 600,000 acre-feet (see Figure 4-19). However, the storage in the basin recovered after the drought period (by 2000). The storage reduction during the multi-year drought period is approximately 10 percent of total groundwater storage.

- **Single-Year Drought**: The driest year of the period was 1992, which coincides with the last year of the multi-year drought period. The cumulative storage change in 1992 was about 600,000 acre-feet. Considering that SBBA storage is over 5 million acre-feet and the water levels recovered by the year 2000, the region can meet its water demand during the single-year drought as well as the multi-year drought period.

It should be mentioned that the modeling studies assumed that the newly conserved SAR water will be available for use and banking in the region (water rights applications are approved by the SWRCB). In order to take advantage of new SAR water, the facilities listed in Section 4.2.1.4.1 should be prioritized and implemented based on cost-effectiveness. This plan also assumes the current water quality problems at Seven Oaks Dam will be resolved by United States Army Corps of Engineers (USACE).

Figure 4-19
Cumulative Annual Changes in Groundwater Storage for Baseline Conjunctive Use Scenario



4.2.1.6.1 Water Shortage Contingency Plan

The water shortage contingency plan provides a framework for implementing specific measures to deal with water shortages during emergencies. A water shortage contingency plan has been drafted for the region and should be adopted and implemented during severe water shortages. The plan provides specific actions that should be taken to ensure critical water needs of the region are met during a period in which water supplies are cut by 50 percent. A copy of the plan is presented in Appendix F.

4.2.1.6.2 Meeting Daily Peak Demands of Water Purveyors

This section examines the Valley District's ability to deliver water to meet the purveyors' service area peak day demand on SWP supplies. The purpose of this evaluation is to determine the adequacy of the conveyance capacity of Valley District's facilities to make direct deliveries of SWP water during peak demand, today and in the future.

Valley District direct deliveries are to surface water treatment plants that were generally built to treat local surface water and for artificial recharge. The District deliveries are required when local surface water supplies are insufficient.

The peak day water demands for the following purveyors are examined by review of their UWMP:

- City of San Bernardino
- City of Redlands
- City of Rialto
- East Valley Water District
- West Valley Water District
- Yucaipa Valley Water District
- Fontana Water Company

Purveyors may have multiple sources of water to meet their peak demands. Groundwater supplies are generally used by the purveyors in the region to augment other sources of water. After discussion with agencies' staff and review of their UWMP data, Table 4-5 was prepared to show the future peak day demand on SWP supplies and the use of Valley District facilities.

In general, it is assumed for this analysis that there are no local surface water supplies available to meet peak demands. This is a conservative but reasonable assumption, since in some dry years local surface water may be severely limited on summer days; therefore, it is reasonable to examine peak day demands on the facilities when local surface water is not available. It is also assumed that SGPWA is obtaining its full Table A amount. Based on this cursory examination, all turnouts have adequate capacity for delivery of peak day demand on SWP water. The following Valley District's Pipelines, and pumping plants may be undersized for the future peak demands; however, the proposed East Branch Extension Phase II would alleviate all of these undersized facilities. It would provide parallel conveyance to the SARC Pipeline, Greenspot Pump Station, and Morton Canyon Connector I. It includes an annex to the Crafton Hills Pump Station that would contain three new 25 cfs pumps.

- If it is assumed that all Purveyors peak day demands coincide, the SARC Pipeline has a total future peak day demand of 144 cfs. Delivery to spreading grounds for the City of San Bernardino is 15 cfs, which can be

interrupted and rescheduled for when peak day demands on the pipeline do not exceed its capacity. SARC has a capacity of 72 cfs

- The Greenspot Pump Station has a future peak day demand of 100 cfs under these assumptions. It has a current capacity of 80 cfs.
- The Morton Canyon Connector has a future peak day demand of 100 cfs under these assumptions. It has a current capacity of 70 cfs.
- The Greenspot Pipeline has a future peak day demand of 100 cfs under these assumptions. It has a current capacity of 70 cfs.
- The Crafton Hills Pump Station has a future peak day demand of 77 cfs. It has a current capacity of 135 cfs.

A more detailed discussion of meeting peak day water demands of the purveyors is presented in Appendix F.

Table 4-5
Future Peak Day SWP Demand for SBVMWD

		Peak Day SWP Demand(cubic-feet per second)												
		SWP East Branch Extension												
Delivery Point (Turnout)	**Turnout Capacity**	**Foothill Pipeline**	**SARC Pipeline**	**Greenspot Pump Station**	**Morton Canyon Connector**	**Greenspot Pipeline**	**Crafton Hills PS**	**Crafton Hills Reservoir**	**EBX Reach 1 Pipeline**	**EBX Reach 2 Pipeline**	**EBX Reach 3 Pipeline**	**Tate Pump Station**	**Yucaipa Pipeline**	**Devil Canyon - Azusa Pipeline**
City of San Bernardino (Sweetwater (16 in) and Waterman (30 in) Spreading Ground Turnouts)	35 cfs and 135 cfs, respectively	15.0												
East Valley WTP (Northfork Turnout (two 12in), City Creek (20in) Turnout (alternate))	16 cfs and 65 cfs, respectively	12.4	12.4											
Bear Valley - Northfork Irrigation (Northfork Turnout	16 cfs	4.0	4.0											
Mentone Reservoir (SARC – Bear Valley Sandbox Turnout)		6.0	6.0											
City of Redlands - Hinckley WTP (SARC – Bear Valley Sandbox (two parallel 30 in) Turnout)	40 cfs	21.7	21.7											
Bear Valley Highline (Bear Valley Highline Connector and/or Bear Valley Highline – Bouillioun Box Turnout)	20 cfs	4.0	4.0	4.0	4.0	4.0								
Greenspot Grove (Bear Valley #1 Turnout, _ cfs)	6 cfs	1.5	1.5	1.5	1.5	1.5								
Crafton Water Company (Crafton - Unger Turnout) (20 in)	25 cfs	6.0	6.0	6.0	6.0									
City of Redlands - Tate WTP (Tate Treatment Plant Turnout) (24 in) Tate Pump Station	32 cfs	27.9	27.9	27.9	27.9							27.9		
Yucaipa Regional Park (Yucaipa Regional Park Turnout) (8 in)	6 cfs	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5					
Yucaipa Non-potable system, untreated SWP (Yucaipa Valley Water District #1	60	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6				
Yucaipa WTP (Yucaipa Valley Water District #1 Turnout)		18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6				
San Gorgonio Pass Water Agency - Current		16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0			
San Gorgonio Pass Water Agency - Future		16.0					16.0	16.0	16.0	16.0	16.0			
West Valley Water District – Oliver P. Roemer WFF (Lytle Creek Turnout)	32 cfs													40.9
West Valley Water District - North Villages WFF (Glen Helen (30 in)	10 cfs													2.6
Fontana Water Company (Lytle Creek Turnout, 14 cfs)	14 cfs													18.7
Facility Peak Day Demand:		175.2	144.2	100.1	100.1	100.1	76.7	76.7	76.7	76.2		27.7	0.0	67.5
Facility Conveyance Capacity		288.0	72	70	70	80	135	104	104	104				110

4.2.1.7 Disaster Preparedness Strategies and Projects

This section addresses vulnerability of the region's water supply system to catastrophic events that may interrupt the water supply system in the Region. While not the only cause for catastrophic water supply interruption, the postulated Magnitude 8+ Earthquake certainly will be the predominant example in the region. Since a large magnitude earthquake is generally considered the most significant event for the region, this section concentrates on earthquake effects as the primary water supply interruption, knowing that other events would be treated similarly. Literature reviewed for this section include post-earthquake surveys of water system damage, earthquake planning reports included in purveyor's UWMPs, and available reports prepared by the State and federal agencies. Other catastrophic interruptions caused by regional power failure, terrorist attack, or other man-made or natural catastrophic event could cause similar conditions and issues to water supply systems in the region. For purposes of this report, a major earthquake is defined as an earthquake on the San Andreas Fault (SAF) on the order of 8.0.

The work conducted for this section is intended to be the fist step and is at the conceptual level. Additional detailed work should be conducted in the future to further evaluate options to effectively address water supply system vulnerabilities. Details on water supply system vulnerability can be found in Appendix F and is summarized below. Appendix F includes a discussion of the following:

- An earthquake literature search of major earthquake events and what has been learned from such events.
- Evaluation of catastrophic interruption of regional facilities.
- Vulnerabilities of the region's water supply system to SWP supply interruption.
- Vulnerably of local purveyors' systems to an earthquake.
- Summary of Findings and Recommendations including a Water Shortage Contingency Plan.
- Water Shortage contingency planning.

4.2.1.7.1 Findings and Recommendations

Findings

The region is located in a seismically active area of Southern California. Four major fault zones are found in the region, including the San Jacinto Fault, the

Chino-Corona segment of the Elsinore Fault, the Cucamonga Fault, and the SAF. Numerous other minor faults associated with these larger fault structures may also present substantial hazards.

In Southern California, the SAF runs along the southern base of the San Bernardino Mountains, crosses through Cajon Pass, and continues northwest along the northern base of the San Gabriel Mountains. Historical records indicate that massive earthquakes have occurred in the central section of the SAF in 1857 and in the northern section in 1906 (the San Francisco Earthquake). In 1857, an estimated magnitude 8+ earthquake occurred on the San Andreas Fault rupturing the ground for 200 to 275 miles, from near Cholame to Cajon Pass and possibly as far south as San Gorgonio Pass. The recurrence interval for a magnitude 8 earthquake along the total length of the fault is estimated to be between 50 and 200 years. It has been 147 years since the 1857 rupture. A study completed by Yuri Fialko (2005) suggests that the SAF in Southern California has been stressed to a level sufficient for an earthquake of magnitude 7.0 or greater.

These findings have been developed from a search of literature reporting the impacts of major earthquakes and limited work by water purveyors. More detailed, site-specific analyses are needed to better quantify and identify impacts from major earthquakes or other catastrophic outages.

- **Reliability of Groundwater Wells.** Review of post-earthquake lifeline performance reports reveals little discussion of groundwater well failure. However, loss of commercial power, damage to electrical equipment and aboveground appurtenances, or damage to the distribution system may effectively put the well out of service. Liquefaction, especially in areas where there is high groundwater levels between depths of 5 to 50 feet, may cause ground settlement and interfere with continued well operation.

  No discussion of the performance of well head treatment systems during earthquakes was found. This may be due to the limited amount of well head treatment in place during prior earthquakes. As well head treatment typically includes purchased equipment installed in a field location, there is significant opportunity for lapses in the seismic design.

  The groundwater basin and the groundwater production wells are a reliable part of the water supply system for the San Bernardino area.

- **Reliability of Pipelines**. Pipelines are generally the most fragile part of a water system. Generally, damage is a function of displacement rather than shaking. Empirical algorithms have been developed to predict seismic reliability of pipelines.

- **Reliability of Pump Stations**. Past earthquakes indicate that the structural and mechanical elements of a pump station are highly resistant to earthquake damage. The most likely failures are to the electrical equipment and loss of commercial power.

- **Reliability of Surface Water Treatment Facilities**. The major elements of a surface water treatment system are typically concrete structures that are very resistant to damage. However, these facilities include a large variety of mechanical equipment, much of it long and lightweight and subject to damage not only from the direct force of an earthquake, but also from the wave action created by the earthquake. Similar to a pump station, power supply and electrical equipment are fragile.

- **Reliability of the State Water Project**. While little specific information was found on anticipated damage to the SWP, the high susceptibility of the Santa Ana Valley Pipeline is recognized. Major vulnerability of the SWP includes the Sacramento-San Joaquin Delta and the California Aqueduct. The SWP does have a Business Resumption Plan and an Emergency Operations Plan.

- **Length of Outages.** Length of water service outages vary by earthquake and by purveyor. The Loma Prieta earthquake affected a large number of separate systems. The San Jose Water Company serves most of San Jose and all of Los Gatos. Los Gatos was hard hit and half of the water customers lost water service. In San Francisco, the worst hit area was the Marina District. Both fires and liquefaction affected the district. East Bay Municipal Water District serves 1.1 million customers and suffered $3.7 million in damage. Damage included a break in a 60-inch raw water line.

  After the Northridge earthquake, the Los Angeles Aqueducts Nos. 1 and 2 were in and out of service for temporary and permanent repairs over several months; these facilities were not critical at that time. Alternate supplies were available and drought conditions limited supply to these aqueducts.

  Valley District's Emergency Operations Plan includes estimates for repair of Valley District facilities. Electrical and pipe repairs are estimated to take 35 to 77 days. Pump repairs are estimated to take 168 to 273 days.

  Table 4-6 shows how interruption in each of the Valley District facilities may impact water deliveries for the local purveyors. Interruption in

Table 4-6
Valley District Facilities Used to Deliver Water to Retail Agencies

Agency	Foothill Pipeline	SARC Pipeline	Morton Canyon Connector	Green-spot Pipeline	Green-spot Pump Station	Devil Canyon - Azusa	Tate Pump Station	Crafton Hills PS	Crafton Hills Reservoir	EBX[1] Reach 1 Pipeline	EBX Reach 2 Pipeline	Yucaipa Pipeline	Baseline Feeder
San Bernardino Municipal Water Department	✓	✓	✓	✓[2]	- -	- -	- -	- -	- -	- -	- -	- -	- -
East Valley Water District	✓	✓	✓	✓[2]	- -	- -	- -	- -	- -	- -	- -	- -	- -
City of Redlands – Hinckley	✓	✓	✓	✓	✓	- -	- -	- -	- -	- -	- -	- -	- -
City of Redlands – Tate	✓	✓	✓	✓	✓	- -	✓	- -	- -	- -	- -	- -	- -
Bear Valley MWC - In lieu obligation and irrigation	✓	✓	✓	✓	✓	- -	- -	- -	- -	- -	- -	- -	- -
Yucaipa Valley Water District	✓	✓	✓	✓	✓	- -	- -	✓	✓	✓	✓	✓	- -
Fontana Water Company	✓	✓	✓	✓[2]	- -	✓	- -	- -	- -	- -	- -	- -	- -
West Valley Water District	✓	✓	✓	✓[2]	- -	✓	- -	- -	- -	- -	- -	- -	✓
City of Rialto	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	✓

Notes:

[1]EBX: East Branch Extension of the California Aqueduct

[2] Required only if Mill Creek water is being delivered in a westerly direction.

Valley District's conveyance system is used to implement the Santa Ana-Mill Creek Cooperative Water Project and effect deliveries of local surface water and exchanges of local surface water and State Project water.

The Devil Canyon - Azusa Pipeline is owned by San Gabriel Valley Municipal Water District. Valley District has conveyance capacity of the pipeline from Devil Canyon to the Lytle Creek area and uses this capacity to convey water to West Valley, Rialto, and Fontana. It could be used to convey local surface water if the SWP were to fail and if the legal issues were resolved.

The Baseline Feeder is used to convey groundwater to Rialto and West Valley. The groundwater is produced by the City of San Bernardino on behalf of Valley District and by Rialto for Rialto.

Valley District deliveries to San Bernardino Municipal Water Department are for recharge. Changes in recharge impact well hydrographs in six to seven months.

Foothill Pipeline, Santa Ana River Connector Pipeline, Morton Canyon Connector, and Greenspot Pipeline affect every purveyor that receives water from Valley District.

4.2.1.7.2 Recommendations for Disaster Preparedness

This section includes recommendations based on the literature review, review of the Valley District facilities, and discussions with District staff and purveyors. Some of the projects already included in the IRWM Plan that would enhance disaster preparedness have also been reviewed in this section.

General Recommendations

- Valley District should consider a Seismic Improvement Program/Water Infrastructure Reliability Project to review the adequacy of Valley District facilities to withstand an earthquake. East Bay Municipal Utilities District and Santa Clara Valley Water District (Santa Clara Valley Water District, 2005) are two agencies that have performed such studies. High priority facilities include Foothill Pipeline, Santa Ana River Connector, Morton Canyon Connector, and Greenspot Pipeline.

- Valley District should consider the opportunities that Big Bear Lake presents as an emergency source of water after an earthquake that interrupts SWP deliveries for many weeks.

- Valley District should consider using the existing MWD agreements to allow the use of Metropolitan Water District facilities to bypass failed Valley District facilities (and the reverse).

- Review the ability to provide drinking water immediately following an earthquake. Arrangements to provide bottled water may be appropriate.

- The USGS Multi-hazards Demonstration Project (MHDP) is leading an effort to create a scenario document for a future M7.8 southern San Andreas Fault earthquake. The document will describe in detail the effects of the earthquake. It will form the basis for a November 2008 statewide earthquake response exercise. This document should be reviewed when it is ready, as useful information for disaster preparedness planning will come out of this effort.

Proposed Projects to Provide Conveyance System Redundancies for the Regional Facilities

Implementation of the following projects (included in the IRWM Plan) may be of particular benefit during major disasters by providing redundancies for the conveyance system.

Project 12 - Central Feeder Pipeline

The Central Feeder System, including projects 12.1 through 12.7, provides the ability to convey Bunker Hill Basin groundwater to purveyors. This project is particularly important because it provides redundancy for the Foothill Pipeline.

Project 36 - West End Pump Station

By conveying Bunker Hill Basin groundwater to the west, provides redundancy to the Baseline Feeder West Extension and the Lytle Creek Pipeline.

Foundation for the Redlands Pump Station which will deliver water into the Central Feeder, Phase 1 Pipeline.

Project 37 - 9th Street Feeder

This project conveys Bunker Hill Basin groundwater as an alternative water supply to East Valley.

Project 39.1 - Mentone Pipeline

Mentone Pipeline may be constructed as the East Branch Extension Phase II to provide additional conveyance capacity to the east—YVWD and SGPWA.

Project 54 - Bunker Hill Regional Water Supply

This project improves the ability to produce groundwater and place that groundwater into regional transmission systems.

Project 57 - Bunker Hill Basin Water Supply Reliability Project

This project improves the ability to convey Bunker Hill Basin groundwater to the west and provides alternative conveyance to the Baseline Feeder and Lytle Creek Pipeline. This project also provides redundancy for Project 54.

Project 60 - Baseline Feeder West Extension

This project provides a method to deliver Bunker Hill Basin Groundwater west beyond West Valley's service area, providing an alternative supply to Fontana Water Company.

4.2.1.7.3 Alternative Local Supplies

This section is intended to initiate a discussion of options that would improve the water supply reliability in case of a catastrophic failure of portions of the Valley District water system.

Interties between Retail Agencies

Table 4-7 lists interconnections between purveyors. These interties could be used to balance supplies between purveyors during an emergency. An interconnection between the City of San Bernardino and East Valley is currently being used to facilitate blending. This use is anticipated to end in the near future. FWC has historically depended on supplies delivered through its interconnection with Cucamonga Valley to meet peak day demand.

Table 4-7
System Interties between Retail Agencies

Agencies	Direction	Capacity (MGD)	Remarks/data source
City of San Bernardino/East Valley	Either	4	Three interties. One currently used to facilitate blending.
City of San Bernardino/Riverside	To San Bernardino	2	(San Bernardino UWMP, Pg 2-10)
City of San Bernardino/West Valley	Either	3	(San Bernardino UWMP, Pg 2-10)
City of San Bernardino/Loma Linda	Either	5	(San Bernardino UWMP, Pg 2-10)
City of San Bernardino/Colton	To Colton	3	(San Bernardino UWMP, Pg 2-10)
City of San Bernardino/Rialto	Either	3.6	(San Bernardino UWMP, Pg 2-10)
City of San Bernardino/ Riverside Highland	To Riverside/ Highland	3	(San Bernardino UWMP, Pg 2-10)
Fontana/Cucamonga Valley	Either	3.6	Fontana UWMP (2500 gpm)
West Valley/Fontana	Either		West Valley UWMP.
West Valley/Rialto	Either		West Valley UWMP.
West Valley/Colton			West Valley UWMP.
Redlands/Loma Linda	To Loma Linda		Greg Gage
Rialto/Marygold	To Marygold		Rialto has historically conveyed 1,500 afy of groundwater to Marygold. The agreement under which this was accomplished is expiring.
Sources: San Bernardino Municipal Water Department 2005 UWMP; Jack Nelson, Yucaipa Valley; Ron Buchenwald, East Valley; Greg Gage, Valley District, West Valley 2005 UWMP. Based on the limited sources of data, this list may be incomplete.			

Big Bear Lake

Big Bear Lake has a capacity of over 70,000 acre-feet, most of which is owned by the Bear Valley Mutual Water Company. An agreement could be written that might make water from the lake available for municipal use in case of a catastrophe.

Increased Groundwater Production Capacity and Reliability

If the catastrophe is an earthquake, the most likely impact on groundwater production capacity will be damage to the electrical system of the well or to the electricity supplier's system.

Thus, providing emergency generators for "key" wells would help improve the area's ability to operate after a catastrophic failure.

4.2.1.7.4 Alternative Conveyance of Surface Water

Alternatives to Foothill Pipeline System

The following systems could provide some alternative conveyance of surface water should portions of the Foothill Pipeline System fail.

A segment of the 78-inch-diameter Central Feeder, Phase 1 pipeline is lowered into place.

- Metropolitan's Inland Feeder can convey water stored in Diamond Valley north to the SBVMWD service area. The conveyance capacity of the Inland Feeder operating from Diamond Valley Lake to the north is reported to be 250 cfs.
- Once completed, the tunnel portion of the Inland Feeder, with proper interties, will be able to convey SWP water from Devil Canyon Afterbay into the Foothill Pipeline.
- The Central Feeder, portions of which are under construction, would increase the ability to convey groundwater between agencies following a catastrophe. Connecting the Central Feeder to the Santa Ana Valley Pipeline and to the Crafton Hills Pump Station would provide redundancy for the Foothill Pipeline.
- The proposed East Branch Extension Phase II will convey SWP water from the eastern portion of the Foothill Pipeline to Crafton Hills Pump Station. This will provide increased capacity for the SARC Pipeline, Greenspot Pump Station, Morton Canyon Connector I, and Greenspot Pipeline.
- The proposed State Water Project Extension (previously called the Desert Aqueduct) contemplates extension of the State Water Project to Coachella Valley. Depending on the alignment chosen, this project could provide an alternative for conveying SWP water to portions of the Valley District service area or to San Gorgonio's service area.

Alternatives to the Lytle Pipeline

- Metropolitan's Foothill Feeder, the Rialto Pipeline segment, parallels the Devil Canyon-Azusa Pipeline east for approximately nine miles. With turnouts, it could provide alternative conveyance to West Valley's and FWC's surface water treatment plants.

- The Baseline Feeder conveys groundwater to West Valley and Rialto. This groundwater is an alternative to SWP water conveyed by the Lytle Pipeline.

Alternatives to Baseline Feeder System

- The Devil Canyon-Azusa Pipeline conveys SWP water to West Valley, FWC, and Rialto. This surface water is supplemental to groundwater conveyed by the Baseline Feeder.

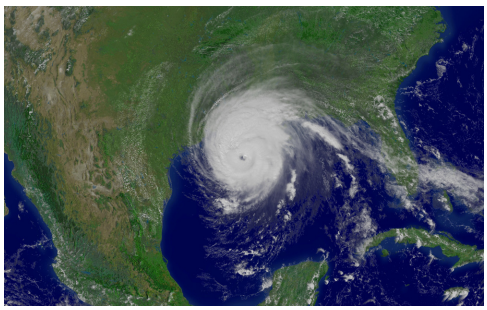
4.2.1.7.5 Back-Up Power Supplies

Power Supplies for Pumping Plants and Groundwater Wells

A catastrophic earthquake may cause loss of electricity for an indeterminate amount of time. In order to ensure water supplies in the immediate aftermath and weeks following a major earthquake, it is critical to have back-up generators or internal combustion engines for key pumping stations and production wells throughout the region.

Similar evaluations should be conducted for other facilities such as water treatment plants and the key pumping plants, and back-up power generation should be put in place for use during emergencies.

4.2.1.7.6 Climate Change



Climate change may have a considerable impact on management of water supply and flood control systems in the state.

Climate change may have considerable impact on the management of water supply and flood control systems in the State. Climate change impacts may include changes in the following:

- Temperature and its effect on timing of snow melt,
- Precipitation variation and intensity, and
    - Snow pack and snow-covered areas in the watershed.

In July 2006, DWR issued a Technical Memorandum Report entitled "Progress on Incorporating Climate

Change into Management of California's Water Resources." The study presented in the report focused on the four climate change scenarios selected by the Climate Action Team, which was appointed in response to the Governor's Executive Order SB3-05 on climate change. Four climate change simulations represent two greenhouse gas emission scenarios and two different models that were used to evaluate the climate effects. The two gas emission scenarios were developed by the Intergovernmental Panel on Climate Change representing low and high emission scenarios. Each scenario was then examined by two models, the Geophysical Fluid Dynamic Lab model (GFDL) and the Parallel Climate Model (PCM). The results of the study indicate the following:

- By 2050, the PCM model predicts a one-degree Celsius increase in temperature for both gas emission scenarios, while the GFDL model predicts a 2.25-degree increase for both scenarios. Increases up to 5 degrees Celsius occur by 2100 in the GFDL model.

- Climate model projections for changes in total annual precipitation in California through the end of this century are mixed. Models predicting the greatest amount of warming generally predicted moderate decreases in precipitation. Models projecting smaller increases in temperature tend to predict moderate increases in precipitation.

- Changes in runoff associated with climate change can be related to the changes in watershed response due to the modification of the seasonal snow pack. Increasing temperatures will likely push the snow level in watersheds to higher elevations, leaving more of the watershed available to contribute to direct winter runoff processes. In addition, higher elevation snow levels decrease the available watershed area for snow pack to develop.

- Increased temperatures are likely to lead to increased elevations for snow pack formation, which leads to a greater contributing area for winter storm runoff. In addition, warming temperatures may lead to early melting of snow pack. The combination of earlier melt time, greater variability, and greater potential for direct storm runoff may challenge the current flood and water supply system in California.

For Southern California, the GFDL model predicts a 10 percent decrease in precipitation after 2050 for both gas emission scenarios, while the PCM model predicts a 1 percent decrease in precipitation for both scenarios. By 2100, however, the PCM model predicts a 10 percent increase in precipitation for both scenarios. (See Table 4-8.)

Table 4-8
PCM Model of Precipitation

Southern CA	1961-1990 Average	2035-2064 Average	Difference
Historical	14.24	N/A	N/A
GFDL A2	17.92	17.70	-0.22
GFDL B1		16.15	-1.77
PCM A2	11.36	12.06	0.70
PCM B1		11.28	-0.08

Historically, average snowline elevations in California have ranged from about 4,500 feet in the north to above 6,000 feet in the southern Sierra mountains. DWR staff estimates that the average snow-covered area totals about 13,200 square miles in the water-supply-producing basins of the Central Valley and the Trinity River above Lewiston. This is about 8 percent of the State's total land surface. The northern Sierra and Trinity mountains account for about 7,000 square miles of the 13,200 square mile total. The west slope of the southern Sierra accounts for the remainder. Rising temperatures will cause reductions in the State's snow pack by raising snowline elevations and reducing the area where annual snow pack accumulates. A rudimentary analysis of the impact of rising temperatures on snow pack shows that a 3 degree Celsius rise will likely cause snowlines to rise about 1,500 feet, based on a moist lapse rate of 500 feet per 1 degree Celsius. This would cause a significant reduction in the amount of snow-covered area in the State and an estimated average annual loss of about 5 million acre-feet of effective water storage in snow pack. Climate model studies support projections for continued reductions in the State's snow pack as a result of warming. Simulations under various amounts of temperature rise indicate that California's snow pack is very vulnerable to warming.

Generally, there is great uncertainty in the magnitude, timing, and location of precipitation and runoff changes associated with climate change. However, it is generally understood that climate change would decrease snow runoff and therefore reduce the level of water supply reliability of the existing projects, including the SWP. It is also understood by the water managers that additional data sets, research, and studies will be needed to more accurately bracket the potential impacts of the climate change on the State water supply and flood control system.

There is also a great level of uncertainty in magnitude of reduction in water supply due to climate change for Southern California and for Upper Santa Ana, in particular. Considering uncertainty about the water supply impact of climate change in the Upper Santa Ana Region at this time, the TAG has acknowledged the need for additional studies. Because of the uncertainty about the magnitude

of climate change impact on the water supply, it is premature to plan for expensive infrastructures in Upper Santa Ana to deal with associated impacts. Instead, the TAG has decided to first conduct a sensitivity analysis to determine what range of impact climate change may have on water supply availability and groundwater storage in the region and then plan for strategies to deal with the potential impacts. The sensitivities analysis is followed by formulation of appropriate strategies to deal with potential future water shortage associated with climate change.

The sensitivities analyses indicate that the impact of reduction of SWP reliability and the reduction of the long-term local surface supply by 10 percent will result in a reduction of about 20,000 acre-feet of water supplies in the region. Assuming reduction of SWP and local supplies will occur as stated above, the region will need about 20,000 acre-feet to offset the impact of climate change.

To deal with the changes in water supply associated with climate change, it is recommended that a series of additional aggressive water conservation and recycling programs be developed for the Upper Santa Ana Region. Because these conservation and recycling programs are in addition to 40 TAF conservations projects envisioned to be implemented to meet 2030 water needs, additional studies should be conducted to develop feasible projects. A detailed discussion of water conservation and water recycling strategies is presented under the water management strategy section of this plan.

4.2.2 Protect and Enhance Water Quality Objective

The goal of this objective is to protect the quality of the region's surface water and groundwater resources. To ensure reasonable protection, the water management strategies for the basin should be consistent with and contribute to the water quality objectives for the region, such as the Santa Ana Regional Water Quality Control Plan and the SAWPA IRWM Plan. The water quality objective is designed to address issues specific to the region.

Groundwater management is currently influenced by the presence of contamination plumes. Most of these plumes resulted from historic military and industrial operations in the region. The following plumes have been identified:

1. Newmark-Muscoy Superfund (trichloroethylene (TCE)
2. Redlands-Crafton (TCE, Perchlorate)
3. Santa Fe Plume (TCE)
4. Former Norton Air Force Base (TCE)
5. Rialto-Colton Subbasin (PCE, TCE, 1,1-DCE, cis-1,2-DCE, perchlorate)
6. No-Mans Land (PCE)

Management strategies will be developed to not only avoid any adverse impacts that would cause these plumes to spread further but also to develop projects that will accelerate the cleanup of these plumes. These strategies will be evaluated using computer models. Avoiding any impacts to and from the plumes, and their removal when possible, is considered a BMO for the region. This BMO is also consistent with the Groundwater Management Planning Act requiring BMOs to be formulated to address groundwater quality issues of the basins.

Federal and State law, the Orange County and Western Judgments, and sound water management practices require compliance with specific water quality standards. The Clean Water Act is the federal law requiring that water quality standards be established and, as appropriate, revised. The Porter-Cologne Act is the State law that established both the SWRCB and the present system of nine RWQCBs. This law directs that each Regional Board formulate a water quality control plan for its region that complies with the requirements of federal and State law and also regularly update these plans. The Upper SAR watershed is subject to the jurisdiction of the Basin Plan.

The Basin Plan establishes water quality standards for all the ground and surface waters in the watershed. It identifies a total of 19 beneficial uses of water in the

SAR Basin and the levels of water quality that must be met and maintained. Examples of these beneficial uses include Municipal and Domestic Supply, Groundwater Recharge, and Wildlife Habitat. The Basin Plan also includes narrative and specific numeric objectives for inland surface waters and groundwater and regulatory plans to achieve these objectives. Dissolved minerals, generally expressed as TDS; nitrogen levels, largely in the form of nitrate; and the presence of groundwater contamination, for example, PCE and TCE contaminants, are primary concerns.

With respect to surface water quality, the Federal Clean Water Act Section 303(d) requires that states identify waters that do not or are not expected to meet water quality standards (beneficial uses, water quality objectives, and the anti-degradation policy) with the implementation of Best Available Technology. Once a water body has been placed on the 303(d) list of impaired waters, states are required to develop a Total Maximum Daily Load (TMDL) to address each pollutant causing impairment.

A TMDL defines how much of a pollutant a water body can tolerate and still meet water quality standards. Each TMDL must account for all sources of the pollutant, including discharges from wastewater treatment facilities; runoff from homes, forested lands, agriculture, streets, or highways; contaminated soils/sediments and legacy contaminants such as dichlorodiphenyltrichloroethane (DDT) and polychlorinated biphenyls (PCBs); on-site disposal systems (septic systems); and deposits from the air. Federal regulations require that the TMDL, at a minimum, account for contributions from point sources (permitted discharges) and nonpoint sources, including natural background.

In addition to accounting for past and current activities, TMDLs allocate allowable pollutant loads for each source, and identify management measures that, when implemented, will ensure that water quality standards are attained. The Basin Plan (described above) must include an implementation plan that describes how the water quality standards established in the Basin Plan will be met. TMDLs, with their associated implementation plans, are adopted into the Basin Plans through the Basin Planning process.

The ability to protect water quality has a direct bearing on the viability of many IRWM Plan objectives and strategies. This section describes strategies and projects for (1) TDS and Nitrogen Management, (2) Remediation of Groundwater Contamination, (3) Water Supply, (4) Surface Water Quality Improvement, and (5) Groundwater and Surface Water Quality Monitoring.

4.2.2.1 Total Dissolved Solids and Nitrogen Management Strategy

Groundwater quality in the Upper SAR watershed is generally good; however, long-term historic land-use practices, particularly agriculture, have resulted in an

accumulation of salts that are now in the unsaturated soils overlying groundwater subbasins (now defined in the Basin Plan as groundwater management zones). These salts will, over time, degrade groundwater quality.

Watershed stakeholders have invested significant resources to better understand and resolve questions concerning the build-up of dissolved minerals in the watershed. These initiatives are in response to water quality monitoring and computer modeling of groundwater indicating that the levels of dissolved minerals, generally expressed as TDS, were exceeding water quality objectives or would do so in the future in some groundwater subbasins unless appropriate controls were implemented. Nitrogen levels, largely in the form of nitrate, were likewise projected to exceed objectives.

In 1996, a Nitrogen and Total Dissolved Solids (TIN/TDS) Task Force was formed in the watershed to conduct scientific investigations regarding the then existing TDS and nitrogen and water quality objectives of the 1995 Basin Plan. This Task Force, administered by SAWPA, was comprised of 22 water supply and wastewater agencies.

In 2003, a Final Technical Memorandum was completed that reported the results of this scientific investigation, *The TIN/TDS Study – Phase 2B of the Santa Ana Watershed Wasteload Allocation Investigation*. In 2004, as a result of this work, the Basin Plan was amended. As amended, the Basin Plan implements new water quality monitoring and reporting requirements. One such requirement is the preparation of an *Annual Report of Santa Ana River Water Quality.*

In June 2007, the third *Annual Report of Santa Ana River Water Quality* was prepared. The report provides water quality information that will be utilized to develop and implement a surface water monitoring program, which, in turn, will enable watershed stakeholders to determine compliance with the nitrogen and TDS objectives of the SAR, and, thereby, the effectiveness of wasteload allocations prescribed in the Basin Plan.

The Basin Plan establishes new TDS and nitrogen water quality objectives for both surface water and groundwater. It also establishes new surface water monitoring commitments associated with certain agencies' "maximum benefit" programs. This is a comprehensive monitoring program implemented by some Task Force members that includes an evaluation of compliance with the TDS and nitrogen objectives for Reaches 2, 4, and 5 of the SAR.

SAR Reach 5 is located in the Upper SAR watershed. The Basin Plan specifies water quality objectives for SAR Reach 5 for TDS, hardness, sodium, chloride, TIN, sulfate, and COD. Along SAR Reach 5, the OCWD monitors a single site, *SAR-WATERMAN-01*. In 2006, this site was monitored by OCWD only once in

August. Based upon analysis of the limited available data collected by OCWD, no constituents were shown to exceed Basin Plan objectives.

Non-tributary discharges to SAR Reach 5 include recycled water inflows from the City of San Bernardino Water Reclamation Facility and potential inflows from San Timoteo Creek produced at Yucaipa Valley Water District (YVWD) Wastewater Reclamation Facility and City of Beaumont's WWTP No. 1. As demonstrated in previous years' measurements of streamflow conducted by YVWD, during dry-weather conditions, the City of Beaumont's recycled water discharge completely infiltrates into the streambed in Cooper's Creek, a tributary of San Timoteo Creek. Prior to San Timoteo Creek's confluence with SAR, almost all of YVWD's recycled water discharge infiltrated the nearby streambed. The U.S. Geological Survey (USGS) maintains two gaging stations for this segment of the SAR—Station 11059300, located along the SAR at E Street near San Bernardino, and station 11057500, located along San Timoteo Creek near Loma Linda.

The water quality strategy for TDS and Nitrogen Management includes the following:

- Continue to work collaboratively with stakeholders throughout the entire Santa Ana watershed, including the RWQCB and the TDS/TIN Task Force to develop sound water management solutions that are responsive to site-specific hydrologic characteristics. Implement the signed agreement between the RWQCB and certain water agencies to "Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basins." The agreement does not restrict the beneficial uses of SWP water for groundwater recharge, with the acknowledgement that the RWQCB could consider regulatory actions to restrict the use of SWP water for groundwater recharge in the future.

- **YVWD Desalter and Brine Disposal Project** – The construction and operation of groundwater desalters to extract and treat poor quality groundwater has been and continues to be an essential component of salt management in the Upper SAR watershed. Such projects will be increasingly important in the watershed to protect local water supplies and provide supplemental, reliable sources of potable supplies.

  In the San Timoteo watershed areas, the YVWD anticipates that demineralization of groundwater or recycled water will be necessary in the future. YVWD is committed to constructing and operating desalting and brine disposal facilities according to terms and conditions described in the Basin Plan. The construction of these facilities will be in accordance with a plan and schedule submitted by YVWD and

approved by the RWQCB. These facilities should be designed to stabilize or reverse the degradation trend evidenced by effluent and/or management zone quality.

- **City of Beaumont and the San Timoteo Watershed Management Authority (STWMA) Desalter and Brine Disposal Project** – The construction and operation of groundwater desalters to extract and treat poor-quality groundwater has been and continues to be an essential component of salt management in the Santa Ana watershed. Such projects will be increasingly important in the Upper SAR watershed to protect local water supplies and provide supplemental, reliable sources of potable supplies.

  The City of Beaumont and STWMA will construct and operate desalting facilities and brine disposal facilities according to terms and conditions described in the Basin Plan. The construction of these facilities will be in accordance with a plan and schedule submitted by the City of Beaumont and STWMA and approved by the RWQCB. These facilities shall be designed to stabilize or reverse the degradation trend evidenced by effluent and/or management zone quality.

- **Santa Ana Regional Interceptor (SARI) Improvement Project** – The SARI is primarily a utility for non-reclaimable wastewater. Its highest and best use is the removal of salts from the watershed to keep them from degrading water quality and thereby allowing better long-term and sustainable use of groundwater resources and expansion of the region's ability to reclaim water. The long-term goal of achieving salt balance within the region can be accomplished through the use of local desalters, selective use of imported water in combination with exporting salts from the watershed through the SARI pipeline.

  In the Upper SAR watershed, the SARI extends into the cities of Riverside and San Bernardino. The SARI faces challenges such as the deferral of system maintenance and high capital costs for on-going improvements, repairs, refurbishment, and capacity management. Projects will be developed to fully utilize the capacity of the SARI system and to ensure its viability as a means to remove salts from the watershed.

4.2.2.2 Remediation of Groundwater Contamination Strategy

Several contaminant plumes are present throughout the region. These plumes limit the use of groundwater in some areas as well as management of the groundwater basins. Clean-up activities are undertaken for some plumes as discussed below and specific strategies are being developed to expedite

remediation in others. The SBBA is impacted by five major groundwater contamination plumes. Remediation of these plumes is underway. For example, remediation of the Newmark-Muscoy and former Norton Air Force Base Plumes is progressing under the EPA Superfund Program.

The proposed Bunker Hill Regional Water Supply Project is another measure to facilitate and expedite remediation of the Newmark Plume while accomplishing other important purposes—to provide a new source of water supply, improve water supply reliability during dry periods, develop a conjunctive use project that would optimize the capture and storage of imported water in strategic locations within the Bunker Hill Basin, facilitate in-lieu groundwater storage in adjacent groundwater basins, and improve regional water supply reliability during dry periods.

The project is the development of a well field to extract contaminated groundwater from the Newmark Plume and deliver it to a water treatment plant where it would be treated to remove PCE and TCE contaminants. After treatment, the water would be conveyed to Bunker Hill Basin groundwater purveyors for municipal and domestic use. The amount of water to be extracted and supplied ranges from 20,000 to 60,000 acre-feet per year. Annual production from the project could not exceed the quantities previously recharged under the program. In order to sustain these extraction rates, it is assumed that a similar amount of imported water, supplemented by stormwater, would be used to recharge the groundwater basin located upgradient of the proposed well field. This strategy was discussed in detail in Section 4.2.1.3.2 under Bunker Hill Basin Regional Water Supply Program.

FWC currently operates and maintains a groundwater remediation project at its Plant F10 pursuant to a long-term agreement with San Bernardino County, the owner and operator of the Mid Valley Sanitary Landfill, and a corresponding Clean-Up and Abatement order issued to San Bernardino County by the RWQCB. The 5,000 gpm treatment plant utilizes liquid phase granular activated carbon to treat for volatile organic compounds including but not limited to PCE, TCE, 1,1-DCE, and cis-1,2-DCE. The plant treats and removes those contaminants from groundwater extracted from both the Rialto-Colton and No-Mans Land subbasins.

Other projects to protect groundwater quality within the region include septic system conversion for the Highgrove Area and the Pellesier Ranch Barrier wells and water treatment plant.

4.2.2.3 Improving Groundwater Quality by Recharge of the Basins with Good Quality Water

The quality of water supply impacts the multiple beneficial uses of water. For example, the quality of water supply impacts the extent to which wastewater can be reused and recycled without resulting in adverse impacts on affected receiving waters as well as discrete industrial discharges, returns to groundwater from homes using septic tank systems, returns from irrigation of landscaping in sewered and unsewered areas, and returns to groundwater from commercial irrigated agriculture.

Imported SWP water is an important part of the region's water supply. The use of higher quality SWP water, with a long-term TDS average of less than 300 milligrams per liter (mg/L), together with the capture of flood/stormwater for groundwater recharge can also be an important part of the region's strategy to protect water quality.

The use of SWP water can allow for maximum reuse of water supplies without aggravating the watershed mineralization. It can also be utilized for direct and in-lieu recharge of groundwater basins to improve long-term and dry-year period water supply reliability. Under certain circumstances, such as the Bunkerhill Regional Water Supply Project (see "Remediation of Groundwater Contamination Strategy"), it can be utilized to facilitate and expedite groundwater remediation. Therefore, the use of high-quality SWP water in the Upper SAR watershed can provide multiple benefits that extend beyond direct water supply.

Likewise, the use of flood water/stormwater for groundwater recharge is an important part of an overall strategy to improve water quality. Most groundwater recharge occurs in the natural channels of the Upper SAR watershed. The San Bernardino County Flood Control District (SBCFCD), the SBVWCD, and other agencies in the region operate extensive recharge facilities that enhance the capture and recharge of high-quality stormwater.

Fully utilizing higher quality SWP water and flood water/stormwater for groundwater recharge will be accomplished through operation of existing facilities to maximize recharge during periods of optimal water quality (e.g., during wet periods) and through the planning, design, and construction of new groundwater recharge facilities and multi-purpose flood control district facilities such as soft-bottom flood control channels. This strategy will also require the planning and development of conveyance facilities and new institutional arrangements to share and coordinate use of facilities that are owned and operated by multiple agencies.

Facilities are planned by STWMA to recharge imported water and stormwater. Facilities are also planned as part of "maximum benefit" proposals by the YVWD, STWMA, and the City of Beaumont. Such proposals include efforts to import and recharge high quality SWP water when it is available. These activities increase both the quantity and quality of available groundwater resources.

4.2.2.3.1 Cooperative Agreement to Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basin

The Cooperative Agreement to Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basin was signed in 2007 by the Santa Ana Regional Water Quality Control Board (SARWQCB), and the City of Corona, City of Riverside, Eastern Metropolitan Water District, Elsinore Valley Metropolitan Water District, OCWD, Valley District, SGPWA, and Western (Recharge Parties).

The RWQCB is charged by statute with adopting water quality objectives as may be required to protect the beneficial uses of water within the region. In particular, the long-term conjunctive use of groundwater in the region requires that the quality of water in groundwater basins in the region be managed to meet the water quality objectives for nitrogen and TDS (collectively, the Salinity Objectives) adopted by the RWQCB in the 1995 Water Quality Control Plan for the Santa Ana River Basin, as amended in 2004 by R8 2004-0001 (Basin Plan).

The Salinity Objectives presently included in the Basin Plan are the result of a multi-year, multi-million dollar cooperative effort among many of the parties. The Salinity Objectives are a product of the best scientific and technical information available.

The parties that intentionally recharge imported water within the Santa Ana Region (the Recharging Parties) agree voluntarily to collect, compile, and analyze the TIN/TDS water quality data necessary to determine whether the intentional recharge of imported water in the region may have a significant adverse impact on compliance with the Salinity Objectives within the region. To that end, the Recharging Parties will collect, compile, and analyze such TIN/TDS water quality data and prepare, within 18 months from the effective date of the agreement and every three years thereafter, a report containing the following information:

a. A summary of the then-current ambient water quality in each groundwater management zone and a comparison of that ambient water quality with the Salinity Objectives. The Recharging Parties shall calculate ambient water quality for each groundwater management zone

in a manner that allows for a technically valid comparison with the Salinity Objectives.

b. A summary of the amount and quality of imported water recharged in each groundwater management zone during the previous three-year period.

c. The initial report and each report prepared at six-year intervals thereafter will include a projection of ambient water quality in each groundwater management zone for the subsequent 20 years.

    (1) The projection of ambient water quality for each groundwater management zone will be based upon professionally accepted modeling techniques, will reasonably account for surface fluxed of salt input, will reflect the effects of all existing and reasonably foreseeable recharge projects for which there is a certified environmental document, and will compare baseline ambient water quality with the Salinity Objectives.

    (2) The projections for different groundwater management zones may be based on different modeling techniques.

    (3) Each report that includes a 20-year projection of ambient water quality will also present a comparison of then-current water quality in each groundwater management zone with the ambient water quality projection made six years earlier, together with an evaluation of the reason(s) for any differences.

The Recharging Parties agreed among themselves regarding the manner in which they will prepare the report and the manner in which they will share the cost of preparing the report. The Recharging Parties will circulate a draft version of each report to all other parties for review and written comments for at least a 45-day period prior to completing the final report and submission to the RWQCB.

Each Recharging Party also agreed that, when it serves as a lead agency under the California Environmental Quality Act (CEQA) for a proposed project involving the recharge of imported water within the region, the environmental document will include the water quality data compiled in the most recent triennial report to the RWQCB in the analysis of the potential impacts of the proposed project. The environmental document will also incorporate professionally acceptable modeling techniques.

This agreement provides a framework for groundwater recharge of imported water and will facilitate conjunctive management in the region while protecting water quality. A copy of the agreement is presented in Appendix A.

4.2.2.4 Surface Water Quality Improvement Strategy

The Basin Plan, pursuant to California state law (Porter-Cologne Water Quality Control Act, California Water Code Section 13000 et. seq.) and federal law (Clean Water Act 303(d)), must include an implementation plan that describes how the water quality standards established in the Basin Plan will be met. TMDLs, with their associated implementation plans, are adopted into the Basin Plans through the Basin Planning process. This strategy addresses TMDL implementation with respect to impaired (303(d)) bodies of water located in the Big Bear Lake watershed and consists of developing and implementing plans and projects to improve the water quality of impaired surface water bodies that do not or are not expected to meet water quality standards for beneficial uses pursuant to the 303(d) list of impaired waters.

The Big Bear area watershed is located in the San Bernardino Mountains. Major water bodies in this watershed include Big Bear Lake, Baldwin Lake, Stanfield Marsh, Shay Meadows, Rathbone (Rathbun) Creek, Summit Creek, and Grout Creek. Pursuant to the Clean Water Act Section 303(d), the following water bodies are impaired: Big Bear Lake, due to nutrients, copper, mercury, metals, and siltation; Grout Creek, for metals and nutrients; Summit Creek, due to nutrients; Knickerbocker Creek, for pathogens and metals; and Rathbone Creek, due to nutrients and siltation. The problem pollutants have been identified as coming from nonpoint sources. In conjunction with local stakeholders, the RWQCB has adopted TMDLs for these pollutants (Resolution R8-2006-0023).

A program has been formulated to identify a coordinated and comprehensive plan for management of the lake and surrounding watershed to protect the lake's beneficial uses. The Big Bear Municipal Water District (Big Bear Municipal) will serve as the sponsoring agency, with significant participation of Big Bear Lake watershed stakeholders. The plan will include data collection, modeling and analysis of data, and reporting. It will include a plan and schedule for short-term and long-term in-lake sediment nutrient reduction for Big Bear Lake. The plan will also include an evaluation of the applicability of various in-lake treatment technologies to support development of a long-term strategy for control of nutrients from the sediment, noxious and nuisance aquatic plants, and many other features.

Another water quality improvement project for Big Bear Lake is a phosphorous treatment plant. Based on existing data, phosphorus is the primary nutrient problem within Big Bear Lake. For example, past studies have shown that Big Bear Lake is eutrophic (meaning a body of water whose oxygen content is depleted by organic nutrients) and that the limiting nutrient is phosphorous. The phosphorous treatment project is intended to meet several water quality objectives identified in the Basin Plan, including those related to phosphorous,

dissolved oxygen, and excess algae. The high nutrient levels are causing impairment to beneficial uses. Reducing phosphorous concentrations will restore aquatic habitat by reducing excess algae growth and inhibiting the spread of invasive plant species. In addition to improving water quality, this project will improve access and navigability for swimmers and boaters, particularly along the shallower shoreline of the lake.

The proposed project will expand successful pilot demonstrations supported by previous Proposition 13 grant funds. It will include the broad application of liquefied alum that will establish an ionic bond with dissolved phosphorous, forming an inert mineral salt that rapidly precipitates out of the water column. This project is co-sponsored by Big Bear Municipal, SBCFCD, and the City of Big Bear Lake as a joint effort to implement the water quality management strategies specified in the Basin Plan, the RWQCB's watershed Management Initiative, the Nutrient TMDL, BBMWD's Lake Management Plan, the County's Stormwater Management Plan, and the City's Stormwater Management Plan.

4.2.2.5 Groundwater and Surface Water Quality Monitoring Strategy

Groundwater and surface water quality monitoring and assessment information enables water resource managers to understand the effectiveness or needs for improvement of their water quality management practices. For example, water quality objectives for the SAR for TDS and nitrogen are set forth in the Basin Plan and water rights judgments. In order to ensure compliance, water quality is monitored on the SAR at a point just below Prado Dam. The USGS maintains a gaging station at this location to measure instantaneous flow and a water quality recorder provides continuous measurements of specific conductance. Surface water grab samples are taken by the RWQCB staff, the USGS, and others, and analyzed to determine compliance with water quality objectives. This information is used to assess the effectiveness of water management practices over time.

A comprehensive surface and groundwater monitoring and assessment program is currently underway in the region. Such a program provides information needed to evaluate the effectiveness of a water quality management practice and, as appropriate, modify management practices. Management of groundwater basins in general and the proposed process to manage the SBBA requires extensive monitoring to ensure the annual operation of the basin is in compliance with requirements of existing agreements and judgments and that operation of the basin will result in the expected outcome. A comprehensive groundwater monitoring plan has been prepared for this IRWM Plan and is presented in Appendix B.

4.2.2.5.1 Surface Water Ambient Monitoring Program

In general, the RWQCB's surface water monitoring program is not strictly formalized. Other than monitoring at the location just below Prado Dam (described above), the sampling frequency, locations, constituents, and other details vary from year to year depending on identified problems and needs and on staff and funding availability. In addition to these efforts, a number of other agencies conduct surface water monitoring programs in the region, including water purveyors, wastewater dischargers, and flood control agencies.

The Surface Water Ambient Monitoring Program (SWAMP) is a relatively new statewide program (Water Code Section 13192). The purpose of SWAMP is to create an effective surface water quality ambient monitoring program for all of California's surface waters to ensure that water quality is comprehensively measured to protect beneficial uses and to evaluate protection and restoration efforts. The program also intends to capture monitoring information collected under other State and RWQCB programs, such as the State's TMDL, Nonpoint Source, and Watershed Project Support programs.

All State-funded projects that include a surface water monitoring component are required to develop and implement a SWAMP Quality Assurance Plan approved by the RWQCB as a condition of funding. This is a strategy to (1) implement this requirement, and (2) voluntarily adhere to and implement SWAMP Quality Assurance standards and protocols whenever possible for surface water quality monitoring in the Upper SAR watershed. Note that this does not include projects that include effluent or discharge monitoring, which is covered under National Pollutant Discharge Elimination System permits and Waste Discharge Requirements. The guidelines for preparation of such a plan, the Quality Assurance Project Plan, can be found at http://www.swrcb.ca.gov/swamp/qapp.html.

4.2.3 Ecosystem Restoration and Environmental Improvement Objective

Protecting and restoring, where possible, the ecological functions of the watershed is an objective for the region. This IRWM Plan provides a framework for the integration and coordination of ecosystem and environmental improvement strategies relating to flood management, recreation and public access, and land use planning. The purpose of this framework is to enable stakeholders to coordinate and advance strategies to improve the ecological health of the watershed and, in the process, improve public awareness, access, stewardship, and enjoyment of this region's most valued water resources.

This section begins with a definition and description of Ecosystem Restoration and Environment Improvement followed by three broad strategies to achieve this objective. The role of watershed stakeholders and the importance of collaboration to achieve this objective are also described. The section concludes with a more detailed explanation of the strategies and the projects to implement them.

Restoration means the reestablishment of structure and function of the Santa Ana watershed ecosystems. The restoration process is used to reestablish the general structure, function, dynamic, and self-sustaining behavior of the ecosystem. As this is accomplished, the natural biological attributes of the system return, such as native plants, fish, birds, and other wildlife, which enriches the quality of life for everyone.

It is not possible, nor would it be desirable, to restore the Upper SAR watershed ecosystem to a pre-disturbance condition. Human activity and use of the landscape has precluded many options and has altered natural ecosystem processes; for example, vegetation is changed and hardscape increased. A return to a more natural, self-sustaining system, however, can lower infrastructure costs, raise property values, and reconnect people with the natural wildland beauty of the Santa Ana watershed.

Many stakeholders, such as federal and state resource agencies; regional, county, and city governments; public and private non-governmental organizations; and the public, are actively engaged in Ecosystem Restoration and Environment Enhancement projects. Accordingly, the strategies described in the IRWM Plan are intended to serve as a framework for the integration and coordination of the projects to be performed by stakeholders. The foundation of this framework is collaboration. Through increasing collaboration, stakeholders are able to more effectively integrate and coordinate their resources to protect, restore, and enhance the environment; institute land use policies that protect the watershed

values; and establish and maintain public access to open space, parks, trails, and other recreational amenities.

While the focus of these strategies is the Upper SAR watershed, it is recognized that all stakeholders within the watershed are linked to one another and to State and national resource management priorities. Accordingly, the Ecosystem Restoration and Environment Enhancement strategies described in this plan are intended to be consistent with broader watershed plans and strategies, such as the strategies described in the "Santa Ana Watershed Project Authority (SAWPA) Integrated Watershed Plan, 2005 Update," and the "2002 SAWPA Integrated Watershed Plan, Volume 2: Environmental and Wetlands Component."

The strategies for Ecosystem Restoration and Environment Improvement are (1) Habitat Protection, Restoration, and Enhancement; (2) Land Use Planning; and (3) Recreation and Public Access. Taken together, these strategies will enable stakeholders to advance the objective of ecosystem restoration and environment improvement. These strategies will also provide other benefits to the watershed, such as improved water quality, increased water supply, increased dry-year water supply reliability, increased groundwater storage, improved flood control and stormwater management, and greater public education and awareness that is critical for the long-term stewardship of the watershed.

4.2.3.1 Habitat Protection, Restoration, and Enhancement Strategy

The Upper SAR watershed is home to extraordinary natural resources. The headwaters of the watershed are located in the San Bernardino National Forest. The San Bernardino Valley is home to six unique habitat types, six state endangered species, 13 federally endangered or threatened species, and over 53 species of special concern. Riparian corridors thread through the watershed and provide important habitat.

The San Bernardino National Forest is home to extraordinary natural resources.

This strategy reflects the value of the watershed's natural resources. It addresses the economic benefits of natural systems; for example, the use of erosion control measures to reduce sediment loading and thereby improve water quality. It also strives to reduce conflict associated with human activity.

This strategy addresses policy, planning, projects, and project initiatives to protect, restore, and enhance Upper SAR watershed habitats. These initiatives

are organized into three categories of projects: (1) Land Management and Habitat Conservation Planning Projects, (2) Habitat Improvement and Environmental Enhancement Projects, and (3) Non-Native Plant Removal Projects.

4.2.3.1.1 Land Management and Habitat Conservation Planning Projects

Land Management and Habitat Conservation Planning projects are policy and planning initiatives that recognize that wildlife habitat is often in direct competition with other land uses and strive to resolve these conflicts in a manner that protects and enhances the ecosystem value of the Upper SAR watershed as habitat for sensitive, threatened, and endangered species.

4.2.3.1.2 Habitat Improvement and Environmental Enhancement Projects

The second category of projects—Habitat Improvement and Environmental Enhancement Projects—are projects to improve habitat and enhance the environment. These are multi-faceted projects that range from property acquisition and construction of facilities, to oversight monitoring, maintenance of land and facilities, public education, and outreach. The benefits of these projects include ecosystem restoration, flood and stormwater management, water quality improvement, public access and recreation, and public outreach and education.

An example of an existing Habitat Improvement and Environmental Enhancement project is the Bear Creek Fishery Project. Located in the San Bernardino National Forest, this project was implemented to sustain the aquatic health of Bear Creek. Big Bear Municipal administers this program, which consists of monitoring and managing carefully controlled releases of water to the creek from Big Bear Lake. An example of a partially completed project is the 145-acre wildlife preserve, the Stanfield Marsh. This project, when completed, will restore and enhance habitat for aquatic species, wetland species, wildlife to include wintering and breeding waterfowl, wintering bald eagles, osprey, and summer residents, and potentially nesting pelicans. An example of a new project initiative is the Lytle Creek Watershed Assessment and Restoration Project. This is a proposed, multi-purpose program to advance ecosystem restoration and improve water quality and local water supply reliability. It also includes public outreach and education, addressing wildfire prevention, non-point pollution prevention, and public outreach targeted to Lytle Creek recreational users.

Upper Santa Ana River Wash Land Management and Habitat Conservation Plan (Project) – Historically, the Santa Ana River Wash was a natural floodplain and alluvial fan that provided a place to convey frequent devastating flood waters depositing sediment percolate surface water to the groundwater basin, providing a significant source of water supply for the Upper SAR watershed. It is also habitat for a variety of sensitive, threatened, and endangered species. Its ecosystem value has become more apparent due to several factors, including the decrease in this type of habitat throughout Southern California.

The proposed project is Land Management, Mining and Reclamation, Water Management and Conservation, and Habitat Conservation Plan for the Upper Santa Ana River Wash Area. The plan is being prepared under the guidance and direction of many stakeholders, with the SBVWCD serving as lead agency. The plan area encompasses approximately 4,500 acres and is generally bounded by the SAR on the south, Alabama Street on the west, Plunge Creek and Green Spot Road on the north, and Mill Creek on the east.

When completed, the plan would directly contribute to all three strategies for ecosystem restoration and environmental improvement presented in this IWRM Plan: (1) habitat protection, restoration, and enhancement; (2) land use planning; and (3) recreation and public access. Habitat preservation would be strategically located in large inter-connected areas with intact natural habitat. A trails system would be maintained, expanded, and improved. Water conservation (groundwater recharge) and flood control activities will continue in areas historically utilized for these activities. Through land use planning and land exchanges, it would confine and minimize mining activities to one area on land currently disturbed by mining or land adjacent to disturbed areas.

San Bernardino National Forest Watershed Management Planning – The upper reaches of the Santa Ana watershed are located in the San Bernardino National Forest. The San Bernardino National Forest is one of 18 national forests in California, collectively referred to as Region 5 of the United States Forest Service (USFS). In 1981, Region 5 entered into a Management Area Agreement with the SWRCB pursuant to Clean Water Act Section 208. This agreement designates Region 5 as the Water Quality Management Agency (WQMA) for the San Bernardino National Forest.

As the WQMA, Region 5 is responsible for the proper installation, operation, and maintenance of State- and EPA-approved BMPs in the San Bernardino National Forest. Region 5 is tasked with the responsibility of (1) correcting water quality problems in National Forests; (2) perpetually implementing BMPs; and (3) carrying out identified processes for improving or developing BMPs. In the Upper SAR watershed, the San Bernardino National Forest works conjunctively with the RWQCB on water quality issues such as TMDLs.

Currently, Region 5 is working with the State and RWQCBs to re-certify the Management Area Agreements pursuant to recent changes in State law, such as the new Nonpoint Source Implementation and Enforcement Policy. The process of revising the WQMP and Management Area Agreements will be a joint SWRCB and Region 5 effort. This will be a collaborative effort to develop a plan that identifies, prioritizes, and annually updates site-specific issues. In addition to re-certification of the Management Area Agreements, the San Bernardino National Forest (SBNF) will be implementing its 2006 Forest Plan. The Forest Plan describes the strategic direction at the broad program-level for managing the SBNF, including watershed management initiatives over the next 10 to 15 years.

Water Resources Institute Watershed Management Internship Program (Project) – Local governments in the Upper SAR watershed are facing major challenges with water quality, stormwater runoff, flood damage liability, and concerns about whether there will be enough water for new development. The long-term protection and management of the watershed will require the development and training of a new generation of water resources professionals.

The WRI- CSUSB is collaborating with the Natural Resource Conservation Service, SAWPA, local resource conservation districts, and other watershed groups to provide multi-disciplinary internships on watershed management projects related to increasing population, changing land use patterns, and expanding urbanization in the Santa Ana watershed. This program is funded by the United States Department of Agriculture. Under this program, up to 30 under-represented students will be selected for paid internships to conduct scientific research on real-world problems in the Santa Ana watershed. This program will also train students in the latest Internet-based information-sharing systems.

Lytle Creek Watershed Assessment and Restoration Project – Lytle Creek is an impaired stream on the 303(d) list with an existing pathogen impact. Because of increasing visitor traffic and recreational use, the condition of Lytle Creek will become worse if corrective actions are not taken.

The Lytle Creek Watershed Assessment and Restoration Project is a multi-faceted program to advance ecosystem restoration and improve water quality and local water supply reliability. Program elements include a water quality assessment and a biological assessment. The program includes bilingual (English and Spanish) public outreach and education and addressing wildfire prevention and non-point pollution prevention. Public outreach will be targeted to Lytle Creek recreational users. This program is sponsored by the WRI-CSUSB.

4.2.3.1.3 Non-Native (Arundo donax) Plant Removal Maintenance Project

Non-native plants can drive out native vegetation and species.

The third and final project category under this strategy is Non-Native Plant Removal Projects. The removal of non-native plants is a specific type of habitat restoration—for example, Giant Reed or *Arundo donax* consumes large amounts of water and clogs up streams and waterways. Because *Arundo donax* spreads so rapidly, it pushes out native vegetation and the species that inhabit it. These Non-Native Plant Removal projects remove non-native plants and maintain such areas in order to restore native habitats and maintain the quality of restored habitat.

A number of projects to remove non-native plants, especially *Arundo donax,* or giant reed, in order to restore and maintain native habitats have been implemented in the Upper SAR watershed. Some projects are located in environmentally sensitive areas; for example, along important biological corridors that are habitat for threatened and endangered species. Projects require continued vegetation management to maintain restored habitats and monitoring to prevent the establishment of invasive weed species. Many of these areas where removal has been successful, such as the least Bell's vireo, provide important habitat for federal- and State-listed species.

The Inland Empire Resource Conservation District (IERCD), together with Santa Ana Watershed Association (SAWA), removed approximately 2,800 acres of *Arundo donax* within the Upper SAR watershed. *Arundo donax* removal and maintenance is imperative with regards to water resources quantity and quality. An acre of *Arundo donax* is estimated to consume three times more water than an acre of native vegetation within the Santa Ana watershed. If the *Arundo donax* is not managed, it would result in reduced streamflow, reduced groundwater recharge, reduced availability of water for native species, and eventual replacement of native riparian vegetation with *Arundo donax*. Native species naturally hang over rivers and streams, creating shade and keeping water temperatures lower. Streams infested with *Arundo donax* have little shade, which raises water temperature and changes water chemistry. These changes, due to increased sunlight, promote algal growth and raise pH.

Past invasive species removal efforts have been very successful. Eradication contracts have included the initial physical removal of the non-native plants with hand tools or machinery followed by five years of monitoring and spraying with EPA-approved herbicide. IERCD wants to ensure these areas remain free of

Arundo donax in perpetuity and proposes to monitor and maintain these removal project areas to ensure re-infestation does not occur. *Arundo donax* removal maintenance will assist in accomplishing the following objectives: improve surface water and groundwater management, protect water quality, improve water supply reliability, and restore and sustain riparian ecosystems.

City of San Bernardino Warm Creek Restoration Project – The proposed project consists of restoration activities along Warm Creek in the City of San Bernardino. This area consists of approximately three acres of a highly degraded stream channel that runs through private property. Typically, Warm Creek has contained mostly 100 percent invasive non-native vegetation, including *Arundo donax*.

In the spring of 2006, the project sponsor, the IERCD, obtained landowner approval to remove invasive species, including *Arundo donax* and castor bean, and substantial work has been completed. To complete the restoration and rehabilitation of this urban stream, IERCD will continue to remove additional invasive species such as Mexican fan palm (*Washingtonia robusta)* and Date palm (*Phoenix canariensis*), and actively re-vegetate the riparian areas with native species like Mulefat (*Baccharis salicifoli)* and willow.

Restoring Warm Creek in the City of San Bernardino will allow for the return of native riparian habitat in this highly urban and economically disadvantaged area. In addition, this restoration will save water, increase streamflow, improve instream flow timing, and improve water quality. Restoring native riparian habitat to Warm Creek will also allow for native plant and animal species to occupy the area. The riparian zone may support threatened, endangered, or migratory birds, fish, or other aquatic species.

Stanfield Marsh Wetlands Habitat Restoration Project – Stanfield Marsh is habitat for numerous wet meadow species; the southern Bald Eagle and its roosting, perching, and foraging sites; thousands of wintering waterfowl; numerous breeding waterfowl and upland birds in summer; and a large population of white pelicans. It is also considered the most amenable valley in the Big Bear Lake watershed for ecological enhancement, sensitive land acquisition, education, recreation, and scenic beauty.

The habitat value of the marsh was reduced as the result of construction of Stanfield Cutoff, a causeway (land bridge) built during the 1920s that largely separated the marsh from Big Bear Lake. The history of this site, the presence of wetland species, and hydrologic conditions make this an exceptional site for wetland enhancement. Partial wetlands enhancement has been completed.

The proposed project, when completed, would maintain a more consistently wet marsh area and a permanent wet habitat. When needed, for example, during dry periods, up to several hundred gallons of water per minute would be pumped from Big Bear Lake to the marsh. Pumped water not consumptively used in the marsh would return to the lake through the culverts under Stanfield Cutoff, with lower nutrient concentration and higher dissolved oxygen concentration. In addition to improving habitat and restoring wetlands, this project would improve lake water quality by reducing nutrients and increasing dissolved oxygen. It would also provide numerous public education and public outreach benefits in conjunction with other programs administered by the project sponsor, Big Bear Municipal.

4.2.3.2 Land Use Planning Strategy

Land use in the Upper SAR watershed is regulated by county and city government General Plans and Zoning Ordinances. Within the San Bernardino National Forest, land use planning is guided by the Forest Service Land Management Plan.

The Upper SAR watershed is one of the fastest growing regions in the United States. Substantial new development is forecast for the Upper SAR watershed. Stakeholders are taking into consideration the impacts of growth, such as the potential loss of open space and increase in impervious surfaces such as roads and buildings, and are exploring strategies to efficiently manage land and water resources.

This strategy addresses water resource-efficient land use principles and stewardship actions that can be implemented by local governments and other watershed stakeholders to protect and restore, where possible, the ecological functions of the watershed as well as improve the reliability and quality of the region's water resources. An example is the Ahwahnee Water Principles for Resource Efficient Land Use (Principles) developed by the Local Government Commission to improve the stewardship of local water resources.

The Principles encourage the identification of natural resources in the watershed, such as wetlands, floodplains, recharge zones, open space, and native habitat, to preserve and protect as many valued assets as possible to augment flood protection, improve water quality, recharge groundwater, restore habitat, and sustain overall long-term water resources. For example, as development occurs, its impact to the watershed would be mitigated, in part, by incorporating water holding areas such as creek beds, recessed athletic fields, ponds, cisterns, and other features that allow for natural groundwater recharge, reduce stormwater runoff, and decrease local flooding.

The Principles seek to reduce water demand through water conservation measures and efficient land use practices. For example, all aspects of landscaping, from the selection of plants to soil preparation and the installation of irrigation systems, are addressed to reduce water demand, retain runoff, decrease flooding, and allow for groundwater recharge. Impervious surfaces such as driveways, streets, and parking lots are minimized so that land is available to absorb (recharge) stormwater and reduce polluted urban runoff. Dual plumbing that allows grey water from showers, sinks, and washers to be reused for landscape irrigation is included in the infrastructure for new development. The Principles advocate maximum use of recycled water for appropriate applications, including outdoor irrigation, toilet flushing, and commercial and industrial processes. Urban water conservation technologies such as low-flow toilets, efficient clothes washers, and more efficient water-using industrial equipment are encouraged to be incorporated in all new construction and retrofitted in remodeled buildings.

The Principles also encourage the preservation of water supplies and water quality by promoting growth in the form of compact, mixed-use, transit-oriented development.

4.2.3.2.1 Inland Empire Sustainable Watershed Program Project

The Inland Empire Sustainable Watershed Program is a multi-faceted program to inform and empower local communities to become effective watershed stewards to re-establish sustainable ecological function in the Upper SAR watershed. The program builds regional capacity for community-based watershed management by reaching out to residents, including children, municipalities, water districts, resource agencies, businesses, land developers, and other stakeholders that impact watershed function in their daily activities. California Resource Connection serves as the program manager. This is a CALFED watershed-funded program that began in December 2006 and will be completed in December 2008. The program activities summarized below will support IWRM Plan Ecosystem Restoration and Environment Improvement.

Upper Santa Ana River Watershed Management Opportunities Atlas and Green Map – This is a public outreach and education tool that attractively identifies watershed assets for community stakeholders to visualize open spaces serving areas for groundwater recharge, sensitive habitat needing to be protected, impaired waterways needing to be restored, that trails systems and parks can green the urban landscape, and water management facilities bringing water supplies to homes and businesses.

Model Ordinance Program – This program is assessing regulations in the municipal code and development codes in the Upper SAR watershed that prevent the implementation of the resource-efficient land use practices, such as the

Ahwahnee Water Principles for Resource Efficient Land Use, that were developed by the Local Government Commission with funding from the SWRCB. Model Ordinances will be drafted for local adoption in a form that cities or the county can use in a manner that best fits local conditions.

Green Development Initiative – This is an educational forum for developers, land use planners, architects/engineers, and nurseries in the Upper SAR watershed to promote "green" development practices during this period of rapid development.

Watershed U-Inland Empire – This is an educational program with forums on topics such as ecosystem function, urban greening and design, water-efficient landscaping, and local restoration projects to encourage the public to live and work with fewer impacts on the watershed and to get involved in local projects.

Think River! – This is a hands-on watershed education program for teachers and youth on water sustainability, water quality, geology, plants and wildlife, and other environmental science topics relevant to the Upper SAR watershed.

4.2.3.2.2 LIDS for KIDS (Low Impact Development for a Healthy Watershed) Project

Urban development in the Upper Santa Ana Region has increased impermeable surface acreage and, as a result, increased the amount of stormwater runoff. This stormwater runoff collects and carries pollutants that decrease the quality of water. The land use planning process can utilize the standards described in "Low Impact Development Design Strategies – An Integrated Design Approach" prepared by the Department of Environmental Resources, June 1999, and other sources to reduce the amount of permeable surface, reduce ecosystem impacts, and improve water quality.

The Lids for Kids project is a public demonstration and public outreach project that will assist with retrofitting existing structures and educating key stakeholders, such as land developers and homebuilders who design and build in the Upper SAR watershed. The project sponsor, IERCD, has been conducting public outreach within the Upper SAR watershed for many years. The objectives of this project are to improve stormwater management practices, encourage environmentally sensitive development practices, reduce construction and maintenance costs associated with the current stormwater control methods, encourage the public to utilize low-impact development methods, and increase "green zones" for wildlife and people of the region.

4.2.3.2.3 Low Impact Development Guidance and Training Project for Southern California

San Bernardino County's Low Impact Development (LID) Guidance and Training Project for Southern California is aimed at facilitating the incorporation

of LID into National Pollutant Discharge Elimination System (NPDES) and TMDL programs at the local government level. LID employs construction, design, and landscape architecture features that reduce hydro-modification and, in turn, the water pollution caused by stormwater discharges. A Request for Qualifications (RFQ) was issued to compete for a multi-year project that will create a database of performance results for various BMPs by measuring and monitoring the effectiveness of these features at actual LID projects that have been constructed in Southern California.

The project is sponsored by the SBCFCD in cooperation with the Stormwater Monitoring Coalition made up of the three Southern California RWQCBs (Los Angeles, Santa Ana, San Diego), the SWRCB, the municipal permittees (the County of Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego), Heal the Bay, and the Southern California Coastal Water Research Project (SCCWRP).

The project will evaluate a LID pilot site with a combination of BMPs to identify the BMPs to integrate LID into existing design, construction, and maintenance programs. The project will develop a model program for localities in California that are interested in adopting LID strategies and techniques. It will produce a manual and provide training to local government and private planners to balance the needs of development while addressing the environmental concerns associated with urban runoff. Materials developed for the project will provide a foundation and benchmarks for local governments to incorporate LID techniques into their site design and construction and post-construction BMP design process.

4.2.3.2.4 Alluvial Fan Task Force

DWR is utilizing the knowledge and expertise of the WRI-CSUSB to coordinate the activities of an Alluvial Fan Task Force. Alluvial fans are prevalent throughout Southern California where alluvial fan flooding has occurred. The principle hazards associated with alluvial fan flooding at the base of mountain bases are high-velocity, debris-laden flows resulting from a series of storms, particularly following wildfires common in semi-arid regions. Alluvial fans are most prevalent in San Bernardino, Riverside, Los Angeles, Ventura, Santa Barbara, San Luis Obispo, Kern, Orange, Imperial, and San Diego Counties.

The task force will be comprised of stakeholders in areas affected by rapid growth on alluvial fans with broad representation from developers, elected officials, flood control districts, stormwater managers, water suppliers, water quality regulators, Native Americans, and the environmental community. The members of the Alluvial Fan Task Force are charged by the Legislature with reviewing the state of knowledge of alluvial fan flooding and developing a Model Ordinance that will reduce long-term flood damages on alluvial fans and provide land use guidelines for sustainable development on alluvial fans. The ordinance

will be developed collaboratively by the members of the proposed task force, under the guidance of a professional facilitator, and is intended for voluntary adoption by local governments. The findings of the proposed Alluvial Fan Task Force will be reported to the Legislature.

Funding for the task force was provided by FEMA under the Pre-Mitigation Disaster Planning Grant Program with a 25 percent match from DWR Division of Flood Management.

4.2.3.2.5 WRI Watershed Management Internship Program

The WRI-CSUSB is collaborating with the Natural Resource Conservation Service (Redlands office), SAWPA, local resource conservation districts, and other watershed groups to provide multi-disciplinary internships on watershed management-related projects regarding increasing population, changing land use patterns, and expanding urbanization in the Santa Ana watershed.

Funded by the United States Department of Agriculture, the project will select up to 30 underrepresented students for paid internships to conduct scientific research in the Santa Ana watershed on real-world problems and trains students in the latest Internet-based information sharing systems.

4.2.3.4 Recreation and Public Access Strategy

This is a strategy to maintain and create new opportunities for the public to enjoy the area's waterways and other recreational amenities; enhance the watershed's natural features; and ensure access to the region's wetlands, lakes, and streams. In anticipation of further growth in the region, this strategy reflects the need for a balance between growth of urban areas and the environment to maintain a viable habitat for native plant and wildlife species, and to maintain a high quality of life for watershed residents and visitors. An effective means of establishing this balance is the development of open space corridors that allow for multiple species habitat, wetlands, storm flow capture and aquifer recharge, water quality improvements, and passive and active recreational facilities and open spaces.

When completed, the Santa Ana River Trail System will extend from Huntington Beach to the crest of the San Bernardino Mountains.

The development of the Santa Ana River Trail System (SART) trail tread and the integration of the trail tread with other (federal, state, regional, and local) planning initiatives is the backbone of this strategy. The SART is a 110-mile walking/biking/recreational trail system along the SAR. When completed, the trail will extend from the ocean in the City of Huntington Beach to the Crest of the San Bernardino Mountains. It will connect the many trails,

recreation, and open space amenities into one cohesive park and trail system. At the trailhead in the San Bernardino Mountains it will connect to the USFS system of trails and to the Pacific Crest Trail.

Because SART involves many different governmental agencies and would cross many different landowners and water management facilities, it is critical that it be fully integrated with related plans. For example, SART is being planned in coordination with the Upper Santa Ana Wash Habitat Conservation Plan and the land use planning of the Cities of Highland and Redlands and the County of San Bernardino. Through this coordinated approach, the development of SART will advance multiple species habitat, wetlands, storm flow capture and groundwater recharge, water quality improvements, and passive and active recreational open spaces.

In the Upper SAR watershed, the SART will traverse a total of approximately 26 miles, the first eight miles of which are completed. This segment is located entirely in Riverside County beginning at Riverside Narrows and ending at the San Bernardino County line.

In San Bernardino County, the SART will traverse approximately 18 miles, primarily along the south levee of the river. A master plan for the SART was approved by the San Bernardino County Board of Supervisors in July 1990, and two initial phases of trail construction, a total of 6.7 miles, are completed. Planning, design, and permitting are currently underway for the final two phases of the SART, described below.

SART Phase III Project – SART Phase III is a 3.5-mile segment of the SART that will extend from Waterman Avenue in the City of San Bernardino to California Street in the City of Redlands. The trail tread width will be 18 feet, made up of 10 to 12 feet of asphalt and 6 to 8 feet of non-paved shoulder. The trail tread will be designed to Caltrans standards. The sponsor of this project is the County of San Bernardino Parks Department.

SART Phase IV Project – SART Phase IV is the final 7.8-mile segment of the SART system trail tread that will extend from California Street in the City of Redlands to Greenspot Road in the community of Mentone. The trail tread width will be 18 feet, made up of 10 to 12 feet of asphalt and 6 to 8 feet of non-paved shoulder. The trail tread will be designed to Caltrans standards. The sponsor of this project is the County of San Bernardino Parks Department.

5 Integrated Regional Water Management Plan Implementation

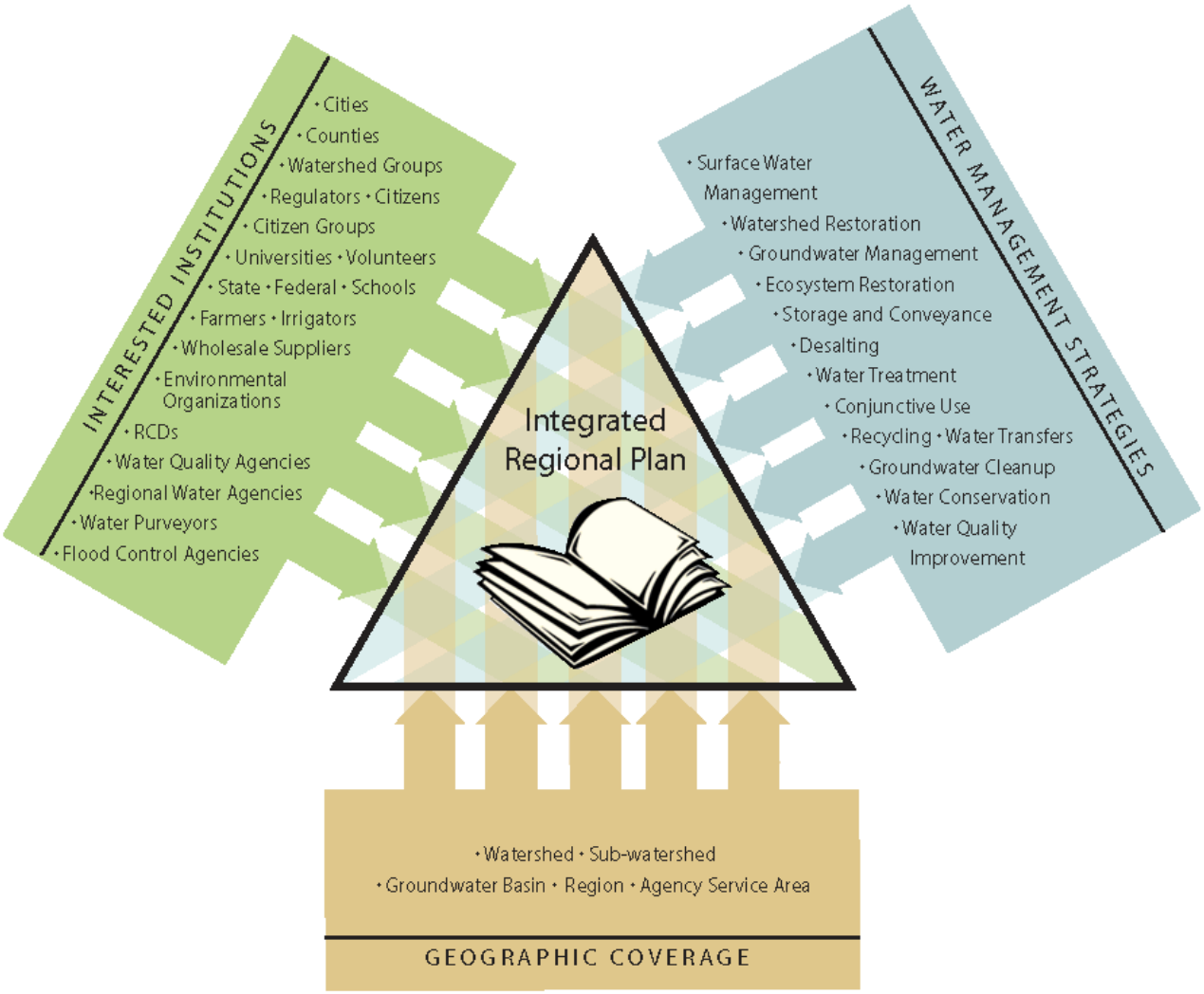
5.1 Integration of Water Management Strategies

Regional planning is a process in which regional agencies and stakeholders come together to develop a plan that serves the individual agencies involved as well as serving the region as a whole. Regional planning promotes sharing of resources and facilities and implementation of strategies that have benefits for multiple agencies.

Integrated planning encourages broad investigation of the interrelated strategies and implementation of projects that provide multiple benefits and serve a wide range of strategies. The investigation is designed to help develop water management strategies that contribute to achievement of multiple objectives. Integrated regional water management planning brings various water interests, stakeholders, and institutions together to plan for future management and use of resources in a large geographic area (Figure 5-1). With the above concept in mind, the Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IRWM Plan) has been developed to prepare a road map for management of the water resources in the region. The Technical Advisory Group (TAG) recognized from the beginning that management of groundwater resources, surface supplies, stormwater, and imported water are inseparable and intrinsically interrelated. It is also recognized that water quality plays a critical role in management of groundwater basins and groundwater conjunctive use implementation.

During the planning process, interrelated water management strategies are identified and planned so that they work together in an integrated fashion. Some examples of such integrated planning are discussed below.

Figure 5-1
Integrated Regional Water Management Planning



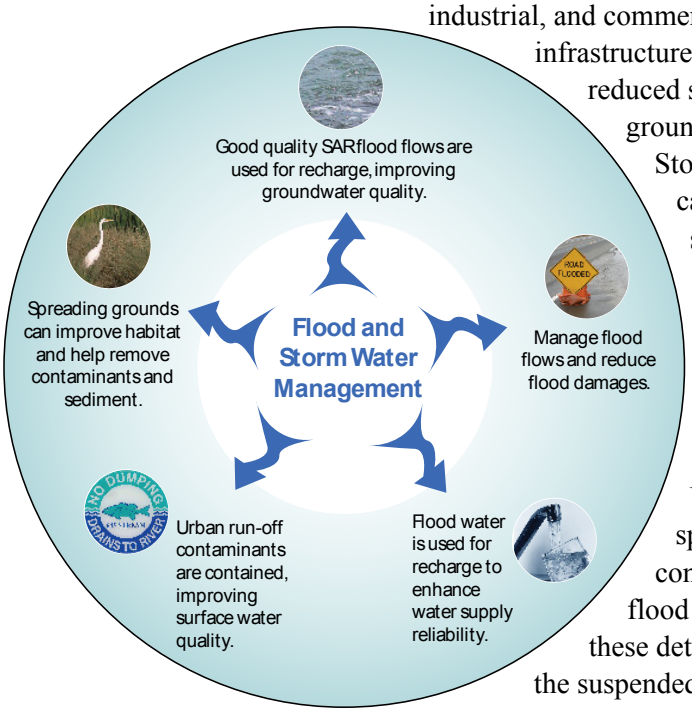
5.1.1 Integration of Surface Water and Groundwater Resources Strategies

Today, groundwater provides 79 percent of the water supply to the region and groundwater basins are used for water storage to regulate the highly variable local surface water and imported supplies. In order to continue to regulate the highly variable surface water in the region, surface water and groundwater resources must be integrated and optimized. When surface water is available it should be used for recharge as well as direct use. In addition, the region should work to limit the amount of high flows that go to the ocean in any given year.

These goals can be achieved through integration of surface water and groundwater.

5.1.2 Integration of Stormwater Management, Flood Management, Water Supply Reliability, and Surface and Groundwater Quality

The Upper Santa Ana River (SAR) Watershed is heavily developed. Housing, industrial, and commercial development, roads, and other urban infrastructure have replaced natural vegetation, which has reduced soil absorption capacity, reduced groundwater recharge, and increased urban runoff. Stormwater can cause flood damage and can carry sediment and urban pollutants into streams. Although stormwater can cause flooding, with proper management it could provide a source of water supply to this arid region. Improvement in the management of stormwater can help the region achieve multiple objectives while integrating a number of strategies in the Upper Santa Ana Region. Generally speaking, stormwater is captured and conveyed to detention basins to reduce peak flood flows and reduce flood damage. However, these detention basins can also be designed to settle the suspended sediment and pollutants out of the water, increase groundwater recharge, and possibly provide wildlife habitat. Use of stormwater for groundwater recharge and use of flood control detention basins for groundwater recharge during the non-flood seasons are strategies that have been used within the region and should be further enhanced to improve water supply reliability and groundwater quality in the Upper Santa Ana Region.



Integration of Water Management and Flood Management Strategies in the Upper Santa Ana River Watershed

5.1.3 Integration of Water Supply Reliability and Water Quality Strategies

Contamination plumes present a challenge and constraint for management and use of groundwater resources. An integrated approach has been taken to clean the plumes, which will eventually remove them as a constraint and improve water supply reliability for water users in the region. The Bunker Hill Basin Regional Water Supply Project is an example of a project that seeks to speed the cleanup of a contamination plume by pumping and treating water from the "heart" of the plume. This type of strategy can expedite the clean-up process and

facilitate conjunctive use of the basins while providing reliable water supplies for the water purveyors.

5.1.4 Integration of Imported Water and Local Water Supplies Strategies

The region has a significant public investment in and is dependent upon imported water to meet the region's water needs into the future. However, the State Water Project (SWP) can be unreliable. To improve the reliability of SWP water supply, the region should take delivery of its entire Table A amount each year and store any "leftover" amount that is not used directly by the local water agencies. The water could be stored within local groundwater basins or in a "water bank." By storing as much SWP water as possible during "wet" years, the region will have that water available during drought periods.

5.2 Projects Identified for IRWM Plan Implementation

To implement the water management strategies identified in this plan, over 100 projects have been proposed. Project descriptions have been developed for these projects and are presented in Appendix E.

The focus of these projects is driven by the Water Management Objectives as well as Basin Management Objectives (BMOs) formulated during the planning process. These objectives include improving surface water and groundwater management, water supply reliability, water quality protection, ecosystem improvement, and environmental enhancement.

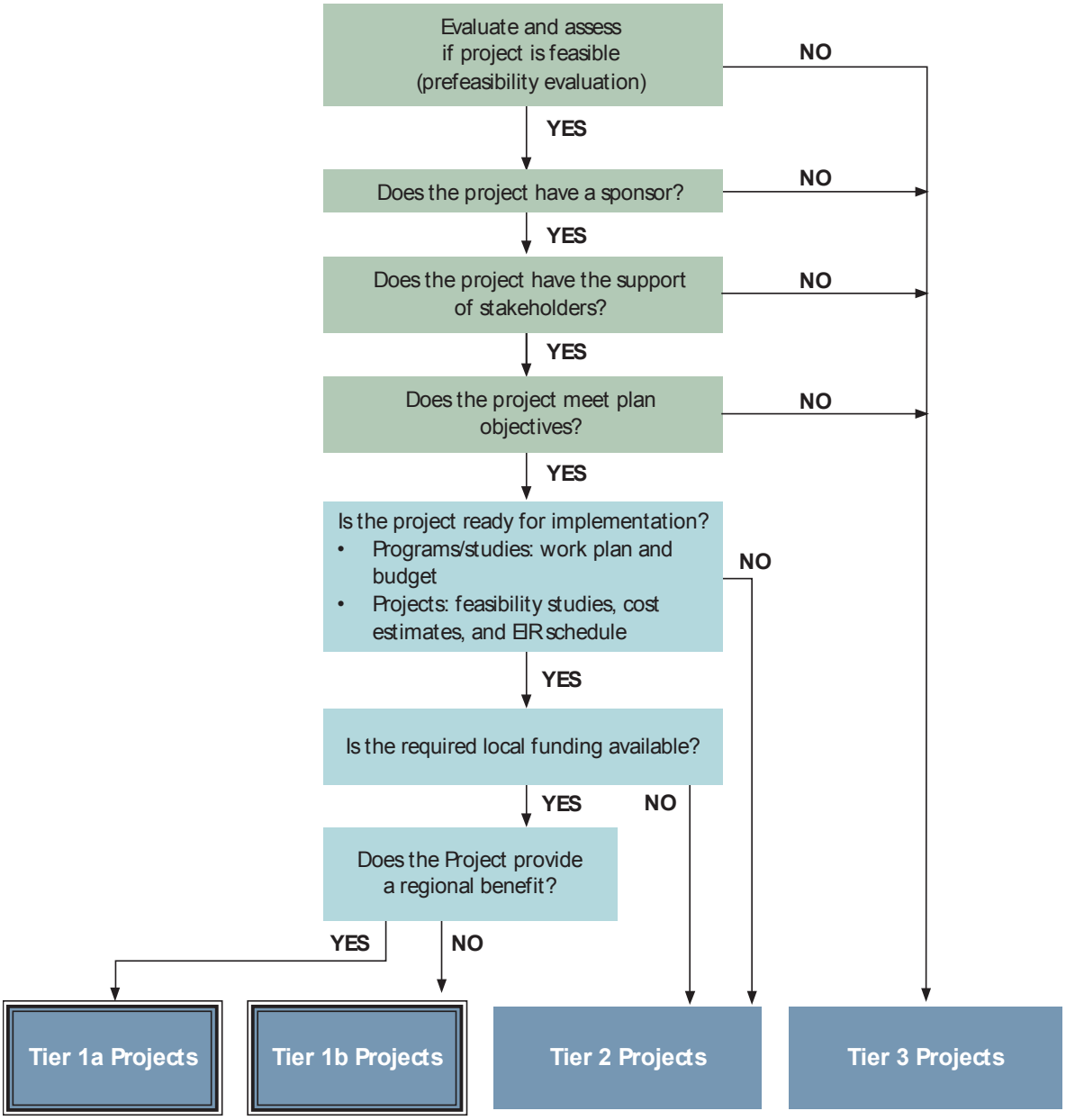
Some of the projects were taken from previous planning efforts such as the San Bernardino Valley Municipal Water District's (Valley District) Master Plan. The list also includes projects that will allow the region to capture and use SAR floodwater. The City of San Bernardino, the largest pumper in the Bunker Hill Basin and the key local agency with responsibility for mitigation of groundwater contamination, is the lead agency for the Bunker Hill Regional Water Supply Project, which involves several other agencies. Projects included in previous Santa Ana Watershed Project Authority (SAWPA) planning studies and Urban Water Management Plans (UWMPs) were also evaluated to identify specific projects that could achieve the objectives of the region and are incorporated into the plan.

In a series of TAG meetings starting in March 2006 and continuing through 2007, the TAG members reviewed the list of projects and provided additional input. Water agencies within the area that are not part of the TAG were also encouraged to participate in development of the list. Most of these projects are integrated and serve multiple strategies. Together, these projects help develop a regional system that would integrate the use of groundwater, SWP water of the State of California (State) contractors in the region, flood and stormwater, and local surface water to meet the Water Management Objectives.

5.2.1 Project Prioritization and Screening Process

The primary purpose of project prioritization and ranking is to provide a process for water leaders in the region to review the proposed projects and collectively decide the region's priorities for the construction of facilities. To facilitate this task, a prioritization and ranking process was developed and is presented in Figure 5-2. The project prioritization and ranking is a two-step process. The first step is to ensure that the project has a sponsor and meets the planning objectives and strategies. The projects that do not pass the first step will be ranked as Tier 3 projects until additional information is gathered that would suggest that it have a higher priority. The second step is to prioritize the projects that pass the first step. It is important to note that project ranking and prioritization is a

Figure 5-2
Planning Process for Project Screening and Ranking



"snapshot in time" and that projects will move from tier to tier as they meet the criteria requirements.

5.2.1.1 Definitions

5.1.2.1.1 Tier 1 Projects

Tier 1a and 1b projects are currently ready for construction per the following criteria:

- Projects have completed or will complete environmental documentation and feasibility studies and cost estimates by July 1, 2008, and will be ready for implementation by July 1, 2009 (design will be completed).
- Studies that are needed to improve water management in the region have developed a detailed scope of work and study cost estimate.
- Projects have necessary local funding for implementation.
- Projects serve the region and reduce regional water supply system vulnerability.

The only difference between Tier 1a and Tier 1b projects is that Tier 1a projects are regional (serve more than three communities).

5.1.2.1.2 Tier 2 Projects

Tier 2 projects include those projects that may not be ready for implementation or do not have local funding. Once a Tier 2 project meets all of the necessary criteria, it can become a Tier 1a or Tier 1b project.

5.1.2.1.3 Tier 3 Projects

Tier 3 projects are conceptual in nature as defined by the following:

- Technically, economically, or financially not feasible at this time (through a pre-feasibility evaluation of the project).
- Lack of local support/sponsor.
- Inconsistent with current water management goals and objectives of the region.
- Inconsistent with existing regulatory or institutional setting.

Once a Tier 3 project meets all of the necessary criteria, it will become a Tier 2 or Tier 1 project.

To prioritize and rank the project, a set of scoring criteria were developed and reviewed by the TAG. The criteria were then applied to all projects to prioritize implementation. A detailed description of the project ranking and scoring criteria is shown in Appendix E. A list of the projects and the results of the project prioritization and ranking is shown in Table 5-1. Table 5-2 shows how projects meet the region's objectives and their relation to water management strategies.

Figure 5-3 shows the locations of the proposed projects.

Table 5-1
Upper Santa Ana IRWM Plan Project Ranking

STRATEGY	PROJECT NO	PROJECTS	Agency/ Project Sponsor	Project Effectiveness: Meets IRWMP Objectives: SGM	WSR	WQP	ESR	Supports Integration and Multiple Water Management Strategies	Provides Public Safety and Emergency Needs	Serves Disadvantaged Communities	Project commitment: Readiness for Implementation	Availability of Local Funds	Regional Benefit: Serves the Region	Reduce Water Supply Vulnerability	Overall Project Implementation Priority	Tier
Tier 1a - Regional Projects that are "Ready"																
	54	Bunker Hill Regional Water Supply	City of SB	2	1	1	0	5	0	5	5	5	5	5	34	1a
	90.3	City Creek Crossing	SBVMWD	0	2	0	0	5	0	5	5	5	5	5	32	1a
	15	Seven Oaks Dam Borrow Pit Groundwater Recharge and Habitat	Conservation	2	1	0	1	5	0	2	5	5	5	5	31	1a
	12	Central Feeder:	SBVMWD	1	2	0	0	5	0	2	5	5	5	5	30	1a
	12.1	Central Feeder Pipeline	SBVMWD	See Project 12												
	12.3	San Bernardino Pump Station #2	SBVMWD	See Project 12												
	1.1	Enhance Spreading	SBVMWD	2	1	0	0	5	0	2	5	5	5	5	30	1a
	4.0	Santa Ana River Construction Area - Plunge Pool Pipeline	SBVMWD	2	1	0	0	5	0	2	5	5	5	5	30	1a
	80.2	Alabama Street Connector Pipeline	SBVMWD	1	2	0	0	5	0	2	3	5	5	5	28	1a
	80.3	Alabama Street Wellfield	SBVMWD	1	2			5	0	2	3	5	5	5	28	1a
	46	Pellesier Ranch Barrier Wells and Water Treatment Plant	RPU	1	2	0	0	5	3	0	3	3	5	5	27	1a
	19	Riverside-Corona Feeder	WMWD	1	2	0	0	5	0	2	5	1	5	5	26	1a
	12.7	Riverside Pump Station (Raub Emergenecy Supply Intertie)	RPU, SBVMWD, WMWD	1	2	0	0	3	3	0	3	3	5	5	25	1a
Tier 1b - Non-Regional Projects that are "Ready"																
	9	Lytle Creek and Glen Helen Turnout	SBVMWD	1	2	0	0	5	0	0	5	3	3	2	21	1b
	11	LIDS for Kids- Low Impact Development	IERCD	1	0	0	2	5	0	2	3	3	5	0	21	1b
	18	San Timoteo Creek Aquatic Restoration	Redlands	1			2	5	0	2	3	3	5	0	21	1b
	42	Oak Valley WRP	Yucaipa Valley WD	0	2	1	0	5	0	0	5	5	1	2	21	1b
	48	Muscoy Spreading Basins	City of SB	1	2			5	0	5	3	5	0	0	21	1b
	97	Erwin Lake/Sugarload Fire Flow & Water Transmission Improvement	BBLDWP	0	2	0	0	3	5	0	5	5	1	0	21	1b
	99	Fontana Water Company Recycled Water Project	FWC	0	2	1	0	5	0		5	5	3	0	21	1b
	110	San Timoteo Canyon State Park Acquisition and Restoration Project	WRI-CSUSB	0	0	1	2	5	0	2	5	3	3	0	21	1b
	118	Lytle Creek Watershed Assessment and Restoration	R.L.C.	0	1	1	2	5	0	2	5	5	0	0	21	1b
	127	Rialto Direct Connection to State Water Project	Rialto		2			5	0	5	3	3	1	2	21	1b
	6	Inland Empire Sustainable Watershed Program	IERCD	1		1	2	3	0	2	5	3	5	0	22	1b
	23	Installation of Groundwater Monitoring Wells in Santa Ana River	Conservation	2	0	0	0	5	0	2	5	3	5	0	22	1b
	28	Tertiary Treatment Plant and Reclaimed Water Expansion Study	Rialto	0	2	1	0	5	0	5	3	3	3	0	22	1b
	51	Groundwater Reclamation Interagency Project (GRIP)	City of Redlands	1	2	1	0	5	0	0	3	5	5	0	22	1b
	53	Medical Center No. 2 Reservoir and Pump Station to Lower Zone	City of SB	0	2	0	0	3	3	5	5	3	1	0	22	1b
	58	City of San Bernardino Water Recycling - RIX	City of SB	0	2	1	0	5	0	5	3	3	3	0	22	1b
	98	Waterman-Gage Intertie	RPU	1	2	0	0	5	3	0	3	3	3	2	22	1b
	113	Removal of Invasive Plant Maintenance	IERCD	1	1	0	2	3	0	0	5	5	5	0	22	1b
	124	SAR Trail - Phase III	SBCPD	0	0	0	2	5	0	2	3	5	5	0	22	1b
	125	SAR Trail - Phase IV	SBCPD	0	0	0	2	5	0	2	3	5	5	0	22	1b
	128	Characterization Study of the Contaminant Plume in the Rialto-	Rialto		1	2		5	0	5	3	3	1	2	22	1b
	129	Groundwater Production and Perchlorate Removal Treatment	Rialto		2	1		5	0	5	3	3	1	2	22	1b
	131	Groundwater Remediation - Capture High-Concentration Perchlorate	Rialto		1	2		5	0	5	3	3	1	2	22	1b
	132	Long-Term Remediation Plan for Rialto-Colton Basin	Rialto		1	2		5	0	5	3	3	1	2	22	1b
	16	Recycled Water Program	BBARWWA	0	2	1	0	5	0	0	5	5	3	2	23	1b
	22	City of Beaumont WWTP	City of Beaumont	0	2	1	0	5	0	0	5	5	3	2	23	1b
	27	Rialto -Colton Basin Groundwater Recharge Study	WVWD, Rialto	2	1	0	0	5	0	5	5	5	0	0	23	1b
	102	Big Bear Lake - Lake Management Plan	Multiple Agencies	0	0	2	1	5	0	0	5	5	5	0	23	1b
	126	North Village Water Treatment Facility	WVWD	1	2	1		3	3	0	5	5	3	0	23	1b
	130	Extension of the Baseline Feeder Agreement	Rialto		2			5	0	5	3	5	1	2	23	1b
	13	Riverside North Recharge Basin	RPU	2	1	1	0	5	0	0	5	5	5	0	24	1b
	25	North Lake Project	SBVMWD	0	2	0	1	3	5	2	3	3	5	0	24	1b
	114	Warm Creek Restoration Project	IERCD	1	1	0	2	3	0	2	5	5	5	0	24	1b
	31	Randall Basin	FCD	2	1	0	0	3	3	5	5	5	1	0	25	1b
	33	Sand/Warm Confluence	FCD	2	1	0	0	5	3	5	5	3	1	0	25	1b
	36	West End Pump Station	SBVMWD	1	2	0	0	5	0	2	5	5	5	0	25	1b
	121	Alluvial Fan Development Guideline	WRI-CSUSB	2	1	1	1	5	0	2	5	3	5	0	25	1b
	10	Wash Land Management Habitat Conservation Plan	Conservation	1	1	0	2	5	0	2	5	5	5	0	26	1b
	120	Water Conservation Demonstration Garden	SBVMWD	1	2	0	1	5	0	2	5	5	5	0	26	1b
	123	Regional W. C. Feasibility Study	SBVMWD	1	2	0	1	5	0	2	5	5	5	0	26	1b
	8	Lytle Creek Construction Area	SBVMWD	2	1	0	0	5	0	2	5	5	5	2	27	1b
	119	Model Institutional WC Makeover	SBVMWD, WRI-CSUSB	1	2	1	1	5	0	2	5	5	5	0	27	1b
	29	Cactus Basins #4 and #5	FCD	2	1	1	1	5	3	5	5	5	1	0	29	1b
	30	Cactus Basin #3	FCD	2	1	1	1	5	3	5	5	5	1	0	29	1b

Notes: Project readiness include completion of pre-feasibility study, environemental documenetation, project design, and expected implementation date

Tier: 1a - If Regional Benefit is 10 and Total Score is more than 20.
1b - If Total Score is more than 20
2 - If Regional Benefit is less than 10 and Total Score is less than 21
3 - If score for Project Commitment is 4 or less

Terms:
SGM Surface Water and Groundwater Management
WSR Water Supply Reliability
WQP Water Quality Protection
ESR Ecosystem Restoration

Agencies:
BBARWWA Big Bear Area Regional Wastewater Agency
BBLDWP Big Bear Lake Department of Water and Power
IERCD Inland Empire Resource Conservancy District
RPU City of Riverside Public Utility Department
RLD Riverside Land Conservancy
SBVMWD San Bernardino Valley Municipal Water District
City of San Bernardino San Bernardino Municipal Water Department
SBCPD San Bernardino County Parks Department
WRI-CSUSB Water Resources Institute - California State University San Bernadino
WVWD West Valley Water District
Conservation San Bernardino Valley Water Conservation District
WMWD Western Municipal Water District
FWC Fontana Water Company

Scoring Criteria

1 Meets Objectives: Score 2 for one objective. Add 1 point for each additional objective met.
2 Supports Strategies: Score 1 for single strategy. Score 3 if integrated. Score 5 if integrated and supports multiple strategies.
3 Provides for Public Safety and Emergency Needs: Project is needed for either, score 3. Project is needed for both, score 5.
4 Serves Disadvantaged Communities: Provides regional benefit including disadvantaged communities, score 2. Provides specific benefit to disadvantaged communities and addresses environmental justice concerns, 5 points.
5 Ready for Implementation: Score 1 point for limited information. Score 3 points for a completed feasibility study or pre-design documents and a preliminary scope of work and budget estimate. Score 5 points if environmental documentation and feasiblity study is complete and has a detailed scope of work and budget.
6 Available Local Funds: No funds, 0 point. 10%, 2 points. 50%, 3 points. 90% or more, 5 points.
7 Serves the Entire Region: Serves single agency, 1 point. Serves up to three agencies, 3 points. Serves multiple communities and agencies and is a regional project, 5 points.
8 Reduces Water Supply System Vulnerability: For single community, 2 points. For the region, 5 points.

Table 5-1
Upper Santa Ana IRWM Plan Project Ranking

STRATEGY / PROJECT NO	PROJECTS	Agency/ Project Sponsor	Project Effectiveness: Meets IRWMP Objectives: SGM	WSR	WQP	ESR	Supports Integration and Multiple Water Management Strategies	Provides Public Safety and Emergency Needs	Serves Disadvantaged Communities	Project commitment: Readiness for Implementation	Availability of Local Funds	Regional Benefit: Serves the Region	Reduce Water Supply Vulnerability	Overall Project Implementation Priority	Tier
Tier 2 - Projects Needing Additional Work															
45	Septic System Conversion Highgrove Area - Phase II	RPU	1	1	2	0	5	0	0	3	3	3	2	20	2
70.3	Yucaipa Connector	SBVMWD	1	2	0	0	3	3	0	3	3	5	0	20	2
43	Riverside Regional Water Quality Control Plant		0	2	1	0	5	0	0	3	3	3	2	19	2
20	Regional Water Supply Renewal	YVWD	0	1	2	0	5	0	0	3	3	3	0	17	2
26	City of Redlands WWTP	City of Redlands	0	2	1	0	5	0	0	3	3	1	2	17	2
24	Security Fencing of Groundwater Recharge Facilities	Conservation	2	1	0	0	5	0	2	3	3	0	0	16	2
57	Bunker Hill Basin Water Supply Reliability	WVWD	1	2	0	0	5	0	0	3	3	1	0	15	2
21	Horace P. Hinckley WTP	City of Redlands	0	2	1	0	3	0	0	3	3	1	0	13	2
Tier 3 - Projects Further Out on the "Planning Horizon," Need More Implementation Commitment															
39.1	Mentone Pipeline	SBVMWD	1	2	0	0	5	0	2	1	3	5	5	24	3
39.2	Mentone Feeder	SBVMWD	1	2	0	0	5	0	2	1	3	5	5	24	3
39.3	Citrus Pump Station (Mentone Pump Station)	SBVMWD	1	2	0	0	5	0	2	1	3	5	5	24	3
39.4	Citrus Reservoir (Mentone Reservoir)	SBVMWD	1	2	0	0	5	0	2	1	3	5	5	24	3
40.1	DWR Pump Station Alternative 1	SBVMWD	1	2	0	0	5	0	2	1	3	5	5	24	3
40.2	DWR Pump Station Alternative 2 (only count cost of 40.1 as these are alternatives)	SBVMWD	1	2	0	0	5	0	2	1	3	5	5	24	3
7	Devil Canyon Construction Area	SBVMWD	2	1	0	0	5	0	2	1	3	5	2	21	3
12.6	Redlands Reservoir	SBVMWD	0	2	0	0	5	0	2	1	3	5	2	20	3
35	Existing Pilot Dewatering and Phased Dewatering Project	SBVMWD	2	1	0	0	5	3	5	1	3	0	0	20	3
37	9th Street Feeder	SBVMWD	1	2	0	0	5	0	5	1	3	1	2	20	3
14	Surface Water Treatment Plants	SBVMWD	1	2	1	0	3	0	5	1	1	5	0	19	3
59	Lytle Creek Reservoir	City of SB	0	2	0	0	3	0	5	1	3	5	0	19	3
60.1	Baseline Feeder West Extension	SBVMWD	1	2	0	0	5	0	2	1	3	5	0	19	3
80.1	Orange Street Connector Pipeline	SBVMWD	1	2	0	0	5	0	2	1	3	5	0	19	3
12.4	Redlands Pump Station	SBVMWD	0	2	0	0	3	0	2	1	3	5	2	18	3
70.2	Yucaipa Pump Station	SBVMWD	1	2	0	0	3	3	0	1	3	5	0	18	3
1	Seven Oaks Dam and Reservoir Construction Area	SBVMWD	1	2	0	0	5	0	2	1	1	5	0	17	3
32	Constructed Wetlands	WRI-CSUSB	0	0	1	2	5	0	5	1	3	0	0	17	3
38.1	South End Feeder	SBVMWD	1	2	0	0	5	0	0	1	3	5	0	17	3
38.2	South End Pump Station	SBVMWD	1	2	0	0	5	0	0	1	3	5	0	17	3
60.2	Baseline Feeder Pump Station (East and/or West Alternative)	SBVMWD	0	2	0	0	3	0	5	1	3	3	0	17	3
34	Cable Creek	FCD	2	1	0	0	3	3	2	3	1	1	0	16	3
55	Medical Center to Virginia Street Connector	City of SB	0	2	0	0	3	0	5	1	3	1	0	15	3
100	Foothill Pipeline Enlargement	SBVMWD	0	2	0	0	3	0	2	1	3	1	3	15	3
61	Waterman Pump Station to Lower Zone	City of SB	0	2	0	0	3	0	5	1	3	0	0	14	3
12.2	San Bernardino Pump Station #1	SBVMWD	0	2	0	0	3	0	0	1	3	1	2	12	3
70.1	Yucaipa Lakes Pipeline	SBVMWD	0	2	0	0	3	0	0	1	3	1	0	10	3
4.1	Morton Canyon Hydroelectric Gen. Plant	SBVMWD	0	0	0	0	0	0	0	0	0	0	0	0	3
DWR Projects															
39.5	East Branch Extension of the SWP, Phase 2	DWR	1	2	0	0	5	0	2	3	3	5	5	26	1a
39.6	DWR Pump Station Expansions	DWR	0	2	0	0	5	0	2	3	3	5	5	25	1a
39.8	Zanja Reservoir	DWR	1	2	0	0	5	5	2	1	3	3	3	25	3
39.7	Sunrise Ranch Reservoir	DWR	1	2	0	0	5	5	2	1	3	5	0	24	3
Back Burner Projects															
	BCV Forest Land Reserved														
	Bogart Park Wetlands														
	City of Beaumont Desalter	City of Beaumont													
	Sari Improvement Project														
	Stanfield Marsh														
122	Numeric Groundwater Model for Riverside/Arlington Groundwater Basins	RPU, WMWD													

Notes: Project readiness include completion of pre-feasibility study, environemental documenetation, project design, and expected implementation date

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BBLDWP Big Bear Lake Department of Water and Power
IERCD Inland Empire Resource Conservancy District
RPU City of Riverside Public Utility Department
RLD Riverside Land Conservancy
SBVMWD San Bernardino Valley Municipal Water District
City of San Bernardino San Bernardino Municipal Water Department
SBCPD San Bernardino County Parks Department
WRI-CSUSB Water Resources Institute - California State University San Bernardino
WVWD West Valley Water District
Conservation San Bernardino Valley Water Conservation District
WMWD Western Municipal Water District
FWC Fontana Water Company

Scoring Criteria

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Table 5-2
Upper Santa Ana IRWMP Prioritization and Cost

OBJECTIVES	STRATEGY PROJECT NO	PROJECTS	Agency/ Project Sponsor	Project Ranking/ Tier	Objectives SGM	WSR	WQP	ESR	Strategies	Funding Opportunities	Projected Costs
IMPROVE WATER SUPPLY RELIABILITY	WATER TREATMENT AND RECYCLING										
	14	**Surface Water Treatment Plants**	SBVMWD	3	✓	✔	✓		**WS, SWQ**	**PROP 84**	
	16	**Big Bear Area Regional Wastewater Agency Plant**	BBARWWA	2		✔	✓		**WTR, SWQ, WS**	**SWRCB**	$42,600,000
	21	**Horace P. Hinckley WTP**	City of Redlands	2		✔	✓		**WTR, SWQ, WS**	**SWRCB, DPH**	
	28	**Tertiary Treatment Plant and Reclaimed Water Expansion Study**	Rialto	1b		✔	✓		**WTR, SWQ, WS**	**SWRCB**	$165,000
	58	**City of San Bernardino Water Recycling - RIX**	City of SB	1b		✔	✓		**WTR, SWQ, WS**	**SWRCB**	$67,800,000
	22	**City of Beaumont WWTP**	City of Beaumont	1b		✔	✓		**WTR, SWQ, WS**	**SWRCB, DPH**	
	26	**City of Redlands WWTP**	City of Redlands	2		✔	✓		**WTR, SWQ, WS**	**SWRCB, DPH**	
	42	**Oak Valley WRP**	Yucaipa Valley WD	1b		✔	✓		**WTR, SWQ, WS**	**SWRCB, DPH**	
	43	**Riverside Regional Water Quality Control Plant**		2		✔	✓		**WTR, SWQ, WS**	**SWRCB, DPH**	
	126	**North Village Water Treatment Facility**	WVWD	1b		✔	✓		**WTR, SWQ, WS**	**SWRCB**	$14,540,000
	99	**Fontana Water Company Recycled Water Project**	FWC	1b		✔	✓		**WTR, SWQ, WS**	**SWRCB**	$7,547,352
	WATER CONSERVATION										
	123	**Regional W. C. Feasibility Study**	SBVMWD	1b	✓	✔		✓	**WC, WS, EHE**	**PROP 84 CH 2, PROP 50**	$250,000
	120	**Water Conservation Demonstration Garden**	SBVMWD	1b	✓	✔		✓	**WC, WS, EHE**	**PROP 50, PROP 84**	$120,000
	119	**Model Instutional WC Makeover**	SBVMWD, WRI-CSUSB	1b	✓	✔		✓	**WC, WS, EHE**	**PROP 50, PROP 84**	$350,000
	CONVEYANCE AND INTERTIE										
	9.1 & 9.2	**Lytle Creek and Glen Helen Turnout**	SBVMWD	1b	✓	✔			**CI, WS**	**PROP 84 CH 2**	$4,160,000
	12.1	**Central Feeder Pipeline**	SBVMWD	1a	✓	✔			**CI, WS**	**PROP 84 CH 2**	$117,000,000
	12.2	**San Bernardino Pump Station #1**	SBVMWD	3		✔			**CI, WS**	**PROP 84 CH 2**	$2,900,000
	12.3	**San Bernardino Pump Station #2**	SBVMWD	1b		✔			**CI, WS**	**PROP 84 CH 2**	$10,000,000
	12.4	**Redlands Pump Station**	SBVMWD	3		✔			**CI, WS**	**PROP 84 CH 2**	$55,000,000
	12.7	**Riverside Pump Station (Raub Emergenecy Supply Intertie)**	RPUD	1a	✓	✔			**CI, WS**	**PROP 84 CH 2**	$8,000,000
	19	**Riverside-Corona Feeder**	WMWD	1a	✓	✔			**CI, WS**	**PROP 84 CH 2**	$176,000,000
	36	**West End Pump Station**	SBVMWD	1b	✓	✔			**CI, WS**	**PROP 84 CH 2**	$10,000,000
	37	**9th Street Feeder**	SBVMWD	3	✓	✔			**CI, WS**	**PROP 84 CH 2**	$24,100,000
	38.1	**South End Feeder**	SBVMWD	3	✓	✔			**CI, WS**	**PROP 84 CH 2**	$11,500,000
	38.2	**South End Pump Station**	SBVMWD	3	✓	✔			**CI, WS**	**PROP 84 CH 2**	$1,090,000
	39.1	**Mentone Pipeline**	SBVMWD	3	✓	✔			**CI, WS**	**PROP 84 CH 2**	$11,700,000
	39.2	**Mentone Feeder**	SBVMWD	3	✓	✔			**CI, WS**	**PROP 84 CH 2**	$18,800,000
	39.3	**Citrus Pump Station (Mentone Pump Station)**	SBVMWD	3	✓	✔			**CI, WS**	**PROP 84 CH 2**	$13,800,000
	39.5	**EBX Phase 2 (Pipeline, PS & Reservoirs)**	DWR	1a	✓	✔			**CI, WS**	**PROP 84 CH 2**	$196,000,000
	39.6	**DWR Pump Station Expansions (Crafton Hills PS, Greenspot PS, Cherry Valley PS)**	DWR	1a		✔			**CI, WS**	**PROP 84 CH 2**	$5,000,000
	40.1	**DWR Pump Station Alternative 1**	SBVMWD	3	✓	✔			**CI, WS**	**PROP 84 CH 2**	$23,300,000
	40.2	**DWR Pump Station Alternative 2 (only count cost of 40.1 as these are alternatives)**	SBVMWD	same as above	Same as	above			**CI, WS**	**PROP 84 CH 2**	See 40.1
	55	**Medical Center to Virginia Street Connector**	City of SB	3		✔			**CI, WS**	**PROP 84 CH 2**	$3,475,000
	60.1	**Baseline Feeder West Extension**	SBVMWD	3	✓	✔			**CI, WS**	**PROP 84 CH 2**	$30,300,000
	60.2	**Baseline Feeder Pump Station (East and/or West Alternative)**	SBVMWD	3		✔			**CI, WS**	**PROP 84 CH 2**	$3,100,000
	61	**Waterman Pump Station to Lower Zone**	City of SB	3		✔			**CI, WS**	**PROP 84 CH 2**	$1,010,000
	70.1	**Yucaipa Lakes Pipeline Replacement**	SBVMWD	3		✔			**CI, WS**	**PROP 84 CH 2**	$760,000
	70.2	**Yucaipa Pump Station**	SBVMWD	3	✓	✔			**CI, WS**	**PROP 84 CH 2**	$12,900,000
	70.3	**Yucaipa Connector**	SBVMWD	2	✓	✔			**CI, WS**	**PROP 84 CH 2**	$4,500,000
	80.1	**Orange Street Connector Pipeline**	SBVMWD	3	✓	✔			**CI, WS**	**PROP 84 CH 2**	$4,900,000
	80.2	**Alabama Street Connector Pipeline**	SBVMWD	1a	✓	✔			**CI, WS**	**PROP 84 CH 2**	$8,800,000
	80.3	**Alabama Street Well Field**	SBVMWD	1a	✓	✔			**CI, WS**	**PROP 84 CH 2**	$4,500,000
	90.3	**City Creek Crossing**	SBVMWD	1a		✔			**CI, WS**	**PROP 84 CH 2**	$5,200,000
	97	**Erwin Lake Fire Flow**	BBLDWP	1b		✔			**CI, WS**	**PROP 84 CH 2**	$1,600,000
	98	**Waterman-Gage Intertie**	RPUD	1b	✓	✔			**CI, WS**	**PROP 84 CH 2**	$5,300,000
	100	**Foothill Pipeline Enlargement**	SBVMWD	1b		✔			**CI, WS**	**PROP 84 CH 2**	$25,000,000
	127	**Rialto Direct Connection to State Water Project**	Rialto	1b		✔			**CI, WS**	**PROP 84 CH 2**	$12,119,379
	130	**Extension of the Baseline Feeder Agreement**	Rialto	1b		✔			**CI, WS**	**PROP 84 CH 2**	
	STORAGE										
	12.5	**San Bernardino Reservoir**	SBVMWD	1b		✔			**STO, WS**	**PROP 84 CH 2**	$4,500,000
	12.6	**Redlands Reservoir**	SBVMWD	3		✔			**STO, WS**	**PROP 84 CH 2**	$5,700,000
	25	**North Lake Project**	SBVMWD	1b		✔		✓	**STO, WS**	**PROP 84 CH 2**	$133,000,000
	39.4	**Citrus Reservoir (Mentone Reservoir)**	SBVMWD	3	✓	✔			**STO, WS**	**PROP 84 CH 2**	$91,000,000
	39.7	**Sunrise Ranch Emergency Reservoir**	DWR	3	✓	✔			**STO, WS**	**PROP 84 CH 2**	$133,000,000
	39.8	**Zanja Emergency Storage**	DWR	3	✓	✔			**STO, WS**	**PROP 84 CH 2**	$130,000,000
	53	**Medical Center No. 2 Reservoir**	City of SB	1b		✔			**STO, WS**	**PROP 84 CH 2**	$18,100,000
	59	**Lytle Creek Reservoir**	City of SB	3		✔			**STO, WS**	**PROP 84 CH 2**	$16,100,000

✔ Denotes Primary Objective
✓ Denotes Secondary Objective

Strategies in **bold** are primary
Strategies not in bold are secondary

Notes: Project readiness include completion of pre-feasibility study, environemental documenetation, project design, and expected implementation date

Tier:
1a - If Regional Benefit is 10 and Total Score is more than 20.
1b - If Total Score is more than 20
2 - If Regional Benefit is less than 10 and Total Score is less than 21
3 - If score for Project Commitment is 4 or less

Terms:
SGM Surface Water and Groundwater Management
WSR Water Supply Reliability
WQP Water Quality Protection
ESR Ecosystem Restoration

Strategy Abbreviations

WTR Water Treatment and Recycling
WC Water Conservation
CI Conveyance and Intertie
STO Storage
GWM Groundwater Management
GQP Groundwater Quality Protection
CU Conjunctive Use
WS Water Supply
SWM Surface Water Management
FSW Flood and Storm Water Management
TNM TDS and Nitrogen Management
SWQ Surface Water Quality Improvement
EHE Ecosystem Protection and Habitat Enhancement
WR Wetlands Restoration
LU Land Use
RPA Recreation and Public Access
WR Water Recycling

Table 5-2
Upper Santa Ana IRWMP Prioritization and Cost

OBJECTIVES	STRATEGY / PROJECT NO	PROJECTS	Agency/ Project Sponsor	Project Ranking/ Tier	Objectives: SGM	Objectives: WSR	Objectives: WQP	Objectives: ESR	Strategies	Funding Opportunities	Projected Costs
IMPROVE SURFACE WATER AND GROUNDWATER MANAGEMENT	**GROUNDWATER MANAGEMENT**										
	15	**Seven Oaks Dam Borrow Pit Groundwater Recharge and Habitat Restoration Project**	Conservation	1a	✔	✓		✓	**GWM, CU, EHE**	**PROP 84 CH 2, PROP 84 CH 5**	$9,700,000
	23	**Installation of Groundwater Monitoring Wells in Santa Ana River Forebay**	Conservation	1b	✔				**GWM**	**AB 303**	$640,000
	27	**Rialto -Colton Basin Groundwater Recharge Study**	WVWD	1b	✔	✓			**GWM, CU**	**PROP 84 CH 2 NON-IRWMP, AB303**	$280,000
	121	**Alluvial Fan Development Guideline**	WRI-CSUSB	1b					**GWM, LU, FSW**	**PROP 84 CH 3, 1E**	$630,000
	122	**Numeric Groundwater Model for Riverside/Arlington Groundwater Basins**	RPUD, WMWD		✔	✓			**GWM, CU**	**AB 303**	
	GROUNDWATER QUALITY PROTECTION										
	35	**Existing Pilot Dewatering and Phased Dewatering Project**	SBVMWD	3	✔	✓			**GWM, GQP, WS**	**PROP 84 CH 2**	Unknown
	45	**Septic System Conversion Higrove Area- Phase II**	RPUD	2	✓	✓	✔		**GQP, WS**	**PROP 84 CH 2, DPH**	$9,730,000
	46	**Pellesier Ranch Barrier Wells and Water Treatment Plant**	RPUD	1a	✓	✔			**GQP, WS, CI**	**PROP 84 CH 2, PROP 84 CH 2 NON-IRWMP, DPH**	$17,700,000
	51	**Groundwater Reclamation Interagency Project (GRIP)**	City of Redlands	1b	✓	✔	✓		**GQP, WS, WR**	**PROP 84 CH 2**	$9,100,000
	54	**Bunker Hill Regional Water Supply**	City of SB	1a	✔	✓	✓		**GQP, WS, GWM**	**PROP 84 CH 2, PROP 84 CH 2 NON-IRWMP, DPH**	$86,300,000
	57	**Bunker Hill Basin Water Supply Reliability**	WVWD	2	✓	✔			**GQP**	**PROP 84 CH 2**	$13,000,000
	128	**Characterization Study of the Contaminant Plume in the Rialto-Colton Basin**	Rialto	1b	✔	✓			**GQP, WS**	**AB 303**	$6,490,561
	129	**Groundwater Production and Perchlorate Removal Treatment**	Rialto	1b	✔	✓			**GQP, WS**	**PROP 84 CH 2, DPH**	$6,060,000
	131	**Groundwater Remediation - Capture High-Concentration Perchlorate Contamination in the Rialto-Colton Basin**	Rialto	1b	✔	✓			**GQP, WS**	**PROP 84 CH 2, DPH**	$14,500,000
	132	**Long-Term Remediation Plan for Rialto-Colton Basin**	Rialto	1b	✔	✓			**GQP, WS**	**PROP 84 CH 2, DPH**	$250,000
	CONJUNCTIVE USE										
	1	**Seven Oaks Dam and Reservoir Construction Area**	SBVMWD	3	✓	✔			**SWM, CU, WS**	**PROP 84 CH 2**	$29,000,000
	1.1	**Enhance Spreading**	SBVMWD	1a	✓	✔	✓		**SWM, CU, WS**	**PROP 84 CH 2**	$8,000,000
	4.0	**Santa Ana River Construction Area**	SBVMWD	1a	✔	✓			**SWM, CU, WS**	**PROP 84 CH 2**	$122,000,000
	4.1	**Morton Canyon Hydroelectric Gen. Plant**	SBVMWD	3					**CU**	**OTHER**	$38,000,000
	7	**Devil Canyon Construction Area**	SBVMWD	3	✔	✓			**SWM, CU, WS**	**PROP 84 CH 2**	$1,720,000
	8	**Lytle Creek Construction Area**	SBVMWD	1b	✔	✓			**SWM, CU, WS**	**PROP 84 CH 2**	$13,500,000
	13	**Riverside North Recharge Basin**	RPUD	1b	✔	✓	✓		**CU, SWM, WS**	**PROP 84 CH 2**	$13,400,000
	48	**Muscoy Spreading Basins**	SBVMWD	1b	✔	✓	✓		**CU, SWM**	**PROP 84 CH 2**	$5,227,200
	FLOOD AND STORM WATER MANAGEMENT										
	29	**Cactus Basins #4 and #5**	FCD	1b	✔	✓	✓	✓	**FSW, SWM, CU, SWQ**	**PROP 84 CH 3, PROP 84 CH 5, 1E**	$21,300,000
	30	**Cactus Basins #3**	FCD	1b	✔	✓	✓	✓	**FSW, SWM, CU, SWQ**	**PROP 84 CH 3, PROP 84 CH 5, 1E**	$21,300,000
	31	**Randall Basin**	FCD	1b	✔	✓			**FSW, SWM, CU, SWQ**	**PROP 84 CH 3, PROP 84 CH 5, 1E**	$1,460,000
	34	**Cable Creek Debris Basin**	FCD	3	✔	✓			**FSW, SWM, CU, SWQ**	**PROP 84 CH 3, PROP 84 CH 5, 1E**	$38,000,000
	33	**Sand/Warm Confluence**	FCD	1b	✔	✓			**FSW**	**PROP 84 CH 3, PROP 84 CH 5, 1E**	$2,600,000
PROTECT WATER QUALITY	**TDS AND NITROGEN MANAGEMENT**										
	20	**Desalter and Brine Disposal**	YVWD	2		✓	✔		**TNM, WS**	**PROP 84 CH 2, PROP 84 CH 2 NON-IRWMP**	$9,600,000
		City of Beaumont Desalter	City of B.	0					**TNM, WS**	**PROP 84 CH 2**	
		Sari Improvement Project		0					**TNM, WS**	**PROP 84 CH 2**	
	SURFACE WATER QUALITY IMPROVEMENT										
	24	**Security Fencing of Groundwater Recharge Facilities**	Conservation	2	✔	✓			**SWQ, GQP**	**PROP 84 CH 2, PROP 84 CH 2 NON-IRWMP**	$1,140,000
	102	**Big Bear Lake Management Plan**	Multiple Agencies	1b			✔	✓	**SWQ, WS, EHE**	**PROP 84 CH 2, PROP 84 CH 2 NON-IRWMP, PROP 84 CH 5**	$260,000
ECOSYSTEM RESTORATION AND ENVIRONMENTAL ENHANCEMENT	**ECOSYSTEM PROTECTION AND HABITAT ENHANCEMENT**										
	10	**Wash Habitat Conservation Plan**	Conservation	1b	✓	✓		✔	**EHE, CU**	**PROP 84 CH 5, PROP 84 CH 9, AB 303**	$300,000
	110	**Lytle Creek Watershed Assessment and Restoration**	WRI-CSUSB	1b		✓	✓	✔	**EHE**	**PROP 84 CH 5, PROP 84 CH 9**	$260,000
	118	**San Timoteo Canyon State Park Acquisition and Restoration**	R.L.C.	1b			✓	✔	**EHE**	**PROP 84 CH 5, PROP 84 CH 9**	$5,500,000
	113	**Removal of Invasive Plant**	IERCD	1b	✓	✓		✔	**EHE**	**PROP 84 CH 5, PROP 84 CH 9**	$300,000
	114	**Warm Creek Restoration Project**	IERCD	1b	✓	✓		✔	**EHE**	**PROP 84 CH 5, PROP 84 CH 9**	$63,000
	WETLANDS RESTORATION										
		Stanfield Marsh							**WR, EHE**		
		Bogart Park Wetlands							**WR, EHE**		
	LAND USE										
		BCV Forest Land Reserved							**LU, SWQ**		
	6	**I.E. Sustainable Watershed Project**	IERCD	1b	✓		✓	✔	**LU, SWQ**	**CALFED**	$115,000
	11	**LIDS for Kids- Low Impact Development**	IERCD	2	✓			✔	**EHE, SWQ**	**PROP 84 CH 5, PROP 84 CH 9**	$237,000
	RECREATION AND PUBLIC ACCESS										
	18	**San Timoteo Creek Aquatic Restoration**	Redlands	1b							$5,500,000
	32	**Constructed Wetlands**	WRI-CSUSB	1b			✓	✔	**RPA**	**PROP 84 CH 8, PROP 84 CH 9**	Unknown
	124	**SAR Trail - Phase III**	SBCPD	1b				✔	**RPA**	**PROP 84 CH 5**	
	125	**SAR Trail - Phase IV**	SBCPD	1b				✔	**RPA**	**PROP 84 CH 5**	
									Total:		$1,989,749,492

✔ Denotes Primary Objective
✓ Denotes Secondary Objective

Strategies in **bold** are
Strategies not in bold are secondary

Notes: Project readiness includes completion of pre-feasibility study, environmental documentation, project design, and expected implementation date

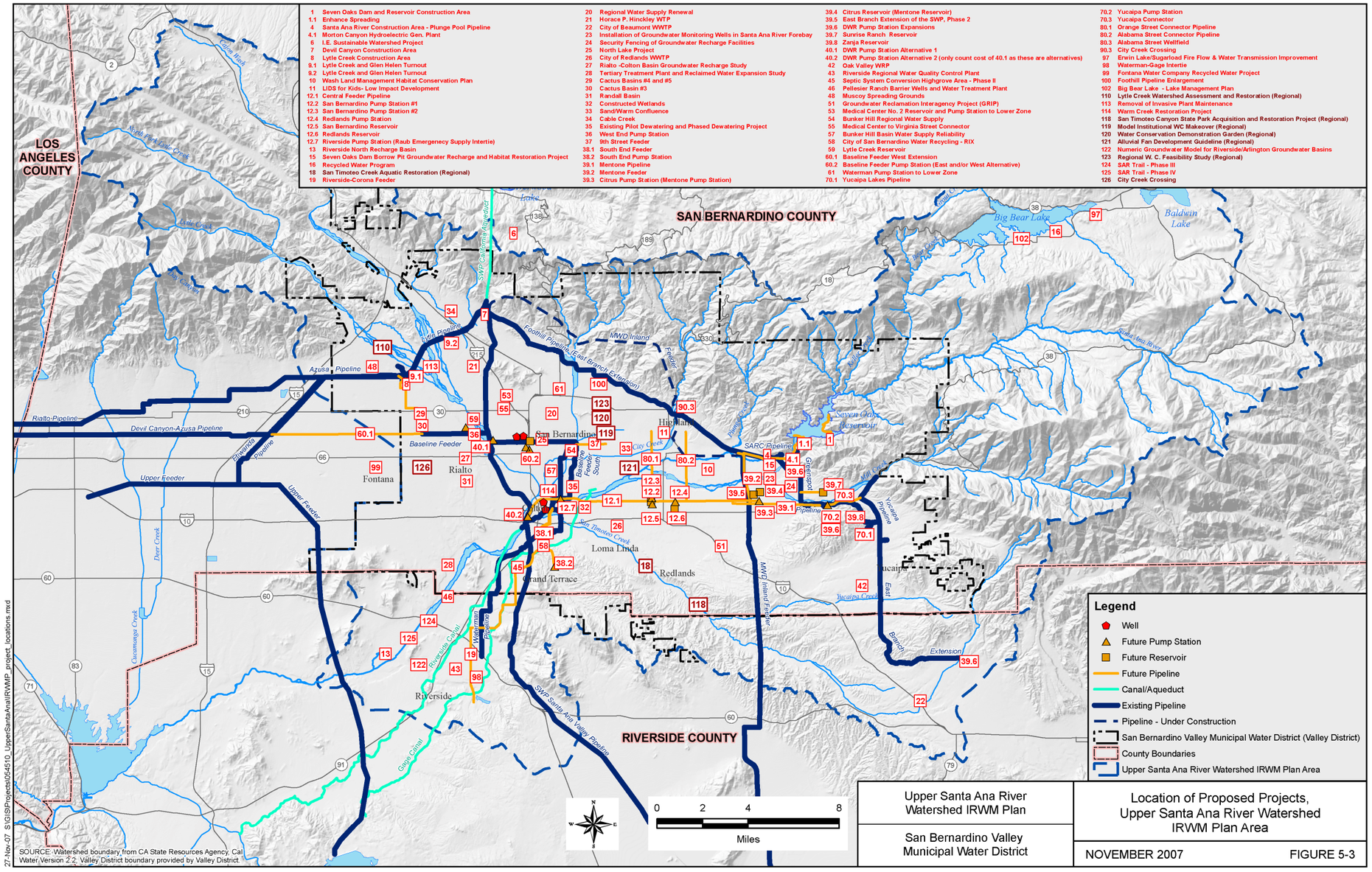
Tier:
1a - If Regional Benefit is 10 and Total Score is more than 20.
1b - If Total Score is more than 20
2 - If Regional Benefit is less than 10 and Total Score is less than 21
3 - If score for Project Commitment is 4 or less

Terms:
SGM Surface Water and Groundwater Management
WSR Water Supply Reliability
WQP Water Quality Protection
ESR Ecosystem Restoration

Strategy Abbreviations

WTR Water Treatment and Recycling
WC Water Conservation
CI Conveyance and Intertie
STO Storage
GWM Groundwater Management
GQP Groundwater Quality Protection
CU Conjunctive Use
WS Water Supply
SWM Surface Water Management
FSW Flood and Storm Water Management
TNM TDS and Nitrogen Management
SWQ Surface Water Quality Improvement
EHE Ecosystem Protection and Habitat Enhancement
WR Wetlands Restoration
LU Land Use
RPA Recreation and Public Access
WR Water Recycling

Figure 5-3
Project Locations



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5.2.2 Economic and Technical Feasibility of the Projects

As stated above, a pre-feasibility evaluation of the projects is conducted to assess technical and economical feasibility of the projects. Those projects that are deemed not feasible at this time (based on a pre-feasibility evaluation) are ranked as Tier 3 and considered not ready for implementation. These projects will be evaluated in the future as additional information is developed and becomes available.

The projects that pass the above test are ranked as Tier 1 or Tier 2. Tier 1 projects are considered to be ready for implementation. These projects must have or should have a completed feasibility study, pre-design documents, and environmental documents by mid-2008. Therefore, only those projects that are deemed economically and technically feasible will move forward for implementation. The project's sponsoring agency is responsible for meeting the stated schedule for conducting the feasibility evaluations.

5.3 Implementation Considerations

5.3.1 Institutional Structures Needed for Plan Implementation

The responsibility for implementation of the IRWM Plan will be shared among the individual entities that participated in the planning process and prepared this plan. The implementation responsibility is based upon the jurisdiction of each responsible entity. The following summarizes the proposed implementation approach for those projects, programs, and investigations that have been formulated to date, and identifies recommendations to assist in future program and project formulation and direction.

5.3.1.1 Management of San Bernardino Basin Area

The Basin Technical Advisory Committee (BTAC) will develop the annual operation plan for managing the San Bernardino Basin Area (SBBA). The annual basin management plan will then be forwarded on to the applicable elected officials for review and approval. The BTAC will be comprised of staff representatives from plaintiffs and non-plaintiffs of the Western Judgment (Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426). A detailed discussion of the process for managing the SBBA and BTAC responsibility is presented in Chapter 4.

5.3.1.2 Management of the Groundwater Basins

Most of the groundwater basins in the Upper SAR Watershed are adjudicated by pumpers or adjudicated "in gross" and are overseen by "Watermasters" who keep an accounting of recharge and extractions.

5.3.2 Project Implementation

Implementation of the projects is the responsibility of the project sponsor(s). For projects funded through the grant programs, the TAG will work with regional agencies as well as SAWPA to coordinate, apply, receive, and distribute the grant funding for project implementation. Projects formulated for this plan must periodically be updated and reprioritized, and new projects may be introduced for screening and prioritization. These activities will also be the responsibility of the TAG, which will be coordinated by Valley District. Project implementation responsibilities include coordination with the appropriate local, State, and federal agencies to prepare and complete necessary environmental documents and to pursue opportunities to fund the projects that are under their jurisdiction, consistent with the IRWM Plan.

5.3.3 Periodic Review and Update of the IRWM Plan

In order to keep the IRWM Plan current, it should be refined as necessary. These refinements will be the result of knowledge gained through the use of the plan.

Valley District will assume responsibility for making updates to the plan on an interval agreed upon by the TAG. Reviews and updates will focus on analyzing new information developed since the adoption of the previous plan and the need for specific water management actions. The reviews would identify areas where the plan has been successfully implemented, as well as areas where deficiencies are apparent.

Valley District will continue to coordinate the regional planning activities of the TAG as needed, and coordinate with other IRWM Plan planning activities in the region and with State and federal agencies.

5.3.3.1 Monitoring and Data Management

Implementation of monitoring programs and data management and coordination is the responsibility of the entities managing the basins, as summarized below.

- The BTAC will be responsible for monitoring, data management, and coordination for the SBBA, Rialto-Colton Basin, and North Riverside Basin as defined in the monitoring program developed for this plan.
- San Timoteo Watershed Management Authority is responsible for data collection, management, and coordination activities related to the San Timoteo Basin.
- Big Bear MWD is responsible for data collection, storage, and monitoring coordination activities associated with the Big Bear Lake Basin.

5.3.4 Implementation Schedule

The IRWM Plan will be implemented during the next 25 years. The first step in implementation is to prepare a capital improvement plan to identify funding sources for proposed projects. It is anticipated that feasible Tier 1a and 1b projects will be implemented during the next 20 years. Tier 2 and 3 projects will be periodically reviewed and as additional project information becomes available, will move up for implementation. Additional projects may be identified for implementation. Implementation schedules for individual projects will also be prepared along with feasibility studies. Figure 5-4 is a snap shot (as of December 2007) of the Plan implementation schedule. This schedule will be updated as additional information is developed and full feasibility of the projects is completed.

Figure 5-4
Implementation Schedule

Upper Santa Ana River Watershed Integrated Regional Water Management Plan
Implementation Schedule.– Dec. 2007

	Year																													
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Adoption of the IRWMP																								
SBVMWD																								
SBVWCD																								
City of San Bernardino																								
Other Partners																								
Implementation of Strategies (Project Rankings 1a and 1b)																								
Capital Improvement Program (by Valley District)																								
Water Conservation Strategy																								
Alternative Refinement																								
Alternative Implementation																								
Water Recycling Strategy																								
Alternative Refinement																								
Alternative Implementation																								
Surface Water Management Strategy																								
Local Water Supplies																								
Alternative Refinement																								
Alternative Implementation																								
Imported Water Supplies																								
Identify storage alternatives																								
Implement storage																								
Groundwater Management Strategy																								
Identify Stormwater Recharge Opportunities																								
Alternative Refinement																								
Alternative Implementation																								
Implement Process for Managing the SBBA		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Protect Water Quality																								
Monitor Water Quality																								
Identify Water Quality Improvement Opportunities																								
Alternative Refinement																								
Alternative Implementation																								
Ecosystem Restoration and Improvement																								
Identify Opportunities for Ecosystem Restoration and Improvement																								
Alternative Refinement																								
Alternative Implementation																								
Disaster Preparedness																								
Adaptive Management																								
Monitor IRWMP Effectiveness																								
Update IRWMP																								
Identify New Alternatives																								
Re-evaluate Projects (Previously Ranked as 2 or 3)																								
Implementation of Additional Strategies (Previously Ranked as Teir2 and 3) and new projects																								
Alternative Refinement																								
Alternative Implementation																								

Notes:

Alternative Refinement: Includes activities associated with project development, project feasibility, project design.

Alternative Implementation: Includes activities associated with: permitting and environmental review, plans and specifications, and project implementation.

* Annual SBBA Operation Plan

IRWMP activities and long-term monitoring.

Activities associated with Implementation of 1a and 1b ranked projects.

Activities associated with implementation of projects previsouly ranked as 2 or 3.

5.3.5 Regional and Statewide Priority and Issues of State Significance

Improving water supply reliability and reducing reliance on the SWP during droughts is considered an issue of Statewide significance. Environmental and fishery issues of the Sacramento-San Joaquin Delta (Delta), including endangered species, vulnerability of Delta levees, and Delta water quality issues, significantly reduce reliability of the SWP supplies. Recently, State water leaders and the Governor's Office have had renewed discussion of an "Isolated Facility" around the Delta as an alternative to the current "broken" operations in the Delta. The isolated facility has the potential to improve fishery issues, reduce the impact of water diversions on listed species, and improve drinking water quality (less total dissolved solids (TDS), trihelimethane, and bromide) for millions of Californians. This translates into increased reliability for the SWP supplies. The resolution of Delta conveyance issues, therefore, will benefit the region and its water supply, and will significantly contribute to water supply reliability and water quality improvement in the Upper Santa Ana Region.

It should also be noted that a major consideration and a regional priority for formulation of this IRWM Plan is to improve water supply reliability and optimize the use of imported water to reduce reliance on imported water during droughts. Implementation of water management strategies of this plan, therefore, will reduce stresses on SWP supplies, especially during drought periods, and will provide statewide water supply benefits.

5.4 Capital Improvement Funding

Implementation of the projects listed in Table 5-1 requires an estimated investment of over $2 billion. This level of funding is beyond the financial abilities of local agencies of the region at this time. Therefore, it is important for the water leaders to develop a capital improvement plan that identifies funding sources and further refines priorities for project implementation. In addition, the agencies should actively engage in obtaining grant funding to assist in project implementation.

Depending on the characteristics and scope of a particular project, some activities and projects currently identified in this IRWM Plan and future activities will likely be in some part contingent on securing funding from federal, State, and/or local sources. The following summarizes project funding approaches to date, as well as anticipated funding strategies.

5.4.1 Federal Funding

The federal grant funding sources are currently limited. The U.S. Bureau of Reclamation's (Reclamation) Challenge Grant Program provides funding for water management programs and projects in the western United States. This grant program might help fund the implementation of water conservation projects. Reclamation also provides funding for water recycling programs in Southern California. The Environmental Protection Agency (EPA) provides funding for environmental improvement projects. In addition, funding can be directed for implementation of projects under the IRWM Plan, through the Federal Energy and Water Development Appropriations legislation.

5.4.2 State Grant Funding

State funding may be a significant source of funding for implementation of the IRWM Plan. Current key State funding sources include the following:

- The Water Use Efficiency Program, which is currently administered by DWR and is funded through various bond initiatives, and provides grant funding for agricultural and urban water conservation programs.
- DWR's AB 303 Local Groundwater Assistance Program funds groundwater management, data collection, modeling, monitoring, and assessment programs. AB 303 is a potential source of funding for a range of groundwater management projects.
- The Integrated Regional Water Management Grant Program is well suited for funding of the projects developed for the IRWM Plan. Proposition 84 allocated $114 million for the Santa Ana Region integrated regional plans, which is a small fraction of the funding needed for the region's projects.

- The passage of Proposition 84 in the November 2006 election allocated $800 million for flood control projects in which $180 million is allocated for the subvention program to help local agencies outside the Central Valley to implement local flood control projects.
- Proposition 1E provides $300 million in funding for stormwater management and other projects outside of the Central Valley.
- Proposition 84 allocated $45 million in funding to expand and improve the Santa Ana River Parkway.

5.4.3 Local Agency Funding

Local entities for years have been implementing cost-effective projects and programs at the local level. In the past, local funding has been used in part or in total to fund local water projects. Today, however, a major constraint in implementing many of the projects in this IRWM Plan is the lack of financial capacity and funding availability at the local level. Some of the communities in the Upper Santa Ana Region are economically disadvantaged (i.e., their median income is less than 80 percent of the average) and they may not be able to finance costly projects. Bond laws (i.e., Chapter 8 of Proposition 50) generally require local agencies to share the cost of implementing their project unless the project is benefiting an economically disadvantaged community, in which case, the community could be qualified for exemption from local cost-sharing requirements.

5.5 Obstacles to Implementation

The most significant obstacle to implementation of the IRWM Plan is funding of capital improvement projects. Considering the limited financial capacity of the agencies in the Upper Santa Ana Region, it would be very difficult to fund projects with an estimated cost of $2 billion. Steps that can be taken to remedy funding obstacles include development of a capital improvement plan, implementation phasing, obtaining grant funding, and forging partnerships to fund major projects. No other insurmountable obstacles to implementation of the IRWM Plan have been identified. As described earlier, the agencies within the Plan Area have successfully worked together in the past on the development and implementation of projects and programs to improve the water resources management within the region. Working together, these agencies have developed a successful relationship, enabling them to accomplish things that satisfy the varied interests within the Upper SAR Watershed. Developing these initial relationships, trust, and accountability among the participating groups is one of the biggest challenges to any regional cooperation. The stakeholders and interested parties within the Upper Santa Ana Region can continue to successfully work together to implement future projects to improve the water resources management for the citizens of the region.

5.6 Impacts and Benefits of the Upper Santa Ana IRWM Plan

5.6.1 IRWM Plan Benefits

Probably the most significant benefit of the Upper Santa Ana River Watershed IRWM Plan is the planning process itself. The process has created a cooperative environment among all agencies in the region. They meet on a regular basis to discuss the water management issues and plan for meeting future water needs of the region. The agencies worked together to develop solution-oriented programs, they forged agreements, and they work together to provide the most basic and essential service to the communities—serving water. The planning process provided a framework for developing regional and integrated solutions.

Full implementation of the Upper Santa Ana River Watershed IRWM Plan will result in multiple benefits associated with meeting the objectives identified in Chapter 4 of this IRWM Plan. Key public and overall benefits from implementation of the plan elements include the following:

- Significant improvement in water supply reliability during drought periods while reducing reliance on imported water.
- Improved and coordinated management of the region's surface water and groundwater resources, including conjunctive management of groundwater and surface water resources and recharge of groundwater basins.
- Improved water quality through effective management of groundwater resources, expediting clean up process of contaminant plumes in the region, and improving stormwater management.
- Enhancement of water-dependent environmental assets.
- Improved water-related education, recreation, and public access opportunities in the region.
- Improved understanding of the region's water resources, including focused regional monitoring to ensure groundwater is used in a sustainable manner.
- Improved coordination of water management activities of the region through sharing of ideas and mutually beneficial management of project opportunities.
- Coordinated development of water management strategies and associated projects.

5.6.2 IRWM Plan Impacts

The potential negative impacts from implementing most of the projects in the Upper Santa Ana River Watershed IRWM Plan are anticipated to be primarily short-term facility construction impacts. It is proposed that conjunctive water management projects include a monitoring and assessment element to evaluate the impacts of project implementation. Monitoring and assessment elements will provide tools to evaluate and modify project operation to mitigate potential impacts. Further discussion of project monitoring and assessment is presented in Chapter 6.

5.6.2.1 Environmental Documentation and County Ordinance Compliance

Permitting and environmental documentation will be required for many of the new project facilities in accordance with federal, State, and local laws and ordinances. The project-specific environmental compliance will be performed by project sponsors on a case-by-case basis prior to project construction. Impacts and benefits of the proposed actions will be further assessed. All actions and investigations will be coordinated with local, State, and federal agencies to share information and ensure compliance with applicable laws and ordinances.

6 Data Management and Monitoring, Technical Analyses, and Plan Performance

This chapter summarizes the technical analyses, data management, and performance of the Integrated Regional Water Management Plan (IRWM Plan). The chapter is organized in two parts. Part I describes data management and monitoring as well as technical analyses conducted during plan preparation. Part II examines monitoring, data management, and plan performance during plan implementation. This chapter also describes how the performance data will be used to adapt the IRWM Plan and its management tools in response to plan implementation success and its performance.

6.1 Part I: Data Management and Technical Analyses for Plan Preparation

6.1.1 Use of Available Information to Develop the IRWM Plan

The Upper Santa Ana River (SAR) IRWM Plan documents the results of a comprehensive two-year effort of over 20 agencies with varying water management and flood control responsibilities in the region focused on developing a coordinated approach to water resources management. The IRWM Plan was prepared using information and guidance from the Technical Advisory Group (TAG) and the local agencies involved in water resources management and can, in turn, be used by these same agencies to guide and support their future water management efforts.

Prior to the preparation of the IRWM Plan, the water management agencies within the region often worked on an agency-by-agency basis to define their individual needs, and collectively to address water management issues that affect regional issues. During this time, extensive information and data were collected, compiled, and evaluated, including numerous agreements, memorandums of understanding (MOUs), and court judgments. This information served as the foundation for the development of this plan, as described below.

6.1.2 Existing Information and Reports

The IRWM Plan is a document that is intended to provide a common vision for water resources management within the Upper Santa Ana Watershed. A considerable amount of available information was used to develop this plan. Following is a general description of the existing reports that were extensively used in the IRWM Plan and their main contributions.

- Information in local water purveyors' 2005 **Urban Water Management Plans** was used in preparing the water budget for the region. Information analyzed included water demand projections through 2030, water supply reliability strategies in general, and water conservation and water recycling strategies in particular.

- **Master Plans** prepared by local water and flood control agencies were used to estimate water use, supplies, and existing and planned facilities, and for development of the conveyance and recharge strategies for the region.

- **County and City General Plans** were reviewed to ensure that land use assumptions and information used in the IRWM Plan are consistent with the Master Plans.

- **Court Judgments and Agreements** between or among water agencies were used as the basis of groundwater and surface water management activities and to develop surface water and groundwater management strategies that include developing a process to manage the San Bernardino Basin Area (SBBA) (Figure 4-12). These documents were reviewed to ensure the groundwater and surface water management strategies prepared for the Plan are consistent with these documents.

- **Environmental Impact Report for Santa Ana River Water Rights Applications for Supplemental Water Supply** information was used for water supply analyses, water supply reliability strategies, and background information about the region and its water resources.

- A number of other reports and data sources (Western Watermaster Reports, water level data, U.S. Geological Survey (USGS) models and reports, contaminant plume(s) data, and Conservation District Engineering Investigations) were used in a minor role to prepare this plan. A detailed list of reports used in the preparation of the IRWM Plan is included in Section 8, *References*.

6.1.3 Data Management and Monitoring

An extensive network of groundwater and surface water monitoring is in place in the region. Data from these monitoring sites were used extensively in the Operation Model, Allocation Model, Groundwater Model, and other studies conducted for the IRWM Plan. Surface water and groundwater data collected throughout the region by various agencies were used for preparation of the plan. The data are used in various models to evaluate water management strategies and potential benefits of the proposed projects. The majority of the data used in the preparation of the IRWM Plan are available to the public through the local agencies. The existing data and new data collected as a result of the preparation of the IRWM Plan are available to the TAG, stakeholders, interested parties, California Department of Water Resources (DWR), and other state agencies.

The Upper SAR Watershed IRWM Plan is nested within the larger Santa Ana Watershed Project Authority's (SAWPA) IRWM Plan, which serves as an umbrella plan. The information developed as part of the Upper SAR Watershed IRWM Plan is provided for inclusion in the umbrella watershed plan.

6.1.4 Technical Analyses to Develop the IRWM Plan and Projects

The initial efforts in preparing the IRWM Plan focused on identifying the key water resources goals and objectives of the Plan Area. Once the objectives were identified, a considerable amount of time, resources, and technical effort was allocated during a period of 18 months to evaluate surface water and groundwater

resources of the region and define water management strategies that would meet plan objectives. A brief summary of the key technical analyses for the IRWM Plan is presented below.

- **Development and Use of Operations Model (OPMODEL).** OPMODEL was developed to estimate the quantity of unappropriated SAR water available for diversion by the San Bernardino Valley Municipal Water District (Valley District) and Western Municipal Water District (Western) after accounting for diversions by prior water rights holders and environmental flows. This model provides basic water supply data needed to evaluate the feasibility of conjunctive use strategies using local surface water supplies.

- An **"Allocation Model**" was developed and used to evaluate the use and allocation of local surface water and State Water Project (SWP) supplies throughout the service area, including direct deliveries to existing water treatment plants and spreading grounds.

- **Use of Groundwater Model.** A detailed and enhanced groundwater model was developed for the SBBA. Upon completion and calibration of the model, it was extensively used to evaluate potential conjunctive use projects and to define the locations and sizes of the recharge basins and the location and number of groundwater production wells needed for each conjunctive use scenario. The model is a tool that can be used for operation and management of the groundwater basin and for management of water levels and water quality in the SBBA.

- The surface and groundwater data collected in the SBBA were extensively used for development and calibration of the models and for the analysis of the conjunctive use scenarios.

- Preliminary engineering analyses were conducted for evaluation of diversion and conveyance facilities to convey water to the spreading basins.

- Water demand and supply analyses were conducted to understand water demands in the region and how future demands will be met.

- Detailed analyses of water demands and supplies included the ability of the purveyors to meet water demands during a single-year drought and a multiple-year drought scenario. In addition, water needs for the peak day demand of water purveyors within the Valley District service area were studied.

- A sensitivity analysis was conducted to determine the significant level of impact on meeting future water needs, assuming reduced local surface water and reduced reliability in SWP supplies. This analysis intended to capture uncertainties related to SWP future water supply reliability and/or uncertainties of local surface water supplies due to climate change.

- Conceptual engineering analyses were conducted to evaluate the impact of water supply interruption during major disasters and its impact on meeting customers' water needs as well as evaluation of the facilities needed to provide redundancies for infrastructures.

- Pre-feasibility evaluations were conducted of individual projects identified in response to water management strategies and to determine project benefits and associated costs.

The agencies began identifying individual projects that may contribute to meeting the planned water management strategies and objectives. Each project and program included in the Upper SAR IRWM Plan were identified by a local lead agency (project sponsor) that was primarily responsible for the project's description and technical evaluation, as well as the project's integration into the IRWM Plan. The project's sponsor will be responsible for any further project refinement, pursuit of funding, project implementation, and assessment of project performance.

The project description and available supporting information were used to evaluate and rank the individual projects and programs. There was a large range of available supporting information for the projects that tended to reflect the maturity of the planning process and previous efforts made to define project details and establish a project's readiness to proceed. Compared to other projects, the highest ranked projects (Tier 1a and 1b projects) typically had considerable supporting information such as feasibility studies, cost estimates, and preliminary design information. Completion of required additional studies and investigations needed for some of the other projects could improve ranking of such projects in the future.

6.2 Part II: Monitoring, Data Management, Plan Performance, and Adaptive Process during Plan Implementation

6.2.1 Data Collection and Monitoring

As stated earlier, an extensive network of data collection is already in place in the region. A monitoring plan was also developed for the region as a component of this IRWM Plan to formalize and standardize data collection procedures. The objectives of the monitoring plan are to:

- Provide a standard methodology for the collection, storage, and reporting of hydrologic data.
- Document the collection of data needed for management of the groundwater basin to meet the requirements of various judgments. In the SBBA and other adjudicated basins, the Watermaster is responsible for collection, review, and compilation of the data needed for management of the basin and for providing a level of coordination among many water users.
- Provide the data needed for developing the "Annual Operation Plan" for management of the SBBA.
- Provide standardized procedures to collect source water data that agencies use to meet requirements of the California Department of Public Health (CDPH) (formerly the California Department of Health Services) drinking water standards.

The monitoring plan is presented in Appendix B. Currently, the following hydrologic data are being collected in the region:

- **Groundwater data:** Groundwater monitoring is in place for measuring groundwater production, water quality, and water levels representative of the various subbasins. Groundwater level data were used to evaluate the groundwater level trends as well as to evaluate the groundwater flows and included the following:
    - USGS multi-level monitoring wells.
    - Target wells used in the groundwater model. A list of these wells, as well as a map showing the location of the targeted modeling wells, is presented in Appendix B.

- Groundwater monitoring wells identified in various agreements (e.g., Seven Oaks Accord, Riverside Agreement). Monitoring of these wells is required to ensure full compliance with the terms of the agreements. A list of these wells is presented in Appendix B.

- Environmental Protection Agency (EPA)/City of San Bernardino Newmark-Muscoy plume(s) monitoring wells.

- Local purveyors' water production data required by judgments and provided to the Watermaster. All purveyors of wells that pump groundwater are required to report the annual production of the wells to the Watermaster. Production data are then presented in an annual report prepared by the Watermaster.

- Water quality data collected by water purveyors for each well. These data are periodically monitored according to Title 22 and are required by the CDPH.

- **Stream gage data:** Stream gages in the region are operated by either the USGS or the San Bernardino County Flood Control District (SBCFCD).

- **Subsidence monitoring**: During the period from 1944 to 1969, at least one foot of subsidence occurred in the Pressure Zone immediately north of Loma Linda between the San Jacinto and Loma Linda faults. Currently, there is no subsidence monitoring station in place. No evidence of any significant subsidence is present in the subbasins at this time.

6.2.2 Data Gaps/Additional Monitoring Requirements

Although vast amounts of data are currently collected for management of the basin's water resources, there is always opportunity to collect additional data to fill necessary gaps. One such gap could be the lack of subsidence monitoring data in the region. The following additional data collection activities would be needed to fulfill the data gaps of the region:

- A network of benchmarks in the Pressure Zone area could be helpful in monitoring subsidence. Each benchmark should be established and surveyed by a California-licensed land surveyor. Locations of the benchmarks are dependent upon permitting from the appropriate agency. (This task should be coordinated with USGS to ensure there is not any duplication of efforts. USGS may collect some of these data.)

- If proven necessary, some extensometer wells could be installed on the basis of periodic land surveys within the Pressure Zone area where the

highest probability of subsidence may occur. Extensometers could be installed to measure non-recoverable compaction of fine-grained materials interbedded within the aquifer systems.

6.2.3 Management of the Data

As part of the USGS program for disseminating water data, the USGS maintains a distributed network of computers for the acquisition, processing, review, and long-term storage of water data. This distributed network of computers is called the National Water Information System (NWIS). Many types of data are stored in the NWIS, including comprehensive information for site characteristics, well construction details, time-series data for gage stage, streamflow, groundwater level, precipitation, and physical and chemical properties of water. Data collected by the USGS in the region are available to stakeholders and the public through the NWISWeb (http://nwis.waterdata.usgs.gov/nwis).

Data collected as part of the IRWM Plan will be stored, organized, and secured in an electronic database. Valley District is developing a comprehensive database that will be utilized to house the data needed for management of surface and groundwater resources of the region.

The database created for storing all monitoring data will be maintained by Valley District. Valley District will provide a central storage location for data and documentation. Valley District will coordinate with all agencies collecting data to facilitate exchanges in a consistent manner.

Data collected in the region will be available to the stakeholders, DWR, and other local and state agencies. Data collected in support of state-funded water quality-related projects will be made available to the State Water Resources Control Board's (SWRCB) Surface Water Ambient Monitoring Program and Groundwater Ambient Monitoring and Assessment Program.

Monitoring data collected each year will be summarized in an Annual Monitoring Report. This report will incorporate the past year's data in tabular and electronic format.

6.2.4 Adaptive Management and Plan Performance for the Upper Santa Ana River Watershed IRWM Plan

The Upper SAR Watershed IRWM Plan presents the current state of water resources planning in the region, based upon available information, and recognizes that water management strategies will continue to evolve in response to changing conditions. In recognition of the fluid nature of water management in the region, the IRWM Plan incorporates an adaptive management approach that is intended to allow the IRWM Plan to stay current in light of changing

conditions, such as local and regional water needs and changing regulatory requirements.

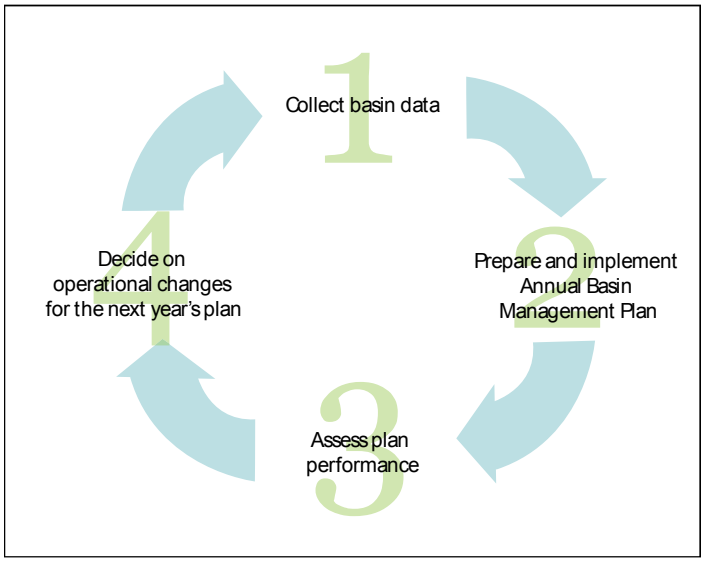
In that sense, the planning process is continually evolving in response to these changing conditions and the development of additional data that improve our understanding, which may redefine our objectives and priorities to respond to these changing conditions.

The adaptive management framework is based on an iterative process of:

- Collecting information and data regarding the conditions within the IRWM Plan Area,
- Evaluating the new data to determine plan/project performance, and
- Formulating a plan in response to these changing conditions.

For this IRWM Plan, adaptive management will primarily occur in the following areas:

Performance Evaluation and Adaptive Process For Preparing the SBBA Annual Basin Management Plan



1. Preparation of the Annual Basin Management Plan for the SBBA. The process for updating the annual plan is discussed in detail in Chapter 4 and illustrated in Figure 4-12. This process is designed to manage the basin considering basin conditions especially in the preceding year. Performance is characterized by meeting specific water level and water quality objectives established for the basin. The data collected for specified key stations are reviewed. The groundwater levels and water quality data are compared with established performance criteria. Based on conditions of the groundwater basin, an annual basin management plan is prepared and adopted for implementation in the subsequent year. This process for management of the SBBA is continuous and adaptive.

2. Periodic review of the water management strategies and reprioritization of project implementation based on availability of funding, readiness of the projects to proceed, and changing conditions.

3. Continuous refinement of the IRWM Plan process in an adaptive management framework to proactively manage the available resources, including making a significant investment in the planning and implementation of new projects and programs. This includes preparation of periodic updates of the IRWM Plan as needed to respond to changing conditions and through a continued working relationship with the TAG and other means, and to inform project participants and stakeholders about changes to the IRWM Plan.

The performance evaluation activities will be conducted for the IRWM Plan in association with the implementation of projects identified in the Upper SAR Watershed IRWM Plan. Some form of performance evaluation criteria, such as a Project Assessment and Evaluation Plan (PAEP), could be developed for projects that include public funding prior to implementing the project. PAEP was developed by the SWRCB to measure the effectiveness of a project. The goals of a PAEP are as follows:

- To provide a framework for assessment and evaluation of project performance,
- To maximize the value of public expenditures to achieve results,
- To identify measures that can be used to monitor progress towards achieving project goals, and
- To provide information to help improve current and future projects.

The PAEP will be based on project-specific information, which may be included in the implementation of a funding contract agreement to:

- Describe project characteristics and the project sponsor,
- Demonstrate consistency with local planning documents such as the IRWM Plan,
- Identify project goals and link goals with desired outcome,
- Select performance indicators,
- Identify expected benefits and impacts,

- Determine outcome indicators (site-specific, regional, and system-wide),
- Identify/implement monitoring needed to evaluate a project's performance,
- Analyze and assess data,
- Evaluate overall success of the project, and
- Communicate the results to the TAG.

Table 6-1 presents an example of a project performance indicator that can be used for evaluation of overall success of the proposed projects for the Upper SAR Watershed IRWM Plan.

Table 6-1
Example of Project Performance Indicator to Assess Project Success

Projects/Programs	Project Goal	Desired Outcome	Outcome Indicators	Target
Project #1				
Project #2				

Implementation of projects that support one or more of the water management strategies identified in the Upper SAR Watershed IRWM Plan may have several monitoring efforts. These monitoring efforts will provide tools for evaluation of project performance. As mentioned earlier, the most significant performance evaluation will be the process for managing the SBBA. The annual operation of the SBBA must comply with a series of conditions set forth in judgments, agreements, and MOUs between signed parties for operation of the basin. The operation of the basin is examined every year to ensure the performance requirements are met or that specific adaptive management actions will be put into place as part of the annual plan for basin operation.

7 Abbreviations and Acronyms

ABBREVIATIONS AND ACRONYMS

Accord	Seven Oaks Accord
ACEC	Area of Critical Environmental Concern
Advisory Commission	San Bernardino Valley Municipal Water District Advisory Commission on Water Policy
AHHG	Area of Historic High Groundwater
Association	Upper Santa Ana Water Resources Association
Banning	City of Banning
Basin Plan	1995 Water Quality Control Plan for the Santa Ana River Basin as amended in 2004 by R8 2004-0001
BBARWA	Big Bear Area Regional Wastewater Agency
BBCSD	Big Bear Community Services District
BBLDWP	City of Big Bear Lake Department of Water and Power
BCVWD	Beaumont-Cherry Valley Water District
Bear Valley Mutual	Bear Valley Mutual Water Company
Beaumont	City of Beaumont
bgs	below ground surface
Big Bear Municipal	Big Bear Municipal Water District
BLM	Bureau of Land Management
BMO	Basin Management Objectives
BMP	Best Management Practice
BTAC	Basin Technical Advisory Committee
Caltrans	California Department of Transportation
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CLAWA	Crestline-Lake Arrowhead Water Agency
Colton Public Utilities	City of Colton Public Utilities Department

ABBREVIATIONS AND ACRONYMS

CRA	Colorado River Aqueduct
CSUSB	California State University at San Bernardino
CUWCC	California Urban Water Conservation Council
DBCP	debromochloropropane
DDT	dichlorodiphenyltrichloroethane
Declaration	Declaration of Fully Appropriated Streams
DEIR	Draft Environmental Impact Report
Delta	Sacramento-San Joaquin Delta
DMM	Demand Management Measures
DWP	Department of Water and Power
DWR	California Department of Water Resources
East Valley	East Valley Water District
EC	electrical conductivity
EOC	Engineering and Operations Community
EPA	Environmental Protection Agency
ESRI	Environmental Systems Research Institute
Exchange Plan	Santa Ana River-Mill Creek Cooperative Water Project Agreement
FEMA	Federal Emergency Management Agency
FWC	Fontana Water Company
GFDL	Geophysical Dynamic Lab
GIS	Geographic Information System
GMP	Groundwater Management Program
gpm	gallons per minute
HET	High-Efficiency Toilet
ICGMP	Institutional Controls Groundwater-Management Program
ICSA	Institutional Controls and Settlement Agreement
IEUA	Inland Empire Utilities Agency
IRWM Plan	Integrated Regional Water Management Plan
IWP	Integrated Watershed Plan
LID	Low Impact Development
Lockheed	Lockheed Martin Corporation
Marygold	Marygold Mutual Water Company
MCL	maximum contaminant level

ABBREVIATIONS AND ACRONYMS

Metropolitan	Metropolitan Water District of Southern California
mg/L	milligrams per liter
mgd	million gallons per day
MOU	memorandum of understanding
MPD	Master Plan of Drainage
MSHCP	Multi-Species Habitat Conservation Plan
msl	mean sea level
Muscoy	Muscoy Mutual Water Company
Newmark Site	Newmark Groundwater contamination Superfund Site
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NWIS	National Water Information System
OCWD	Orange County Water District
OPMODEL	operations model
Orange County Judgment	April 17, 1969 Orange County Superior Court Judgment
PAEP	Project Assessment and Evaluation Plan
PCB	Polychlorinated Biphenyls
PCE	perchloroethylene
PCM	Parallel Climate Model
ppb	parts per billion
Reclamation	U.S. Bureau of Reclamation
Regents	Regents of the University of California
Region	Integrated Regional Water Management Plan Area
RFQ	Request for Qualifications
Rialto	City of Rialto
Riverside Highland	Riverside Highland Water Company
RIX	Rapid Infiltration Extraction
RM	river mile
RPU	City of Riverside Public Utilities Department
RRWQCP	Riverside Regional Water Quality Control Plant
RWQCB	Regional Water Quality Control Board
SAR	Santa Ana River

ABBREVIATIONS AND ACRONYMS

SARI	Santa Ana Regional Interceptor
SARRWQCB	Santa Ana River Regional Water Quality Control Board
SART	Santa Ana River Trail
SAWA	Santa Ana Watershed Association
SAWPA	Santa Ana Watershed Project Authority
SAWPA Plan	Santa Ana Watershed Project Authority Plan
SBBA	San Bernardino Basin Area
SBCFCD	San Bernardino County Flood Control District
SBMWD	San Bernardino Municipal Water Department
SBNF	San Bernardino National Forest
SBVWCD	San Bernardino Valley Water Conservation District
SCADA	Supervisory Control and Data Acquisition
SCAG	Southern California Association of Governments
SCCWRP	Southern California Coastal Water Resource Project
SGPWA	San Gorgonio Pass Water Agency
SOC	synthetic organic compound
State	State of California
STWMA	San Timoteo Watershed Management Authority
STWMP	San Timoteo Watershed Management Program
SWAMP	Surface Water Ambient Monitoring Program
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
TAG	Technical Advisory Group
TCE	trichloroethylene
TDS	total dissolved solids
TMDL	total maximum daily load
UCR	University of California Riverside
ULFT	Ultra-Low-Flow Toilet
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USGS	U.S. Geological Survey

ABBREVIATIONS AND ACRONYMS

UWMP	Urban Water Management Plan
Valley District	San Bernardino Valley Municipal Water District
VOC	volatile organic compound
West Valley	West Valley Water District
Western	Western Municipal Water District
Western Judgment	Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426
WQMA	Water Quality Management Agency
WQO	water quality objectives
WRI	Water Resources Institute
WRP	Water Reclamation Plant
WSPA	Wooly-Star Preserve Area
WWTP	waste water treatment plant
YVWD	Yucaipa Valley Water District

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Ron Buchwald, East Valley, August 2007
Tom Crowley, West Valley, August 2007. Email on August 28.
Chris Diggs, Redlands, August 2007
Jack Nelson, Yucaipa Valley, August 2007
Matt Litchfield, August 2007

2005 Urban Water Management Plans:

East Valley Water District
Fontana Water Company
City of Redlands
West Valley Water District
Yucaipa Valley Water District

Thanks to the members of the Technical Advisory Group who actively participated in preparing the Plan.

Thanks also to the San Bernardino Valley Municipal Water District Advisory Commission on Water Policy for holding numerous public meetings and providing policy guidance for the development of this Plan.

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Prepared by GEI Consultants, Inc., in association with SAIC and GEOSCIENCE Support Services, Inc.

2011 Regional Water Management Plan

Basin Technical Advisory Committee

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2011 Regional Water Management Plan

December 2010

BTAC Approved December 6, 2010

2011 Regional Water Management Plan

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2011 Regional Water Management Plan

WATER RESOURCES AND MODELING:

	Pre Rainy Season	Post Rainy Season
State Water Project (SWP) Allocation (~25% needed for direct deliveries	**25%**	
SBVMWD/WMWD Santa Ana River Diversions for 2010:	in process	
San Bernardino Basin Area Conditions:		
Liquefaction potential:	**Low**	
Leakage across the San Jacinto Fault:	**Low**	
2009 Annual Change in Storage	**(78,400)**	
2009 Cumulative Change in Storage	**(433,000)**	
2010 Change in Storage	in process	
Cumulative Change in Storage trend	**Down**	
Precipitation trend	**Slightly UP**	
Subsidence risk?	**App H**	
San Bernardino Basin Area 2008 Groundwater Modeling:		
Maximum artificial recharge in 2009 if 2010 is a "flood" year (1969)[1]:	**125,300**	
Maximum artificial recharge in 2009 if 2010 is a "critically dry" year[1]:	**184,000**	
Increased liquefaction potential due to recharge maximums?	**No**	
Contamination plumes negatively impacted due to recharge maximums?	**No**	
Water Levels	**App D**	

[1] Groundwater model being revised. Modeling results from 2008, assumes average natural recharge in 2011.

BTAC RECOMMENDATIONS

	Pre Rainy Season	Post Rainy Season
SBVMWD/WMWD Santa Ana River Diversions in 2011:		
Direct delivery		
Artificial Recharge	All	
Exchange (long-term storage/banking, 40 cfs max)		
Additional San Bernardino Basin Area pumping	not required	
State Water Project Water for 2011:		
Available:		
Entitlement (25% allocation as of November 2010)	25,650	
Carryover from 2010	10,000	
Yuba Accord	3,000	
Dry year yield program	-	
TOTAL AVAILABLE	**38,650**	
Estimated Direct Deliveries	(25,000)	
BALANCE	**13,650**	
Recommended Uses for Remaining State Water Project Water in 2011:		
Short-term (carryover) storage for direct deliveries in 2012	(10,000)	
Artificial recharge in local basins	(3,650)	
Long-term storage/banking		
Other		
Purchase additional imported water	No	

2011 Regional Water Management Plan (continued)

BTAC RECOMMENDATIONS (Continued)

Artificial Recharge Targets

San Bernardino Basin Area	Local	SWP	Artificial Recharge 2011[2] (Suggested Max)
1. Waterman Basins			21,000
2. Santa Ana Basins[3]			60,000
3. Mill Creek Basins			8,000
4. City of Redlands Spreading Basins			
5. Bear Valley Spreading Basin			
6. (Not used, previously City Creek)			-
7. Patton Basin			300
8. EVWD Turnout			
9. East Twin Creek Spreading Basin			17,000
10. Badger Basins			2,700
11. Wiggins Basin			
12. Devil Canyon & Sweetwater Basins			16,000
13. Gravel Pits			
14. Lower Lytle Creek Basins (proposed)			
Sub-total SBBA			125,000
Reserve Account (Riverside Agreement)			(4,470)

2 Suggested maximums based on computer modeling runs. See Appendix F.

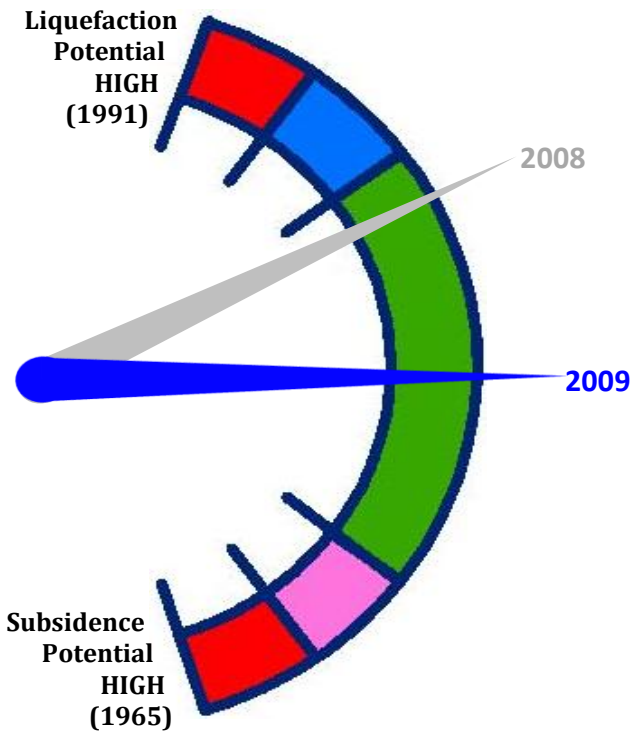
Rialto-Colton Basin	
Yucaipa Basin	
Riverside North Basin	
SBVMWD Recharge in Riverside North (have until 2013)	423
Other	

Other Requirements

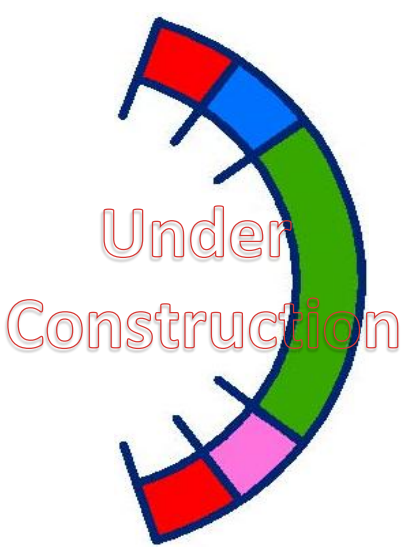
			Pre Rainy Season	Post Rainy Season
Water Level Requirements of Agreements met?			Yes	
Triennial water quality report provided to RWQCB?			Aug 2012	

2011 Regional Water Management Plan
Groundwater Dashboard

San Bernardino Basin Area



Yucaipa



Rialto-Colton

Riverside North

2011 Spreading Maximums

2011 Regional Water Management Plan Model Results

Ref: 2008 Modeling Run 1: "Wet Scenario", 1,000s acre-ft

Definitions

Artificial recharge: Intentionally introducing water into the groundwater system by manmade means such as pouring water into pits and allowing it to percolate into the ground.

BTAC: Basin Technical Advisory Committee

Direct delivery: Any delivery that is made to benefit one single agency. Examples include deliveries to surface water treatment plants and for artificial recharge projects that recharge a specific well field owned by one agency.

SBBA: San Bernardino Basin Area

Western Judgment: Western Municipal Water District of Riverside County, et al. vs. East San Bernardino County Water District, et al., 1969.

Purpose

In December 2007, fourteen agencies adopted the *Upper Santa Ana Watershed Integrated Regional Water Management Plan* (Integrated Plan). This comprehensive water resources plan identifies various management strategies that will help ensure a reliable water supply for the San Bernardino, Yucaipa, Big Bear Valleys, and San Gorgonio Pass area. The Plan covers all, or portions of the cities and communities of San Bernardino, Riverside, Fontana, Rialto, Colton, Grand Terrace, Loma Linda, Highland, Redlands, Mentone, Yucaipa, Big Bear Lake, the San Timoteo Watershed, Beaumont, Banning, Cherry Valley and a large portion of the San Bernardino National Forest. Most of the study area is within the boundaries of the San Bernardino Valley Municipal Water District (Valley District).

Within Valley District, over 60% of the water demand is met by groundwater. Of that groundwater, over 70% comes from the San Bernardino Basin Area (SBBA). Given the importance of the SBBA, a process for managing the SBBA was developed as part of the Integrated Plan. The process is to be implemented by the Basin Technical Advisory Committee (BTAC) and generally consists of tracking the inflow and outflow from the SBBA as well as complying with all of the requirements of various judgments, agreements, and MOUs developed and agreed upon by water entities in the region. Per the Integrated Plan, the BTAC is to produce a management plan each year and submit it to the Boards of Directors that are responsible for the overall management of the SBBA, Valley District and Western Municipal Water District (Western).

Although the SBBA is the single largest resource within Valley District's service area, its service area also includes all, or portions, of the following basins: Riverside North, Rialto-Colton and Yucaipa. In addition to these groundwater resources, Valley District also has an entitlement to 102,600 acre-feet of State Water Project water that is used for both direct deliveries to treatment plants and artificial recharge of the groundwater basins. Realizing the need to consider these, and other, regional water resources, the BTAC decided to expand the management plan for the SBBA to include other basins within the Valley District service area and other regional resources such as the State Water Project. The result is this comprehensive *Regional Water Management Plan*.

The Integrated Plan requires that the management plan for any given year be submitted by November of the previous year. However, little water resources information is known in November about a subsequent year. For example, there is no way to determine if the precipitation for the upcoming year will be classified as wet, dry or normal. Although there is much uncertainty about the water resources "picture" in November, the BTAC can give recommendations regarding the use of Santa Ana River water that will be diverted by Valley District and Western. Since the other water resources information will not be available until the following year, the BTAC has decided to do an update of the annual plan the following May. By this time, it is anticipated that the BTAC will have key information such as the final allocation of SWP water and whether the precipitation was wet, dry or normal.

The following sections of this document were taken from the Integrated Plan and are provided for reference. The appendices of this document contain the technical information on which the BTAC's recommendations are based.

San Bernardino Basin Area Governance

The Western Judgment identifies regional representative agencies to be responsible, on behalf of the numerous parties bound thereby, for implementing the replenishment obligations and other requirements of the judgment. The representative entities for the Western Judgment are Valley District and Western. Valley District is solely responsible for providing replenishment of the SBBA if extractions exceed the safe yield of the basin. The court-appointed Watermaster includes representatives from Valley District and Western. The proposed basin management process could be under the authority of the Valley District and Western Boards of Directors with inputs from other significant producers.

Basin Technical Advisory Committee (BTAC)

The Integrated Plan established the BTAC membership as the staff representatives from plaintiffs and non-plaintiffs of the Western Judgment. Since the Integrated Plan was adopted, the BTAC has unanimously decided to include any other agencies that wish to participate in the development of the regional water management plan. The BTAC will meet as often as needed to effectively "operate" the regional water resources within Valley District on a real-time basis and to address any other technical issues related to basin management. The BTAC strives to make decisions by consensus.

SBBA Basin Management Strategy

The BMOs formulated for the SBBA are the driving force in developing strategies for the basin management plan. The BMOs are as follows:

- Improve water supply reliability during droughts,
- Protect water quality,
- Reduce risk of liquefaction, and
- Avoid impact from and to the contaminant plumes.

To ensure adequate reliable water supply for the communities in the Upper SAR watershed during a prolonged drought, the overall basin management strategy will be to operate the basin under the "Tilted Basin Concept" such that the basin would begin a drought period in "as full as possible" condition. Keeping the basin relatively full and operating a conjunctive management program according to the "Tilted Basin Concept" also provides the added flexibility to reduce imports from the SWP when water quality is less desirable. This overarching management strategy will be followed by the BTAC as they draft the basin management plan. Some of the specific management strategies that could contribute to improving water supply reliability during a drought are as follows:

- Retailers could take direct deliveries of SWP water when available instead of producing water from their wells. This reduces the amount of water withdrawn from the groundwater basin, which is equivalent to recharging the basin. This strategy will require participation by the water agencies and may require the construction of new water treatment plants or upgrades to existing plants.

- Recharge as much SWP water as possible when available. This will likely result in spreading water in wet years, which has not occurred as much in the past. It may also require upgrading the existing spreading grounds.

- Prepare, to the extent possible, for the high groundwater condition that may be created by maintaining a "full basin" when a wet year arrives.

    - Implement an agreement(s) with groundwater producers within the Pressure Zone to maximize production from the Pressure Zone as much as practicable during unacceptably high groundwater level conditions.

    - Construct additional facilities to pump and convey large quantities of water from the Pressure Zone for use outside the Pressure Zone.

The San Bernardino Basin Area Management Plan will be developed in consideration of this overall management strategy and the BMOs.

SBBA Basin Management Requirements (Legal Agreements)

The annual basin management plan for the SBBA will meet the requirements identified in the following legal documents:

1. Western Judgment – April 1969
2. Seven Oaks Accord – July 2004
3. Settlement Agreement between SBVWCD, Valley District, and Western – August 2005
4. MOU between City of Riverside, Valley District, and Western – September 2005
5. Agreement between City of Riverside, Valley District, and Western – March 2007
6. Cooperative Agreement to Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basin, June 2007
7. Consent Decree, City of San Bernardino v. United States of America, CV 96-8867 and CV 96-5205 (Consolidated).

A summary of the pertinent basin management information from each of these documents is provided below.

1) Western Judgment

a) **Natural Safe Yield** - established at 232,100 acre-feet per year. The Plaintiffs' (Western entities) rights are capped at 27.95 percent of the natural safe yield, or 64,862 acre-feet, notwithstanding any Additional Extraction Agreements or "new conservation," as defined in the judgment. The Non-Plaintiffs' (Valley District entities) rights are unlimited provided that an equal amount of basin replenishment occurs to offset any amount that the Non-Plaintiff production exceeds—72.05 percent of the natural safe yield, or 167,238 acre-feet. An annual report, entitled *Annual Report of the Western-San Bernardino Watermaster*, provides an "accounting" of basin extractions.

b) **Replenishment** – Valley District is responsible for replenishing the SBBA for that amount of Non-Plaintiff extractions exceeding 167,238 acre-feet. The replenishment obligation may be met by any of the following means:

i) Return flow from excess extractions;

ii) Replenishment provided in excess of that required;

iii) Amounts extracted without replenishment obligations (i.e., Additional Production Agreement);

iv) That amount of water extracted below the natural safe yield; and

v) Return flow from imported water.

c) **New Conservation** is defined in the 1969 Judgment as "any increase in replenishment from natural precipitation which results from operation of works and facilities not now in existence." The judgment contemplated that the parties would develop facilities that would result in the capture of more natural runoff. Construction of the Seven Oaks Dam within the SAR has provided such an opportunity, and Valley District and Western are seeking to obtain a water right from the SWRCB and to construct the facilities necessary to capture SAR water that was not historically captured. The parties under the Western Judgment will have their adjusted extraction rights increased to include a proportionate share of any New Conservation, provided that each Plaintiff party pays its proportionate share of the costs to develop said New Conservation.

2) Seven Oaks Accord

a) **Groundwater Spreading/Management Program** (GMP) – Requires Valley District and Western to develop and manage a groundwater spreading program in cooperation with other parties, "That is intended to maintain groundwater levels at the specified wells at relatively constant levels, in spite of the inevitable fluctuations due to hydrologic variation." Specific requirements of the Seven Oaks Accord are as follows:

i) GMP shall identify target water-level ranges in the specified "index wells" subject to the requirement that such spreading will not worsen high groundwater levels in the Pressure Zone.

ii) Thresholds of significance in terms of SAR water diverted by Valley District and Western and spreading by all parties should be observed (see sidebar). See Appendix I of the Accord.

iii) The determination as to whether a certain groundwater management action will "worsen" high groundwater levels in the Pressure Zone is made through the use of the integrated surface and groundwater models.

iv) GMP must be "adopted" within five years of the date the SWRCB grants a permit to Valley District/Western. To date, Valley District and Western have not received the permit.

v) Redlands, East Valley, and Bear Valley Mutual agree to limit spreading to conform to the annual GMP.

3) San Bernardino Valley Water Conservation District Settlement Agreement

a) Annual Groundwater Management Plan – Valley District and Western will consult with SBVWCD in the development of the GMP.

b) An interim GMP could be developed prior to the completion of the model being developed for the San Bernardino Basin Area.

c) GMP objectives to be achieved simultaneously include:

i) Maximize the quantity of water spread in the SAR spreading grounds.

ii) Establish and maintain a shallowest target of 50 feet depth to water within the Pressure Zone.

iii) Maintain groundwater levels in the Forebay Area within 10 feet of the levels that would have occurred in the absence of SAR diversions by Valley District and Western. Quantifying the difference between diversions and no diversions will be accomplished using the groundwater flow model developed for the SBBA.

iv) Otherwise avoid significant impacts on the environment.

d) Set as a goal to coordinate the San Bernardino Consent Decree management plan with the GMP.

e) No spreading will take place without authorization by the GMP.

4) Riverside MOU

a) Basin Management Account – Established with funds and future revenues from the SBVWCD "to fund recharge efforts in the basin."

b) Valley District and Western are required to exercise SBVWCD water rights in a manner that:

i) Maintains groundwater levels for the benefit of the production wells in the geographic area historically served by the SBVWCD at relatively constant levels.

ii) Maximizes the use of native water supplies to replenish the SBBA without causing high groundwater problems in the artesian zone and without causing the migration of contaminant plumes that would result in significant degradation of the water quality in any domestic well.

c) Valley District will spread sufficient water to ensure that groundwater supplies necessary to support the safe yield of the SBBA are maintained pursuant to the Western Judgment.

5) Riverside Agreement

a) This agreement establishes the Seven Oaks Dam Water Diversions Engineering and Operations Committee (EOC) to develop and implement procedures to:

i) Maintain the groundwater levels in the Index Wells at relatively constant levels, in spite of fluctuations due to hydrologic variation.

ii) Minimize such fluctuations (reduce highs and lows).

iii) Provide water "accounts" to Riverside to offset the loss of recharge to the SBBA and/or Riverside North due to Western/Valley District SAR water diversions.

(1) "Reserve Account" is initially established as 38 percent of the total volume of water diverted from the SAR by Valley District and Western pursuant to the SWRCB water right permit. To be recharged in the SBBA either directly or through an exchange.

(2) "Replacement water" varies from 0 to 6 percent of the flow at the E Street Bridge. Water to be recharged into the Riverside North basin.

iv) Develop recommendations to the Western Judgment Watermaster regarding the classification of diverted SAR water as either New Conservation or existing safe yield of the SBBA.

b) EOC will meet no later than six months after the SWRCB grants permits to Valley District and Western to develop the initial procedures. Ongoing, the EOC will meet no later than October 1 of each year. The EOC shall meet on a regular basis to effectively operate, on a real-time basis, a program to achieve the objectives listed above. EOC decisions will be implemented once approved by the EOC and will be provided to the BTAC for inclusion in the Annual San Bernardino Basin Area Management Plan. The tasks of the EOC could be covered at the BTAC meetings, realizing that most of the

members of the BTAC have no standing in this agreement and the decisions of the EOC are not subject to review by BTAC or any of the BTAC members.

c) Water levels at the index wells outside the Pressure Zone must be maintained at no lower than 10 feet, on average, during a repeat of the 39-year base period. Valley District will commence spreading to maintain these levels.

d) If the 12-month rolling averages of the Backyard Well ports D4, D5, and D6 are 50 feet bgs or greater, Valley District and Western will recharge water from the Reserve Account.

6) Consent Decree, City of San Bernardino March 23, 2005

a) The City of San Bernardino Municipal Water Department (SBMWD) is a party to a consent decree entered in March 2005. The Consent Decree obligates the SBMWD to operate and maintain a system of wells and treatment plants known as the Newmark Groundwater Contamination Superfund Site (Newmark Site). The Newmark Site specifically treats groundwater contaminated with TCE and perchloroethylene (PCE).

b) The SBMWD is required by the terms of the Consent Decree, entered on March 23, 2005, to enact institutional controls and implement an ordinance providing for the protection and management of the Interim Remedy set forth in the Record of Decisions and Explanation of Significant Differences prepared by the Environmental Protection Agency (EPA).

7) City of San Bernardino Ordinance No. MC-1221 and Institutional Controls Settlement Agreement (ICSA)

a) Ordinance No. MC-1221 – This ordinance establishes the management zone boundaries within the City of San Bernardino for water spreading and water extraction activities.

i) The Consent Decree requires that the City of San Bernardino adopt and enforce an ordinance to ensure that activities occurring in the management zone, including, but not limited to, development, digging, drilling, boring or reconstruction of wells, extraction of groundwater from wells, and spreading of recharge water, do not interfere or cause pass-through of contaminants from the Newmark and Muscoy Operable Units. The ordinance was approved on March 20, 2006, by the Mayor and City Council.

ii) The Interim Remedy requires the extraction of contaminated groundwater from the Bunker Hill Groundwater Basin and within the Newmark and Muscoy Operable Units, and treatment of the groundwater to meet all State of California (State) and federal permits and requirements for drinking water.

iii) Unless a permit issued by the SBMWD pursuant to the provisions outlined in the ordinance is first obtained, it shall be unlawful for any person, as principal, agent, or employee to spread (artificial recharge) or extract (well pumping) within the Management Zones as defined in the ordinance.

b) Institutional Controls Settlement Agreement (ICSA)

i) An agreement (ICSA) has been executed to develop and adopt a successor agreement, titled Institutional Controls Groundwater Management Program (ICGMP), between the following parties:

(1) City of San Bernardino Municipal Water Department

(2) San Bernardino Valley Municipal Water District

(3) Western Municipal Water District

(4) City of Riverside

(5) West Valley Water District

(6) East Valley Water District

(7) City of Colton

(8) Riverside Highland Water Company

ii) The parties identified above will not be subject to the provisions of City of San Bernardino Ordinance No. MC-1221 as long as each is a party to the ICSA and, subsequently, the ICGMP Agreement.

8) Cooperative Agreement to Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basin

a) Requires the preparation of a triennial water quality report, limited to nitrogen and total dissolved solids (TDS), which analyzes whether the recharge of imported water had any adverse impact on compliance with Salinity Objectives established in the Water Quality Control Plan for the Santa Ana River Basin. The first report is due August 2009 and then every three years thereafter.

b) Requires any party that is serving as a lead agency for a project involving the recharge of imported water to analyze any adverse impacts on Salinity Objectives as part of the California Environmental Quality Act (CEQA) review process. Said analysis must be made with a groundwater quality model listed in the agreement.

Development of Annual Management Plan for the SBBA

Considering the provisions of the above judgments and agreements, a process was developed for managing the SBBA (see Appendix A). This process is intended to be flexible and will be modified, as needed. The main purpose in developing a process is to ensure that management of the SBBA is in compliance with the provisions of the applicable judgment and agreements and to provide a cooperative forum among the water agencies to engage in developing solutions.

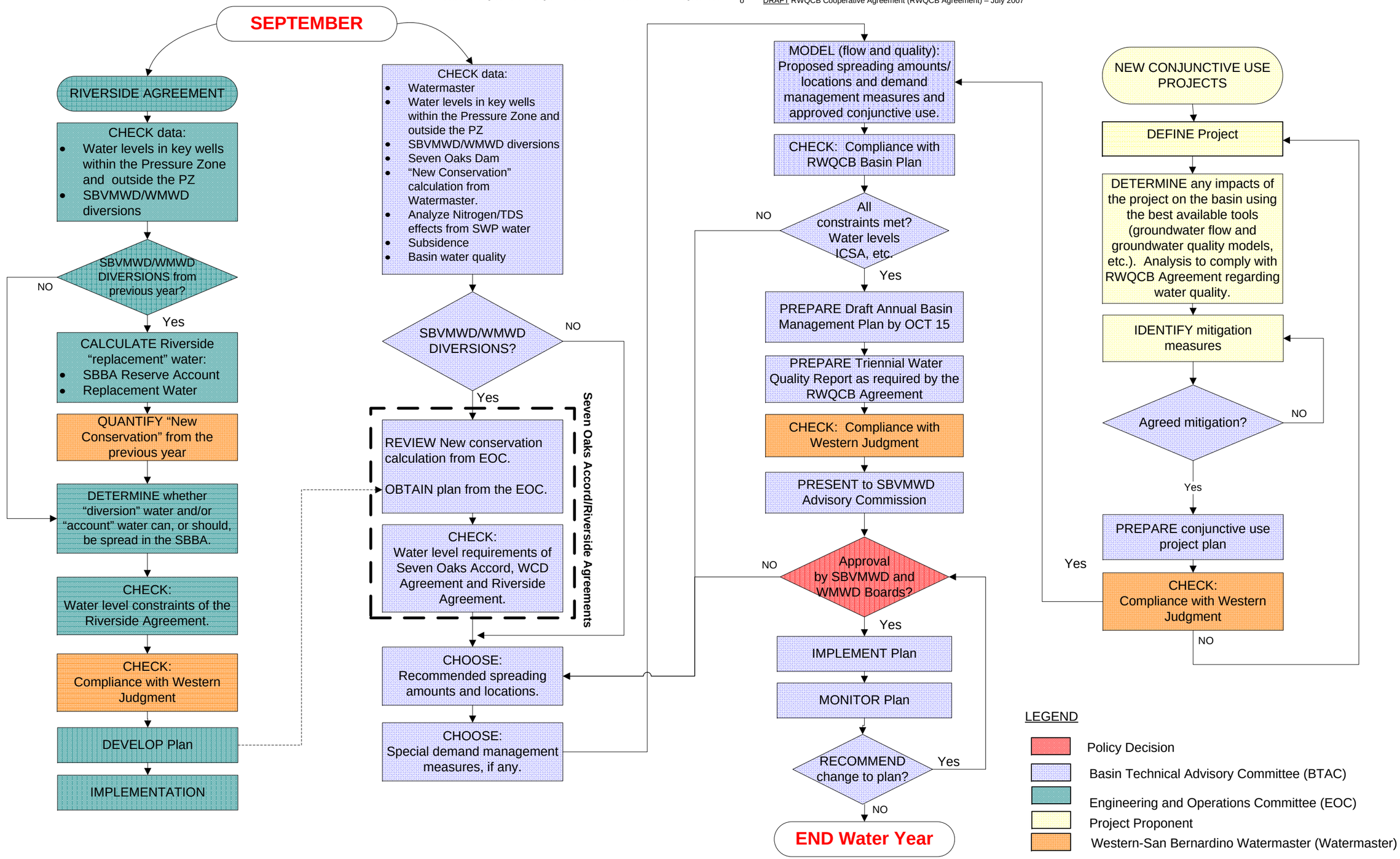
APPENDIX

A. PROCESS FLOW CHART FOR MANAGING THE SBBA

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

Process for Managing the San Bernardino Basin Area

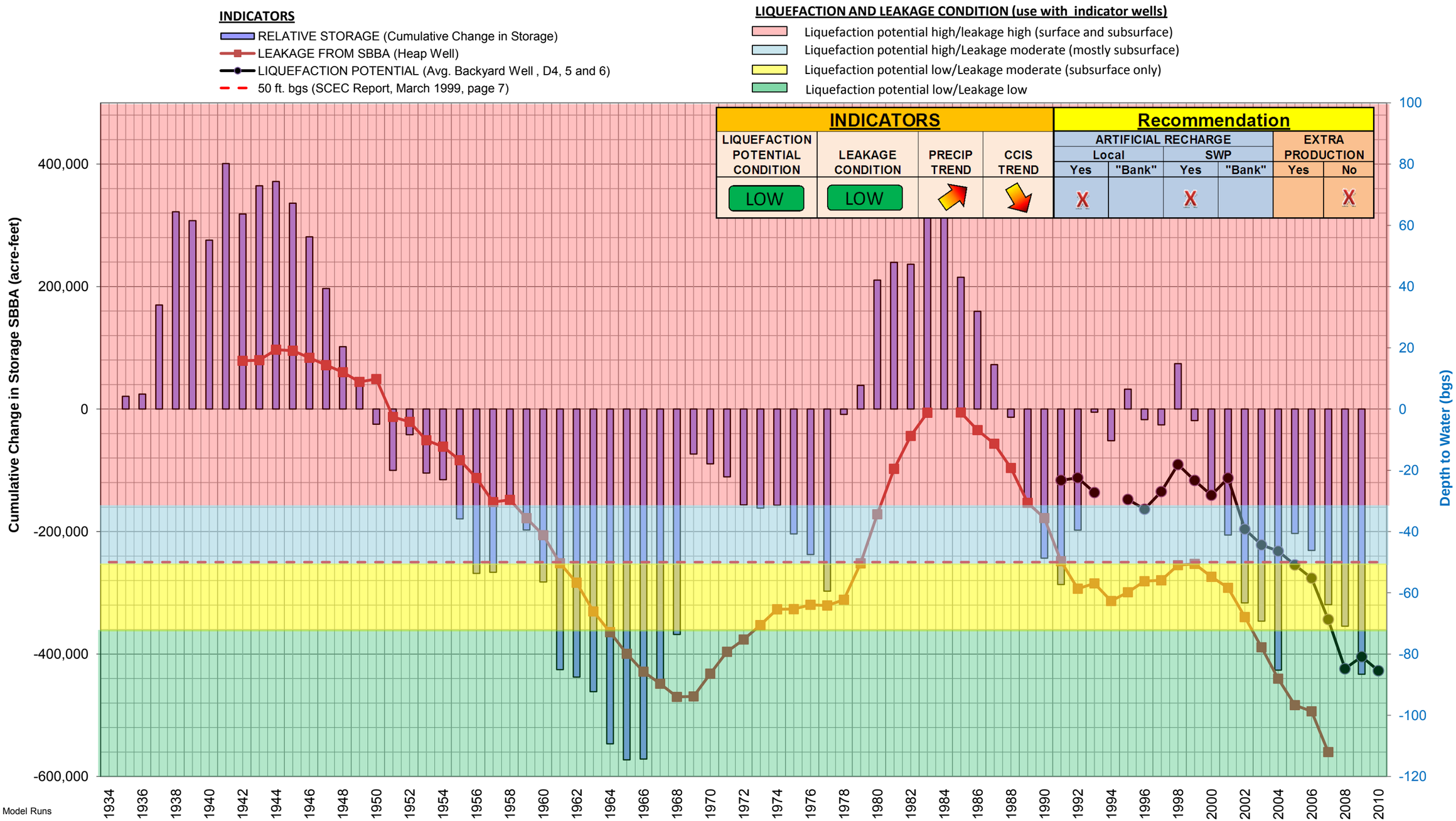
Sources:
- o Western Judgment – April 1969
- o Seven Oaks Accord – July 2004
- o Settlement Agreement Among SBVWCD, SBVMWD, and WMWD – August 2005
- o MOU Among City of Riverside, SBVMWD, and WMWD – September 2005
- o Agreement Among City of Riverside, SBVMWD and WMWD – March 2007
- o Institutional Controls Settlement Agreement (ICSA)
- o DRAFT RWQCB Cooperative Agreement (RWQCB Agreement) – July 2007



9/28/2007;RMT

B. SBBA RECOMMENDATIONS

BTAC ANNUAL MANAGEMENT PLAN: SHOULD WE ARTIFICIALLY RECHARGE? DO WE NEED EXTRA PRODUCTION?



2011 Spreading Maximums

2011 Regional Water Management Plan Model Results

Ref: 2008 Modeling Run 1: "Wet Scenario", 1,000s acre-ft

C. RIVERSIDE AGREEMENT SUMMARY

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

380 East Vanderbilt Way
San Bernardino, CA 92408
phone: 909.387.9200
fax: 909.387.9247
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November 16, 2010

Kevin S. Milligan
Assistant Director, Water
Riverside Public Utilities
3900 Main Street
Riverside, CA 92522

SUBJECT: Postponement of 2010 "Reduced Recharge" Calculations Required by the Riverside Agreement

Dear Kevin,

In March 20, 2007, Riverside Public Utilities (Riverside), Western Municipal Water District (Western) and San Bernardino Valley Municipal Water District (Valley District) entered into an agreement titled *Agreement Relating to the Diversion of Water from the Santa Ana River System Among Western Municipal Water District of Riverside County, San Bernardino Valley Municipal water District and City of Riverside* (Riverside Agreement). The main purpose of the Riverside Agreement was to mitigate for any reduction in natural recharge to the San Bernardino Basin Area (SBBA) and the Riverside North Basin that may be caused by the upstream diversion of SAR water by Valley District/Western. To mitigate the impacts of these upstream diversions on groundwater recharge, the agreement establishes a procedure for calculating the portion of the upstream diversions by Valley District/Western that would have naturally recharged the SBBA and the Riverside North Basin (reduced recharge). These reduced recharge calculations are performed each year by the Seven Oaks Dam Water Diversions Engineering and Operations Committee (EOC), formed by the Riverside Agreement, and the results are tracked in two "accounts". The "Reserve Account" tracks the amount of reduced recharge in the SBBA and the "Riverside North Basin Recharge Account" tracks the amount of reduced recharge in the Riverside North Basin. The balances in these accounts are provided on an annual statement which is published in the Regional Water Management Plan produced by the Basin Technical Advisory Committee (BTAC) each year.

The calculation of reduced recharge is dependent on the assumed amount of water that naturally recharges in the river bottom. The assumptions related to river bottom recharge in the Riverside Agreement are based upon analysis performed for the Valley District/Western water rights applications. This year, Riverside, San Bernardino Valley Water Conservation District and Valley District performed a field test to determine the amount of water that could be recharged in the river bottom between Seven Oaks Dam and E Street. The results of this test suggest that the assumptions used in the Riverside Agreement related to river bottom recharge may need to be adjusted. To make a final determination of whether these assumptions need to be changed, Western, Riverside and Valley District have hired Geoscience Support Services, Inc. and Science Applications International Corporation (SAIC) to perform a

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detailed analysis. Since the results of this analysis will likely have an effect on the reduced recharge calculations, the EOC is recommending that the calculations for the 2010 diversions by Valley District and Western be postponed until the results of this study are available and the EOC determines how the results may impact the Riverside Agreement. This letter is intended to document this decision.

Sincerely,

Douglas D. Headrick

Douglas Headrick, P.E.
General Manager

cc: Bob Tincher
John Rossi, WMWD
Jack Safely, WMWD

Riverside Agreement

2009 Statement

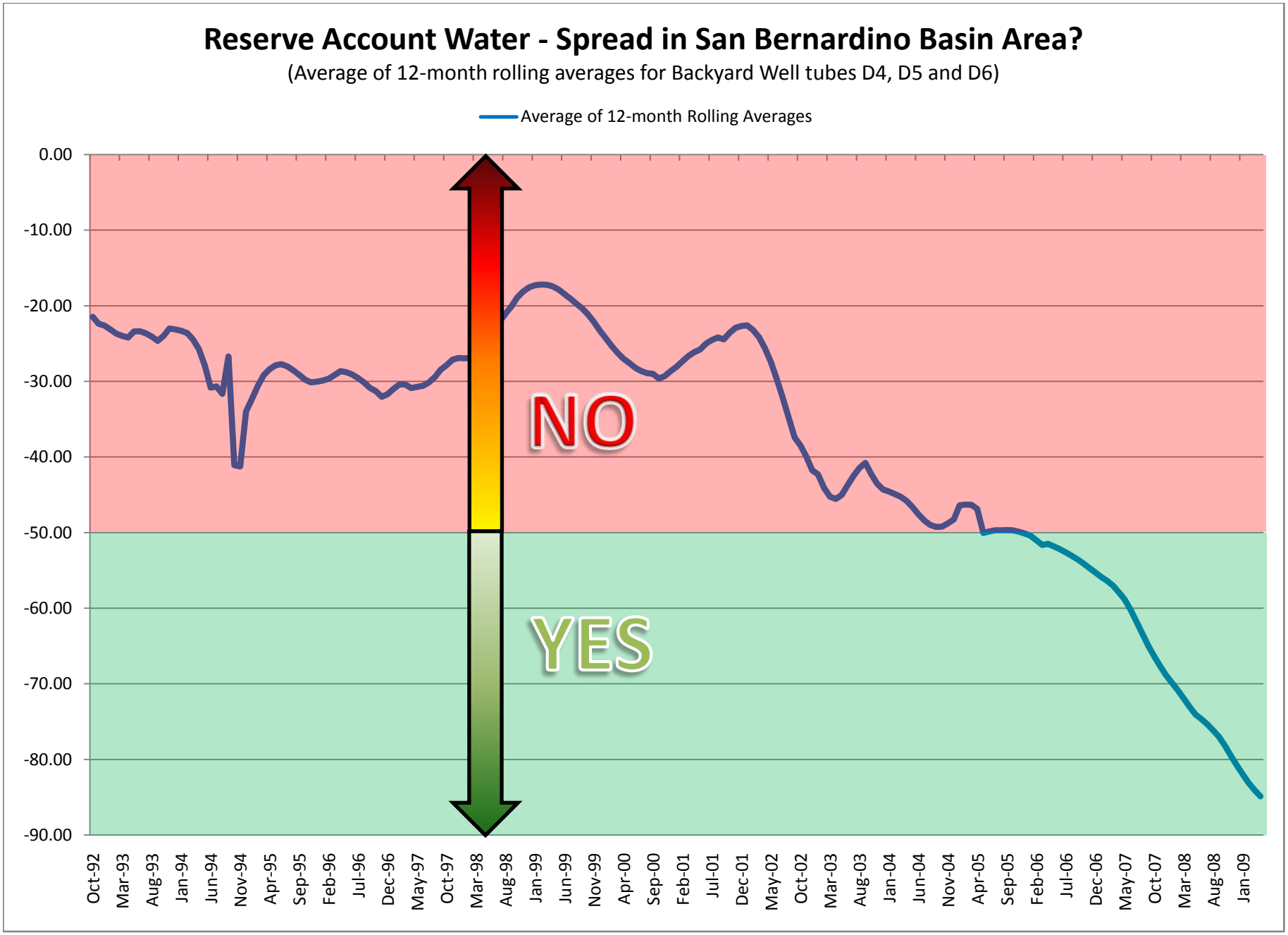
TOTAL SBVMWD/WMWD DIVERSIONS FOR 2009	**0.0** acre-ft

RESERVE ACCOUNT (San Bernardino Basin Area)

	Amount (acre-ft)	Expiration
Beginning Balance	(4,470.2)	8/31/2013
2009 Recharge of SBBA by SBVMWD/WMWD	0.0	
Required SBBA recharge to offset 2009 diversions	0.0	
2009 Balance (negative indicates credit)	**(4,470.2)**	**8/31/2013**

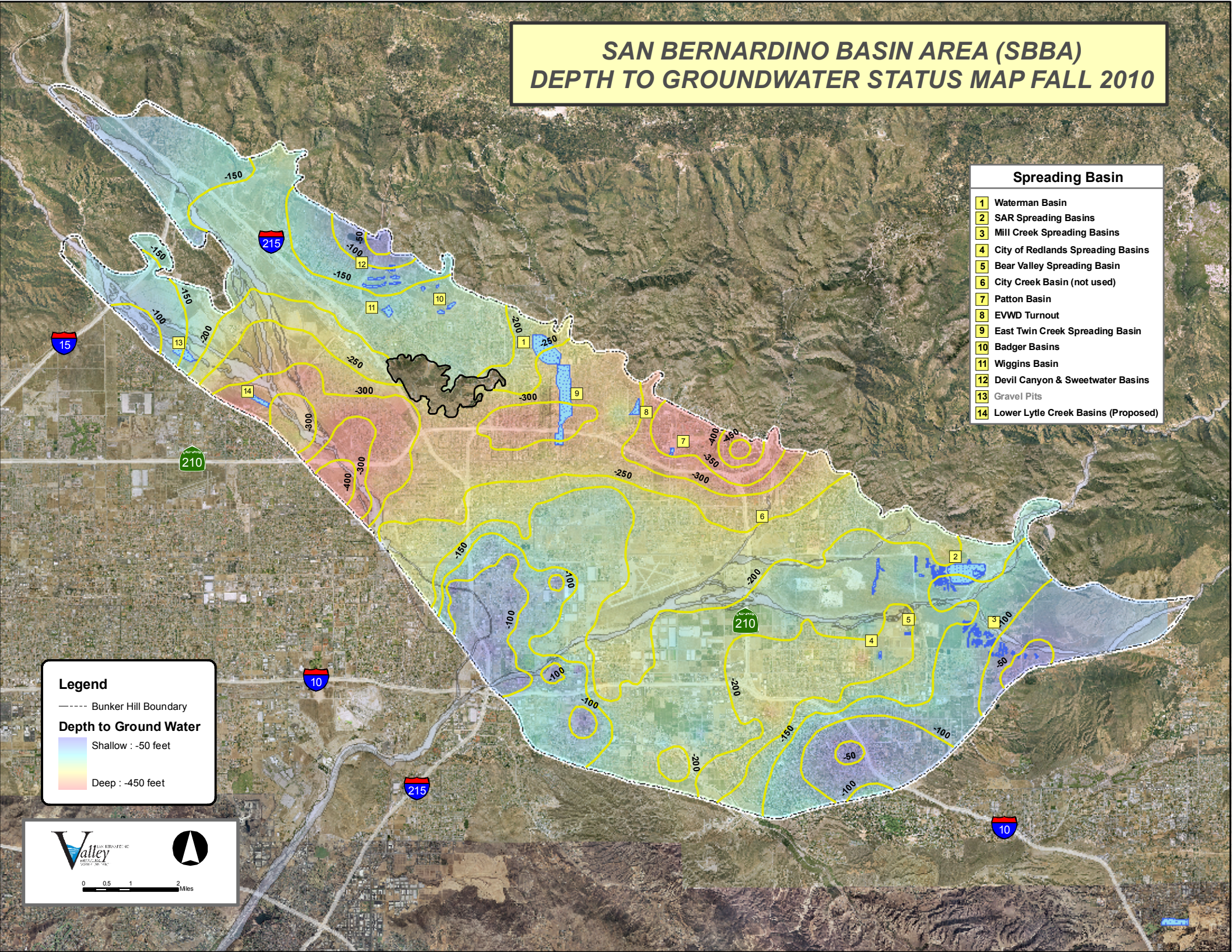
RIVERSIDE NORTH BASIN RECHARGE ACCOUNT

	Amount (acre-ft)	Recharge Deadline (Desired)	Recharge Deadline (no later than)
Beginning Balance	423.0	8/31/2009	8/31/2013
Required recharge to offset 2009 diversions	0.0		
2009 Balance	423.0	8/31/2009	8/31/2013
Amount available for in-lieu delivery	**302.5**		

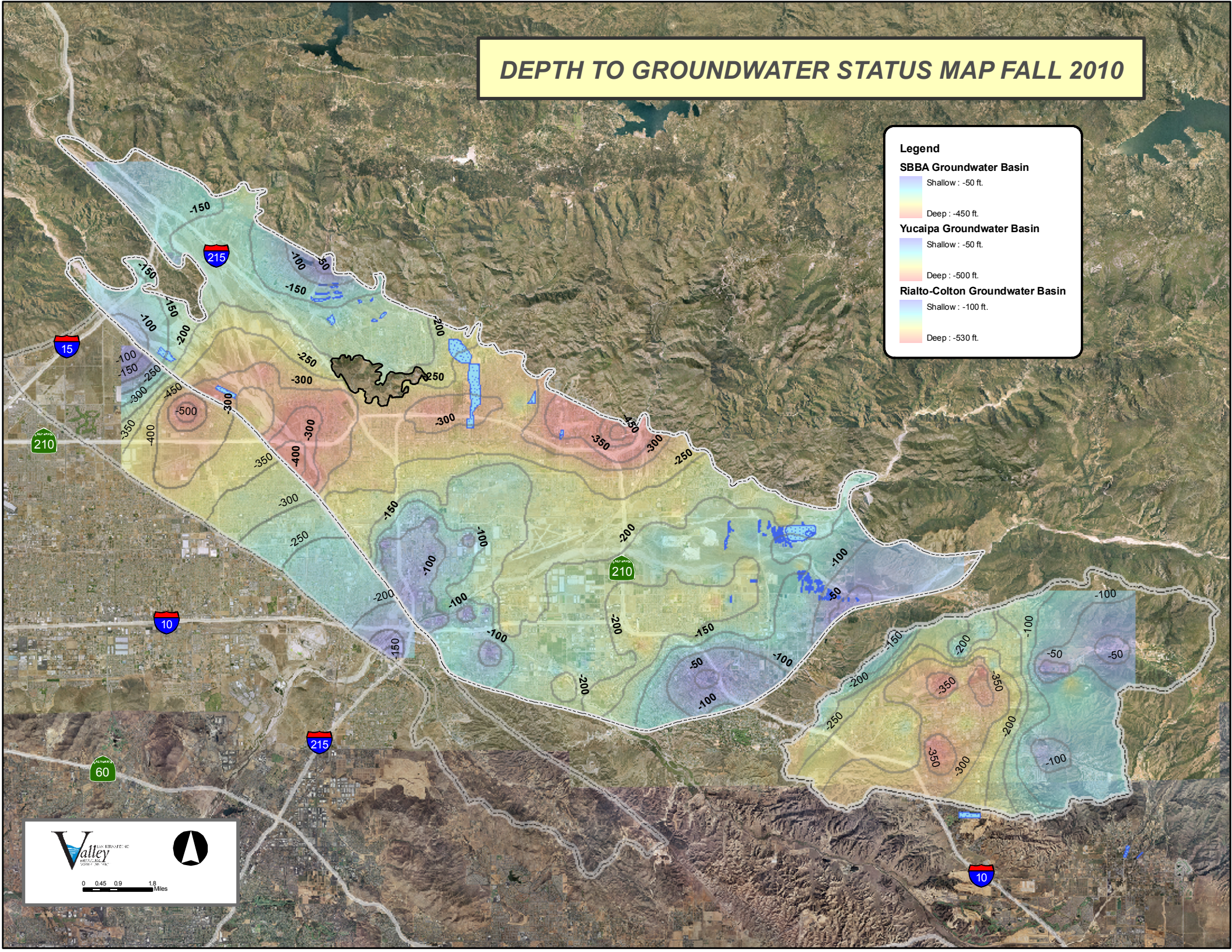

Reserve Account Water - Spread in San Bernardino Basin Area?
(Average of 12-month rolling averages for Backyard Well tubes D4, D5 and D6)
Average of 12-month Rolling Averages
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00
-80.00
-90.00
NO
YES
Oct-92
Mar-93
Aug-93
Jan-94
Jun-94
Nov-94
Apr-95
Sep-95
Feb-96
Jul-96
Dec-96
May-97
Oct-97
Mar-98
Aug-98
Jan-99
Jun-99
Nov-99
Apr-00
Sep-00
Feb-01
Jul-01
Dec-01
May-02
Oct-02
Mar-03
Aug-03
Jan-04
Jun-04
Nov-04
Apr-05
Sep-05
Feb-06
Jul-06
Dec-06
May-07
Oct-07
Mar-08
Aug-08
Jan-09

D. WATER LEVEL DATA

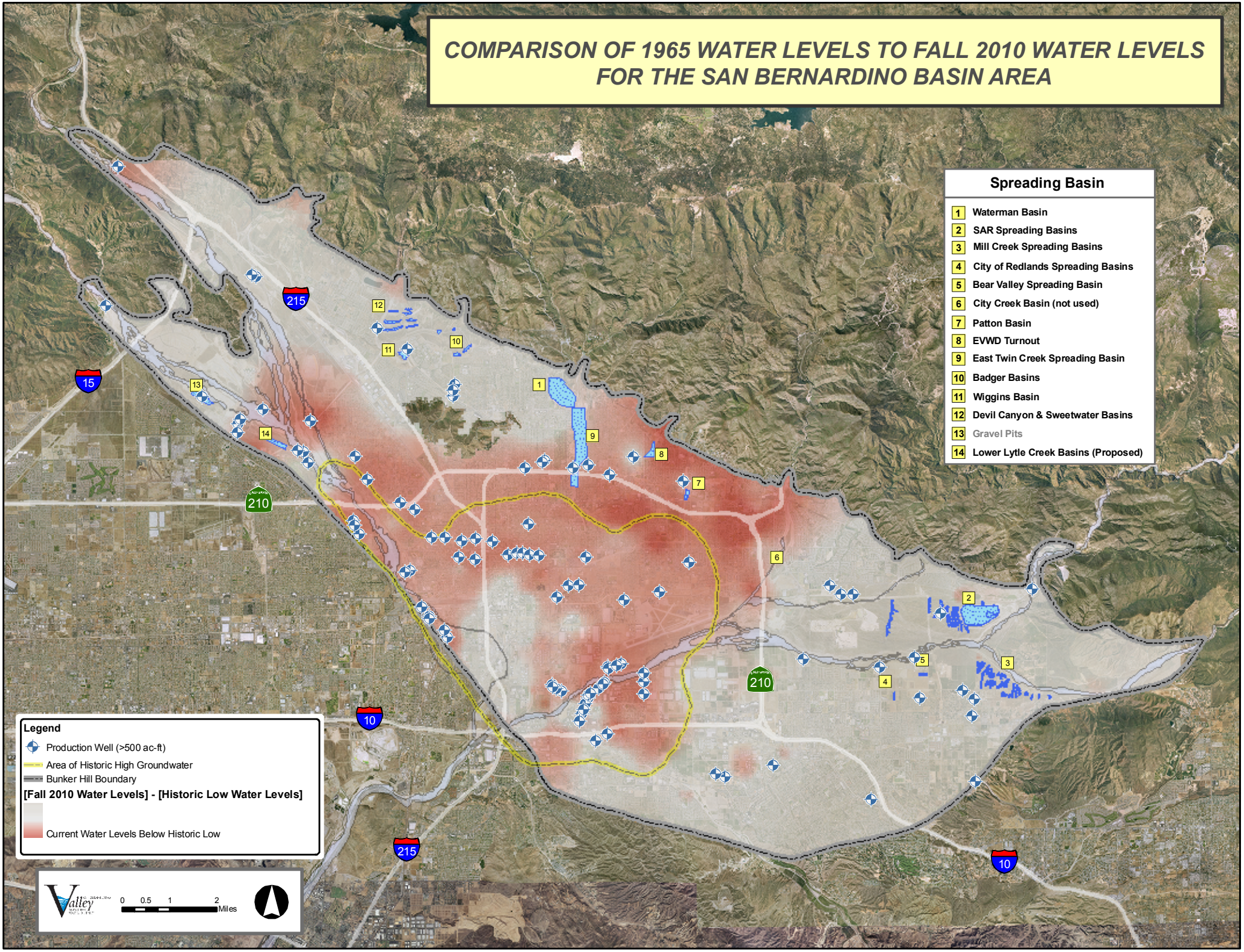
SAN BERNARDINO BASIN AREA (SBBA)
DEPTH TO GROUNDWATER STATUS MAP FALL 2010



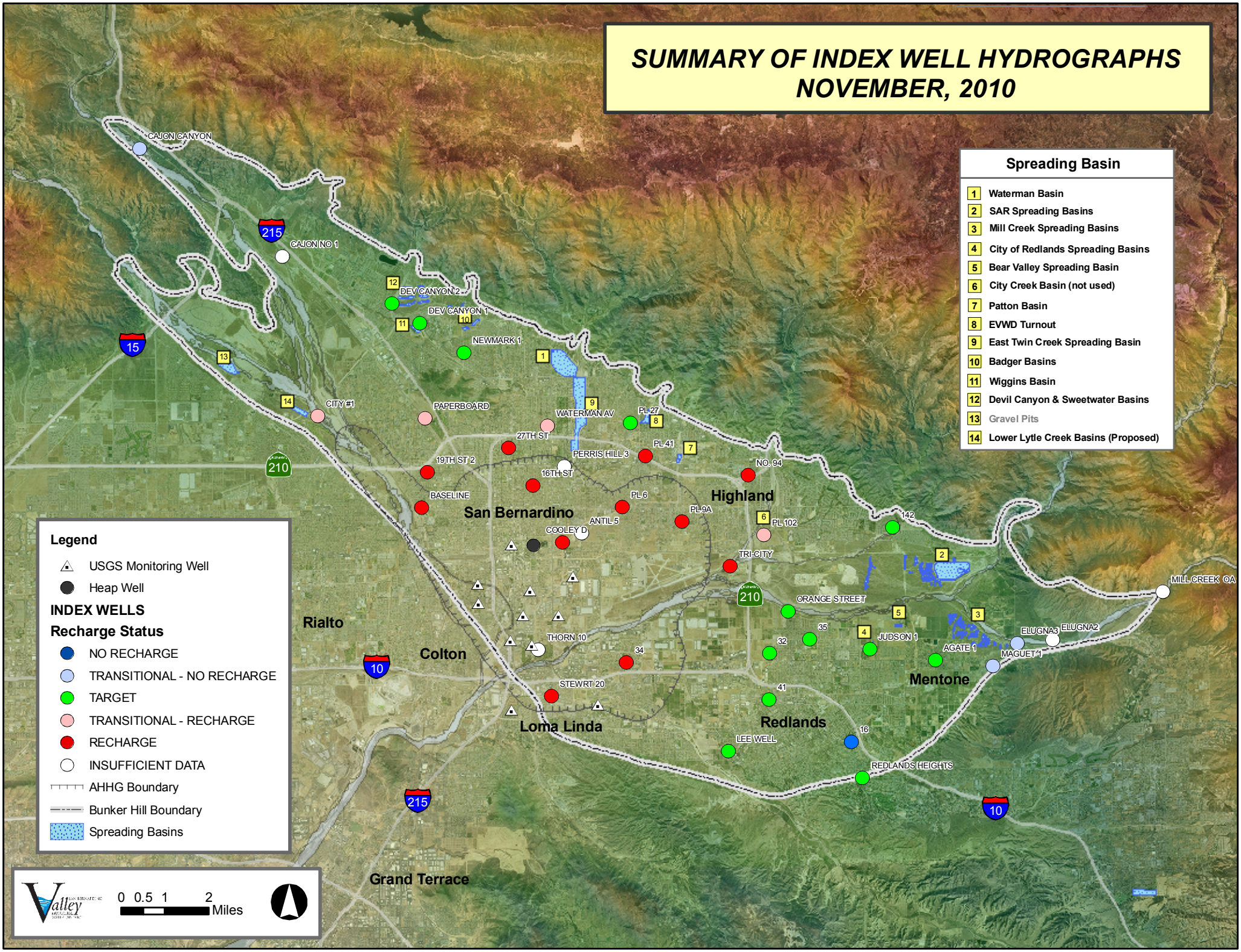
DEPTH TO GROUNDWATER STATUS MAP FALL 2010



COMPARISON OF 1965 WATER LEVELS TO FALL 2010 WATER LEVELS FOR THE SAN BERNARDINO BASIN AREA



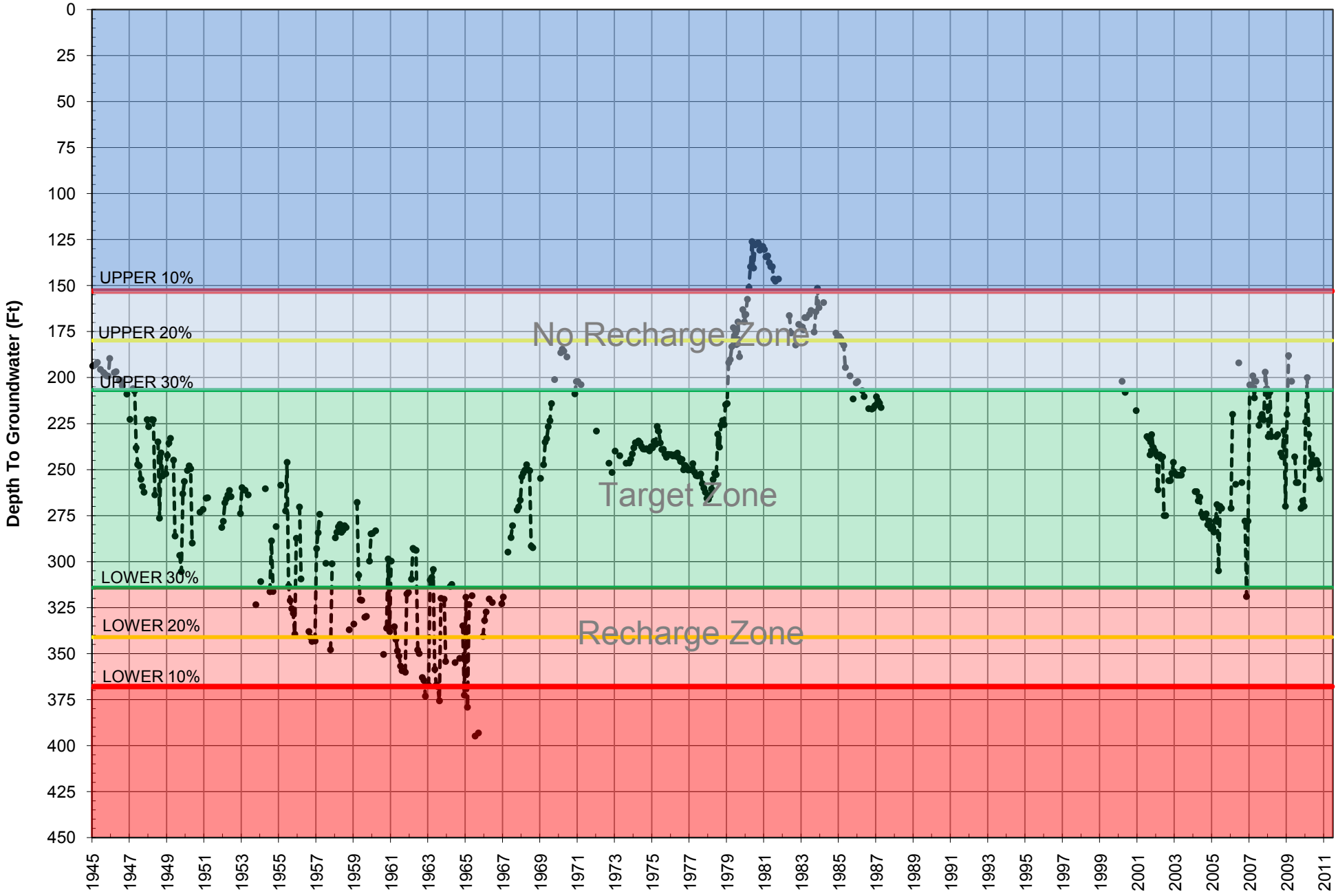
SUMMARY OF INDEX WELL HYDROGRAPHS
NOVEMBER, 2010



B.V. Judson

Index Well Hydrograph

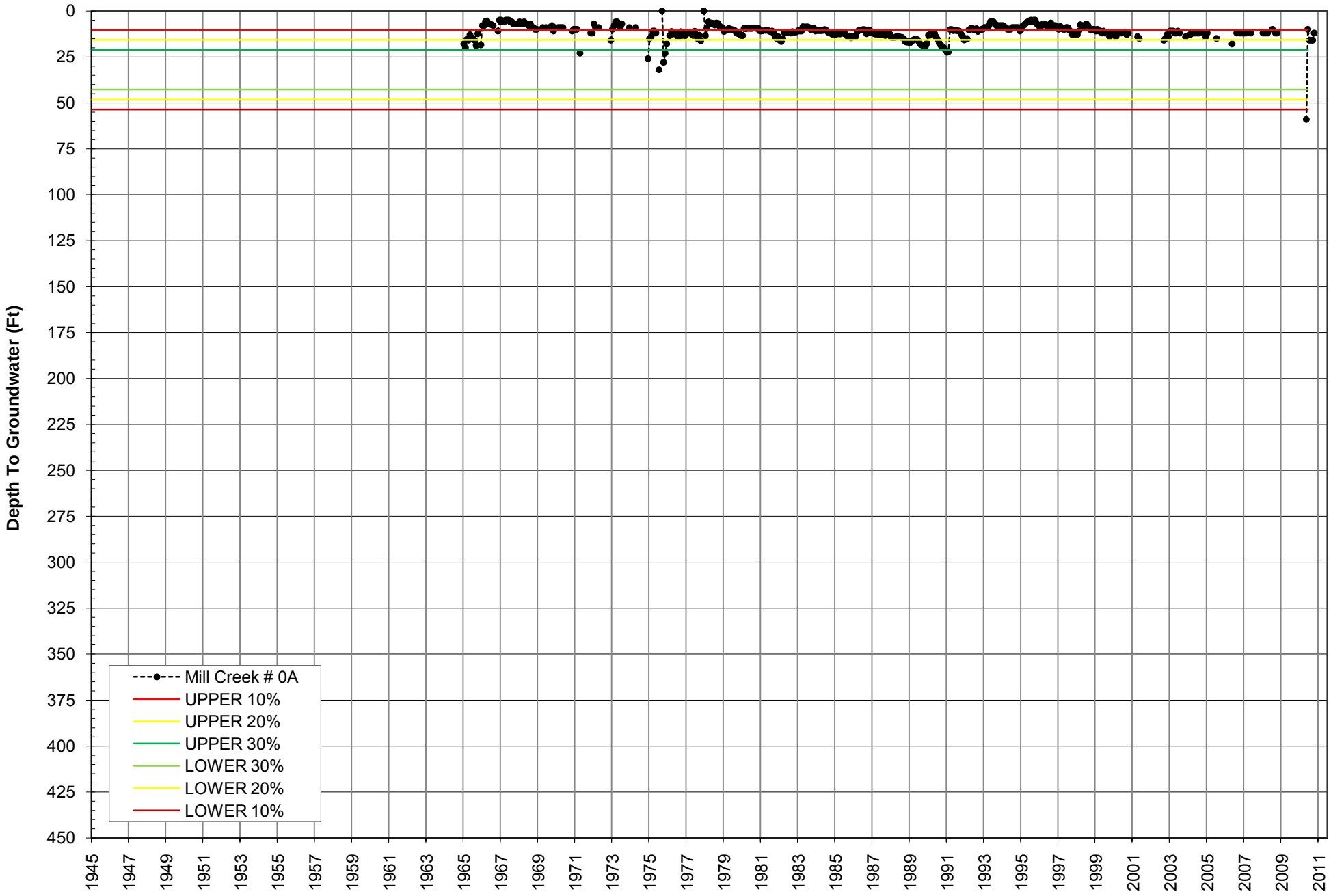
Bear Valley Mutual Water Co.



Mill Creek #0A

Index Well Hydrograph

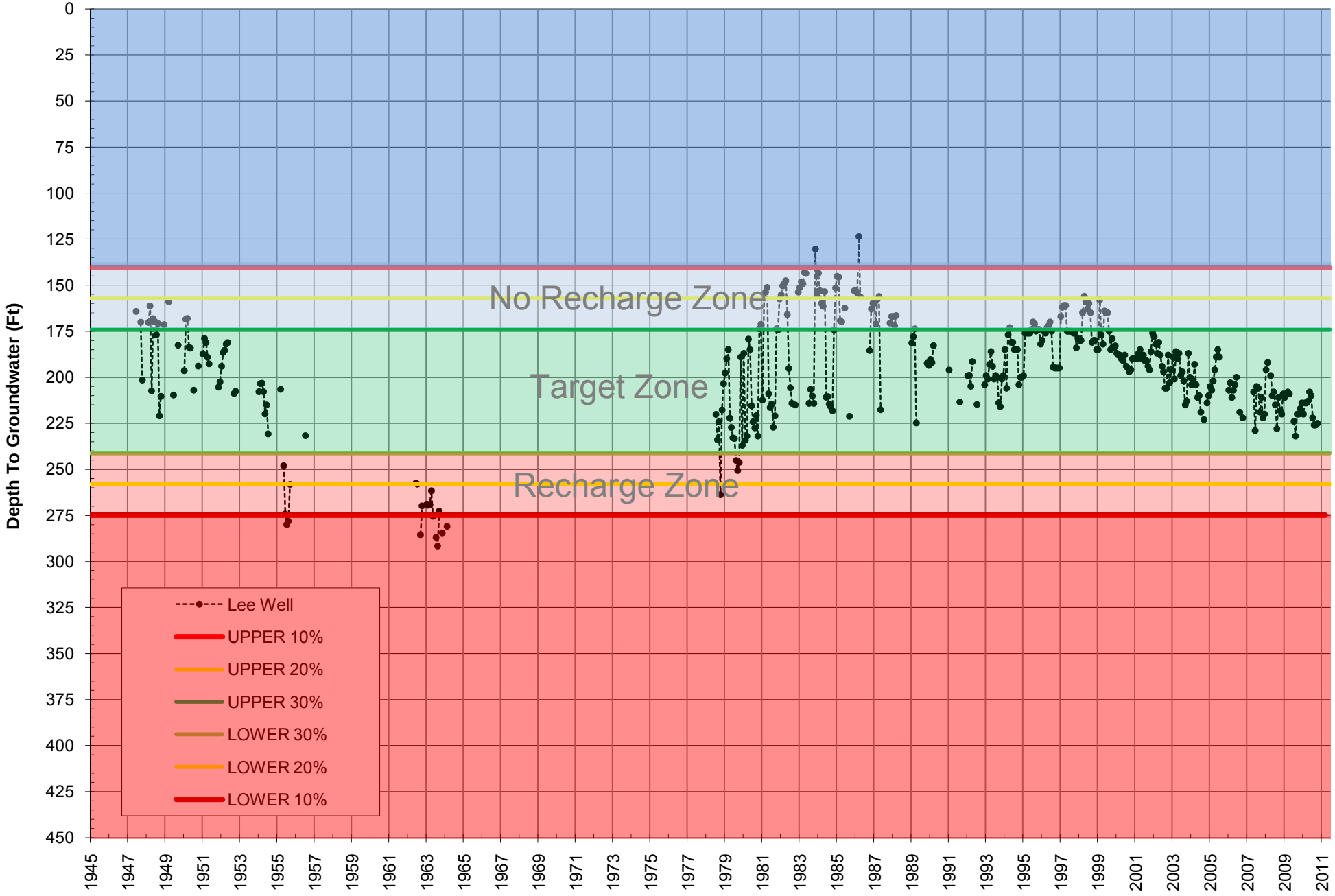
City of Redlands



Lee Well

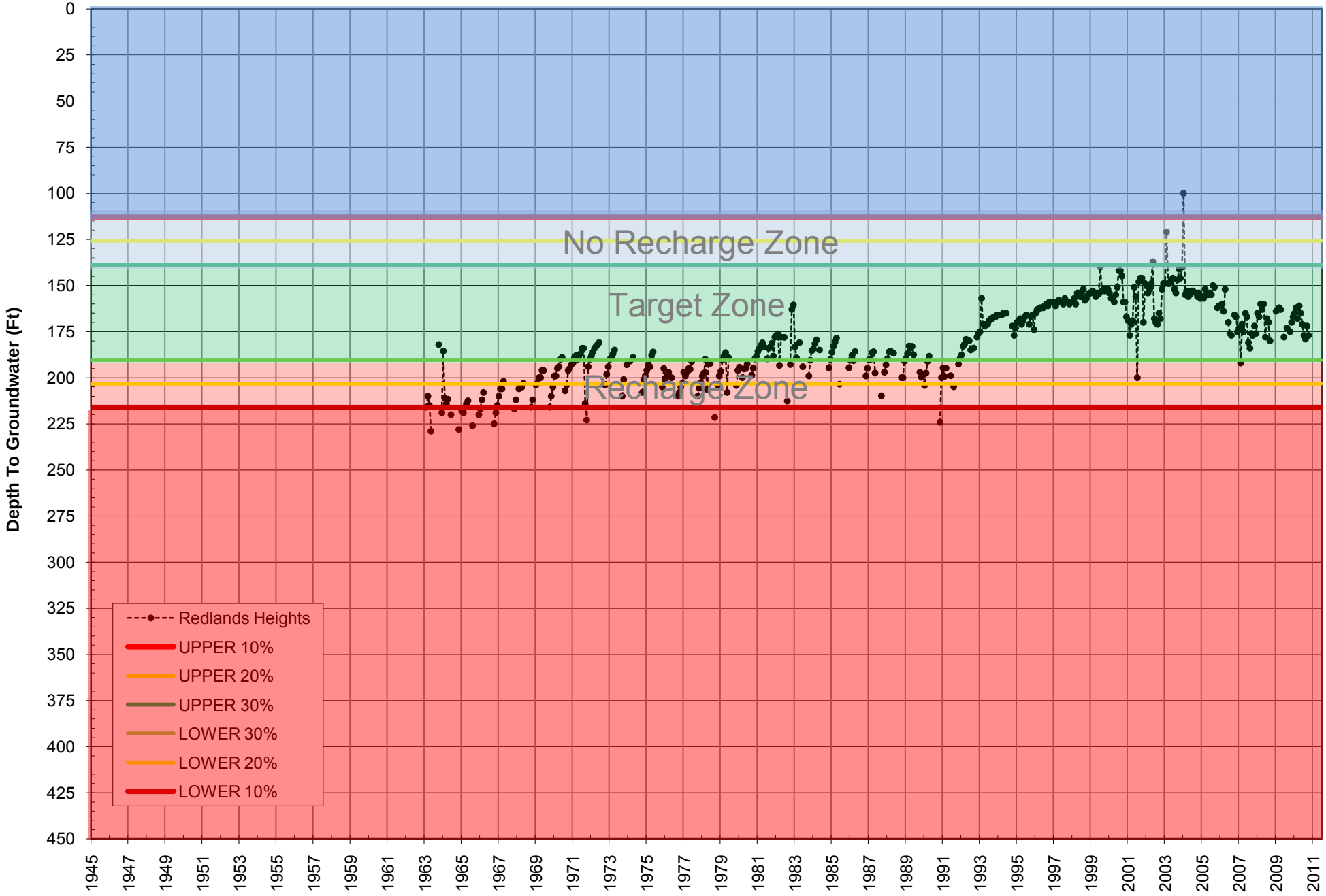
Index Well Hydrograph

City of Redlands



Redlands Heights
Index Well Hydrograph

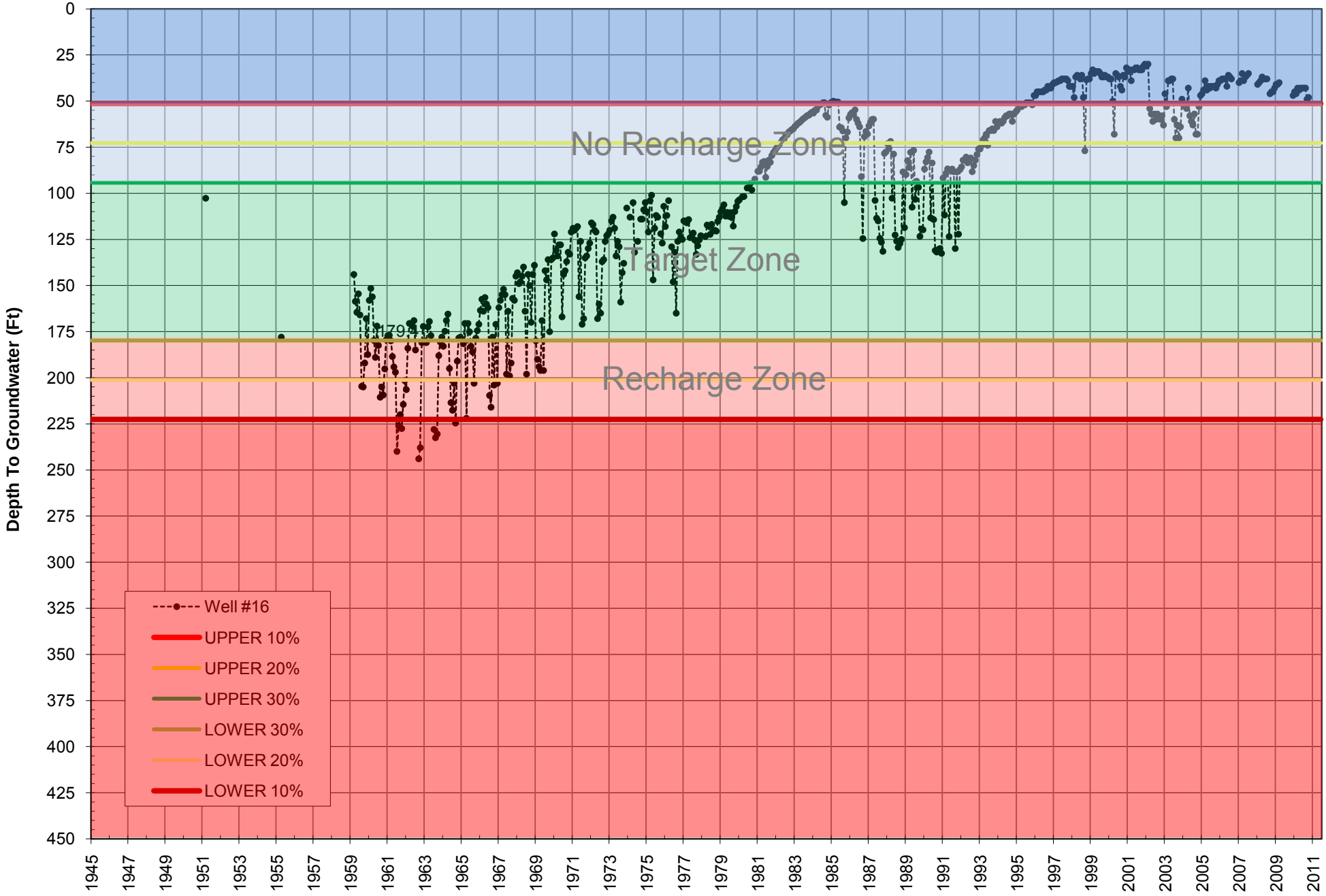
City of Redlands



Well #16

Index Well Hydrograph

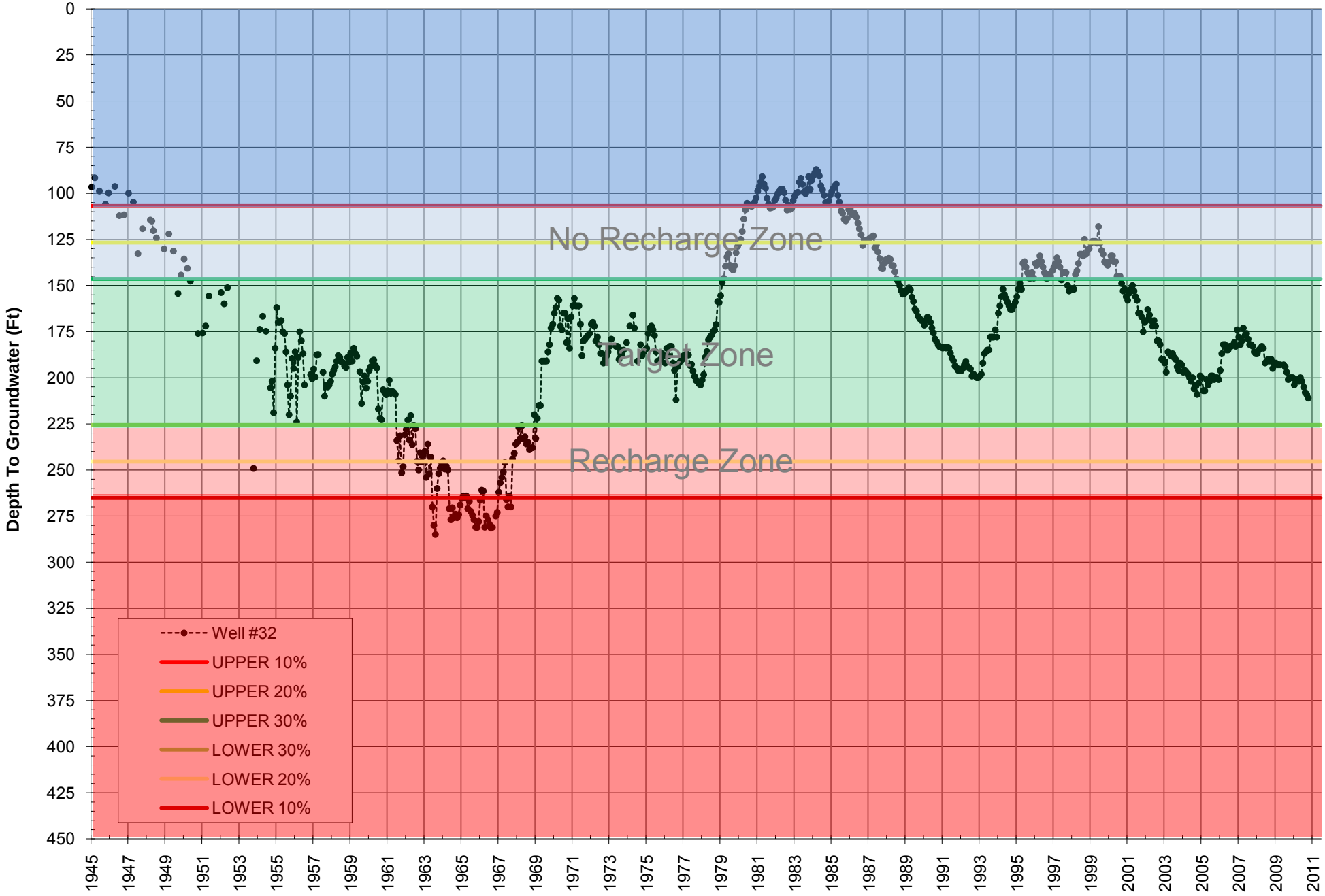
City of Redlands



Well #32

Index Well Hydrograph

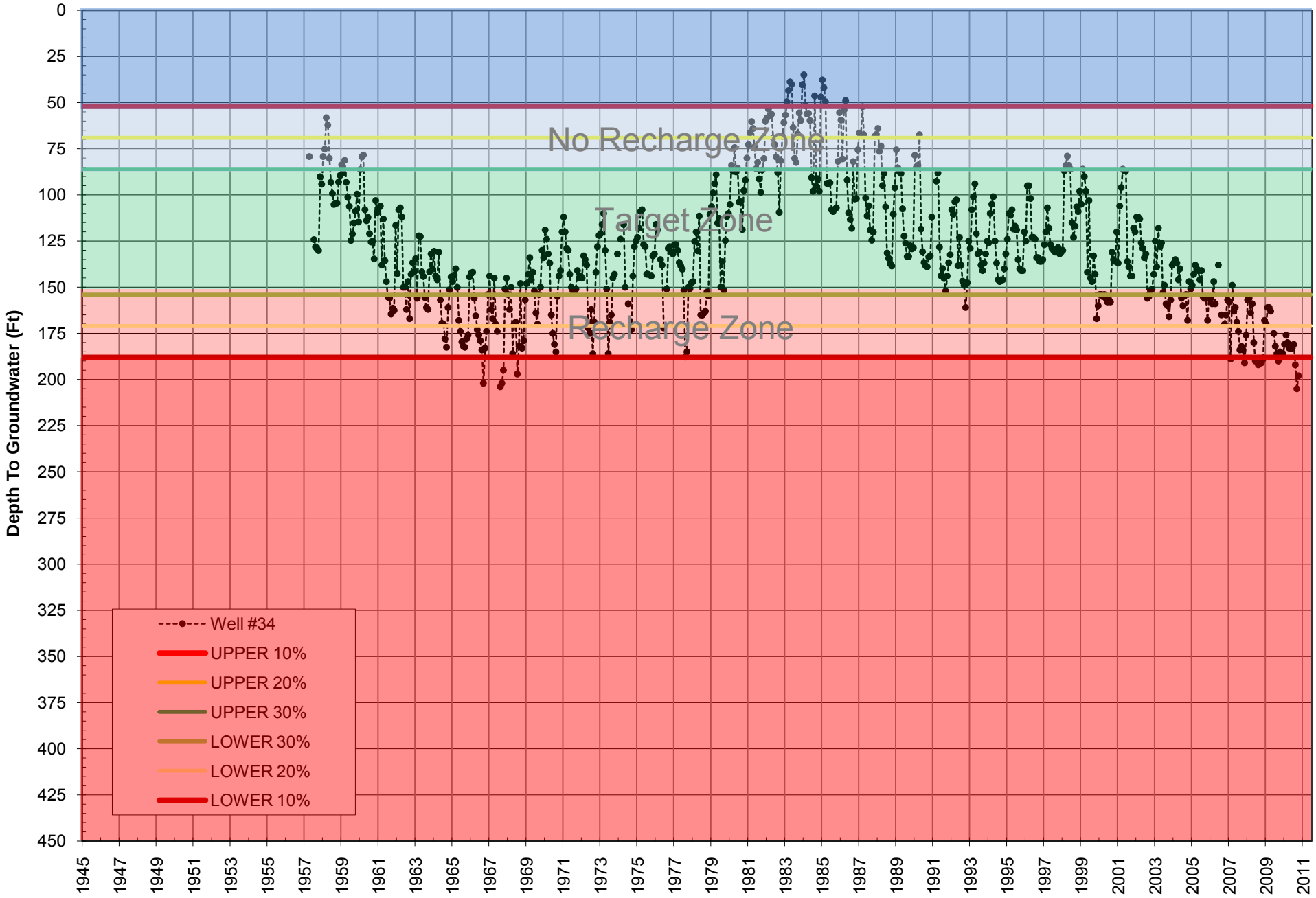
City of Redlands



Well #34

Index Well Hydrograph

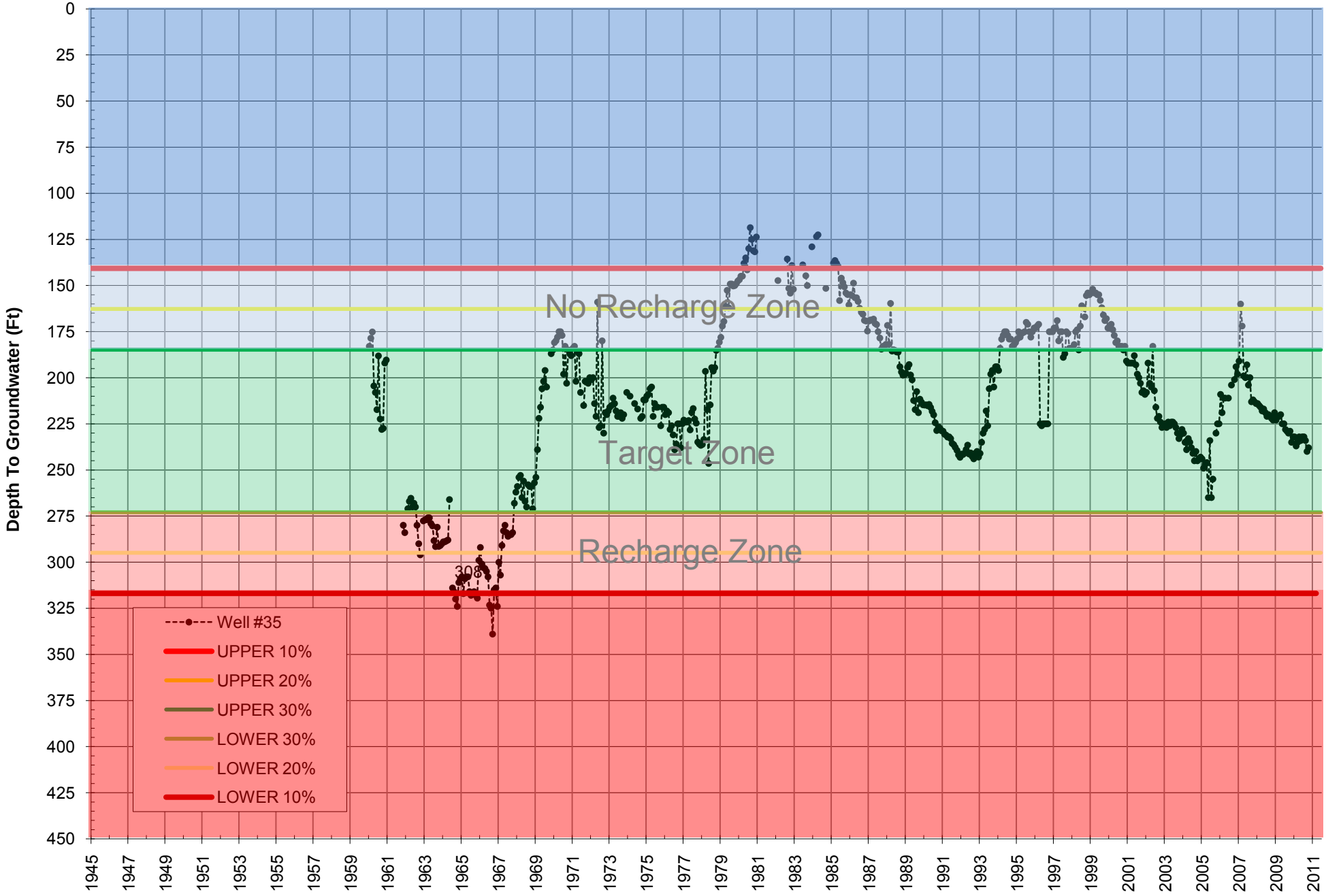
City of Redlands



Well #35

Index Well Hydrograph

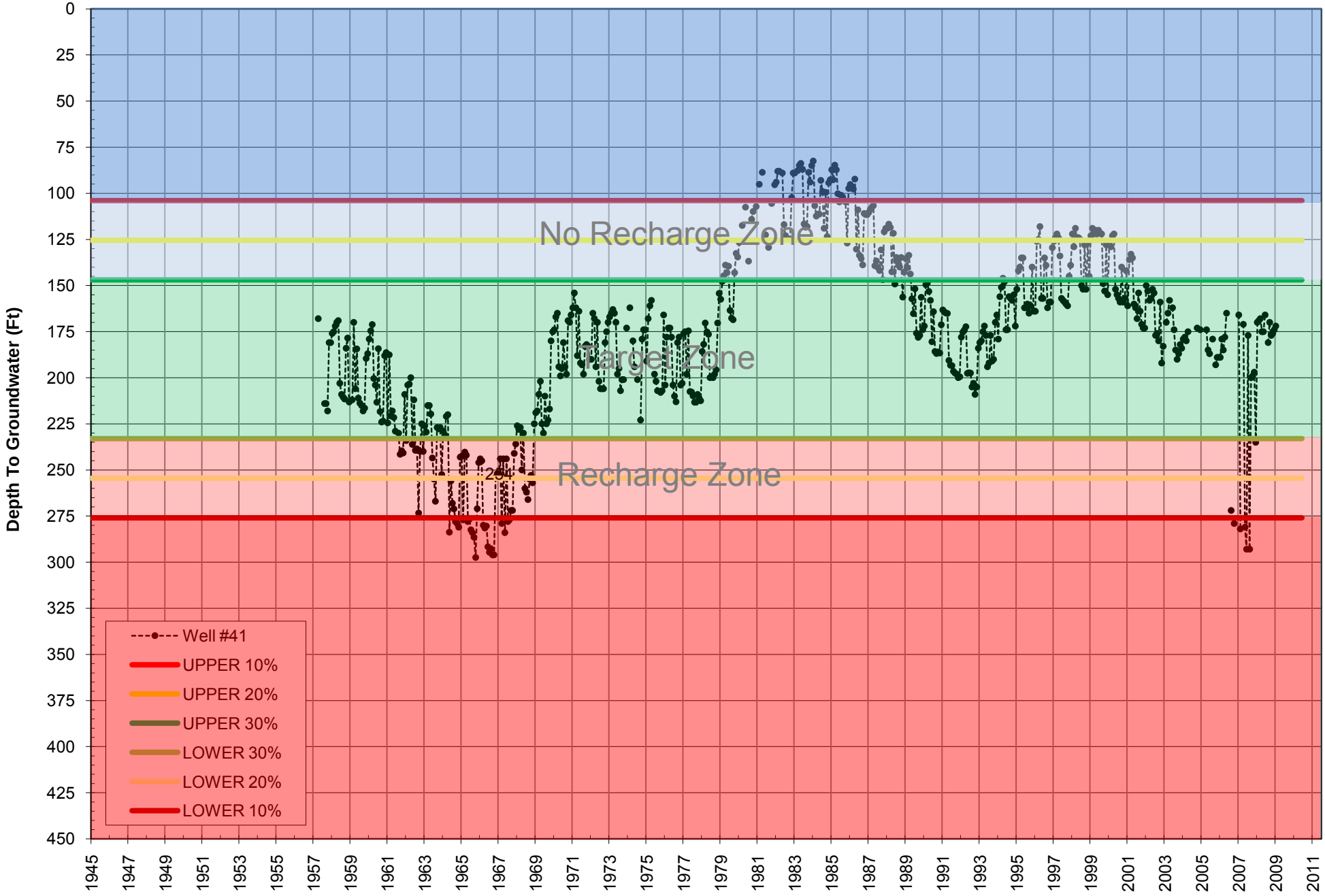
City of Redlands



Well #41

Index Well Hydrograph

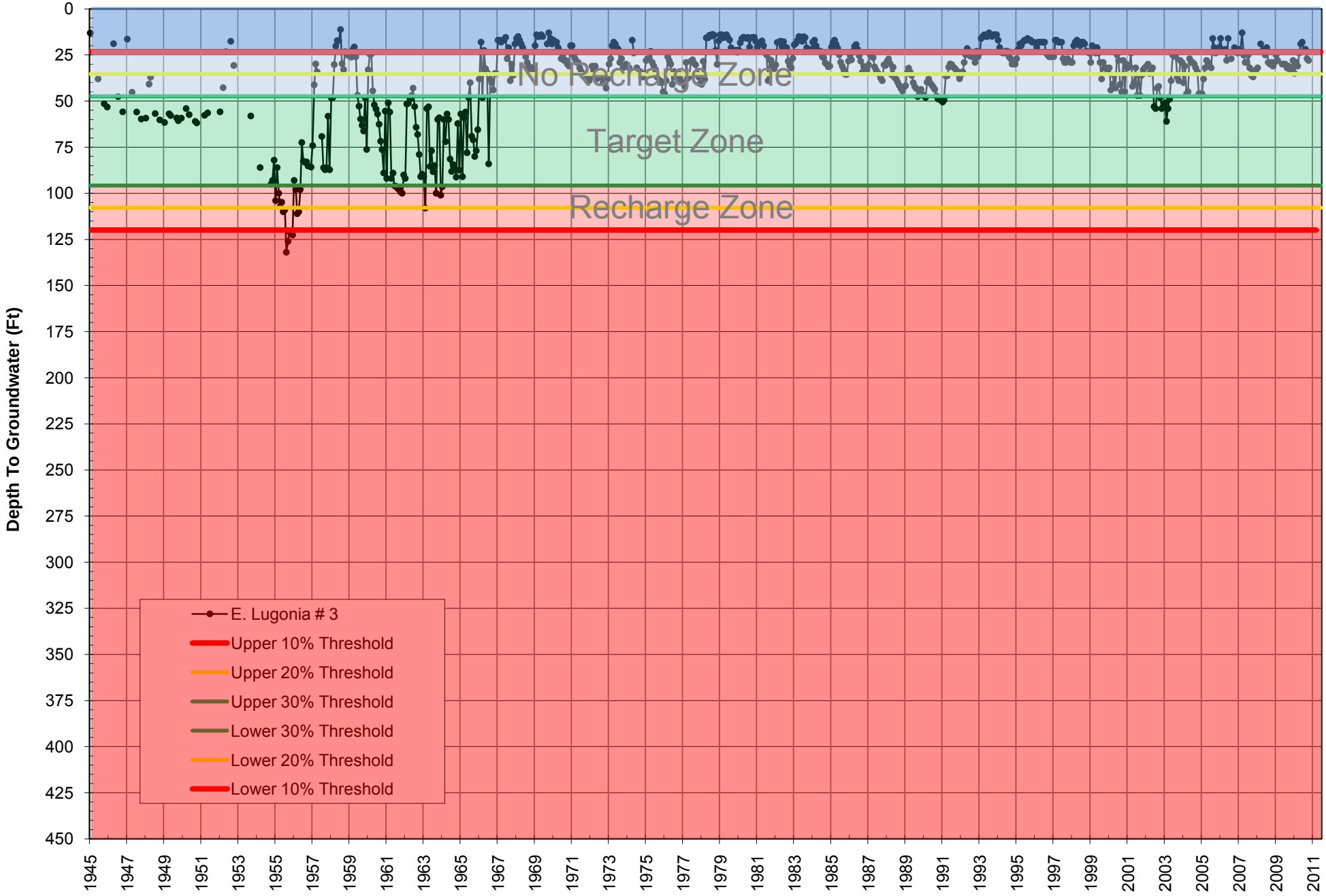
City of Redlands



East Lugonia #3

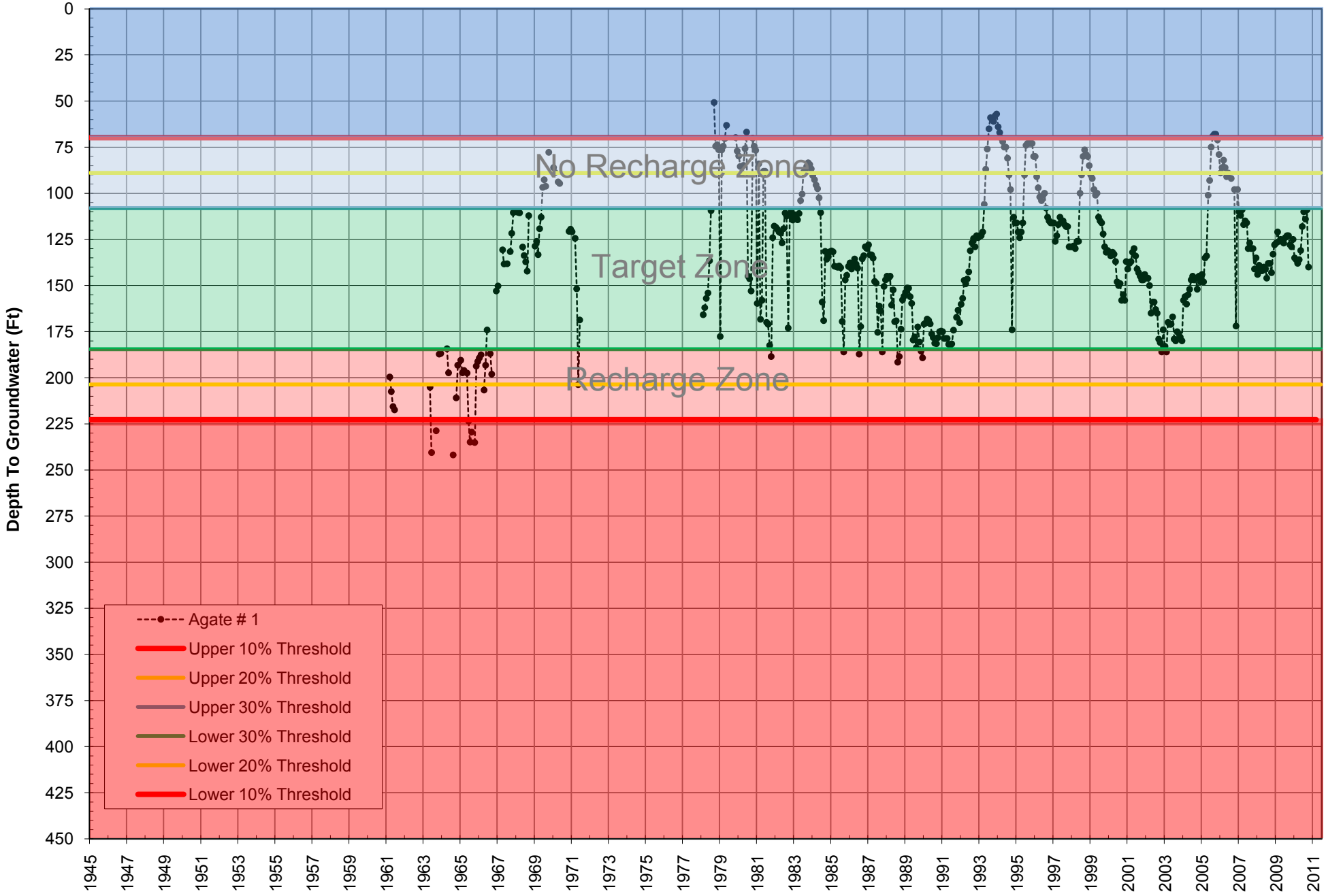
Index Well Hydrograph

City of Redlands



Agate #1
Index Well Hydrograph

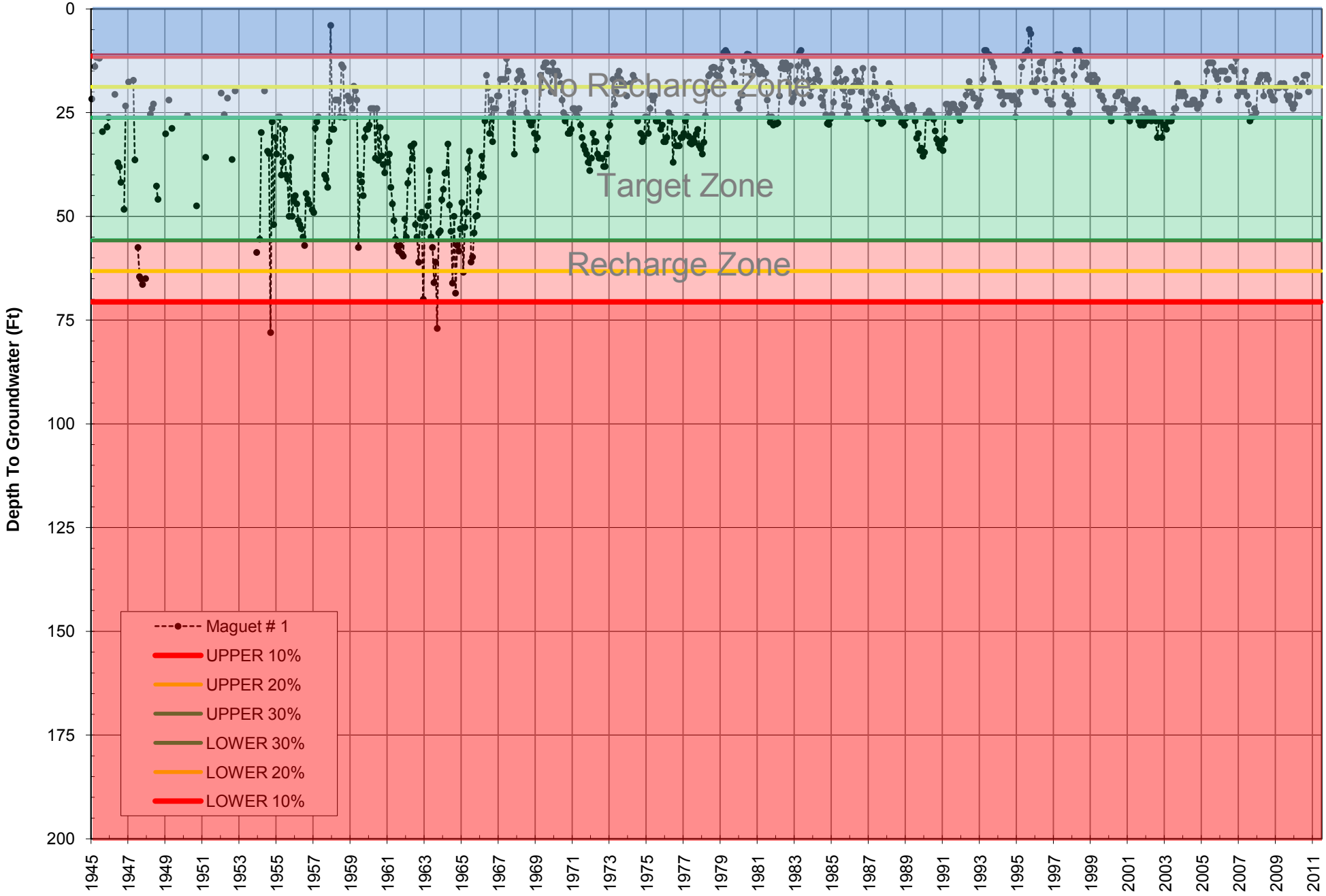
City of Redlands



Maguet #1

Index Well Hydrograph

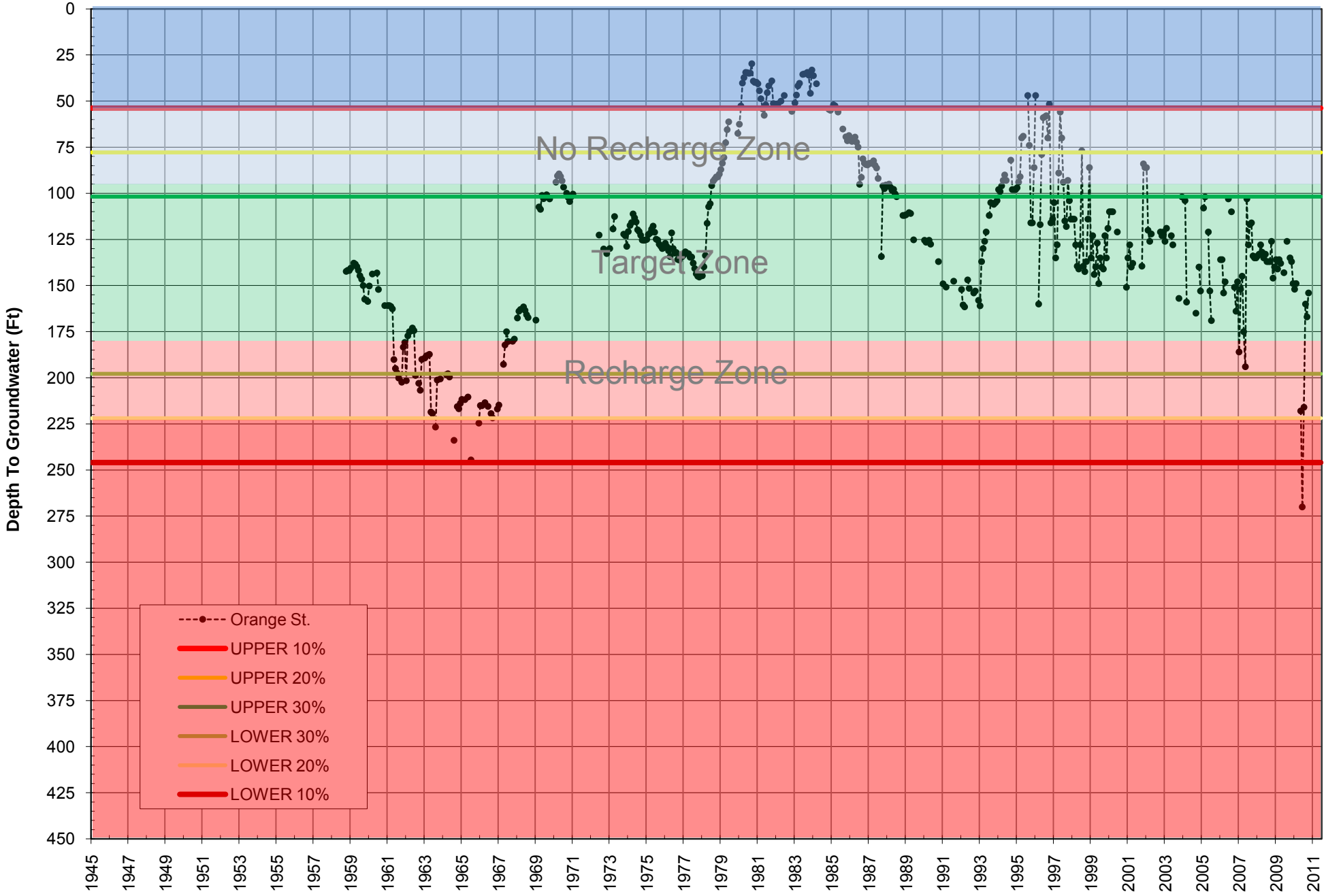
City of Redlands



Orange St.

Index Well Hydrograph

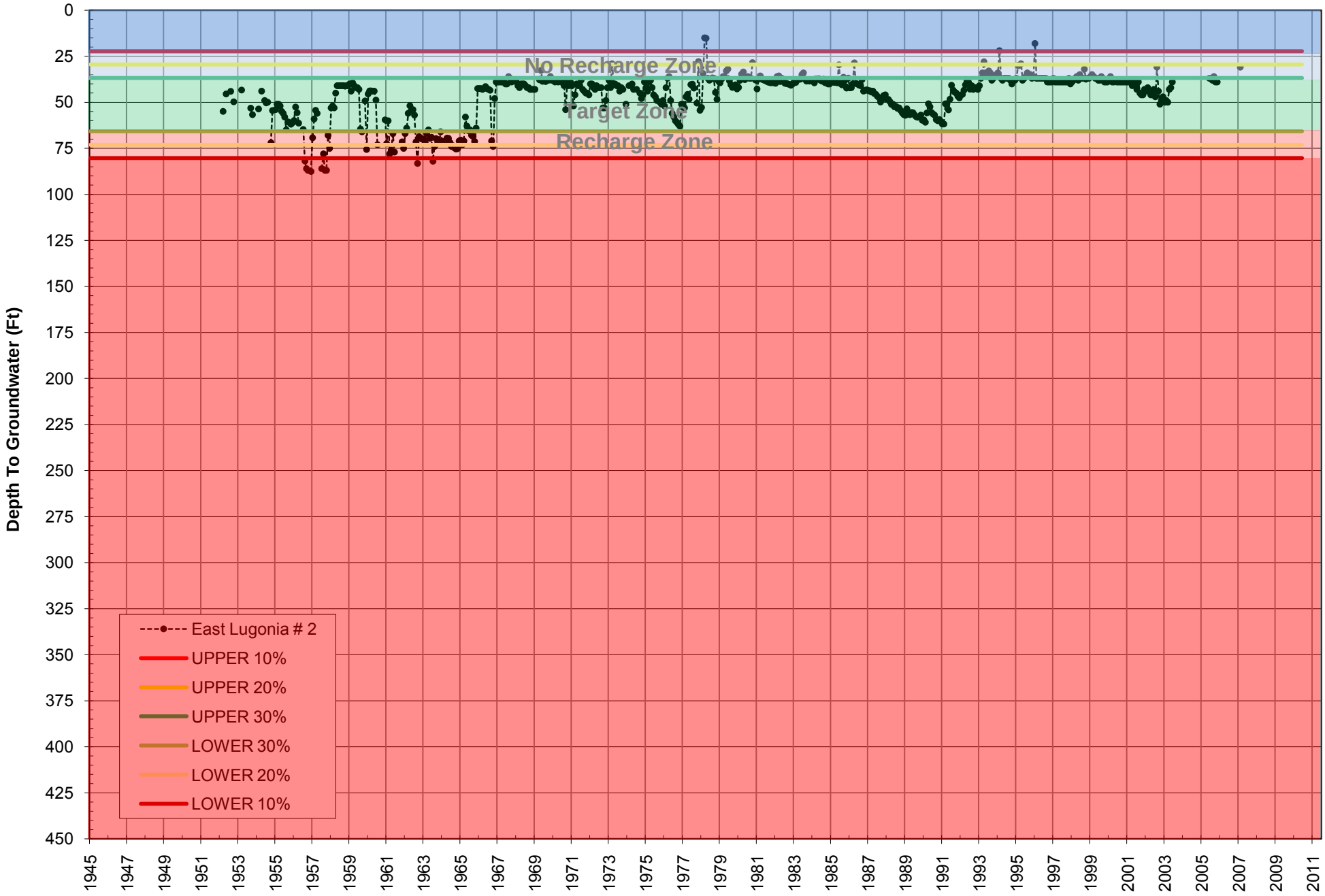
City of Redlands



East Lugonia #2

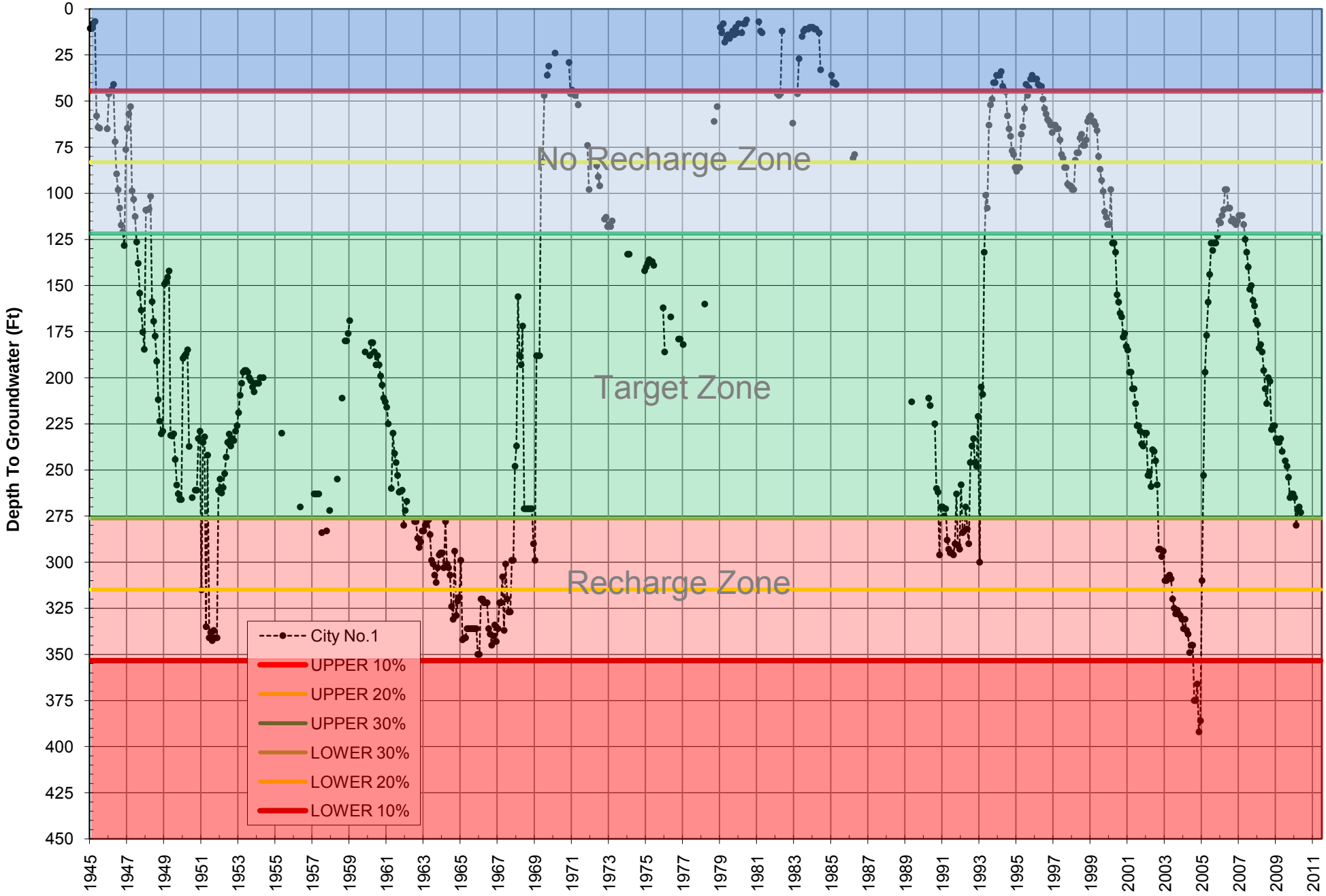
Index Well Hydrograph

City of Redlands



City No. 1
Index Well Hydrograph

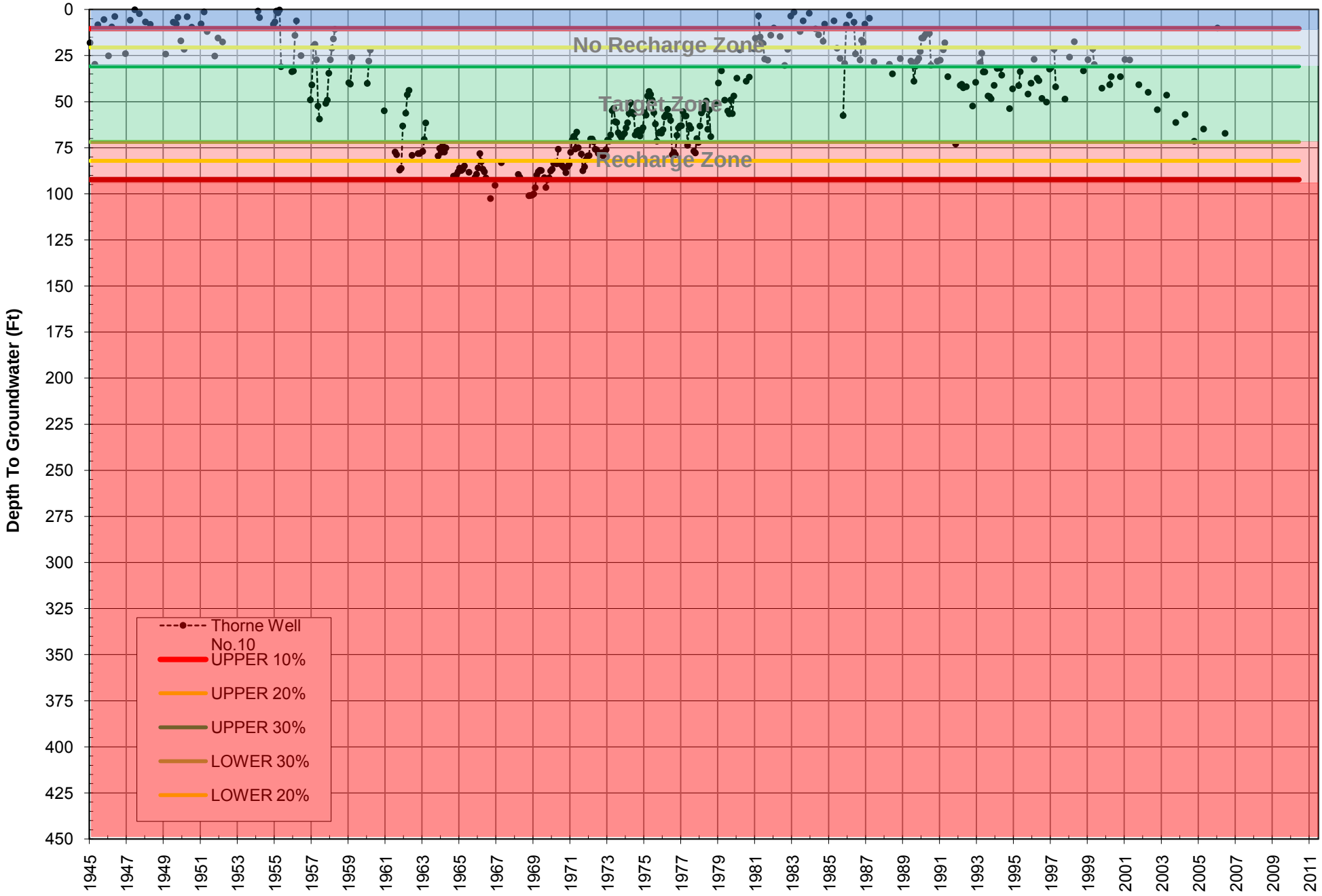
City of Rialto



Thorne No. 10

Index Well Hydrograph

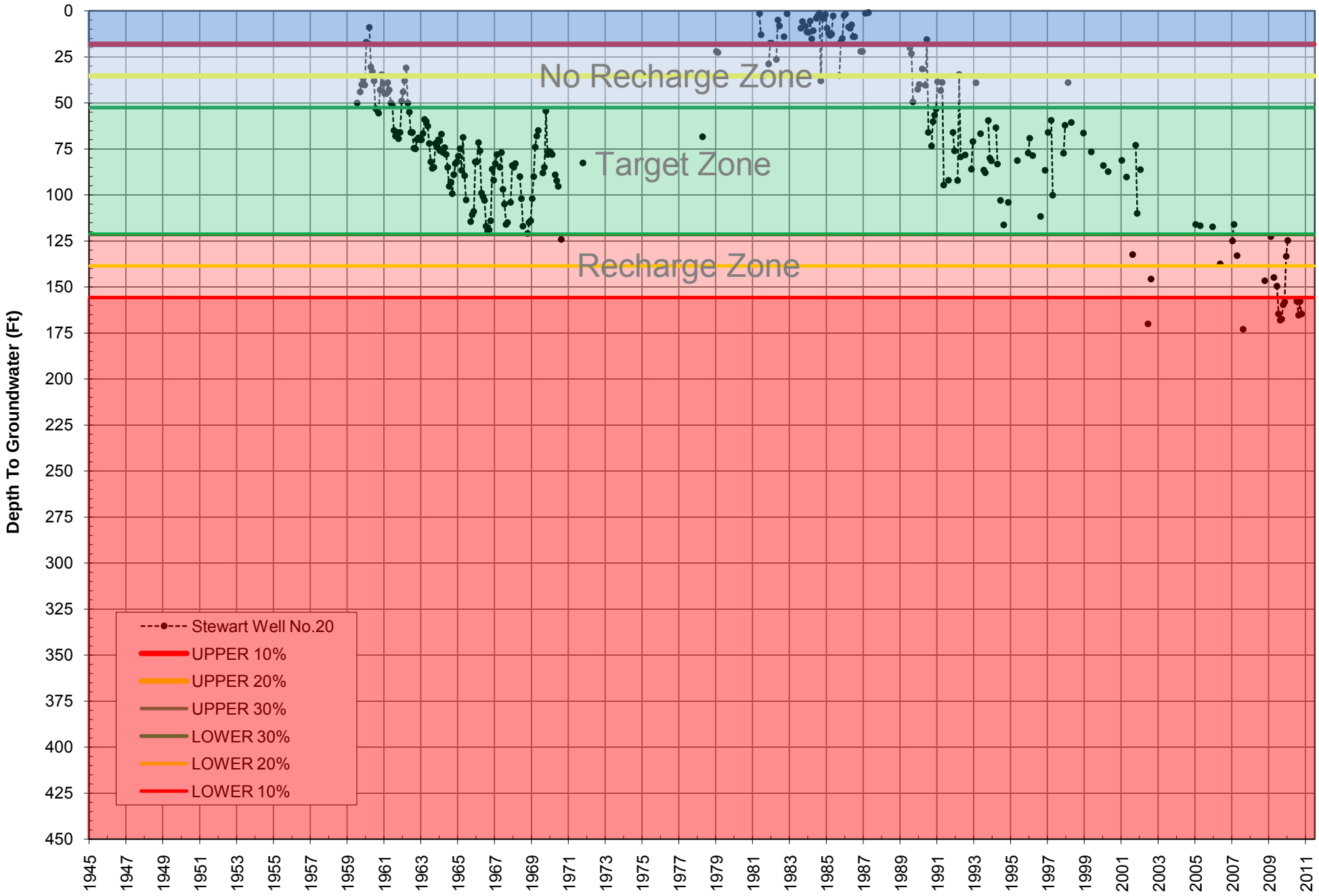
City of Riverside



Stewart No. 20

Index Well Hydrograph

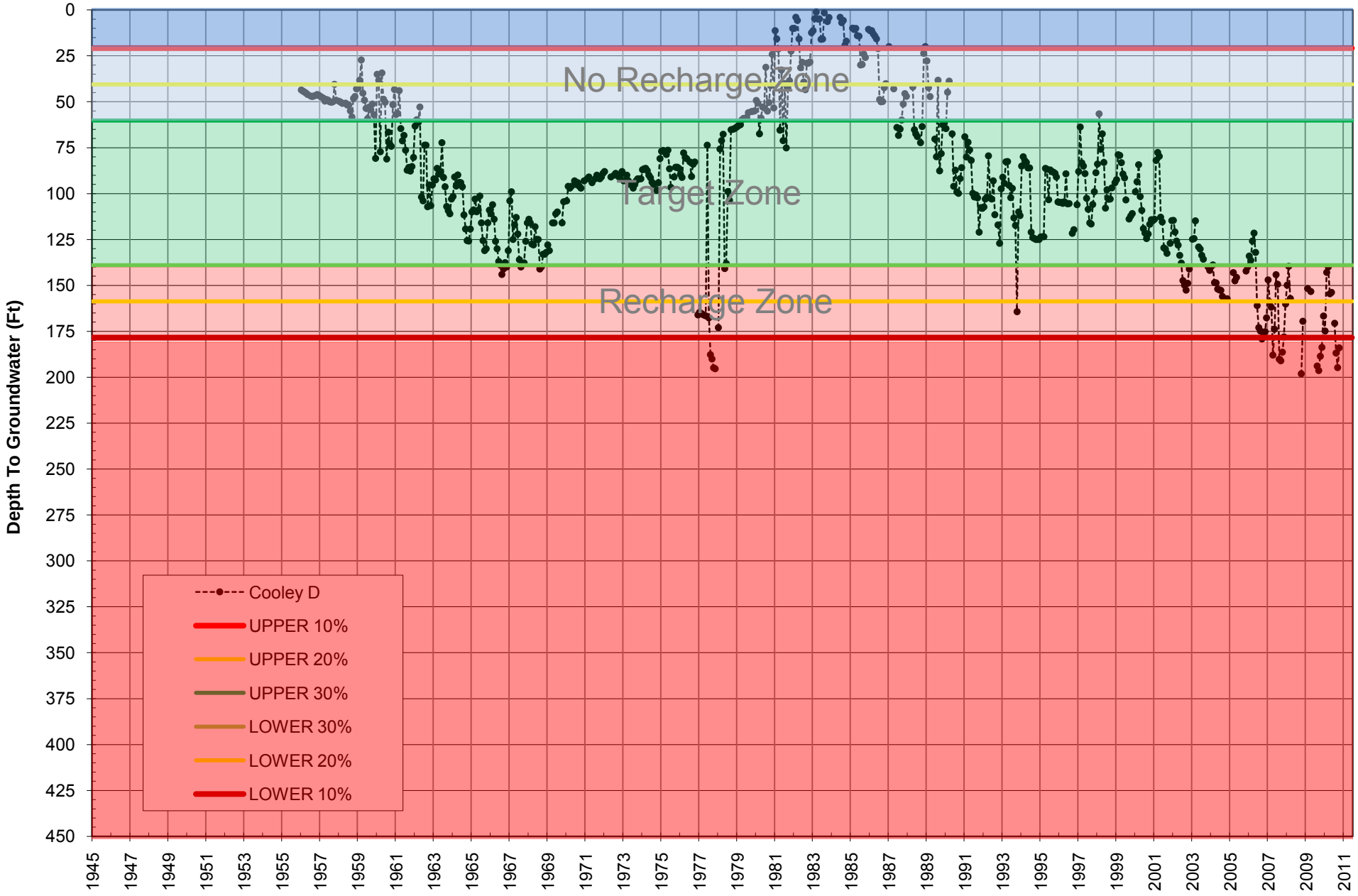
City of Riverside



Cooley D

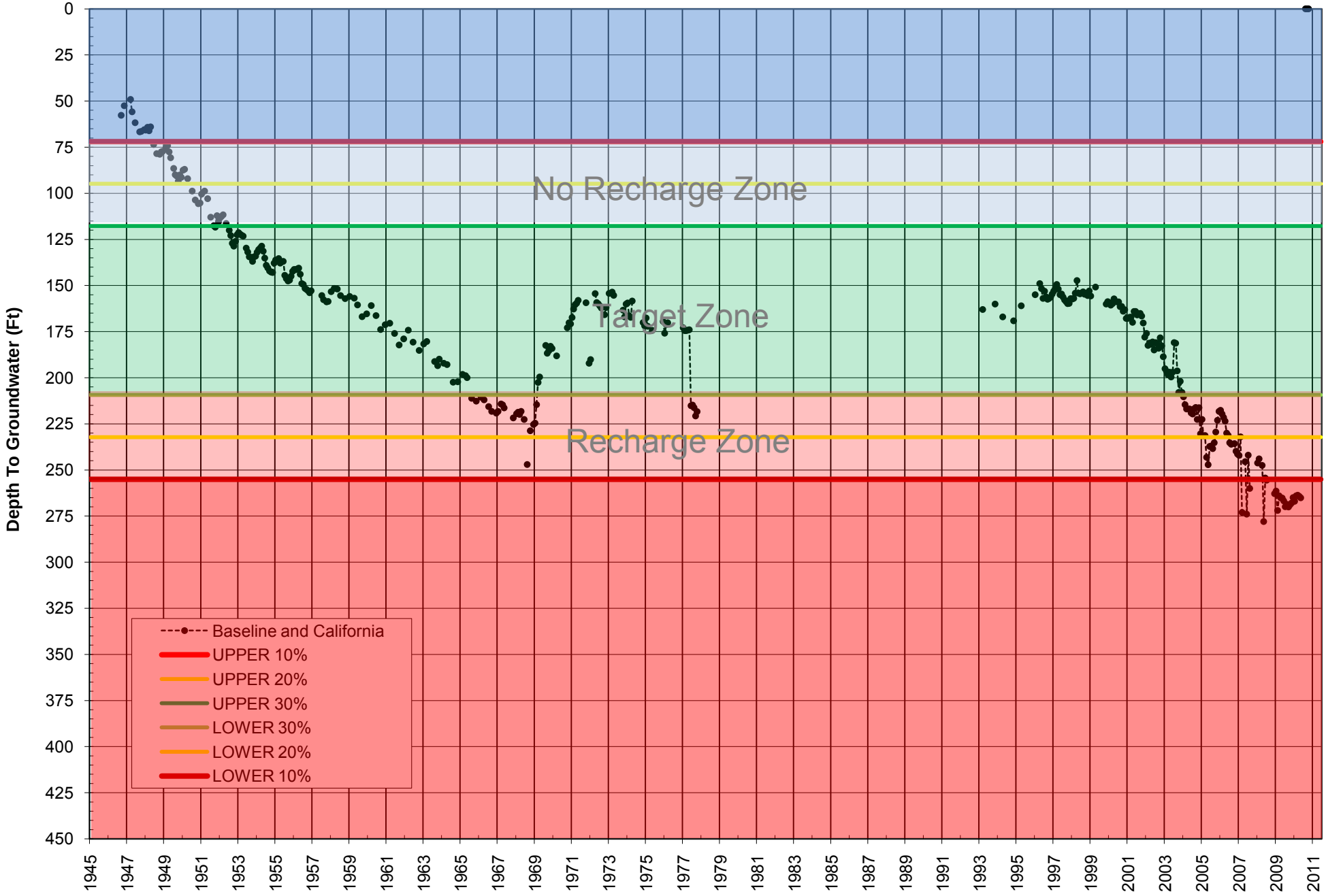
Index Well Hydrograph

City of Riverside



Baseline & California
Index Well Hydrograph

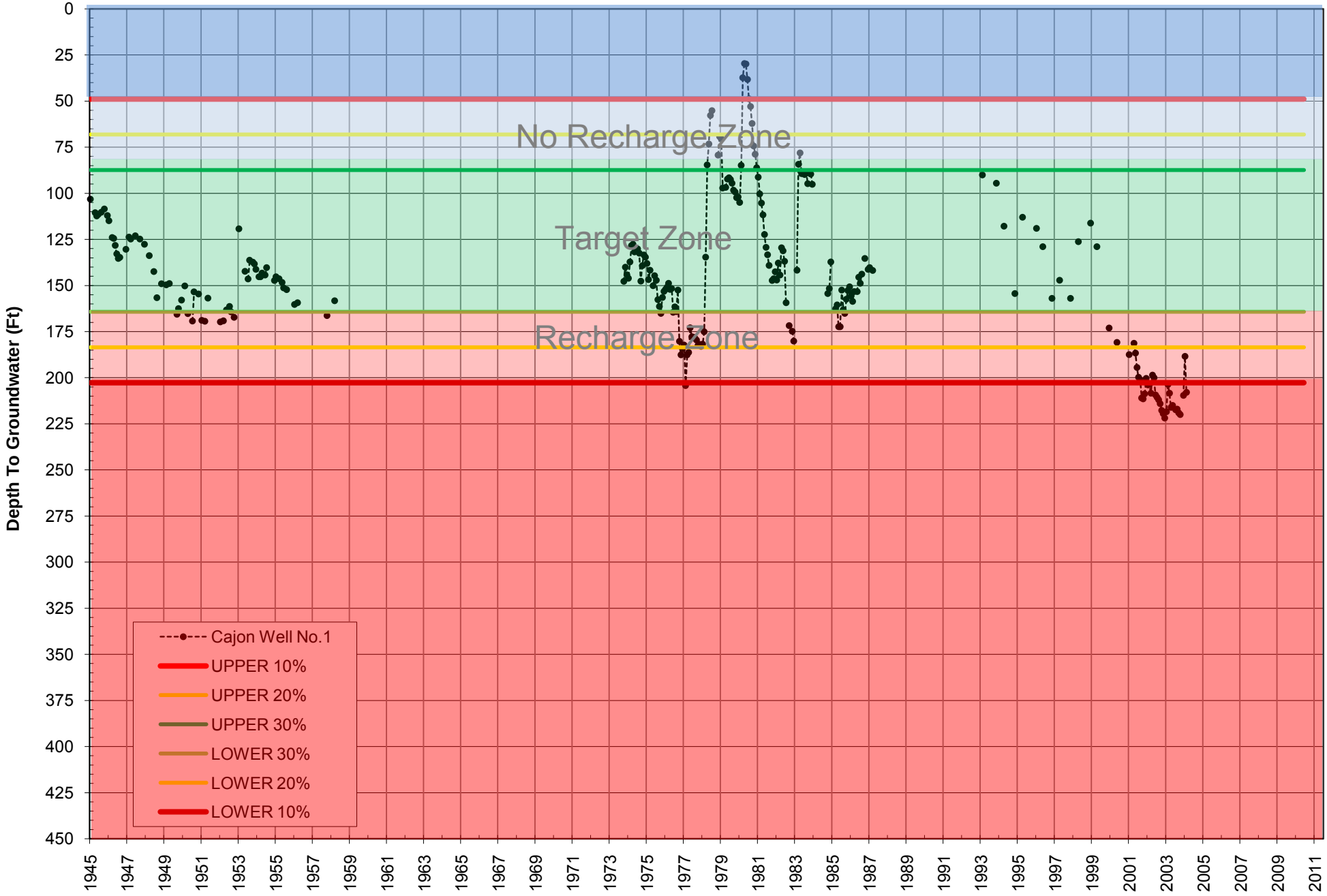
City of San Bernardino



Cajon Well No. 1

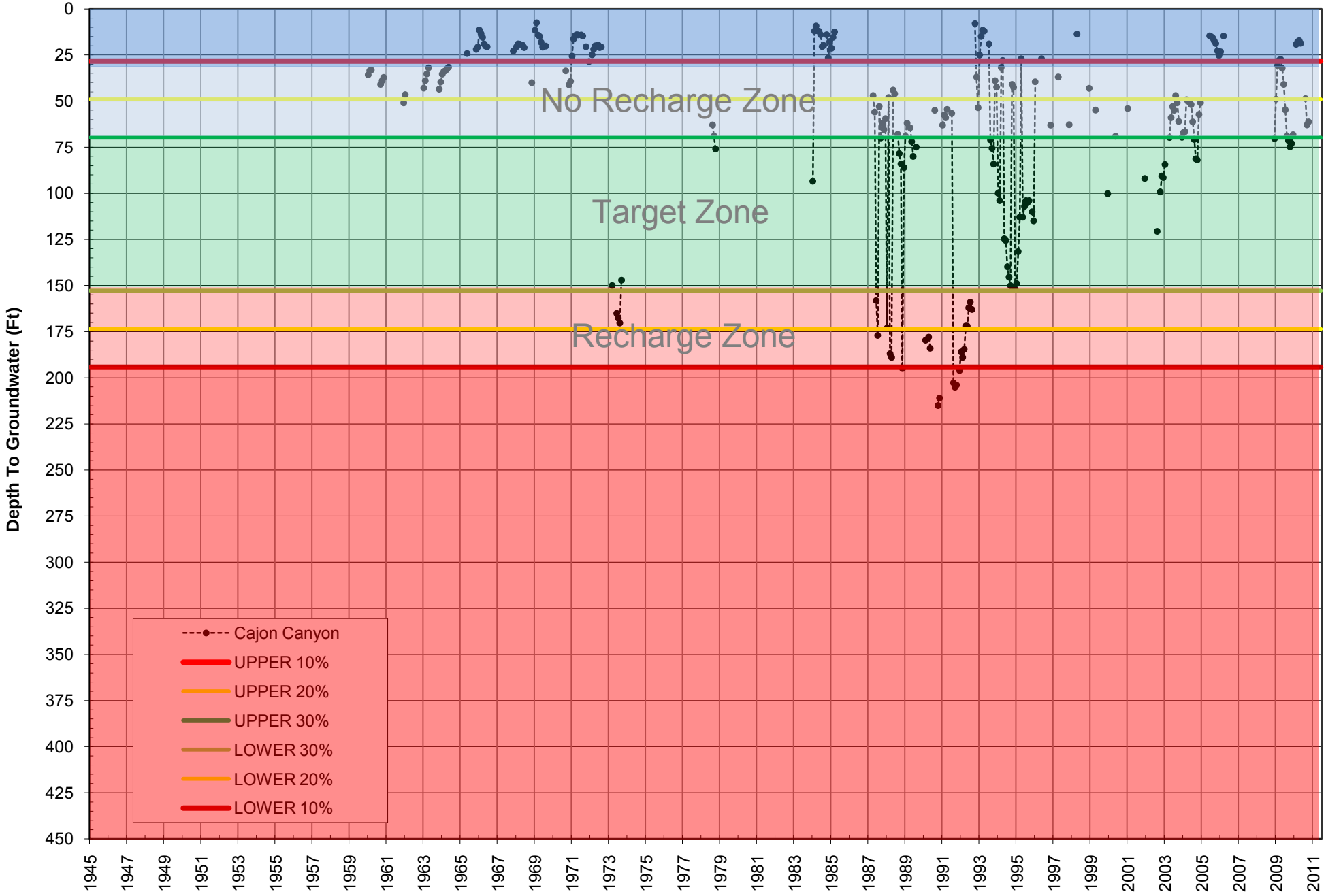
Index Well Hydrograph

City of San Bernardino



Cajon Canyon
Index Well Hydrograph

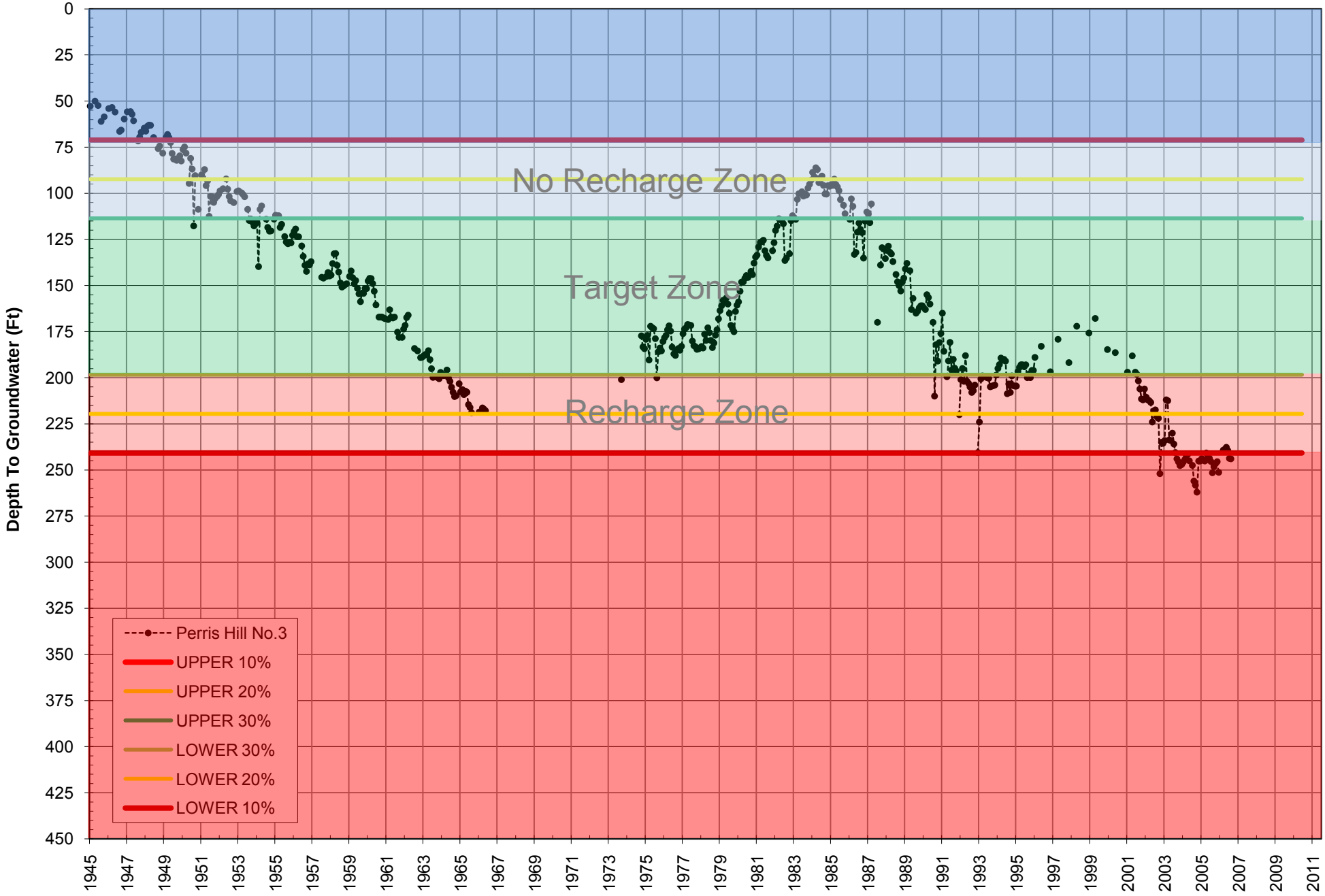
City of San Bernardino



Perris Hill No. 3

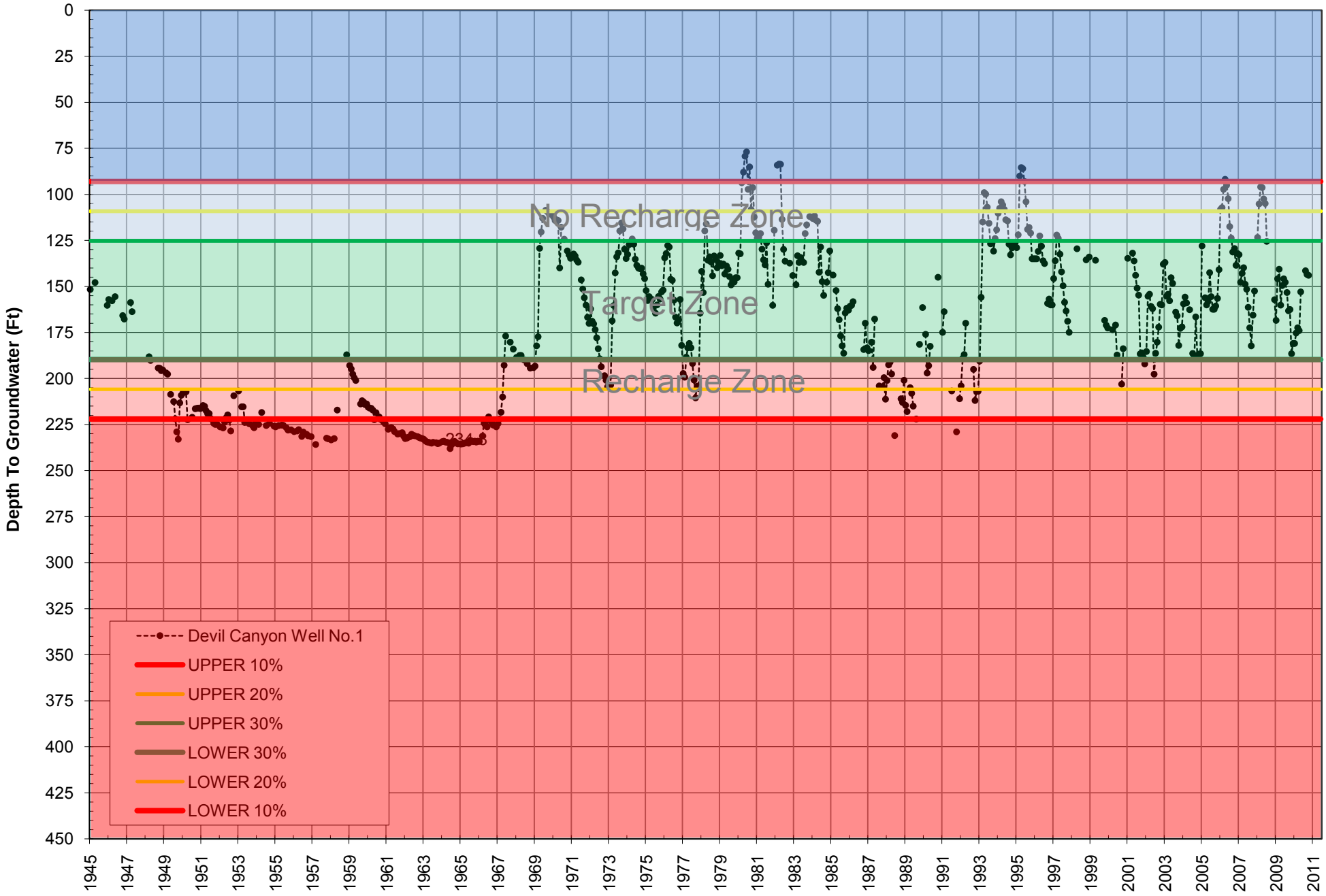
Index Well Hydrograph

City of San Bernardino



Devil Canyon No. 1
Index Well Hydrograph

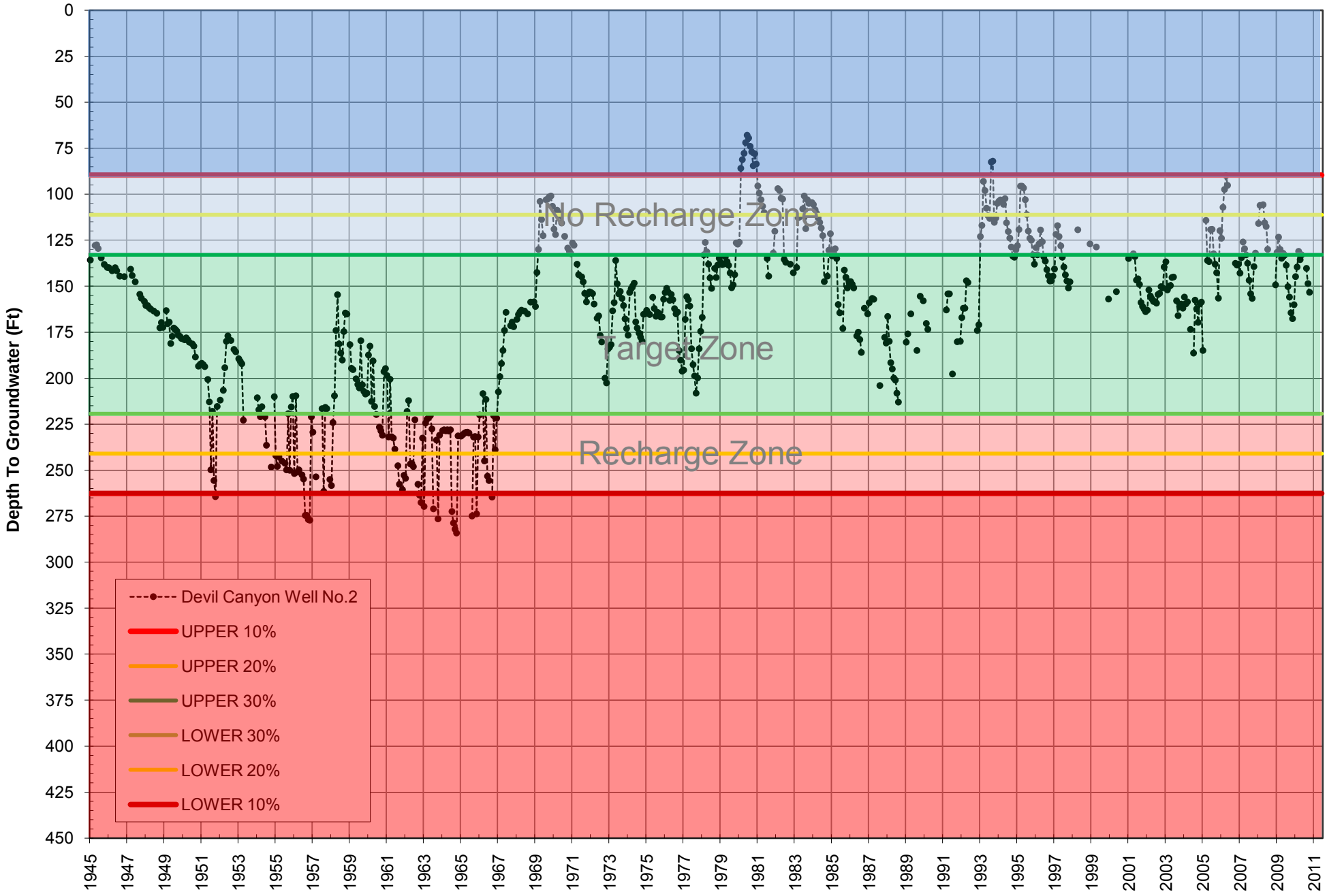
City of San Bernardino



Devil Canyon No. 2

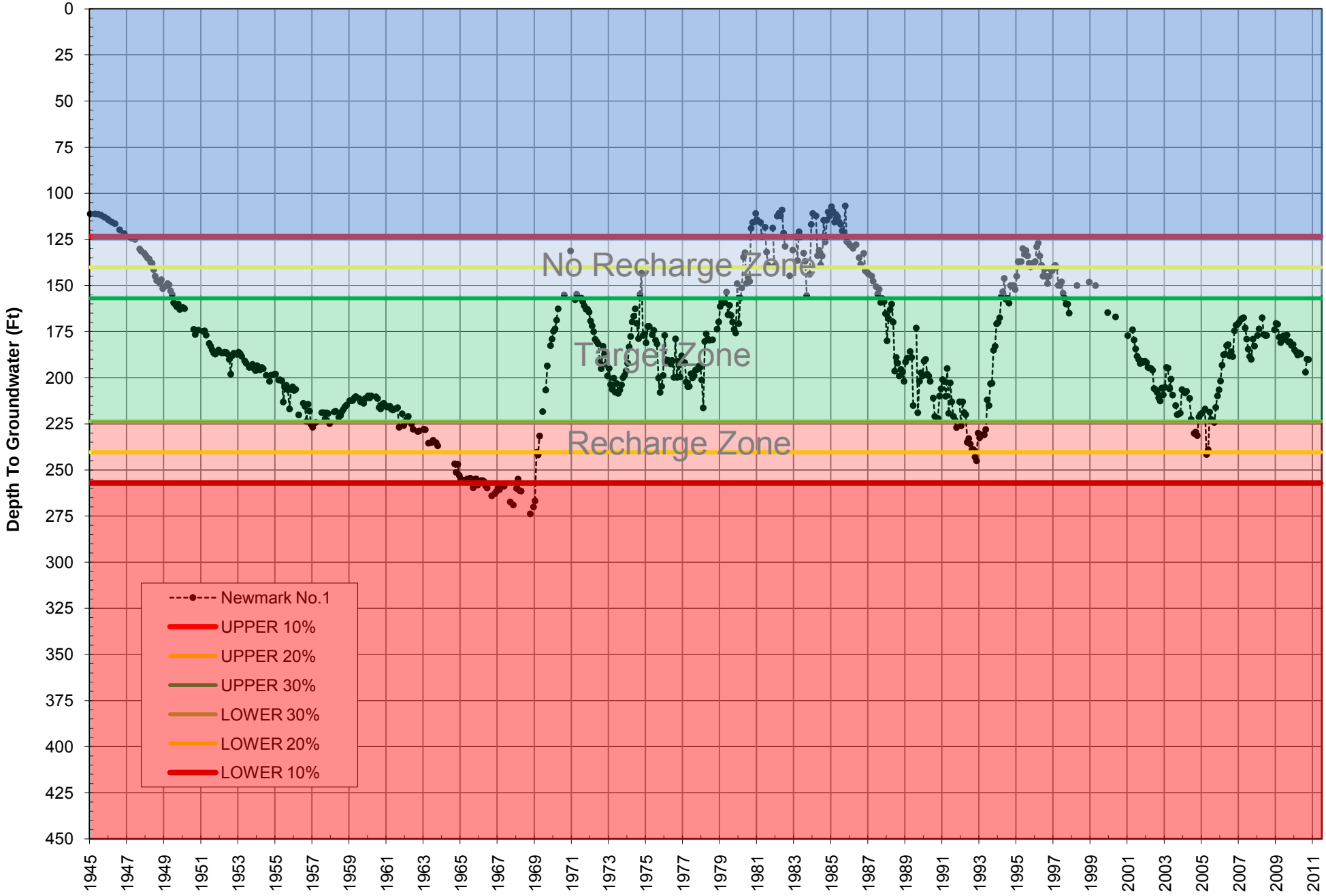
Index Well Hydrograph

City of San Bernardino



Newmark No. 1
Index Well Hydrograph

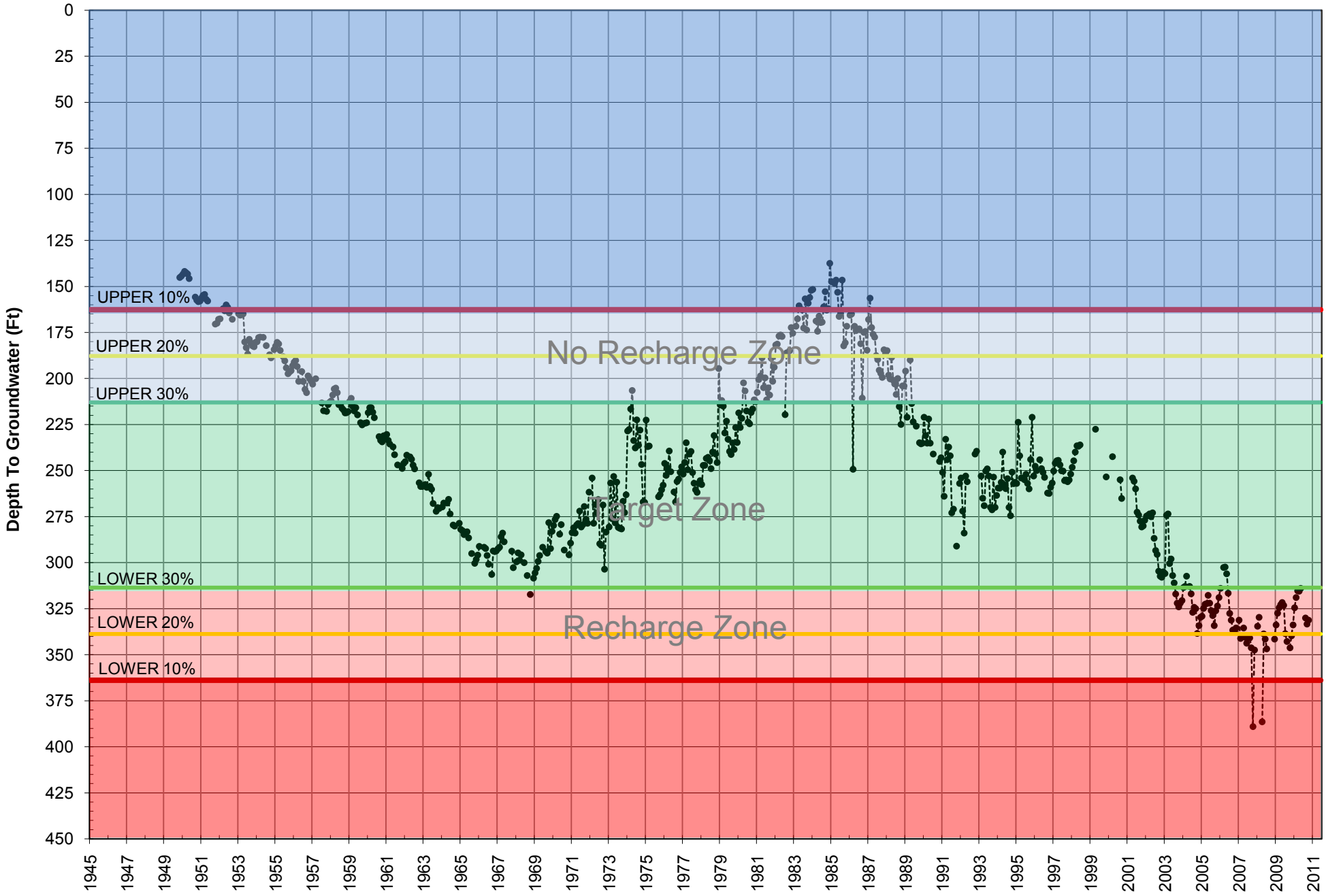
City of San Bernardino



Waterman Ave.

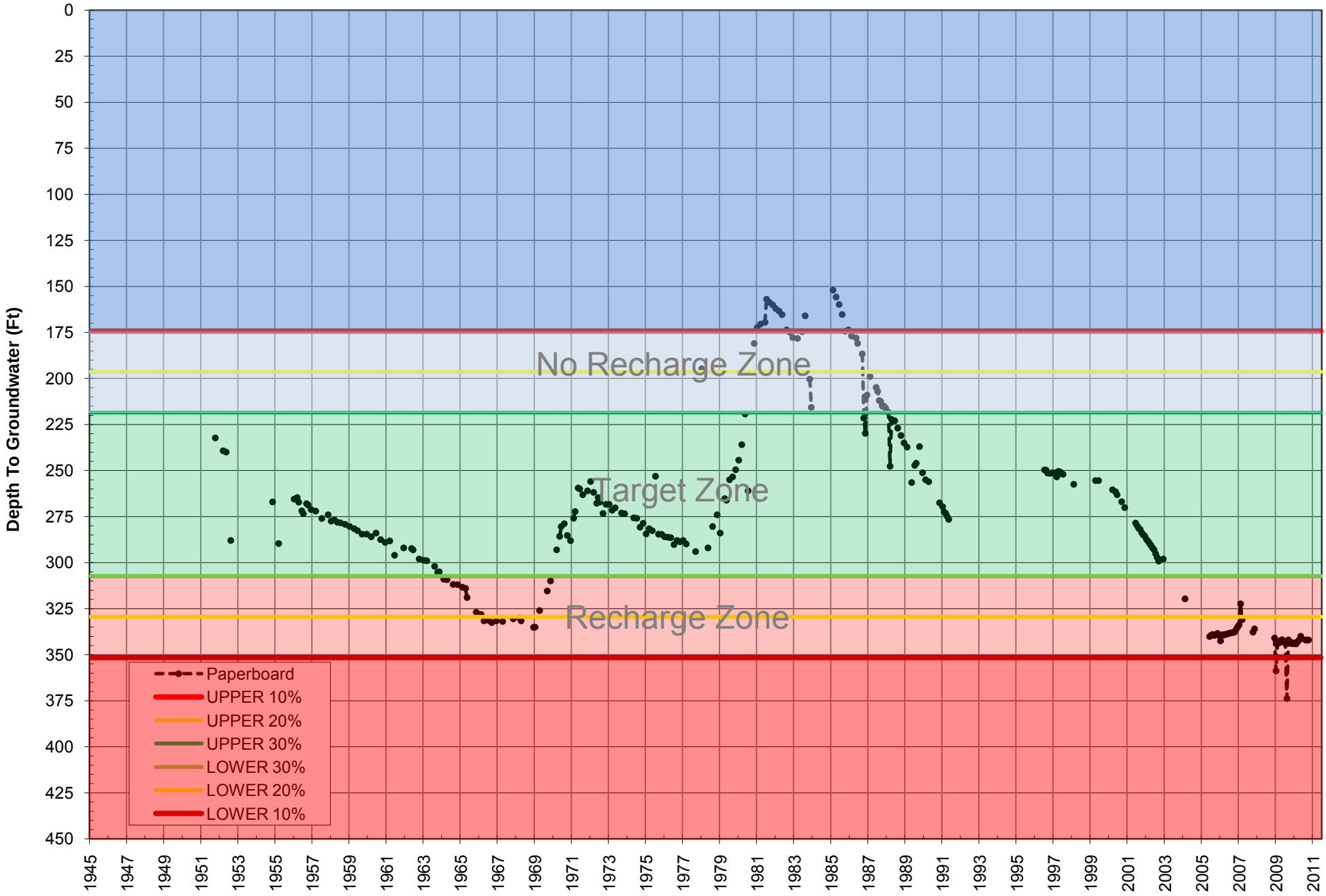
Index Well Hydrograph

City of San Bernardino



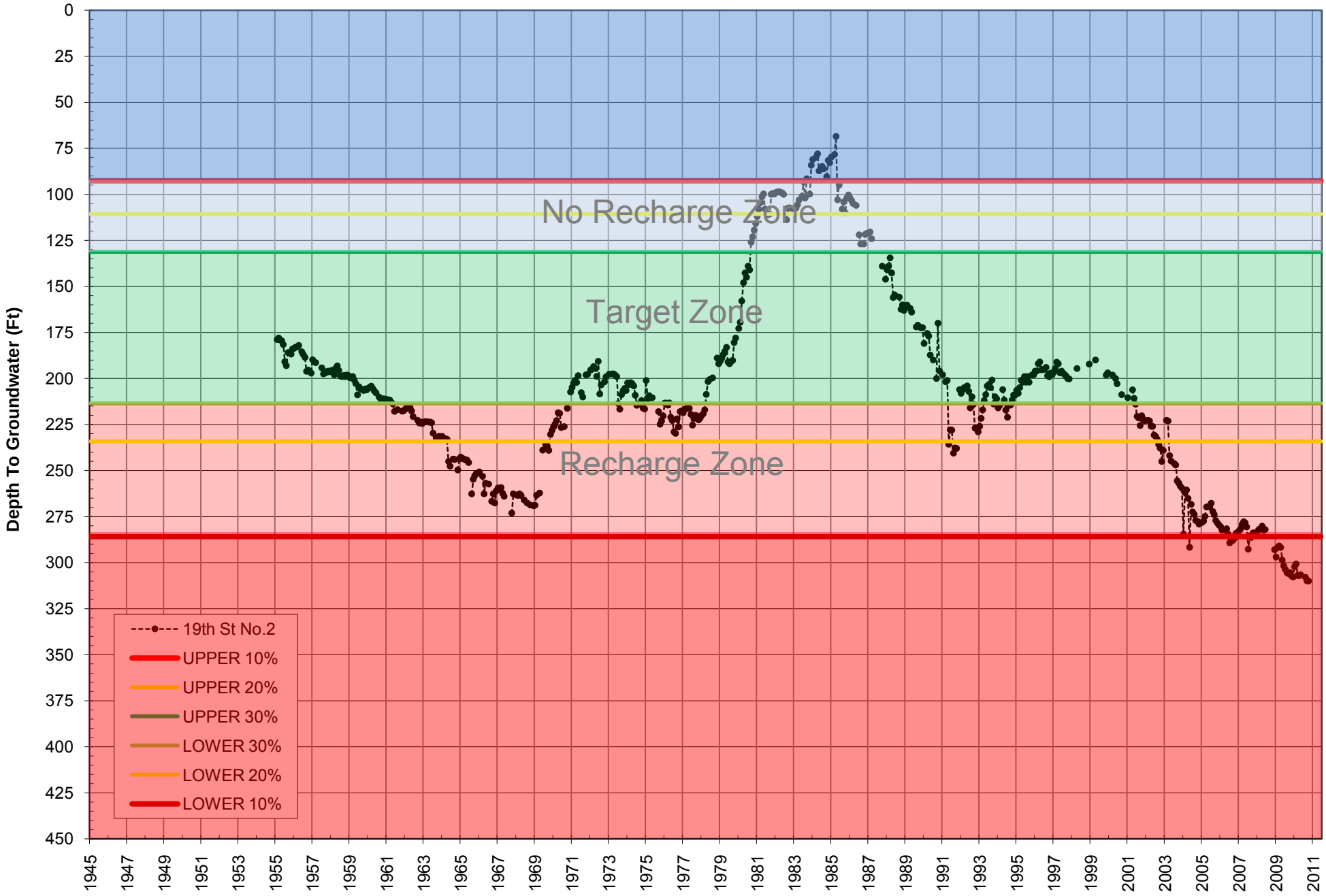
PaperBoard
Index Well Hydrograph

City of San Bernardino



19th St. No. 2
Index Well Hydrograph

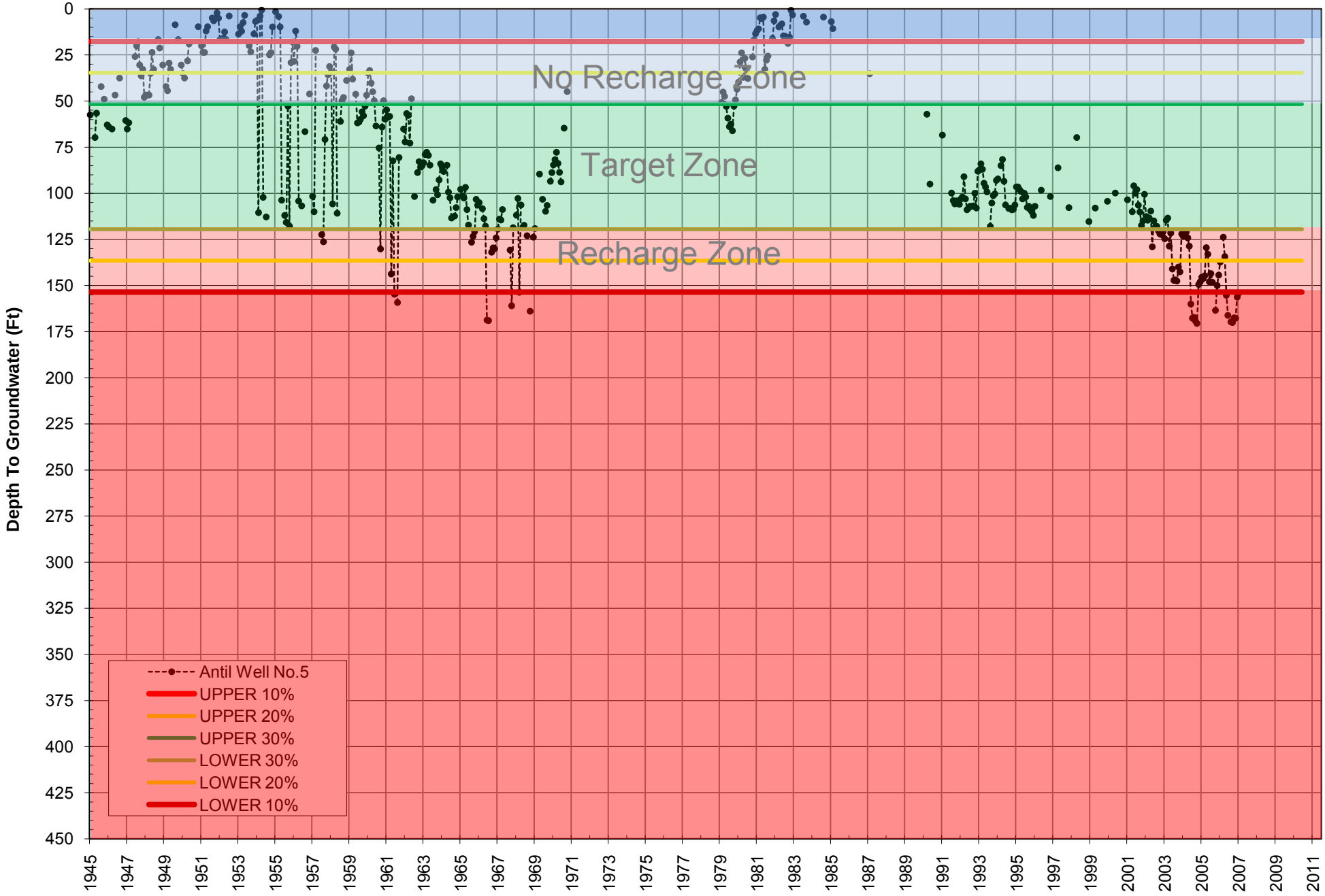
City of San Bernardino



Antil No. 5

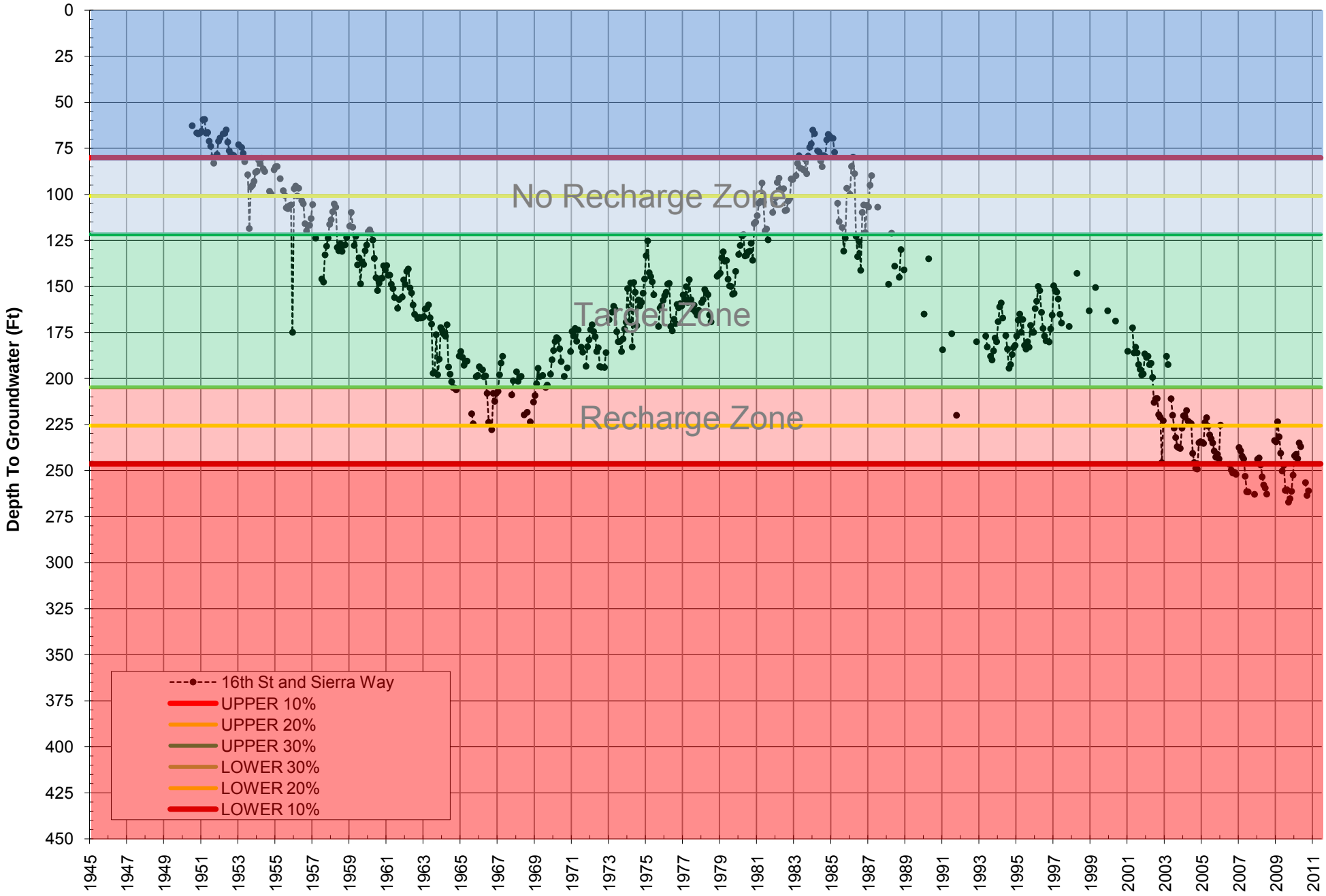
Index Well Hydrograph

City of San Bernardino



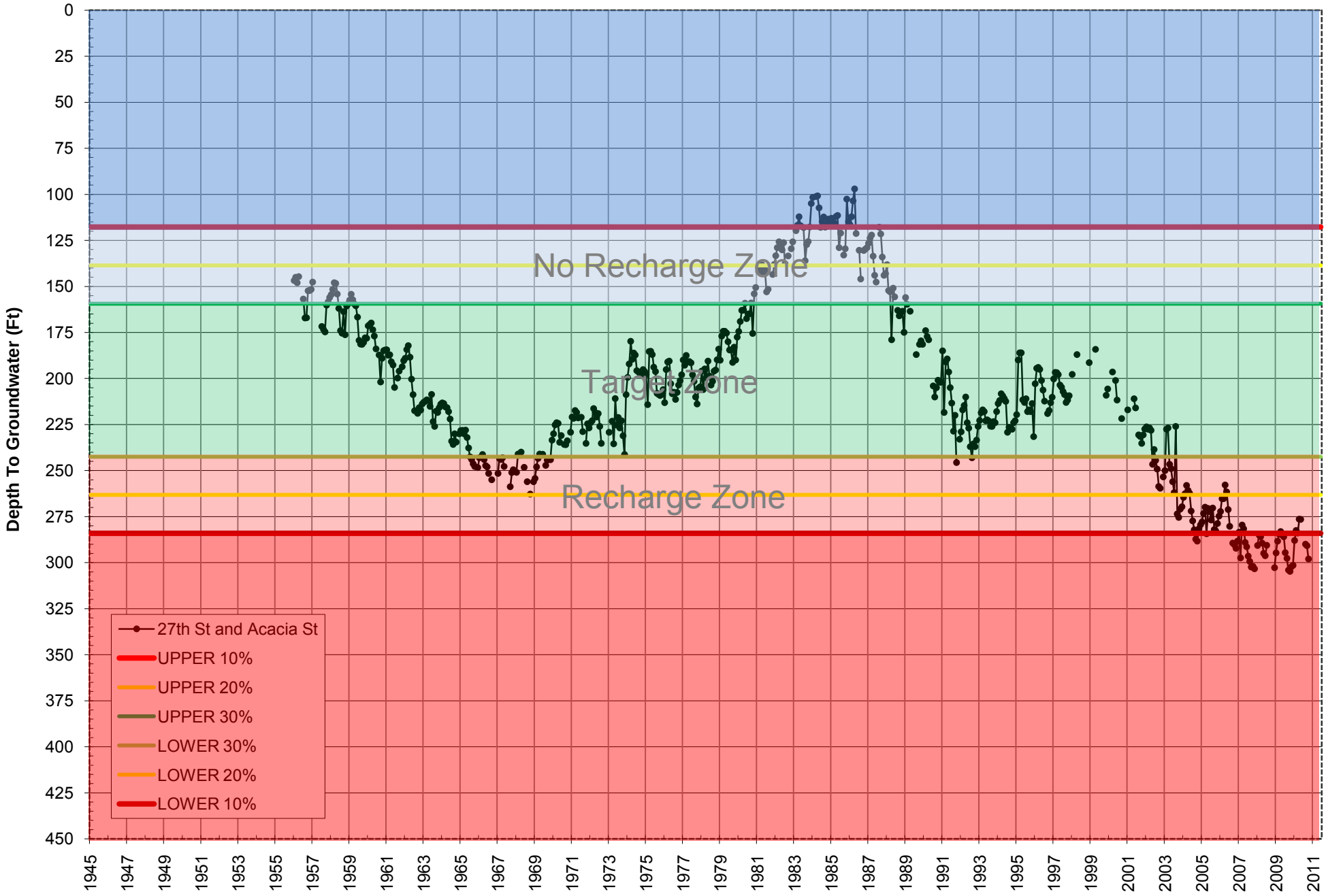
16th St.
Index Well Hydrograph

City of San Bernardino



27th St.
Index Well Hydrograph

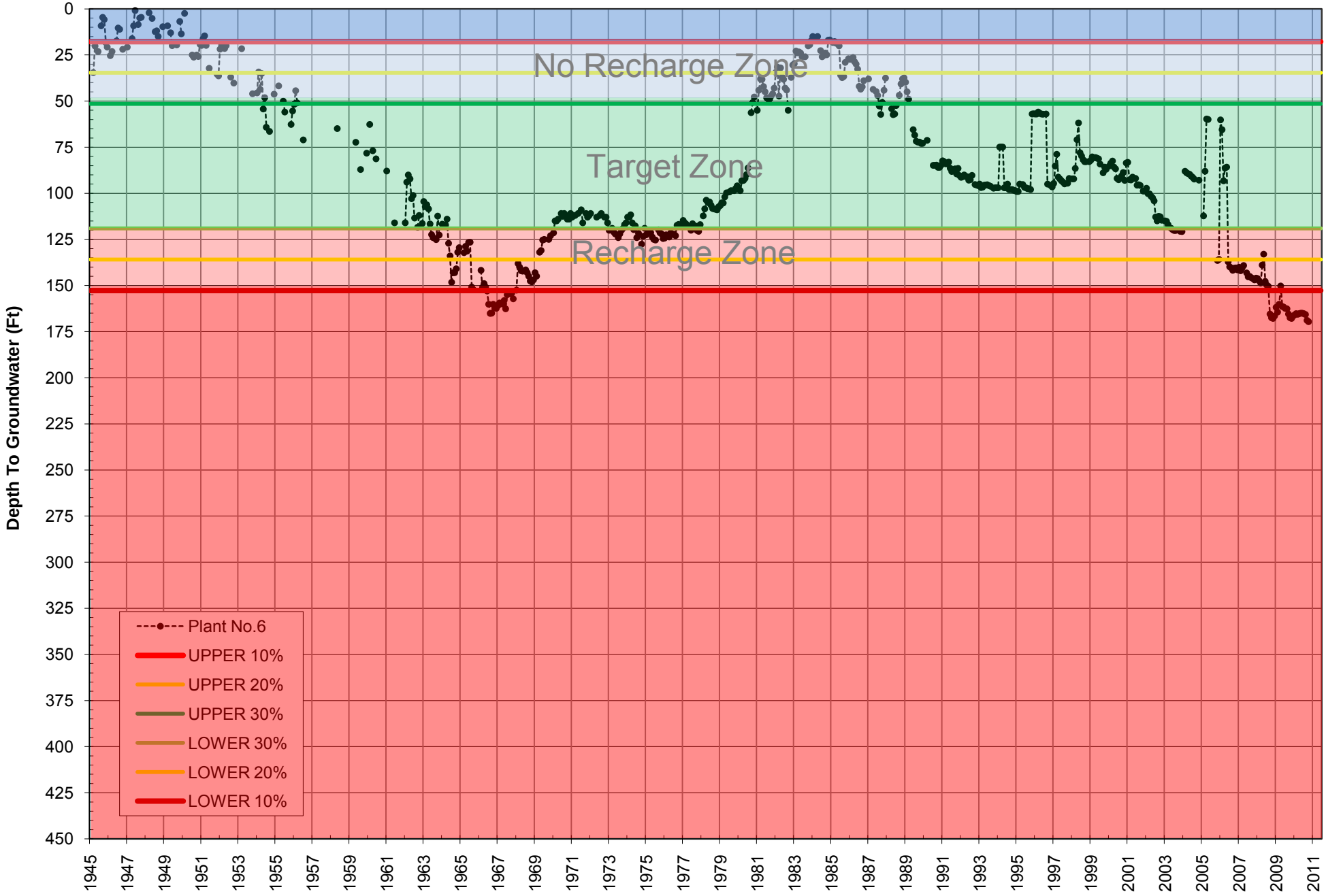
City of San Bernardino



Plant No. 6

Index Well Hydrograph

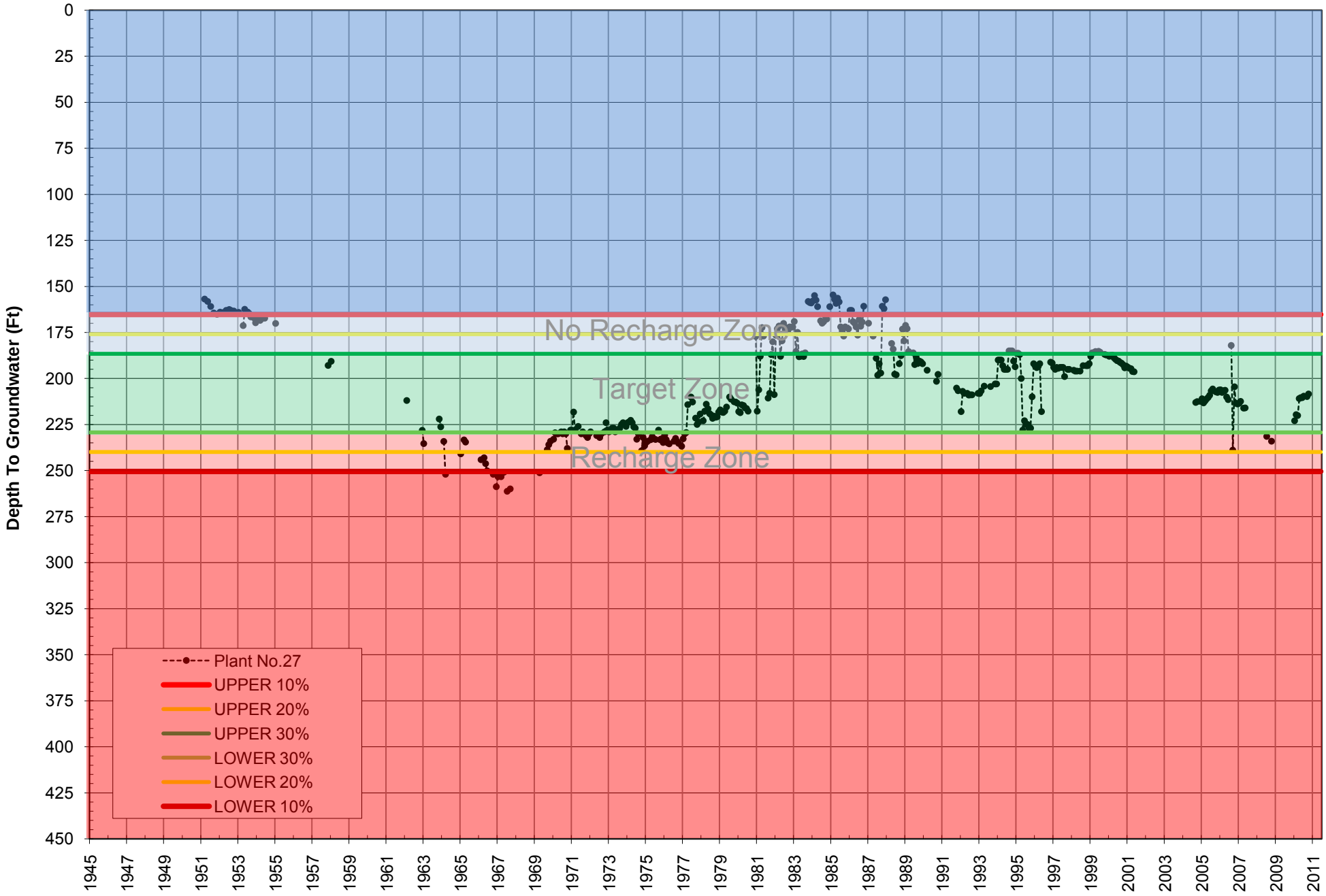
East Valley Water District



Plant No. 27

Index Well Hydrograph

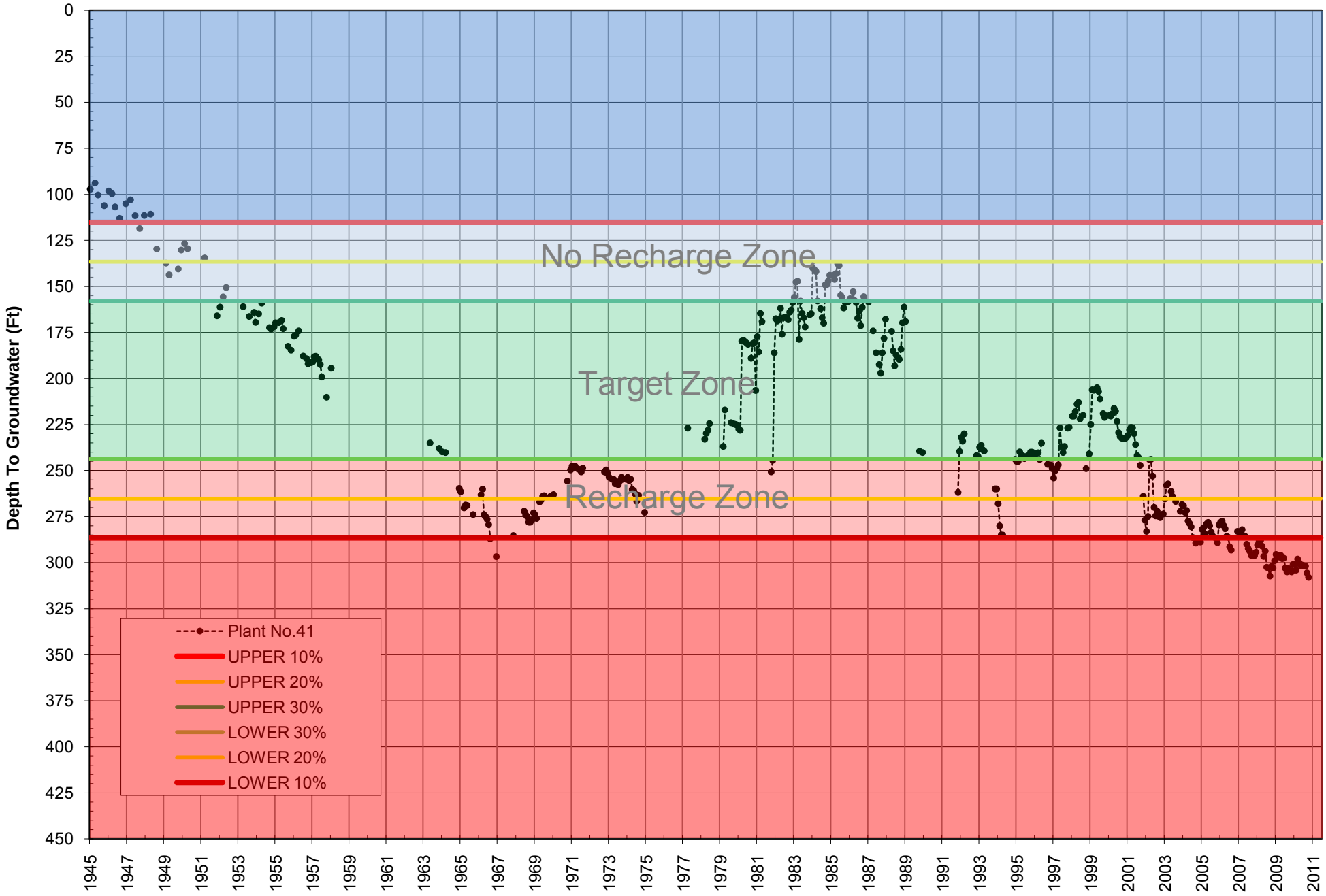
East Valley Water District



Plant No. 41

Index Well Hydrograph

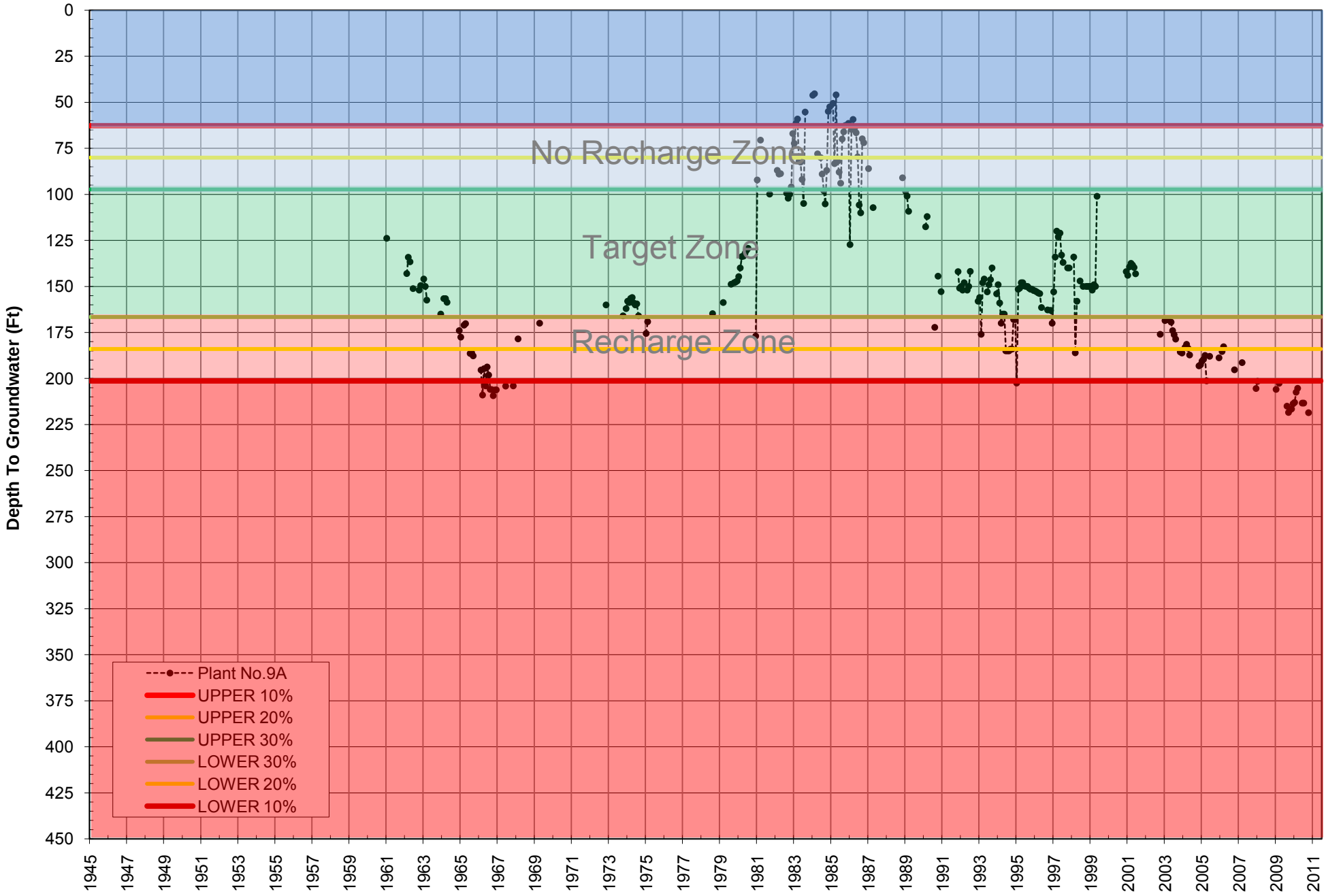
East Valley Water District



Plant No. 9A

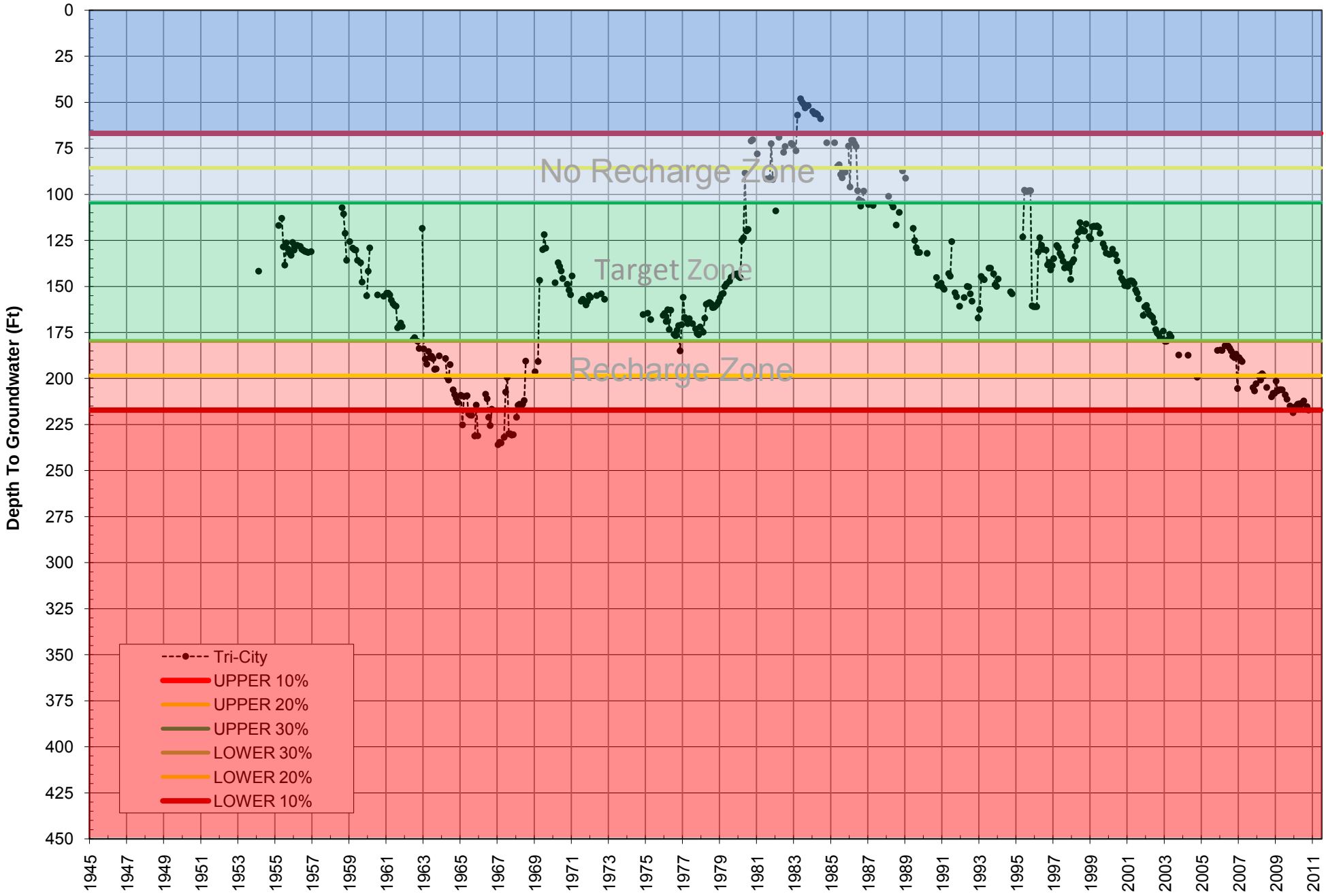
Index Well Hydrograph

East Valley Water District



Tri City
Index Well Hydrograph

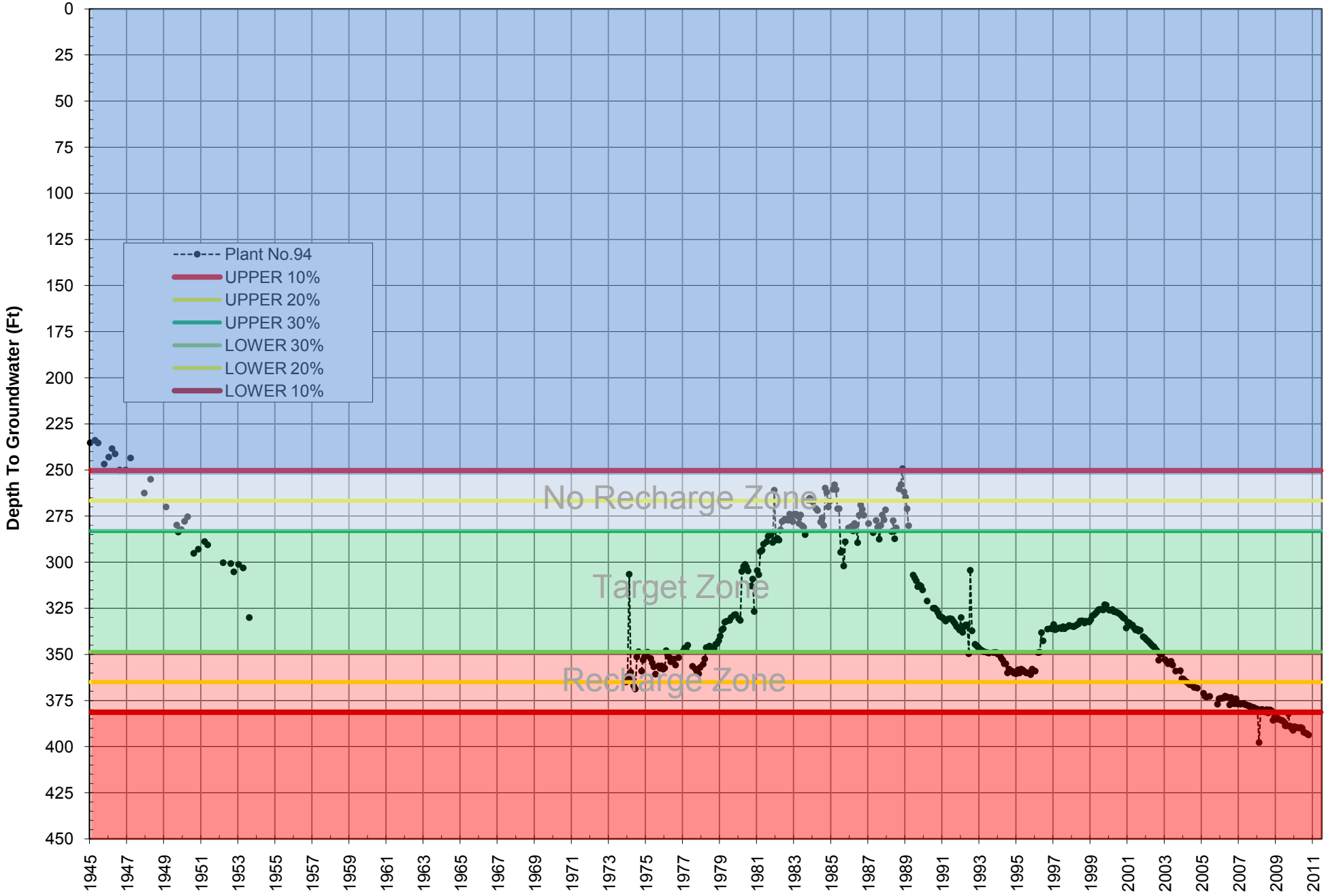
East Valley Water District



Plant No. 94

Index Well Hydrograph

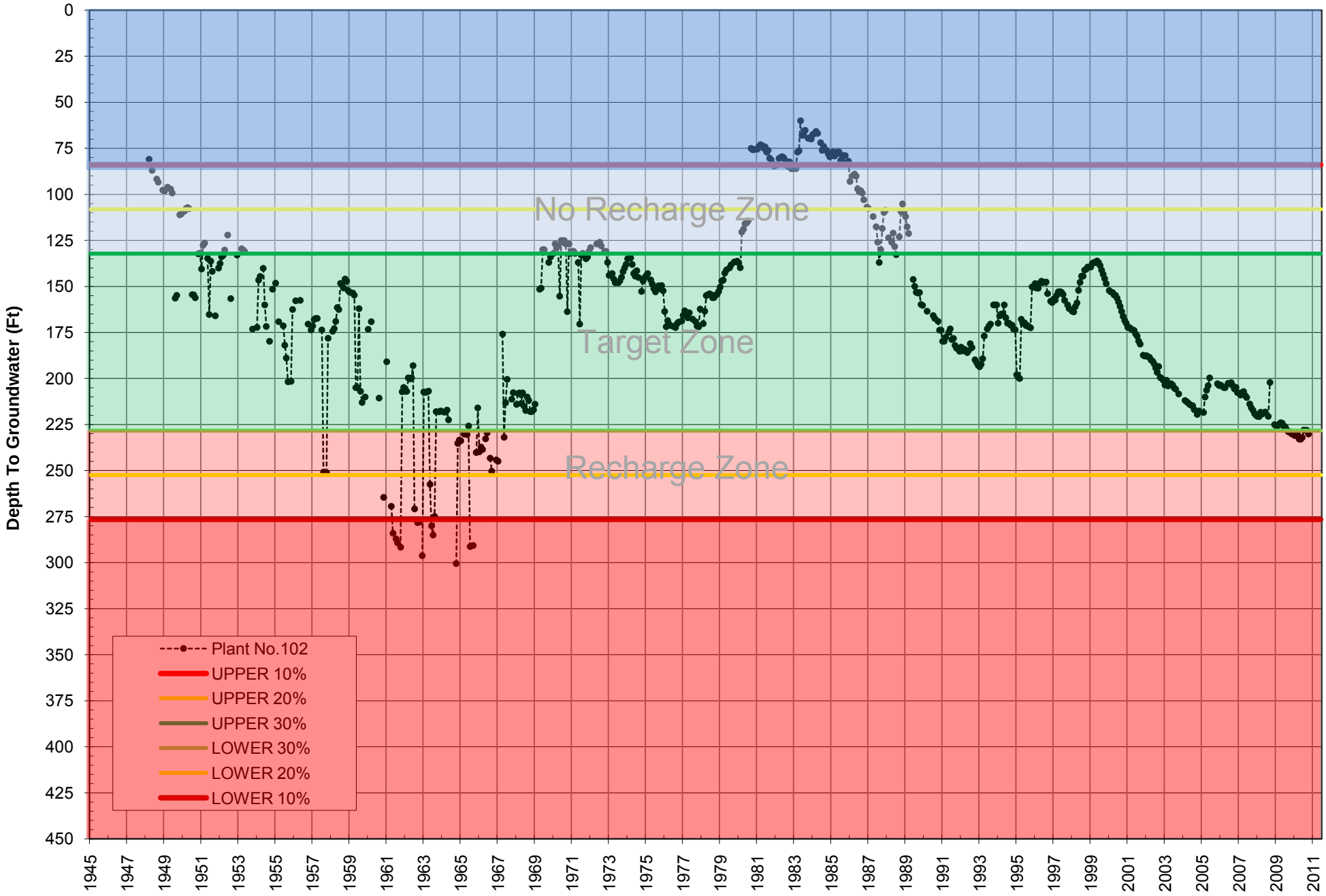
East Valley Water District



Plant No. 102

Index Well Hydrograph

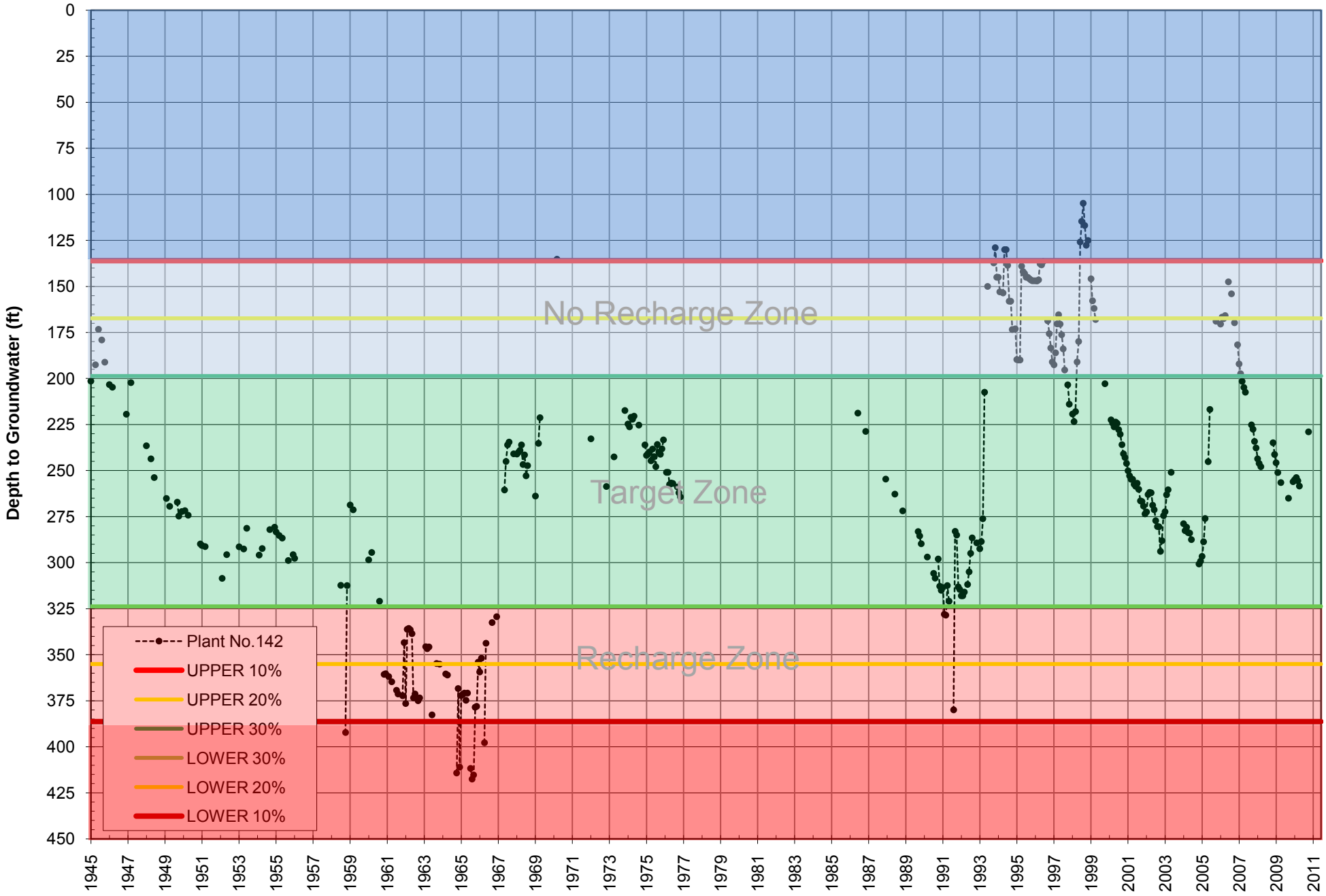
East Valley Water District



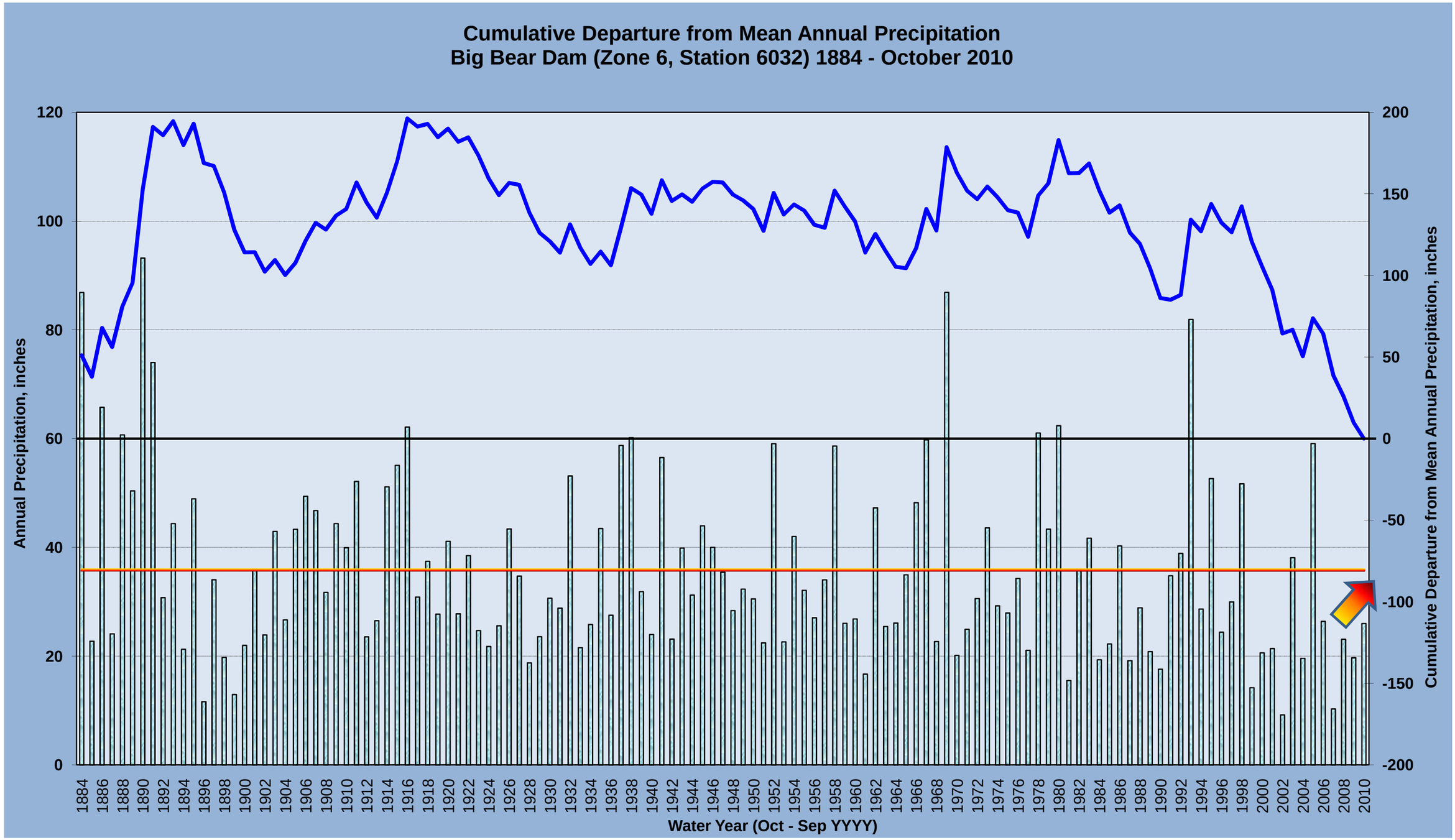
Plant No. 142

Index Well Hydrograph

East Valley Water District



E. PRECIPITATION DATA


Cumulative Departure from Mean Annual Precipitation
Big Bear Dam (Zone 6, Station 6032) 1884 - October 2010
Annual Precipitation, inches
Cumulative Departure from Mean Annual Precipitation, inches
Water Year (Oct - Sep YYYY)
120
100
80
60
40
20
0
200
150
100
50
0
-50
-100
-150
-200
1884
1886
1888
1890
1892
1894
1896
1898
1900
1902
1904
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1962
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1968
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1972
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2000
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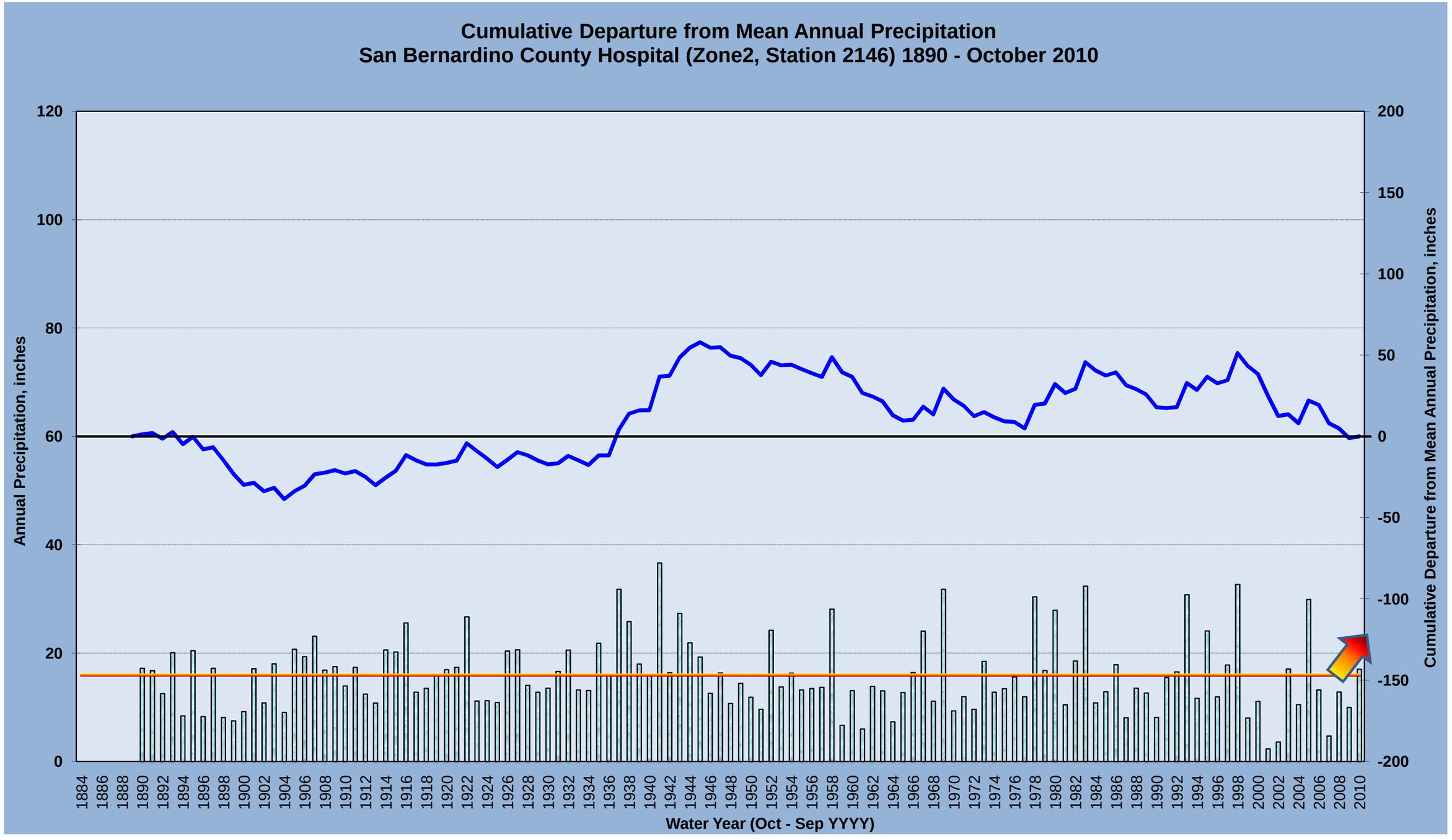
2004
2006
2008
2010


Cumulative Departure from Mean Annual Precipitation
San Bernardino County Hospital (Zone2, Station 2146) 1890 - October 2010
Annual Precipitation, inches
Cumulative Departure from Mean Annual Precipitation, inches
Water Year (Oct - Sep YYYY)
120
100
80
60
40
20
0
200
150
100
50
0
-50
-100
-150
-200
1884
1886
1888
1890
1892
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1898
1900
1902
1904
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F. GROUNDWATER MODEL RESULTS

The purpose of the groundwater modeling run is to determine the theoretical maximum amount of recharge that could occur during 2010 without causing high groundwater or causing problems with contamination cleanup projects. Since last year's precipitation was below average, basin conditions are essentially the same as 2009. Therefore, the BTAC did not feel a new model run was necessary for this year's report. Instead, the results of last year's modeling run are being used for this year's report and are included in this appendix.

San Bernardino Basin Area Groundwater Model

2009 Regional Water Management Plan

Prepared for : San Bernardino Valley Municipal Water District

November 19, 2008

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SAN BERNARDINO BASIN AREA GROUNDWATER MODEL
2009 REGIONAL WATER MANAGEMENT PLAN

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5.2 Hydrographs of Key Wells 5

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5.4 Groundwater Budget 6

5.5 Liquefaction Potential 6

5.6 Impact on Contamination Plumes 7

1.0 MODEL SUMMARY

Model Run Name	2009 Regional Water Management Plan Model Run 1 Wet Scenario with Maximum Replenishment in 2009	2009 Regional Water Management Plan Model Run 2 Dry Scenario without Replenishment in 2009	2009 Regional Water Management Plan Model Run 3 Dry Scenario with Maximum Replenishment in 2009
Client	San Bernardino Valley Municipal Water District (Valley District)		
Project	Upper Santa Ana River Watershed 2009 Regional Water Management Plan		
Hydrology Used	A Median Hydrologic Year in 2009 (i.e. 1974) Followed by a Very Wet Year in 2010 (i.e. 1969)	A Median Hydrologic Year in 2009 (i.e. 1974) Followed by a Critical Dry Year in 2010 (i.e. 1990)	A Median Hydrologic Year in 2009 (i.e. 1974) Followed by a Critical Dry Year in 2010 (i.e. 1990)
Predicted Period	2009-2010		
Number of Years Predicted	Two Years		
Model Stress Period	Annual		
Computer Code	MODFLOW 2000 and MODPATH		
Report	This Report		
Findings	Maximum replenishment of 125,300 acre-ft in 2009 (see Table 2) (1) would not cause depth to water shallower than 50 ft in the Pressure Zone (see Figure 32) and (2) would not impact the contamination plumes (see Figure 33)	No replenishment in 2009 would result in a cumulative change in groundwater storage of -495,000 acre-ft in 2010. This is very close to the historical low of -572,600 acre-ft in year 1965 (see Figure 31)	Maximum replenishment of 184,000 acre-ft in 2009 (see Table 2) (1) would not cause depth to water shallower than 50 ft in the Pressure Zone and (2) would not impact the contamination plumes (see Figure 33)

2.0 BASIC ASSUMPTIONS

The following table summarizes the basic assumptions for the IRWMP Baseline Run 1.

Model Assumptions		2009 Regional Water Management Plan
Hydrologic Period		Run 1: 1974 (Median) and 1969 (Very Wet). Run 2: 1974 (Median) and 1990 (Critical Dry). Run 3: 1974 (Median) and 1990 (Critical Dry).
Groundwater Pumping		Groundwater pumping was determined based on the 2006 pumping records.
Artificial Recharge	**Valley District's Replenishment Obligation**	Run 1: The maximum possible replenishment was estimated based on model iterative runs so that the amount of replenishment in 2009 (1) would not cause depth to water shallower that 50 ft in the Pressure Zone and (2) would not impact the contamination plumes. Run 2: No replenishment. Run 3: The maximum possible replenishment was estimated using the same approach as the Run 1.
	Diversion by SBVWCD[1]	Based on SBVWCD's licensed rights.
	Diversion by Senior Water Rights Claimants	Diversion by Senior Water Rights Claimants was based on Seven Oaks Accord.
	SAR[2] Water Right Applications	Under the project, Valley District/Western have several options for conveying and distributing SAR water. The water can be put either to direct use, stored in groundwater basins within the Muni/Western service area for later extraction and use, or conveyed to agencies outside the Muni/Western service area for their use and returned through exchange.

[1] San Bernardino Valley Water Conservation District
[2] Santa Ana River

3.0 ARTIFICIAL RECHARGE

Artificial recharge includes replenishment of SAR water by SBVWCD (Licensed rights) and Valley District/Western (SAR Water Right Applications) and replenishment of SWP[3] water by Valley District per the Western Judgment.

The spreading of SAR water by SBVWCD was estimated by the OPMODEL. The OPMODEL assumes the first 88 cubic feet per second (cfs) of the SAR water is diverted by the Senior Water Rights holders (per the Seven Oaks Accord). The remaining SAR water, if it is available, is then diverted by the SBVWCD according to the licensed rights at 10,400 acre-ft/yr.

Under the SAR Water Right Applications, Valley District and Western have several options for conveying and distributing SAR water. The water can be put either to direct use, stored in groundwater basins within the Valley District/Western service area for later extraction and use, or conveyed to agencies outside the Valley District/Western service area for their use and returned through exchange. The amount of spreading possible at various spreading grounds was estimated by the capacity of the spreading grounds and assigned to the groundwater model.

For purpose of this study, the replenishment of SWP water by the Valley District for the Model Runs 1 and 3 is the maximum possible replenishment in 2009. For model Run 2, no replenishment was assumed. The maximum possible replenishment was estimated based on model iterative runs so that the amount of replenishment in 2009 (1) would not cause depth to water shallower that 50 ft in the Pressure Zone and (2) would not impact the contamination plumes. The amount of replenishment at each spreading ground was then assigned to the groundwater model using the Recharge Package, assuming a 5% evapotranspiration loss.

Table 1 shows the resultant replenishment by spreading grounds during the model simulation period from 2009 to 2010 for each model run. As shown, the estimated maximum possible replenishment in 2009 would be 125,300 acre-ft for Wet Scenario (Run 1) and 184,000 acre-ft for Dry Scenario (Run 3), respectively.

[3] State Water Project

4.0 PRODUCTION

Groundwater pumping was determined based on the 2006 pumping records. Table 2 shows the annual groundwater pumping by agency used for the model Runs 1, 2 and 3. The total annual groundwater pumping is 197,645 acre-ft in years 2009 and 2010 for Model Runs 1, 2 and 3.

5.0 MODEL RESULTS

5.1 Groundwater Elevation Maps

Groundwater elevation contours for the model Runs 1, 2 and 3 in 2010 are shown on Figures 1, 2 and 3, respectively.

5.2 Hydrographs of Key Wells

Figure 4 shows the location of the 25 key wells for the Seven Oaks Accord and the Backyard Well[4].

The model predicted depth to water from each model run for the 25 Seven Oaks Accord key wells and the Backyard Well is shown in Figures 5 through 30.

5.3 Cumulative Annual Change in Groundwater Storage

The cumulative annual change in groundwater storage for the San Bernardino Basin Area for each of the model run is shown in the Figure 31. As shown, the cumulative change in

[4] The Backyard Well is a monitoring well per the Agreement Relating to the Diversion of Water from the Santa Ana River System among Western Municipal Water District, San Bernardino Valley Municipal Water District and City of Riverside (2007).

groundwater storage in 2010 under the model Run 2 (Dry Scenario without replenishment in 2009) would be -495,000 acre-ft. This is very close to the historical low of -572,600 acre-ft in year 1965.

5.4 Groundwater Budget

The inflow terms for the model include recharge to groundwater from gauged streamflow, artificial recharge (including Valley District SWP Water Replenishment, Valley District/Western SAR Water Replenishment and spreading of SAR water by SBVWCD), local runoff generated by precipitation, infiltration from direct precipitation, return flow from groundwater pumping, ungaged mountain front runoff, and underflow. The outflow terms comprise evapotranspiration, groundwater pumping, and underflow. The difference between the total inflow and total outflow is the change in groundwater storage. Annual groundwater budgets for the model Runs 1, 2 and 3 are shown in Tables 3, 4 and 5, respectively.

5.5 Liquefaction Potential

Liquefaction typically occurs in recent (Holocene to late Pleistocene) deposits of silt, sand, and gravel. Most liquefaction occurs where the depth to groundwater is less than 50 ft; this depth is traditionally considered adequate for most investigations of liquefaction potential (Martin and Lew, 1999[5]). Soil liquefaction is a major cause of damage during earthquakes. For the purposes of this report, areas with depth to groundwater of less than 50 ft in the Pressure Zone were evaluated for each model scenario.

Results show that approximately 170 acres of area in the Pressure Zone would have a depth to

[5] Martin, G.R. and Lew, M. (ed.), 1999. Recommended Procedures for Implementation of DMB Special Publication 117 Guidelines for Analyzing and Mitigating Liquefaction Hazards in California. Organized through the Southern California Earthquake Center, University of Southern California, 63 p.

water less than 50 ft (less than 1% of the Pressure Zone area) in 2010 under model Run 1 conditions (Wet Scenario with Maximum Replenishment in 2009) (see Figure 32). As shown, the area with depth to water less than 50 ft would occur in the vicinity of Santa Ana River and Lytle Creek channels as a result of significant recharge from the streamflow in year 2010. This would occur even without any artificial recharge in 2009 based on the results from an iterative model run.

An additional model run was performed to examine the potential liquefaction area in the Pressure Zone for a longer period after the maximum replenishment in 2009 followed by the very wet year 2010. This was done by extending the model for another five years (i.e. extended to 2015) assuming an average year (i.e. hydrologic year 1973) for the period 2011 to 2015. Results show that potential liquefaction would occur in a very small area in the vicinity of river channels. The acreage of the potential liquefaction area in the Pressure Zone would be 10, 20, 80, 180 and 270 acres in year 2011 through 2015, respectively.

There would be no area with depth to water less than 50 ft in the Pressure Zone for model Run 2 (Dry Scenario without Replenishment in 2009) and Run 3 (Dry Scenario with Maximum Replenishment in 2009).

5.6 Impact on Contamination Plumes

The purpose of the MODPATH model was to evaluate potential impacts of the maximum replenishment on remediation (i.e. cleanup) efforts by evaluating directions of groundwater flow paths and travel times. MODPATH is a post-processing package developed to compute three dimensional flow paths (i.e. particle tracking) using output from the groundwater flow model. MODPATH uses a semi-analytical particle-tracking scheme that allows an analytical expression of the particle's[6] flow path to be obtained within each finite-difference grid cell. Particle paths are computed by tracking particles from one cell to the next until the particle

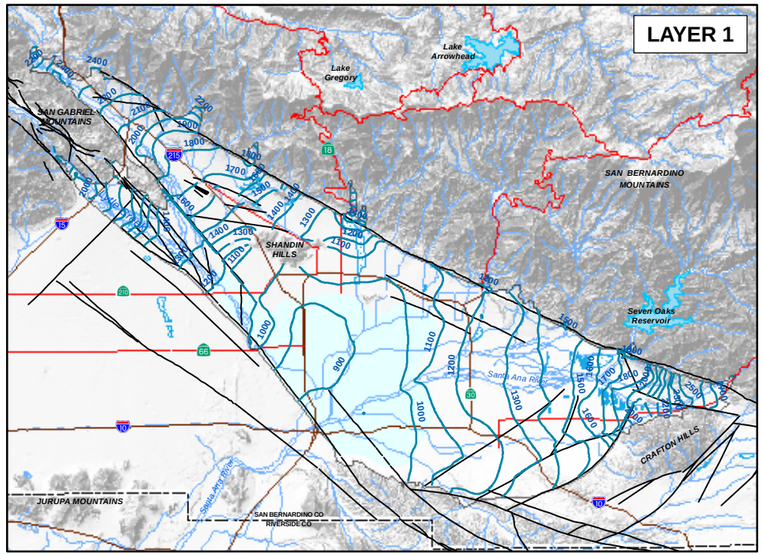
[6] A “particle track” would represent the flow path taken by groundwater through model time and influenced by any relevant recharge or discharge component (e.g. pumping or spreading).

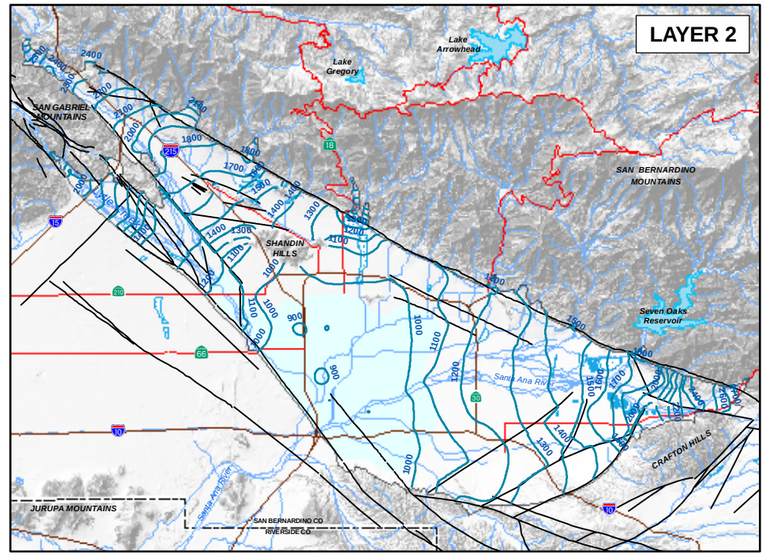
reaches a boundary, an internal sink/source, or satisfies some other termination criterion.

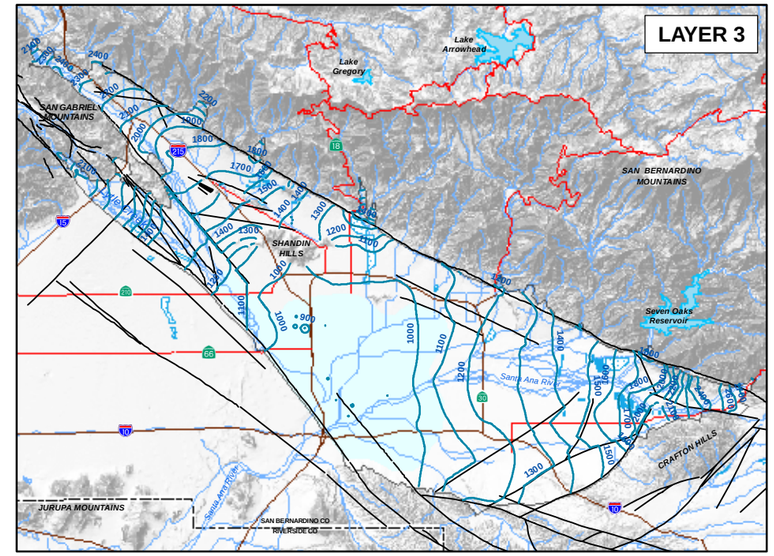
MODPATH does not take into account dispersion, retardation or half-life decay. The results of MODPATH simply provide an indication of the direction and rate of groundwater flow.

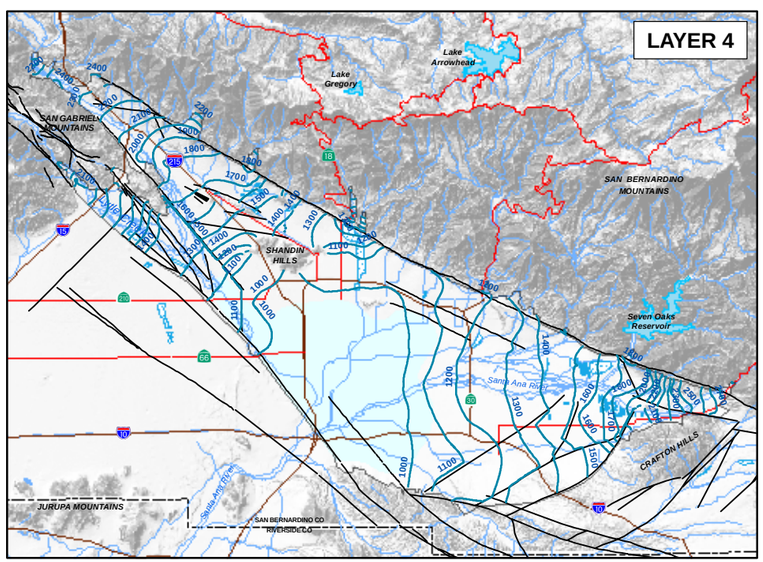
Particles were released approximately 1,000 ft north of the Newmark Plume front extraction wells and 500 ft north of the Muscoy Plume front extraction wells in 2009. As shown in Figure 33, these particles traveled from north to south following the groundwater flow direction and were either captured by the extraction wells or on the way to being captured.

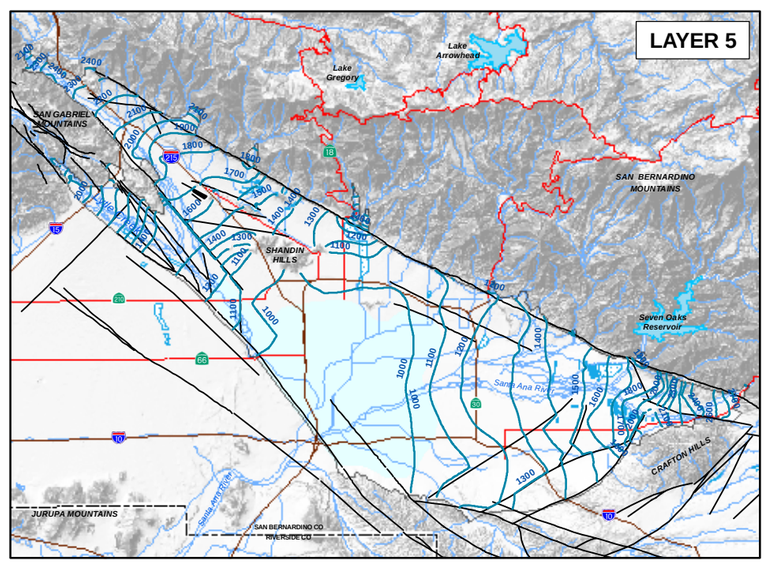
FIGURES











EXPLANATION

- 1100 — Groundwater Elevations (feet above mean sea level) in Year 2010
- Spreading Grounds or Basins
- San Bernardino Basin Area Groundwater Basin Boundary
- Pressure Zone
- Surface Water
- Stream or River
- Fault
- Freeway
- State Highway
- County Boundary

GROUNDWATER ELEVATIONS IN YEAR 2010 MODEL RUN 1 - WET SCENARIO WITH MAXIMUM REPLENISHMENT IN 2009

NORTH

0 5 10 Miles

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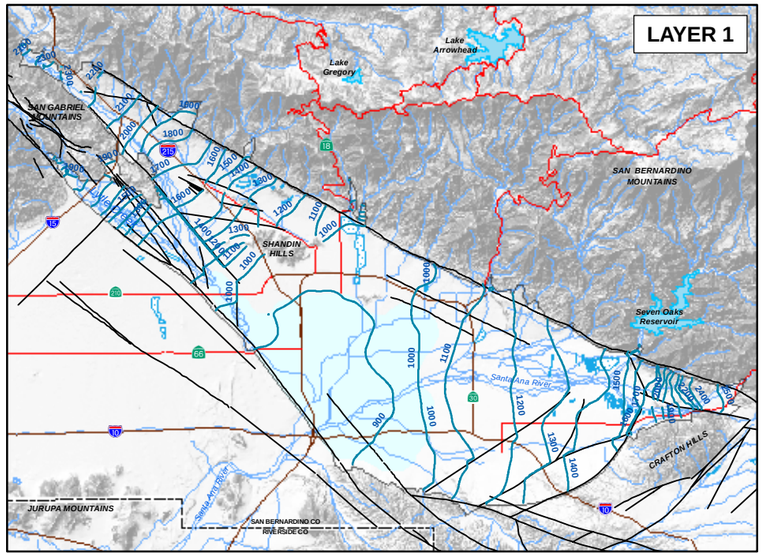
19-Nov-08

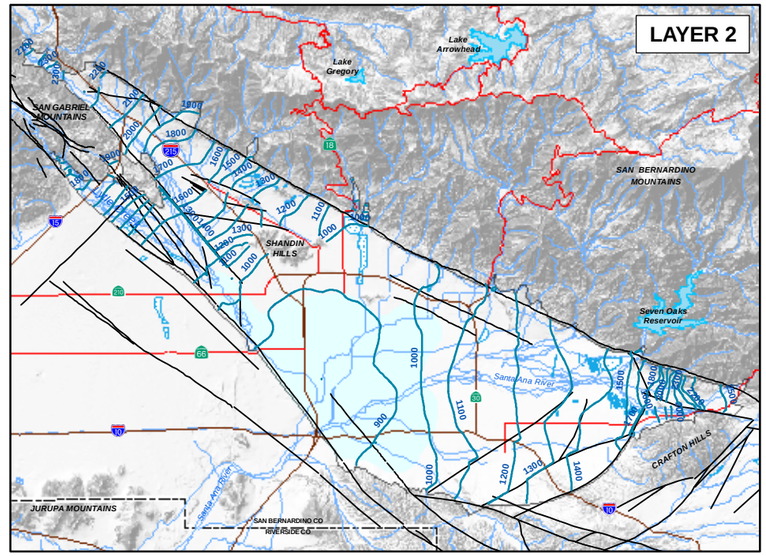
Prepared by: DWB

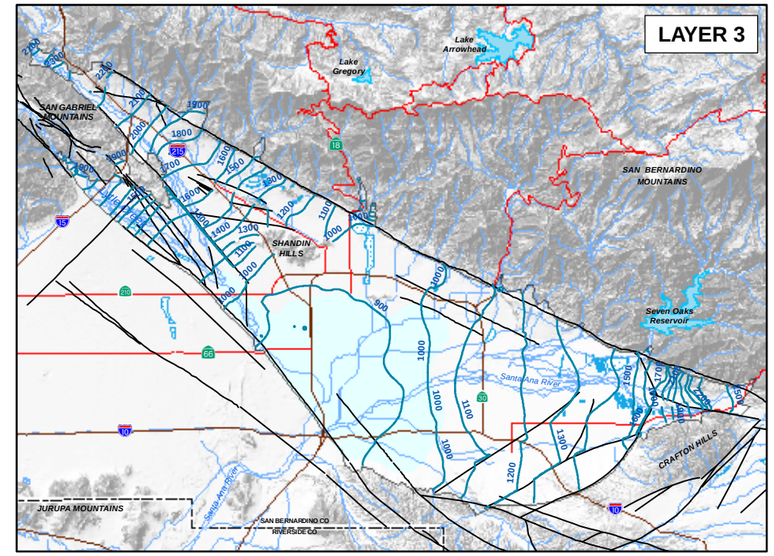
Map Projection: State Plane Zone V, NAD83, feet

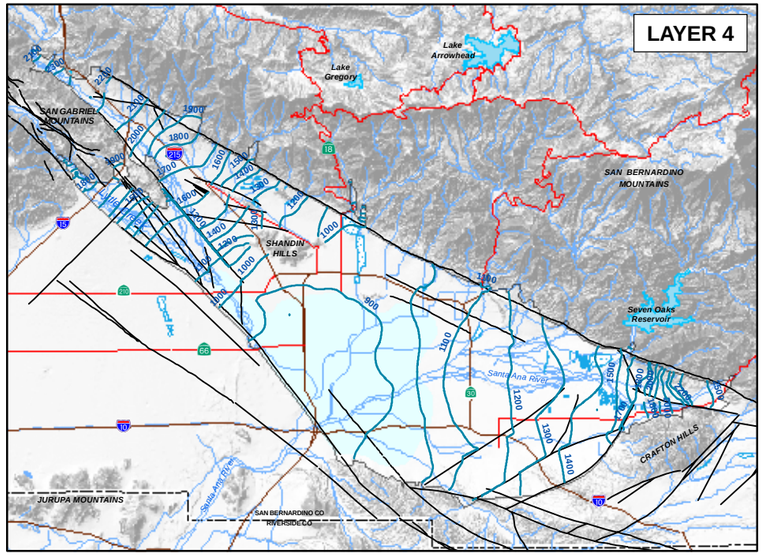
Figure 1

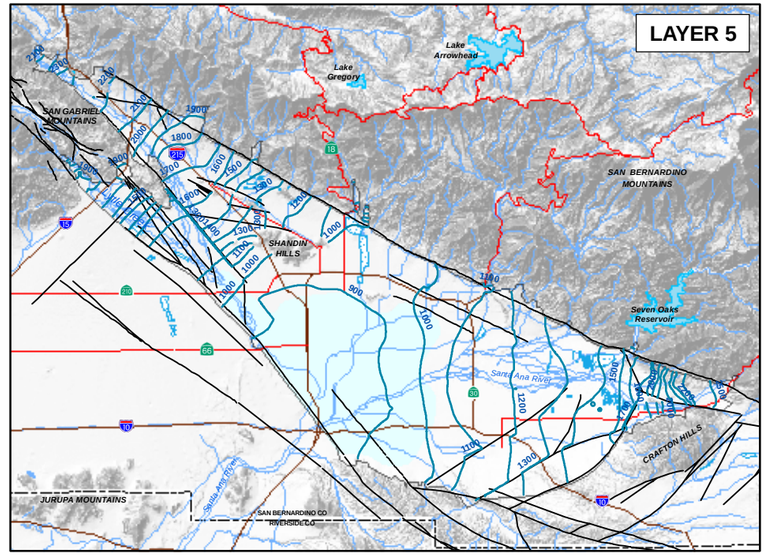
GIS_proj/muni_BTAC_scenarios_10-08/0_muni_BTAC_Fig_1_Wet_Scenario_10-08.mxd











EXPLANATION

- 1100 — Groundwater Elevations (feet above mean sea level) in Year 2010
- Spreading Grounds or Basins
- San Bernardino Basin Area Groundwater Basin Boundary
- Pressure Zone
- Surface Water
- Stream or River
- Fault
- Freeway
- State Highway
- County Boundary

GROUNDWATER ELEVATIONS IN YEAR 2010 MODEL RUN 2 - DRY SCENARIO WITHOUT REPLENISHMENT IN 2009

NORTH

0 5 10 Miles

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19-Nov-08

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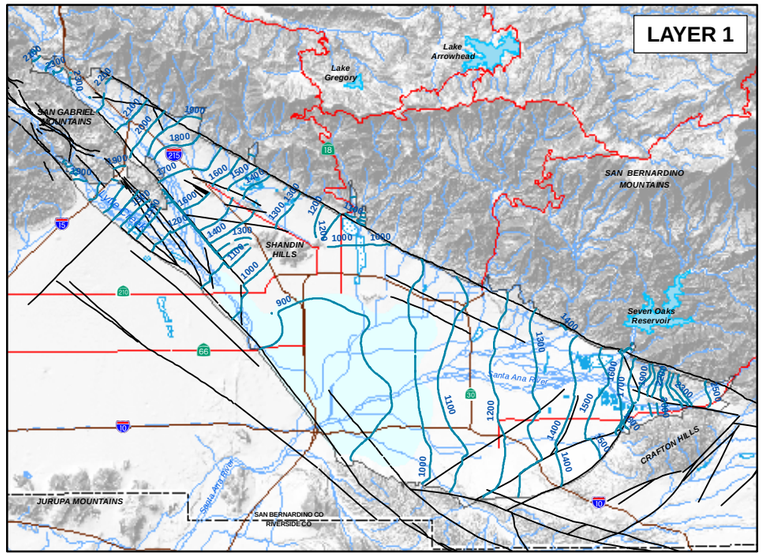
Map Projection: State Plane Zone V, NAD83, feet

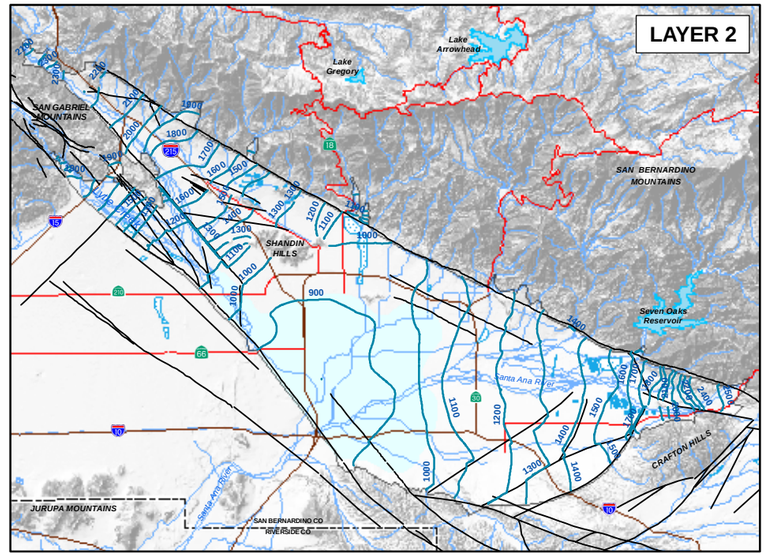
Figure 2

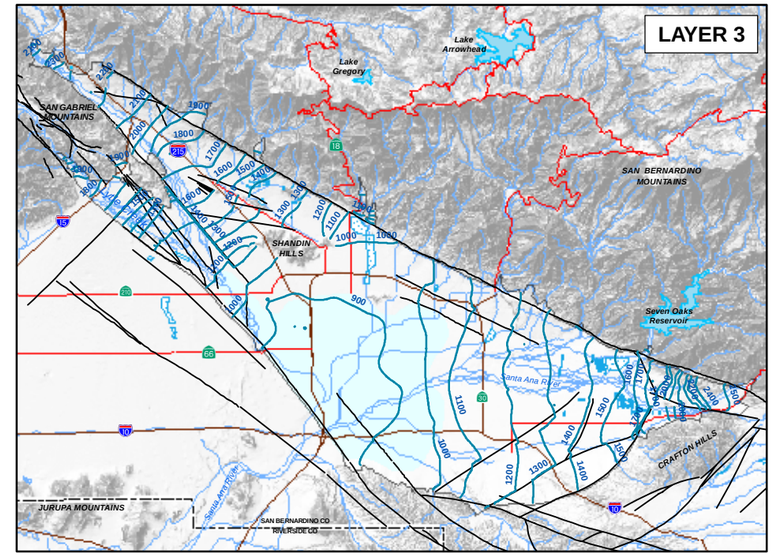
GIS_proj/muni_BTAC_scenarios_10-08/0_muni_BTAC_Fig_2_Dry_Scenario_10-08.mxd

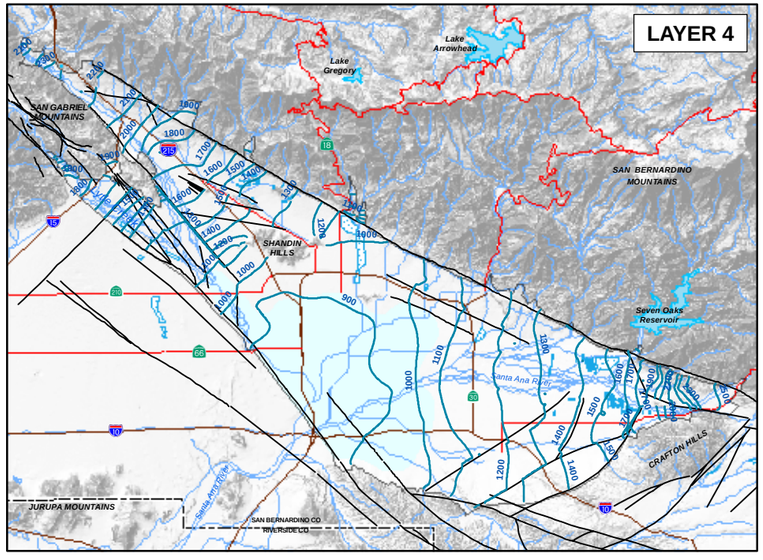
SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

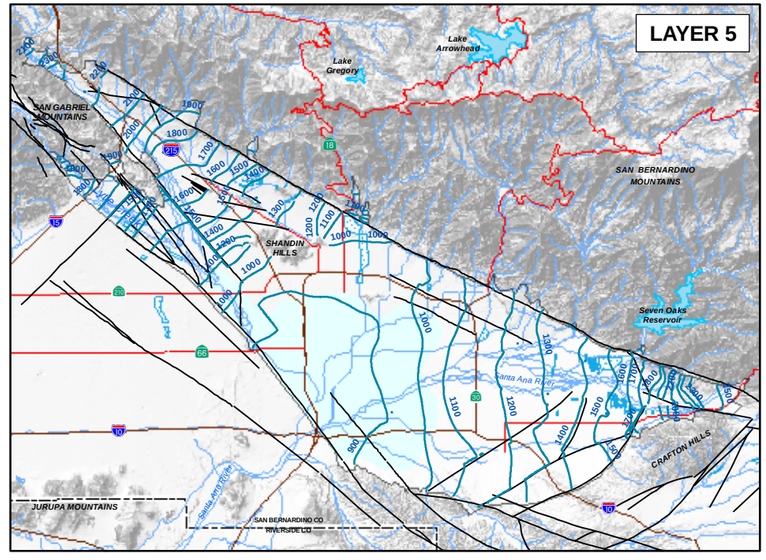
SBBA GROUNDWATER MODEL 2009 REGIONAL WATER MANAGEMENT PLAN











EXPLANATION

- 1100 — Groundwater Elevations (feet above mean sea level) in Year 2010
- Spreading Grounds or Basins
- San Bernardino Basin Area Groundwater Basin Boundary
- Pressure Zone
- Surface Water
- Stream or River
- Fault
- Freeway
- State Highway
- County Boundary

GROUNDWATER ELEVATIONS IN YEAR 2010 MODEL RUN 3 - DRY SCENARIO WITH MAXIMUM REPLENISHMENT IN 2009

NORTH

0 5 10 Miles

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19-Nov-08

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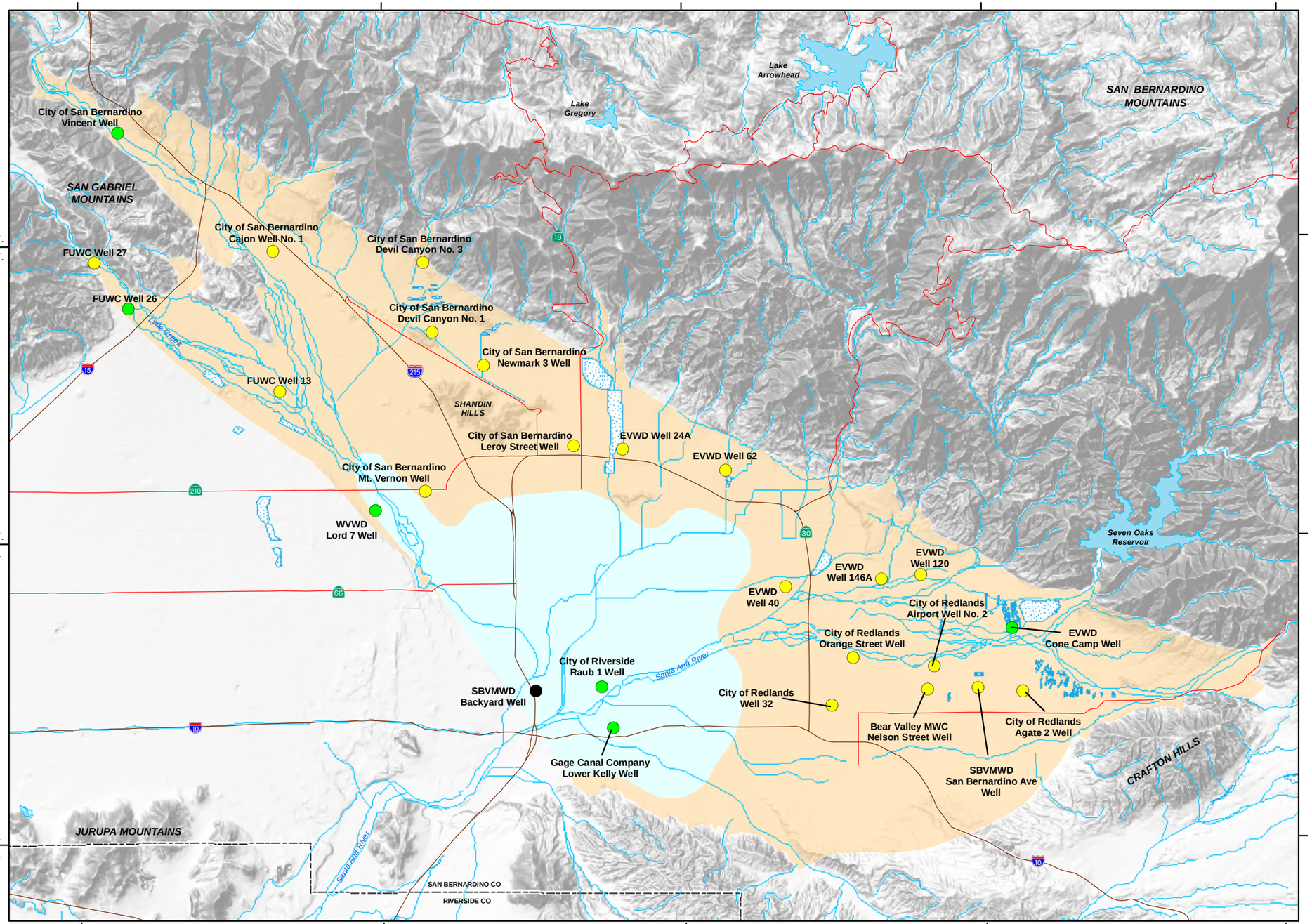
Map Projection: State Plane Zone V, NAD83, feet

Figure 3

GIS_proj/muni_BTAC_scenarios_10-08/0_muni_BTAC_Fig_3_DryRch_Scenario_11-08.mxd

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

SBBA GROUNDWATER MODEL 2009 REGIONAL WATER MANAGEMENT PLAN



LOCATIONS OF WELLS WITH HYDROGRAPHS

EXPLANATION

SBVMWD Backyard Well	Riverside Agreement Well (1 Well)
City of Riverside Raub 1 Well	Seven Oaks Accord Wells (6 Wells)
EVWD Well 40	Riverside Agreement and Seven Oaks Accord Wells (19 Wells)

Bear Valley MWC - Bear Valley Municipal Water Company
EVWD - East Valley Water District
FUWC - Fontana Union Water Company
SBVMWD - San Bernardino Valley Municipal Water District
WVWD - West Valley Water District

- Spreading Grounds or Basins
- San Bernardino Basin Area Groundwater Basin Boundary
- Pressure Zone
- Surface Water
- Stream or River
- Freeway
- State Highway
- County Boundary

19-Nov-08

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Map Projection: State Plane Zone V, NAD27, feet

NORTH

0 2 4 Miles

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Figure 4

GIS_proj/muni_BTAC_scenarios_10-08/0_muni_BTAC_Fig_4_wells_hydrographs_11-08.mxd

Depth To Water for City of San Bernardino Vincent Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

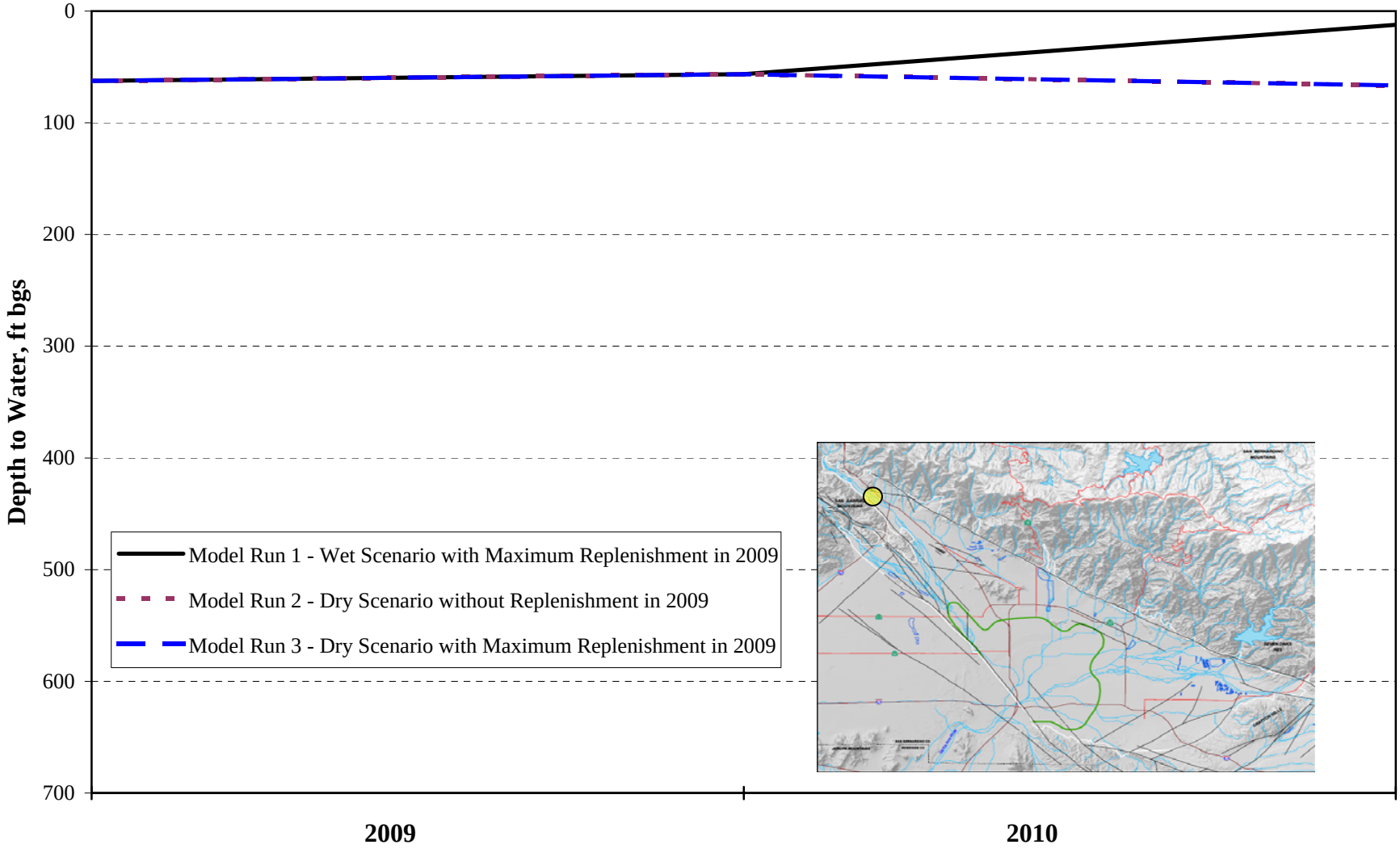


Figure 5

Depth To Water for City of San Bernardino Devil Canyon Well No. 3
SBBA BTAC Wet and Dry Scenarios 2009-2010

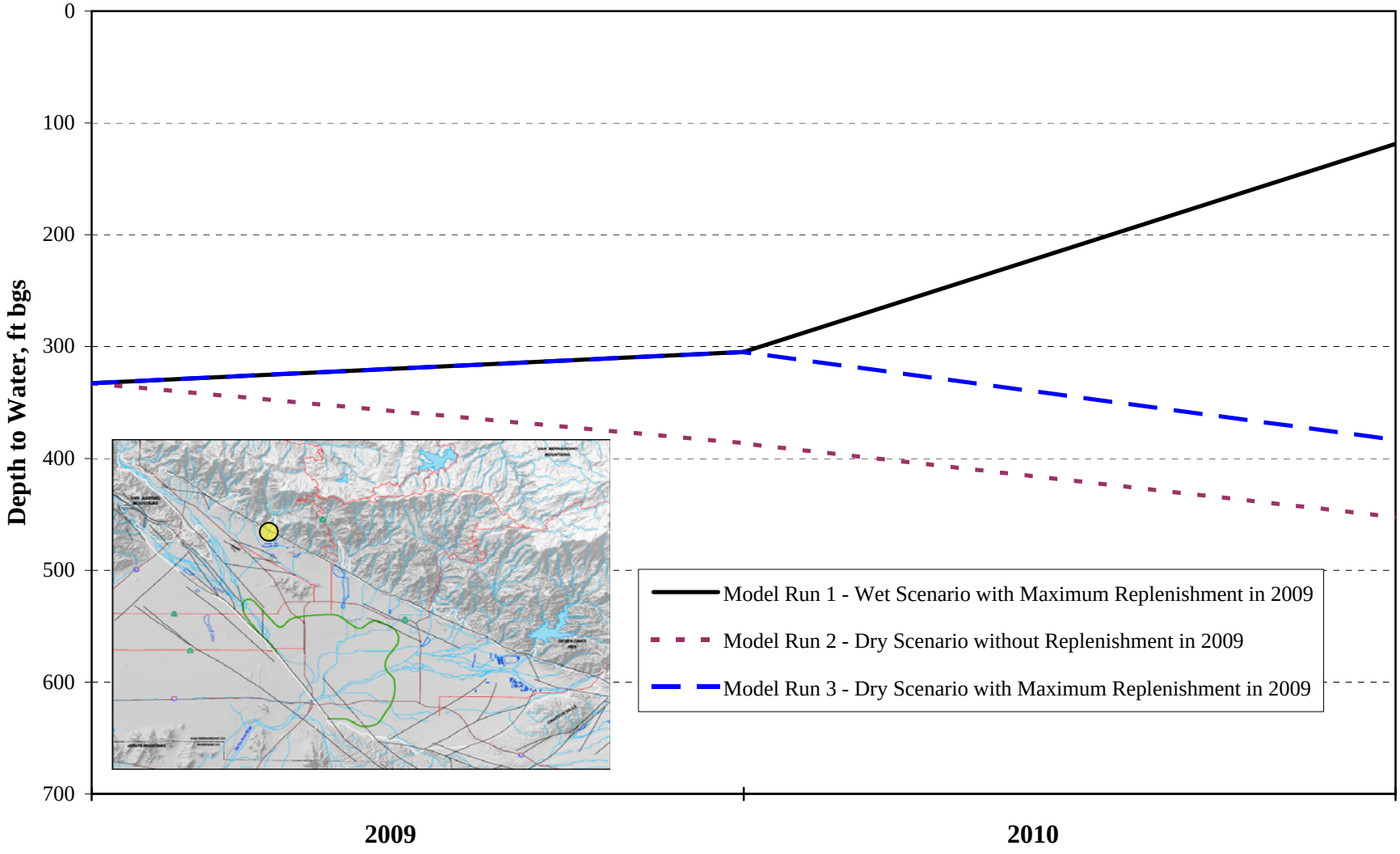


Figure 6

Depth To Water for City of San Bernardino Devil Canyon Well No. 1
SBBA BTAC Wet and Dry Scenarios 2009-2010

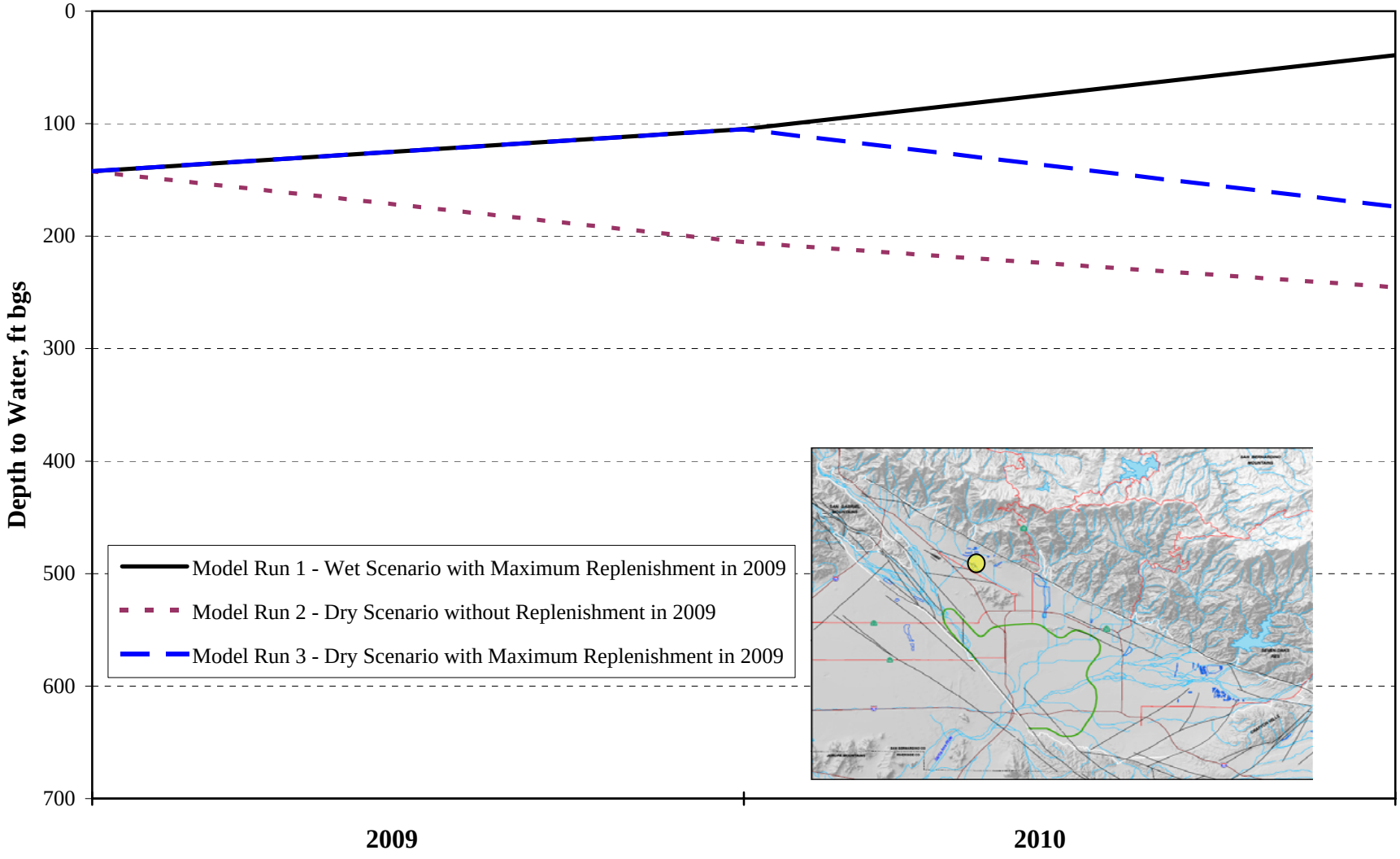


Figure 7

Depth To Water for City of San Bernardino Cajon Well No. 1
SBBA BTAC Wet and Dry Scenarios 2009-2010

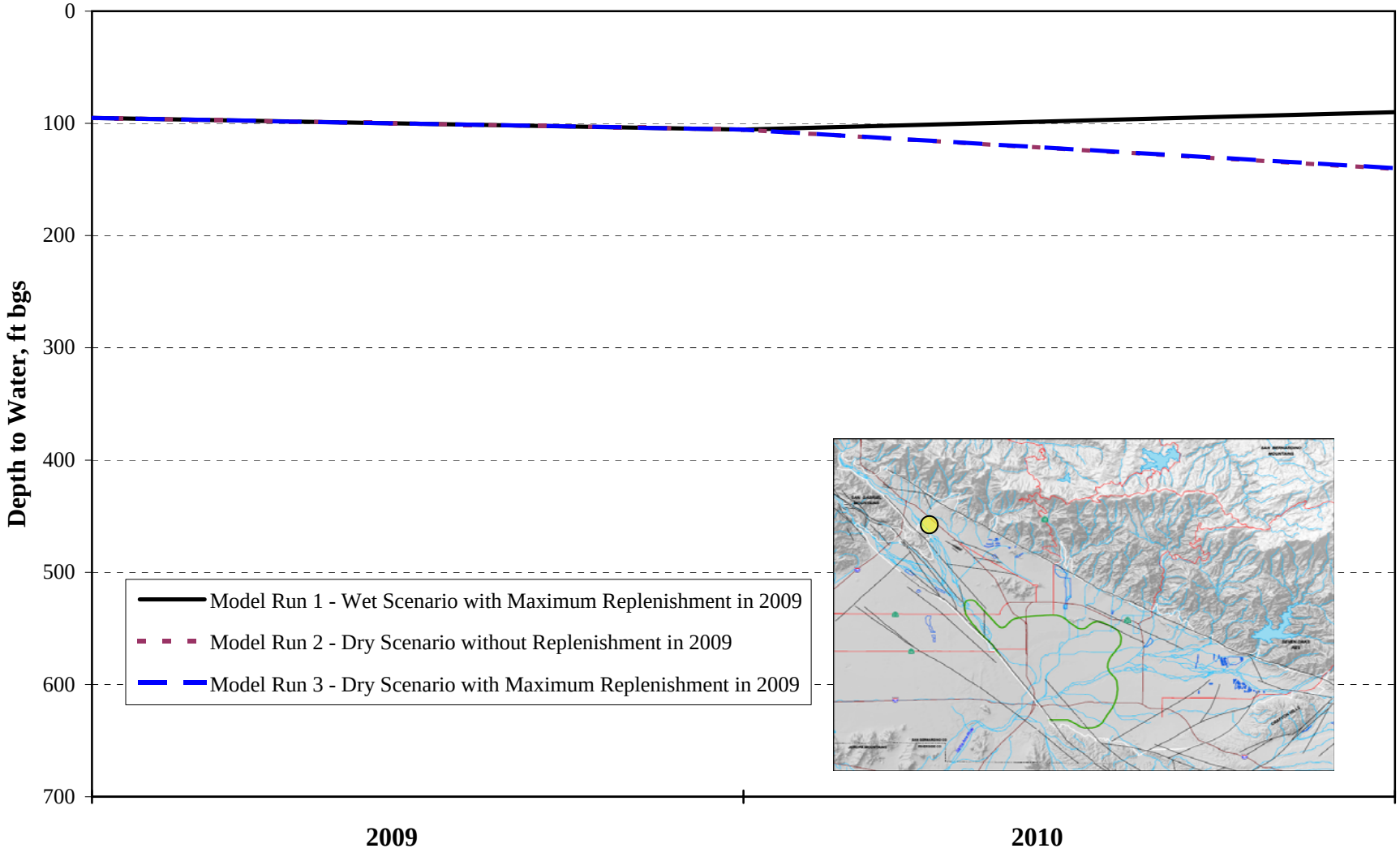


Figure 8

Depth To Water for City of San Bernardino Mt. Vernon Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

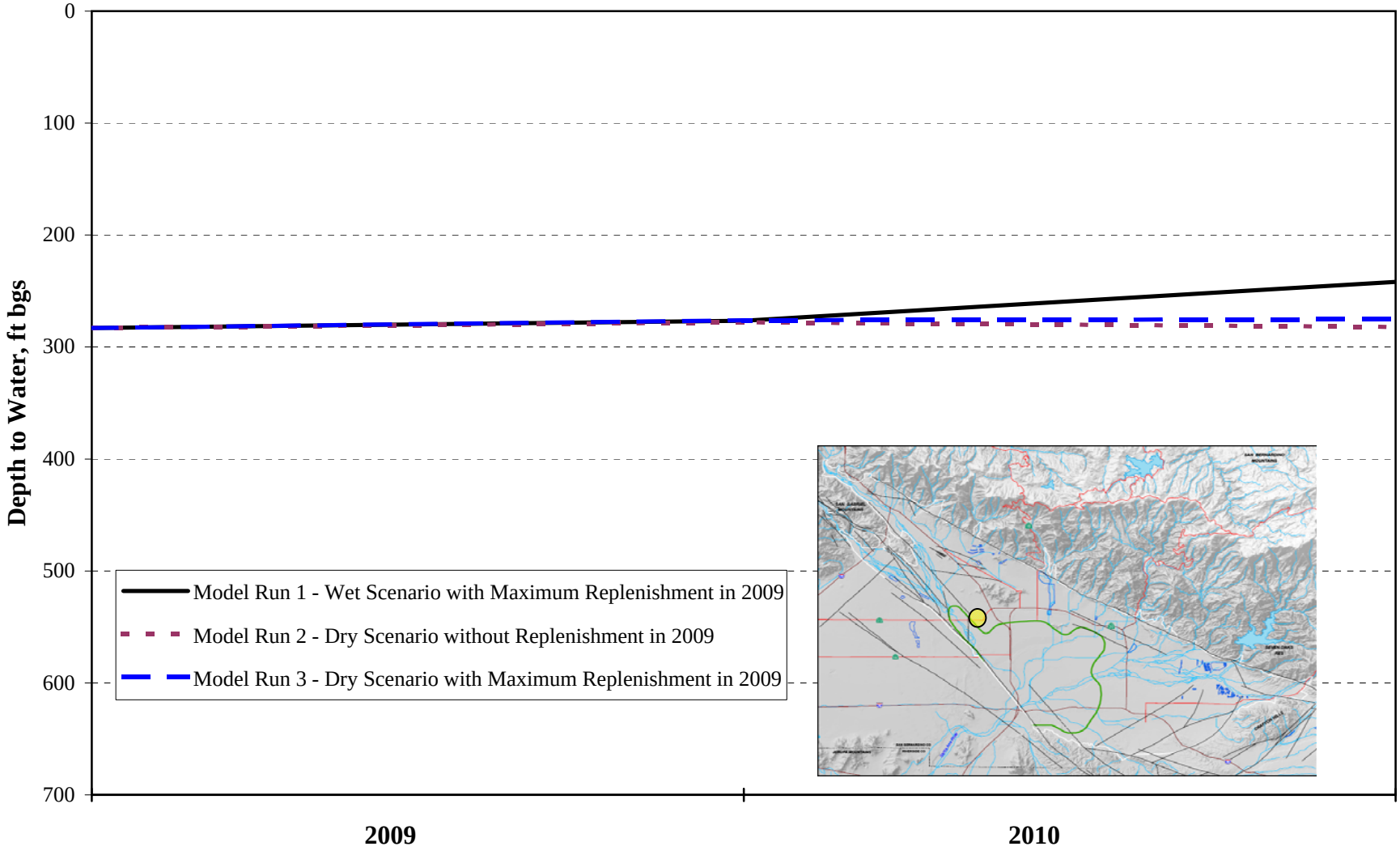


Figure 9

Depth To Water for Fontana Union Water Company Well 27
SBBA BTAC Wet and Dry Scenarios 2009-2010

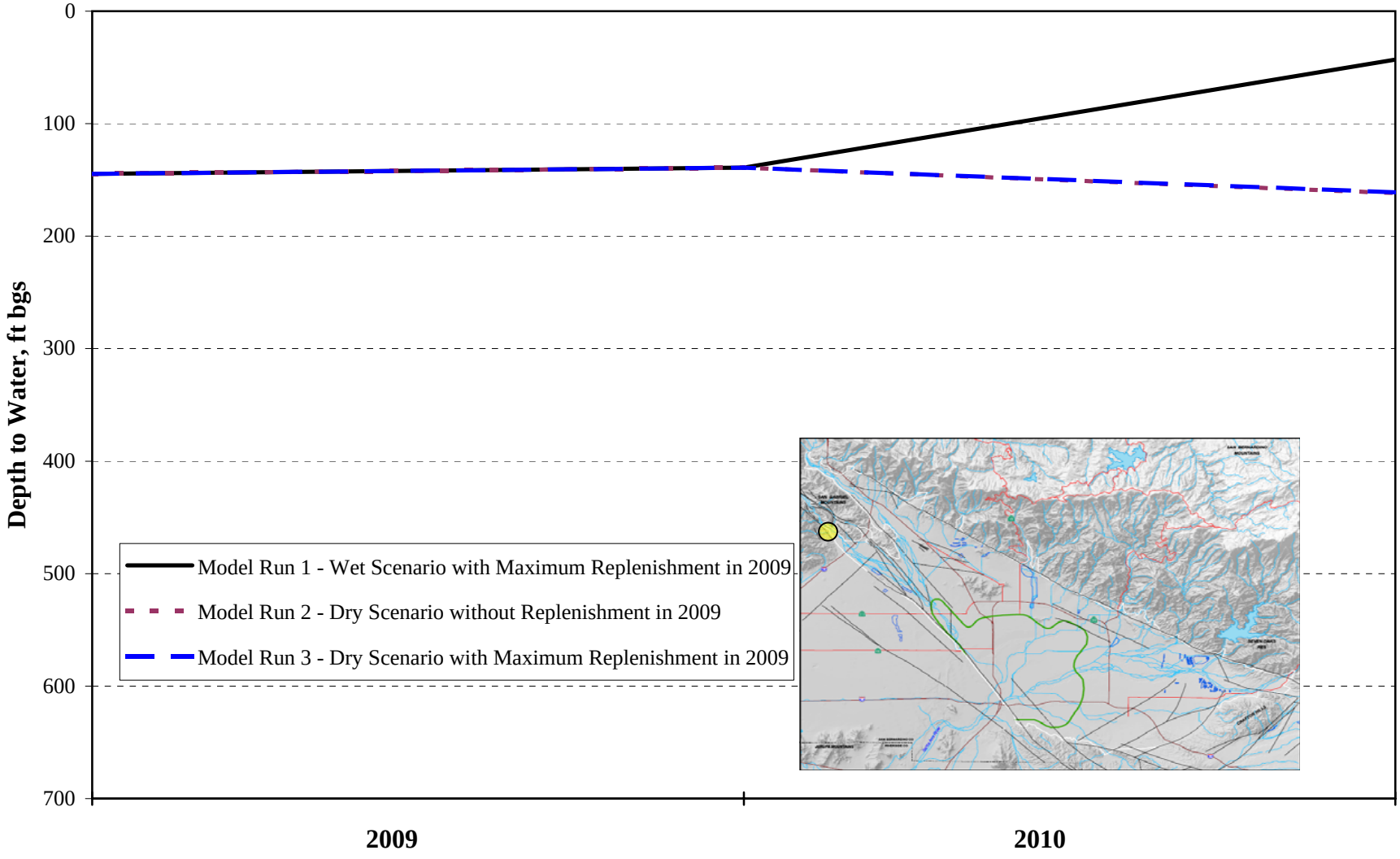


Figure 10

Depth To Water for Fontana Union Water Company Well 26
SBBA BTAC Wet and Dry Scenarios 2009-2010

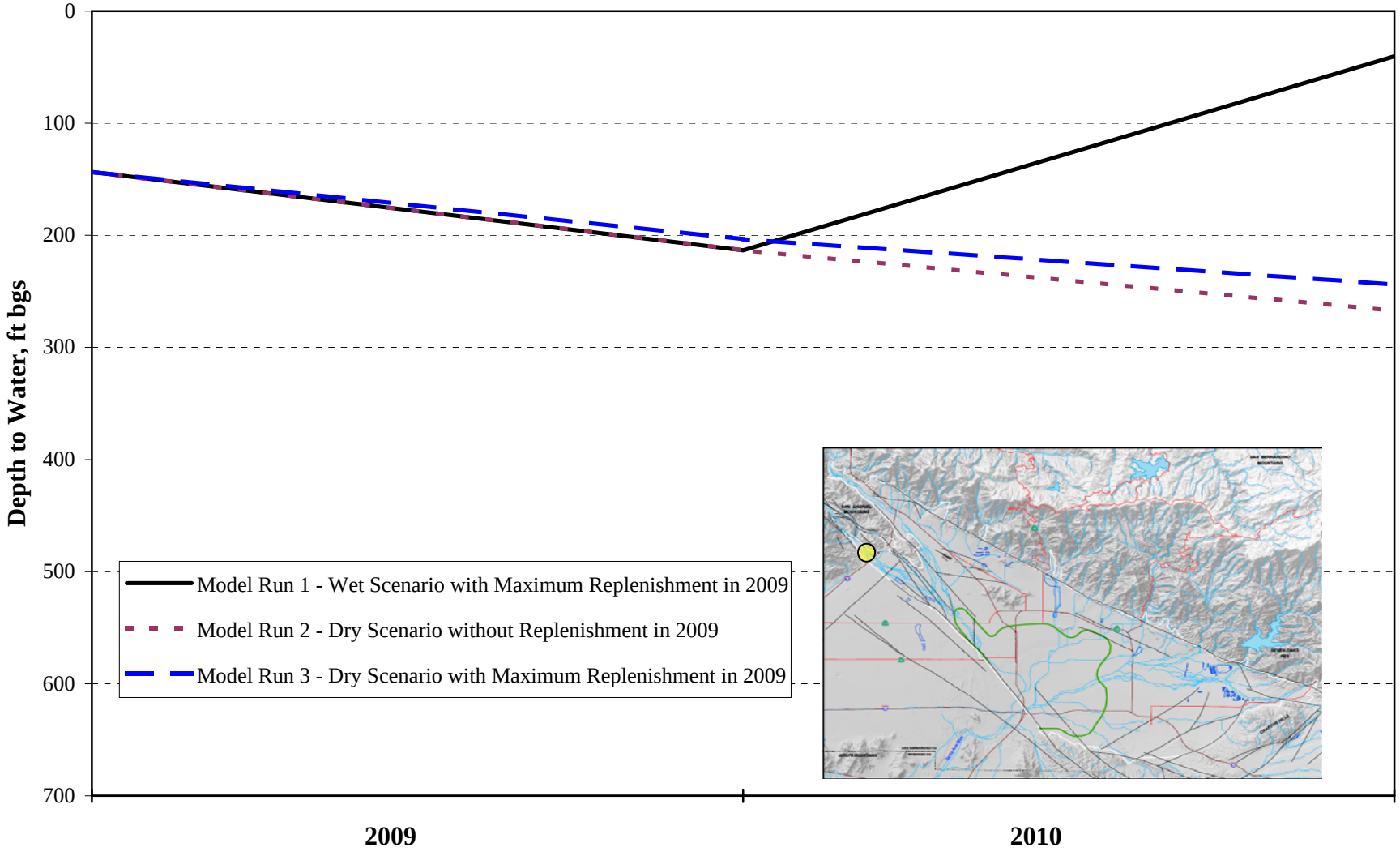


Figure 11

Depth To Water for Fontana Union Water Company Well 13
SBBA BTAC Wet and Dry Scenarios 2009-2010

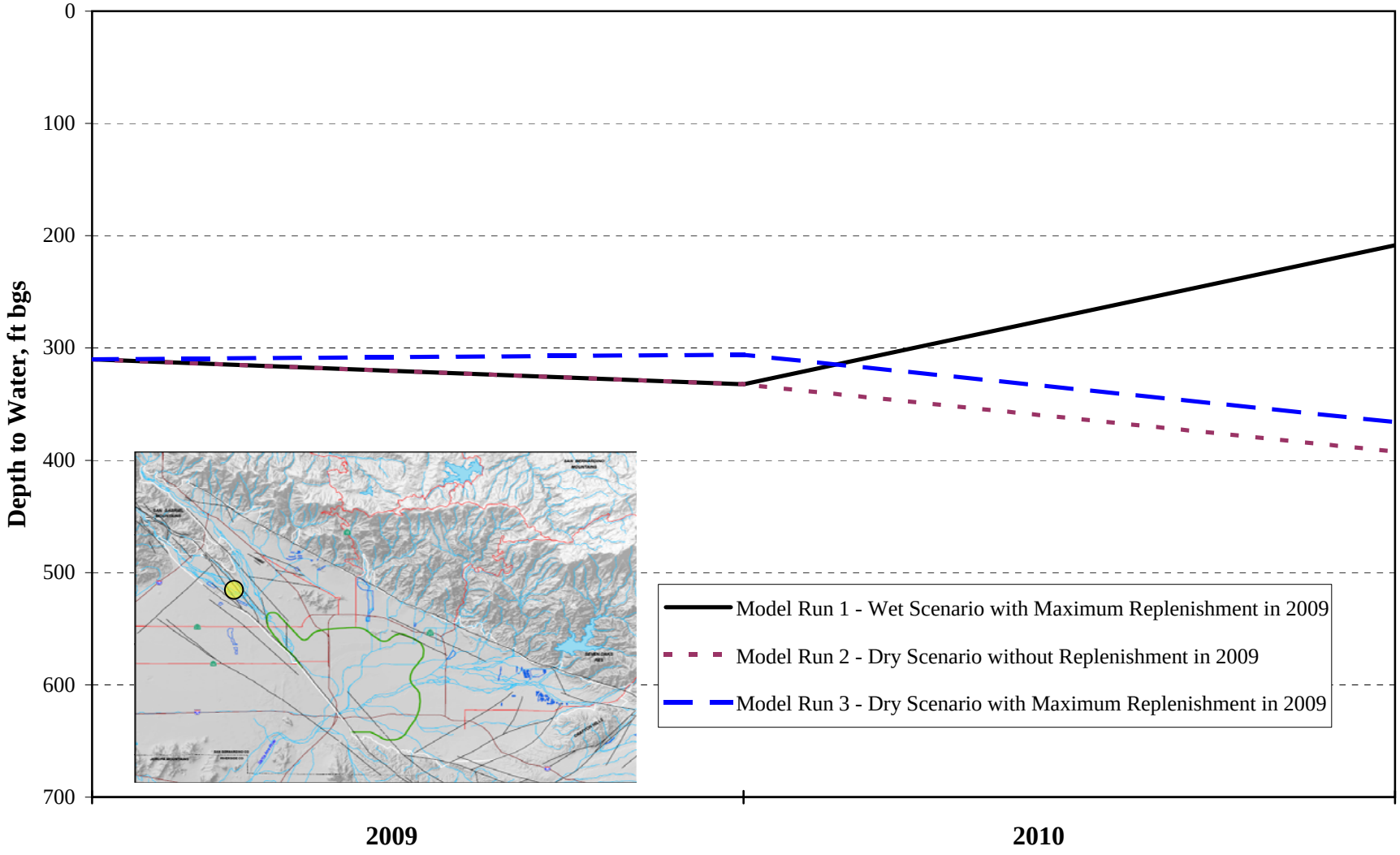


Figure 12

Depth To Water for West Valley Water District Lord 7 Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

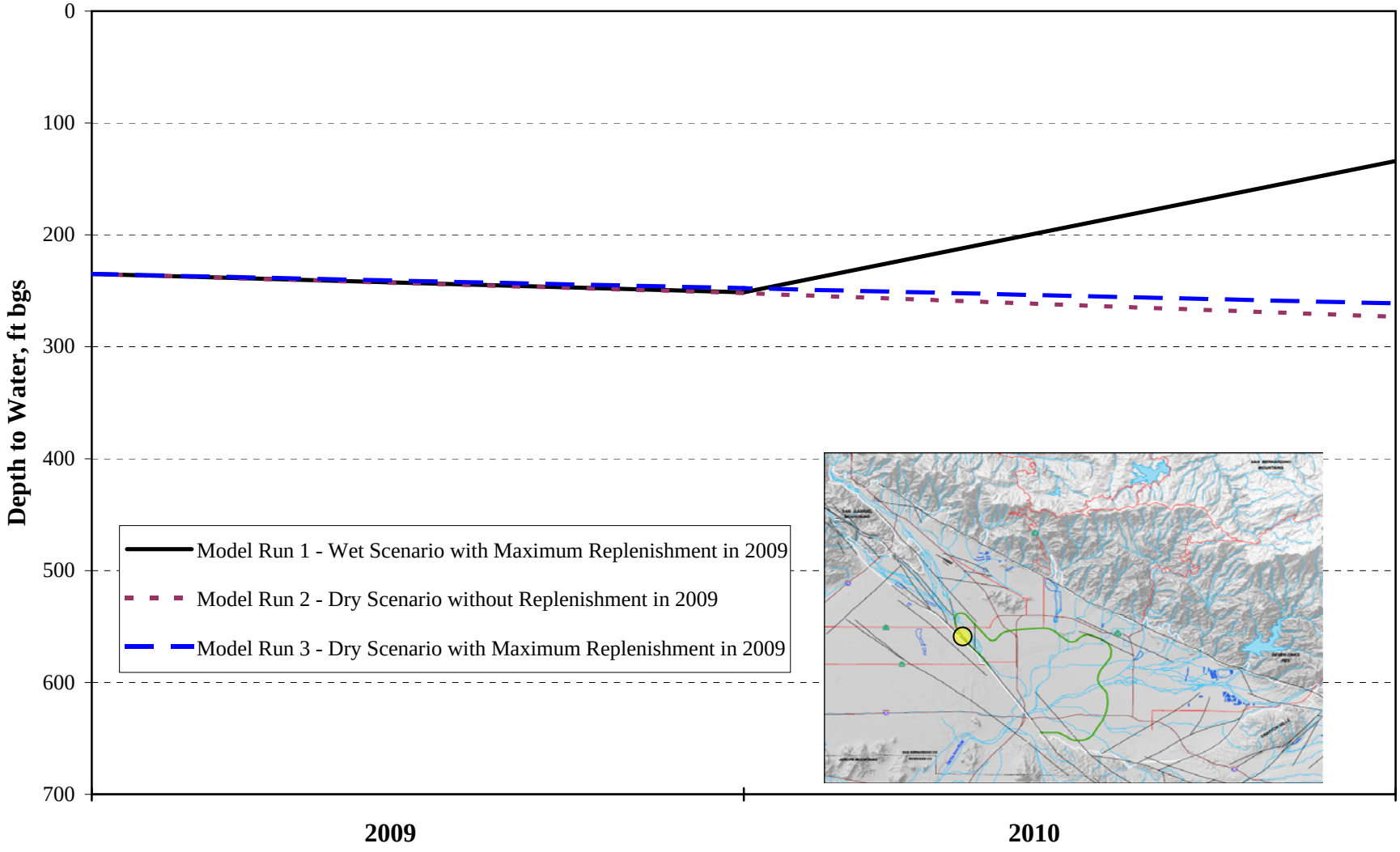


Figure 13

Depth To Water for East Valley Water District Well 24A
SBBA BTAC Wet and Dry Scenarios 2009-2010

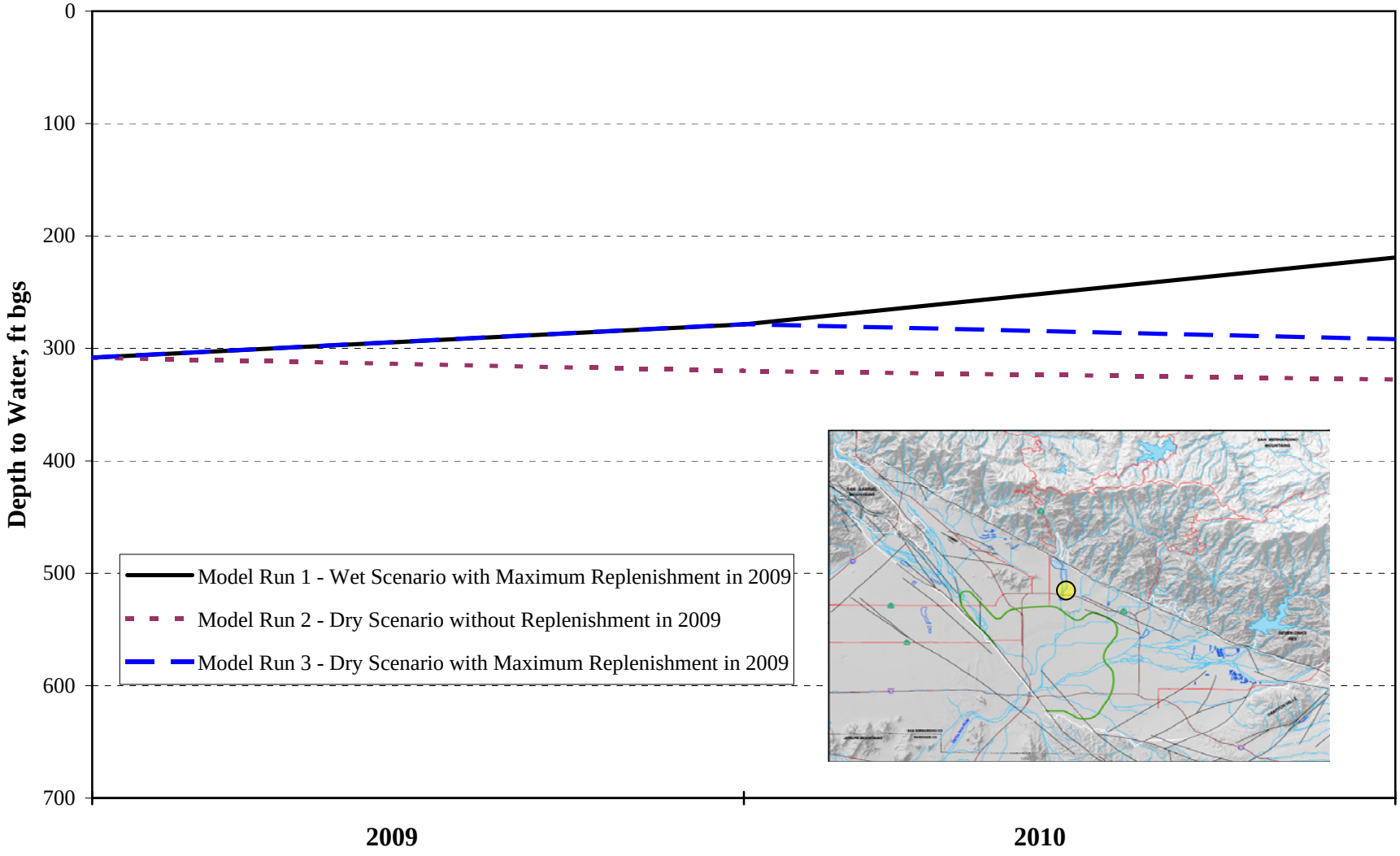


Figure 14

Depth To Water for City of Riverside Raub 1 Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

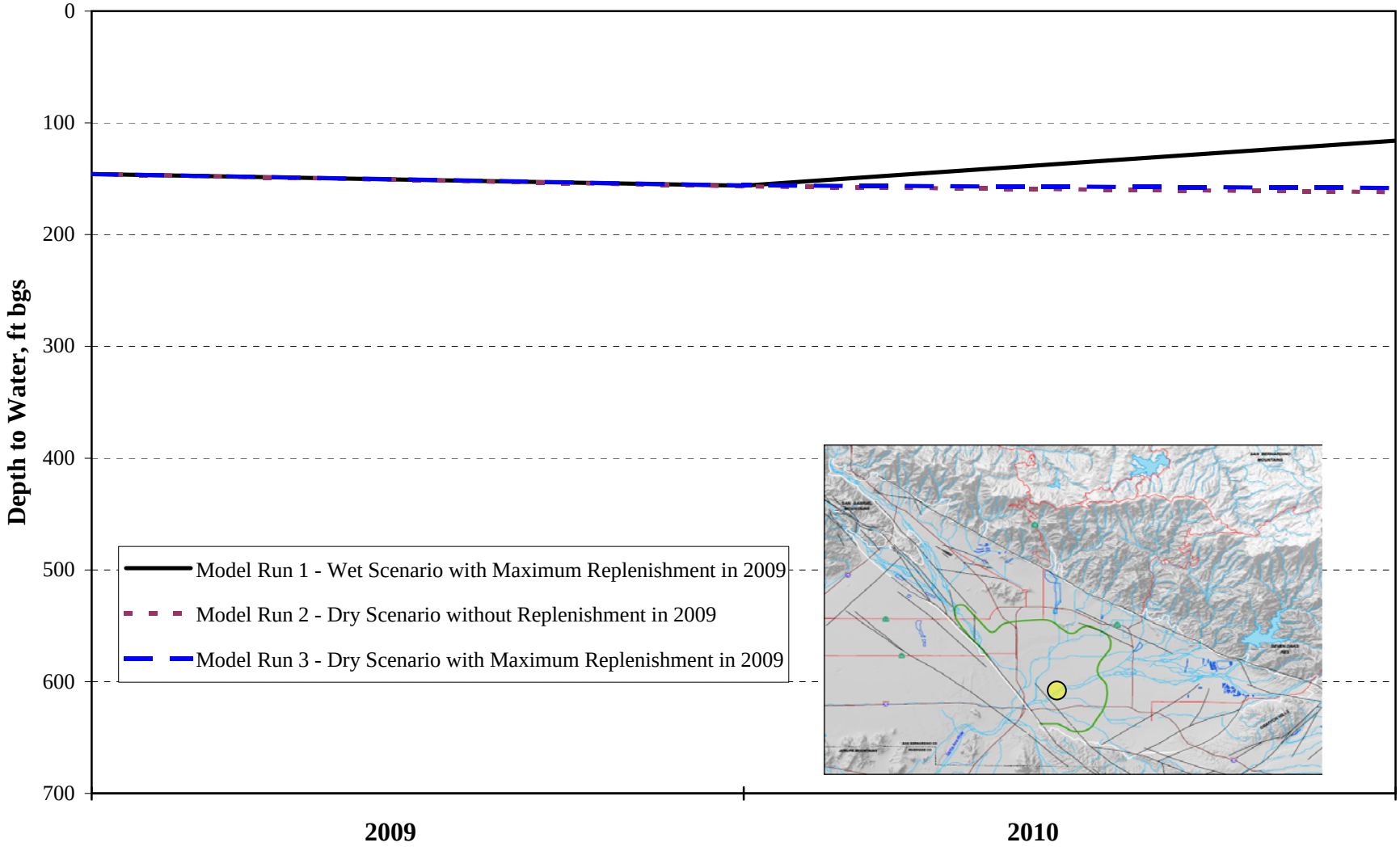


Figure 15

Depth To Water for Gage Canal Company Lower Kelly Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

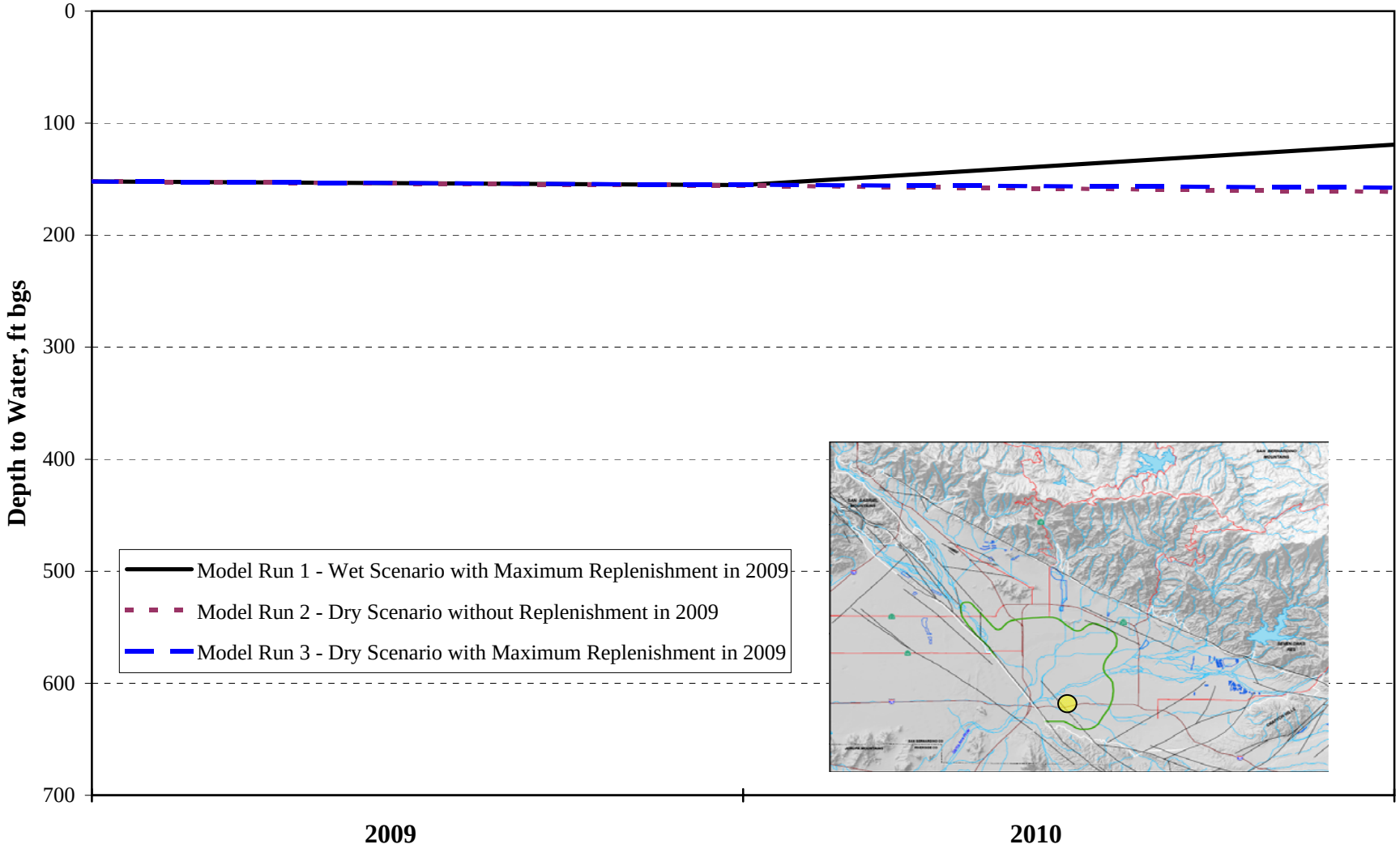


Figure 16

Depth To Water for City of San Bernardino Newmark 3 Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

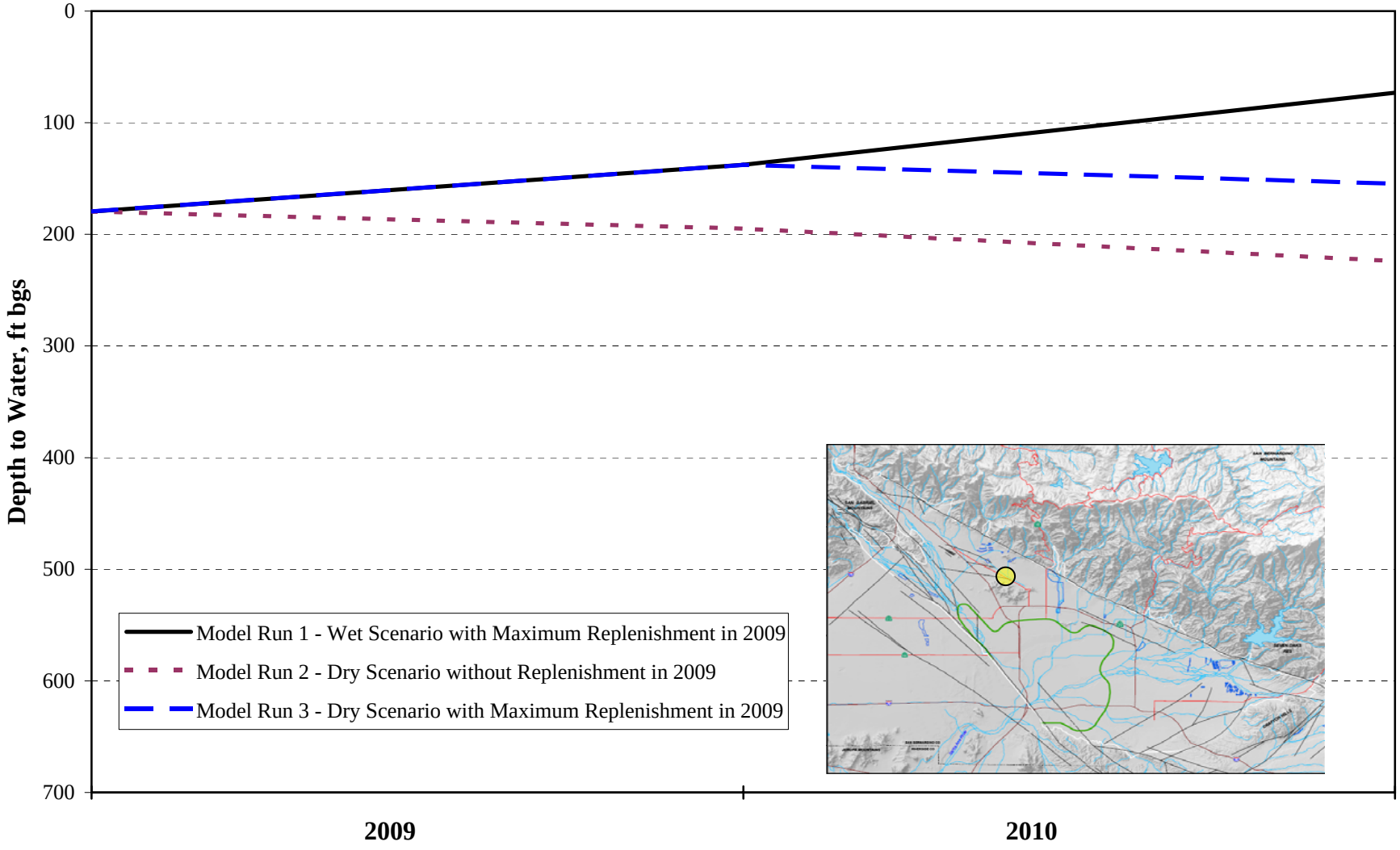


Figure 17

Depth To Water for City of San Bernardino Leroy Street Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

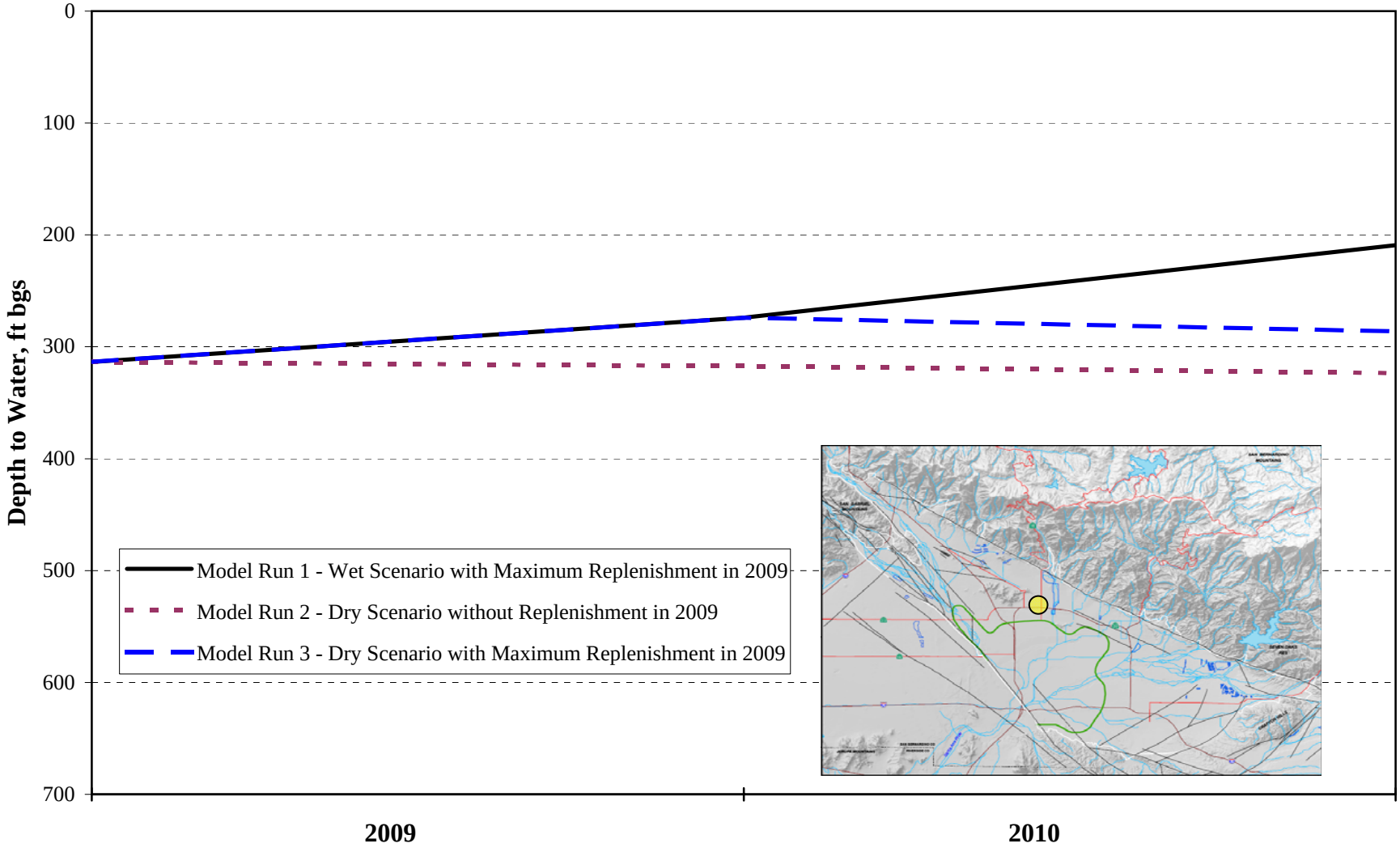


Figure 18

Depth To Water for East Valley Water District Well 40
SBBA BTAC Wet and Dry Scenarios 2009-2010

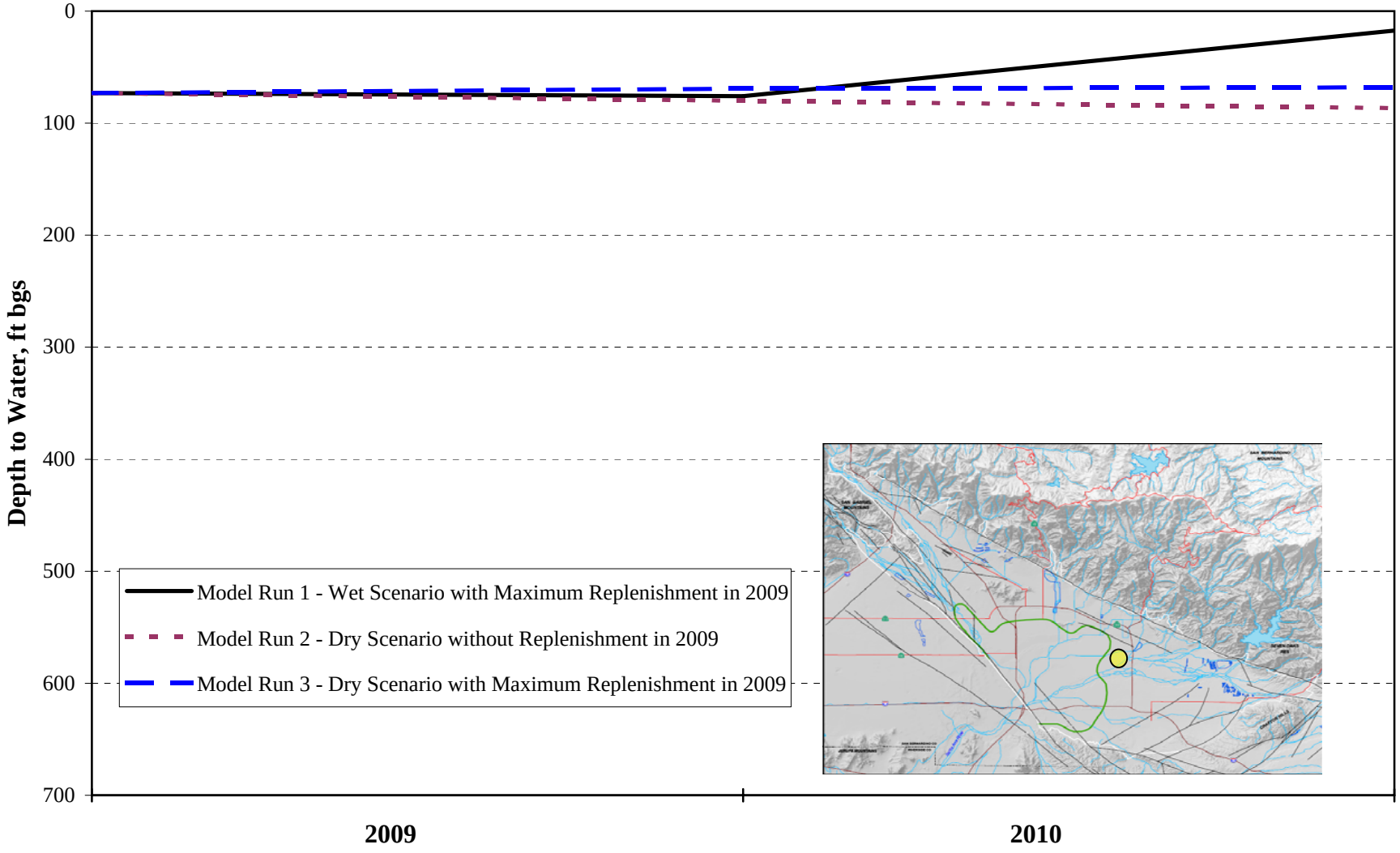


Figure 19

Depth To Water for City of Redlands Orange Street Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

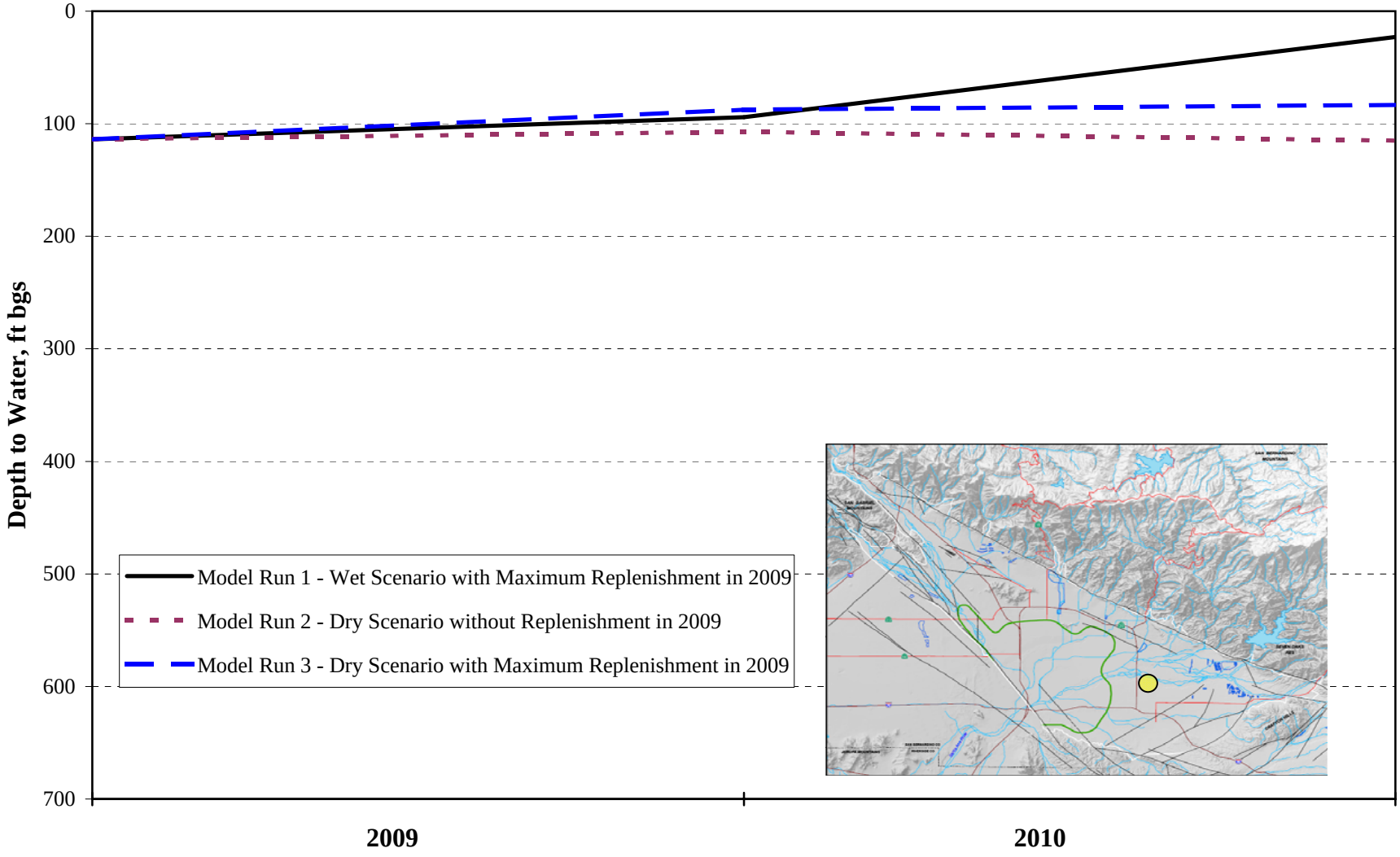


Figure 20

Depth To Water for City of Redlands Well 32
SBBA BTAC Wet and Dry Scenarios 2009-2010

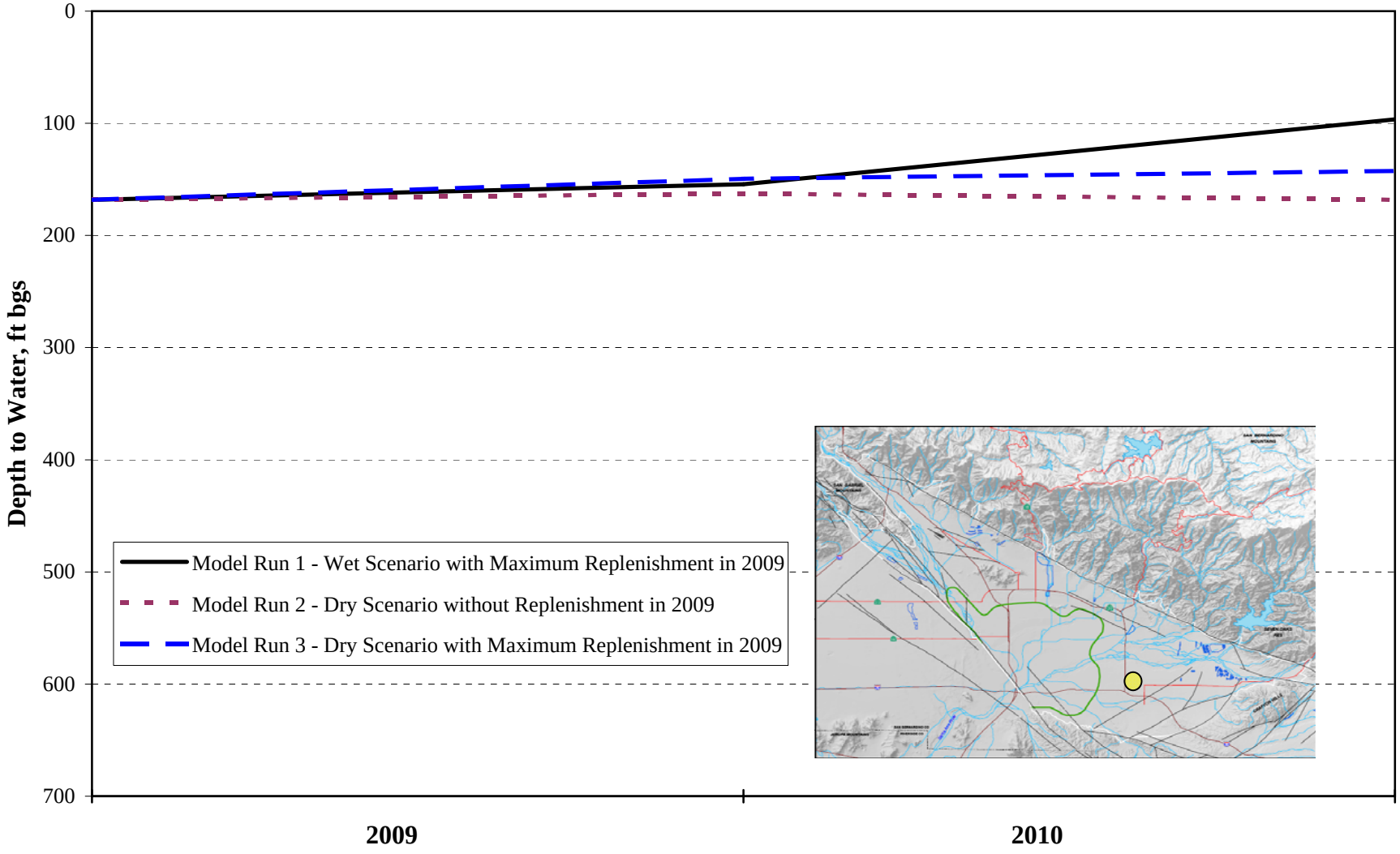


Figure 21

Depth To Water for East Valley Water District Well 62
SBBA BTAC Wet and Dry Scenarios 2009-2010

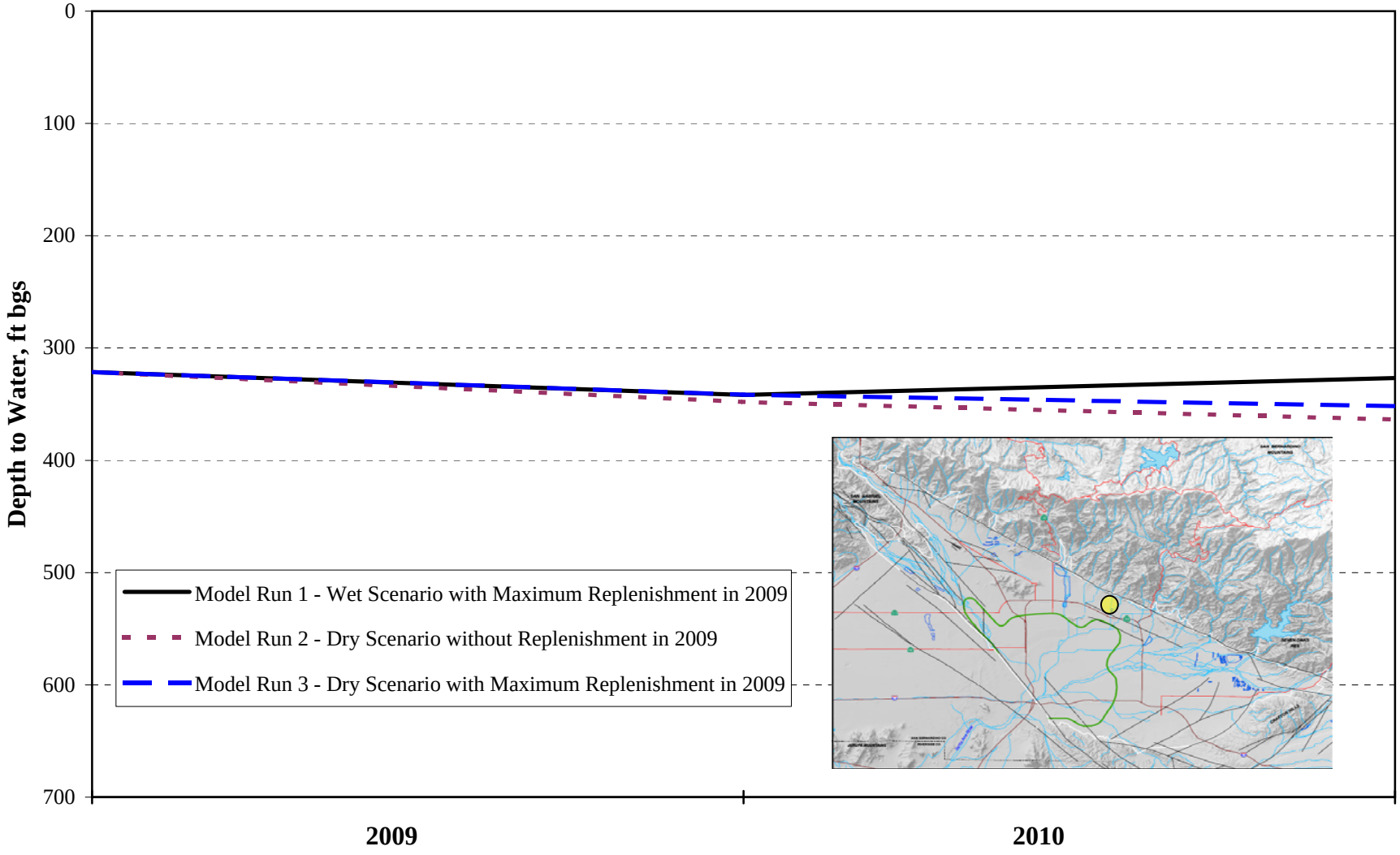


Figure 22

Depth To Water for City of Redlands Agate 2 Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

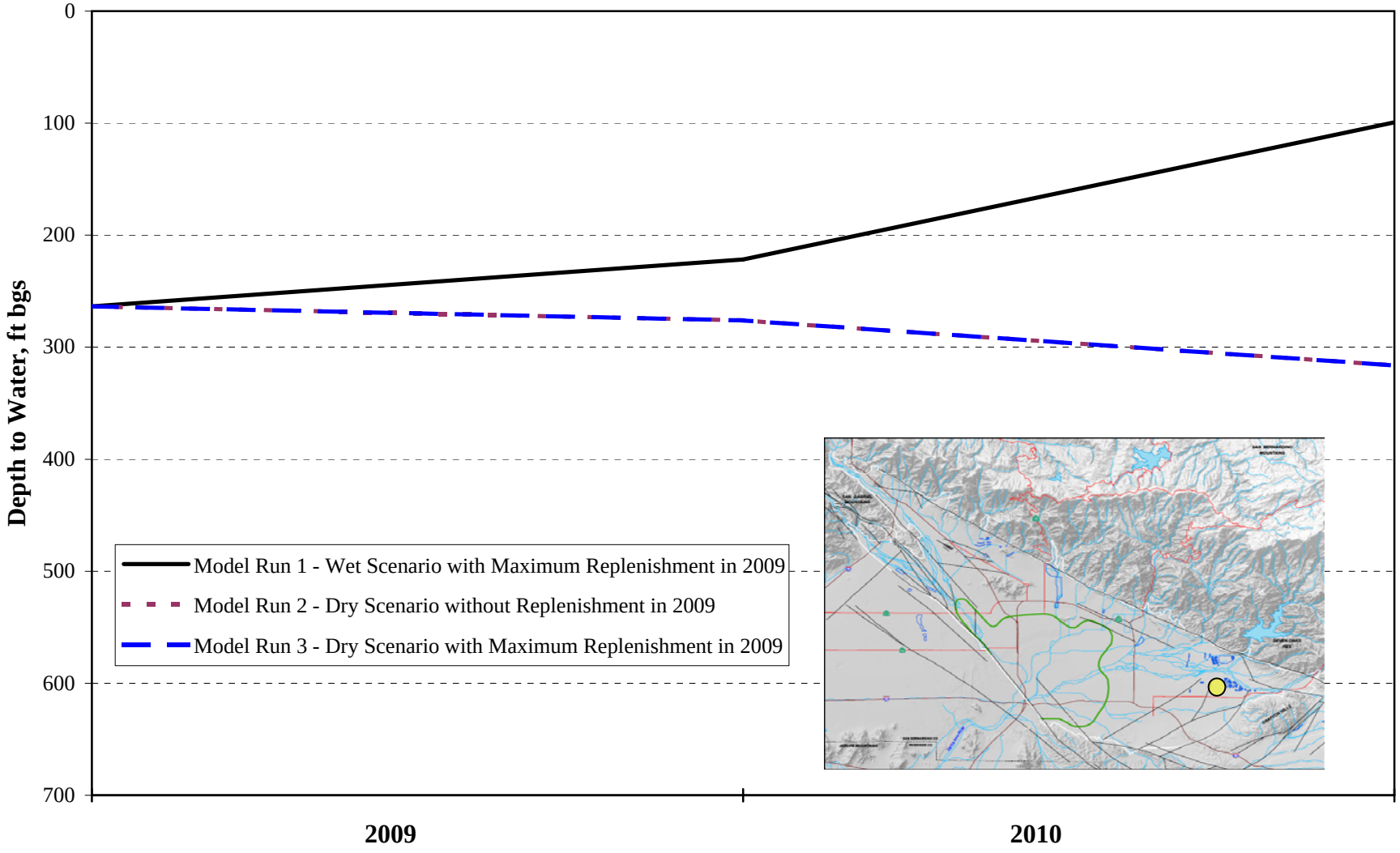


Figure 23

Depth To Water for Bear Valley MWC Nelson Street Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

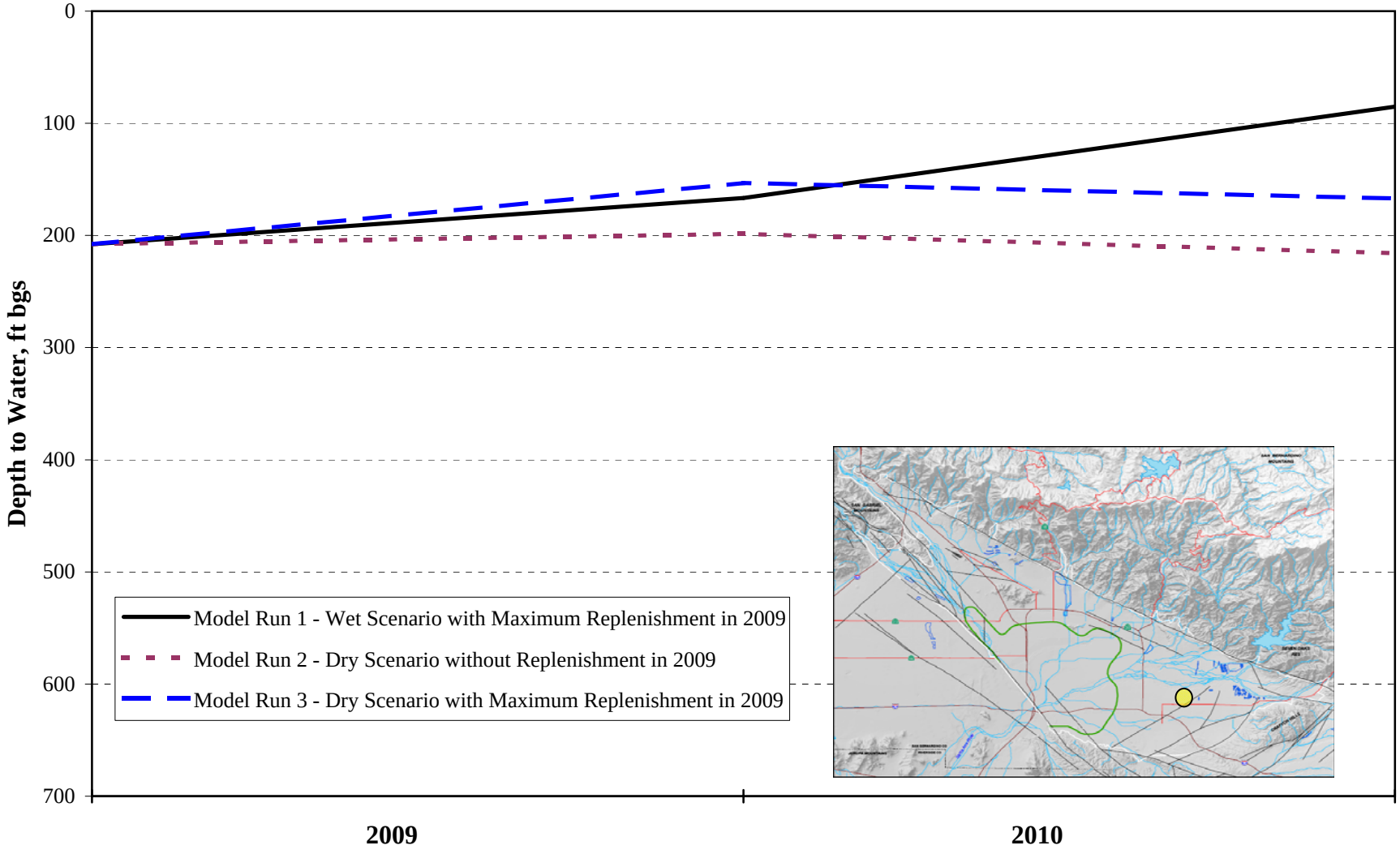


Figure 24

Depth To Water for City of Redlands Airport Well No. 2
SBBA BTAC Wet and Dry Scenarios 2009-2010

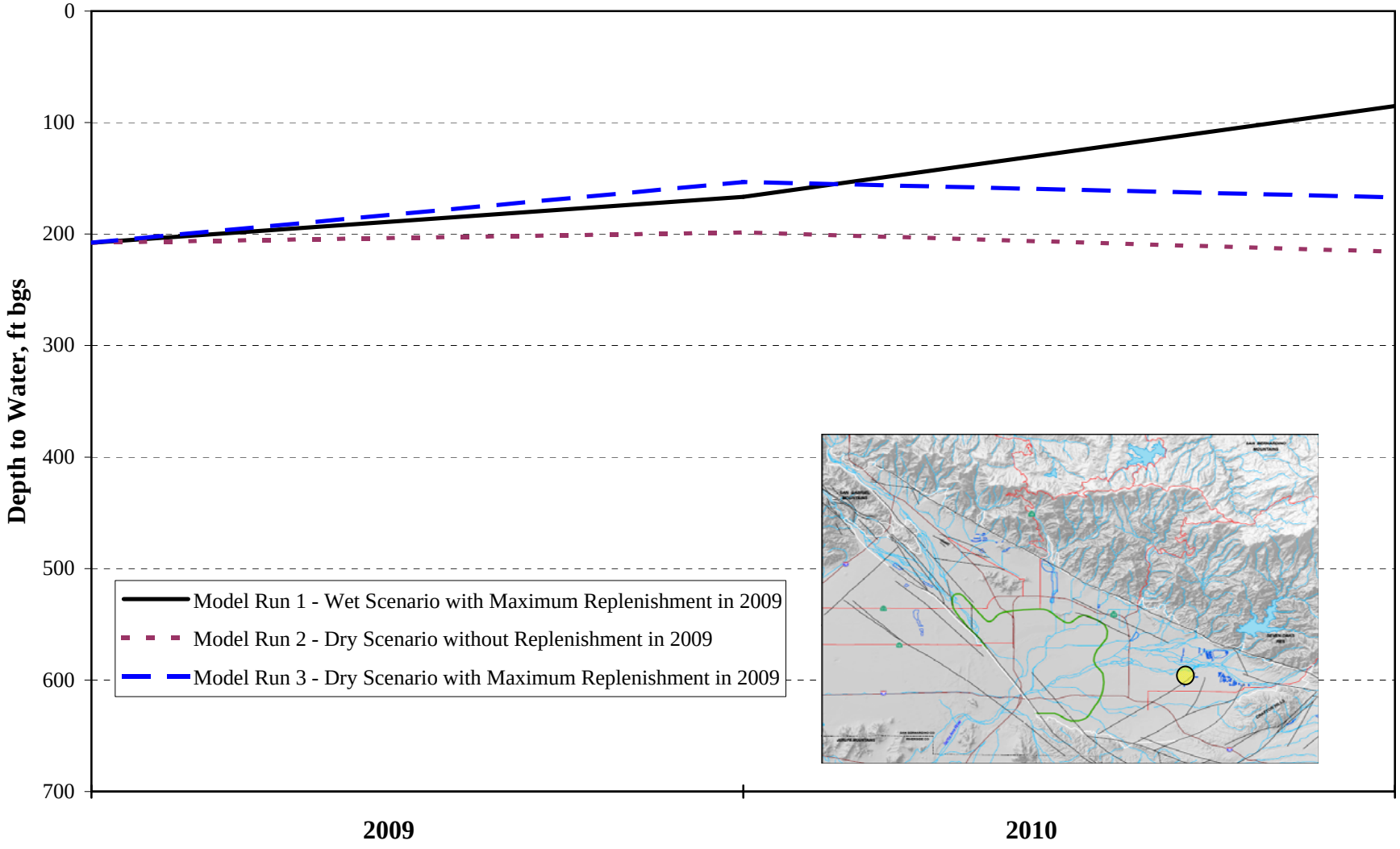


Figure 25

Depth To Water for SBVMWD San Bernardino Ave. Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

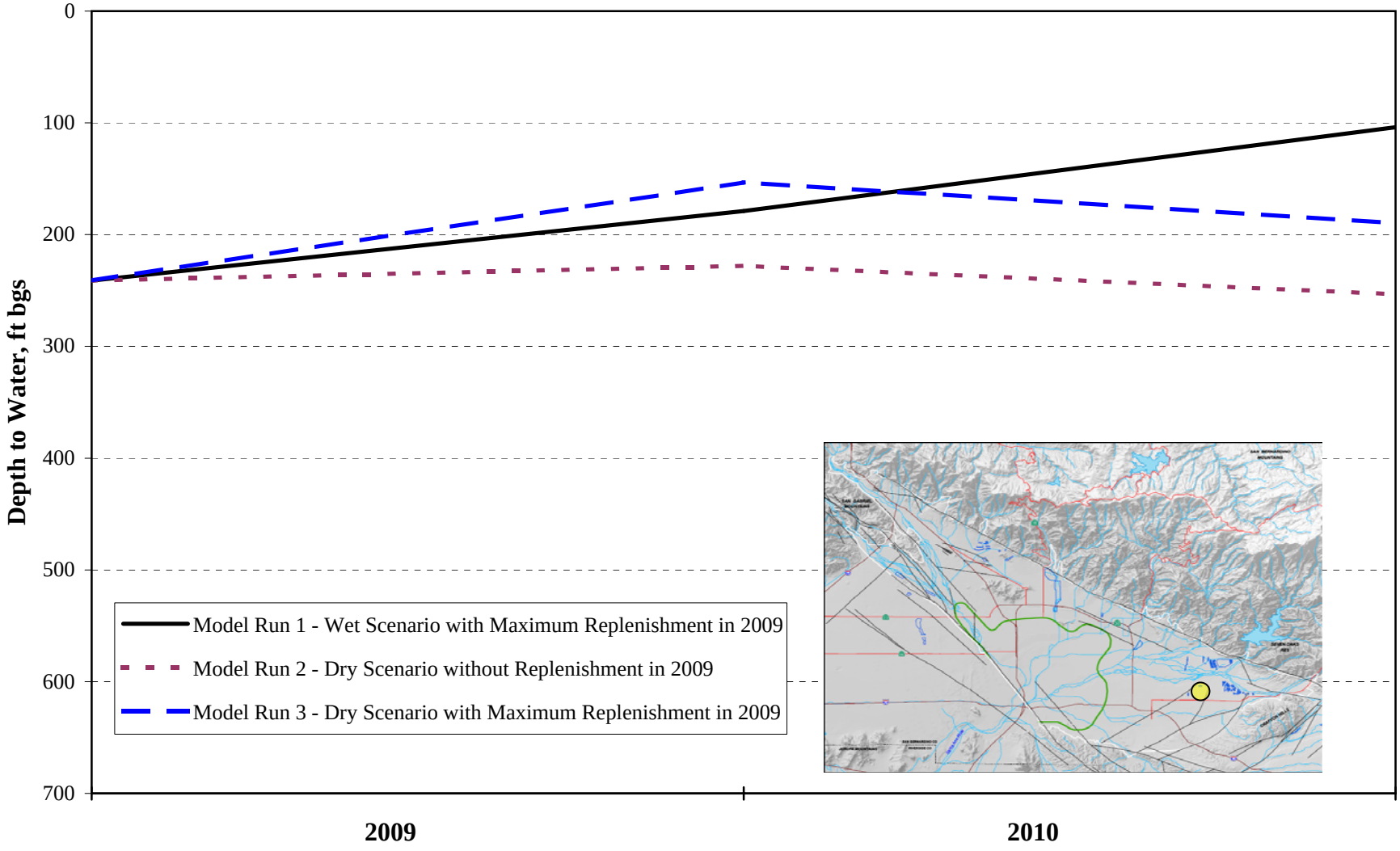


Figure 26

Depth To Water for East Valley Water District Well 120
SBBA BTAC Wet and Dry Scenarios 2009-2010

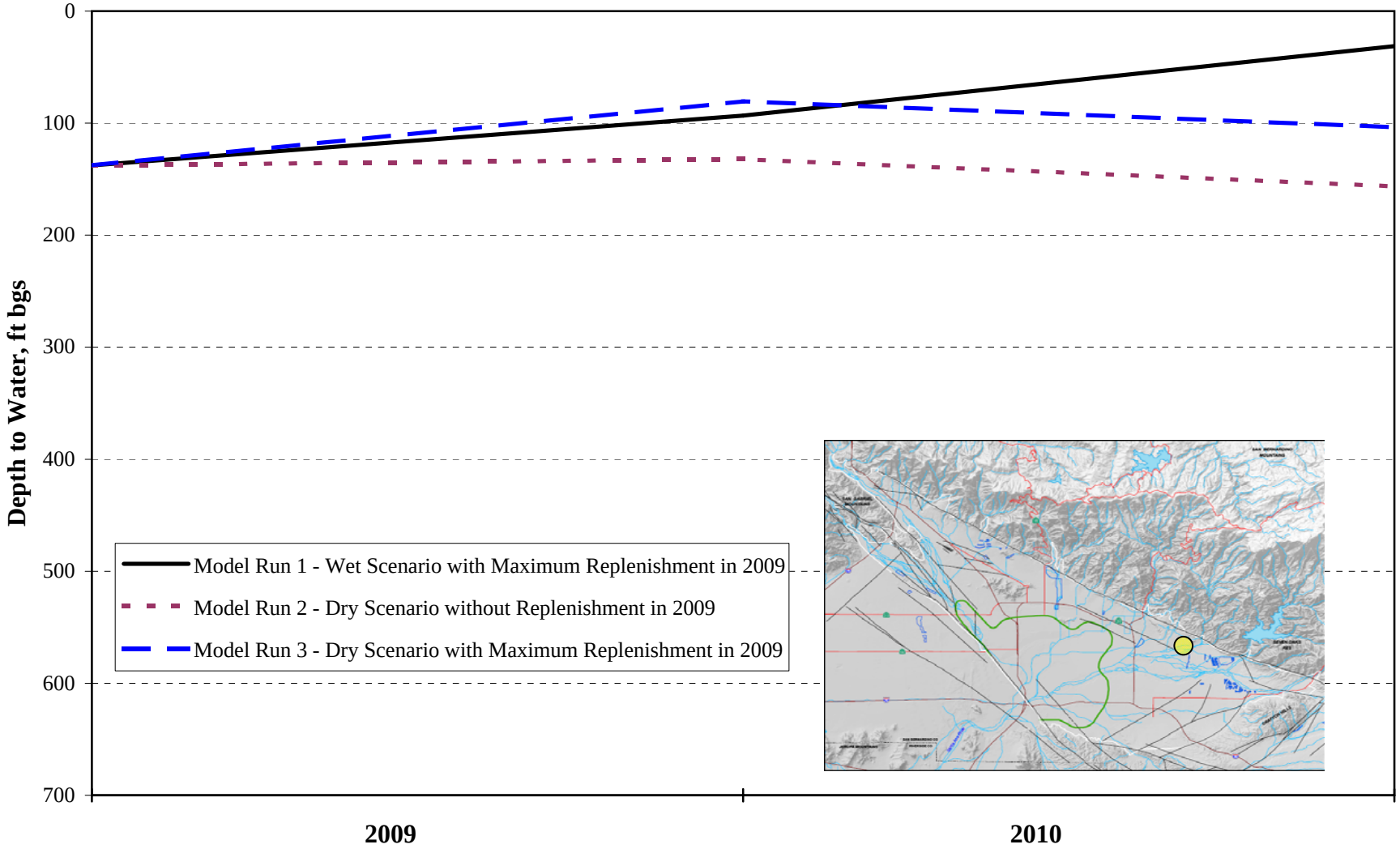


Figure 27

Depth To Water for East Valley Water District Well 146A
SBBA BTAC Wet and Dry Scenarios 2009-2010

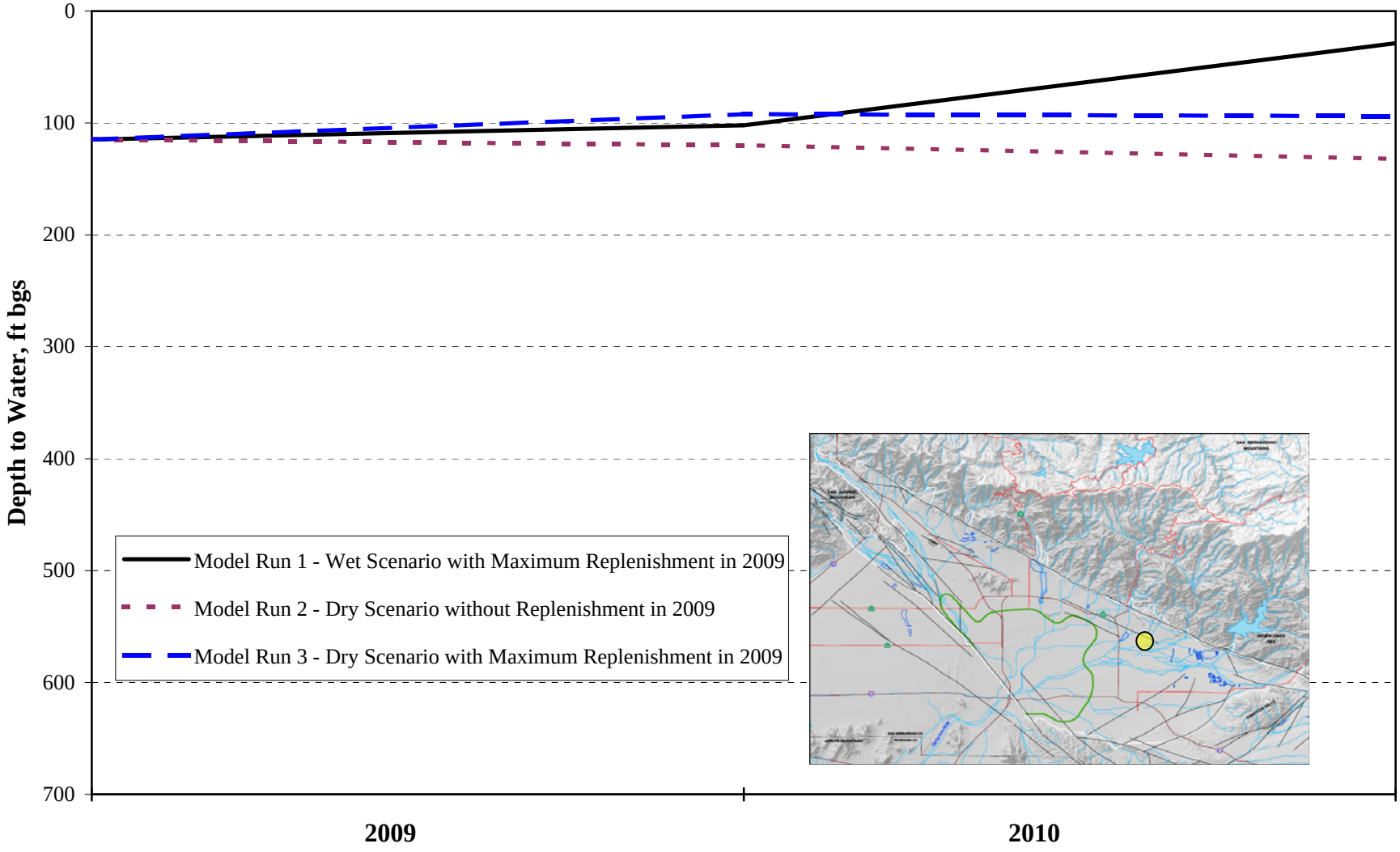


Figure 28

Depth To Water for East Valley Water District Cone Camp Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

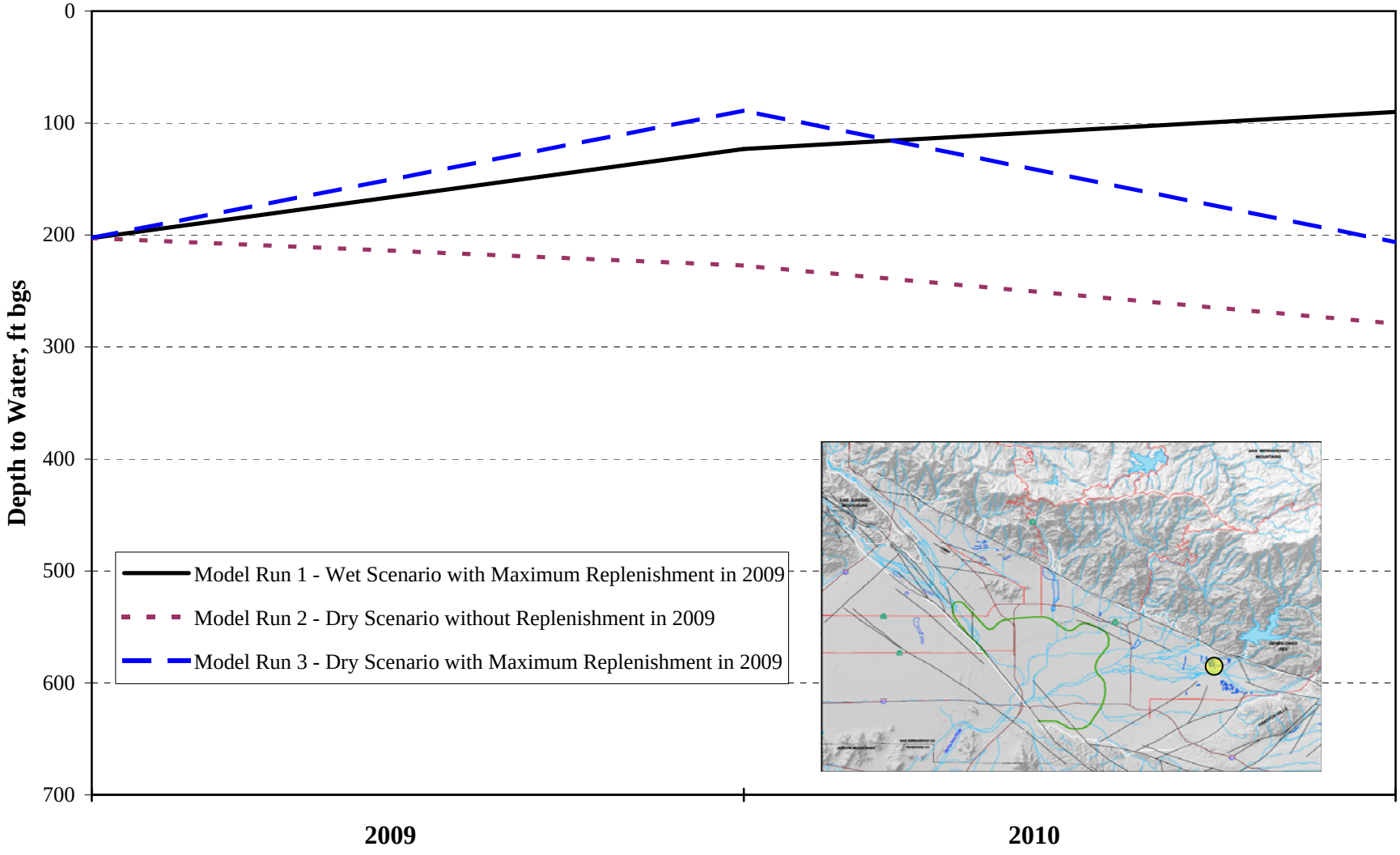


Figure 29

Depth To Water for SBVMWD Backyard Well
SBBA BTAC Wet and Dry Scenarios 2009-2010

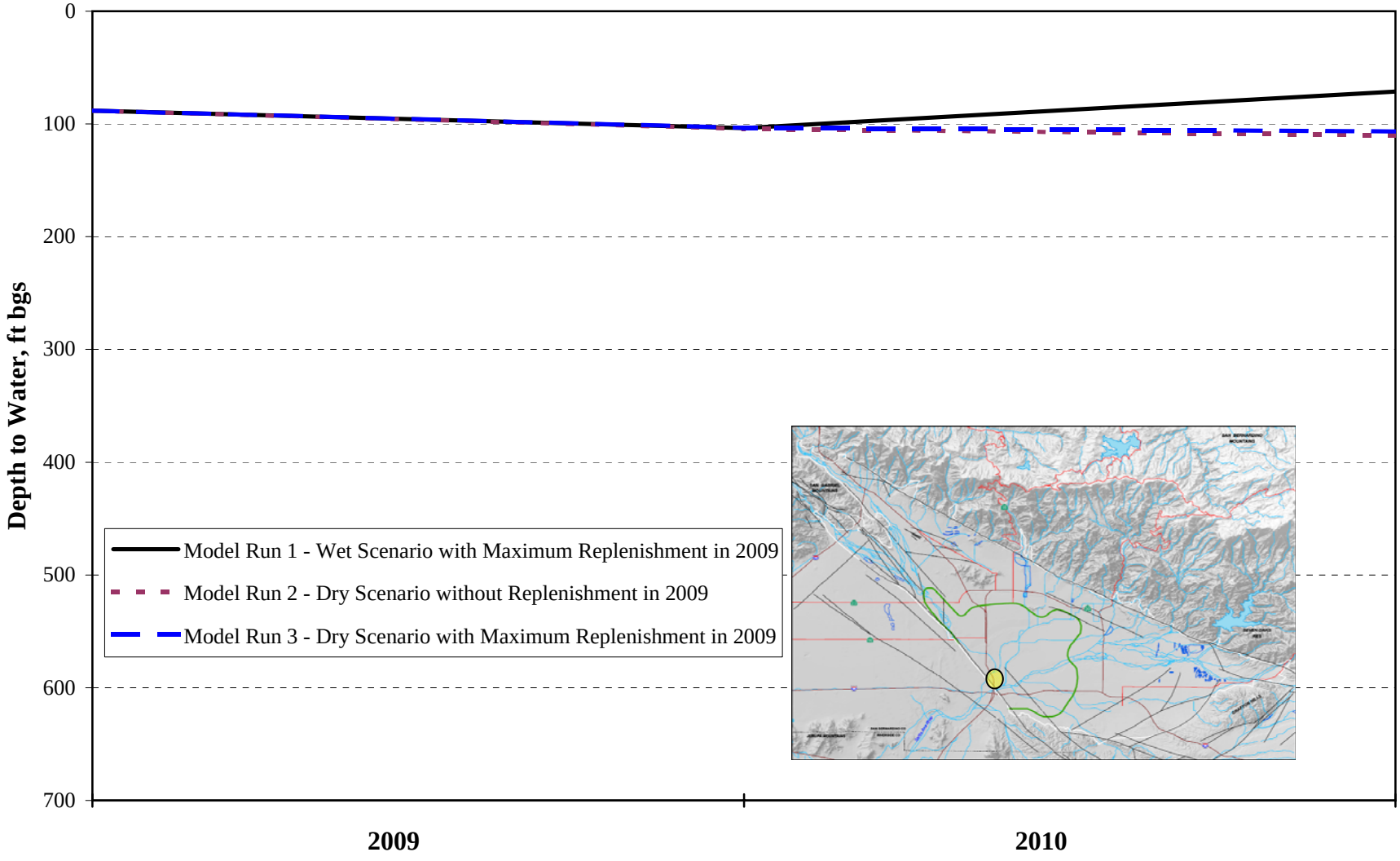


Figure 30

Cumulative Change in Groundwater Storage for Model Runs 1, 2 and 3

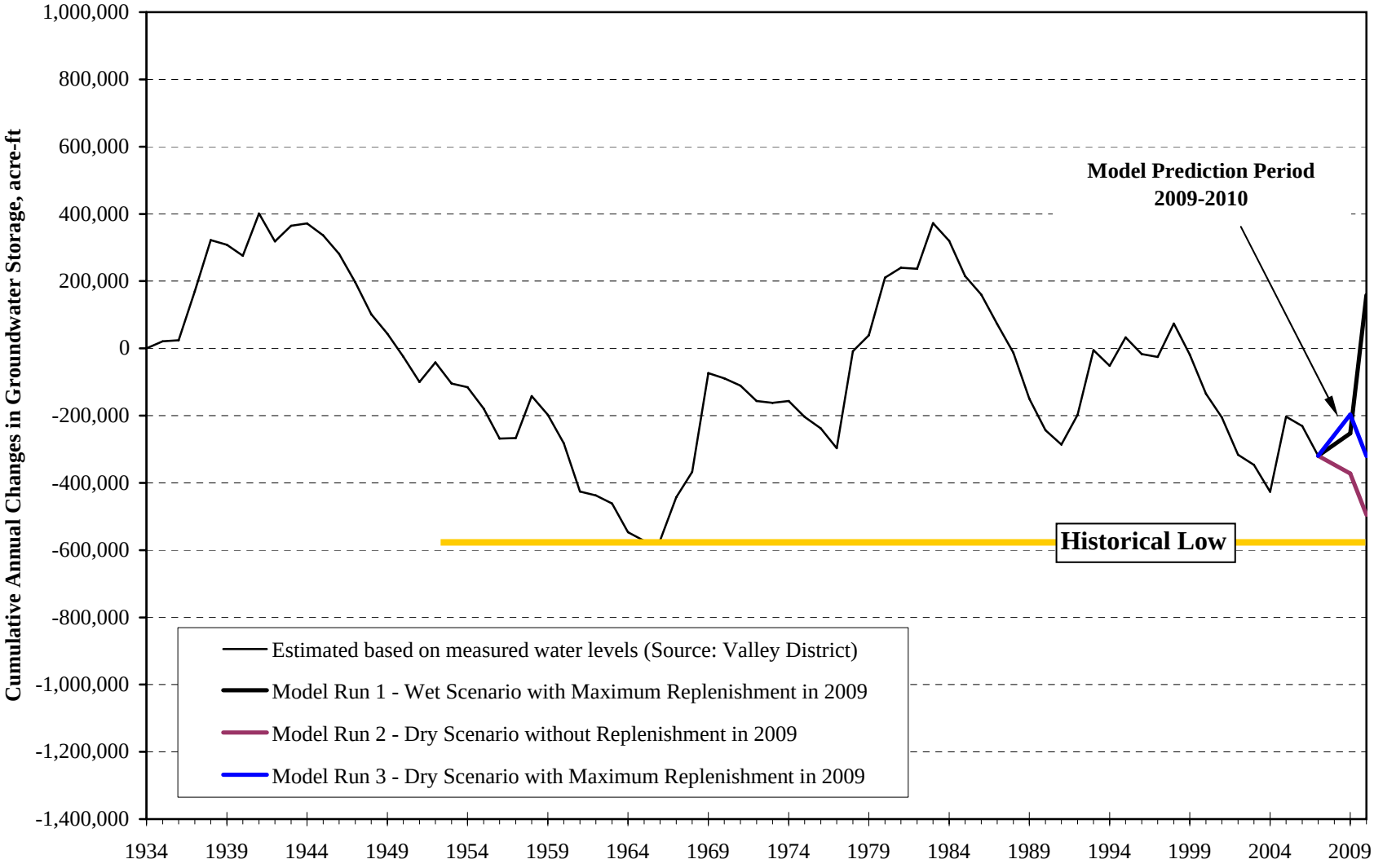
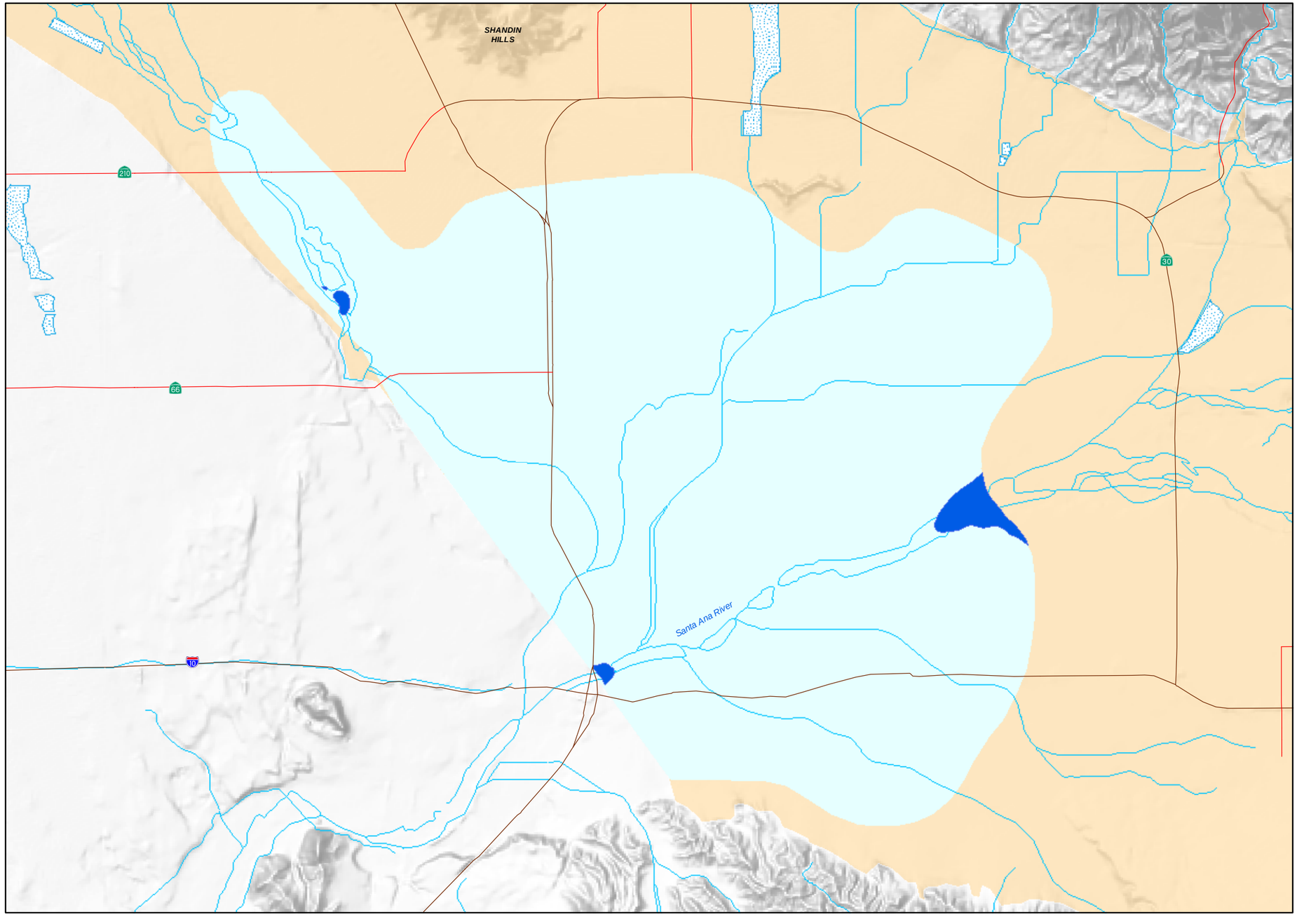


Figure 31

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

SBBA GROUNDWATER MODEL 2009 REGIONAL WATER MANAGEMENT PLAN



AREA WITH DEPTH TO WATER LESS THAN 50 FT IN 2010 - MODEL RUN 1 WET SCENARIO WITH MAXIMUM REPLENISHMENT IN 2009

EXPLANATION

- Depth to Water Less Than 50 ft (approximately 170 acres)
- Pressure Zone (approximately 19,000 acres)
- Spreading Grounds or Basins
- San Bernardino Basin Area Groundwater Basin Boundary
- Stream or River
- Freeway
- State Highway

19-Nov-08

Prepared by: DWB

Map Projection: State Plane Zone V, NAD27, feet

NORTH

0 1 2 Miles

GEOSCIENCE

GEOSCIENCE Support Services, Inc.
P.O. Box 220, Claremont, CA 91711
Tel: (909) 920-0707 Fax: (909) 920-0403
www.gssiwater.com

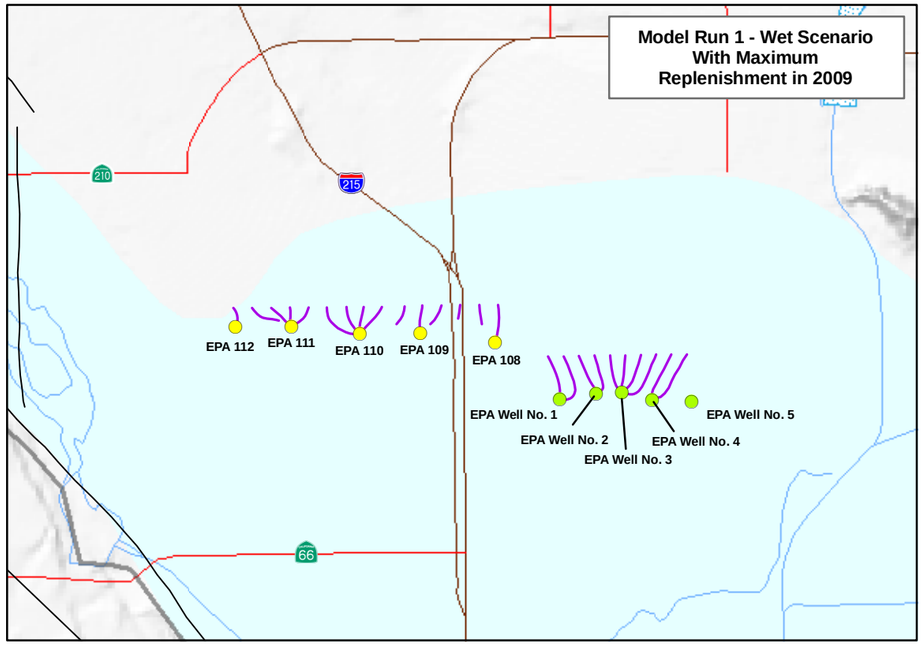
Figure 32

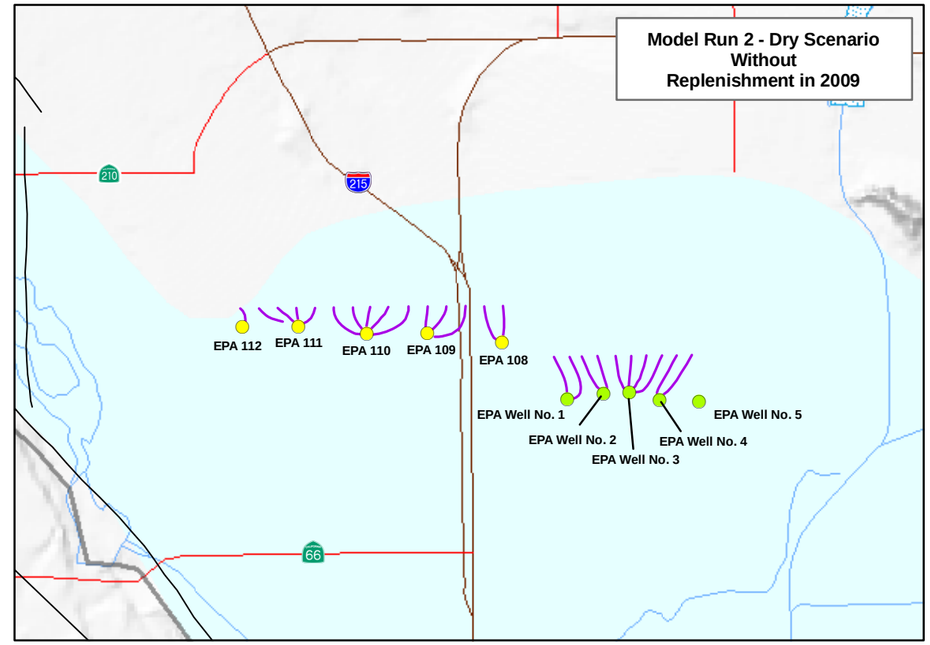
GIS_proj/muni_BTAC_scenarios_11-08/0_muni_BTAC_Fig_32_potential_liquefaction_11-08.mxd

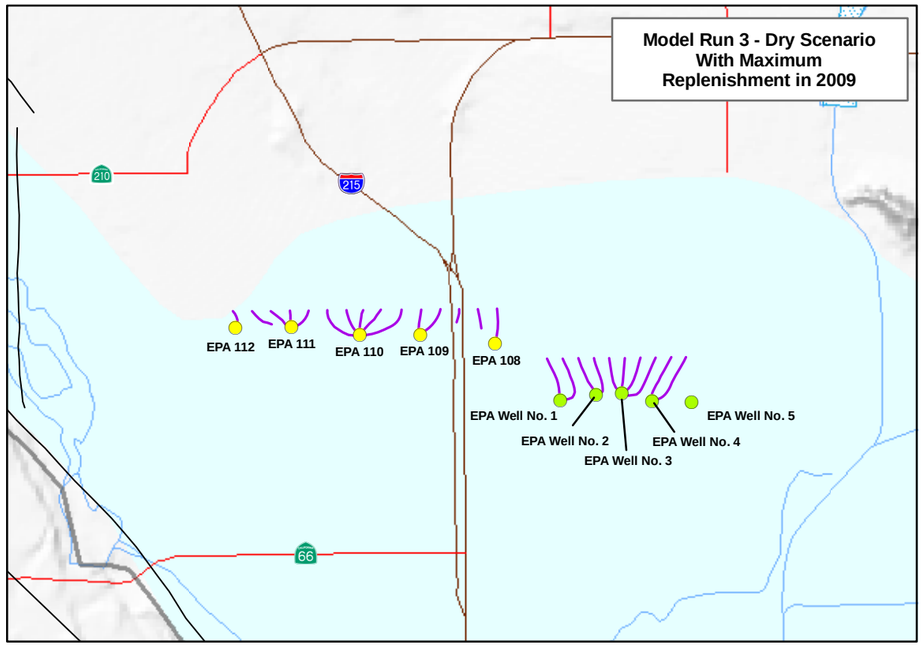
SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

SBBA GROUNDWATER MODEL 2009 REGIONAL WATER MANAGEMENT PLAN

PARTICLE TRACKS 2009-2010







EXPLANATION

- EPA Muscoy Plume Front Extraction Well
- EPA Newmark Plume Front Extraction Well
- Particle Tracks (Particles Released in Model Layer 3 in 2009)
- Spreading Grounds or Basins
- San Bernardino Basin Area Groundwater Basin Boundary
- Pressure Zone
- Stream or River
- Fault
- Freeway
- State Highway

NORTH

0 4,000 8,000 Feet

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www.gssiwater.com

19-Nov-08

Prepared by: DWB

Map Projection: State Plane Zone V, NAD83, feet

Figure 33

GIS_proj/muni_BTAC_scenarios_11-08/0_muni_BTAC_Fig_33_particle_track_11-08.mxd

TABLES

Table 1

Annual Replenishment for the 2009 Regional Water Management Plan Model Runs - 2009 to 2010 (Units in acre-ft)

Model Run 1: Wet Scenario with Maximum Replenishment in 2009

Model Year	Mill Creek SG (Airport)		Santa Ana River SG*		Devil Canyon/ Sweetwater SG		Lytle Creek SG		City Creek SG		Patton SG		Waterman SG		East Twin Creek SG		Badger SG		Mill Creek SG		Total
	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	
2009	0	0	0	60,300	0	16,000	0	0	0	0	0	300	0	21,000	0	17,000	0	2,700	0	8,000	**125,300**
2010	0	0	0	0	16,000	0	0	0	0	0	300	0	21,000	0	17,000	0	1,000	0	25,000	0	**80,300**
Average	**0**	**0**	**0**	**30,150**	**8,000**	**8,000**	**0**	**0**	**0**	**0**	**150**	**150**	**10,500**	**10,500**	**8,500**	**8,500**	**500**	**1,350**	**12,500**	**4,000**	**102,800**

Model Run 2: Dry Scenario without Replenishment in 2009

Model Year	Mill Creek SG (Airport)		Santa Ana River SG*		Devil Canyon/ Sweetwater SG		Lytle Creek SG		City Creek SG		Patton SG		Waterman SG		East Twin Creek SG		Badger SG		Mill Creek SG		Total
	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	Includes Senior Deliveries SAR	SWP	
2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2010	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Average	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Model Run 3: Dry Scenario with Maximum Replenishment in 2009

Model Year	Mill Creek SG (Airport)		Santa Ana River SG*		Devil Canyon/ Sweetwater SG		Lytle Creek SG		City Creek SG		Patton SG		Waterman SG		East Twin Creek SG		Badger SG		Mill Creek SG		Total
	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	SAR	SWP	Includes Senior Deliveries SAR	SWP	
2009	0	1,000	0	70,000	0	16,000	0	20,000	0	6,000	0	300	0	21,000	0	17,000	0	2,700	0	30,000	**184,000**
2010	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Average	**0**	**500**	**0**	**35,000**	**0**	**8,000**	**0**	**10,000**	**0**	**3,000**	**0**	**150**	**0**	**10,500**	**0**	**8,500**	**0**	**1,350**	**0**	**15,000**	**92,000**

SG: Spreading Ground
SAR: Santa Ana River
SWP: State Project Water
*Not including spreading by SBVWCD

Table 2

Groundwater Pumping for the 2009 Regional Water Management Plan Model Runs 1, 2 and 3 - 2009 to 2010

Year	Colton, City of	East Valley Water District	Fontana W.C.	Loma Linda, City of	Marigold Mutual W.C.	Muscoy Mutual W.C.	Redlands, City of - Water Utility	Rialto, City of	San Bernardino Municipal Water Dept, City of	Terrace Water Co.	West Valley Water District	Agricultural/Private	Riverside Public Utilities	Riverside-Highland W.C.	Meeks and Daley W.C.	Regents of California	TOTAL
	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]
2009	6,697	22,605	12,607	2,890	278	2,096	13,402	6,014	53,762	309	9,586	15,958	47,755	2,487	666	534	197,645
2010	6,697	22,605	12,607	2,890	278	2,096	13,402	6,014	53,762	309	9,586	15,958	47,755	2,487	666	534	197,645
Average	6,697	22,605	12,607	2,890	278	2,096	13,402	6,014	53,762	309	9,586	15,958	47,755	2,487	666	534	197,645

Source: Stantec

Table 3

Groundwater Budget for the Model Run 1 - Wet Scenario with Maximum Replenishment in 2009 - 2009 to 2010 (Units in acre-ft/yr)

Model Year	Hydrologic Year	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
		INFLOW										OUTFLOW				
		Recharge from Gaged Streamflow	Replenishment by Valley District (SWP Water)	Replenishment by Valley District and Western (SAR Water)	Spreading of SAR Water by SBVWCD	Recharge from Local Runoff Generated by Precipitation	Infiltration from Direct Precipitation	Return Flow from Groundwater Pumping	Recharge from Ungaged Mountain Front Runoff	Underflow Recharge	Total Inflow	Evapo-transpiration	Groundwater Pumping	Underflow Discharge	Total Outflow	CHANGE IN GROUNDWATER STORAGE
2009	**1974**	97,798	125,300	0	0	5,038	1,109	31,048	11,497	3,385	275,175	8,463	197,645	2,466	208,575	**66,600**
2010	**1969**	423,244	0	80,300	10,400	10,694	1,109	31,048	67,034	3,349	627,179	16,205	197,645	2,444	216,294	**410,885**
Average		**260,521**	**62,650**	**40,150**	**5,200**	**7,866**	**1,109**	**31,048**	**39,266**	**3,367**	**451,177**	**12,334**	**197,645**	**2,455**	**212,434**	**238,742**

[1] Model-calculated
[2] Estimated by model iterative runs so that the recharge does not cause water level shallower that 50 ft in the Pressures Zone and the recharge does not cause any impacts to contamination plumes
[3] Model input data based on OPMODEL
[4] Model input data based on OPMODEL. The OPMODEL assumes that the first 88 cfs of SAR water is diverted by the Senior Water Rights holders and then the remaining SAR water is diverted by the SBVWCD based on the licensed rights at 10,400 acre-ft/yr.
[5] Model input data based on historical conditions
[6] Model input data based on historical conditions
[7] Model input data based on 2006 pumping records
[8] Model input data based on historical conditions
[9] Model input data based on historical conditions
[10] = sum of [1] to [9]
[11] Model-calculated
[12] Model input data based on 2006 pumping records
[13] Model input data based on historical conditions
[14] = [11] + [12] +[13]
[15] = [10] - [14]

Table 4

Groundwater Budget for the Model Run 2 - Dry Scenario without Replenishment in 2009 - 2009 to 2010 (Units in acre-ft/yr)

Model Year	Hydrologic Year	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
		INFLOW										OUTFLOW				
		Recharge from Gaged Streamflow	Replenishment by Valley District (SWP Water)	Replenishment by Valley District and Western (SAR Water)	Spreading of SAR Water by SBVWCD	Recharge from Local Runoff Generated by Precipitation	Infiltration from Direct Precipitation	Return Flow from Groundwater Pumping	Recharge from Ungaged Mountain Front Runoff	Underflow Recharge	Total Inflow	Evapo-transpiration	Groundwater Pumping	Underflow Discharge	Total Outflow	CHANGE IN GROUNDWATER STORAGE
2009	**1974**	97,798	0	0	0	5,038	1,109	31,048	11,497	3,385	149,875	2,193	197,645	2,466	202,305	**-52,430**
2010	**1990**	36,275	0	0	0	2,741	1,109	31,048	3,994	3,349	78,516	1,643	197,645	2,444	201,733	**-123,217**
Average		**67,036**	**0**	**0**	**0**	**3,890**	**1,109**	**31,048**	**7,746**	**3,367**	**114,195**	**1,918**	**197,645**	**2,455**	**202,019**	**-87,823**

[1] Model-calculated
[2] Assumes without replenishment
[3] Model input data based on OPMODEL
[4] Model input data based on OPMODEL. The OPMODEL assumes that the first 88 cfs of SAR water is diverted by the Senior Water Rights holders and then the remaining SAR water is diverted by the SBVWCD based on the licensed rights at 10,400 acre-ft/yr.
[5] Model input data based on historical conditions
[6] Model input data based on historical conditions
[7] Model input data based on 2006 pumping records
[8] Model input data based on historical conditions
[9] Model input data based on historical conditions
[10] = sum of [1] to [9]
[11] Model-calculated
[12] Model input data based on 2006 pumping records
[13] Model input data based on historical conditions
[14] = [11] + [12] +[13]
[15] = [10] - [14]

Table 5

Groundwater Budget for the Model Run 3 - Dry Scenario with Maximum Replenishment in 2009 - 2009 to 2010 (Units in acre-ft/yr)

Model Year	Hydrologic Year	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
		INFLOW										OUTFLOW				
		Recharge from Gaged Streamflow	Replenishment by Valley District (SWP Water)	Replenishment by Valley District and Western (SAR Water)	Spreading of SAR Water by SBVWCD	Recharge from Local Runoff Generated by Precipitation	Infiltration from Direct Precipitation	Return Flow from Groundwater Pumping	Recharge from Ungaged Mountain Front Runoff	Underflow Recharge	Total Inflow	Evapo-transpiration	Groundwater Pumping	Underflow Discharge	Total Outflow	CHANGE IN GROUNDWATER STORAGE
2009	**1974**	97,798	184,000	0	0	5,038	1,109	31,048	11,497	3,385	333,875	11,427	197,645	2,466	211,539	**122,336**
2010	**1990**	36,275	0	0	0	2,741	1,109	31,048	3,994	3,349	78,516	1,657	197,645	2,444	201,746	**-123,231**
Average		**67,036**	**92,000**	**0**	**0**	**3,890**	**1,109**	**31,048**	**7,746**	**3,367**	**206,195**	**6,542**	**197,645**	**2,455**	**206,643**	**-448**

[1] Model-calculated
[2] Estimated by model iterative runs so that the recharge does not cause water level shallower that 50 ft in the Pressures Zone and the recharge does not cause any impacts to contamination plumes
[3] Model input data based on OPMODEL
[4] Model input data based on OPMODEL. The OPMODEL assumes that the first 88 cfs of SAR water is diverted by the Senior Water Rights holders and then the remaining SAR water is diverted by the SBVWCD based on the licensed rights at 10,400 acre-ft/yr.
[5] Model input data based on historical conditions
[6] Model input data based on historical conditions
[7] Model input data based on 2006 pumping records
[8] Model input data based on historical conditions
[9] Model input data based on historical conditions
[10] = sum of [1] to [9]
[11] Model-calculated
[12] Model input data based on 2006 pumping records
[13] Model input data based on historical conditions
[14] = [11] + [12] +[13]
[15] = [10] - [14]

G. COLTON BASIN AND RIVERSIDE BASIN

Minimum Water Surface Elevations

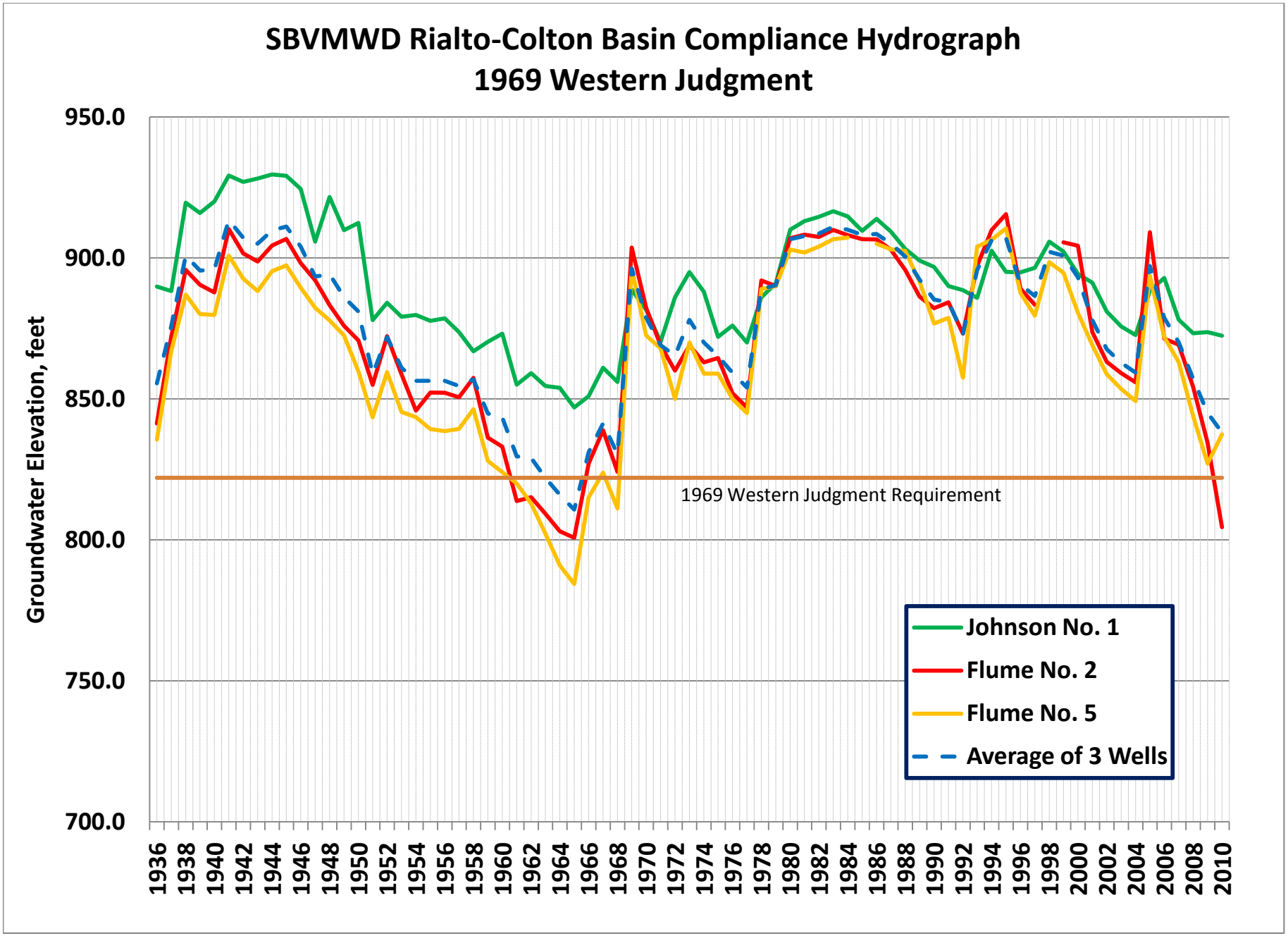
Extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County for use in San Bernardino Valley are not limited, provided that the average static water surface elevation as measured at wells numbered 1S/4W-21Q03S, 1S/4W-29H01S, and 1S/4W-29Q01S is not less than 822.04 feet, as set forth in the Judgment. This elevation is determined each year by averaging the lowest static water level occurring in each of the three wells at or near the same time of the year.

Hydrographs of the 2007 static water surface elevations in the three key wells are shown on Figures 1, 2, and 3 which follow. Data pertinent to the key wells as well as the records of historic water surface measurements are included in Report of Watermaster, Volume 8-2006 entitled *Ground Water Surface Elevations in Wells Numbered 1S/4W-21Q03S, 1S/4W-29H01S, and 1S/4W-29Q01S Located Within the Colton Basin Area and Riverside Basin Area in San Bernardino County through December,* 2007.

The lowest static water surface elevation measured in each of the three wells during 2007 is as follows:

Well Number	Date of Measurement	Elevation of Water Surface
1S/4W-21Q03S (Johnson #1)	Nov. 28, 2007	878.11
1S/4W-29H01S (Flume #2)	Nov. 28, 2007	869.25
1S/4W-29Q01S (Flume #5)	Nov. 19, 2007	863.03
	Average	870.13

Thus, the lowest average fall water surface elevation for calendar year 2007 is 8.61 feet lower than the 2006 average of 878.74 and 48.09 feet higher than the 1963 average of 822.04.


SBVMWD Rialto-Colton Basin Compliance Hydrograph
1969 Western Judgment
Groundwater Elevation, feet
950.0
900.0
850.0
800.0
750.0
700.0
1969 Western Judgment Requirement
Johnson No. 1
Flume No. 2
Flume No. 5
Average of 3 Wells
1936
1938
1940
1942
1944
1946
1948
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
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1994
1996
1998
2000
2002
2004
2006
2008
2010

H. SUBSIDENCE

To: Basin Technical Advisory Committee (BTAC)

From: Management Tools Subcommittee

Subject: Subsidence

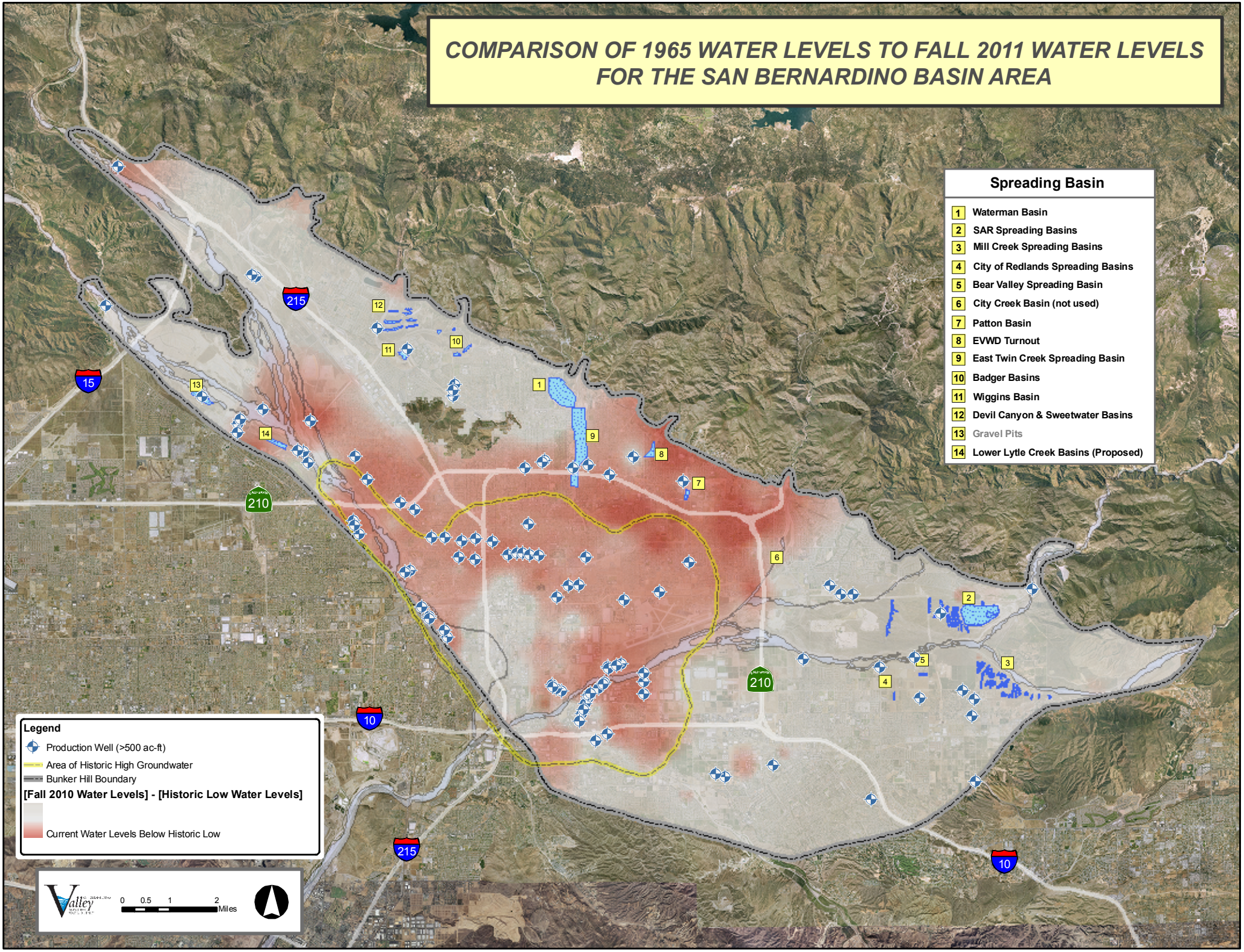
References:

a. USGS Fact Sheet 165-00, December 2000
b. Evaluation and Prediction of Subsidence, ASCE Conference, January 1978.
c. USGS Land Subsidence in the United States, Circular 1182, 1999.

The Management Tools Subcommittee (Subcommittee) references the above-mentioned documents regarding subsidence. According to these documents, most land subsidence occurs in clay layers that have been "newly" dewatered. Therefore, the "at risk areas" for subsidence in the San Bernardino Basin Area (SBBA) would generally be classified as any area where a clay layer has been dewatered below the lowest recorded water level.

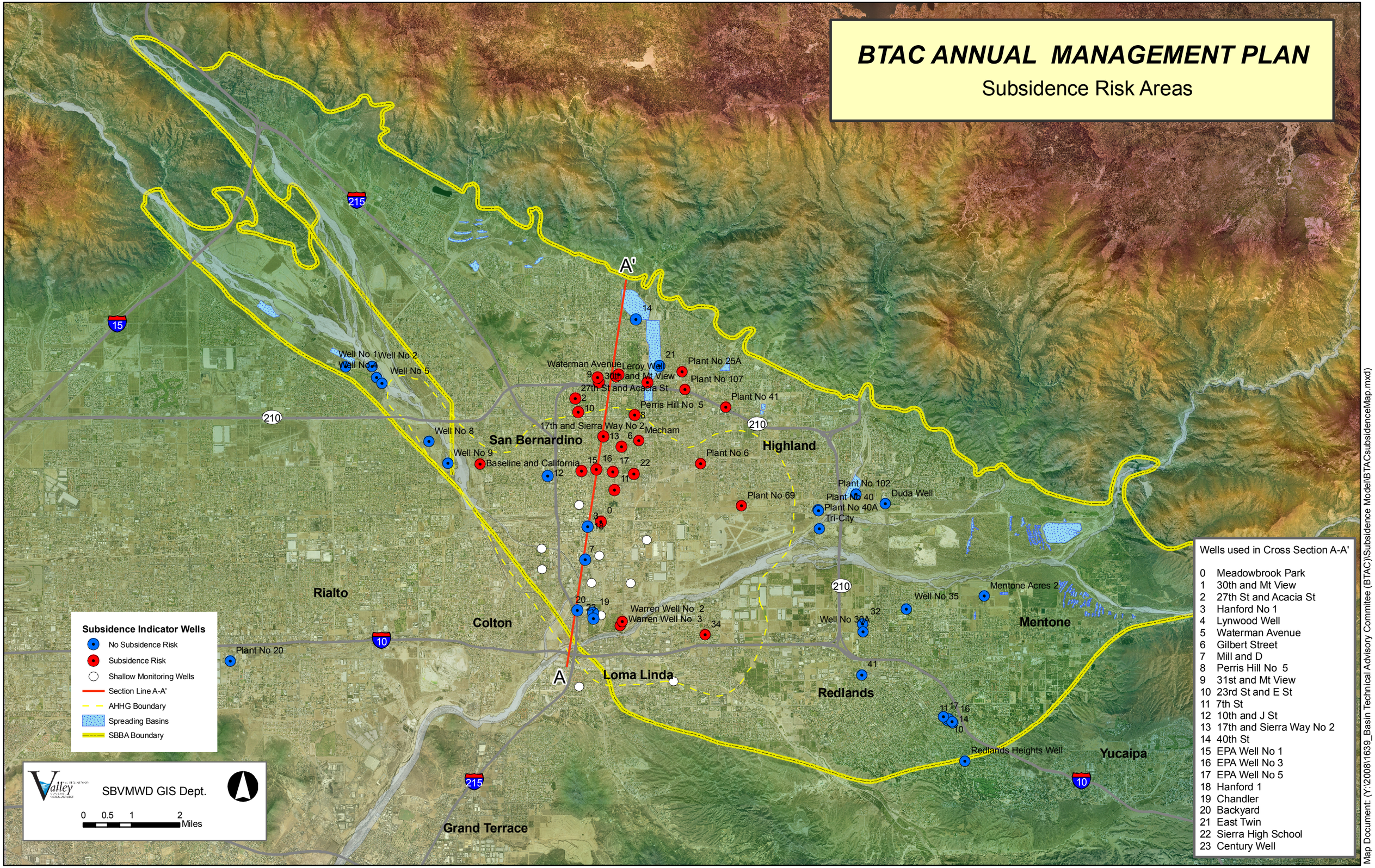
The attached map shows any areas that are newly dewatered (experienced water levels below 1965 levels). Also attached is a cross-section through a portion of the newly dewatered area showing the anticipated geology. Since there is no one on the BTAC that feels qualified to make a determination regarding subsidence risk, it is left to the reader to draw their own conclusions from the provided data.

COMPARISON OF 1965 WATER LEVELS TO FALL 2011 WATER LEVELS FOR THE SAN BERNARDINO BASIN AREA

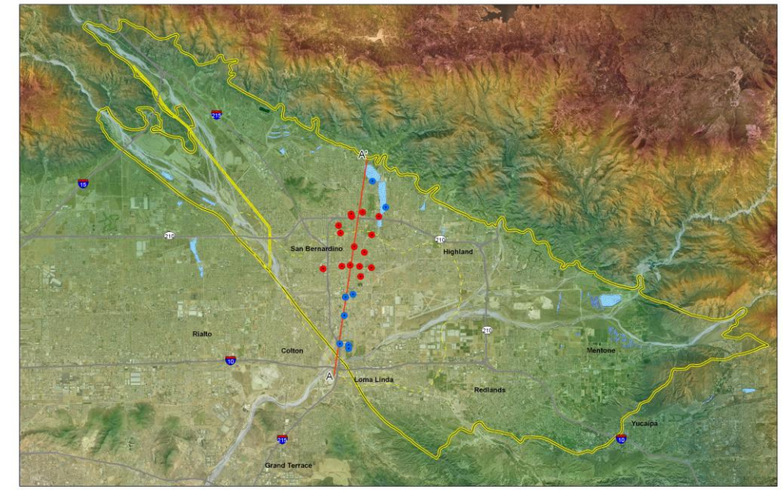


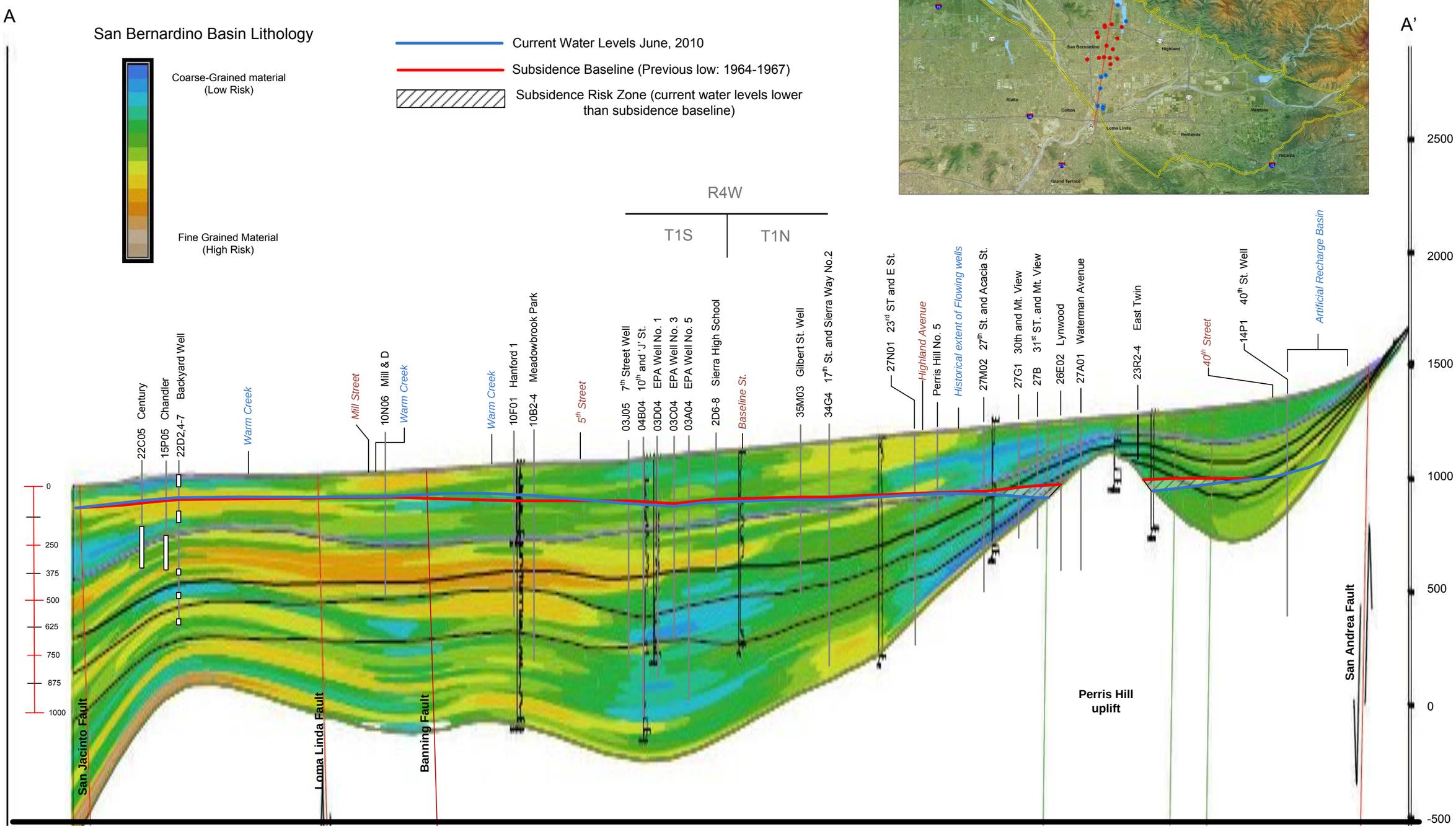
BTAC ANNUAL MANAGEMENT PLAN

Subsidence Risk Areas



2010 Regional Water Management Plan
Subsidence Risk Cross-Section A-A'





Section A-A' and stratigraphic base from Numeric Solutions, LLC.

Well construction and water level data from the SBVMWD Water Resources Database

Appendix F

Demand Management Measures

- Assumptions Used in Calculation of DMM Cost Effectiveness Analyses for East Valley Water District, City of Loma Linda, City of San Bernardino, West Valley Water District, and Colton
- East Valley Water District Ordinance 375
- City of Redlands Water Waste Ordinance
- City of Loma Linda Municipal Code Title 13
- City of Loma Linda Ordinance 443
- West Valley Water District Ordinance 68 and Article 24
- Yucaipa Valley Water District Ordinance 48-1998 Section 5.15
- City of Colton FY 2010 Budget

Assumptions Used in Calculation of DMM Cost Effectiveness Analyses for East Valley Water District, City of Loma Linda, City of San Bernardino, West Valley Water District, and Colton

Appendix F1
Water Conservation Measures Analysis Assumptions

F.1 Base Assumptions (Common to All Programs)

Category	Variable	Value Used	Data Sources and Assumptions
Agency Benefits	Unit cost of avoided water supply	City of Colton – $331 City of Loma Linda - $153 City of San Bernardino - $188 EVWD - $274 WVWD - $126	Provided by Agencies
Discounting Information	Agency discount rate	2.9% per year	Real discount rate based on assumed nominal bond rate of 5% less 2.1% inflation (difference between nominal and real discount rates recommended by 2008 Office of Management and Budget Circular No. A-94, see http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html).

F.2 BMP 1: Residential Assistance (Surveys)

Category	Variable	Value Used	Data Sources and Assumptions
Agency Cost	Survey cost	$313 per survey	Cost of survey targeted indoor/outdoor survey and indoor handouts including showerheads, aerators and toilet flappers was reported to be $200 and $16, respectively, in 1995 dollars (CUWCC 2005 BMP Costs and Savings Study, pgs 2-50 to 2-51). Cost projected to be approximately $313 per survey in 2010 dollars.
	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
Water Savings	Reduction in average use	40 gpd	Savings for residential assistance program was reported to be 40 gpd for SFR (CUWCC Research and Evaluation Committee Report to Steering Committee, 8/13/2009).
	Savings decay	10% per year	While survey savings tend to decay over time by as much as 25% per year (CUWCC Research and Evaluation Committee Report to Steering Committee, 8/13/2009), high water users typically have leaks which contribute to excessive water use. Identifying and fixing these problems would result in greater sustained savings than surveys offered to typical customers without leaks.

F.3 BMP 2: Residential Plumbing Retrofit Kits

Category	Variable	Value Used	Data Sources and Assumptions
Agency Cost	Kit cost	$12 per kit (includes 2 aerators and 1 showerhead)	Estimated typical value based on Kennedy/Jenks experience.
	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
Water Savings	Reduction in use (program savings, 1.5 gpm model)	7.7 gpd	CUWCC 2005 BMP Costs & Savings Study (pg 2-44) states 5.5 gpd for 2.5 gpm models. Assume 40% additional savings than 2.5 gpm models.
	Savings decay (1.5 gpm model)	30% per year	CUWCC 2005 BMP Costs & Savings Study (pg 2-44)

F.4 Residential High Efficiency Washing Machine Rebate Programs and Natural Replacement Savings

Category	Variable	Value Used	Data Sources and Assumptions
Annual Costs	HEWC rebate cost	$150	Typical value.
	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
Water Savings	Average annual savings	10,220 gallons per year per machine	CUWCC Research and Evaluation Committee Report to Steering Committee, 8/13/2009
	Decay Factor	8%	Assume units replaced with equally efficient units.

F.5 BMP 14: Residential HET & ULFT Rebates

Category	Variable	Value Used	Data Sources and Assumptions
Annual Costs	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
	HET rebate cost	$100 per year	Typical value.
	Average savings per HET	21.1 gpd for SFR and 26.6 gpd for MFR	CUWCC Research and Evaluation Committee Report to Steering Committee, 8/13/2009
	Average savings per ULFT	16.9 gpd for SFR and 21.3 gpd for MFR	ULFT savings scaled from HET savings based on ratio of 1.3 gallons per flush (gpf) vs. 1.6 gpf for ULFTs.
	Decay factor	4%	AB 715 toilet standard requires 1/2 of all toilets sold to be HET in 2010 and all will be HET in 2014. Decayed units will be replaced with HET's.

F.6 BMP 5: Dedicated Irrigation Accounts Surveys

Category	Variable	Value Used	Data Sources and Assumptions
Agency Cost	Survey cost	$1,320 per survey	CUWCC 2005 BMP Cost and Savings Study cited cost of survey in 1999 at $500 to $1500. Use cost of $1,000 with 2.5% inflation. Includes cost for inventory of accounts, targeting, marketing, implementation, monitoring and tracking.
	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
Water Savings	Reduction in average use	20%	CUWCC 2005 BMP Cost and Savings Study pg 2-103
	Savings decay	17% per year	CUWCC Research and Evaluation Committee Report to Steering Committee, 8/13/2009 suggests landscape surveys have life of 6 years.
Implement-ation Level	Number of surveys conducted per year	5%	Requirement is to reach all accounts that are 20% over their budgets within 6 years of implementing water budgets. Assume 5% of total dedicated irrigation accounts per year.

F.7 BMP 5: CII WBICs Direct Install

Category	Variable	Value Used	Data Sources and Assumptions
Agency Cost	Direct install cost	$1,000 per installation, 1.5 devices per site.	Average cost of installation in a previous project in Riverside County. Includes, product, installation, anc years signal fee costs, average of 1.5 devices per sit
	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
Water Savings	Reduction in avera	20% of outdoor use	Outdoor savings typically in the 20% range for high use customers. CUWCC 2005 Cost & Savings Study (pg 2-3).
	Savings decay	10% per year	Expected life 10-15 years. CUWCC 2005 Cost & Sa Study (pg 2-4)

F.8 BMP 5: CII WBICs Rebates

Category	Variable	Value Used	Data Sources and Assumptions
Agency Cost	Rebate cost	$200 per installation, 1.5 installations per site.	Typical value.
	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
Water	Reduction in	20% of outdoor	Outdoor savings typically in the 20% range for high

Category	Variable	Value Used	Data Sources and Assumptions
Savings	average use	use	use customers. CUWCC 2005 Cost & Savings Study (pg 2-3).
	Savings decay	10% per year	Expected life 10-15 years. CUWCC 2005 Cost & Savings Study (pg 2-4).

F.9 BMP 5: CII Precision Sprinkler Nozzles Distribution

Category	Variable	Value Used	Data Sources and Assumptions
Agency Cost	Nozzle cost	$4 per nozzle	Typical costs.
	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
	Nozzles distributed to each account	150 nozzles	Estimated value based on previous project in Riverside County.
Water Savings	Reduction in average use	0.002 AFY per nozzle	Estimated value based on previous project in Riverside County.
	Savings decay	20% per year	Estimated value based on previous project in Riverside County. Life of nozzles is 5 years.

F.10 BMP 9: CII High Efficiency Washing Machine Rebate Programs

Category	Variable	Value Used	Data Sources and Assumptions
Annual Costs	HEWC rebate cost	$150	Typical value.
	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
Water Savings	Average annual savings	24,000 GPY	Based on previous Kennedy/Jenks project.
	Decay factor	0%	No decay was used. After 2010, all washing machines sold in CA will use no more than 6 gallons per CF washing capacity. http://energy.ca.gov/releases/2009_releases/2009-10-29_clotheswashers.html

F.11 BMP 9: CII Indoor Surveys

Category	Variable	Value Used	Data Sources and Assumptions
Agency Cost	Survey cost	$12,000 per survey	Kennedy/Jenks experience with prior CII indoor water survey project showed that consultant surveys for large CII water users can be between $12,000-$15,000 per survey
	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
Water	Reduction in	12%	Based on 11% for consultant surveys (CUWCC

Category	Variable	Value Used	Data Sources and Assumptions
Savings	average use		2005 BMP Cost and Savings Study pg 2-66) and 12-15% (CUWCC MOU, 2007).
	Savings decay	10% per year	While survey savings tend to decay over time by as much as 25% per year, high water users typically have leaks or other system inefficiencies which contribute to excessive water use. Identifying and fixing these problems for high users would result in greater sustained savings than surveys offered to the average customers.

F.12 BMP 9: CII Performance Based Program Incentives

Category	Variable	Value Used	Data Sources and Assumptions
Agency Cost	Incentive cost	$975/AFY saved	MWD's former Save a Buck program offered $3 per 1000 gallons saved, equivalent to $975/AFY. Kennedy/Jenks previous experience with CII audits found that roughly ~$1000/AFY would be the minimum rebate required for large CII customers to be able to make capital improvements for water savings. However, the required amount can often be $2000/AFY or more.
	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
Water Savings	Reduction in average use	1 AFY for every $975 spent	Estimated typical value based on Kennedy/Jenks experience.
	Savings decay	10% per year	While survey savings tend to decay over time by as much as 25% per year, high water users typically have leaks or other system inefficiencies which contribute to excessive water use. Identifying and fixing these problems for high users would result in greater sustained savings than surveys offered to the average customers.

F.13 CII HET and Urinal Installs

Category	Variable	Value Used	Data Sources and Assumptions
Agency Costs	Admin cost	25%	Estimated typical value based on Kennedy/Jenks experience.
	HET Install cost	$162.5	Assume average cost of $162.5 per fixture. Average cost of $87.50 attributable to the fixture (at one-half) plus $75 for administrative and implementation costs, for a total cost of $162.50 per toilet fixture Source: CUWCC PBMP Report Year 2 - HEU's and HETs, pg 22.
	HE Urinal Install Cost	$450	Average cost for an HE urinal is approximately $375. Adding a $75 per unit cost for program

	ULF Urinal Install Cost	$450	administration and implementation brings the average total cost to $450.
	Zero Flow Urinal Install Cost	$450	Source: CUWCC PBMP Report Year 2 - HEU's and HETs, pg 23.
Water Savings	Average savings per HET	38 gpd	
	Average savings per HE urinal	62 gpd	
	Average savings per ULV urinal	72 gpd	
	Average savings per zero flow urinal	82 gpd	CUWCC MOU, 2008
	Decay factor	3 (flushometer)-4 (tank-type)%	AB 715 toilet standard requires 1/2 of all toilets sold to be HET in 2010 and all will be HET in 2014. Decayed units will be replaced with HET's. Assume same for urinals.

East Valley Water District Ordinance 375

ORDINANCE NO. 375

AN ORDINANCE OF THE EAST VALLEY WATER DISTRICT RESCINDING ORDINANCE NO. 358 ENTITLED "AN ORDINANCE ESTABLISHING RULES AND REGULATIONS FOR WATER SERVICE, ESTABLISHING A WATER DEPARTMENT, PROVIDING FOR INSTALLATION AND CONNECTION TO DISTRICT WATER MAINS, REGULATING CROSS CONNECTION CONTROL".

Be it ordained by the Board of Directors of the East Valley Water District, that Ordinance No. 358 is amended as follows:

SECTION 1. INDEX

		Page No.
Section 1	Index	1
Section 2	General Provisions	2
Section 3	Definitions	4
Section 4	Water Department	7
Section 5	General Rules	9
Section 6	Application for Water Service	15
Section 7	Temporary Service	20
Section 8	Fire Protection	21
Section 9	Cross Connection Control	24
Section 10	Customer Billing Procedures	32
Section 11	Complaints and Disputed Bills	34
Section 12	Disconnection for Nonpayment	36
Section 13	Adding Delinquent Charges to Tax Roll	37
Section 14	Charges and Deposits	38
Section 15	Water Conservation	42
Section 16	Effective Date	50

SECTION 2. GENERAL PROVISIONS

2.01 Short Title - This Ordinance may be cited as the "East Valley Water District Water Regulations and Service Ordinance".

2.02 Purpose - This Ordinance is intended to provide rules and regulations applicable to the administration and operational activities of the District. This Ordinance may be amended from time to time by action of the Board of Directors of the East Valley Water District.

2.03 Enabling Statutes - This Ordinance is adopted pursuant to the applicable provisions of Division 12 of the Water Code and Division 5, Chapter 7, Title 5, Division 2 of the Government Code, and further pursuant to the Constitution of the State of California. The District is further authorized by Water Code Section 31027 to prescribe and define by Ordinance those restrictions, prohibitions and exclusions it may determine to be necessary pursuant to the California Constitution Article X, Section 2 and Water Code Sections 31026 and 350 et seq. to restrict the use of District water during threatened or existing water shortages. It is therefore the intent of the Board of Directors to establish by this Ordinance those procedures and policies necessary to the orderly administration of a water conservation program to prohibit waste and to restrict the use of water during a water shortage or emergency.

2.04 Application - This Ordinance shall apply to all water facilities constructed, maintained, and operated by the District.

2.05 Enterprise - The District will furnish and/or make available, a system, plant, works, and undertaking used for and useful in the delivery of water for the District's service area, including all annexations thereto. lands, easements, rights in land, contract rights and franchises.

2.06 Separability - If any section, subsection sentence, clause, phrase, or portion of this Ordinance or the application thereof to any person or circumstances are for any reason held to be unconstitutional or invalid by any court of competent

14.18 **Water System Design Charge** - A non-refundable water system design charge shall be required for all main extensions, service connection and/or special facilities requiring the preparation of engineering plans and drawings.

14.19 **Engineering Services Charge** - The Engineering Services charge is a fee for the District's time and effort spent on assisting customers who have a requirement to construct water main extensions, or other water facilities, that must meet District needs and conform to District standards. This fee includes time and effort the District spends on plan checking, plan and easement development, and all other related work.

Prior to submission of any documents requiring work by the district, a non-refundable minimum charge in the amount of 7.5% of the engineer's estimated cost for the project shall be submitted to the district. The work will be accomplished on a time and effort basis. Should the District use more funds than the original charge, the additional billed costs must be paid prior to allowing water service to the project.

14.20 **Construction Water Charge** - The construction water charge is a temporary flat rate water charge. It is only available during the construction phase of a new building for services 1" in diameter or less. It is available for a period not exceeding six months.

14.21 **Fire Flow Test Charge** - The fire flow test charge is a flat rate to cover the District's time and effort for testing parts of the water system to obtain fire flow test data and calculate results as requested.

14.22 **Valve Deposit** - The valve deposit is a refundable charge that is used to insure all valve cans and caps are constructed to final grade before a water system construction project is complete. The District will accept a guarantee bond in lieu of a cash deposit. The fee will be returned or the bond released when valve cans and caps are constructed to final grade by the developer's contractor and verified by the District.

14.23 Service Initiation Charge - The service initiation charge is a non refundable charge which covers the reasonable District costs for initiating water service.

14.24 Returned Check Charge - A returned check charge is a charge which covers the reasonable administrative cost and banking charges for processing a returned check.

14.25 Temporary Service Charge - A temporary service is available through the use of a fire hydrant. A customer deposit for the temporary service will be required. All other applicable service charges shall apply.

SECTION 15 WATER CONSERVATION

15.01 Waste or Nuisance Water and Other Substances - It is unlawful for any person, firm or corporation to deposit, drain, wash, or allow to run or divert water, mud or sand into, or upon, any public road, highway, street, alley, drainage ditch, storm drain, flood control channel owned or controlled by any public agency within the District. When a written application is filed with the District, and approved by the General Manager, a permit may be granted with terms and conditions and applicable fees as it may deem appropriate to impose to such person . For purposes of enforcement of this section, the owner of the meter, or property, which is the source of the "waste or nuisance water and other substances" as defined herein will be considered the responsible party. Any violations cited hereunder, and defined as being detrimental to public health, safety or welfare, will be borne by the responsible party.

15.02 Conservation Measures - Stage No.1 Normal Conditions: Voluntary Conservation Measures - Normal conditions shall be in effect when the District is able to meet all the water demands of its customers in the immediate future. During normal conditions all water users should continue to use water wisely, to prevent the waste or unreasonable use of water, and to reduce water consumption to that necessary for ordinary domestic and commercial purposes

15.03 **Stage No. 2 - Threatened Water Supply Shortage** - In the event of a threatened water supply shortage which could affect the District's ability to provide water for ordinary domestic and commercial uses, the Board of Directors shall hold a public hearing at which consumers of the water supply shall have the opportunity to protest and to present their respective needs to the District. The Board may then, by resolution, declare a water shortage condition to prevail, and the following conservation measures shall be in effect:

15.03.01 **Exterior Landscape Plans** - Exterior landscape plans for all new commercial and industrial development shall provide for timed irrigation and shall consider the use of drought resistance varieties of flora. Such plans shall be presented to and approved by the District prior to issuance of a water service letter.

15.03.02 **Excessive Irrigation and Related Waste** - No customer of the District or other person acting on behalf of or under the direction of a customer shall cause or permit the use of water for irrigation of landscaping or other outdoor vegetation, plantings, lawns or other growth, to exceed the amount required to provide reasonable irrigation of same, and shall not cause or permit any unreasonable or excessive waste of water from said irrigation activities or from watering devices or systems. The free flow of water away from an irrigated site shall be presumptively considered excessive irrigation and waste as defined in Section 3 herein.

15.03.03 **Agricultural Irrigation** - Persons receiving water from the District who are engaged in commercial agricultural practices, whether for the purpose of crop production or growing of ornamental plants shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. Upon the request of the General Manager, these persons may be required to prepare a plan describing their irrigation practices and equipment, including but not limited to, an estimate of the efficiency of the use of water on their properties.

15.03.04 **Commercial Facilities** - Commercial and industrial facilities shall, upon request of the General Manager, provide the District with a plan to conserve water at their facilities. The District will provide these facilities with information regarding the average monthly water use by the facility for the last two year period. The facility will be expected to provide the District with a plan to conserve or reduce the amount of water used by that percentage deemed by the Board of Directors to be necessary under the circumstances. After review and approval by the General Manager, the water conservation plan shall be considered subject to inspection and enforcement by the District.

15.03.05 **Parks, Golf Courses, Swimming Pools and School Grounds** Public and private parks, golf courses, swimming pools and school grounds which use water provided by the District shall use water for irrigation and pool filling between the hours of 10:00 p.m. and 6:00 a.m.

15.03.06 **Domestic Irrigation** - Upon notice and public hearing, the District may determine that the irrigation of exterior vegetation shall be conducted only during specified hours and/or days, and may impose other restrictions on the use of water for such irrigation. The irrigation of exterior vegetation at other than these times shall be considered to be a waste of water.

15.03.07 **Swimming Pools** - All residential, public and recreational swimming pools, of all size, shall use evaporation resistant covers and shall re-circulate water. Any swimming pool which does not have a cover installed during periods of non-use shall be considered a waste of water.

15.03.08 **Run-off and Wash-down** - No water provided by the District shall be used for the purposes of wash-down of impervious areas, without specific written authorization of the General Manager. Any water used on a premises that is allowed to escape the premises and run off into gutters or storm drains shall be considered a waste of water.

15.03.09 **Vehicle Washing** - The washing of cars, trucks or other vehicles is not permitted, except with a hose equipped with an automatic shut-off device, or a commercial facility so designated on the District's billing records.

15.03.10 **Drinking Water Provided by Restaurants** - Restaurants are requested not to provide drinking water to patrons except by request.

15.04 **Stage No.3- Water Shortage Emergency:Mandatory Conservation Measures** - In the event of a water shortage emergency in which the District may be prevented from meeting the water demands of its customers, the Board of Directors shall, if possible, given the time and circumstances, immediately hold a public hearing at which customers of the District shall have the opportunity to protest and to present their respective needs to the Board. No public hearing shall be required in the event of a breakage or failure of a pump, pipeline, or conduit causing an immediate emergency. The General Manager is empowered to declare a water shortage emergency, subject to the ratification of the Board of Directors within 72 hours of such declaration, and the following rules and regulations shall be in effect immediately following such declarations:

15.04.01 **Prohibition** - Watering of parks, school grounds, golf courses, lawn water, landscape irrigation, washing down of driveways, parking lots or other impervious surfaces, washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water, filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes are prohibited.

15.04.02 **Restaurants** - Restaurants shall not serve drinking water to patrons except by request.

15.04.03 **Construction Meters** - No new construction meter permits shall be issued by the District. All existing construction meters shall be removed and/or locked.

15.04.04 **Commercial Nurseries and Livestock** - Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.

15.05 **Implementation and Termination of Mandatory Compliance Stages** The General Manager of the District shall monitor the supply and demand for water on a daily basis to determine the level of conservation required by the implementation or termination of the Water Conservation Plan Stages and shall notify the Board of Directors of the necessity for the implementation, or termination, of each stage. Each declaration of the Board of Directors implementing, or terminating, a water conservation stage shall be published at least once in a newspaper of general circulation, and shall be posted at the District offices. Each declaration shall remain in effect until the Board of Directors otherwise declares, as provided herein.

15.06 **Exceptions - Application for Exception Permits** - The General Manager may grant permits for uses of water otherwise prohibited under the provisions of this Ordinance if he finds and determines that restrictions herein would either:

15.06.01 **Hardship** - Cause an unnecessary and undue hardship to the water user or the public; or

15.06.02 **Emergency** - Cause an emergency condition affecting the health, sanitation, fire protection or safety of the water use or of the public.

15.06.03 **Exemptions Granted** - Such exceptions may be granted only upon written application therefor. Upon granting such exception permit, the General Manager may impose any conditions he determines to be just and proper.

15.07 **Enforcement, Inspection** - Authorized employees of the District, after proper identification may, during reasonable hours, inspect any facility having a water conservation plan, and may enter onto private property for the purpose of observing the operation of any water conservation device, irrigation equipment or water facility.

Employees of the District may also observe the use of water or irrigation equipment within the District from public rights-of-way.

15.08 Criminal Penalties for Violation - Water Code Section 31029 makes any violation of this Ordinance a misdemeanor and upon conviction thereof, the violator shall be punished by imprisonment, fine or by both fine and imprisonment as may be allowed by law.

15.09 Civil Penalties for Violation - In addition to criminal penalties, violators of the mandatory provisions of this Ordinance shall be subject to civil action initiated by the District as follows:

15.09.01 First Violation: For a first violation, the District shall issue a written notice of violation to the water user violating the provisions of this Ordinance. The notice shall be given pursuant to the requirements of Section 15.10 below.

15.09.02 Second Violation: $100.00 Surcharge - For a second violation of this Ordinance within a 12 month period, or failure to comply with the notice of violation within the period stated, a surcharge of $100.00 is hereby imposed for the meter through which the wasted water was supplied.

15.09.03 Third Violation: $200.00 Surcharge and/or Installation of a Flow Restrictor - For a third violation of this ordinance within a 12 month period, or for continued failure to comply within 30 days after notice of an imposition of second violation sanctions, a one month penalty surcharge in the amount of $200.00 is hereby imposed for the meter through which the wasted water was supplied. In addition to the surcharge, the District may, at its discretion, install a flow-restricting device at such meter with a one-eighth inch (1/8") orifice for services up to one and one half (1-1/2") inch size, and comparatively sized restrictors for larger services, on the service of the customer at the premises at which the violation occurred for a period of not less than forty-eight (48) hours. The charge to the customer for installing a flow-restricting device shall be based upon the size of the meter and the actual cost of installation but shall not

be less than that provided in the District's Rules and Regulations. The charge for removal of the flow-restricting device and restoration of normal service shall be as provided in the District's Rules and Regulations.

15.09.04 Subsequent Violations: Discontinuance of Service - For any subsequent violation of this Ordinance within the twenty-four (24) calendar months after a first violation as provided in Section 15.09.2 hereof, the penalty surcharge provided in Section 15.09.3 hereof shall be imposed and the District may discontinue water service to that customer at the premises or to the meter where the violation occurred. The charge for reconnection and restoration of normal service shall be as provided in the Rules and Regulations of the District. Such restoration of service shall not be made until the General Manager of the District as determined that the water user has provided reasonable assurances that future violations of this Ordinance by such user will not occur.

15.10 Notice - First Violation - For a first violation, written notice shall be given to the customer and/or property owner personally or by regular mail.

15.10.01 Subsequent Violations - If the penalty assessed is a surcharge for a second or third violation, notice may be given by regular mail.

15.10.02 Violations Involving Installation of Flow-Restrictors or Discontinuance of Water Service - If the penalty assessed is, or includes, the installation of a flow restrictor or the discontinuance of water service to the customer for any period of time, notice of the violation shall be given in the following manner:

a. Personal Service - By giving written notice thereof to the occupant and/or property owner personally; or if the occupant and/or property owner is absent from his/her place of residence and from his/her assumed place of business, by leaving a copy with some person of suitable age and discretion at either place, and sending a copy through the United States mail addressed to the occupant and/or owner at his/her place of business or residence; or

b. **Posting** - If such place of residence and business cannot be ascertained, or a person of suitable age or discretion cannot be located, then by affixing a copy in a conspicuous place on the property where the failure to comply is occurring and also by delivering a copy to a person there residing, if such person can be found, and also sending a copy through the United States mail addressed to the occupant at the place where the property is situated and the owner if different.

15.10.03 Form of Notice - All notices provided for in this Section shall contain, in addition to the facts of the violation, a statement of the possible penalties for each violation and a statement informing the occupant/owner of his/her right to hearing on the violation.

15.11 Hearing - Any customer or property owner against whom a penalty is levied pursuant to this ordinance shall have a right to a hearing, in the first instance by the General Manager, with the right of appeal to the Board of Directors, on the merits of the alleged violation upon the written request of that customer within fifteen (15) days of the date of alleged violation. At the next regularly scheduled meeting, the customer may then appear and present any evidence in support of his position and ask for a decision by the Board.

15.12 Delays on Action - The Board shall act promptly to resolve the dispute, but may delay a resolution of the dispute to the time of its next regular meeting in order to investigate the dispute or receive special reports related to the dispute.

15.13 Decision of the Board - The decision of the Board of Directors shall be final. Should the Board not render a decision within sixty (60) days of application to the Board, the failure to act shall be deemed a denial of the requested action, unless both parties have agreed to extend the resolution period.

SECTION 16. EFFECTIVE DATE

This Ordinance shall become effective upon adoption.

Approved and adopted this 15TH day of July 2010

ROLL CALL:
Ayes: Directors
Noes:
Absent:
Abstain:

_____

George E. Wilson, President

ATTEST:_____

Robert E. Martin, Secretary

City of Redlands Water Waste Ordinance

Chapter 13.06
WATER CONSERVATION PLAN

13.06.010: TITLE:

This chapter establishes the *CITY OF REDLANDS WATER CONSERVATION PLAN.* (Ord. 2151 § 1, 1991)

13.06.020: INTENT:

The city council of the city of Redlands declares that the public health, safety and general welfare requires that water resources available to the city be put to maximum beneficial use, that the waste or unreasonable use of water be prevented, and that the conservation of such water must occur to protect the people and property of the city of Redlands. (Ord. 2151 § 1, 1991)

13.06.030: PURPOSE AND SCOPE:

A. The purpose of this chapter is to reduce the nonessential use of water to conserve city water supplies, thereby minimizing the effect of a shortage of water supplies on city users. The water conservation plan here established is to:

1. Protect the health, safety, and welfare of the citizens and property owners of the city;

2. Assure the maximum beneficial use of city water supplies; and

3. Attempt to provide sufficient water supplies to meet the basic needs of human consumption, sanitation and fire protection.

B. This chapter shall remain in effect until the city council declares by ordinance that the provisions of this chapter are no longer applicable to existing water supply conditions and the supply of water available for distribution within the city's service area has been replenished or augmented. (Ord. 2151 § 1, 1991)

13.06.040: AUTHORIZATION:

A. The city is authorized to implement the provisions of this chapter following a public hearing as specified below upon the city council's determination by majority vote of the entire council that such implementation is necessary to protect the public health and safety.

B. A public hearing shall be held to determine whether to adopt a water conservation plan, and, if so, which measures provided herein should be implemented. A similar public hearing shall be held by the city council prior to the implementation or termination of each incremental water conservation stage pursuant to section 13.06.080 of this chapter. Notice of the time and place of these public hearings shall be published not less than ten (10) days before the hearing in a newspaper of general circulation.

C. Upon adoption by the city council, the provisions of this chapter shall become effective immediately. Notice of the implementation of successive stages of water conservation shall be given to water users immediately both by publication at least once in a newspaper of general circulation within ten (10) days after adoption, and by a notice enclosed with the next regular city invoice for water or utility service.

D. If the city council cannot meet in time to act to protect the public interest pursuant to this chapter, the city manager or his designee is hereby authorized and directed to implement such provisions of this chapter upon his or her written determination that the city cannot supply adequate water to meet the ordinary demands of water consumers, and that such implementation is necessary to protect the public health or safety. Such written determination shall be presented to the city council at its next meeting for review, revocation or ratification. Such meeting shall be held as soon as possible. (Ord. 2151 § 1, 1991)

13.06.050: APPLICATION:

The provisions of this chapter shall apply to all persons, customers, and property served water by the city wherever situated. (Ord. 2151 § 1, 1991)

13.06.060: GENERAL PROHIBITION:

No water user shall make, cause, use, or permit the use of water supplied by the city for residential, commercial, industrial, agricultural, governmental or any other use in a manner contrary to this chapter. Waste or the unreasonable or nonbeneficial use of water is prohibited in the city of Redlands. (Ord. 2151 § 1, 1991)

13.06.070: MANDATORY CONSERVATION; STAGE CRITERIA:

The director of the public works department shall recommend guidelines for adoption by the city council setting forth the criteria to determine when water supply conditions in the city require the implementation or termination of each water conservation stage. Such guidelines shall be updated when the director determines that water availability so requires. The director shall include in such guidelines a calendar symbol system designating allowed days for irrigation. (Ord. 2151 § 1, 1991)

13.06.080: MANDATORY CONSERVATION; PHASE IMPLEMENTATION:

The public works department shall monitor the projected supply and demand for water by its customers on a daily basis during the months of June, July, August, September, and October and shall recommend to the city manager the extent of conservation required through the implementation and/or termination of particular conservation stages to allow the department to prudently plan for and supply water to its customers. Thereafter, the city manager may recommend to the city council the implementation or termination of the appropriate stage of water conservation in accordance with the applicable provisions of this chapter. The city council may implement or terminate the appropriate stage pursuant to section 13.06.040 of this chapter. Notice of the implementation or termination of each stage shall be given pursuant to subsection 13.06.040C of this chapter.

A. Stage I, Voluntary Conservation Measures: Water users are requested to limit their water use from June 1 to October 1 of each year to an amount necessary for health, safety, economic necessity and irrigation. Water users should use water wisely and prevent its waste or unreasonable use.

   The following actions are recommended:

   1. Adjust sprinklers and irrigation systems to avoid overspray, runoff, and waste. Avoid watering on windy days;

   2. Install water saving devices, such as low flow showerheads and faucet aerators;

3. Select low water demand shrubs, ground covers and trees for new landscaping;

4. Restrict water service in restaurants.

B. Stage II, Mandatory Compliance; Water Alert: When implemented pursuant to subsection 13.06.040B of this chapter and noticed pursuant to subsection 13.06.040C of this chapter, the following restrictions shall apply to the use of water supplied by the city in addition to the recommendations of stage I:

1. Irrigation of lawns, gardens, landscaped areas, trees, shrubs, or other plants utilizing individual sprinklers or sprinkler systems is allowed only on an irrigation day designated by the city and is prohibited between the hours of twelve o'clock (12:00) noon and eight o'clock (8:00) P.M. However, irrigation is permitted at any time if:

   a. A handheld hose is used, or

   b. A handheld, faucet filled bucket containing five (5) gallons or less is used, or

   c. A drip irrigation system is used.

   Commercial nurseries, commercial farmers, and grove settings requiring twenty four (24) hour irrigation cycles, are exempt from stage II irrigation restrictions, but shall curtail all nonessential water use.

2. The washing of automobiles, trucks, trailers, boats, aircraft and other types of mobile equipment is allowed only on designated irrigation days and is prohibited between the hours of twelve o'clock (12:00) noon and eight o'clock (8:00) P.M. Mobile equipment washing shall be done only with a handheld bucket or a handheld hose equipped with a positive shutoff nozzle for quick rinses.

   Notwithstanding the above, washing of such equipment may be done at any time on the immediate premises of a commercial car wash or commercial service station with washwater recycling facilities. Garbage trucks and vehicles to transport food and perishables are exempt from these regulations if the public health or safety requires frequent vehicle cleaning.

3. The washing or sprinkling of foundations or structures shall be allowed only by city permit. Regulations for such permit shall be enacted by resolution.

4. The refilling or adding of water to uncovered swimming or wading pools or spas is allowed only on designated irrigation days and is prohibited between the hours of twelve o'clock (12:00) noon and eight o'clock (8:00) P.M.

5. The operation of any ornamental fountain or other structure making similar decorative use of water is prohibited, unless the fountain or structure has a recycling system.

6. The use of water for irrigation of golf greens and tees is allowed only on designated irrigation days and is prohibited between twelve o'clock (12:00) noon and eight o'clock (8:00) P.M. The irrigation of golf course fairways is absolutely prohibited. The irrigation of

golf courses utilizing treated wastewater or reused water is not subject to these prohibitions.

7. Restaurants shall not serve water to customers except upon specific customer request.

8. Failure to repair controllable leaks is prohibited.

9. Use of running water to wash driveways, sidewalks, parking areas, patios, tennis courts and other paved areas is prohibited.

10. Failure to prevent excessive runoff from irrigation activities is prohibited.

11. Use of water from fire hydrants is limited to firefighting and other activities necessary to maintain the health, safety, and welfare of the citizens of Redlands. The use of water piped from fire hydrants and sprinkled for construction purposes is prohibited.

C. Stage III, Mandatory Compliance; Water Warning: When implemented pursuant to subsection 13.06.040B of this chapter and noticed pursuant to subsection 13.06.040C of this chapter, the following restrictions, in addition to all elements of stages I and II, shall apply:

1. All outdoor irrigation of vegetation shall occur only on designated days using handheld hoses, drip irrigation, or handheld buckets and is prohibited between the hours of twelve o'clock (12:00) noon and eight o'clock (8:00) P.M.

   Exemption: Permanently installed automatic sprinkler systems may be used on designated irrigation days but are prohibited between the hours of twelve o'clock (12:00) noon and eight o'clock (8:00) P.M.

2. The watering of golf tee areas is prohibited except with treated wastewater or reused water.

D. Stage IV, Mandatory Compliance; Water Emergency: Pursuant to California Water Code section 350 et seq., the city council may declare a water shortage emergency upon its determination that the ordinary demands of city water users cannot be satisfied without depleting the city water supply to a point of insufficient water for human consumption, sanitation and fire protection. When implemented pursuant to subsection 13.06.040B of this chapter and noticed pursuant to subsection 13.06.040C of this chapter, the following restrictions, in addition to all elements of stages I, II and III, shall apply:

1. All outdoor irrigation of vegetation shall be allowed only between the hours of eight o'clock (8:00) P.M. and twelve o'clock (12:00) midnight on designated irrigation days.

2. The washing of automobiles, trucks, trailers, boats, airplanes, and other types of mobile equipment not occurring upon the immediate premises of commercial car washes and commercial service stations and not in the immediate interest of the public health or safety is prohibited.

3. The washing of automobiles, trucks, trailers, boats, airplanes, or other types of mobile equipment upon the immediate premises of commercial car washes and commercial service stations shall occur only between the hours of twelve o'clock (12:00) noon and six o'clock (6:00) P.M.

4. Commercial nurseries and commercial farmers using city water shall water only on designated irrigation days between the hours of ten o'clock (10:00) A.M. and six o'clock (6:00) P.M. and shall use only handheld hoses, drip irrigation systems, or handheld buckets.

5. The filling, refilling, or adding of water to uncovered swimming or wading pools and spas is prohibited at any time of day or night.

6. The operation of any ornamental fountain or similar structure is prohibited.

7. The issuance of new service connections and meters is prohibited. (Ord. 2151 § 1, 1991)

13.06.090: RELIEF FROM COMPLIANCE:

A city water user may file a request for relief from any provision of this chapter. The city manager shall review all requests and hold a hearing with each applicant. The city manager may grant relief from the provisions of this chapter if he determines that special circumstances make compliance not reasonably possible, or that the restrictions herein would either:

A. Cause an unnecessary and undue hardship to the water user or the public; or

B. Cause an emergency condition affecting the health, sanitation, fire protection or safety of the water user or of the public.

Such relief may be granted only upon written request to the city. Upon granting such relief, the city manager may impose any conditions he determines to be just and proper. The city manager shall make his determination within fourteen (14) days of receipt of the request for relief and shall inform the applicant of the decision in writing.

An applicant shall have the right to appeal the city manager's decision regarding his or her application to the city council or its designee. The appeal must be in writing and received by

the city within ten (10) days of the date of the city manager's written decision. The appeal shall be heard by the city council or its designee within a reasonable period of time from the date the appeal is filed. The city shall provide written notice to the applicant of the time and date of the hearing. The city council or its designee, at its discretion, may affirm, reverse or modify the city manager's decision and impose any conditions it deems proper. The decision of the city council shall be final. (Ord. 2151 § 1, 1991)

13.06.100: FAILURE TO COMPLY:

Violation by any customer of the water use prohibitions of this chapter shall be penalized as follows:

A. First Violation; Notice Of Noncompliance: The city manager is authorized and directed to issue a written notice of noncompliance to any water user who, in the reasonable judgment of the city manager, has failed or refused in a significant way to comply with those water use curtailment provisions of this chapter currently in effect. Any such notice of violation shall specify the time, place and manner of noncompliance, and shall specify a reasonable period to achieve compliance. Any notice of noncompliance shall be directed to the customer of record for the premises where the noncompliance was observed. Delivery may be through regular mail or by personal delivery with a declaration of delivery returned to the city manager.

B. Second Violation; Warning Of Penalties: For a second violation by any customer of the water use curtailment provisions of this chapter currently in effect, a written warning notice of the future imposition of penalties on the customer's water bill shall be issued. Any such warning notice shall specify the time, place and manner of noncompliance and shall require compliance within two (2) days. Any warning notice shall be directed to the customer of record for the premises where the violation has occurred. Delivery will be made by personal delivery with a declaration of delivery returned to the city manager.

C. Third Violation; Imposition Of Penalties:

1. For a third violation by any customer of this chapter, a citation shall be issued and a surcharge imposed on the customer's next regular water bill. The surcharge shall consist of a percentage of the customer's commodity charge as shown on the most recent water bill, based upon the water conservation stage then in effect at the time of the most recent

violation. The penalty surcharge for each stage is shown below:

Stage II	25 percent
Stage III	50 percent
Stage IV	75 percent

As an example, if a water user's most recent commodity charge is twenty five dollars ($25.00), a third violation while the city is in stage III would result in the imposition of a twelve dollar fifty cent ($12.50) surcharge.

2. If a water customer cited for a third violation fails or refuses to comply with the requirements of this chapter or to pay any outstanding water bills including surcharges, the city manager is hereby granted discretionary authority pursuant to California Water Code section 375 to cause a flow restricting device to be installed at the meter to reduce water availability to the customer's service address. Pursuant to California Water Code section 35423, if installation of a flow restrictor is infeasible, impractical or is unlikely to induce compliance with this chapter, the city manager may authorize a shutoff of service to the premises involved. (Ord. 2151 § 1, 1991)

13.06.110: HEARING REGARDING VIOLATIONS:

A. Any customer receiving notice of a second or subsequent violation pursuant to section 13.06.090 of this chapter shall have a right to a hearing by the city manager within fifteen (15) days of mailing or other delivery of the notice of violation.

B. The customer's written request for a hearing within the fifteen (15) day period shall automatically stay the imposition of monetary penalties on the customer's water bill until the city manager renders his decision.

C. The decision of the city manager may be appealed to the city council. (Ord. 2151 § 1, 1991)

13.06.120: CITY MANAGER DELEGATION:

The city manager may delegate all duties and responsibilities hereunder. (Ord. 2151 § 1, 1991)

13.06.130: SEVERABILITY:

If any provision, section, subsection, sentence, clause, or phrase of this chapter, or the application of same to any person or set of circumstances is held to be unconstitutional, void, or invalid, such decision shall not affect the remaining portions of this chapter which shall remain in full force and effect, and all provisions of this chapter are declared to be severable for that purpose. (Ord. 2151 § 1, 1991)

13.06.140: INCOMPATIBLE PROVISIONS:

To the extent any provision of this chapter is incompatible with or at variance with any prior adopted ordinance or resolution, the provisions of this chapter shall take precedence, and all prior ordinances and resolutions shall be interpreted to harmonize with and not change the provisions of this chapter. (Ord. 2151 § 1, 1991)

13.06.150: PUBLIC HEALTH AND SAFETY NOT TO BE AFFECTED:

Nothing in this chapter shall be construed to require the city to curtail the supply of water to any customer when such water is required by that customer to maintain an adequate level of public health or public safety. (Ord. 2151 § 1, 1991)

13.06.160: EXEMPTION FROM CALIFORNIA ENVIRONMENTAL QUALITY ACT:

The city council determines that the adoption of this chapter and implementation of the measures set forth herein are exempt from review under the California environmental quality act[1] because it is an action taken to mitigate or prevent a water shortage emergency, and to protect natural resources. The city council directs the city manager or his designee to prepare and file a notice of exemption as soon as possible following adoption of the ordinance codified in this chapter. (Ord. 2151 § 1, 1991)

City of Loma Linda Municipal Code Title 13

Chapter 13.32 WATER-EFFICIENT LANDSCAPE

13.32.010 Purpose.

A. The State Legislature has found that:

1. The limited supply of state waters are subject to ever increasing demands;
2. California's economic prosperity depends on adequate supplies of water;
3. State Policy promotes conservation and efficient use of water;
4. Landscapes provide recreation areas, clean the air and water, prevent erosion, offer fire protection and replace ecosystems displaced by development; and
5. Landscape design, installation and maintenance can and should be water efficient.

B. Consistent with the legislative findings, the purpose of this chapter is to:

1. Promote the values and benefits of landscapes while recognizing the need to invest water and other resources as efficiently as possible;
2. Establish a structure for designing, installing and maintaining water-efficient landscapes in new projects; and
3. Establish provisions for water management practices and water waste prevention for established landscapes. (Ord. 488 § 1 (part), 1992)

13.32.020 Definitions.

The words used in this chapter have the meaning set forth below:

"Anti-drain valve" or "check valve" means a value located under a sprinkler head to hold water in the system so it minimizes drainage from the lower elevation sprinkler heads.

"Application rate" means the depth of water applied to a given area, usually measured in inches per hour.

"Applied water" means the portion of water supplied by the irrigation system to the landscape.

"As-builts" means a set of reproducible drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor.

"Automatic controller" means a mechanical or solid state timer, capable of operating valve stations to set the days and length of time of a water application.

"Backflow prevention device" means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

"Conversion factor (0.62)" means a number that converts the maximum applied water allowance from acre-inches per acre per year to gallons per square foot per year. The conversion factor is calculated as follows:

(325,829 gallons/43,560 square feet)/12 inches = (0.62)

325,829 gallons = one acre foot

43,560 square feet = one acre

12 inches = one foot

To convert gallons per year to 100-cubic-feet per year, another common billing unit for water, divide gallons per year by 748. (748 gallons = 100 cubic feet.)

"Ecological restoration project" means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

"Effective precipitation" or "usable rainfall" means the portion of total precipitation that is used by the plants. Precipitation is not a reliable source of water, but can contribute to some degree toward the water needs of the landscape.

"Emitter" means drip irrigation fittings that deliver water slowly from the system to the soil.

"Established landscape" means the point at which plants in the landscape have developed roots into the soil adjacent to the root ball.

"Established period" means the first year after installing the plant in the landscape.

"Estimated applied water use" means the portion of the estimated total water use is derived from applied water. The estimated applied water use shall not exceed the maximum applied water allowance. The estimated applied water use may be the sum of the water recommended through the irrigation schedule.

"Estimated total water use" means the annual total amount of water estimated to be needed to keep the plants in the landscaped area healthy. It is based upon such factors as the local evapotranspiration rate, the size of the landscaped area, the types of plants and the efficiency of the irrigation system.

"ET adjustment factor" means a factor of 0.8, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.

A combined plant mix with a site-wide average of 0.5 is the basis of the plant factor portion of this calculation. The irrigation efficiency for purposes of the ET adjustment factor is 0.625, therefore, the ET adjustment factor (0.8) = (0.5/0.625).

"Evapotranspiration" means the quantity of water evaporated from adjacent soil surfaces and transpired by plants during a specific time.

"Flow rate" means the rate at which water flows through pipes and valves (gallons per minute or cubic feet per second).

"Hydrozone" means a portion of the landscaped area having plants with similar water needs that are served by a valve or set or valves with the same schedule. A hydrozone may be irrigated or non-irrigated. For example, a naturalized area planted with native vegetation that will not need supplemental irrigation once established is a non-irrigated hydrozone.

"Infiltration rate" means the rate of water entry into the soil expressed as a depth of water per unit of time (inches per hour).

"Irrigation efficiency" means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum irrigation efficiency for purposes of this chapter is 0.625. Greater irrigation efficiency can be expected from well designed and maintained systems.

"Landscape irrigation audit" means a process to perform site inspections, evaluate irrigation systems and develop efficient irrigation schedules.

"Landscaped area" means the entire parcel less the building footprint, driveways, non-irrigated portions of parking lots, hardscapes — such as decks and patios and other non-porous areas. Water features are included in the calculation of the landscaped area. Areas dedicated to edible plants, such as orchards or vegetable gardens are not included.

"Lateral line" means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

"Main line" means the pressurized pipeline that delivers water from the water source to the valve or outlet.

"Maximum applied water allowance" means, for design purposes, the upper limit of annual applied water for the established landscaped area. It is based upon the area's reference evapotranspiration, the ET adjustment factor, and the size of the landscaped area. The estimated applied water use shall not exceed the maximum applied water allowances.

"Mined-land reclamation projects" means any surface mining operation with a reclamation plan approved in accordance with the Surface Mining and Reclamation Act of 1975.

"Mulch" means any material such as leaves, bark, straw or other materials left loose and applied to the soil surface to reduce evaporation.

"Operating pressure" means the pressure at which a system of sprinklers is designed to operate, usually indicated at the base of a sprinkler.

"Overspray" means the water which is delivered beyond the landscaped area, wetting pavements, walks, structures or other non-landscaped areas.

"Plant factor" means a factor that when multiplied by reference evapotranspiration, estimates the amount of water used by plants. For purposes of this chapter, the average plant factor or low water using

plants ranges from 0 to 0.3, for average water using plants the range is 0.4 to 0.6, and for high water using plants the range is 0.7 to 1.0.

“Rain sensing device” means a system which automatically shuts off the irrigation system when it rains.

“Record drawing” or “as-builts” means a set of reproducible drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor.

“Recreational area” means areas of active play or recreation such as sports fields, school yards, picnic grounds or other areas with intense foot traffic.

“Recycled water,” “reclaimed water,” or “treated sewage effluent water” means treated or recycled waste water of a quality suitable for nonpotable uses such as landscape irrigation; not intended for human consumption.

“Reference evapotranspiration” or “ETo” means a standard measurement of environmental parameters which affect the water use of plants. ETo is given in inches per day, month, or year, and is an estimate of the evapotranspiration of a large field of four-inch to seven-inch tall, cool-season grass that is well watered. Reference evapotranspiration is used as the basis of determining the maximum applied water allowances so that regional differences in climate can be accommodated.

“Rehabilitated landscape” means any re-landscaping project that requires a permit.

“Run off” means water which is not absorbed by the soil or landscape to which it is applied and flows from the area. For example, run off may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a severe slope.

“Soil moisture sensing device” means a device that measures the amount of water in the soil.

“Soil texture” means the classification of soil based on the percentage of sand, silt, and clay in the soil.

“Sprinkler head” means a device which sprays water through a nozzle.

“Static water pressure” means the pipeline or municipal water supply pressure when water is not flowing.

“Station” means an area served by one valve or by a set of valves that operate simultaneously.

“Turf” means a surface layer of earth containing mowed grass with its roots. Annual bluegrass, Kentucky bluegrass, perennial ryegrass, red fescue, and tall fescue are cool-season grasses. Bermudagrass, kikuyugrass, seashore paspalum, St. Augustinegrass, zoysiagrass, and buffalo grass are warm-season grasses.

“Usable rainfall” means the portion of total precipitation that is used by the plants. Precipitation is not a reliable source of water, but can contribute to some degree toward the water needs of the landscape.

“Valve” means a device used to control the flow of water in the irrigation system.

“Water conservation concept statement” means a one-page checklist and a narrative summary of the project as shown in Exhibit “A” set out following this chapter. (Ord. 488 § 1 (part), 1992)

13.32.030 Provisions for new or rehabilitated landscapes.

A. APPLICABILITY.

1. Except as provided in Section 13.32.030(A)(3), this section shall apply to:

a. All new and rehabilitated landscaping for public agency projects and private development projects that requires a permit; and

b. Developer-installed landscaping in landscape maintenance district areas of single-family and multi-family projects.

2. Projects subject to this section shall conform to the provisions in this chapter.

3. This section shall not apply to:

a. Homeowner-provided landscaping at single-family and multi-family projects;

b. Cemeteries;

c. Registered historical sites;

d. Ecological restoration projects that do not require a permanent irrigation system; or

e. Mined-land reclamation projects that do not require a permanent irrigation system; or

f. Any project with a landscaped area less than twenty- five thousand square feet.

B. LANDSCAPE DOCUMENTATION PACKAGE.

1. A copy of the landscape documentation package conforming to this chapter shall be submitted to the city or county. No permit shall be issued until the city or county reviews and approves the landscape documentation package.

2. A copy of the approved landscape documentation package shall be provided to the property owner or site manager along with the record drawings and any other information normally forwarded to the property owner or site manager.

3. A copy of the water conservation concept statement and the certificate of substantial completion shall be sent by the project manager to the local retail water purveyor.

4. Each landscape documentation package shall include the following elements, which are described herein:

a. Water conservation concept statement;

b. Calculation of the maximum applied water allowance;

c. Calculation of the estimated applied water use;

d. Calculation of the estimated total water use;

e. Landscape design plan;

f. Irrigation design plan;

g. Irrigation schedule;

h. Maintenance schedule;

i. Landscape irrigation audit schedule;

j. Grading design plan;

k. Soil analysis;

l. Certificate of substantial completion (to be submitted after installation of the project.)

5. If effective precipitation is included in the calculation of the estimated total water use, then an effective precipitation disclosure statement from the landscape professional and the property owner shall be submitted with the landscape documentation package.

C. ELEMENTS OF LANDSCAPE DOCUMENTATION PACKAGE.

1. Water Conservation Concept Statement. Each landscape documentation package shall include a cover sheet, referred to as the water conservation concept statement similar to the following example. It serves as a check list to verify that the elements of the landscape documentation package have been completed and has a narrative summary of the project.

2. The Maximum Applied Water Allowance.

a. A project’s maximum applied water allowance shall be calculated using the following formula:

MAWA	= (ETo) (o.8) (LA) (o.62) where:
MAWA	= Max. applied water allowance (gallons per year)
ETo	= Reference evapotranspiration (inches per year)
0.8	= ET adjustment factor

LA	= Landscaped area (square feet)
0.62	= Conversion factor (to gallons per square foot)

b. Two example calculations of the maximum applied water allowance

i. Project Site One: Landscaped area of 50,000 sq. ft. in Fresno

MAWA	= (ETo) (.8) (LA) (.62)
	= (51 inches) (.8) (50,000 square feet) (.62)
	Maximum applied water allowance = 1,264,800 gallons per year (or 1,691 hundred-cubic-feet per year: 1,264,800/748 = 1,691)

ii. Project Site Two: Landscaped area of 50,000 sq. ft. in San Francisco

MAWA	= (ETo) (.8) (LA) (.62)
	= (35 inches) (.8) (50,000 square feet) (.62)
	Maximum Applied Water Allowance = 868,000 gallons per year (or 1,160 hundred-cubic-feet per year)

c. Portions of landscaped areas in public and private projects such as parks, playgrounds, sports fields, golf courses, or school yards where turf provides a playing surface or serves other recreational purposes may require water in addition to the maximum applied water allowance. A statement shall be included with the landscape design plan, designating areas to be used for such purposes and specifying any needed amount of additional water above the maximum applied water allowance.

3. Estimated Applied Water Use.

a. The estimated applied water use shall not exceed the maximum applied water allowance.

b. A calculation of the estimated applied water use shall be submitted with the landscape documentation package. It may be calculated by summing the amount of water recommended in the irrigation schedule.

4. Estimated Total Water Use.

a. A calculation of the estimated total water use shall be submitted with the landscape documentation package. The estimated total water use may be calculated by summing the amount of water recommended in the irrigation schedule and adding any amount of water expected from effective precipitation (not to exceed twenty-five percent of the local annual mean precipitation) or may be calculated from a formula such as the following:

The estimated total water use for the entire landscaped area equals the sum of the estimated water use of all hydrozones in that landscaped area:

$$\text{EWU (hydrozone)} = \frac{(\text{ETo})\ (\text{PF})\ (\text{HA})\ (.62)}{(\text{IE})}$$

EWU (hydrozone)	=	Estimated water use (gallons per year)
ETo	=	Reference evapotranspiration (inches per year)
PF	=	Plant factor
HA	=	Hydrozone area (square feet)
(.62)	=	Conversion factor
IE	=	Irrigation efficiency

b. If the estimated total water use is greater than the estimated applied water use due to precipitation being included as a source of water, an effective precipitation disclosure statement such as the one in the section entitled “Effective Precipitation” shall be included in the landscape documentation package.

5. Landscape Design Plan. A landscape design plan meeting the following requirements shall be submitted as part of the landscape documentation package:

a. Plant Selection and Grouping.

i. Any plants may be used in the landscape, providing the estimated applied water use recommended does not exceed the maximum applied water allowance and that the plants meet the specifications set forth in subsections (a)(ii), (a)(iii), and (a)(iv) immediately following.

ii. Plants having similar water use shall be grouped together in distinct hydrozones.

iii. Plans shall be selected appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the site. Protection and preservation of native species and natural areas is encouraged. The planting of trees is encouraged wherever it is consistent with the other provisions of this chapter.

iv. Fire prevention needs shall be addressed in areas that are fire prone. Information about fire prone areas and appropriate landscaping for fire safety is available from local fire departments or the California Department of Forestry.

b. Water Features.

i. Recirculating water shall be used for decorative water.

ii. Pool and spa covers are encouraged.

c. Landscape Design Plan Specifications. The landscape design plan shall be drawn on project base sheets at a scale that accurately and clearly identifies:

i. Designation of hydrozones;

ii. Landscape materials, trees, shrubs, groundcover, turf, and other vegetation. Planting symbols shall be clearly drawn and plants labeled by botanical name, common name, container size, spacing, and quantities of each group of plants indicated;

iii. Property lines and street names;

iv. Streets, driveways, walkways, and other paved areas;

v. Pools, ponds, water features, fences and retaining walls;

vi. Existing and proposed buildings and structures including elevation if applicable;

vii. Natural features including but not limited to rock outcroppings, existing trees, shrubs that will remain;

viii. Tree staking, plant installation, soil preparation details, and any other applicable planting and installation details;

ix. A calculation of the total landscaped area;

x. Designation of recreational areas.

6. Irrigation Design Plan. An irrigation design plan meeting the following conditions shall be submitted as part of the landscape documentation package:

a. Irrigation Design Criteria.

i. Runoff and Overspray. Soil types and infiltration rate shall be considered when designing irrigation systems. All irrigation systems shall be designed to avoid runoff, low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways or structures. Proper irrigation equipment and schedules, including features such as repeat cycles, shall be used to closely match application rates to infiltration rates therefore minimizing runoff.

Special attention shall be given to avoid runoff on slopes and to avoid overspray in planting areas with a width less than ten feet, and in median strips. No overhead sprinkler irrigation systems shall be

installed in median strips less than ten feet wide.

ii. Irrigation Efficiency. For the purpose of determining the maximum water allowance, irrigation efficiency is assumed to be 0.625. Irrigation systems shall be designed, maintained, and managed to meet or exceed 0.625 efficiency.

iii. Equipment.

(A) Water Meters. Separate landscape water meters shall be installed for all projects except for single family homes or any projects except for single-family homes or any project with a landscaped area of less than five thousand square feet.

(B) Controllers. Automatic control systems shall be required for all irrigation systems and must be able to accommodate all aspects of the design.

(C) Valves. Plants which require different amounts of water shall be irrigated by separate valves. If one valve is used for a given area, only plants with similar water use shall be used in that area. Anti-drain (check) valves shall be installed in strategic points to minimize or prevent low-head drainage.

(D) Sprinkler Heads. Heads and emitters shall have consistent application rates within each control valve circuit. Sprinkler heads shall be selected for proper area coverage, application rate, operating pressure, adjustment capability, and ease of maintenance.

(E) Rain Sensing Override Devices. Rain sensing override devices shall be required on all irrigation systems.

(F) Soil Moisture Sensing Devices. It is recommended that soil moisture sensing devices be considered where appropriate.

b. Recycled Water.

i. The installation of recycled water irrigation systems (dual distribution systems) shall be required to allow for the current and future use of recycled water, unless a written exemption has been granted as described in the following subsection (b)(ii).

ii. Irrigation systems shall make use of recycled water unless a written exemption has been granted by the local water agency, stating that recycled water meeting all health standards is not available and will not be available in the foreseeable future.

iii. The recycled water irrigation systems shall be designed and operated in accordance with all local and state codes.

c. Irrigation Design Plan Specifications. Irrigation systems shall be designed to be consistent with hydrozones. The irrigation design plan shall be drawn on project base sheets. It should be separate from, but use the same format as, the landscape design plan. The scale shall be the same as that used for the landscape design plan.

The irrigation design plan shall accurately and clearly identify:

i. Location and size of separate water meters for the landscape;

ii. Location, type and size of all components of the irrigation system, including automatic controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, and backflow prevention devices;

iii. Static water pressure at the point of connection to the public water supply;

iv. Flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (psi) for each station;

v. Recycled water irrigation systems as specified in this chapter.

7. Irrigation Schedules. Irrigation schedules satisfying the following conditions shall be submitted as part of the landscape documentation package:

a. An annual irrigation program with monthly irrigation schedules shall be required for the plant establishment period, for the established landscape, and for any temporarily irrigated areas.

b. The irrigation schedule shall:

i. Include run time (in minutes per cycle), suggested number of cycles per day, and frequency of irrigation for each station; and

ii. Provide the amount of applied water (in hundred cubic feet, gallons or whatever billing units the local water supplier uses) recommended on a monthly and annual basis.

c. The total amount of water for the project shall include water designated in the estimated total water use calculation plus water needed for any water features, which shall be considered as a high water using hydrozone.

d. Recreational areas designated in the landscape de-sign plan shall be highlighted and the irrigation schedule shall indicate if any additional water is needed above the maximum applied water allowance because of high plant factors (but not due to irrigation inefficiency).

e. Whenever possible, irrigation scheduling shall incorporate the use of evapotranspiration data such as those from the California Irrigation Management Information System (CIMIS) weather stations to apply the appropriate levels of water for different climates.

f. Whenever possible, landscape irrigation shall be between two a.m. and ten a.m. to avoid irrigating during times of high wind or high temperature.

8. Maintenance Schedules. A regular maintenance schedule satisfying the following conditions shall be submitted as part of the landscape documentation package:

a. Landscapes shall be maintained to ensure water efficiency. A regular maintenance schedule shall include but not be limited to checking, adjusting, and repairing irrigation equipment; resetting the automatic controller; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning, and weeding in all landscaped areas.

b. Whenever possible, repair of irrigation equipment shall be done with the originally specified materials or their equivalents.

9. Landscape Irrigation Audit Schedules. A schedule of landscape irrigation audits, for all but single-family residences, satisfying the following conditions shall be submitted to the city or county as part of the landscape documentation package:

a. At a minimum, audits shall be in accordance with the state of California Landscape Water Management Program as described in the Landscape Irrigation Auditor Handbook, the entire document, which is incorporated by reference. (See Landscape Irrigation Auditor Handbook (June 1990) Version 5.5 [formerly Master Auditor Training].)

b. The schedule shall provide for landscape irrigation audits to be conducted by certified landscape irrigation auditors at least once every five years.

10. Grading Design Plan. Grading design plans satisfying the following conditions shall be submitted as part of the landscape documentation package:

a. A grading design plan shall be drawn on project base sheets. It should be separate from but use the same format as the landscape design plan.

b. The grading design plan shall indicate finished configurations and elevations of the landscaped area, including the height of graded slopes, drainage patterns, pad elevations, and finish grade.

11. Soils.

a. A soil analysis satisfying the following conditions shall be submitted as part of the landscape documentation package:

i. Determination of soil texture, indicating the percentage of organic matter;

ii. An approximate soil infiltration rate (either measured or derived form soil texture/infiltration rate tables). A range of infiltration rates should be noted where appropriate;

iii. Measure of pH, and total soluble salts.

b. A mulch of at least three inches shall be applied to all planting areas except turf.

12. Certification.

a. Upon completing the installation of the landscaping and the irrigation system, an irrigation audit shall be conducted by a certified landscape irrigation auditor prior to the final field observation. (See Landscape Irrigation Auditor Handbook as referenced in Section 13.32.040.)

b. A licensed landscape architect or contractor, certified irrigation designer, or other licensed professional in a related field shall conduct a final field observation and shall provide a certificate of substantial completion to the city or county. The certificate shall specifically indicate that plants were installed as specified, that the irrigation system was installed as designed, and that an irrigation audit has been performed, along with a list of any observed deficiencies.

c. Certification shall be accomplished by completing a certificate of substantial completion and delivering it to the city or county, to the retail water supplier, and to the owner of record. A sample of such a form, which shall be provided by the city or county is set out in Exhibit “B” following this chapter.

D. PUBLIC EDUCATION—PUBLICATIONS. Local agencies shall provide information to owners of all new, single-family residential homes regarding the design, installation, and maintenance of water efficient landscapes.

Information about the efficient use of landscape water shall be provided to water users throughout the community. (Ord. 488 § 1 (part), 1992)

13.32.040 Provisions for existing landscapes.

A. Water Management. All existing landscaped areas to which the city or county provides water that are one acre or more shall have a landscape irrigation audit at least every five years. At a minimum, the audit shall be in accordance with the California Landscape Water Management Program as described in the Landscape Irrigation Auditor Handbook, the entire document which is hereby incorporated by reference. (See Landscape Irrigation Auditor Handbook, Dept. of Water Resources, Water Conservation Office (June 1990) Version 5.5.)

1. If the project's water bills indicate that they are using less than or equal to the maximum applied water allowance for that project site, an audit shall not be required.

2. Recognition of projects that stay within the maximum applied water allowance is encouraged.

B. Water Waste Prevention. Cities and counties shall prevent water waste resulting from inefficient landscape irrigation by prohibiting runoff, low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways or structures. Penalties for violation of these prohibitions shall be established locally. (Ord. 488 § 1 (part), 1992)

13.32.050 Effective precipitation.

SAMPLE CERTIFICATE OF SUBSTANTIAL COMPLETION

If effective precipitation is included in the calculation of the estimated total water use, an effective precipitation disclosure statement (similar to the sample Exhibit "C" set out following this chapter) shall be completed, signed, and submitted with the landscape documentation package. No more than twenty-five percent of the local annual mean precipitation shall be considered effective precipitation in the calculation of the estimated total water use. (Ord. 488 § 1 (part), 1992)

EXHIBIT "A" SAMPLE WATER CONSERVATION CONCEPT STATEMENT

Project Site: Project Number:
Project Location:
Landscape Architect/Irrigation Designer/Contractor:

Included in this project submittal package are:
(Check to indicate completion)

___ 1. Maximum Applied Water Allowance:
___ gallons or cubic feet/year

___ 2. Estimated Applied Water Use:
___ gallons or cubic feet/year

*___ 2.(a) Estimated Amount of Water Expected from Effective Precipitation:
___ gallons or cubic feet/year

___ 3. Estimated Total Water Use:
___ gallons or cubic feet/year

Note: * If the design assumes that a part of the Estimated Total Water Use will be provided by precipitation, the Effective Precipitation Disclosure Statement in Section 704 shall be completed and submitted. The Estimated Amount of Water Expected from Effective Precipitation shall not exceed 25 percent of the local annual mean precipitation (average rainfall).

___ 4. Landscape Design Plan
___ 5. Irrigation Design Plan
___ 6. Irrigation Schedule
___ 7. Maintenance Schedule
___ 8. Landscape Irrigation Audit Schedule
___ 9. Grading Design Plan
___ 10. Soil Analysis

Description of Project

(Briefly describe the planning and design actions that are intended to achieve conservation and efficiency in water use.)

Date:_____ Prepared By:_____

EXHIBIT "B" SAMPLE CERTIFICATE OF SUBSTANTIAL COMPLETION

Project Site/Number:_____
Project Location:_____

Preliminary Project Documentation Submitted (Check indicating submittal)

___ 1. Maximum Applied Water Allowance:
___ (gallons or cubic feet per year)
___ 2. Estimated Applied Water Use:
___ (gallons or cubic feet/year)
___ *2a. Estimated Amount of Water Expected from Effective Precipitation:
___ (gallons of cubic feet/year)
___ 3. Estimated Total Water Use:
___ (gallons of cubic feet/year)

NOTE: *If the design assumes that a part of the Estimated Total Water Use will be provided by precipitation, the Effective Precipitation Disclosure Statement shall be completed and submitted. The estimated Amount of Water Expected from Effective Precipitation shall not exceed 25 percent of the local annual mean precipitation (average rainfall).

___ 4. Landscape Design Plan
___ 5. Irrigation Design Plan
___ 6. Irrigation Schedules
___ 7. Maintenance Schedule
___ 8. Landscape Irrigation Audit Schedule
___ 9. Grading Design Plan
___ 10. Soil Analysis

Post-Installation Inspection: (Check indicating substantial completion)

___ A. Plants installed as specified
___ B. Irrigation system installed as designed
B. ___ dual distribution system for recycled water
B. ___ minimal run off or overspray
___ C. Landscape irrigation Audit performed

___ Project submittal package and a copy of this certification has been provided to owner/manager and local water agency.

Comments:

I/we certify that work has been installed in accordance with the contract documents.

_____
Contractor Signature

_____
Date License Number

I/we certify that based upon periodic site observations, the work has been substantially completed in accordance with the Water Efficient Landscape Ordinance and that the landscape planting and irrigation installation conform with the approved plans and specifications.

_____
Landscape Architect Signature
or Irrigation Designer/Consultant
or Licensed or Certified Professional in a Related Field

_____
Date State License Number

I/we certify that I/we have received all of the contract documents and that it is our responsibility to see that the project is maintained in accordance with the contract documents.

_____
Owner Signature

_____
Date

EXHIBIT "C" SAMPLE EFFECTIVE PRECIPITATION DISCLOSURE STATEMENT

I certify that I have informed the project owner and developer that this project depends on _____ (gallons or cubic feet) of effective precipitation per year. This represents _____ percent of the local mean precipitation of _____ inches per year.

I have based my assumptions about the amount of precipitation that is effective upon:

I certify that I have informed the project owner and developer that in times of drought, there may not be enough water available to keep the entire landscape alive.

_____
Licensed or Certified Landscape Professional

I certify that I have been informed by the licensed or certified landscape professional that this project depends upon _____ (gallons or cubic feet) of effective precipitation per year. This represents _____ percent of the local mean precipitation of _____ inches per year.

I certify that I have been informed that in times of drought, there may not be enough water available to keep the entire landscape alive.

_____ _____

Owner Developer

EXHIBIT "D" REFERENCE EVAPOTRANSPIRATION

(In inches—Historical Data, extrapolated from 12-month Normal Year ETo Maps and U.C. publication 21426)

SAN BERNARDINO COUNTY

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann ETo.
Baker	2.7	3.9	6.1	8.3	10.4	11.8	12.2	11.0	8.9	6.1	3.3	2.1	86.6
Barstow	2.6	3.6	5.7	7.9	10.1	11.6	12.0	10.4	8.6	5.7	3.3	2.1	83.6
Chino	2.1	2.9	3.9	4.5	5.7	6.5	7.3	7.1	5.9	4.2	2.6	2.0	54.6
Crestline	1.5	1.9	3.3	4.4	5.5	6.6	7.8	7.1	5.4	3.5	2.2	1.6	50.8
Needles	3.2	4.2	6.6	8.9	11.0	12.4	12.8	11.0	8.9	6.6	4.0	2.7	92.1
Lucerne Valley	2.2	2.9	5.1	6.5	9.2	11.0	11.4	9.9	7.4	5.0	3.0	1.8	75.3
San Bernardino	2.0	2.7	3.8	4.6	5.7	6.9	7.9	7.4	5.9	4.2	2.6	2.0	55.6
29 Palms	2.6	3.6	5.9	7.9	10.1	11.2	11.2	10.3	8.6	5.9	3.4	2.2	82.9
Victorville	2.3	3.1	4.9	6.7	9.3	10.0	11.2	9.8	7.4	5.1	2.8	1.8	74.6

City of Loma Linda Ordinance 443

Chapter 13.04 WATER DEPARTMENT

Note

* Prior ordinance history: Ords. 1, 294, 286 and 333.

13.04.010 Short title.

This chapter shall be known and may be cited as the “utility services division (water) of the community services department” of the city. (Ord. 443 § 1 (part), 1991)

13.04.020 Definitions.

As used in this chapter:

A. Words and Phrases. For the purpose of this chapter, all words used in the present tense shall include the future; all words in the plural number shall include the singular number; and all words in the singular number shall include the plural number.

B. “City council” means the city council of the city of Loma Linda, California. All decisions of the city manager and city staff may be appealed to the city council pursuant to Section 2.08.030.

C. “City staff” means the employees and contract representatives of the city who are appointed to administer and operate the water system of the city.

D. “Connection” means the pipe line and appurtenant facilities such as the curb stop, meter and meter box, all used to extend water service from the main to premises, the laying thereof and the tapping of the main. Where services are divided at the curb or property line to serve several customers, each such branch service shall be deemed a separate service.

E. “Cost” means the cost of labor, material, transportation, supervision, engineering, and all other necessary overhead expense.

F. “Cross-connection” means any physical connection between the piping system from the division’s service and that of any other water supply that is not, or cannot be, approved as safe and potable for human consumption, whereby water from the unapproved source may be forced or drawn into the utility services division (water) distribution mains.

G. “Main” means a water pipe line in a street, highway, alley, or easement used for public and private fire protection and for general distribution of water.

H. “Owner” means the person owning the fee, or the person in whose name the legal title to the property appears, by deed duly recorded in the county recorder’s office, or the person in possession of the property or buildings under claim of, or exercising acts of ownership over same for himself, or as executor, administrator, guardian or trustee of the owner.

I. “Person” means an individual or a company, association, copartnership or public or private corporation.

J. “Premises” means a lot or parcel of real property under one ownership, except where there are well-defined boundaries or partitions such as fences, hedges, or other restrictions preventing the common use of the property by the several tenants, in which case each portion shall be deemed separate premises. Apartment houses and office buildings may be classified as single premises.

K. “Private fire protection service” means water service and facilities for building sprinkler systems, hydrants, hose reels and other facilities installed on private property for fire protection and the water available therefor.

L. “Public fire protection service” means the service and facilities of the entire water supply, storage and

distribution system of the division, including the fire hydrants affixed thereto, and the water available for fire protection, excepting house service connections and appurtenances thereto.

M. “Regular water service” means water service and facilities rendered for normal domestic, commercial and industrial purposes on a permanent basis, and the water available therefor.

N. “Temporary water service” means water service and facilities rendered for construction work and other uses of limited duration, and the water available therefor.

O. “Utility services division (water)” means division operated under the jurisdiction of the city council represented by appropriate employees or agents. (Ord. 443 § 1 (part), 1991)

13.04.030 Notice—To customers.

Notices to customers by the division will normally be given in writing and either delivered or mailed to him at his last known address. Where conditions warrant, and in emergencies, the utility services division (water) may resort to notification either by telephone or messenger. (Ord. 443 § 1 (part), 1991)

13.04.040 Notice—From customers.

Notices from customers to the utility services division (water) may be given by the customer or his authorized representative in writing, in person or by mail at the division’s office. (Ord. 443 § 1 (part), 1991)

13.04.050 Authority of public services director.

The public services director shall have full charge and control of the maintenance, operation and construction of the water works and water distribution system of the district. The public services director shall regularly inspect all physical facilities related to the city water system, to see that they are in good repair and proper working order, and to note and report violations of any ordinances or water regulations. (Ord. 443 § 1 (part), 1991)

13.04.060 Supervisory employees designated.

The supervisory employees of the utility services division (water) shall consist of public services director and a utility services superintendent. (Ord. 443 § 1 (part), 1991)

13.04.070 Administrative powers and duties.

Regular inspection of all physical facilities belonging and related to the city water system to ensure they are in good repair and proper working order and to note violations of any water regulations. The public services director or his designee shall have charge of other employees working under his direct supervision, particularly relating to the repair and maintenance of the water system and the reading of customer meters. He shall report and be responsible to the city manager in all matters pertaining to the operation of the utility services division (water). In the event of an emergency requiring immediate action, he shall take whatever steps are necessary to maintain customer service pending further action by the city manager, if any. Supervision of all repair or construction work authorized by the city council and any other duties prescribed elsewhere in this chapter or which shall, after the effective date of the ordinance codified in this chapter, be prescribed by the rules and regulations of the city council are the responsibility of the public services director or his designee. (Ord. 443 § 1 (part), 1991)

13.04.080 Delegation of utility services.

In the absence of the public services director, the duties set forth may be performed by another employee who may be designated by the public services director to perform such duties. (Ord. 443 § 1 (part), 1991)

13.04.090 Department to furnish system.

The city will furnish a system, plant, and works used for and useful in obtaining, conserving and disposing of water for public and private uses, including all appurtenances to it, and lands, easements, rights in land, water rights, contract rights, franchises, and other water supply, storage and distribution facilities and equipment, including but not limited to private and public developed projects both on-site and off-site. (Ord. 443 § 1 (part), 1991)

13.04.100 Acceptance of conditions required.

All applicants for service connections or water service shall be required to accept such conditions of pressure and services as are provided by the distributing system at the location of the proposed service connection, and to hold the city harmless for any damages arising out of low pressure or high pressure conditions or interruptions in service. (Ord. 443 § 1 (part), 1991)

13.04.110 Department not responsible for pressure.

The city shall not accept any responsibility for the maintenance of pressure, and it reserves the right to discontinue service while making emergency repairs, etc. Consumers dependent upon a continuous supply of water should provide their own emergency storage. (Ord. 443 § 1 (part), 1991)

13.04.120 Valve operation restricted to department.

No one except an employee or representative of the utility services division (water) shall at any time in any manner operate the curb cocks or valves, except for repair on private property or to avoid property damage, main cocks, gates or valves of the city's water system or interfere with meters or their connections, street mains or other parts of the water system. (Ord. 443 § 1 (part), 1991)

13.04.130 Service discontinuance authorized for noncompliance.

For the failure of the customer or his agent to comply with all or any part of this chapter and any ordinance, resolution, or order fixing rates and charges of the city's utility service division (water), the customer's service shall be discontinued, and water shall not be supplied such customer until he shall have complied with the rule or regulation which he has violated or paid the rates or charges made against him for services rendered. This section shall be in addition to any other remedies authorized by law. (Ord. 443 § 1 (part), 1991)

13.04.140 Division right to determine connection size and location.

The utility services division (water) reserves the right to determine the size of service connections and their location with respect to the boundaries of the premises to be served. The laying of consumer's pipe line to the curb should not be done until the location of the service connection has been approved by the utility services division (water) superintendent. (Ord. 443 § 1 (part), 1991)

13.04.150 Curb cock or valve required.

Every service connection installed by the utility services division (water) shall be equipped with a curb cock or ball valve on the inlet side of the meter. Such valve or curb cock is intended for the exclusive use of the utility services division (water) in controlling the water supply through the service connection pipe. If the curb cock or valve is damaged by the consumer's use to an extent requiring replacement, such replacement shall be at the consumer's expense. (Ord. 443 § 1 (part), 1991)

13.04.160 Service connection regulations.

Domestic, commercial and industrial service connections shall conform with the following rules and any deviation therefrom shall be deemed unlawful:

A. Separate Building. Each house or building under separate ownership must be provided with a separate service connection. Two or more houses under one ownership and on the same lot or parcel of land may be supplied through the same service connection; provided, that for each house under a separate roof which shall face a street, an additional minimum water charge will be applied to the single meter serving the house or a separate service connection may be provided for each building. The city reserves the right to limit the number of houses or the area of land under one ownership to be supplied by one service connection.

B. Single Connection. Not more than one service connection for domestic or commercial water supply shall be installed for one building, except under special conditions approved by the public services director.

C. Different Owners. A service connection shall not be used to supply adjoining property of a different owner or to supply property of the same owner across a street or an alley.

D. Divided Property. When property provided with a service connection is divided, each service connection shall be considered as belonging to the lot or parcel of land which it directly enters.

E. Service Connections. The service connections extending from the water main to the property line and including the meter, meter box and curb cock or ball valve, shall be maintained by the utility services division (water). All pipes and fixtures extending or lying beyond the meter or seven feet from main whichever is closer shall be installed and maintained by the owner of the property. (Ord. 443 § 1 (part), 1991)

13.04.170 Main extension—Regulations.

The following rules are established for making main extensions:

A. Any owner of one or more lots or parcels, or a subdivider of a tract of land, desiring the extension of one or more water mains, to serve such property, shall make a written application therefor to the utility services division (water), such application to contain the legal description of the property to be served and tract number thereof, and any additional information which may be required by the city, and be accompanied by a map showing the location of the proposed connections.

B. Upon receipt of the application, the utility services division (water) shall make an investigation and survey of the proposed extension and shall report the findings to the city council, including the estimated cost of any extensions involving the utility services division (water).

C. The city council shall thereupon consider the application and report of the utility services division (water) and after such consideration reject or approve the same.

D. All extensions of mains, fire hydrants, laterals and connections provided for in accordance with this chapter and approved by the city council shall by agreement become and remain the property of the city. When a contractor or subdivider installs water mains, fire hydrants, laterals and connections in any subdivisions at his own expense, but under the supervision of the utility services division (water), such installations, upon completion and before water service is provided shall be transferred to the ownership of the city by appropriate grant deed and bill of sale.

E. No dead-end lines shall be permitted, except with the approval of the utility services superintendent, and in cases where circulation lines are necessary they shall be designed and approved by the utility services division (water) in advance of installation before becoming a part of the city system.

F. The city will provide all main pipe line extensions in existing streets to properties along dedicated roads and streets upon application for water service and if in their opinion such water service is economically feasible and to the advantage of the city system in serving the requirements of the area. The cost of such extension of water mains shall be at the expense of the applicant or group of applicants to be shared by them. If an applicant could be served adequately by

a certain size pipe line to provide for future expansion of water services in the area, the city may agree to share the cost of the pipe lines on terms agreeable to both parties concerned. In the event that a larger pipe line is installed at partial cost to the city, the city may require future water users in the area who apply for new connections to reimburse the utility services division (water) for such main line extension cost until the full amount of the cost has been recovered.

G. If the property owners or subdividers initiating the pipe line extension are required to defray the entire cost of any main line extension under these regulations, and they wish to put up the entire cost of the project, the city may agree to reimburse such property owners or subdividers over a period of years by requiring all new connections in that area to pay a proportionate amount of the cost to the city, which money shall then be paid to the original investors until the full amount has been paid. (Ord. 443 § 1 (part), 1991)

13.04.180 Independent pipe line systems required when.

The applicant may apply for as many services as may be reasonably required for his premises provided that the pipe line system for each service be independent of the others and that they not be interconnected. (Ord. 443 § 1 (part), 1991)

13.04.190 Wasting water prohibited—Service discontinuance authorized when.

No customer shall knowingly permit leaks or waste water. Where water is wastefully or negligently used on a customer's premises, seriously affecting the general service, the utility services division (water) may discontinue the service if such conditions are not corrected within five days after giving the customer written notice. (Ord. 443 § 1 (part), 1991)

13.04.200 Facilities department property—Obstruction removal authorized.

All facilities installed by the city on private property for the purpose of rendering water service shall remain the property of the city and may be maintained, repaired or replaced by the utility services division (water) without the consent or interference of the owner or occupant of the property. The owner shall use reasonable care in the protection of the facilities. No payment shall be made for placing or maintaining the facilities on private property. Shrubbery or plants must not be planted adjacent to fire hydrants or water meters. If property owners do not cooperate in this, the city shall have the right to remove such obstructions at the expense of the property owner after giving notice of such intention. (Ord. 443 § 1 (part), 1991)

13.04.210 Customer liability for facilities damage.

The customer shall be liable for any damage to the service facilities when such damage is from causes originating on the premises by an act of the customer or his tenants, agents, employees, contractors, licensees, or permitees, including the breaking or destruction of locks by the customer or others on or near a meter, and any damage to a meter that may result from hot water or steam from a boiler or heater on the customer's premises. The city shall be reimbursed by the customer for any such damage promptly on presentation of a bill for same. (Ord. 443 § 1 (part), 1991)

13.04.220 Attaching ground wires prohibited.

All individuals or business organizations are forbidden to attach any ground wire or wires to any plumbing which is or may be connected to a service connection or main belonging to the city. The city shall hold the customer liable for any damage to its property occasioned by such ground wire attachments. (Ord. 443 § 1 (part), 1991)

13.04.230 Customer required to provide valve.

The customer shall provide a valve on his side of the service installation, as close to the meter location as practicable,

to control the flow of water to the pipe lines on his premises. The customer shall not use the service curb valve to turn meter on and off for his convenience. (Ord. 443 § 1 (part), 1991)

13.04.240 Department right-of-entry.

Representatives from the utility services division (water) shall have the right of ingress and egress to the customer's premises at reasonable hours for any purpose reasonably connected with the furnishing of water service. (Ord. 443 § 1 (part), 1991)

13.04.250 Unauthorized connection to avoid charges.

A customer, subdivider or their employees or agents shall not make illegal and unauthorized connections to the water system with or without a meter, thus avoiding the record of payment of water charges. (Ord. 443 § 1 (part), 1991)

13.04.260 Meters—Installation—Sealing.

Meters will be installed on or near property lines and shall be owned by the city and installed and removed at its expense. No rent or other remuneration will be paid by the city for a meter or other facilities including connections belonging to individuals. All meters will be sealed by the utility services division (water) at the time of installation, and no seal shall be altered or broken except by one of the utility services division (water) authorized employees or agents. (Ord. 443 § 1 (part), 1991)

13.04.270 Meters—Relocation charges.

Meters moved for the convenience of the customer will be relocated at the customer's expense. Meters moved to protect the city's property will be moved at its expense. If the lateral distance which the customer desires to have the meter moved exceeds eight feet, he will be required to pay for new service at the desired location. (Ord. 443 § 1 (part), 1991)

13.04.280 Service discontinuance authorized for cross-connection.

Water service may be refused or discontinued to any premises where there exists a cross-connection in violation of state or federal laws. (Ord. 443 § 1 (part), 1991)

13.04.290 Service discontinuance—Fraud or abuse.

Service may be discontinued if necessary to protect the city against fraud or abuse. (Ord. 443 § 1 (part), 1991)

13.04.300 Service discontinuance—Noncompliance.

Service may be discontinued for noncompliance with this chapter or any other ordinance or regulation relating to the water service. (Ord. 443 § 1 (part), 1991)

13.04.310 Water service application—Form.

A property owner or his agent may make application for regular water service on a form provided by the utility services division (water). Such application shall signify the customer's willingness and intention to comply with this chapter and other ordinances or regulation relating to the regular water service and to make payment for the water service received. (Ord. 443 § 1 (part), 1991)

13.04.320 Water service application—Payment of past service required.

An application for water service will not be honored unless payment in full has been made for water service previously rendered to the applicant within the boundaries of the division. (Ord. 443 § 1 (part), 1991)

13.04.330 Connection charges—Installation by authorized personnel.

A. Where a regular charge has been fixed for the type of service connection desired, such regular charges shall be paid in advance by the applicant. Where there is no regular fixed charge, the city reserves the right to require the applicant to deposit an amount equal to the estimated cost of such service connection. The current schedule of regular service connection charges is in resolution form.

B. Only duly authorized employees or agents of the utility services division (water) will be authorized to install service connections. (Ord. 443 § 1 (part), 1991)

13.04.340 Service installation—Main abutment required.

Regular water services will be installed at the location desired by the applicant, of the size determined by the utility services division (water). Service installation will be made only to property abutting on distribution mains as have been constructed in public streets, alleys or easements, or to extensions thereof as provided in this chapter. Service installed in new subdivisions prior to the construction of streets or in advance of street improvements must be accepted by the applicant in the installed location. (Ord. 443 § 1 (part), 1991)

13.04.350 Service requirements changes—Notice required.

Customers making any material change in the size, character or extent of the equipment or operations utilizing water services, or whose change in operations results in a large increase in the consumption of water, shall immediately give the utility services division (water) written notice of the nature of the change and, if necessary, amend or change their original application. (Ord. 443 § 1 (part), 1991)

13.04.360 Subdivision system application—Required.

A person or persons desiring to provide a water system within a tract of land which he proposes to subdivide, shall make written application therefor. (Ord. 443 § 1 (part), 1991)

13.04.370 Subdivision system application—Contents.

The application shall state the number of the tract, the name of the subdivision, and its location. It shall be accompanied by a copy of the final map and of the plans, profiles and specifications for the street work therein. (Ord. 443 § 1 (part), 1991)

13.04.380 Subdivision system—Compliance required.

If approved by the city council, it shall be required that the subdivider shall meet all specifications set forth by the American Water Works Association and city standards and specifications as to adequate size, type and quality of materials used and the location of main lines, valves, connections, fire hydrants, etc., and comply with all requirements of the State Health Department and the department of public safety (fire division). (Ord. 443 § 1 (part), 1991)

13.04.390 Subdivision system—Subdivider responsibility—Division inspection.

The utility services division (water) will not undertake on its own initiative to provide or construct any main extension pipe lines in a subdivision or for the extension of main lines from existing pipe lines to the subdivision area. Such subdivision main lines and service required, together with any extension of existing pipe lines to such area, shall be the responsibility of and at the expense of the subdivider. He shall provide and arrange for the construction of all main lines, valves, connections and hydrants with laterals to the inside of curb. Upon completion of the construction project, the system shall be inspected by utility services and if approved, the subdivider shall be required to obtain final approval of the city engineer. Upon such approval, the subdivider shall be required to transfer his ownership in the mains, valves, fire hydrants, laterals, connections, etc., to the city before any regular water service shall be supplied to the subdivided tract or area. (Ord. 443 § 1 (part), 1991)

13.04.400 Subdivision system—Division payment for larger main installation.

If the city council shall require a subdivider or other person to install a larger size main pipe line than that which would normally be required or necessary to serve the interests of the subdivider or others, by consent and written agreement between the subdivider or others and the city council, the utility services division (water) may agree to pay for the difference in cost between the small size main pipe line and the large one which is deemed necessary and desirable for future expansion of the system. All final agreements must be approved and ratified by the city council. (Ord. 443 § 1 (part), 1991)

13.04.410 Department right to set meter—Consumer liability for negligence.

The utility services division (water) reserves the right to set and maintain a meter on any service connection. The water consumer shall be held liable, however, for any damage to the meter due to customer’s negligence or carelessness and in particular, for damage caused by hot water or steam from the premises. (Ord. 443 § 1 (part), 1991)

13.04.420 Guarantee deposit required when.

All water customers who are renters, subdividers or builders subject to frequent change of customers shall be required to make a guarantee deposit set by resolution per connection returnable or applicable to the last or closing bill. (Ord. 443 § 1 (part), 1991)

13.04.430 Temporary service—Connection discontinuance.

Temporary service connections shall be discontinued and terminated within six months after installation unless an extension of time is granted in writing by the utility services division (water). (Ord. 443 § 1 (part), 1991)

13.04.440 Temporary service—Cost deposit required—Connection charges.

The applicant shall deposit, in advance, the estimated cost of installing and removing the facilities required to furnish the service exclusive of the cost of salvageable material. Upon discontinuance of service, the actual cost shall be determined and an adjustment made as an additional charge, refund or credit. If service is supplied through a fire hydrant, the applicant will be charged as per resolution. (Ord. 443 § 1 (part), 1991)

13.04.450 Temporary service—Facilities operation.

All facilities for temporary service to the customer connection shall be made by the utility services division (water) and shall be operated in accordance with its instructions. (Ord. 443 § 1 (part), 1991)

13.04.460 Temporary service—Meter responsibility.

The customer shall use all possible care to prevent damage to the meter or to any other loaned facilities of the utility services division (water) which are involved in furnishing the temporary service from the time they are installed until they are removed, or until forty-eight hours' notice in writing has been given to the utility services division (water) that the contractor or other person is through with the meter or meters and the installation. If the meter or other facilities are lost or damaged, the cost of the meter or cost of making repairs shall be paid by the customer. (Ord. 443 § 1 (part), 1991)

13.04.470 Temporary service—Hydrant use regulations.

An applicant for temporary use of water from a fire hydrant must secure a permit therefor from the utility services division (water) and pay the regular fee charged for the installation and removal of a meter to be installed on the hydrant, provide himself with a hydrant wrench necessary to operate such hydrant, and pay for the water used in accordance with the meter readings, at the rates prescribed by resolution. (Ord. 443 § 1 (part), 1991)

13.04.480 Tampering with hydrant prohibited.

Tampering with any fire hydrant for the unauthorized use of water therefrom, or for any other purpose, is punishable by law. (Ord. 443 § 1 (part), 1991)

13.04.490 Temporary service—Advance payment or credit references required.

The applicant shall pay the estimated cost of water service in advance or shall be otherwise required to establish acceptable credit references. (Ord. 443 § 1 (part), 1991)

13.04.500 Arrangements for large quantities of water required.

When an abnormally large quantity of water is desired for filling a swimming pool or for other purposes, arrangements must be made with the utility services division (water) prior to taking such water. Permission to take water in unusual quantities will be given only if it can be safely delivered through the city's facilities and if other consumers are not inconvenienced thereby. (Ord. 443 § 1 (part), 1991)

13.04.510 Equipment maintenance required.

The customer shall, at his own risk and expense, furnish, install and keep in good and safe condition all equipment that may be required for receiving, controlling, applying and utilizing water, and the city shall not be responsible for any loss or damage caused by the improper installation of such equipment, or the negligence or wrongful act of the customer or of any of his tenants, agents, employees, or contractors, licensees or permittees in installing, maintaining, operating or interfering with such equipment. The city shall not be responsible for and will not consider refunds or credits for the loss or wastage of water occasioned by the breakage, leakage or damage to pipe lines on customer's property which is beyond the customer's water meter. The city also shall not be responsible for damage to property caused by faucets, valves and other equipment that are open when water is turned on at the customer's meter, either originally or when turned on after a temporary shutoff. (Ord. 443 § 1 (part), 1991)

13.04.520 Collection by suit—Defendant payment of costs.

Defendant shall pay all costs of suit in any judgment rendered in favor of the city. (Ord. 443 § 1 (part), 1991)

13.04.530 Hydrants—Authorized use only permitted.

Fire hydrants are for use by the utility services division (water) or by the department of public safety (fire division). Other parties desiring to use fire hydrants for any purpose must first obtain written permission from the utility services

division (water) prior to use and shall operate the hydrant in accordance with instructions issued by the utility services division (water). Unauthorized use of hydrants will be prosecuted according to law. (Ord. 443 § 1 (part), 1991)

13.04.540 Hydrants—Maintenance charge.

A charge, to be determined by contract between the utility services division (water) and organized fire protection agencies will be imposed for hydrant maintenance and water used for public fire protection. (Ord. 443 § 1 (part), 1991)

13.04.550 Hydrants—Change in location.

When a fire hydrant has been installed in the location specified by proper authority, the city has fulfilled its obligation. If a property owner or other party desires a change in the size, type or location of the hydrant, he shall bear all costs of such changes without refund. Any change in the location of a fire hydrant must have the approval of the proper authority. (Ord. 443 § 1 (part), 1991)

13.04.560 Private fire protection—Applicant to pay installation cost.

The applicant for private fire protection service shall pay the total actual cost of installation of the service from the distribution main to the customer's premises, including the cost of an approved double detector check device as per City Standard W-11. Customer shall be responsible for maintenance and testing of such device and meter at cost. (Ord. 443 § 1 (part), 1991)

13.04.570 Private fire protection—Connection with other systems prohibited.

There shall be no connections between this fire protection system and any other water distribution system on the premises. (Ord. 443 § 1 (part), 1991)

13.04.580 Private fire protection—Fire extinguishing and testing purposes only authorized.

There shall be no water used through the fire protection service except to extinguish fires and for testing the firefighting equipment. (Ord. 443 § 1 (part), 1991)

13.04.590 Private fire protection—Charges double when—Exception.

Any consumption recorded on the meter will be charged for at double the regular service rates, except that no charge will be made for water used to extinguish fires where such fires have been reported to the department of public safety (fire division). (Ord. 443 § 1 (part), 1991)

13.04.600 Private fire protection—Rate determination.

The monthly rates for private fire protection shall be established by the utility services division (water) upon receipt of application. (Ord. 443 § 1 (part), 1991)

13.04.610 Private fire protection—Tank filling authorized when.

Occasionally water may be obtained from a private fire service for filling a tank connected with a fire service, but only if permission is secured from the utility services division (water) in advance and an approved means of measurement is available. The regular water rates will be applied. (Ord. 443 § 1 (part), 1991)

13.04.620 Private fire protection—Service discontinuance authorized when.

If water is used from a private service in violation of the agreement or of this chapter, the city may, at its option, discontinue and remove the service. (Ord. 443 § 1 (part), 1991)

13.04.630 Private fire protection—Department nonresponsibility for damage.

The city assumes no responsibility for loss or damage due to lack of water or pressure, either high or low, and merely agrees to furnish such quantities and pressures as are available in its general distribution system. The service is subject to shutdowns and variations required by the operation of the system. (Ord. 443 § 1 (part), 1991)

13.04.640 Private fire protection—Other service connections authorized.

The city shall have the right to take a domestic, commercial or industrial service connection from the fire service connection at the curb to supply the same premises as those to which the fire service connection belongs. The city shall also have the right to determine the proportion of the installation costs properly chargeable to each service connection, if such segregation of costs shall become necessary. (Ord. 443 § 1 (part), 1991)

13.04.650 Private fire protection—Check valve installation authorized.

The city reserves the right to install on all fire service connections a double detector check as per City Standard W-11, at the expense of the owner of the property. (Ord. 443 § 1 (part), 1991)

13.04.660 Backflow protective device—Installation required when.

The customer must comply with state and federal laws governing the separation of dual water systems or installations of backflow protective devices to protect the public water supply from the range of cross-connections. Backflow protective devices must be installed as per city standard and shall be open to test and inspection by the utility services division (water). Plans for the installation of backflow protection devices must be approved by the utility services division (water) prior to installation. (Ord. 443 § 1 (part), 1991)

13.04.670 Pressure relief valves required when.

As a protection to the customer’s plumbing system, a suitable pressure relief valve must be installed and maintained by him, at his expense, when check-valves or other protective devices are used. The relief valve shall be installed between the check-valve and the water heater. (Ord. 443 § 1 (part), 1991)

13.04.680 Backflow protective device—Required on supply lines when.

Whenever backflow protection has been found necessary on a water supply line entering a customer’s premises, then any and all water supply lines from the utility services division (water) mains entering such premises, buildings, or structures shall be protected by an approved backflow device, regardless of the use of the additional water supply lines. (Ord. 443 § 1 (part), 1991)

13.04.690 Backflow protective device—Inspection and testing.

The double check valve or other approved backflow protection devices shall be inspected and tested in accordance with the California Administrative Code Title 17 by the utility services division (water) or a certified tester. The devices shall be serviced, overhauled, or replaced whenever they are found defective, and all costs of repair and maintenance shall be borne by the customer. (Ord. 443 § 1 (part), 1991)

13.04.700 Service discontinuance authorized for check valve installation defected.

The service of water to any premises may be immediately discontinued by the utility services division (water) if any defect is found in the check valve installations or other protective devices, or if it is found that dangerous unprotected cross-connections exist. Service will not be restored until such defects are corrected. (Ord. 443 § 1 (part), 1991)

13.04.710 Department nonliability for service interruption damage.

The city shall not be liable for damage which may result from an interruption in service from a cause beyond the control of the utility services division (water). (Ord. 443 § 1 (part), 1991)

13.04.720 Billing—Period.

The regular billing period will be monthly or bimonthly at the option of the utility services division (water). (Ord. 443 § 1 (part), 1991)

13.04.730 Meters—Reading.

Meters will be read as nearly as possible on the same day of each month, as near the end of each month as practicable and reasonably possible. (Ord. 443 § 1 (part), 1991)

13.04.740 Opening and closing bill proration.

Opening and closing bills for less than the normal billing period shall be prorated both as to minimum charges and quantity by blocks of one hundred cubic feet. If the total period for which service is rendered is less than one month, the bill shall not be less than the monthly minimum charge applicable. Closing bills may be estimated by the utility services division (water) for the final period as an expediency to permit the customer to pay the closing bill at the time service is discontinued. (Ord. 443 § 1 (part), 1991)

13.04.750 Charges due when.

Water charges are due and payable within twenty days of billing date to the property owner or his tenant or agency as designated in the application, and delinquent twenty days after the date indicated on the bill. Service may be discontinued without further notice if payment is not made by the delinquent date. (Ord. 443 § 1 (part), 1991)

13.04.760 Billing—Payment due notice required.

Bills for metered water services shall be rendered at the end of each billing period. Flat rate service shall be billed in advance. Bills shall be payable on presentation. On each bill for water service rendered by the utility services division (water) shall be printed substantially as follows: “Payment is due within twenty (20) days of billing date. Service may be turned off if account is unpaid.” (Ord. 443 § 1 (part), 1991)

13.04.770 Billing—Separate bills required—Exception.

Separate bills will be rendered for each meter installation except where the utility services division (water) has, for its own convenience, installed two or more meters in place of one meter. Where such installations are made the meter readings will be combined for billing purposes. (Ord. 443 § 1 (part), 1991)

13.04.780 Payment guarantee required for turn on.

The water charge begins when a service connection is installed and the meter is set, unless the water is ordered to be left shut off when the service connection is ordered to be installed. Before water is turned on by the utility services division (water) for any purpose whatever, the property owner or tenant must sign a form in which he guarantees payment of future water bills for the service required. The person signing the guarantee form or meter set form will be held liable for water used until the utility services division (water) is notified in writing to discontinue service or to transfer the account to another owner or tenant. (Ord. 443 § 1 (part), 1991)

13.04.790 Unauthorized water use—Consumer liability.

A person taking possession of premises and using water from an active service connection without having made application to the utility services division (water) for meter service shall be held liable for the water delivered from the date of the recorded meter reading, and if the meter is found inoperative, the quantity consumed will be estimated. If proper allocation for water service is not made upon notification to do so by the utility services division (water), and if accumulated bills for service are not paid immediately, the service may be discontinued by the utility services division (water) without further notice. (Ord. 443 § 1 (part), 1991)

13.04.800 Department nonliability for wasted water.

When turning on the water supply as requested, and the house or property is vacant, the utility services division (water) will endeavor to ascertain if water is running on the inside of the building. If such is found to be the case, the water will be left shut off at the curb cock on the inlet side of the meter. The utility services division (water) jurisdiction and responsibility ends at the property line for all purposes, and the utility services division (water) will in no case be liable for loss of wasted water or for damages occasioned by water running from open or faulty fixtures, or from broken, leaking or damaged pipes inside of the property line of the customer. (Ord. 443 § 1 (part), 1991)

13.04.810 Desired discontinuance—Notification required.

Customers desiring to discontinue service should so notify the utility services division (water) two days prior to vacating the premises. Unless discontinuance of service is ordered, the customer shall be liable for regular charges whether or not any water is used. (Ord. 443 § 1 (part), 1991)

13.04.820 Collection by suit—Authorized when.

All unpaid rates and charges and penalties provided in this chapter may be collected by suit. (Ord. 443 § 1 (part), 1991)

13.04.830 Service rates.

Each and all premises which are served by a connection to the water system of the city shall be charged and the owner thereof shall pay a water service usage charge based upon a schedule for such charges fixed by resolution duly adopted by the city council. (Ord. 443 § 1 (part), 1991)

13.04.840 Administrative decision appeal—City council action final.

All ruling of the city council shall be final. All administrative decisions of the staff concerning city policies, rules or regulations shall be appealed, if at all, to the city council within ten days subsequent to written notice of such administrative decision; otherwise, the decision shall be deemed final. (Ord. 443 § 1 (part), 1991)

13.04.850 Meter testing—Required when—Procedure.

All meters will be tested prior to installation, and no meter will be installed which registers more than two percent fast. If a customer desires to have the meter serving his premises tested, he shall first deposit the fees required and may be present when the meter is tested in the meter shop of the utility services division (water). Should the meter register more than two percent fast, the deposit will be refunded, but should the meter register less than two percent fast, the deposit will be retained by the utility services division (water). (Ord. 443 § 1 (part), 1991)

13.04.860 Meter testing—Refund authorized when.

If a meter tested at the request of a customer is found to be more than two percent fast, the excess charges for the time service was rendered the customer requesting the test, or for a period of six months, whichever shall be the lesser, shall be refunded to the customer. (Ord. 443 § 1 (part), 1991)

13.04.870 Meter testing—Additional billing authorized when.

If a meter tested at the request of a customer is found to be more than five percent slow, the utility services division (water) may bill the customer for the amount of the undercharge based upon corrected meter readings for the period, not exceeding six months, that the meter was in use. (Ord. 443 § 1 (part), 1991)

13.04.880 Charge estimate when meter not registering.

If a meter is found to be not registering, the charges for service shall be at the minimum monthly rate or based on the estimated consumption, whichever is greater. Such estimates shall be made from previous consumption records for a comparable period or by such other method as is determined by the utility services division (water) and its decision shall be final. (Ord. 443 § 1 (part), 1991)

13.04.890 Service discontinuance authorized for nonpayment.

Service may be discontinued for nonpayment of bills on or before the twentieth day following the date of billing. (Ord. 443 § 1 (part), 1991)

13.04.900 Failure to receive bill no relief of liability.

Failure to receive a bill for service rendered does not relieve consumer of liability. Any amount due shall be deemed a debt to the city, and any person, firm or corporation failing, neglecting or refusing to pay such indebtedness shall be liable to an action in the name of the city in any court of competent jurisdiction for the amount thereof. (Ord. 443 § 1 (part), 1991)

13.04.910 Reconnection charge—Meter removal charge.

A reconnection charge, plus penalties as per resolution shall be made and collected prior to renewing service following a discontinuance of water service due to nonpayment of bill, and an additional charge shall be made whenever it is deemed necessary to remove the meter from the premises. (Ord. 443 § 1 (part), 1991)

13.04.920 Delinquent charge penalty.

Rates and charges which are not paid on or before the day of delinquency shall be subject to a penalty of ten percent and thereafter shall be subject to a further penalty of two percent per month on the first day of each month following. (Ord. 443 § 1 (part), 1991)

13.04.930 Security deposit charge.

The security deposit is the charge which insures payment of minimum utility service division (water) charges. Upon discontinuance of service the security deposit shall be applied to reduce any unpaid charges outstanding on the customer's account. The amount of deposit required shall be established by the city council in the resolution on fees. The security deposit shall be refunded to the customer as provided in this section. (Ord. 443 § 1 (part), 1991)

13.04.940 Waste or nuisance water and other substances.

It is unlawful for any person, firm or corporation to deposit, drain, wash, allow to run or divert into or upon any public road, highway, street or alley, drainage ditch, storm drain or flood control channel owned by or controlled by any public agency within the city, any water, mud, or sand; except that, upon written application of any person filed with the city and approved by the director of public services, the city may, upon such terms and conditions as it may deem advisable to impose, including the charging of a fee therefor, grant a permit to such person to do any of the acts prohibited by this section, provided the same shall not be detrimental to the public health, safety or welfare. For purposes of enforcement of this section, the owner of the meter or property which is the source of the waste or nuisance water or other substance as defined in this section is considered the party responsible for any violations cited under this section. (Ord. 443 § 1 (part), 1991)

13.04.950 Conservation measures—Stage No. 1 normal conditions—Voluntary conservation measures.

Normal conditions shall be in effect when the city is able to meet all the water demands of its customers in the immediate future. During normal conditions all water users should continue to use water wisely, to prevent the waste or unreasonable use of water, and to reduce water consumption to that necessary for ordinary domestic and commercial purposes. (Ord. 443 § 1 (part), 1991)

13.04.960 Stage No. 2—Threatened water supply shortage.

In the event of a threatened water supply shortage which could affect the city's ability to provide water for ordinary domestic and commercial uses, the city council shall hold a public hearing at which consumers of the water supply shall have the opportunity to protest and to present their respective needs to the city. The city council may then, by resolution, declare a water shortage condition to prevail, and the following conservation measures shall be in effect.

A. Exterior Landscape Plans. Exterior landscape plans for all new commercial and industrial development shall provide for timed irrigation and shall consider the use of drought resistant varieties of flora. Such plans shall be presented and approved by the city prior to issuance of a water service letter.

B. Excessive Irrigation and Related Waste. No customer of the city or other person acting on behalf of or under the direction of a customer shall cause or permit the use of water for irrigation of landscaping or other outdoor vegetation, plantings, lawns or other growth, to exceed the amount required to provide reasonable or excessive waste of water from such irrigation activities or from watering devices or systems. The free flow of water away from an irrigated site shall be presumptively considered excessive irrigation and waste as defined.

C. Agricultural Irrigation. Persons receiving water from the city who are engaged in commercial agricultural practices, whether for the purpose of crop production or growing of ornamental plants shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. Upon the request of the director of public services, these persons may be required to prepare a plan describing their irrigation practices and equipment, including but not limited to, an estimate of the efficiency of the use of water on their properties.

D. Commercial Facilities. Commercial and industrial facilities shall, upon request of the director of public services, provide the city with a plan to conserve water at their facilities. The city will provide these facilities with information regarding the average monthly water use by the facility for the last two-year period. The facility will be

expected to provide the city with a plan to conserve or reduce the amount of water used by that percentage deemed by the city council to be necessary under the circumstances. After review and approval by the director of public services, the water conservation plan shall be considered subject to inspection and enforcement by the city.

E. Parks, Golf Courses, Swimming Pools and School Grounds. Public and private parks, golf courses, swimming pools and school grounds which use water provided by the city shall use water for irrigation and pool filling between the hours of six p.m. and six a.m.

F. Domestic Irrigation. Upon notice and public hearing, the city may determine that the irrigation of exterior vegetation shall be conducted only during specified hours and/or days, and may impose other restrictions on the use of water for such irrigation. The irrigation of exterior vegetation at other than these times shall be considered to be a waste of water.

G. Swimming Pool. All residential, public and recreational swimming pools, of all sizes, shall use evaporation resistant covers and shall recirculate water. Any swimming pool which does not have a cover installed during periods of nonuse shall be considered a waste of water.

H. Runoff and Washdown. No water provided by the city shall be used for the purposes of washdown of impervious areas without specific written authorization of the director of public services. Any water used on a premises that is allowed to escape the premises and run off into gutters or storm drains shall be considered a waste of water.

I. Vehicle Washing. The washing of cars, trucks or other vehicles is not permitted, except with a hose equipped with an automatic shut-off device, or at a commercial facility designated and so designated on the city's billing records.

J. Drinking Water Provided by Restaurants. Restaurants are requested not to provide drinking water to patrons except by request. (Ord. 443 § 1 (part), 1991)

13.04.970 Stage No. 3—Water shortage emergency—Mandatory conservation measures.

In the event of a water shortage emergency in which the city may be prevented from meeting the water demands of its customers, the city council shall, if possible given the time and circumstances, immediately hold a public hearing at which customers of the city shall have the opportunity to protest and to present their respective needs to the city council. No public hearing shall be required in the event of a breakage or failure of a pump, pipeline, or conduit causing an immediate emergency. The director of public services is empowered to declare a water shortage emergency, subject to the ratification of the city council within seventy-two hours of such declaration, and the following rules and regulations shall be in effect immediately following such declarations:

A. Prohibition. Watering of parks, school grounds, golf courses, lawn watering, landscape irrigation, washdown of driveways, parking lots or other impervious surfaces, washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water, filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes are prohibited.

B. Restaurants. Restaurants shall not serve drinking water to patrons except by request.

C. Construction Meters. No new construction meter permits shall be issued by the city. All existing construction meters shall be removed and/or locked.

D. Commercial Nurseries and Livestock. Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary. (Ord. 443 § 1 (part), 1991)

13.04.980 Mandatory compliance—Implementation and termination.

The director of public services of the city shall monitor the supply and demand for water on a daily basis to determine the level of conservation required by the implementation or termination of the water conservation plan stages and shall notify the city council of the necessity for the implementation or termination of each stage. Each declaration of the city council implementing or terminating a water conservation stage shall be published at least once in a newspaper of general circulation, and shall be posted at the city offices. Each declaration shall remain in effect until the city council

otherwise declares, as provided in this section. (Ord. 443 § 1 (part), 1991)

13.04.990 Mandatory compliance—Exception permits.

The director of public services may grant permits for uses of water otherwise prohibited under the provisions of this chapter if he finds and determines that restrictions herein would either:

A. Hardship. Cause an unnecessary and undue hardship to the water user or the public; or

B. Emergency. Cause an emergency condition affecting the health, sanitation, fire protection or safety of the water use or of the public. (Ord. 443 § 1 (part), 1991)

13.04.1000 Exception granted.

Such exceptions may be granted only upon written application therefor. Upon granting such exception permit, the director of public services may impose any conditions he determines to be just and proper. (Ord. 443 § 1 (part), 1991)

13.04.1010 Enforcement, inspection.

Authorized employees of the city, after proper identification may, during reasonable hours, inspect any facility having a water conservation plan, and may enter onto private property for the purpose of observing the operation of any water conservation device, irrigation equipment or water facility. Employees of the city may also observe the use of water or irrigation equipment within the city from public rights-of-way and as alleged violations are reported to the city. (Ord. 443 § 1 (part), 1991)

13.04.1020 Civil penalties for violation.

Violators of the mandatory provisions of this chapter shall be subject to civil action initiated by the city as follows:

A. First Violation. For a first violation, the city shall issue a written notice of violation to the water user violating the provisions of this chapter. The notice shall be given pursuant to the requirements listed in Sections 13.04.970 and 13.04.980.

B. Second Violation. For a second violation of this chapter within a twelve-month period or for failure to comply with the notice of violation within the period stated, a surcharge of one hundred dollars is imposed for the meter through which the wasted water was supplied.

C. Third Violation. For a third violation of this chapter within a twelve-month period, or for continued failure to comply within thirty days after notice of an imposition of second violation sanctions, a one-month penalty surcharge in the amount of two hundred dollars is imposed for the meter through which the wasted water was supplied. In addition to the surcharge, the city may, at its discretion, install a flow-restricting device at such meter with a one-eighth inch orifice for services up to one and one-half inch size, and comparatively sized restrictors for larger services, on the service of the customer at the premises at which the violation occurred for a period of not less than forty-eight hours. The charge to the customer for installing a flow-restricting device shall be based upon the size of the meter and the actual cost of installation but shall not be less than that provided in the city’s rules and regulations. The charge for removal of the flow-restricting device and restoration of normal service shall be as provided in the city’s rules and regulations.

D. Subsequent Violations—Discontinuance of Service. For any subsequent violation of this chapter within the twenty-four calendar months after a first violation as provided in this section, the penalty surcharge shall be imposed and the city may discontinue water service to that customer at the premises or to the meter where the violation occurred. The charge for reconnection and restoration of normal service shall be as provided in the rules and regulations of the city. Such restoration of service shall not be made until the director of public services of the city has determined that the water user has provided reasonable assurances that future violations of this chapter by such user will not occur. (Ord. 443 § 1 (part), 1991)

13.04.1030 Notification of violation.

A. First Violation. For a first violation, written notice shall be given to the customer and/or property owner personally or by regular mail.

B. Subsequent Violation. If the penalty assessed is a surcharge for a second or third violation, notice may be given by regular mail.

C. Penalties Involving Installation of Flow-restrictors or Discontinuance of Water Service. If the penalty assessed is, or includes, the installation of a flow restrictor or the discontinuance of water service to the customer for any period of time, notice of the violation shall be given in the following manner:

1. Personal Service. By giving written notice thereof to the occupant and/or property owner personally, or if the occupant and/or property owner is absent from his/her place of residence and from his/her assumed place of business, by leaving a copy with some person of suitable age and discretion at either place, and sending a copy through the United States mail addressed to the occupant and/or owner of his/her place of business or residence; or

2. Posting. If such place of residence and business cannot be ascertained, or a person of suitable age or discretion cannot be located, then by affixing a copy in a conspicuous place on the property where the failure to comply is occurring and also by delivering a copy to a person there residing, if such person can be found, and also sending a copy through the United States mail addressed to the occupant at the place where the property is situated and to the owner if different. (Ord. 443 § 1 (part), 1991)

13.04.1040 Form of notice.

All notices provided for in Section 13.04.1030 shall contain, in addition to the facts of the violation, a statement of the possible penalties for each violation and a statement informing the occupant/owner of his/her right to a hearing on the violation. (Ord. 443 § 1 (part), 1991)

13.04.1050 Hearing.

Any customer or property owner against whom a penalty is levied pursuant to this chapter shall have a right to a hearing, in the first instance by the director of public services, with the right of appeal to the city council, on the merits of the alleged violation upon the written request of that customer within fifteen days of the date of alleged violation. At the next regularly scheduled meeting, the customer may then appear and present any evidence in support of his position and ask for a decision by the city council. (Ord. 443 § 1 (part), 1991)

13.04.1060 Delays on action.

The city council shall act promptly to resolve the dispute, but may delay a resolution of the dispute to the time of its next regular meeting in order to investigate the dispute or receive special reports related to the dispute. (Ord. 443 § 1 (part), 1991)

13.04.1070 Decision of the city council.

The decision of the city council shall be final. Should the city council not render a decision within sixty days of application to the city council, this failure to act shall be deemed a denial of the requested action, unless both parties have agreed to extend the resolution period. (Ord. 443 § 1 (part), 1991)

West Valley Water District Ordinance 68 and Article 24

ARTICLE 24. WATER CONSERVATION

1. Purpose. The purpose of this Article is to provide water conservation measures in order to minimize the effect(s) of a water shortage on the citizens of, visitors to, and the economic well-being of the communities we serve and, by means of this Article, to adopt provisions that will significantly reduce the wasteful and inefficient consumption of water, thereby extending the available water resources required for the domestic, sanitation, and fire protection needs of the citizens of, and visitors to, the communities we serve while reducing the hardship on the District and the general public to the greatest extent possible.

2. Application. The provisions of this Article shall apply to all customers and property within the service area of the District and shall also apply to all property and facilities owned, maintained, operated, or otherwise under the jurisdiction of the West Valley Water District.

a) Exception. The prohibited uses of water provided for by this Ordinance are not applicable to that use of water necessary for public health and safety or for essential government services such as police, fire, and similar emergency services.

3. Policy. Due to the fact that we are located in a semi-arid region and our groundwater is of limited supply and in an overdraft condition and because of these conditions prevailing in the District and areas elsewhere from which the District obtains its water supplies, the general welfare requires that the water resources available to the District be put to the maximum beneficial use to the extent to which they are capable and that the wasteful, inefficient, or unreasonable use, or method of use of our previous, limited, and finite water resources be prevented.

As such, the conservation of such waters is to be exercised with a view to the reasonable and beneficial and efficient use thereof in the interests of the people of the District and for the public welfare.

Therefore, the West Valley Water District establishes the following goals, objectives, policies, and four-stage water conservation plan pertaining to the conservation and use of water:

2401. GOALS

< The conservation of water.

< The efficient use and distribution of available water supplies.

< Adequate and sufficient potable water supply and availability for the greatest public benefit, with particular regard to human consumption, sanitation, and fire protection.

ARTICLE 24. WATER CONSERVATION

< Maintain high quality customer service.

< Ensure fiscal soundness.

< Protect environmental quality.

< Meet growing water quality regulations.

2402. OBJECTIVES

< To conserve all available water supplies.

< To achieve an overall water use reduction.

< To reduce the volume of wastewater.

< To continuously increase consumer awareness about the need for and benefits of water conservation.

< To reduce or eliminate wasteful and inefficient uses of water.

< To assure an adequate supply of potable water sufficient to meet the essential private and public needs of the District's growing population and economy of those communities in which we serve.

< To assure that all new developments and existing dwellings which are remodeled or added to are equipped with water-conserving devices, fixtures, and appliances.

< To increase the use of native or water-conserving plant species for landscaping purposes.

2403. POLICIES

< As a condition of water service, all new structures shall be equipped with ultra low-flush toilets (1.6 gallons per flush max) as per Section 17921.3 of the California Health and Safety Code, and with low-flow showers and faucets as per Title 24, Part 6, Article 1, T20-1406F of the California Administrative Code, in addition to the insulating of all hot water lines according to California Energy Commission Rules.

ARTICLE 24. WATER CONSERVATION

< As a condition of continued water service, existing structures not so equipped, which require building permits to remodel or expand, shall be retrofitted with toilet tank dams resulting in 1.6 gallon flushes unless the toilets are to be replaced, in which case the new toilets shall be ultra low-flush (1.6 gpf), as stated above, and low-flow showers and faucets. Certification of compliance with this Ordinance shall be forwarded to the District.

< The use of lawns shall be minimized in new commercial, hotel, condominium, and high-density housing and shall be subject to District review and conditioning of projects. The use of native or water-conserving trees, shrubs, lawns, grass, ground cover, vines, and other plant species for landscape planting or replanting purposes is required and shall be approved by the District. (A list of such plants can be obtained at the District office.)

< Large water users, as determined by the District, shall submit a water conservation plan to the District and promote implementation of same as a condition to continued service.

< Water demand, use, and mitigation shall be address in every Environmental Impact Report.

< The District shall:

a) Cooperate with other local water purveyors, appropriate state and other responsible agencies in facilitating a continuous program to increase consumer awareness about the need for and benefits of water conservation.

b) Encourage large water users to implement water recycling and reuse processes.

c) Make water conservation as reliable a method of reducing water demands as water supply projects are in meeting such demands.

2404. STAGE I - NORMAL CONDITION

Normal supply and distribution capacity is available. All policies shown in Section 2403 and the following water conservation measures shall apply.

1. Recommendations for use of water.

(a) Watering with sprinklers should be done at night between 11:00 p.m. and 8:00 a.m. Hand watering should be done between 6:00 p.m. and 8:00 a.m. Drip irrigation and hand watering while gardening is exempt from this recommendation. Water being used during repair or maintenance of watering system is exempt from this section.

b) Water conservation should be practiced within the home or business.

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c) All restaurants are requested not to serve water to their customers unless specifically requested by the customer.

2. The following uses of water are hereafter considered non-essential to the public health, safety and welfare and, if allowed, would constitute the wasting of water and is hereby prohibited, pursuant to Water Code Section 350 et seq., Water Code Section 71640 et. Seq., and the common law:

a) There shall be no hose washing of sidewalks, walkways, driveways, parking areas, patios, porches, verandas, tennis courts, or other paved, concrete, or other hard surface areas, unless done with hand-held hose equipped with a trigger nozzle, except that flammable or other similarly dangerous or unhealthy substances may be washed from said areas by direct hose flushing for the benefit of public health or safety.

b) No water shall be used to clean, fill, operate, or maintain levels in decorative fountains unless such water is part of a recycling system.

c) No person shall permit water to leak from any facility or plumbing fixture on his/her premises; said leak shall be repaired in a timely manner.

d) Washing of automobiles, trucks, trailers, boats, airplanes, and other types of mobile equipment are prohibited unless done with a hand-held bucket or hand-held hose equipped with an automatic positive shut off trigger nozzle for quick rinses. The nozzle shall be removed when the hose is not in use. This section does not apply to the washing of the above-listed vehicles or mobile equipment when conducted at a commercial car wash utilizing recycling systems.

    1. Such washings are exempted from these regulations when the health, safety, and welfare of the public is contingent upon frequent vehicle cleaning such as garbage trucks and vehicles used to transport food and perishables.

e) Use of water for any purpose, which results in flooding or run-off in gutters, driveways or streets, should be prevented and controlled.

f) The use of sprinklers for any type of irrigation during high winds is prohibited.

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2405. STAGE II - WATER ALERT

The District may not be able to meet all water demands of all customers, unless the following water conservation measures are applied:

a) All policies and prohibitions listed in Sections 2403 and 2404.

b) All customers are asked for a voluntary minimum 10% reduction of their water consumption over their last year's consumption, unless otherwise stated.

(c) Washing of automobiles, trucks, trailers, boats, airplanes, and other types of mobile equipment is prohibited unless done with a hand-held bucket or hand-held hose equipped with a positive shut off nozzle for quick rinses. This section does not apply to the washing of the above-listed vehicles or mobile equipment when conducted at a commercial car wash utilizing recycling systems.

1. Such washings are exempted from these regulations when the health, safety, and welfare of the public is contingent upon frequent vehicle cleaning such as garbage trucks and vehicles used to transport food and perishables.

d) All restaurants are prohibited from serving water to their customers except when specifically requested by the customer.

e) District will screen all new applications for water service installations and will limit water use before occupancy to that essential use for construction and testing of landscape plumbing. Limited landscaping for new development shall be allowed as approved by the District.

f) Irrigators will be notified that water delivery will be limited to those crops, which are presently planted. Water will not be delivered to crops planted after date of notice.

g) Commercial nurseries shall curtail all non-essential water use and shall irrigate between the hours of 11:00 p.m. to 6:00 a.m. and consumption shall be reduced to 25% less than the customer's last year's comparable billing period unless they are using reclaimed water.

h) All publicly owned lawns, landscapes, parks, school grounds, and freeways shall be irrigated between the hours of 11:00 p.m. and 6:00 a.m. and consumption shall be reduced to 25% less than the customer's last year's comparable billing period unless they are using reclaimed water.

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i) All golf courses and other large landscaped areas shall be irrigated between the hours of 11:00 p.m. to 6:00 a.m. and consumption shall be reduced to 25% less than the customer's last year's comparable billing period unless they are using raw creek water or reclaimed water.

j) All other lawn watering and landscape irrigation shall be done between the hours of 8:00 p.m. and 6:00 a.m. Drip irrigation, hand-watering while gardening and water being used during repair and maintenance of watering system is exempt from this section.

k) Water use for compaction, dust control, and other types of construction shall be by permit only and will be limited to conditions of the permit or may be prohibited as determined by the General Manager or his designee.

2406. STAGE III - WATER WARNING

District is not able to meet all water demands of all customers; therefore, the following water conservation measures shall apply.

a) All policies and prohibitions listed in Sections 2403, 2404 and 2405.

b) All customers are asked for voluntary minimum of 15% reduction in their water consumption over their last year's consumption, unless otherwise stated.

c) Washing of automobiles, trucks, trailers, boats, airplanes, and other types of mobile equipment are prohibited. Washing of the above-listed vehicles or mobile equipment shall be allowed only at a commercial car wash where recycled water is being utilized.

   1. Such washings are exempt from these regulations when the health, safety, and welfare of the public is contingent upon frequent vehicle cleaning such as garbage trucks and vehicles used to transport food and perishables.

d) New water services shall be installed but water shall be used before occupancy for essential construction only and for testing of landscape irrigation systems. The installation of new landscaping for all new development/projects must be approved by the District.

e) Commercial nurseries shall use water only between the hours of 11:00 p.m. and 6:00 p.m., and only with hand-held devices or with drip irrigation, and consumption shall be reduced to 50% less than the customer's last year's comparable billing period unless they are using reclaimed water.

f) School grounds shall be watered only on odd numbered days except where they are equipped with electronic moisture sensor control systems and/or drip irrigation systems. All watering shall be done between the hours of 11:00 p.m. and 6:00 a.m. and consumption shall be reduced to 40% less than the customer's last year's comparable billing period, unless they are using reclaimed water.

g) All other publicly owned lawns, landscape, parks, and freeways shall be watered on even numbered days unless equipped with electronic moisture sensor control systems and/or drip irrigation systems. All watering shall be done only between the hours of 11:00 p.m. and 6:00 a.m. and consumption shall be reduced to 50% less than the customer's last year's comparable billing period, unless they are using reclaimed water. Water being used during repair or maintenance of watering system is exempt from this section.

h) All other lawn and landscape irrigation shall be done as follows: users with house numbers ending in an even number shall water on even numbered days only and users with house numbers ending in an odd number shall water on odd numbered days only, except where equipped with electronic moisture sensor control system and/or drip irrigation systems. All watering shall be done between the hours of 8:00 p.m. and 6:00 a.m.

i) All agricultural water users shall irrigate only at times approved by the District.

j) Swimming pools, ornamental pools, fountains and artificial lakes shall not be filled or refilled after being drained.

k) Water used for compaction, dust control, and other types of construction shall be by permit only and will be limited to conditions of the permit or may be prohibited as determined by the General Manager, or his designee.

2407. STAGE IV - WATER EMERGENCY

District is experiencing a major failure of supply or distribution; therefore, the following water conservation measures shall apply:

a) All policies and prohibitions shown in Sections 2403, 2404, 2405 and 2406.

b) All customers are asked for voluntary minimum 20% reduction in their water consumption over their last year's consumption, unless otherwise stated.

c) No water shall be used for construction purposes. All construction meters shall be locked off or removed.

d) Commercial nurseries shall water only between the hours of 11:00 p.m. and 6:00 a.m. and only with hand-held devices or with drip irrigation systems.

e) There shall be no watering of any lawn or landscaped area.

f) The use of water shall be limited to essential household, commercial, manufacturing, or processing uses only, except where other uses may be allowed by permit.

g) All agricultural water users shall irrigate only at times approved by the District.

2408. DETERMINATION AND DECLARATION OF WATER CONDITIONS

The General Manager of the District, or his designee, shall access all available water supply data and shall make a report of his/her findings to the Board of Directors at the next Regular meeting or at a Special meeting called for that purpose. The Board of Directors may at that time determine and declare which of the four (4) previously discussed conditions the District's water supply is in and the extent of water conservation required to prudently plan for and supply water to the District's customers.

Thereafter, the Board of Directors may order that the appropriate stage of water conservation be implemented or terminated in accordance with the applicable provision of this Ordinance. The declaration of any stage shall be made by public announcement and notice shall be published once in a local newspaper of general circulation. The stage designated shall become effective immediately upon announcement.

2409. DURATION OF DECLARATION

The declaration of any stage of water supply conditions shall remain in effect until such time as another stage is declared.

2410. AUTHORITY - MISDEMEANOR

This Article is adopted pursuant to Sections 375 and 376 of the California Water Code. Any second or subsequent violation of this policy after notice as specified in Section 2411 1(a) is a misdemeanor. (California Water Code Section 377).

ARTICLE 24. WATER CONSERVATION

2411. ENFORCEMENT

1. **Violations**. In addition to the remedy of criminal prosecution available to the District as described above, violation of this Ordinance may result in the imposition of surcharges and restriction and/or termination of water service as set forth below:

a) First Violation - written warning accompanied by a copy of this Ordinance, delivered by U.S. Mail and/or hung on customer's door.

b) Second Violation (within one year) - a surcharge of $100.00 or 100% of the current water billing cycle, whichever is higher.

c) Third Violation (within one year of the first violation) – a surcharge of $300.00 or 200% of current water billing cycle, whichever is higher, and installation of flow restricting device in the meter for a minimum of ninety-six (96) hours. Said restricted flow shall meet minimum

County Health Department's standards, if any have been established. If said ninety-six (96) hour period ends on a weekend or holiday, full service will be restored during the next business day.

d) Fourth Violation (within one year of the first violation) – a surcharge of $500.00 or 300% of the current water billing cycle, whichever is higher, and termination of service for such period as the Board of Directors determines to be appropriate under the circumstances, following a hearing regarding said issue. Written notice of the hearing shall be mailed to the customer at lest ten days before the hearing.

2. **Surcharges, Additional Charges**. Any surcharge hereunder shall be in addition to the basic water rates and other charges of the District for the account and shall appear on and be payable with the billing statement for the period during which the violation occurred; non-payment shall be subject to the same remedies available to the District as for non-payment of basic water rates.

In addition to any surcharge, a customer violating this Ordinance shall be responsible for payment of the District's charges for installing and/or removing any flow restricting device and for disconnecting and/or reconnecting service per the District's Schedule of Charges then in effect. Such charges shall be paid prior to the removal of the flow restrictor or reconnection of service, whichever the case may be.

3. **Nonliability for Damage**. The customer or resident who violates this Ordinance thereby assumes responsibility for injury to the customer and/or other residents/occupants receiving service, including emotional distress and/or damage to the customer's private water system and/or to other real or personal property owned by the customer or by a third party resulting from the installation and operation of a flow restricting device or from termination of service; said customer shall thereby

be deemed to have: (a) waived any claim for injury or for damage to the customer's property which the customer may otherwise have against the District; and (b) agreed to indemnify, defend, and hold the District harmless from claims by third parties for injury or property damage arising or claimed to arise out of the District's installation and/or operation of a flow restricting device or termination of water service.

4. **Exemptions**. No exemption shall be granted to any person for any reason in the absence of a showing by said person that he/she has achieved the maximum practical reduction in water consumption in his/her residential, commercial, industrial, or governmental water consumption as the case may be.

The General Manager, or his designee, may grant exemptions ("exceptions" to this Ordinance) for uses of water otherwise prohibited by the regulations. Water customers who feel that they need an adjustment in the prohibitions as they relate to him/her will fill out a simple application form for an exemption stating the justification and circumstances. If the exemption is not granted, customer may appeal in writing as stated in Section 2412.1.

a) Inconvenience or the potential for damage to landscaping shall not be considered for exemption from any section of this Ordinance.

2412. APPEALS

1. **Procedures.** The General Manager, or his designated Enforcement Officer, shall determine when violations have occurred and shall issue to the customer a Notice of Violation by mailing same and/or hanging same on the customer's door at least ten (10) days before taking enforcement action. Said notice shall describe the action to be taken (notice of first violation shall simply be accompanied by a copy of this Ordinance) and shall be mailed or delivered at least ten (10) days before the proposed action is scheduled to be taken.

A customer may appeal the Notice of Violation by filing a written notice of appeal with the District no later than the close of business on the day before the date scheduled for enforcement action. Any Notice of Violation not timely appealed shall be final. Upon receipt of a timely appeal, a hearing on the appeal by the Board of Directors shall be scheduled at the Board's next Regular meeting or at a Special meeting scheduled for that hearing; in either, the hearing shall be at least ten (10) days following receipt of the appeal, and the District shall mail written notice of the hearing to the customer at least ten (10) days before the date of said hearing.

ARTICLE 24. WATER CONSERVATION

2. **Interim Measures**. Pending receipt of a written appeal or pending a hearing pursuant to an appeal, the General Manager or the Enforcement Officer, if one has been designated, may take appropriate steps to prevent the unauthorized use of water as appropriate to the nature and extent of the violation and the current declared water condition.

2413. CEQA EXEMPTION

The adoption of this Ordinance, and the actions taken hereunder, are exempt from the provisions of the California Environmental Quality Act of 1970 in that they constitute a project undertaken as immediate action necessary to prevent or mitigate an emergency pursuant to Section 15071 of the State EIR Guidelines.

2414. DURATION OF ORDINANCE

This Ordinance shall remain in effect until the Board of Directors finds that the threatened emergency and threatened water shortage no longer exists. The provisions of this Ordinance shall prevail and control in the event of any inconsistency with any other rules and regulations of the District.

2415. SEVERABILITY

If any section, subsection, sentence, clause, or phrase of this Ordinance is for any reason held to be unconstitutional or invalid, such decision shall not affect the validity of the remaining portions of this Ordinance. The Board of Directors hereby declares that it would have passed this Ordinance and each section, subsection, sentence, clause, or phrase thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases may be unconstitutional or invalid.

2416. EFFECTIVE DATE, PUBLISHING, AND POSTING

This Ordinance shall be effective immediately upon adoption. Within ten (10) days of adoption, a copy of this Ordinance shall be published one time in a local newspaper and posted in the lobby of the District Office.

Yucaipa Valley Water District Ordinance 48-1998 Section 5.15

ORDINANCE NO. 48-1998

ORDINANCE OF THE BOARD OF DIRECTORS OF THE YUCAIPA VALLEY WATER DISTRICT, SAN BERNARDINO AND RIVERSIDE COUNTIES, CALIFORNIA, AMENDING ORDINANCE 42-1992 REGARDING RULES AND REGULATIONS FOR WATER SERVICE WITHIN THE YUCAIPA VALLEY WATER DISTRICT

BE IT ORDAINED by the Board of Directors of the Yucaipa Valley Water District that this Ordinance, amending Ordinance No. 42-1992, shall hereby read as follows:

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supplied such customer until he shall have complied with the rules and regulations, rate or charge which he has violated.

5.13 Water System: The District will furnish a system, plant, works and undertakings used for and useful in obtaining, conserving and disposing of water for public and private uses, including all parts of the Enterprise, all appurtenances to it, and lands, easements, rights in land, water rights, contract rights, franchises, and other water supply, storage and distribution facilities and equipment.

5.14 Number of Services per Premises: The applicant may apply for as many services as may be reasonably required for his premises provided that the pipe line system for each service be independent of the others and that they not be interconnected.

5.15 Water Waste: No customer shall knowingly permit leaks or waste of water. Where water is wastefully or negligently used on a customer's premises the District may discontinue the service if such conditions are not corrected within five days after giving the customer written notice.

5.16 Responsibility for Equipment on Customer Premises: All facilities installed by the District on private property for the purpose of rendering water service shall remain the property of the District and may be maintained, repaired or replaced by the Water Department without consent or interference of the owner or occupant of the property. The property owner shall use reasonable care in the protection of the facilities.

City of Colton FY 2010 Budget

CITY OF COLTON

STATEMENT OF REVENUES, EXPENSES
AND CHANGES IN FUND NET ASSETS
PROPRIETARY FUNDS
YEAR ENDED JUNE 30, 2010

	Business-Type Activities - Enterprise Funds				Governmental Activities- Internal Service Fund
	Electric Utility	Water Utility	Waste Water Utility	Totals	
Operating Revenues:					
Sales and service charges	$ 56,895,682	$ 7,425,807	$ 8,029,360	$ 72,350,849	$ 5,265,523
Miscellaneous	1,067,994	224,749	80,181	1,372,924	75,572
Connection Fees	1,040	274,446	192,518	468,004	-
Total Operating Revenues	**57,964,716**	**7,925,002**	**8,302,059**	**74,191,777**	**5,341,095**
Operating Expenses:					
Salaries and benefits	4,851,237	1,819,922	855,372	7,526,531	1,672,245
Maintenance and operations	4,459,032	4,771,838	3,117,930	12,348,800	1,260,267
Generation	3,632,466	-	-	3,632,466	-
Purchased power	27,170,629	-	-	27,170,629	-
Contractual services	-	-	-	-	162,146
Claims and benefits	-	-	-	-	1,749,949
Charges from other funds	2,310,719	739,338	1,364,533	4,414,590	-
Amortization	156,123	10,229	-	166,352	-
Depreciation expense	3,525,897	624,691	1,165,956	5,316,544	141,500
Total Operating Expenses	**46,106,103**	**7,966,018**	**6,503,791**	**60,575,912**	**4,986,107**
Operating Income (Loss)	11,858,613	(41,016)	1,798,268	13,615,865	354,988
Nonoperating Revenues (Expenses):					
Interest revenue	140,487	33,427	47,808	221,722	-
Interest expense	(2,654,938)	(431,348)	(428,414)	(3,514,700)	-
Gain (loss) on disposal of capital assets	(4,021)	-	-	(4,021)	-
Total Nonoperating Revenues (Expenses)	**(2,518,472)**	**(397,921)**	**(380,606)**	**(3,296,999)**	**-**
Income (Loss) Before Transfers	9,340,141	(438,937)	1,417,662	10,318,866	354,988
Transfers out	(5,538,225)	(76,294)	(47,407)	(5,661,926)	(82,785)
Changes in Net Assets	**3,801,916**	**(515,231)**	**1,370,255**	**4,656,940**	**272,203**
Net Assets:					
Beginning of fiscal year	21,211,676	9,707,932	33,849,631	64,769,239	(979,993)
End of Fiscal Year	**$ 25,013,592**	**$ 9,192,701**	**$ 35,219,886**	**$ 69,426,179**	**$ (707,790)**

Reconciliation of Changes in Net Assets to the Statement of Activities:

Changes in Net Assets, per the Statement of Revenues, Expenses and Changes in Fund Net Assets - Proprietary Funds	$ 4,656,940
Adjustment to reflect the consolidation of current fiscal year internal service funds activities related to enterprise funds	256,372
Changes in Net Assets of Business-Type Activities per Statement of Activities	$ 4,913,312

See Notes to Financial Statements

CITY OF COLTON

STATEMENT OF CASH FLOWS
PROPRIETARY FUNDS
YEAR ENDED JUNE 30, 2010

	Business-Type Activities - Enterprise Funds				Governmental Activities- Internal Service Fund
	Electric Utility	Water Utility	Waste Water Utility	Totals	
Cash Flows from Operating Activities:					
Cash received from customers and users	$58,649,706	$7,814,580	$ 8,649,842	$75,114,128	$ 5,341,428
Cash paid to supplies for goods and services	(36,345,214)	(5,405,419)	(4,053,439)	(45,804,072)	(3,562,592)
Cash paid to employees for services	(4,833,162)	(1,828,487)	(862,419)	(7,524,068)	(1,684,215)
Net Cash Provided (Used) by Operating Activities	**17,471,330**	**580,674**	**3,733,984**	**21,785,988**	**94,621**
Cash Flows from Non-Capital Financing Activities:					
Cash transfers out	(5,538,225)	(76,294)	(47,407)	(5,661,926)	(82,785)
Payment received from other funds	-	-	(389,940)	(389,940)	-
Payment made to other funds	(5,532,351)	389,940	-	(5,142,411)	-
Net Cash Provided (Used) by Non-Capital Financing Activities	**(11,070,576)**	**313,646**	**(437,347)**	**(11,194,277)**	**(82,785)**
Cash Flows from Capital and Related Financing Activities:					
Acquisition and construction of capital assets	(6,358,229)	(249,174)	(169,562)	(6,776,965)	(78,444)
Principal paid on capital debt	(2,185,000)	(260,000)	(1,302,884)	(3,747,884)	-
Interest paid on capital debt	(2,658,943)	(437,086)	(418,978)	(3,515,007)	-
Net Cash Provided (Used) by Capital and Related Financing Activities	**(11,202,172)**	**(946,260)**	**(1,891,424)**	**(14,039,856)**	**(78,444)**
Cash Flows from Investing Activities:					
Interest received	165,248	33,427	53,635	252,310	-
Net Cash Provided (Used) by Investing Activities	**165,248**	**33,427**	**53,635**	**252,310**	**-**
Net Increase (Decrease) in Cash and Cash Equivalents	**(4,636,170)**	**(18,513)**	**1,458,848**	**(3,195,835)**	**(66,608)**
Cash and Cash Equivalents at Beginning of Year	21,991,147	3,618,847	1,012,810	26,622,804	213,462
Cash and Cash Equivalents at End of Year	**$17,354,977**	**$3,600,334**	**$ 2,471,658**	**$23,426,969**	**$ 146,854**

See Notes to Financial Statements

CITY OF COLTON

STATEMENT OF CASH FLOWS
PROPRIETARY FUNDS
YEAR ENDED JUNE 30, 2010

	Business-Type Activities - Enterprise Funds				Governmental Activities- Internal Service Fund
	Electric Utility	Water Utility	Waste Water Utility	Totals	
Reconciliation of Operating Income to Net Cash Provided (Used) by Operating Activities:					
Operating income (loss)	$ 11,858,613	$ (41,016)	$ 1,798,268	$ 13,615,865	$ 354,988
Adjustments to reconcile operating income (loss) net cash provided (used) by operating activities:					
Depreciation	3,525,897	624,691	1,165,956	5,316,544	141,500
Amortization	156,123	10,229	-	166,352	-
(Increase) decrease in accounts receivable	679,240	(105,951)	57,926	631,215	333
(Increase) decrease in deposits receivable	(68,863)	-	-	(68,863)	-
(Increase) decrease in due from other governments	(1,988)	-	289,857	287,869	-
(Increase) decrease in inventories	45,568	(6,167)	-	39,401	-
Increase (decrease) in accounts payable	1,182,064	111,924	429,024	1,723,012	(178,043)
Increase (decrease) in deposits payable	76,601	(4,471)	-	72,130	-
Increase (decrease) in claims and judgments	-	-	-	-	(212,187)
Increase (decrease) in compensated absences	18,075	(8,565)	(7,047)	2,463	(11,970)
Total Adjustments	5,612,717	621,690	1,935,716	8,170,123	(260,367)
Net Cash Provided (Used) by Operating Activities	**$ 17,471,330**	**$ 580,674**	**$ 3,733,984**	**$ 21,785,988**	**$ 94,621**
Non-Cash Investing, Capital, and Financing Activities:					
Gain/(Loss) on disposition of fixed assets	$ (4,021)	$ -	$ -	$ (4,021)	$ -

See Notes to Financial Statements

Appendix G

Water Shortage Contingency Resolutions/Ordinances

- San Bernardino Municipal Water Department Rule and Regulation 21
- Yucaipa Valley Water District 2000 Urban Water Management Plan and Water Shortage Contingency Plan
- City of Colton Draft No Waste Ordinance, Draft Resolution to Declare a Water Shortage Emergency, and Draft Moratorium on New Connections During a Water Shortage

The following resolutions and ordinances also relate to water shortage contingency planning and were provided as part of Appendix F.

- East Valley Water District Ordinance 375
- City of Loma Linda Municipal Code Title 13
- City of Loma Linda Ordinance 443
- City of Redlands Water Waste Ordinance
- West Valley Water District Ordinance 68 and Article 24

San Bernardino Municipal Water Department

Rule and Regulation 21

Exhibit "A"

CITY OF SAN BERNARDINO MUNICIPAL WATER DEPARTMENT

300 North "D" Street
San Bernardino, CA 92401

RULE AND REGULATION NO. 21
GENERAL WATER SERVICE/WATER RATES

The following rates shall be charged for all water furnished for domestic, commercial, industrial, municipal water use within the City of San Bernardino, and any other purpose for which no rate is specified.

A. MINIMUM MONTHLY CHARGE: All users will be assessed a minimum monthly charge to recover fixed costs, such as meter replacement, customer service, mailing costs, bill payment and debt service. The rates will be as follows:

Meter Size	February 1, 2010	January 1, 2011	January 1, 2012
½ inch or ⅝ inch	$ 10.55	$ 12.20	$ 12.90
¾ inch	$ 13.00	$ 15.15	$ 16.15
1 inch	$ 17.90	$ 21.00	$ 22.60
1½ inch	$ 30.15	$ 35.75	$ 38.80
2 inch	$ 44.85	$ 53.45	$ 58.20
3 inch	$ 79.15	$ 94.75	$ 103.50
4 inch	$ 128.15	$ 153.70	$ 168.20
6 inch	$ 250.70	$ 301.15	$ 330.00
8 inch	$ 397.75	$ 478.10	$ 524.15
10 inch	$ 569.30	$ 684.55	$ 750.65

B. COMMODITY CHARGE: This charge recovers water production and treatment costs, as well as associated variable costs of the Department. This rate is charged per hundred cubic feet (hcf) of water sold.

Commodity Charge per hcf	February 1, 2010	January 1, 2011	January 1, 2012
	$1.05	$1.10	$1.15

C. REPLENISHMENT CHARGE: This charge recovers the cost of water purchased to replenish the local basin and may be adjusted up or down, depending upon the amount of replenishment required. This rate is charged per hundred cubic feet (hcf) of water sold.

Replenishment Charge per hcf	February 1, 2010	January 1, 2011	January 1, 2012
	$0.09	$0.09	$ 0.09

D. ELEVATION CHARGE: This charge recovers electrical costs to transport water through the system and is specific to each zone. The electric cost incurred at plant facilities within each elevation level is distributed across water usage within that zone. This rate is charged per hundred cubic feet (hcf) of water sold.

Elevation zone	February 1, 2010	January 1, 2011	January 1, 2012
Zone 1	$0.09	$0.10	$0.11
Zone 2	$0.17	$0.18	$0.19
Zone 3	$0.15	$0.16	$0.17
Zone 4	$0.12	$0.13	$0.14
Zone 5	$0.21	$0.22	$0.23
Zone 6	$0.21	$0.22	$0.23

Note: the Energy Surcharge previously collected is now included in this Elevation Charge.

E. CONSERVATION CHARGE AND TIERS: To encourage conservation, customer accounts placing a greater demand on the water system will be assessed a higher cost. Initially, customers using in excess of 150% of their class average will pay a higher rate for water usage that falls in the second tier. To encourage greater conservation over a longer period of time, each tier and charge will adjust annually. This rate is charged per hundred cubic feet (hcf) only on that usage above the level defined in the tier table below. Revenues recovered from these charge will fund conservation programs sponsored by the Department.

Conservation Charge per hcf	February 1, 2010	January 1, 2011	January 1, 2012
	$0.25	$0.30	$0.35

All usage in hundred cubic feet (hcf) in excess of that listed below, by class, is billed the conservation charge. *As an example:* During 2010, residential use equal to or below 36 hcf in a monthly billing period will not be assessed an additional conservation charge. However, each hcf billed above 36 will be assessed an additional 25¢ per hcf. The table below indicates the hcf cutoff for each customer class by meter size.

Conservation Tiers	February 1, 2010	January 1, 2011	January 1, 2012
Residential	36	34	32
MDU (2)	46	44	42
MDU (2+) per unit	19	18	17
Non-residential ⅝"	27	25	24
Non-residential ¾"	40	38	36
Non-residential 1"	75	70	65
Non-residential 1½"	170	160	150
Non-residential 2"	270	260	250
Non-residential 3"	800	770	740
Commercial ⅝"	46	44	42
Commercial ¾"	65	60	55
Commercial 1"	150	140	130
Commercial 1½"	305	290	275
Commercial 2"	485	465	445
Commercial 3"	965	920	875
Commercial 4"	2,660	2,530	2,400
Commercial 6"	9,950	9,475	9,000

F. MUNICIPAL CHARGE: Water furnished to the City of San Bernardino will be exempt from all water service charges so long as such usage does not exceed 110% of the fiscal year 1994/1995 municipal water usage (645,625 hundred cubic feet). All water usage in excess of that shall be charged the municipal rate, billed per hundred cubic feet of water sold.

Municipal contracts and other designated service customers will be billed the municipal rate, per hundred cubic feet of water sold, where no other rate is set forth in the specific contract or agreement.

Municipal Charge per hcf	**February 1, 2010**	**January 1, 2011**	**January 1, 2012**
	$0.37	$0.40	$0.45

G. ASSESSMENT DISTRICT CHARGE: Water furnished to the City for landscape assessment districts or funded from other than the City's General fund will be charged the following rate per hundred cubic feet (hcf) of water sold.

Assessment District Charge per hcf	**February 1, 2010**	**January 1, 2011**	**January 1, 2012**
	$0.37	$0.40	$0.45

H. UNMETERED CHARGE: A "jumper" may be substituted for a water meter during single or multi-family housing construction at a charge of $50 per month for a maximum of 120 calendar days or until the lot landscaping begins. Thereafter, a water meter shall be installed subject to all fees and charges as listed above prior to the issuance of a certificate of occupancy. Water used for tract grading and jetting of trenches is not covered in the above charge and is subject to the fees and charges listed in Rule and Regulation No. 16.

I. SURCHARGE – OUTSIDE CITY LIMITS: Any service installed outside the incorporated territory of the City after February 1, 1991 may be billed the meter charge and all required consumption related charges as set forth in this rule and regulation, multiplied by 1.5.

J. WATER SUPPLY SHORTAGE RATES: To comply with State of California mandates, the City of San Bernardino Municipal Water Department shall implement the following procedure in response to drought or water supply shortage declarations or similar service interruptions in the delivery of water to its customers.

During any drought or water supply shortage condition, the Department's General Manager may declare any one of three shortage level responses with ratification by the Board of Water Commissioners (Board) within three calendar days. A declaration of a water supply shortage may result from:

- interruption of service through major plant failure;
- interruption of replenishment water from various resources;
- rainfall level at twenty-five (25%) or more below normal levels for at least six months; or
- a natural disaster or other emergency event.

Stage I incurs no financial penalties but requires an ongoing commitment to a water conservation program. During Stage I, the Department shall:

- offer educational resources and landscaping classes;
- offer rebate programs for water smart appliances and other water saving devices;
- encourage voluntary conservation through continued media announcements;
- request the City Manager to direct city parks, facilities and golf courses to restrict landscape watering to off-peak hours to reduce demand on the water system and eliminate the 60% evaporation rate during daytime watering.
- provide reminder notices regarding noted water waste; and
- offer community outreach programs.

Due to the continuous conservation efforts required to preserve San Bernardino's water supply in the region's arid climate, Stage I will be maintained at all times.

Stage II will impose a five percent (5%) reduction in water usage and assess financial penalties on usage in excess of those amounts.

A base allowance for each customer will be established based upon their prior year's water usage. A ten percent (10%) surcharge will be applied to each billing unit that exceeds the (5%) required reduction in base allowance.

As an example: A customer used 20 billing units in March 2008. During a Stage II five percent (5%) usage reduction, the customer is permitted 19 billing units during the March 2009 billing period.

20 hcf x 5% = 1 hcf
20 hcf – 1 hcf = 19 hcf

If that customer utilizes 19 or less billing units, no financial penalty is assessed. However, should that customer utilize 25 billing units, a ten percent (10%) surcharge will be assessed for each billing unit in excess of 19:

25 hcf – 19 hcf = 6 hcf x 10% x commodity rate.

Additionally, during Stage II, the Department shall:

- increase advertisement of conservation measures;
- maintain a message center for reporting water waste;
- determine course of action to remediate reported water waste;
- request the City Manager to direct parks, facilities and golf courses to limit outdoor watering for irrigation to four days per week during off-peak hours only.

***Stage III** (Water Shortage Emergency)* will impose a ten percent (10%) reduction in water usage and assess financial penalties on usage in excess of those amounts.

A base allowance for each customer will be established based upon their prior year's water usage. A twenty percent (20%) surcharge will be applied to each billing unit that exceeds the 10% required reduction in base allowance.

> *As an example:* A customer used 20 billing units in March 2008. During a Stage III ten percent (10%) usage reduction, the customer is permitted 18 billing units during the March 2009 billing period.
>
> 20 hcf x 10% = 2 hcf
> 20 hcf – 2 hcf = 18 hcf
>
> If that customer utilizes 18 or less billing units, no financial penalty will be assessed. However, should that customer utilize 25 billing units, a twenty percent (20%) surcharge will be assessed for each billing unit in excess of 18:
>
> 25 hcf – 18 hcf = 7 hcf x 20% x commodity rate penalty for that billing month.

Additionally, during Stage III, the Department shall:

- increase advertisement of conservation measures;
- maintain a message center for reporting water waste;
- determine course of action to remediate reported water waste;
- request the City Manager to direct parks, facilities and golf courses to limit outdoor watering for irrigation to four days per week during off-peak hours only;
- prohibit all water consumption for irrigation of private residences and school grounds;
- deny all new construction meter requests;
- remove or lock out all existing construction meters in service; and
- prohibit vehicle washing unless conducted at a commercial car wash facility.

Notices of Violation:

- Step 1: Warning letter to the customer describing the waste issue and notice of potential fines for continuing waste, providing a Department customer service contact for conservation information and assistance.

- Step 2: Customer site visit to discuss nature of the waste and potential solutions. A second warning letter allowing seven calendar days to remedy the waste situation and comply with conservation restrictions.

- Step 3: Twenty-five dollar ($25) penalty after failure to comply with second warning letter.

- Step 4: Additional penalties increasing incrementally by twenty-five dollars ($25) per occurrence.

- Step 5: The Department may restrict the amount of water supplied to any customer failing to comply with conservation standards. The provisions of this section shall be applied in addition to any other penalties provided in this rule and shall be applied at the discretion of the Department.

  Exceptions: The restrictions of water consumption outlined herein are not applicable to water usage necessary for public health and safety or for essential governmental services, such as police, fire, and emergency services. The Department reserves the right to waive any water restriction penalty when, in its discretion, such consumption is required in order to maintain an adequate level of public health and safety.

Payment of Surcharges and Penalties:

All surcharges and penalties imposed under this rule and regulation shall be added to customers' water bills and become payable at the same time and in the same manner as such bills or by such other method of collection and payment as established by the Department.

Right to Hearing:

Any customer shall have a right to a hearing with the General Manager of the Department, or his/her designee, on a notice of violation, the assessment of a surcharge or penalty, or the denial and/or lock out of a construction meter, upon written request to the Department. Customer's written request for a hearing must be received by the Department within ten calendar days from the date of notice of violation, or customer's right to a hearing shall be deemed waived.

Customer shall be deemed notified of a violation, surcharge, penalty, or denial and/or lockout of a construction meter upon (1) the personal delivery of the notice to customer or (2) the date of lock out and/or denial of construction meter. If personal delivery is not given, the date on which the notice is placed in the regular mail shall be deemed the date of notification.

Customer's timely written request for a hearing shall automatically stay the imposition of a penalty until the General Manager or his/her designee renders a decision; except that denial of a construction meter request or lock out of an existing construction meter shall remain in effect until the General Manager or his/her designee renders a decision.

The decision of the General Manager or his/her designee may be appealed to the Board of Water Commissioners, provided that the customer files a written notice of appeal with the Department within five calendar days of notification of the decision.

The decision of the General Manager, his/her designee, or the Board (if an appeal is timely filed) shall be final and conclusive and shall not be subject to appeal to the Mayor and Common Council. Once the decision becomes final as provided in this rule and regulation, the time in which judicial review of the decision must be sought shall be governed by California Code of Civil Procedure Section 1094.6, or other applicable State law.

Other Water Conservation Measures:

The Board may order implementation of other water conservation measures in addition to those set forth in this rule and regulation. Such additional water shortage measures shall be implemented in the manner provided in this rule.

Conclusion of a Water Supply Shortage Condition:

The General Manager shall notify the Board when the water supply shortage condition stage level should be reduced. The Board may ratify the General Manager's reduction of stage level. All bills issued after the Board's ratification date shall not include water supply shortage surcharges.

Use of Surcharge Funds:

Any surcharges and fines will be segregated into a restricted cash account managed by the Department to supplement the conservation efforts of the Department.

Approved by BOWC:	January 5, 2010
Effective:	February 1, 2010
Supersedes:	June 3, 2008

RESOLUTION NO. 763

A RESOLUTION OF THE BOARD OF WATER COMMISSIONERS OF THE CITY OF SAN BERNARDINO AMENDING GENERAL WATER SERVICE/WATER RATES, AS SET FORTH IN RULE AND REGULATION NO. 21 OF THE BOARD OF WATER COMMISSIONERS OF THE CITY OF SAN BERNARDINO.

WHEREAS, Article IX, Section 163 of the City Charter empowers the Board of Water Commissioners to establish all water rates; and

WHEREAS, water rates are set forth in the Rules and Regulations of the Board of Water Commissioners; and

WHEREAS, the current rates set forth in Rule and Regulation No. 21, General Water Service/Water Rates, are not sufficient to cover the costs to maintain, repair, improve, and operate the water system; and

WHEREAS, the proposed water rate adjustments have been calculated, and this hearing has been noticed forty-five days; and

WHEREAS, a Public Hearing was held on January 5, 2010, to receive comments from the public on proposed water rates, and less than fifty percent of affected property owners protested.

NOW THEREFORE BE IT RESOLVED, by the Board of Water Commissioners of the City of San Bernardino, as follows:

SECTION 1: That the proposed rates set forth in Rule and Regulation No. 21 of the City of San Bernardino Municipal Water Department, General Water Service/Water Rates, attached hereto and marked "Exhibit A," incorporated herein as though fully set forth at length, are hereby approved, effective February 1, 2010.

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A RESOLUTION OF THE BOARD OF WATER COMMISSIONERS OF THE CITY OF SAN BERNARDINO AMENDING GENERAL WATER SERVICE/WATER RATES, AS SET FORTH IN RULE AND REGULATION NO. 21 OF THE BOARD OF WATER COMMISSIONERS OF THE CITY OF SAN BERNARDINO.

I HEREBY CERTIFY that the foregoing resolution was duly adopted by the Board of Water Commissioners of the City of San Bernardino at a regular adjourned meeting thereof held on the 5th day of January 2010, by the following vote to wit:

AYES: COMMISSIONERS CALLICOTT,COCKE,FERNANDEZ,HENDRIX

NAYS: _____

ABSENT: COMMISSIONER MILLER

Robin L. Ohama

ROBIN L. OHAMA
Deputy City Clerk & Ex-Officio Secretary

(SEAL)

Yucaipa Valley Water District 2000 Urban Water Management Plan and Water Shortage Contingency Plan

2000 Urban Water Management Plan
and
Water Shortage Contingency Plan

Prepared For The

Yucaipa Valley Water District

December 2000

Prepared By:

WATER 3 ENGINEERING, INC.
WATER • WASTEWATER • RECYCLED WATER

In Association With:

Byron Buck
Peter McLaggan
Olson Communication
Dudek and Associates

YUCAIPA VALLEY WATER DISTRICT
2000 URBAN WATER MANAGEMENT PLAN
AND
WATER CONTINGENCY PLAN

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YUCAIPA VALLEY WATER DISTRICT
2000 URBAN WATER MANAGEMENT PLAN
AND
WATER CONTINGENCY PLAN

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APPENDICES

Appendix A Water Conservation Cost Effectiveness Evaluation

YUCAIPA VALLEY WATER DISTRICT
2000 URBAN WATER MANAGEMENT PLAN
AND
WATER SHORTAGE CONTINGENCY PLAN

SECTION 1
INTRODUCTION

1.0 INTRODUCTION

This Urban Water Management Plan has been prepared by the Yucaipa Valley Water District in conformance with the California Urban Water Management Planning Act, California Water Code Division 6, Part 2.6 Urban Water Management Planning. This Plan is a revision and update of the District's 1990 Urban Water Management Plan. The plan was developed in coordination with revision of the District's Water and Wastewater Master Plan updates.

1.1 PUBLIC PARTICIPATION

This plan was developed during the summer and fall of 2000. A public workshop on the plan was held by the YVWD Board of Directors on November 16, 2000. A public hearing on the plan was held December 20, 2000 to review the plan with local agencies and to announce the availability to the general public. In addition to the above, individual meetings were held with major property developers and various local agencies. Notifications of the Plan development was also made directly to the following:

Public Agencies and Government

- City of Yucaipa
- City of Calimesa
- San Bernardino Valley Municipal Water District
- San Gorgonio Pass Water Agency
- California Regional Water Quality Control Board
- County of San Bernardino
- County of Riverside
- City of Beaumont Wastewater Authority
- Beaumont Cherry Valley Water District
- City of Redlands
- Yucaipa-Calimesa Joint Unified School District
- Riverside LAFCO
- San Bernardino LAFCO
- East Valley RCD

Private Water Purveyors

- Western Heights Water Company
- South Mesa Water Company

Environmental/Interest Groups

- San Timoteo Greenway Conservancy
- Oak Glen Community Services Organization

Media

- Yucaipa & Calimesa News Mirror
- Press Enterprise
- The San Bernardino Sun

Notification of the Plan development also appeared on the YVWD website.

1.2 SUPPLIER SERVICE AREA CHARACTERISTICS

The Yucaipa Valley Water District provides water, wastewater and recycled water services to customers in the Cities of Calimesa and Yucaipa, and portions of Riverside and San Bernardino County (**Figure 1-1**). The District was formed in 1971, acquiring many of the private water companies serving the Yucaipa Valley. The District has continued to consolidate water services in the region, acquiring the Harry V. Slack Water Company in 1987 and the Wildwood Canyon Mutual Water Company in 1992.

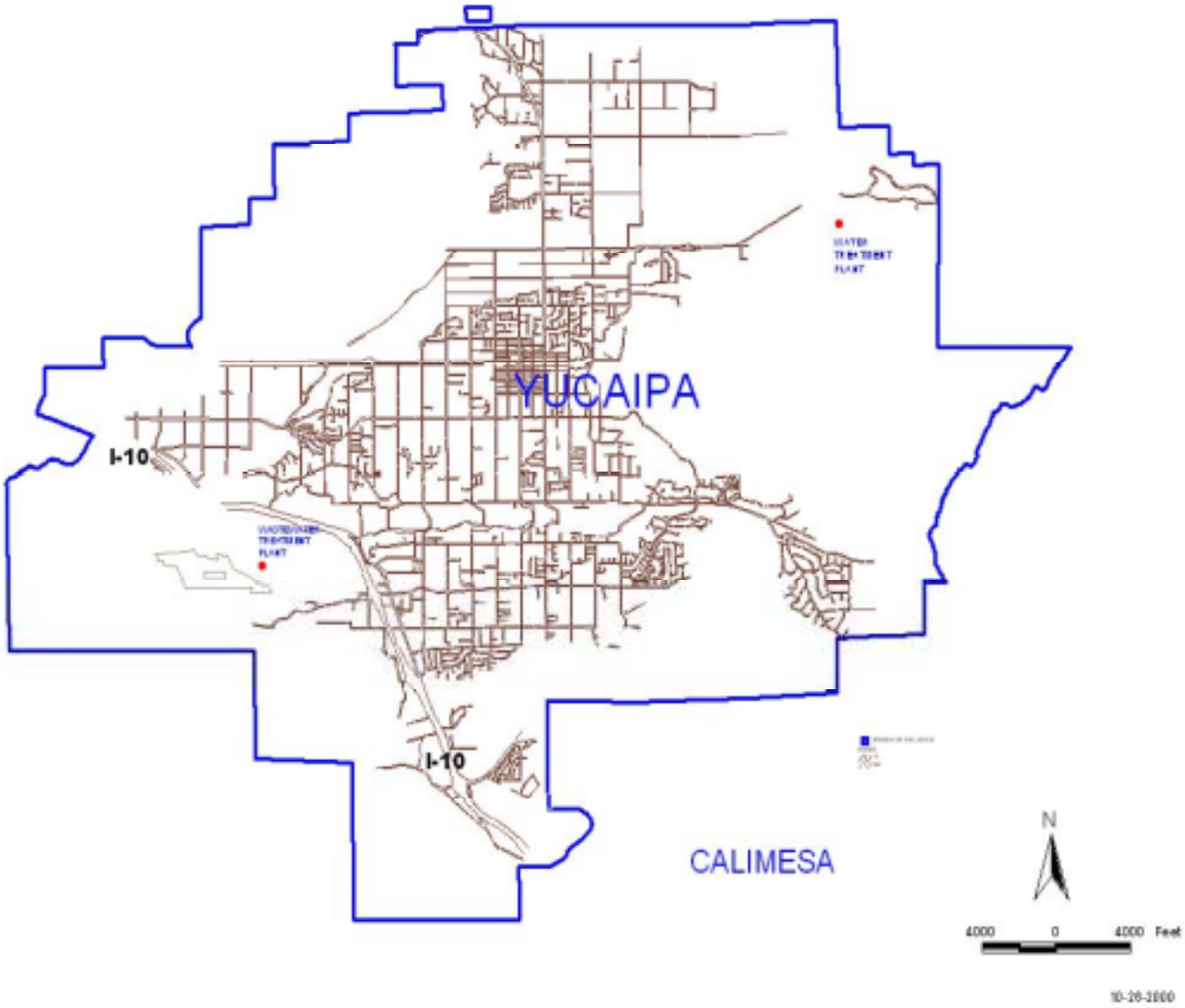
Water was developed in the region to serve a predominantly agricultural base of orchard crops. Recently agriculture is giving way to urban and suburban development and demands are growing apace with population increases. In order to determine the rate and amount of growth in the community, the District relies on the development approval processes of the City of Yucaipa, the City of Calimesa, the County of San Bernardino, and the County of Riverside. The District utilizes the planning projections of these agencies together with the demands of the current residents and businesses to ensure a safe and reliable water supply is maintained

The Yucaipa Valley is bounded by the San Bernardino National Forest to the north and east, low lying hills to the south and the Crafton Hills to the northwest. The District serves elevations ranging from 2,000 feet above sea level to about 3,300 feet above sea level. The City of Yucaipa lies in the middle of this range at about 2,500 feet.

The climate of the region is a Mediterranean type with dry, warm summers and cool wet winters, with significant precipitation variation year to year. The average annual temperature for Redlands, California near Yucaipa but lying a lower elevation, is 78 degrees (F). The average July maximum is 94.5 degrees and the average minimum is 60.5 degrees. The average January maximum is 64.7 degrees and minimum is 39.3 degrees. Average total precipitation is 13.5 inches with 86% of precipitation occurring December through April. Daytime temperatures in the portions of the Yucaipa Valley served by the District will average 2 to 7 degrees cooler than Redlands due to elevation differences.

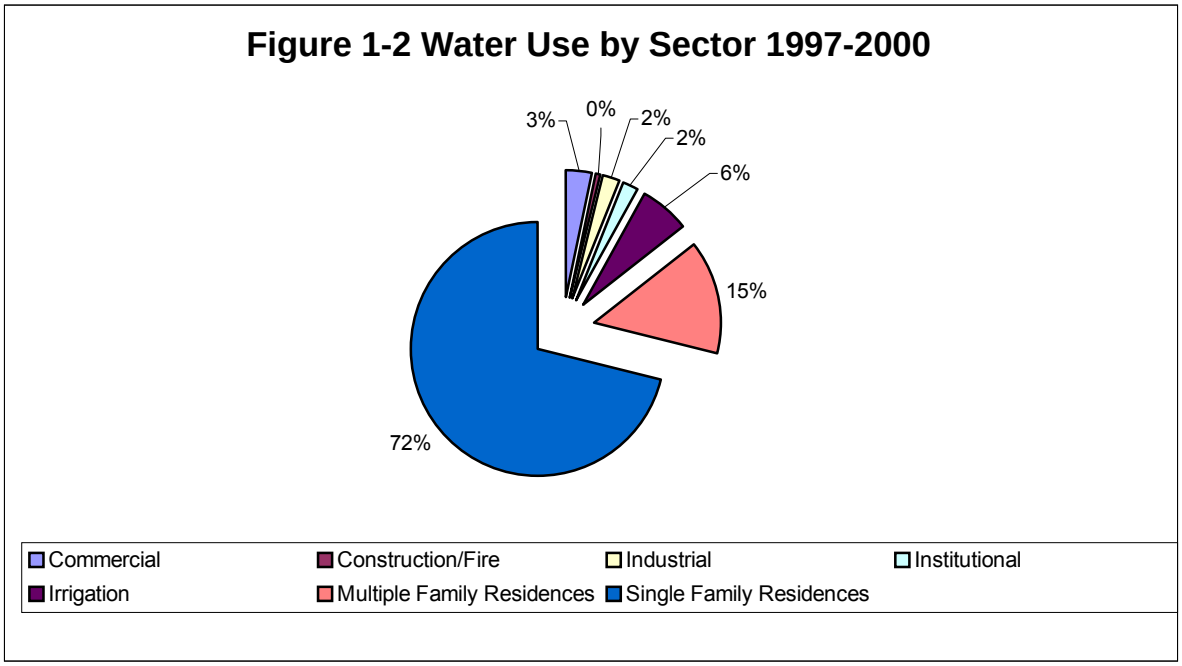
Precipitation is also greater towards the mountains above the Yucaipa Valley due to the effect of orographic lift.

FIGURE 1-1: YUCAIPA VALLEY WATER DISTRICT

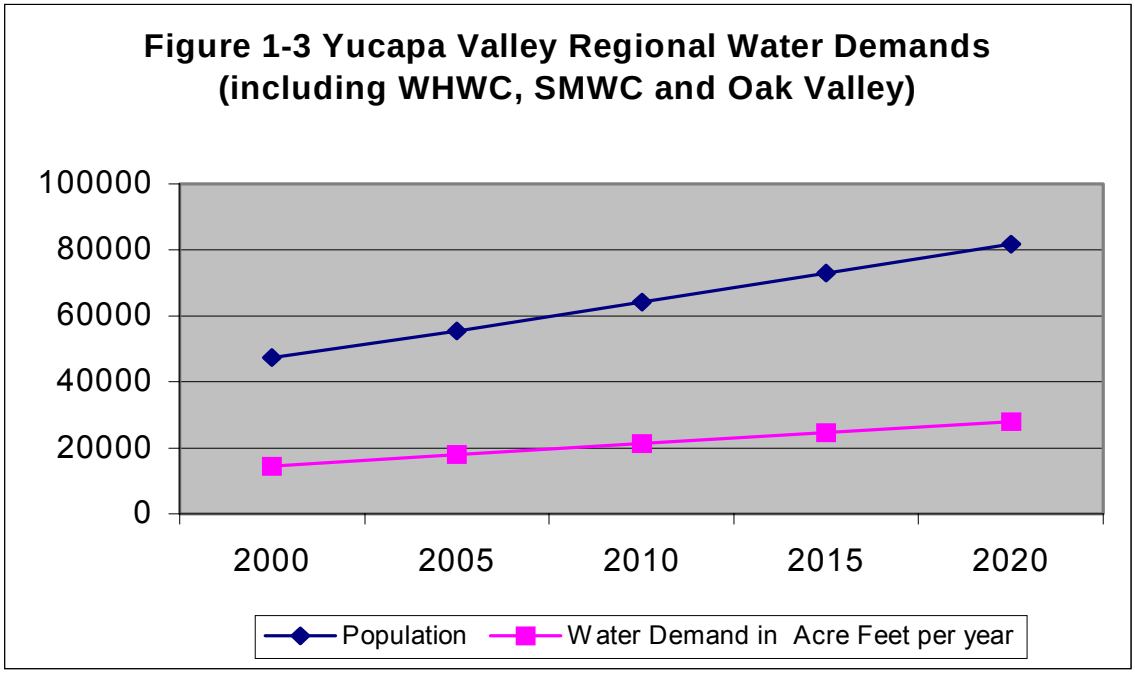


Current and Future Water Use

Current water demand within the District is about 9,500 acre-feet per year. Including areas served by the Western Heights Water Company and the South Mesa Water Company, the demand total grows to about 14,500 acre feet per year. Water use within the district only is predominantly single family residential as show in **Figure 1-2**, accounting for about 8,600 acre feet or 72 percent of water used.



Based upon projected population growth estimates from the State Department of Finance, the Planning Departments of the cities of Yucaipa and Calimesa in addition to data from the Oak Valley Environmental Impact Report, the area population is expected to grow to about 81,800 persons in 2020. Based upon an average per capita demand of 275 gallons per day, total demands in 2020 are expected to grow to about 27,880 acre feet per year, as shown in **Figure 1-3**.



YUCAIPA VALLEY WATER DISTRICT
2000 URBAN WATER MANAGEMENT PLAN
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SECTION 2
WATER SOURCES AND RELIABILITY

2.1 GROUNDWATER

The Yucaipa Valley Water District has traditionally met the bulk of service area customer needs from groundwater through the District's thirty-one primary water wells. Two additional wells were under construction in 2000 replacing capacity from wells with degraded production. Most of these wells pump from the Yucaipa Groundwater Basin, with less than 1,000 acre-feet being pumped from the Beaumont Basin. Demand has grown in the last two decades to where the District alone is now pumping at about the calculated safe yield of the Yucaipa Basin, just over 9,000 acre-feet per year. Coupled with pumping by the Western Heights Municipal Water Company and South Mesa Water Company of about 2,400 acre-feet per year for each Company and the basin is technically in an overdraft situation, though water levels are currently at or near historic highs.

The Yucaipa Groundwater Basin is subdivided into seven sub basins as follows:

- Mill Creek
- Gateway
- Crafton
- Oak Glen
- Calimesa
- Wilson Creek
- San Timoteo

The Wilson Creek and Calimesa sub basins are the largest and most important of these sub basins. Total capacity of the basin is estimated at 807,517 acre-feet (Fox, 1990). Groundwater is typically reached within 200-280' below the land surface. If pumping were to reduce groundwater levels to an average depth of 400', an additional 300,000 acre-feet of water would be available. These sub basins historically have declined during dry cycles and risen during wet ones. No subsidence due to water pumping has been noted. Minor amounts of groundwater recharge (less than 1000 af/yr) through surface water spreading have occurred in the Wilson spreading grounds, an area of four spreading basins located within the District along Wilson Creek.

Significant potential exists to increase spreading of water in the Wilson creek spreading grounds and utilization of the Oak Glenn Creek stream channel for additional recharge. By maximizing the existing spreading grounds and expanding spreading acreage along Oak Glen Creek (25-50 acres), the capability

exists to spread from 7,000 to 14,000 acre feet of surface water annually into the Yucaipa basin.

The YVWD is currently involved with development of a groundwater management plan (AB 3030 Plan) to proscribe collective management of the basin. With ample storage, ability to recharge the basin by spreading surface waters and apparent flexibility in managing groundwater levels without subsidence problems, the Yucaipa Basin could be conjunctively managed both to meet normal annual demands and to meet water resource needs in the event of a drought and curtailment or loss of inconsistent surface water supplies, resulting in a highly reliable water supply. Current goals are to secure agreements to not pump beyond the safe yield of the basin, supplementing supplies with imported surface or groundwaters.

The YVWD will also be able to receive water from the San Bernardino Basin via the East Branch extension of the State Water Project pipeline. This water would be served as part of a conjunctive management scheme for the Basin coordinated with the San Bernardino Valley Municipal Water District, the regional wholesaler of SWP water in San Bernardino County. A portion of the San Bernardino Basin known as the Bunker Hill Pressure Zone, has encountered problems from high groundwater tables occurring mainly after a series of wet years. This high groundwater creates direct impacts in portions of the pressure zone, flooding basements and underground garages, and creates a high liquefaction potential for areas overlying the Zone in the event of an earthquake. Conjunctive management of this Zone along with other portions of the Basin can lower unacceptably high groundwater and allow for recharge in areas upgradient from the Pressure Zone such as the Lytle Creek subbasin.

In October of 2000, the District entered into a Memorandum of Understanding with the California Department of Water Resources, the San Gorgonio Pass Water Agency, the City of Beaumont, the City of Banning, the Beaumont-Cherry Valley Water District and the South Mesa Water Company to work cooperatively on formulating a conjunctive water management program to enhance the dependable yield of the San Gorgonio Pass Area Basins.

2.2 SURFACE SUPPLIES

Surface water supplies currently and prospectively available to the District are all considered inconsistent in that the available amounts will vary year to year based upon hydrology and other demands on these resources.

2.2.1 Local Surface Water Sources

The YVWD has traditionally received about 1,000 acre feet of surface water supplies from the Wildwood Canyon and Oak Glen watersheds. Production from these sources has recently been declining to less than 500 acre-feet annually.

These sources are both minor and relatively unreliable due to their greater availability only in wet periods.

2.2.2 Mill Creek Supplies

Though the Santa Ana – Mill Creek Cooperative Water Project Agreement YVWD is able to exchange up to 32 cfs of State Water Project water for Mill Creek water when available. This water can be delivered by gravity to the Wilson Creek spreading grounds and when the District's water treatment plant is built, this water can serve direct delivery needs. The SWP exchange water is delivered to the City of Redlands Hinckley or Tate water treatment plants. This source is highly variable, however, depending upon local hydrology. Flows in the creek can range from 10,000-120,000 acre-feet per year with the bulk of high water flows in the winter months. This is the least expensive supplemental surface water supply for the District. However, lack of storage limits the ability to exchange this water often available in wet years, for water during dry years.

2.2.3 Santa Ana River Supplies

In addition to the Mill Creek supplies, the District will be able to receive exchange water from Santa Ana River water rights holders once the water filtration plant is completed in 2004 and connected to the East Branch Extension pipeline to be completed in 2002. Phase II of the extension project will expand transmission capacity to the Yucaipa area to 88 cfs, with 48 cfs of capacity rights held by San Gorgonio Pass Water Agency and 40 by the San Bernardino Valley Municipal Water District. Santa Ana River water availability to Yucaipa would be subject to availability and exchange of SWP water.

2.2.4 Seven Oaks Dam Supplies

The recently completed Seven Oaks Dam operated by the U.S. Army Corps of Engineers will operate with a conservation pool of between 10,000 and 50,000 acre feet. The precise amount is the subject of ongoing negotiations. When the East Branch extension pipeline and water filtration plant is in service in 2004, Seven Oaks water could be delivered to Yucaipa for direct delivery to consumers. The long term average yield for the 50,000 acre-foot conservation pool is about 11,700 acre-feet annually. Flow from this conservation pool would be available generally from late spring through early fall, after the prime flood control obligations of the facility have ended each year.

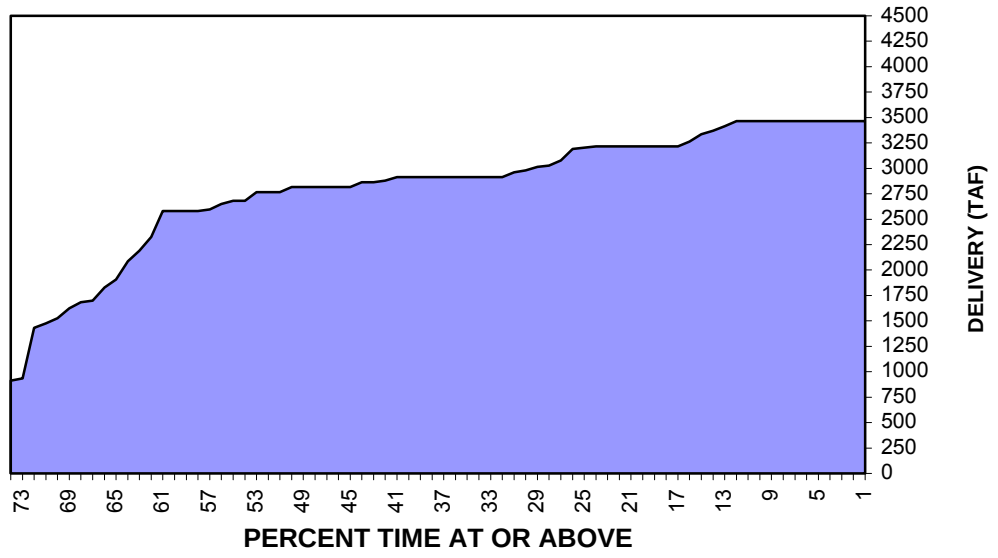
2.2.5 State Project Water

The San Bernardino Valley Municipal Water District encompasses much of the YVWD and holds an entitlement to SWP water in the amount of 102,600 acre-feet annually. The San Gorgonio Pass Water Agency serves the remainder of YVWD through its SWP entitlement of 17,300 per year. SWP water will be

available directly or by exchange when the East Branch extension pipeline is completed in 2002. This water would only be available for groundwater recharge until a water filtration plant is on line in 2004

SWP reliability has been negatively affected due to the State's inability to complete the project as contracted. Despite efforts, it is likely that the full 4.2 million acre-feet design delivery capacity will never be reached due to environmental limitations. Currently the maximum delivery capability for the project is somewhat less than 3.5 million acre feet. In most years this amount cannot be delivered due to infrastructure limitations and environmental restrictions. **Figure 2-1** depicts the current supply reliability frequency for the project recognizing current curtailment requirements under State Water Resources Control Board Order 95-6 related to San Francisco Bay-Delta outflow requirements and SWP Delta pumping operations, in addition to fishery flow requirements as a result of the Central Valley Project Improvement Act Anadromous Fisheries Restoration Plan. As can be seen from the figure, full entitlement demands on the project could be met only about 10% or less of the time, with 25% or higher shortages occurring more than 40% of the time based upon historical hydrology.

Figure 2-1 Frequency of SWP Entitlement Delivery (Not Including Interruptible & Losses) 1995 Level

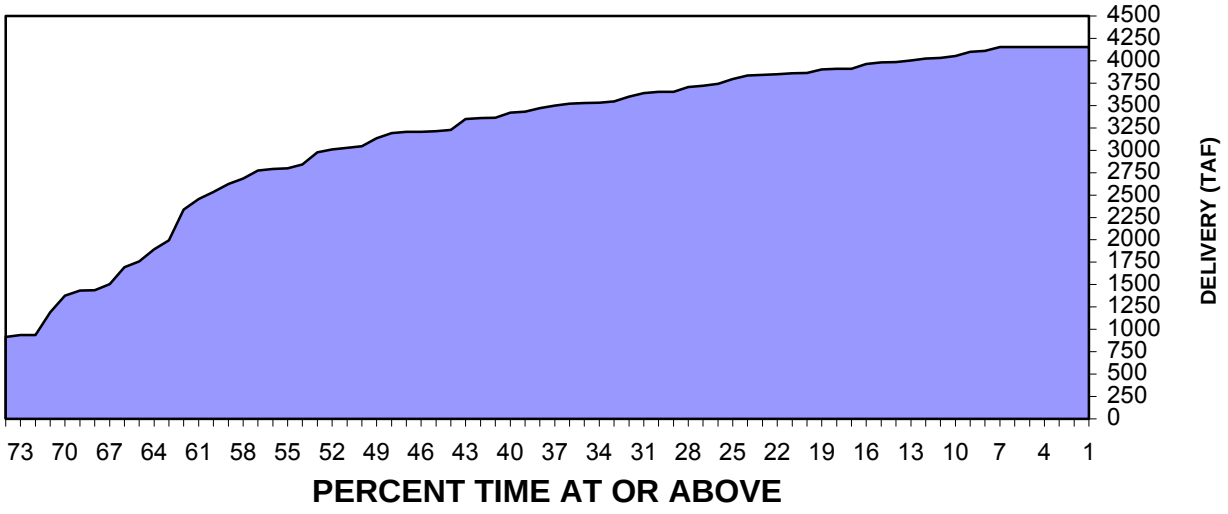


By 2020, with current fishery restrictions, the State assumes it will have added capacity in the system that will meet full entitlement demands only less than 10%

of the time. As shown by **Figure 2-2** in half the years, shortages of up to 25% will occur. In about one in three years, shortages will be 50% of demands or more. It should be recognized however, that demands are not the same as entitlements. In 1995 for example, deliveries to SWP contractors were just over 2 million acre feet or only about 58% of entitlements. It not be before 2020 when actual demands in most years exceed entitlements.

Actual shortages will be a function of actual versus entitlement demands and changes in outflow and fishery requirements. These demands will become closer as time goes on as agency demands served by the SWP grow into their full entitlements. In sum, the above reveals that the SWP is incapable of reliably meeting the full entitlement demands and it will become an increasingly unreliable water source for meeting a high percentage of an agency's ongoing annual water needs as demands on the system grow.

Figure 2-2 Frequency of SWP Delivery (Not Including Interruptible & Losses) 2020 Demand Level



2.3 RECYCLED WATER

The District has been planning for development of recycled water throughout the 1990's. Recycled water meeting Title 22 requirements is available through the Henry N. Wochholz Wastewater Treatment Facility and dual plumbing is currently being installed in new developments. Recycled water is being delivered to three

customers and will be expanding in 2001. Delivery amounts are expected to grow to about 6,700 acre-feet by 2020, or about 24% of total agency water demands.

The District's Recycled Water Master Plan is currently being revised for consideration in 2001. This process is currently revising recycled water demands and developing a revised phasing program optimizing the development of recycled water transmission and delivery systems. General system development can be seen in **Figure 2-3**. Current and projected wastewater flow and projected recycled water appears in **Table 2-1**. With expanded residential and recreational development in the District, significant opportunities for utilization of recycled water are being capitalized upon. Revised recycled water use estimates derived from the master plan update will be incorporated in the 2005 UWMP revision.

Table 2-1
Annual Wastewater Flow (mgd)

Source	2000	2020
Yucaipa	3.5	5.1
Calimesa	0.7	0.8
Oak Valley	--	2.0
Total	4.2	7.9
Total Annual WW Available (Acre-feet)	4,700	8,850
Projected Recycled Water Use Annually (Acre-Feet	--	6,700
Percent Utilized	0%	76%

2.4 WATER SUPPLY RELIABILITY STRATEGY

Despite rapidly growing demands on the YVWD, ample opportunities exist to provide a reliable supply for the community through to its ultimate buildout. In the near term, the District will stabilize its demands on the groundwater basins, continue developing recycled water and utilize surface waters for direct delivery to customers beginning in 2004 to meet increased demands. Surface supply availability from the State Water Project, San Bernardino Basin Bunker Hill Pressure Zone, Seven Oaks Dam, Mill Creek and Santa Ana River can be used interchangeably depending upon local and statewide hydrology to supplement a stable local groundwater yield. Additionally, the District will incorporate recycled water delivery systems into new development, focusing service of new irrigation demands on recycled water. Recycled water will give the District a new local

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SECTION 3
DEMAND MANAGEMENT MEASURES

3.0 INTRODUCTION

Demand management refers to methods a water supplier may undertake to reduce demand on the water system. The Urban Water Management Planning Act requires a description of sixteen specified demand management measures. For those measures not being currently implemented or planned for implementation, an evaluation of those measures and a comparison against expanded or additional water supplies must be made. Preference in the Act is given to those measures offering lower incremental costs than expanded or additional supplies. The Act also requires that economic and noneconomic factors including environmental, social, health, customer impact and technological factors be considered in the evaluation, however no specific guidance on evaluation methodology is given. Additionally, the description of measures in the act is brief, leaving much definition of both conservation devices and activities to be employed in many of the demand management measures to the analyst. A summary of measures recommended for implementation appears in **Table 3-1**.

3.1 DEMAND MANAGEMENT MEASURES UNDER IMPLEMENTATION

The District is implementing a public information program that includes information on interior and landscape water conservation and maintenance of a xeriscape demonstration garden. The District also implements metering and commodity rates for its water services with a tiered or inclining block rate structure with five tiers or blocks. Sewer rates are flat rates for residential service. Commercial and industrial service is a flat rate based upon an equivalent service unit. The District has adopted a water waste prohibition ordinance.

State law requires land use planning jurisdictions to enact a landscape water conservation ordinance consistent with the State Model Landscape Ordinance, or one that uses a water budget approach or one that has rules and regulations without tracking usage. Four land use jurisdictions operate within the District: San Bernardino County, Riverside County and the Cities of Calimesa and Yucaipa. Each have landscape ordinances complying with state law. The District does not independently review development plans for compliance with such ordinances as it does not have the legal authority to do so.

3.2 EVALUATION OF DEMAND MANAGEMENT MEASURES NOT CURRENTLY BEING IMPLEMENTED

The Urban Water Management Planning Act under California Water Code Section 10631 (g) requires an evaluation of water demand management measures specified in the Act which are not currently being implemented or scheduled for implementation. As noted above, preference is given to implementing measures that offer lower incremental costs than expanded or additional water supplies. The evaluation must do all of the following:

Table 3-1
Summary of Recommended Demand Management Actions

Conservation Measure	Currently Implemented	Recomm-ended	Reason For Recommendation	**Begin Imple-menting Date**
Interior and Exterior Audits	No	Yes	Cost effective	'03
Plumbing Fixture Retrofits	No	Yes	Cost effective	'03
Distribution System Audits	Yes	Yes	Continuing program	N/A
Metering with Commodity Rates	Yes	Yes	Continuing program	N/A
Large Landscape Audits	No	Yes*	Pilot program initially recommended; potentially effective	'01
Landscape Conservation Requirements	Yes	Yes	Continuing program	N/A
Public Information	Yes	Yes	Continuing program	N/A
School Education	No	Yes	Inexpensive and complements other savings programs	'02
Commercial Industrial Conservation	No	No	Few such uses in District	N/A
New Commercial Industrial Review	No	No	'92 plumbing code already produces savings	N/A
Conservation Pricing	Yes	Yes	Continuing program	N/A
Landscape Conservation - Single Family Homes	Yes	Yes	Cost effective	'01
Water Waste Prohibition	Yes	Yes	Continuing ordinance	N/A
Water Conservation Coordinator	No	Yes	Required for overall implementation	'03
Financial Incentives	No	Yes**	As part of other actions	Varies
Ultra Low Flow Toilets	No	No	Not cost effective	N/A

* Pre Screening Survey Recommended Prior to Pilot Program
** Included in Individual Programs

1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact and technological factors
2) Include a cost benefit analysis, identifying total benefits and costs
3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost

4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation
5) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation
6) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation

3.2.1 Evaluation Methodology

While Water Code Section 10631 (g) specifies elements of the evaluation methodology, considerable room for professional judgement on how to address each element remains with the analyst. This section is describes the general approach used herein.

- Accounting for economic and noneconomic factors including environmental, social, health, customer impact and technological factors. To some degree, these factors can all be reduced to dollar impact values and indeed some are imbedded in the cost/benefit factors which will be used in the cost benefit analysis. Where such factors cannot be incorporated in the cost/benefit analysis or significant implementation issues exist with respect to these factors, a qualitative evaluation will be made.

- Cost Benefit Analysis. Cost benefit analysis is generally understood to be a quantitative analysis analyzing the total benefits of an action less the total costs of the action, accounting for the present value of money. Where the net present value is positive, an action is said to make sense economically. With respect to conservation programs in general, this area is controversial and easily subject to manipulation of outcome based upon the assessments of costs and benefits and in particular, reduction of non-monetary benefits to monetary terms. In the conservation arena, reliable estimates of costs and savings vary by the activities. Local implementation issues such as particular land use make-up, age of structures, demographics, and implementation costs make translation of verified program costs and benefits from one location to another for analysis purposes prone to error. This analysis will utilize the most recent published data where available and appropriate. It must be recognized that many of the demand management measures, such as public information programs cannot of themselves be analyzed for water savings. However, such programs can help to market conservation measures such as plumbing retrofit programs, increasing their effectiveness. Additionally, depending upon measure design, there can be overlap between the demand management measures. For instance, a general residential water audit program can overlap with a single-family landscape water audit program.

The following benefits and costs will be quantified and considered utilizing DWR's Cost Effectiveness Tool, Version 1.1, a model created to provide some uniformity in analyzing costs and benefits of conservation programs within the context of Urban Water Management Plans. The analysis will be made from the perspective of the Yucaipa Valley Water District. This model provides that if a measure's net present value (NPV) is positive then the tactic should be implemented. A summary of the input data used with the DWR Cost Effectiveness Tool is included in **Appendix A**.

The following benefits will be assessed in the cost/benefit analysis.

- *Costs avoided by the water supplier of constructing production, transport, storage distribution capacity and wastewater treatment facilities, if any.*
- *Operating cost avoided by the water supplier, including but not limited to, energy and labor associated with the treatment of water deliveries and wastewater that no longer must be made.*
- *Avoided costs of water purchases by the water supplier.*

The costs above collectively determine the marginal cost of an additional increment of water supply. From the perspective of the water agency, the next cheapest increment of supply would simply be purchases of additional State Project Water from either the San Gorgonio Pass Water Agency or the San Bernardino Valley Water District for treatment and distribution. No additional facilities that could otherwise be avoided will be necessary within the District to accommodate these new demands. Operational and water cost savings would occur, however. These avoided costs are as follows: $132/AF imported raw water cost savings, avoided water treatment, $80/AF, avoided energy (pumping) $20/AF, and avoided wastewater treatment of $20/AF for a total avoided cost of $252/AF.

It is generally recognized that the SWP cannot meet its contractual commitments in dryer years and that incremental improvements under the CALFED Bay-Delta program are being made to increase the marginal supply capacity and reliability of the project. CALFED has estimated the costs of a variety of demand management and supply augmentation actions for the project. The least expensive of the augmentation options include modifications to the South Delta facilities allowing the project pumps to utilize their current maximum capacity of 10,300 cfs and additional storage. The lower range of these costs to the end user are about $800 per acre foot. However, given the cost structure for the SWP, any additional supplies and their costs would be blended into the current rate structure, i.e., the new higher cost supplies would be averaged in with the current supply costs. If the cost effectiveness example were being taken from the state or societal perspective, it might be appropriate to use

these projects as the marginal supply cost. However from the District's perspective, such incremental rates do not apply.

Environmental costs and benefits will not be quantified as there is no generally approved methodology for this.

The following costs are assessed in the cost benefit analysis.

- *Capital expenditures incurred by the water supplier for equipment or conservation devices*
- *Financial incentives to other water suppliers or retail customers*
- *Operating expenses for staff or contractors to plan, design or implement the program*

- Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost. Additional purchases of water from the SWP function as the marginal supply to the District. Costs of these purchases are passed through to the ratepayer as water is sold.

- Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation. The District has the legal authority to implement and recover cost for all of the recommended measures. Where programs are pursued and there are joint agency beneficiaries, contributions will be sought in proportion to the costs avoided and benefits received.

- Existing Conservation Savings. The District's active demand management programs include public information, target replacement of leaking delivery lines and faulty meters, public information and landscape design review for new development. However, no empirical estimate is available for the effect of this existing conservation effort and its effect on the District's ability to further reduce demand. However, it is recognized that much passive conservation is occurring due to public information efforts, the development of a changed water ethic due to the 1987-1992 drought, and in particular plumbing code amendments which eliminate high-flow showerheads, faucets and toilets for new installations or replacement. It is estimated that such passive conservation has lowered demands which otherwise would have occurred by about 10% (DWR Bulletin 160-98). Additionally, generally less conservation potential exists in rapidly growing regions such as served by the District as the housing stock tends to be newer, incorporating low water use appliances. This new stock however, does provide an ongoing opportunity for outdoor savings as such new stock invariably incorporates automatic irrigation systems that must be monitored for maximum efficiency.

3.3 PROGRAMS EVALUATED

1. Interior and exterior water audits and incentive programs for single family residential, multifamily residential, governmental, and institutional customers.

Program Description: These programs generally involve sending a qualified water auditor to customer locations to audit water use. Interior water using fixtures are assessed and where leaking or high-flow devices are noted, the customer is informed. Exterior audits of irrigation systems are often included, from simple audits looking for leaks and broken sprinklers, checks of the system times and development of irrigation schedules, to irrigation uniformity audits. Programs can include provision of low flow showerheads, toilet flappers and toilet displacement devices.

Evaluation of Economic and Noneconomic Factors: Surveys of this type have become common among agencies with demand management programs. However, research on their cost-effectiveness has shown that the long term savings from these programs is much less than originally anticipated. That is, savings achieved through these measures decay over time due to equipment failure, failure of the customer to consistently follow recommendations and customer turnover. Savings decay rates average about 15% per year. Single family surveys can be expected to initially save 15 gpd per survey and multi family about 6.5gpd. Direct survey costs are estimated $125 and $330 per survey, respectively with a multi-family survey covering an average of 10 units per survey ($33/unit) (CUWA, 2000). Agencies generally target high use accounts for surveys and while customers who feel their water use is unexplainably high often opt for surveys, many customers are reluctant to avail themselves of a survey. Such surveys raise insurance and liability issues for site visits and any modifications made by surveyors which must be considered in program design. All other factors being equal, surveys that reduce demands are environmentally preferable over development of additional supplies or deliver of more water.

Cost Benefit Analysis Results: Based upon assumptions above the net present value of water savings from single family residential surveys is positive a $73 per survey. Multi-family audits however show a positive net present value of $162 per survey (assuming 10 units per survey visit).

Recommendation, Implementation and Schedule: Single family audits appear to be reasonably cost effective. It is recommended the District offer a program in FY-02 targeted at the top 10% of residential users. Multi-family surveys show an even higher net benefit to justify initiation of a program. A multi-family survey program will be developed focusing on multi-family units of 10 or more per site beginning in FY-02

2. Enforcement of plumbing fixture efficiency standards and programs to retrofit less efficient fixtures.

Program Description: These programs include two general components, 1) working with the land use jurisdiction to assure use of complying plumbing devices and, 2) distributing and/or installing retrofit kits including high quality low flow showerheads, toilet displacement devices, faucet aerators and toilet flappers to pre 1992 housing. Few agencies find it cost effective to fund or monitor land use jurisdiction's enforcement of plumbing standards. Given that the standards require manufacture of these low flow devices and that is all that is available on the legitimate retail market, such activity is deemed unnecessary. However, many agencies with conservation programs have initiated plumbing retrofit programs, either dropping retrofit kits at pre-1992 housing (hang and pray programs) or offering direct installation.

Economic and Noneconomic Factors: Offering or installing retrofit kits to pre-1992 homes has been a common program among water agencies with active conservation programs. Issues that must be considered are relatively high natural replacement levels for such fixtures as showerheads and recognition that replacement heads already meet the federal 2.5 gpm standard. Direct installation programs have a higher implementation rate than drop off or "hang and pray" distribution methods. However, direct installation programs are more costly and bring insurance and liability issues. It is estimated that these "hang and pray" types of retrofit programs provide average savings of 5.65 gpd per installation with a life expectancy of 10 years even assuming that just over 50% of the kits become installed Costs are relatively low at $13 per kit distributed. All other factors being equal, retrofit programs, which reduce demands, are environmentally preferable over development of additional supplies or delivery of more water.

Cost Benefit Analysis Results: Given the low costs of administering
These projects, the "Hang and pray" retrofit programs result in a net present value of $173 for every installation.

Recommendation, Implementation and Schedule: A simplified retrofit program offering leak detection dye tablets, a high quality low-flow showerhead, toilet flappers and faucet aerators will is recommended for implementation in FY-02, for pre-1992 housing only. If the District decides not to pursue a ULFT retrofit program, toilet dams should be considered as additions to the kits.

3. Distribution System Water Audits Leak Detection and Repair

Program Description: These audits compare total water sales against water production to make sure that unaccounted for water does not exceed 5%, the generally accepted industry standard for unaccounted water. Prior to 1984 the district loss rate was about 15 percent. Through an aggressive program of meter

retrofits and leak reduction program this figure has been brought to within industry standards.

Evaluation of Economic and Noneconomic Factors: Performance of prescreening audits comparing gross system production vs. sales is an accepted industry practice generally done on an annual basis. If results from this prescreening note excessive unaccounted water then a more detailed audit focusing on loss possibilities (system leakage, undermetering, illegal connections, fire flow water and system flushing etc.) are made. No significant social, environmental or technological factors are relevant for this activity.

Cost Benefit Analysis: As a system prescreening audit is current District practice, no cost-effectiveness evaluation was performed.

Recommendation, Implementation and Schedule: Continue with annual prescreening audits. Perform detailed audits where unaccounted water exceeds five percent.

4. Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

Program Description: The District currently meters all connections and a five-tier inclining block commodity rate structure.

5. Large Landscape Water Audits and Incentives

Program Description: These programs identify large landscapes over three acres (schools, parks, golf courses, cemeteries, etc.) offering surveys and development of evapotranspiration (ETo) - based water budgets. Billing information is often correlated with the water budget. Irrigation system training is offered, often in a multilingual format. Financial incentives can be offered through ETo based rate structures to encourage efficient use. Incentives can also be given for irrigation system retrofits and subsidies for irrigation training.

Evaluation of Economic and Noneconomic Factors: Large landscapes are often viewed as water conservation targets by the general public. Generally, however, and especially where dedicated meters exist, large landscapes are more efficiently managed than landscapes which are part of a mixed use setting. This is due to professional management and a direct correlation between the water bill and irrigation practices, where dedicated meters exist. This creates a financial incentive for conservation. Regardless, opportunity exists to improve irrigation efficiency. The California Irrigation Management Information System (CIMIS) operated by the Department of Water Resources provides real-time evapotranspiration and other climatic data available on the Internet to help manage irrigation demands.

While these programs implemented elsewhere have shown promising savings potential, achieving that potential often requires significant investment on the part of the customer which often is uneconomic. Many districts have found it cost-effective to subsidize a portion of irrigation system improvements, increasing the implementation rates of survey recommendations. This analysis assumes average direct and administrative costs are estimated at $500 per survey and incentive payments average $750 per survey for a total cost of $1250 per survey. Savings average from 0.53 to 1.13 af/year per survey.

Cost Benefit Analysis Results: Based upon the costs and average savings above, large landscape surveys show a net positive present value of $10 per survey. A larger value for the District could be achieved by lessening incentive payments to participants. However, that would likely lower implementation rates.

Recommendation, Implementation and Schedule: Given the small positive net present value for a large landscape audit program, it is recommended the District do a pre-screening of large landscape customers of three acres and above. In this pre-screening, the general efficiency and sophistication of the irrigation system can be assessed and the operators can be queried regarding their interest in a systematic survey and their interest and likelihood of being able to invest in efficiency improvements. If sufficient interest exists a pilot program targeting the largest and likely least efficient users could be initiated. Results of the pilot program would drive investment in a full scale program. Pre screening for this program would be initiated in FY-01 with a pilot program beginning in FY-02 if warranted.

While large landscape surveys are often not the most cost-effective conservation technique, they are generally cost-effective if survey recommendation results are implemented. Additionally, with their high public visibility, having a large landscape audit program can be helpful public relations. Given their relatively high rate of consumption, owner and operators of large landscapes are generally cooperative with such surveys as the money savings potential creates and economic incentive for participation. However, as noted above, the cost of implementing survey recommendations can be an impediment to achieving actual savings.

6. Landscape Conservation Requirements for New and Existing Commercial and Industrial , Governmental and Multifamily Developments

Program Description: State law requires local land use jurisdictions to enact and implement a landscape water conservation ordinance consistent with the State Model Landscape Ordinance, or one that uses a water budget approach to with water allowances for landscaping needs, or one that has rules and regulations that promote water conservation without tracking usage. Four land use jurisdictions have authority within the bounds of the Yucaipa Valley Water

District, The Counties of San Bernardino and Riverside and the cities of Yucaipa and Calimesa. Each of these jurisdictions maintains a landscape water conservation ordinance for new development. As such the responsibility for this demand management measure resides with the respective land use jurisdictions.

7. *Public Information*

Program Description: as noted above, the District has an ongoing public education program.

8. School Education

Program Description: These programs generally consist of provision of teacher training materials and teacher inservice training to elementary (4th grade) and above. Materials consist of general information regarding the water cycle, information on California's water system, groundwater resources, drinking water quality and the role of individuals in water conservation and water quality protection. The intent of the materials and in-service training is to educate educators about California's water system, a conservation ethic and to have those teachers incorporate this information into the curriculum for their classrooms. A populace with basic education on water issues assists in resolving water supply and quality problems. Some districts develop their own materials and provide in-classroom instruction. Others utilize materials from the nonprofit Water Education Foundation and their in-service teacher training programs, whose materials are consistent with the standards of California's Framework for Science and History/Social Science Education. A variety of programs are available from the Foundation along with in-service training for those programs.

Evaluation of Economic and Noneconomic Factors: Beginning a school education program will require nominal investment from the District. This investment, however provides dividends in terms of a more educated customer base and improves community relations.

Cost-Benefit Analysis: Water savings data do not exist for education programs. Consequently, no cost benefit analysis is possible. However, education programs complement other conservation activities and are believed to lower overall consumption.

Recommendation, Implementation and Schedule: The District will begin a program in FY-01 dedicating $2,500 to a secondary school program, grades 4-6. Utilizing program materials from the Water Education Foundation, these funds would allow provision of materials and in-service training for up to 125 teachers within the District.

9. Commercial and Industrial Water Conservation

Program Description: These programs consist of identifying commercial and industrial accounts and offering surveys and/or incentives for conservation where the surveys indicate an opportunity for conservation.

Economic and Noneconomic Factors: The District service area historically has been a residential retirement community with only one significant industrial customer, and egg processing plant. Recent residential and supporting commercial growth is changing the customer makeup. However, since this commercial growth is occurring subsequent to the 1992 Plumbing Code amendments, it is deemed to be relatively efficient. Commercial and industrial audits in other regions have found most of the savings opportunity in the replacement of high flow toilets, as these toilets receive relatively high usage rates. The literature reveals that surveys for this sector have resulted in about 1.27AF of savings per year against an average cost of $1,200 per survey. Industrial surveys are more complicated than commercial surveys and thus survey costs for the District are estimated to be about $400. Incentive costs (mostly ULFT rebates) are estimated at $500 per survey at @$75 per toilet for the District.

Cost Benefit Analysis: Given the lack of significant commercial and industrial uses prior to 1992, no analysis was performed.

Recommendation, Implementation and Schedule: As the District develops, new development will both be subject to landscaping water use standards of the land use jurisdictions and the 1992 plumbing code. As such, commercial/industrial retrofit opportunities are largely absent and a program is not recommended.

10. New Commercial and Industrial Water Use Review

Program Description: These programs involve reviews of potential water consumption and conservation potential during the development review process.

Economic and Noneconomic Factors: Given the specialized nature of industrial water use and a high cost to assess process water use, and gains made by the 1992 Plumbing code amendments which cover conventional uses, few water agencies invest in such programs. This action has been dropped from the California Urban Water Conservation Council's list of Best Management Practices.

Cost-Benefit Analysis: No data exists for water savings for this demand management measure; consequently no cost benefit analysis was performed.

Recommendation, Implementation and Schedule: No program is recommended.

11. Conservation Pricing for Water Service and Conservation Pricing for Sewer Service, Where the Urban Water Supplier Also Provides Sewer Service.

Program Description: As noted above in section 10.2, the district practices conservation pricing for its water service with a commodity rate structure which includes five tiers. Sewer service is based upon a flat service charge for residential customers and charges based upon equivalent service units for commercial and industrial customers. With an incentive to conserve on the water rate, it is deemed unnecessary to attempt to construct a commodity rate structure for sewer service. Additionally, the accuracy of such rate structures are questionable as they generally assess charges based upon winter season demands which vary depending on hydrology of a given year and landscaping demands.

12. Landscape Water Conservation for New and Existing Single Family Homes

Program Description: These programs generally involve providing information and incentives for installation of water efficient and xeriscape landscapes.

Economic and Noneconomic Factors: These programs overlap with implementation of landscape ordinances for new construction as required by state law. However, in many new developments, only front yard landscaping is provided, leaving rear yard landscaping to the discretion of the homeowner. Opportunity exists to provide information to new homeowners and to work with developers to provide xeriscape landscape options.

Cost Benefit Analysis: No published data for water savings exist on such programs; no analysis was performed. However, implementation costs for these programs can be nominal and attractive conservation opportunity exists.

Recommendation, Implementation and Schedule: Beginning in FY-01 the District will meet with major developers in the region to encourage their offering xeriscape options for front landscaping. Additionally, the District will work with developers to provide xeriscape landscaping information materials to new homeowners at move-in.

13. Water Waste Prohibitions

Program Description: The District has a water waste prohibition ordinance in place.

14. Water Conservation Coordinator

Program Description: This action consists of designating a water conservation coordinator among the staff of the District or hiring a new person for the function. The person oversees and coordinates the District's conservation programs.

Economic and Noneconomic Factors: Having a designated coordinator helps improve the effectiveness of a water agency's conservation efforts. Depending upon the scope of the program and size of the District, along with other staffing demands, these duties can be a part or full time responsibility.

Cost Benefit Analysis: This action cannot be analyzed for cost-effectiveness

Recommendation, Implementation and Schedule: The District will review the overall conservation program as recommended herein and either designate an existing staff member or hire a new staff member for the function in FY-01.

15. Financial Incentives to Encourage Water Conservation

Program Description: Financial incentives are often provided by water agencies to reduce demand where cost effective. They are usually used in the context of other demand management measures where savings have been identified.

Economic and Noneconomic Factors: The justification for financial incentives is made via specific analysis of other demand management measures as described in this chapter.

Cost Benefit Analysis: See analyses for other program measures in this chapter

Recommendation, Implementation and Schedule: See other program measures in this chapter.

16. Ultra Low Flush Toilet Replacement

Program Description: This program consists of measures to replace older 7gal/flush and 3.5 gal/flush toilets with 1.6 gal/flush toilets. Agencies have approached this program generally in three ways: 1) requiring a retrofit on resale ordinance where homes are required to retrofit to low flow fixtures upon a resale; 2) Direct distribution of toilets to local community groups who oversee installation; and, 3) Rebate programs where vouchers or rebates are given for toilet replacement.

Economic and Noneconomic Factors: ULFT replacement programs have generally been the most successful of demand management measures. A number of issues exist, however. Program cost-effectiveness varies by program design. Retrofit on resale ordinances are very inexpensive from the District's

perspective as costs are shifted to the home repurchasers/sellers. These ordinances tend to be very unpopular with the real estate community and home sellers, however, as it can impede a sale due to timing and often requires replacing floor coverings around the toilet. Direct distribution programs have the highest cost-effectiveness but don't necessarily reach all potential customers. Rebate programs are generally effective but have a higher incidence of "free ridership" where some customers would be replacing a toilet anyway and receive the rebate. Regardless, savings for these programs have been shown to be 35-45 gal. per replacement per day. Higher savings are found in higher density housing and commercial/industrial settings. Savings also persist as toilet life is generally about 25 years. Implementation costs for simple rebate programs, the most popular average about $100 per unit.

It should be recognized that given the revised plumbing code, allowing for only 1.6 gal/flush toilet models to be purchased, that natural turnover, usually in the range of 3-4% per year will eventually replace all of the older, high water use models. ULFT incentive programs accelerate these savings and as such can help defer or eliminate other capital investment needs.

Customer acceptance issues often are raised with these programs. Complaints about the function of early models of ULFTs, bowl cleanliness, double flushing, etc. have been raised as reasons to avoid such programs. With the experience manufacturers have gained in recent years however, such complaints have diminished and data shows that these toilets work as well or better than the older models. Recent federal legislation intending to repeal the low-flow plumbing standards in part due to anecdotal complaints of poor performance of ULFTs was defeated when supporters could not produce customer confidence data and opponents showed empirical data indicating consumer satisfaction was high.

Cost Benefit Analysis: Two potential ULFT retrofit programs were analyzed. A rebate program assuming a rebate of $75 and administrative costs of $25 per toilet installed was assumed in the first program. To account for the natural replacement factor and free ridership, savings attributed to the program were discounted 40% per toilet rebate, resulting in a net unit savings of 24 gallon per rebate per day. Program life was set at 15 years, a conservative assumption given toilets last about 25 years. In the second analysis a direct distribution program was assumed, which lowers the natural replacement and free ridership factor to 20 percent.

Recommendation, Implementation and Schedule: Neither program as posed above produced a positive net present value. The rebate program resulted in a -$6 NPV and the direct distribution program -$33. Sensitivity analysis was done lengthening the program life and savings attributed to the program but that did not improve the NPV. Therefore, this program is not recommended for implementation.

YUCAIPA VALLEY WATER DISTRICT
2000 URBAN WATER MANAGEMENT PLAN
AND
WATER SHORTAGE CONTINGENCY PLAN

SECTION 4
WATER SHORTAGE CONTINGENCY PLAN

4.0 INTRODUCTION

Section 10632 et. Seq. of the California Water Code requires the preparation and maintenance of a Water Shortage Contingency Analysis including the following elements:

a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

b) An estimate of the minimum water supply available during each of the next three water years based upon the driest three-year historic sequence for the agency's water supply.

c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption in of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to prohibiting the use of potable water for street cleaning.

e) Consumption reduction methods in the most restrictive stages. Each water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in supply.

f) Penalties or charges for excessive use, where applicable.

g) An analysis of the impact of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

h) A draft water shortage contingency resolution or ordinance.

i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

The Yucaipa Valley Water District adopted its current Water Shortage Contingency Plan January 30, 1992. This plan builds on that original plan, the District's experience in implementation during the 1987-1992 drought and changed requirements under the law. It also is a supplement to the District's 2000 Urban Water Management Plan.

4.1 THREE-YEAR MINIMUM SUPPLY

The District currently relies on groundwater to provide over 95% of its supply needs. Given the large capacity of the basin, current storage volumes, and current and near-term well capacity, in the near term, the District should be able to meet full service demands in a hydrologic shortage regardless of the hydrology. Therefore, the driest three year sequence on record is not immediately relevant. Some curtailments due to current summertime peak capacity limitations, rather than hydrologic limitations could occur, however.

When State Project water and access to other surface waters come on line in 2002 the system will be able to maintain nearly 100% reliability over any three-year dry cycle sequence. Aggressive recycled water development will also underpin overall supply reliability and lower demands on inconsistent imported water resources. Ultimately if in total, surface water supplies become unacceptably unreliable, the District can develop additional well capacity to match total overall demands, less recycled water availability. In this way, droughts can be managed through conjunctive use of the groundwater basin: drawing down the basin in hydrologic shortages and recharging the basin during supply availability surpluses in wetter years.

4.2 DROUGHT MANAGEMENT

Water shortages can be triggered by a hydrologic limitation in supply, e.g. a prolonged period of below normal precipitation and runoff, limitations or failure of supply and treatment infrastructure, or both. Hydrologic or drought limitations tend to develop and abate more slowly whereas infrastructure failure tends to happen quickly and relatively unpredictably. Additionally, California's imported water supply system is vulnerable to unpredictable restrictions on water storage and delivery due to conflicts with sensitive aquatic species.

California's climatic regime is one typified by distinct seasonal patterns of precipitation and cyclical patterns of a number of years of above or below average precipitation. Therefore, water systems and management mechanisms need to be able to cope with these variations. The Urban Water Management Planning Act requires water agencies to plan for varying levels of temporary or prolonged shortages of up to 50 percent of normal supplies. This plan segregates water shortage scenarios into five stages, outlining progressively more restrictive requirements on water users as shortages become more pronounced.

Customers and the general public will be kept informed of water shortage management actions of the district through direct mail as necessary combined with water billings and at all times through the District's website. A link to the California Department of Water Resources website location for water supply information will be provided on the site *(http://cded.water.ca.gov/water_supply.html)*

4.3 CATASTROPHIC EVENTS

Over the past ten years the District has been upgrading its supply infrastructure to better meet the needs of its customers. Additionally, the age of the District's infrastructure is relatively young with only three percent of the pipeline inventory over 35 years old. However, the District is in a very active seismological area and is also subject to power outages that can limit production from wells and the District's planned treatment plant for imported water. The District has available diesel back-up power generation capability for its well system and treatment plant. Backup power units are portable and can be moved from well site to well site depending upon the location and extent of outage.

In addition to being able to invoke the water shortage contingency actions as stated herein, the District in 1998 adopted a Major Disaster Plan and Alerting Procedures. This plan deals with non-drought related water shortages. This plan addresses shortages that might result from earthquakes, power outages, pipeline ruptures, terrorism threats and water quality limitations/contamination. It outlines the responsibilities of the District's designated emergency response personnel, alerting procedures, alternate headquarters, communications, transportation and relationships with regional and state emergency response officials. District water supply facilities are operated though an independent and reliable radio and telemetry network designed to operate under emergency conditions.

In addition to in-house emergency plans and procedures, the District is a member of the Yucaipa Valley Emergency Services Committee. Other member include the City of Yucaipa Fire and Police departments, County Sheriff's Department and the Yucaipa-Calimesa Joint Unified School District.

4.4 WATER SHORTAGE RESPONSE STAGES, PROHIBITIONS AND PENALTIES

This plan provides for five levels of progressively more aggressive water demand reduction requirements as displayed in **Table 4-1**.

Table 4-1
Water Shortage Response Stages

Stage	Type Program	Water Use Reduction	Overall Reduction
I	Voluntary	10% from selected areas	--
II	Voluntary	Up to 15% district wide	15%
III	Mandatory	Up to 30% district wide	30%
IV	Mandatory	Up to 40% district wide	40%
V	Mandatory	Up to 50% district wide	50%

Drought events which trigger these stages will likely be those affecting imported water sources provided the Yucaipa groundwater basin continues to be managed in a safe yield condition over the long term. As such, the amount of imported water shortage imposed by wholesalers to the District, San Bernardino Valley Water District and the San Gorgonio Pass Water Agency will in most instances drive the required stage. Additionally, to the extent well capacity exists, the Yucaipa basin can be temporarily exercised beyond its long term safe yield of about 9,270 acre feet per year (Mann,Todd, 1990) to compensate for imported water shortages.

The shortage response stages may also be invoked during a non-drought water emergency to handle short-term events such as earthquake damage, pipeline ruptures and water quality problems.

The stages were developed based upon recognition of the need for equity and recognition of the priority for health and safety issues during the extreme shortage conditions. Through the water allocation system they also recognize the variation in water use within a customer class. The system attempts to recognize prior conservation by allocating set amounts per use with partial modification of allocations based upon prior use.

While certain water use prohibitions apply at each stage, in stages III-V the plan balances between achieving savings through those prohibitions and providing an allocation for users to apply as they deem appropriate, consistent with obeying the

prohibitions. This allows the individual consumer to exercise independent judgement as to how best to use their allocation.

The District Board of Directors will determine the appropriate stage of implementation, although they may delegate the authority to implement Stage I or II to the General Manager. Triggers for consideration of invoking a specific stage of the Contingency Plan will be notification from the District's water wholesalers, the San Bernardino Valley Water District and the San Gorgonio Pass Water Agency, collectively or individually, that those districts intend to curtail imported water deliveries to YVWD. For example, where imported water requested deliveries are expected to be curtailed by 10 percent a Stage I action will be considered. Where deliveries are expected to be curtailed by up to 15, 30, 40 and 50 percent, respective shortage stages will be considered (Stages II-V). Inasmuch as imported supplies will make up only a portion of District supplies, the District will determine the total supply available, the likely duration of the imported water shortage and invoke the appropriate stage to reduce overall demands to available supply. As shortage conditions ease, the District will consider relaxing the shortage stages based upon notification from wholesalers that supply conditions are improving.

Use restrictions as follows below, other than water waste ordinance provisions, shall not apply to the use of recycled water.

4.4.1 Stage I Actions – up to 10% Shortage

The District has significant geographic variation in its water consumption, particularly in residential areas, due to land use and a variety of pressure zones. Under Stage I the relatively high water consuming areas would be asked to implement the following measures on a voluntary basis.

Prohibitions

- Landscape watering on an odd-even day basis based upon address number and avoiding irrigation between 0800 and 1700 hours.
- Elimination of hosing of hardscape surfaces, except where health and safety needs dictate.
- Usage of buckets and automatic hose shut off devices for car washing and outside cleaning activities.
- Repair water leaks and adjust sprinklers to eliminate over-spray.

Other Activities

- The District shall notify customers in the target areas of the shortage and indicate requested curtailments of use. Such notification shall provide avenues of additional information assisting customers in achieving requested conservation.

4.4.2 Stage II Actions – up to 15% Shortage

Prohibitions

- Stage II Actions would extend the voluntary requests under Stage 1 district-wide. Additionally, new meter sales for land development would be restricted, allowing meter sales only to property owners of presently existing parcels

Other Actions

- All customers would be notified of the shortage and requested curtailments of use. Such notification shall provide avenues of additional information assisting customers in achieving requested conservation.

- Initiate media campaign to educate the District customers of conservation needs

4.4.3 Stage III Actions – up to 30% Shortage

Prohibitions

- During Stage III the voluntary action requests from Stages I and II become mandatory as a water emergency would be declared by the District's Board of Directors pursuant section 350 of the water code.

- Issuance of construction water meters would cease for the duration of the Stage III event and meters would be installed for new accounts only where the building permit was issued prior to the declaration of the water shortage emergency.

- Mandatory use prohibitions will be enforced through water patrol personnel who may issue a warning notice for a first offense, provide for a water bill surcharge of $25 for a second offense, $75 for a third offense and shut-off of water service for a fourth offense. For a fourth offense normal water use initiation fees would apply for restoration of the service.

Other Actions

- In addition to the prohibited actions, the District would establish average monthly allotments for each connection based upon a base period selected by the District as follows:

    1. Each single family residential connection shall receive no more than 14 hcf per month plus 20% of the average annual usage in excess of 240 hcf.

2. Each multifamily residential unit shall receive no more than 9 hcf per month plus 40% of the average annual usage in excess of 145 hcf.

3. Each commercial, industrial and governmental connection shall receive no more than 80% of its average monthly usage.

4. Each landscaping connection (dedicated irrigation meters) shall receive 40% of the average monthly usage except those accounts determined by District staff to have met applicable landscape design criteria under city or county ordinance which shall receive 80% of average monthly usage.

5. Each recreational connection shall be allotted 70% of the average monthly usage.

6. Exceeding the usage rates above are subject to 100% surcharge of the applicable rate for each use.

4.4.4 Stage IV Actions – up to 40% Shortage

Prohibitions

- All prohibitions from Stage III would be in effect

Other Actions

- In addition to the prohibited actions, the District would establish average monthly allotments for each connection based upon a base period selected by the District as follows:

  1. Each single family residential connection shall receive no more than 14 hcf per month plus 10% of the average annual usage in excess of 240 hcf.

  2. Each multifamily residential unit shall receive no more than 9 hcf per month plus 20% of the average annual usage in excess of 145 hcf.

  3. Each commercial, industrial and governmental connection shall receive no more than 70% of the average monthly usage.

  4. Each landscaping connection (dedicated irrigation meters) shall receive 20% of the average monthly usage except those accounts determined by District staff to have met applicable landscape design criteria under city and county ordinance which shall receive 70% of average monthly usage.

5. Each recreational connection shall be allotted 50% of average monthly usage.

6. Exceeding the usage rates above are subject to 200% surcharge of the applicable rate for each use.

4.4.5 Stage V Actions – up to a 50% shortage

Prohibited Actions

- All prohibited actions in Stage IV would be in force except as noted below.
- No meters would be installed for new accounts for the duration of the Stage V emergency.

Other Actions

- In addition to the prohibited actions, the District would establish average monthly allotments for each connection based upon a base period selected by the District as follows:

  1. Each single family residential connection shall receive no more than 10 hcf per month.

  2. Each multifamily residential unit including mobile homes shall receive no more than 6 hcf per month.

  3. Each commercial, industrial and governmental connection shall receive no more than 65% of the average monthly usage.

  4. Each landscaping connection (dedicated irrigation meters) shall receive no allotment except those accounts determined by District staff to have met applicable landscape design criteria under city and county ordinance, which shall receive 15% of average monthly usage.

  5. Each recreational connection shall receive no water. In the case of irrigation of golf courses, irrigation shall be limited to tees and greens only.

  6. Exceeding the usage rates above are subject to 500% surcharge of the applicable rate for each use.

4.5 ALLOTMENT APPEALS PROCEDURES

1. Any person who wishes to appeal their customer classification or allotment shall do so in writing using forms provided by the District.

2. Appeals will be reviewed by the Assistant General Manager and site visits scheduled if required.
3. A condition of approval shall be that all applicable plumbing fixtures or irrigation systems be replaced or modified for maximum water conservation prior to considering and appeal.
4. Appeals may be granted for the following:
   a. Proof of substantial medical requirements
   b. Residential connections with more than four residents in a single family household or four residents at a multifamily household may be awarded an additional 2 HCF per person. During a Stage V shortage, a census will be conducted to determine the actual number of residents per dwelling unit. Water may be granted to additional permanent residents – defined as five days a week, nine months per year.
   c. Commercial/Industrial accounts may appeal for increased allocations where it can be shown that allocations would otherwise cause unemployment, decreased production or mechanical equipment damage, after confirmation by a District water auditor that the account has instituted all applicable water efficiency improvements.
   d. Nonagricultural customers can appeal for additional water for livestock.
   e. Government agencies (parks, school, county, etc.) may have their separate allotments for each meter combined into one "agency" allotment.
5. In the event an appeal for additional allotment is requested for irrigation of trees or vegetation in residential categories or for any agricultural use, the District may use the services of a qualified consultant in determining the validity of the request.
6. The District General Manager shall approve or deny appeals.
7. If the District General Manager and the applicant are unable to reach accord, then the appeal shall be heard by the Water District Board of Directors, who will make the final determination.
8. All appeals shall be reported monthly to the Board of Directors

4.6 REVENUE AND EXPENDITURE IMPACTS

It is difficult to precisely gauge the revenue and expenditure impacts of implementation of the water shortage contingency plan. As the plan provides for both prohibitions, water use allotments and penalty pricing for exceeding allotments, the ultimate revenue impacts will be based upon a mix of responses to these requirements. Additionally, weather can be a factor as well. Customers may find it more difficult to meet allocations during hot weather where a desire to maintain landscaping uses at a higher level exists and therefore more customers may find themselves paying penalty rates.

For planning purposes it is assumed that District Conservation goals are met at each stage and that revenue losses are proportional to the commodity rate revenue not received, exclusive of penalty rates, plus revenue losses due to particular prohibitions.

It is also assumed that additional District expenses for implementing the plan would be offset by excess use penalties. Potential revenue losses are listed in table 4-2.

Table 4-2
Annual Potential Revenue Losses by Plan Stage
(based on 2001 Revenue and Expenses)

Revenue Source	Stage I[1]	Stage II	Stage III	Stage IV	Stage V
Domestic Water Sales	$112,500	$337,500	$675,000	$900,000	$1,125,000
Construction Water Sales	$0	$20,000	$50,000	$50,000	$50,000
Meter Sales	$0	$20,000	$25,000	$25,000	$32,500
Water Sales Losses	$112,500	$377,500	$750,000	$975,000	$1,207,500
Less Production Cost Reductions	($59,700)	($179,300)	($358,500)	($478,000)	($597,500)
Net Water Revenue Reduction	$52,800	$198,200	$391,500	$497,000	$610,000
Percent Total Water Revenue Loss	1.0%	4.1%	8.1%	10.3%	12.6%

4.7 MEASURES TO OVERCOME IMPACTS

Based upon the District's current fiscal situation, Impacts during stages I and II could be absorbed by District reserves without requiring a rate increase provided the shortage

[1] Stage 1 assumes 5% drop in sales; all other stages at maximum shortage, e.g., Stage IV=40%

condition did not persist for more than two years. Impacts beyond two years would need to be reassessed. Stages III and beyond could require reductions in the pay-as-you go portion of the District's Capital Improvement Program. Additionally, deferring non-critical maintenance items and filling some personnel vacancies would be considered. Should revenue loss impacts begin to affect essential District operations, a temporary emergency surcharge on the base water rate could be imposed to fund District operations.

4.8 REDUCTION MEASURE MEASURING MECHANISM

As the districts accounts are fully metered, accounting for actual consumption will be afforded for each customer against any allocation. Well production records and imported water purchases will also be tallied to discern overall production amounts versus conservation goals. Collectively these data will be analyzed to assess any need for alterations to the Shortage Response Plan.

Yucaipa Water District Shortage Appeals Form

Date: _____

Name: _____

Address: _____

_____

_____

Phone: _____

Account Number: _____

Name on Account if different from Above: _____

Relationship to Account Holder : _____

Signature:_____
Under the penalty of perjury, I certify that the above information is true and correct

Change in Classification Request

Current Customer Classification[2]: _____

Requested Reclassification (if Applicable) _____

Reason(s) supporting classification change request:

_____
_____
_____
_____

Change in Water Allocation Request

Reason(s) for additional allocation:

_____
_____
_____
_____

District Use Only

Action: _____ by:_____ date: _____

Appeal to Board of Directors

Action: _____

Date:

[2] e.g., single family residential, multi-family residential, commercial, industrial, recreation

YUCAIPA VALLEY WATER DISTRICT
URBAN WATER MANAGEMENT PLAN
AND
WATER SHORTAGE CONTINGENCY PLAN

SECTION 5.0
REFERENCES

1. California Department of Water Resources, CALSIM Operations Studies – State Water Project Frequency Distribution Curves, 1999.

2. California Department of Water Resources, Cost Effectiveness Tool Version 1.1, 1997.

3. California Urban Water Agencies, Urban Water Conservation Potential Draft Final Report, October, 2000.

4. California Urban Water Conservation Council, Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices, May, 2000.

5. Camp Dresser and McKee Consulting Engineers, Water Facilities Master Plan for the Yucaipa Valley Water District, 1994.

6. Fox, Robert C., Consulting Engineering Geologist. Groundwater Resouces Monitoring Plan. Prepared for the Yucaipa Valley Water District. 1990

7. Mann, John F. Consulting Geologist and Hydrologist. Revised Safe Yield of the Yucaipa Basin. 1986.

8. San Bernardino Valley Municipal Water District, Regional Water Facilities Master Plan, 1995

9. Yucaipa Valley Water District, Major Disaster Plan and Alerting Procedure, 1998.

10. Yucaipa Valley Water District, Resolution 43-1999, 1999.

11. Yucaipa Valley Water District, Urban Water Management Plan Update, 1990

Input data for DWR Water Conservation Cost Effectiveness Evaluation Tool 1.1

Program 1. Single Family Water Audits

avoided water cost=$252/af

Savings Assumptions

single family survey 15 gpd/survey
15% annual savings decay rate
effective life: 10 years
program cost: $125 /survey

Savings	Gallons	Avoided Supply Value	
year 1	5,475	$	4.23
year 2	4,653	$	3.59
year 3	3,955	$	3.06
year 4	3,362	$	2.60
year 5	2,857	$	2.20
year 6	2,429	$	1.88
year 7	2,064	$	1.57
year 8	1,755	$	1.36
year 9	1,491	$	1.15
year 10	1,267	$	0.98
total	29,308		

DWR Model Result: net present value =$73

Input data for DWR Water Conservation Cost Effectiveness Evaluation Tool 1.1

Program 1. Multi-family water audits

avoided water cost=$252/af

Savings Assumptions

multi family survey: 6.5 gal per unit; 10 units per survey
15% annual savings decay rate
effective life: 10 years
program cost: $330 /survey

Savings	Gallons	Avoided Supply Value	
year 1	23,725	$	18.35
year 2	20,166	$	15.59
year 3	17,141	$	13.25
year 4	14,570	$	11.27
year 5	12,384	$	9.58
year 6	10,556	$	8.16
year 7	8,947	$	6.92
year 8	7,605	$	5.88
year 9	6,465	$	5.00
year 10	5,495	$	4.25
total	127,054		

DWR Model Result: net present value =$162

Input data for DWR Water Conservation Cost Effectiveness Evaluation Tool 1.1

Program 2. Retrofit Program

avoided water cost=$252/af

Savings Assumptions

retrofit savings: 5.65 gpd/retrofit (model based on ten units)
10% annual savings decay rate
effective life: 10 years
program cost: $13 /per installation ($130 model)

Savings	Gallons	Avoided Supply Value
year 1	23,725	$ 18.35
year 2	20,166	$ 15.59
year 3	17,141	$ 13.25
year 4	14,570	$ 11.27
year 5	12,384	$ 9.58
year 6	10,556	$ 8.16
year 7	8,947	$ 6.92
year 8	7,605	$ 5.88
year 9	6,465	$ 5.00
year 10	5,495	$ 4.25
total	127,054	

DWR Model Result: net present value =$173

Input data for DWR Water Conservation Cost Effectiveness Evaluation Tool 1.1

Program 5. Large Landscape Program

avoided water cost=$252/af

Savings Assumptions

survey savings range: 0.53-1.13 afy = avg .83
10% annual savings decay rate
effective life: 10 years
program cost: $500 survey with $750 incentive payment = $1250 total

Savings	Gallons	Avoided Supply Value
year 1	270,414	$ 209.00
year 2	243,372	$ 188.00
year 3	216,331	$ 167.00
year 4	189,289	$ 146.00
year 5	162,248	$ 125.00
year 6	135,207	$ 105.00
year 7	108,165	$ 84.00
year 8	81,124	$ 63.00
year 9	54,082	$ 41.00
year 10	27,041	$ 21.00
total	1,487,273	

DWR Model Result: net present value =$10.00

Input data for DWR Water Conservation Cost Effectiveness Evaluation Tool 1.1

Program16. Ultra Low Flow Replacement - rebate program

avoided water cost=$252/af

Savings Assumptions

ulft savings per unit per year=8760 gallons
no savings decay rate
effective life: 15 years
free-ridership factor:40%
program cost: $100 per unit

Savings	Gallons	Avoided Supply Value	
year 1	8,760	$	6.77
year 2	8,760	$	6.77
year 3	8,760	$	6.77
year 4	8,760	$	6.77
year 5	8,760	$	6.77
year 6	8,760	$	6.77
year 7	8,760	$	6.77
year 8	8,760	$	6.77
year 9	8,760	$	6.77
year 10	8,760	$	6.77
year 11	8,760	$	6.77
year 12	8,760	$	6.77
year 13	8,760	$	6.77
year 14	8,760	$	6.77
year 15	8,760	$	6.77
total	131,400		

DWR Model Result: net present value = -$6

Input data for DWR Water Conservation Cost Effectiveness Evaluation Tool 1.1

Program 16. Ultra Low Flow Replacement - direct distribution program

avoided water cost=$252/af

Savings Assumptions

ulft savings per unit per year=13140 gallons
no savings decay rate
effective life: 15 years
free-ridership factor:20%
program cost: $150 per unit

Savings	Gallons	Avoided Supply Value	
year 1	13,140	$	10.16
year 2	13,140	$	10.16
year 3	13,140	$	10.16
year 4	13,140	$	10.16
year 5	13,140	$	10.16
year 6	13,140	$	10.16
year 7	13,140	$	10.16
year 8	13,140	$	10.16
year 9	13,140	$	10.16
year 10	13,140	$	10.16
year 11	13,140	$	10.16
year 12	13,140	$	10.16
year 13	13,140	$	10.16
year 14	13,140	$	10.16
year 15	13,140	$	10.16
total	197,100		

DWR Model Result: net present value = -$33

City of Colton Draft No Waste Ordinance, Draft Resolution to Declare a Water Shortage Emergency, and Draft Moratorium on New Connections During a Water Shortage

NO WASTE ORDINANCE (DRAFT)

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF COLTON PROHIBITING THE WASTEFUL USE OF WATER AND SETTING FORTH REGULATIONS AND RESTRICTIONS ON WATER USE

The City Council of the City of Colton does hereby ordain as follows:

That in order to conserve the City's water supply for the greatest public benefit, and to reduce the quantity of water used by the City's water customers, that wasteful use of water should be eliminated. Water customers of the City shall observe the following regulations and restrictions on water use:

SECTION 1. No customer shall waste water. As used herein, the term "waste" means:

a. Use of potable water to irrigate turf, ground-cover, shrubbery, crops, vegetation, and trees (agricultural accounts are excluded from the time of irrigation restriction) between the hours of 10:00 o'clock A.M. and 6:00 o'clock P.M. or in such a manner as to result in runoff for more than five (5) minutes;
b. Use of potable water to wash sidewalks, walkways, driveways, parking lots, open ground or other hard surfaced areas except where necessary for public health or safety;
c. Allowing potable water to escape from breaks within the customer's plumbing system for more than twenty-four (24) hours after the customer is notified or discovers the break;
d. Washing cars, boats, trailers, aircraft, or other vehicles by hose without a shutoff nozzle and bucket except to wash such vehicles at commercial or fleet vehicle washing facilities using water recycling equipment;
e. Use of potable water to clean, fill or maintain decorative fountains, lakes or ponds unless such water is recycled.

SECTION 2. The following restrictions are effective during a declared Water Shortage Emergency:

a. No restaurant, hotel, cafe, cafeteria or other public place where food is sold, served or offered for sale, shall serve drinking water to any customer unless expressly requested;
b. Use of potable water for street or parking lot sweeping, building washdown where non-potable or recycled water is sufficient;
c. Use of potable water for sewer system maintenance or fire protection training without prior approval by the Director of Water and Wastewater;
d. Use of potable water for any purpose in excess of the amounts allocated for each class of service.

SECTION 3. Other restrictions may be necessary during a declared Water Shortage Emergency, to safeguard the adequacy of the water supply for domestic, sanitation, fire protection, and environmental requirements.

DRAFT

ENFORCEMENT

Any customer violating the regulations and restrictions on water use set forth in this chapter shall receive a written warning for the first such violation. Upon a second violation, the customer shall receive a written warning and the City may cause a flow-restrictor to be installed in the service. If a flow-restrictor is placed, the cost of installation and removal shall be paid by the violator. Any willful violation occurring subsequent to the issuance of the second written warning shall constitute a misdemeanor and may be referred to the County District Attorney's Office for prosecution. The City may also disconnect the water service. If water service is disconnected, it shall be restored only upon payment of the turn-on charge fixed by the City Council.

PENALTY FOR VIOLATIONS

Except as provided in the enforcement section for the first and second violations, any person, firm, partnership, association, corporation or political entity violating or causing or permitting the violation of any of the provisions of this section or providing false information to the district in response to the City's requests for information needed by the district to calculate consumer water allotments shall be guilty of a misdemeanor punishable by imprisonment in the county jail for not more that thirty days or by a fine not exceeding one thousand dollars or both. Each separate day or portion thereof in which any violation occurs or continues without a good faith effort by the responsible party to correct the violation shall constitute a separate offense and, upon conviction thereof, shall be separately punishable.

APPEALS

Variances from the requirements of this Section may be granted by the City Council only after denial of a variance request by the general manager. Appeals of variance request denials shall be made in writing to the secretary of the City Council at least 2 weeks prior to the meeting at which they will be heard. Upon granting any appeal, the City Council may impose any conditions it determines to be just and proper. Variances granted by the City Council shall be prepared in writing, and then furnished to the applicant. The City Council may require it to be recorded at applicant's expense.

REMEDIES/CUMULATIVE

The remedies available to the City to enforce this ordinance are in addition to any other remedies available under the City Council's code or any state statutes or regulations, and do not replace or supplant any other remedy, but are cumulative.

DRAFT

RESOLUTION TO DECLARE A WATER SHORTAGE EMERGENCY (DRAFT)

CITY OF COLTON
SAN BERNARDINO COUNTY, CALIFORNIA
Date

The City Council, City of Colton does hereby resolve as follows:

PURSUANT to California Water Code Section 350 et seq., the City Council has conducted duly noticed public hearings to establish the criteria under which a water shortage emergency may be declared.

WHEREAS, the City Council finds, determines, and declares as follows:

(a) The City is the water purveyor for the property owners and inhabitants of the City of Colton, certain portions of the City of Loma Linda, and certain unincorporated areas of the County of San Bernardino;

(b) The demand for water service is not expected to lessen;

(c) When the combined total amount of water supply available to the City from all sources falls at or below the Stage 3 triggering levels described in the City of Colton 2005 Urban Water Management Plan, the City will declare a water shortage emergency. The water supply would not be adequate to meet the ordinary demands and requirements of water consumers without depleting the City's water supply to the extent that there may be insufficient water for human consumption, sanitation, fire protection, and environmental requirements. This condition is likely to exist until precipitation and inflow dramatically increases or until water system damage resulting from a disaster are repaired and normal water service is restored.

NOW, THEREFORE, BE IT RESOLVED that the City Council, City of Colton hereby directs the Director of Water and Wastewater to find, determine, declare, and conclude that a water shortage emergency condition exists that threatens the adequacy of water supply, until the City's water supply is deemed adequate. After the declaration of a water shortage emergency, the Director of Water and Wastewater is directed to determine the appropriate Rationing Stage and implement the City's Water Shortage Emergency Response.

FURTHERMORE, the City Council shall periodically conduct proceedings to determine additional restrictions and regulations which may be necessary to safeguard the adequacy of the water supply for domestic, sanitation, fire protection, and environmental requirements.

DRAFT

MORATORIUM ON NEW CONNECTIONS DURING A WATER SHORTAGE (DRAFT)

CITY OF COLTON
SAN BERNARDINO COUNTY, CALIFORNIA
Date

The City Council, City of Colton does hereby resolve as follows:

The Municipal Code of the City of Colton is hereby amended to read as follows:

XX-1 MORATORIUM ON SERVICE COMMITMENTS AND CONNECTIONS

1. When the City declares a water shortage emergency, the following regulations shall become effective immediately and shall continue in full force and effect to prohibit the following while it remains in full force and effect:

    a. The City shall not issue oral or written commitments to provide new or expanded water service, including will-serve letters.
    b. The City shall not sell meters for water service connections, despite the prior issuance of will-serve letters or other oral or written service commitments, unless building permits have been issued.
    c. The City shall not provide new or expanded water service connections, despite the prior issuance of will-serve letters or other oral or written service commitments and meters, unless building permits have been issued.
    d. The City shall not provide water for use on any new plantings installed after the declaration of a Water Shortage Emergency.
    e. The City shall not annex territory located outside the City's service boundary.

2. The following uses are exempt from the moratorium and upon application to the City shall receive necessary water service commitments and connections to receive water from the City:

    a. Uses, including but not limited to, commercial, industrial, single and multifamily residential, for which a building permit has been issued by the City on or before the declaration of a Water Shortage Emergency.
    b. Uses, including but not limited to, commercial, industrial, single and multifamily residential, for which a retail meter had been purchased from the City before the declaration of a Water Shortage Emergency, as evidenced by a written receipt and for which a building permit has been issued and remains in full force and effect.
    c. Publicly owned and operated facilities, including but not limited to schools, fire stations, police stations, and hospitals and other facilities as necessary to protect the public health, safety, and welfare.

DRAFT

Appendix H

Adoption Resolutions

RESOLUTION NO. 7057

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF REDLANDS ADOPTING THE 2010 URBAN WATER MANAGEMENT PLAN

WHEREAS, Section 10620 of the California Water Code require urban water suppliers to prepare and file with the Department of Water Resources an Urban Water Management Plan; and

WHEREAS, the City of Redlands recognizes the water supply of the City represents a limited renewable resource subject to increasing demands; that the conservation and efficient use of urban water supplies are of statewide concern; and that the planning for water use and conservation and the implementation of such plans is best accomplished at the local level; and

WHEREAS, it is in the best interests of Redlands' citizens to ensure that the highest quality of water is reasonably available to them for domestic use; and

WHEREAS, the City has developed its Urban Water Management Plan to achieve water conservation, efficient use of water and sustainable lifestyle consistent with Redlands' unique heritage and community goals; and

WHEREAS, a duly noticed public hearing has been held on the Urban Water Management Plan pursuant to Section 6066 of the California Government Code;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF REDLANDS AS FOLLOWS:

Section 1. That the document entitled "2010 Regional Urban Water Management Plan" is hereby adopted and City staff is hereby directed to file a copy of the plan with the California Department of Water Resources on or before July 1, 2011.

Section 2. That the City of Redlands will implement the 2010 Regional Urban Water Management Plan in accordance with the schedule set forth in the plan.

ADOPTED, SIGNED AND APPROVED this 21st day of June 2011.

Pete Aguilar, Mayor

Attest:

City Clerk

I:\cclerk\Resolutions\Res 7000-7999\7057 Resolution for 2010 UWMP.doc

I, Sam Irwin, City Clerk of the City of Redlands, hereby certify that the foregoing resolution was adopted by the City Council at a regular meeting thereof held on the 21st day of June, 2011 by the following vote:

AYES: Councilmembers Bean, Foster, Gardner; Mayor Aguilar
NOES: None
ABSTAIN: None
ABSENT: Councilmember Harrison

City Clerk

RESOLUTION NO. 12-2011

A RESOLUTION OF THE BOARD OF DIRECTORS
OF YUCAIPA VALLEY WATER DISTRICT ADOPTING THE
2010 REGIONAL URBAN WATER MANAGEMENT PLAN

WHEREAS, The California Urban Water Management Planning Act, Water Code Section 10610 et. seq. (the Act), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare an Urban Water Management Plan (Plan); and

WHEREAS, the Act requires that said Plan be updated and adopted at least once every five years on or before December 31, in years ending in five and zero; and

WHEREAS, Yucaipa Valley Water District is an urban water supplier for purposes of the Act; and

WHEREAS, pursuant to the Water Conservation Act of 2009, also referred to as SBX7-7 (Water Code section 10608 et seq.) and SB 1478 (amending Water Code section 10608.26), the time for urban retail water suppliers and urban wholesale water suppliers to adopt their 2010 Plans was extended to July 1, 2011; and

WHEREAS, under SBX7-7, an "urban retail water supplier" is defined as a water supplier that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes, and an "urban wholesale water supplier" is defined as a water supplier that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes; and

WHEREAS, for purposes of its 2010 Plan, Yucaipa Valley Water District meets the definition of an urban retail water supplier; and

WHEREAS, the 2010 San Bernardino Valley Regional Urban Water Management Plan has been prepared at the direction of San Bernardino Valley Municipal Water District, the City of Colton, East Valley Water District, the City of Loma Linda, the City of Redlands, the City of San Bernardino, West Valley Water District, and Yucaipa Valley Water District (hereafter "AGENCIES"); and

WHEREAS, as a participant in the 2010 San Bernardino Valley Regional Urban Water Management Plan, Yucaipa Valley Water District has prepared those portions of the plan applicable to Yucaipa Valley Water District in accordance with the Act and SBX7-7 and, in accordance with applicable legal requirements, has undertaken certain coordination, notice, public involvement, public comment, and other procedures in relation to its 2010 Plan; and

WHEREAS, as authorized by Water Code section 10620(e), AGENCIES have prepared the 2010 San Bernardino Valley Regional Urban Water Management Plan with staff from AGENCIES, with the assistance of consulting professionals, and in cooperation with other governmental agencies, and has utilized and relied upon industry standards and the expertise of industry professionals in preparing its 2010 Plan, and has also utilized the California Department of Water Resources Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan (March 2011) and the California Department of Water Resources Methodologies for Calculating Baseline and Compliance Urban Per Capita Water

Use (For the Consistent Implementation of the Water Conservation Act of 2009) (February 2011) in preparing the 2010 San Bernardino Valley Regional Urban Water Management Plan; and

WHEREAS, in accordance with applicable law, including Water Code sections 10608.26 and 10642, and Government Code section 6066, a Notice of a Public Hearing regarding Yucaipa Valley Water District adoption of the 2010 San Bernardino Valley Regional Urban Water Management Plan was published within the jurisdiction of Yucaipa Valley Water District on May 27th, 2011 and June 3rd, 2011; and

WHEREAS, in accordance with applicable law, a public hearing was held on June 15th, 2011 at 6:00 p.m., or soon thereafter, in the boardroom of the offices of the Yucaipa Valley Water District, 12770 Second Street, Yucaipa, CA 92399 in order to provide members of the public and other interested entities with the opportunity to be heard in connection with proposed adoption of the 2010 Plan and issues related thereto; and

WHEREAS, pursuant to said public hearing on the 2010 San Bernardino Valley Regional Urban Water Management Plan, Yucaipa Valley Water District, among other things, encouraged the active involvement of diverse social, cultural, and economic elements of the population within Yucaipa Valley Water District's service area with regard to the preparation of the Plan, allowed community input regarding Yucaipa Valley Water District's implementation plan for complying with SBX7-7, considered the economic impacts of Yucaipa Valley Water District's implementation plan for complying with SBX7-7, and adopted Method 1 - 80% of base daily per Capita Water Use under Water Code section 10608.20(b) for determining its water use targets; and

WHEREAS, the Board of Directors desires to adopt the 2010 San Bernardino Valley Regional Urban Water Management Plan in order to comply with the Act and SBX7-7.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF YUCAIPA VALLEY WATER DISTRICT AS FOLLOWS:

SECTION 1. The General Manager is hereby authorized and directed to include a copy of this Resolution in Yucaipa Valley Water District's 2010 San Bernardino Valley Regional Urban Water Management Plan.

SECTION 2. The General Manager is hereby authorized and directed, in accordance with Water Code section 10644(a), to submit copies of the 2010 San Bernardino Valley Regional Urban Water Management Plan to the California Department of Water Resources, the California State Library, and any city or county within which the Yucaipa Valley Water District provides water supplies no later than thirty (30) days after this adoption date.

SECTION 3. The General Manager is hereby authorized and directed, in accordance with Water Code Section 10645, to make the 2010 San Bernardino Valley Regional Urban Water Management Plan available for public review during normal business hours no later than thirty (30) days after filing a copy of the 2010 San Bernardino Valley Regional Urban Water Management Plan with the California Department of Water Resources.

SECTION 4. The General Manager is hereby authorized and directed, in accordance with Water Code Section 10635(b), to provide that portion of the 2010 San Bernardino Valley Regional Urban Water Management Plan prepared pursuant to Water Code Section 10635(a) to any city or county within which the Yucaipa Valley Water District provides water supplies no later than sixty (60) days after submitting a copy of the Plan with the California Department of Water Resources.

SECTION 5. The General Manager is hereby authorized and directed to implement the 2010 San Bernardino Valley Regional Urban Water Management Plan in accordance with the Act and SBX7-7 and to provide recommendations to the Board of Directors regarding necessary budgets, procedures, rules, regulations or further actions to carry out the effective and equitable implementation of the 2010 San Bernardino Valley Regional Urban Water Management Plan.

PASSED, APPROVED and ADOPTED this 15th day of June 2011

YUCAIPA VALLEY WATER DISTRICT

Jay Bogh, President Board of Directors

ATTEST:

Joseph B. Zoba, General Manager

STATE OF CALIFORNIA

COUNTY OF RIVERSIDE
AND SAN BERNARDINO

I, Joseph B. Zoba, Secretary of the Board of Directors of the Yucaipa Valley Water District, California, do hereby certify that the foregoing resolution being Resolution No. 12-2011 was duly passed, approved and adopted by said Board, approved and signed by the President, and attested by the Secretary at the Regular Meeting held on the 15th day of June 2011, and that the same was passed and adopted by the following vote:

AYES:	Director Jay Bogh, Director Ian Cuthbertson, Director Bruce Granlund, Director Lonni Granlund, Director Hank Wochholz.
NOES:	None
ABSENT:	None
ABSTAIN:	None

Executed this 15th day of June 2011 at Yucaipa, CA

Joseph B. Zoba, Secretary of the Yucaipa Valley
Water District and of the Board of Directors

(Seal)

RESOLUTION 2011.14

RESOLUTION OF THE BOARD OF DIRECTORS
OF EAST VALLEY WATER DISTRICT ADOPTING THE 2010
SAN BERNARDINO VALLEY REGIONAL URBAN WATER
MANAGEMENT PLAN

WHEREAS, The California Urban Water Management Planning Act, Water Code Section 10610 et. seq. (the Act), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare an Urban Water Management Plan (Plan); and

WHEREAS, the Act requires that said Plan be updated and adopted at least once every five years on or before December 31, in years ending in five and zero; and

WHEREAS, East Valley Water District is an urban water supplier for purposes of the Act; and

WHEREAS, pursuant to the Water Conservation Act of 2009, also referred to as SBX7-7 (Water Code section 10608 et seq.) and SB 1478 (amending Water Code section 10608.26), the time for urban retail water suppliers and urban wholesale water suppliers to adopt their 2010 Plans was extended to July 1, 2011; and

WHEREAS, under SBX7-7, an "urban retail water supplier" is defined as a water supplier that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes, and an "urban wholesale water supplier" is defined as a water supplier that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes; and

WHEREAS, for purposes of its 2010 Plan, East Valley Water District meets the definition of an urban retail water supplier; and

I, Robert Martin, do hereby certify that this is a true and correct copy of the record.

ROBERT MARTIN, **Secretary To the Board**
East Valley Water District

WHEREAS, the 2010 San Bernardino Valley Regional Urban Water Management Plan has been prepared at the direction of San Bernardino Valley Municipal Water District, the City of Colton, East Valley Water District, the City of Loma Linda, the City of Redlands, the City of San Bernardino, West Valley Water District, and Yucaipa Valley Water District (hereafter "AGENCIES"; and

WHEREAS, as a participant in the 2010 San Bernardino Valley Regional Urban Water Management Plan, East Valley Water District has prepared those portions of the plan applicable to East Valley Water District in accordance with the Act and SBX7-7 and, in accordance with applicable legal requirements, has undertaken certain coordination, notice, public involvement, public comment, and other procedures in relation to its 2010 Plan; and

WHEREAS, as authorized by Water Code section 10620(e), AGENCIES have prepared the 2010 San Bernardino Valley Regional Urban Water Management Plan with staff from AGENCIES, with the assistance of consulting professionals, and in cooperation with other governmental agencies, and has utilized and relied upon industry standards and the expertise of industry professionals in preparing its 2010 Plan, and has also utilized the California Department of Water Resources Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan (March 2011) and the California Department of Water Resources Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (For the Consistent Implementation of the Water Conservation Act of 2009) (February 2011) in preparing the 2010 San Bernardino Valley Regional Urban Water Management Plan; and

WHEREAS, in accordance with applicable law, including Water Code sections 10608.26 and 10642, and Government Code section 6066, a Notice of a Public Hearing regarding East Valley Water District adoption of the 2010 San Bernardino Valley Regional Urban Water Management Plan was

published within the jurisdiction of East Valley Water District on June 14, 2011 and June 21, 2011 and

WHEREAS, in accordance with applicable law, a public hearing was held on June 28, 2011 at 3:00 PM or soon thereafter, in the boardroom of the offices of the East Valley Water District, 3694 E. Highland Ave., Suite 30, Highland, CA 92346 in order to provide members of the public and other interested entities with the opportunity to be heard in connection with proposed adoption of the 2010 Plan and issues related thereto; and

WHEREAS, pursuant to said public hearing on the 2010 San Bernardino Valley Regional Urban Water Management Plan, East Valley Water District among other things, encouraged the active involvement of diverse social, cultural, and economic elements of the population within East Valley Water District's service area with regard to the preparation of the Plan, allowed community input regarding East Valley Water District's implementation plan for complying with SBX7-7, considered the economic impacts of East Valley Water District implementation plan for complying with SBX7-7, and adopted Method 4 under Water Code section 10608.20(b) for determining its water use targets; and

WHEREAS, the Board of Directors desires to adopt the 2010 San Bernardino Valley Regional Urban Water Management Plan in order to comply with the Act and SBX7-7.

NOW, THEREFORE, be it resolved by the Board of Directors of East Valley Water District as follows:

SECTION 1 The General Manager is hereby authorized and directed to include a copy of this Resolution in East Valley Water District's 2010 Plan.

SECTION 2 The General Manager is hereby authorized and directed, in accordance with Water Code section 10644(a), to submit copies of the 2010 Plan to the California Department of Water Resources, the California State Library, and any city

or county within which the East Valley Water District provides water supplies no later than thirty (30) days after this adoption date.

SECTION 3 The General Manager is hereby authorized and directed, in accordance with Water Code Section 10645, to make the 2010 Plan available for public review during normal business hours no later than thirty (30) days after filing a copy of the Plan with the California Department of Water Resources.

SECTION 4 The General Manager is hereby authorized and directed, in accordance with Water Code Section 10635(b), to provide that portion of the 2010 Plan prepared pursuant to Water Code Section 10635(a) to any city or county within which the East Valley Water District provides water supplies no later than sixty (60) days after submitting a copy of the Plan with the California Department of Water Resources.

SECTION 5 The General Manager is hereby authorized and directed to implement the 2010 Plan in accordance with the Act and SBX7-7 and to provide recommendations to the Board of Directors regarding necessary budgets, procedures, rules, regulations or further actions to carry out the effective and equitable implementation of the 2010 Plan.

ADOPTED this June 28th, 2011.

George E. Wilson
President

June 28th, 2011

I HEREBY CERTIFY that the foregoing is a full, true and correct copy of Resolution 2011.14 adopted by the Board of Directors of East Valley Water District at its Regular Meeting held June 28th, 2011

Robert E. Martin
Board Secretary

RESOLUTION NO. 2707

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LOMA LINDA ADOPTING THE 2010 SAN BERNARDINO VALLEY REGIONAL URBAN WATER MANAGEMENT PLAN

WHEREAS, The California Urban Water Management Planning Act, Water Code Section 10610 et. seq. (the Act), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare an Urban Water Management Plan (Plan); and

WHEREAS, the Act requires that said Plan be updated and adopted at least once every five years on or before December 31, in years ending in five and zero; and

WHEREAS, the City of Loma Linda ("CITY") is an urban water supplier for purposes of the Act; and

WHEREAS, pursuant to the Water Conservation Act of 2009, also referred to as SBX7-7 (Water Code section 10608 et seq.) and SB 1478 (amending Water Code section 10608.26), the time for urban retail water suppliers and urban wholesale water suppliers to adopt their 2010 Plans was extended to July 1, 2011; and

WHEREAS, under SBX7-7, an "urban retail water supplier" is defined as a water supplier that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes, and an "urban wholesale water supplier" is defined as a water supplier that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes; and

WHEREAS, for purposes of its 2010 Plan, the CITY meets the definition of an urban retail water supplier; and

WHEREAS, the 2010 San Bernardino Valley Regional Urban Water Management Plan has been prepared at the direction of San Bernardino Valley Municipal Water District, the City of Colton, East Valley Water District, the City of Loma Linda, the City of Redlands, the City of San Bernardino, West Valley Water District, and Yucaipa Valley Water District (hereafter "AGENCIES"; and

WHEREAS, as a participant in the 2010 San Bernardino Valley Regional Urban Water Management Plan, the CITY has prepared those portions of the plan applicable to the CITY in accordance with the Act and SBX7-7 and, in accordance with applicable legal requirements, has undertaken certain coordination, notice, public involvement, public comment, and other procedures in relation to its 2010 Plan; and

WHEREAS, as authorized by Water Code section 10620(e), AGENCIES have prepared the 2010 San Bernardino Valley Regional Urban Water Management Plan with staff from AGENCIES, with the assistance of consulting professionals, and in cooperation with other governmental agencies, and has utilized and relied upon industry standards and the expertise of industry professionals in preparing its 2010 Plan, and has also utilized the California Department of Water Resources Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water

Management Plan (March 2011) and the California Department of Water Resources Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (For the Consistent Implementation of the Water Conservation Act of 2009) (February 2011) in preparing the 2010 San Bernardino Valley Regional Urban Water Management Plan; and

WHEREAS, in accordance with applicable law, including Water Code sections 10608.26 and 10642, and Government Code section 6066, a Notice of a Public Hearing regarding the CITY's adoption of the 2010 San Bernardino Valley Regional Urban Water Management Plan was published within the jurisdiction of CITY on May 31, 2011 and June 7, 2011; and

WHEREAS, in accordance with applicable law, a public hearing was held on June 14, 2011 at 7:00 p.m. or soon thereafter, in the Council Chamber of the CITY, 25541 Barton Road, Loma Linda, CA 92354 in order to provide members of the public and other interested entities with the opportunity to be heard in connection with proposed adoption of the 2010 Plan and issues related thereto; and

WHEREAS, pursuant to said public hearing on the 2010 San Bernardino Valley Regional Urban Water Management Plan, CITY, among other things, encouraged the active involvement of diverse social, cultural, and economic elements of the population within CITY's service area with regard to the preparation of the Plan, allowed community input regarding CITY's implementation plan for complying with SBX7-7, considered the economic impacts of CITY's implementation plan for complying with SBX7-7, and adopted Method 1 under Water Code section 10608.20(b) for determining its water use targets; and

WHEREAS, the City Council desires to adopt the 2010 San Bernardino Valley Regional Urban Water Management Plan in order to comply with the Act and SBX7-7.

NOW, THEREFORE, be it resolved by the City Council of the City of Loma Linda as follows:

SECTION 1 The General Manager is hereby authorized and directed to include a copy of this Resolution in CITY's 2010 Plan.

SECTION 2 The General Manager is hereby authorized and directed, in accordance with Water Code section 10644(a), to submit copies of the 2010 Plan to the California Department of Water Resources, the California State Library, and any city or county within which the CITY provides water supplies no later than thirty (30) days after this adoption date.

SECTION 3 The General Manager is hereby authorized and directed, in accordance with Water Code Section 10645, to make the 2010 Plan available for public review during normal business hours no later than thirty (30) days after filing a copy of the Plan with the California Department of Water Resources.

SECTION 4 The General Manager is hereby authorized and directed, in accordance with Water Code Section 10635(b), to provide that portion of the 2010 Plan prepared pursuant to

Water Code Section 10635(a) to any city or county within which the CITY provides water supplies no later than sixty (60) days after submitting a copy of the Plan with the California Department of Water Resources.

SECTION 5 The General Manager is hereby authorized and directed to implement the 2010 Plan in accordance with the Act and SBX7-7 and to provide recommendations to the Board of Directors regarding necessary budgets, procedures, rules, regulations or further actions to carry out the effective and equitable implementation of the 2010 Plan.

PASSED, APPROVED AND ADOPTED this 28th day of June 2011 by the following vote:

Ayes:	Rigsby, Popescu, Brauer, Dailey, Dupper
Noes:	None
Absent:	None

R L Rigsby

Rhodes Rigsby, Mayor

ATTEST:

Pamela Byrnes-O'Camb

Pamela Byrnes-O'Camb, City Clerk

RESOLUTION NO. 778

A RESOLUTION OF THE BOARD OF WATER COMMISSIONERS, CITY OF SAN BERNARDINO ADOPTING THE 2010 SAN BERNARDINO VALLEY REGIONAL URBAN WATER MANAGEMENT PLAN

WHEREAS, the California Urban Water Management Planning Act, Water Code Section 10610 et. seq. (the Act), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare an Urban Water Management Plan (Plan); and

WHEREAS, the Act requires that said Plan be updated and adopted at least once every five years on or before December 31, in years ending in five and zero; and

WHEREAS, City of San Bernardino Municipal Water Department is an urban water supplier for purposes of the Act; and

WHEREAS, pursuant to the Water Conservation Act of 2009, also referred to as SBX7-7 (Water Code section 10608 et seq.) and SB 1478 (amending Water Code section 10608.26), the time for urban retail water suppliers and urban wholesale water suppliers to adopt their 2010 Plans was extended to July 1, 2011; and

WHEREAS, under SBX7-7, an "urban retail water supplier" is defined as a water supplier that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes, and an "urban wholesale water supplier" is defined as a water supplier that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes; and

WHEREAS, for purposes of its 2010 Plan, City of San Bernardino Municipal Water Department meets the definition of an urban retail water supplier; and

WHEREAS, the 2010 San Bernardino Valley Regional Urban Water Management Plan has been prepared at the direction of the City of San Bernardino Municipal Water Department, San Bernardino Valley Municipal Water District, the City of Colton, East Valley Water District, the City of Loma Linda, the City of Redlands, West Valley Water District, and Yucaipa Valley Water District (hereafter "AGENCIES"); and

WHEREAS, as a participant in the 2010 San Bernardino Valley Regional Urban Water Management Plan, City of San Bernardino Municipal Water Department has prepared those portions of the plan applicable to City of San Bernardino Municipal Water Department in accordance with the Act and SBX7-7 and, in accordance with applicable legal requirements, has undertaken certain coordination, notice, public involvement, public comment, and other procedures in relation to its 2010 Plan; and

WHEREAS, as authorized by Water Code section 10620(e), AGENCIES have prepared the 2010 San Bernardino Valley Regional Urban Water Management Plan with staff from AGENCIES, with the assistance of consulting professionals, and in cooperation with other governmental agencies, and has utilized and relied upon industry standards and the expertise of industry professionals in preparing its 2010 Plan, and has also utilized the California Department of Water Resources Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan (March 2011) and the California Department of Water Resources Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (For the Consistent Implementation of the Water Conservation Act of 2009) (February 2011) in preparing the 2010 San Bernardino Valley Regional Urban Water Management Plan; and

WHEREAS, in accordance with applicable law, including Water Code sections 10608.26 and 10642, and Government Code section 6066, a Notice of a Public Hearing regarding City of San Bernardino Municipal Water Department adoption of the 2010 San Bernardino Valley Regional Urban Water Management Plan was published within the jurisdiction of City of San Bernardino Municipal Water Department on June 3, 2011 and June 10, 2011; and

WHEREAS, in accordance with applicable law, a public hearing was held on June 21, 2011 at 11:30 a.m., or soon thereafter, in the boardroom of the City of San Bernardino Municipal Water Department, 300 North "D" Street, 5th Floor, San Bernardino, California 92418, in order to provide members of the public and other interested entities with the opportunity to be heard in connection with proposed adoption of the 2010 Plan and issues related thereto; and

WHEREAS, pursuant to said public hearing on the 2010 San Bernardino Valley Regional Urban Water Management Plan, City of San Bernardino Municipal Water Department,

among other things, encouraged the active involvement of diverse social, cultural, and economic elements of the population within City of San Bernardino Municipal Water Department's service area with regard to the preparation of the Plan, allowed community input regarding City of San Bernardino Municipal Water Department's implementation plan for complying with SBX7-7, considered the economic impacts of City of San Bernardino Municipal Water Department's implementation plan for complying with SBX7-7, and adopted Method 4 under Water Code section 10608.20(b) for determining its water use targets; and

WHEREAS, the Board of Water Commissioners desires to adopt the 2010 San Bernardino Valley Regional Urban Water Management Plan in order to comply with the Act and SBX7-7.

NOW, THEREFORE, be it resolved by the Board of Water Commissioners of the City of San Bernardino Municipal Water Department as follows:

SECTION 1 The General Manager is hereby authorized and directed to include a copy of this Resolution in City of San Bernardino Municipal Water Department's 2010 Plan.

SECTION 2 The General Manager is hereby authorized and directed, in accordance with Water Code section 10644(a), to submit copies of the 2010 Plan to the California Department of Water Resources, the California State Library, and any city or county within which the City of San Bernardino Municipal Water Department provides water supplies no later than thirty (30) days after this adoption date.

SECTION 3 The General Manager is hereby authorized and directed, in accordance with Water Code section 10645, to make the 2010 Plan available for public review during normal business hours no later than thirty (30) days after filing a copy of the Plan with the California Department of Water Resources.

SECTION 4 The General Manager is hereby authorized and directed, in accordance with Water Code section 10635(b), to provide that portion of the 2010 Plan prepared pursuant to Water Code section 10635(a) to any city or county within which the City of San Bernardino Municipal Water Department provides water supplies no later than sixty (60) days after submitting a copy of the Plan with the California Department of Water Resources.

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SECTION 5 The General Manager is hereby authorized and directed to implement the 2010 Plan in accordance with the Act and SBX7-7 and to provide recommendations to the Board of Water Commissioners regarding necessary budgets, procedures, rules, regulations or further actions to carry out the effective and equitable implementation of the 2010 Plan.

I HEREBY CERTIFY that the foregoing resolution was duly adopted by the Board of Water Commissioners of the City of San Bernardino at a regular meeting thereof held on the 20th of June, 2011 by the following vote, to-wit:

AYES: COMMISSIONERS CALLICOTT, COCKE, HENDRIX

NAYS: NONE

ABSENT: COMMISSIONERS MILLER, FERNANDEZ

Robin L. Ohama
Clerk & Ex-Officio Secretary

(SEAL)

RESOLUTION NO. 2011-1

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE WEST VALLEY WATER DISTRICT ADOPTING THE 2010 SAN BERNARDINO VALLEY REGIONAL URBAN WATER MANAGEMENT PLAN

WHEREAS, the California Legislature has enacted the Urban Water Management Plan Act, California Water Code Sections 10610 through 10657 requiring every supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare an Urban Water Management Plan, the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS, Section 10621 (a) of the California Water Code requires an update of the Urban Water Management Plan at least once every five years on or before December 31, in years ending in five and zero but for the 2010 plan a 6-month extension has been granted for the submittal to provide additional time for water suppliers to address the SBx 7_7 requirements; and

WHEREAS, Section 10632 of the California Water Code requires preparation of an urban water shortage contingency analysis as part of the Urban Water Management Plan; and

WHEREAS, the West Valley Water District is an urban supplier of water providing water to more than 3,000 customers, and has, therefore prepared and circulated for public review its Draft Urban Water Management Plan incompliance with Chapter 3, Article 3 of the Urban Water Management Planning Act and a properly noticed public hearing on said draft plan was held by the District on June 16, 2011 and a final plan prepared;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the West Valley Water District as follows:

1. The final 2010 San Bernardino Valley Regional Urban Water Management Plan, presented at this meeting, is hereby approved and adopted;

2. The 2010 San Bernardino Valley Regional Urban Water Management Plan is ordered to be filed with the Cities of Rialto, Colton, Fontana and the Counties of San Bernardino and Riverside no later than 30 days after adoption;

3. The General Manager is hereby authorized and directed to file this plan with the State Department of Water Resources and the California State Library no later than 30 days after adoption;

4. The General Manager is further directed to periodically review the 2010 San Bernardino Valley Regional Urban Water Management Plan in accordance with applicable law and recommend to the Board of Directors amendments to the plan as may be appropriate as a result of such review.

ADOPTED, SIGNED, AND APPROVED THIS 16TH DAY OF JUNE 2011.

Earl Tillman Jr., President

ATTEST:

Thomas J. Crowley, Assistant General Manager