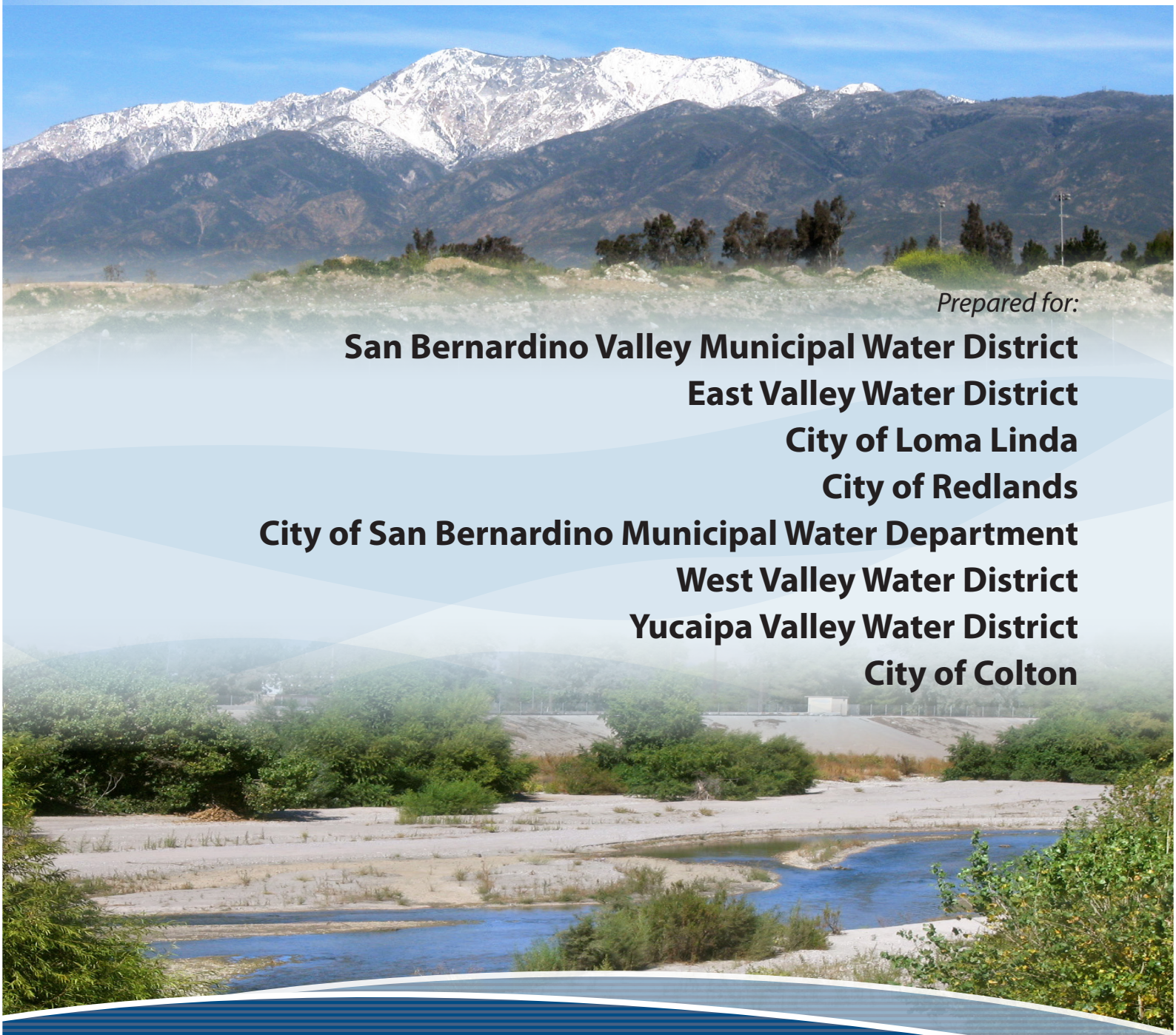
Amended

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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November 2012

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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:

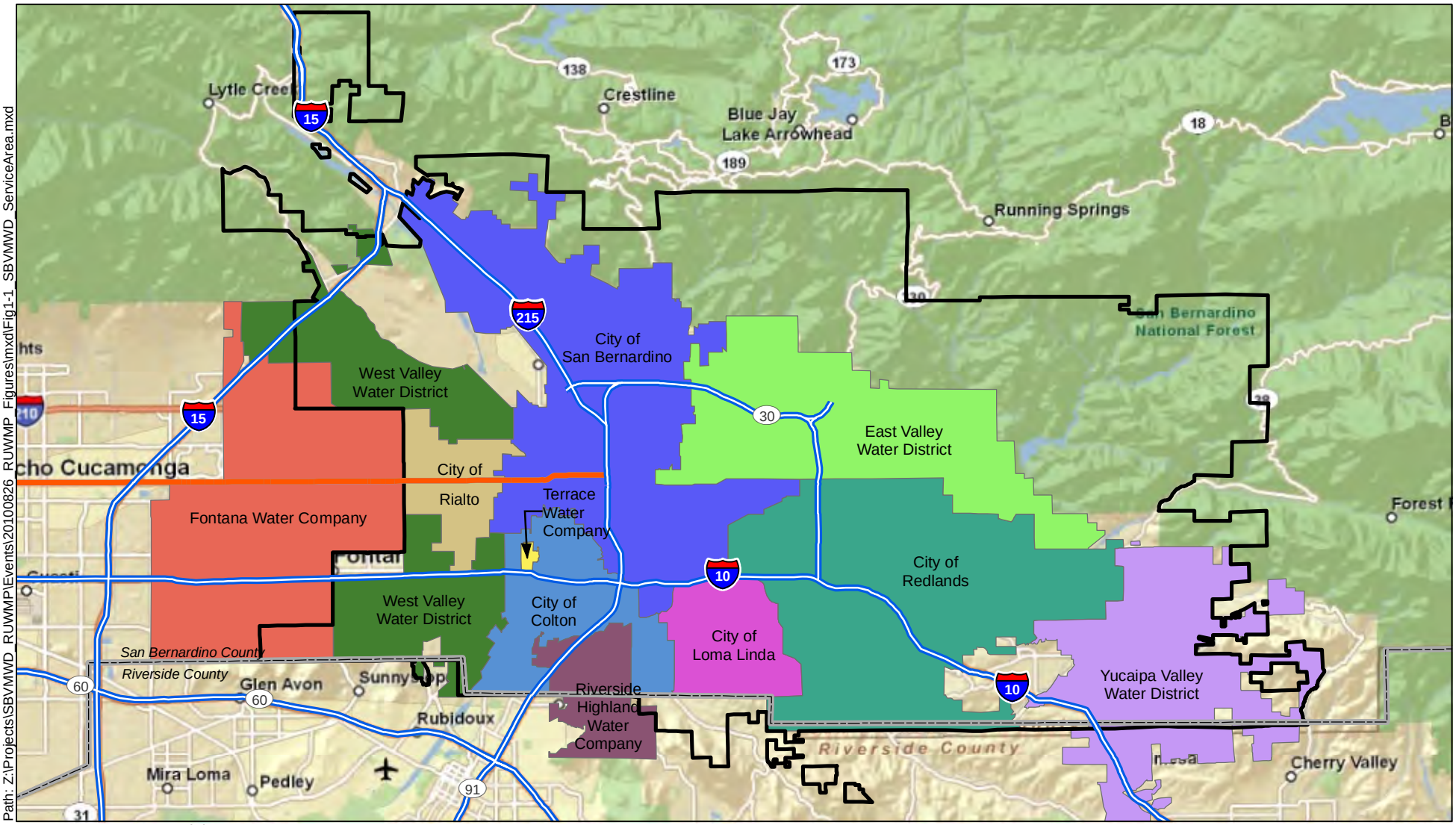
- San Bernardino Valley Municipal Water District (wholesale water agency)
- East Valley Water District
- City of Loma Linda
- City of Redlands
- City of San Bernardino Municipal Water Department
- West Valley Water District
- Yucaipa Valley Water District
- City of Colton

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

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- 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 74 percent of current supplies (see Figure ES-2).

By 2035, groundwater and surface water will still account for 68 percent of supplies. However, the area will also depend upon recycled water. By year 2035, recycled water could make up 11 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

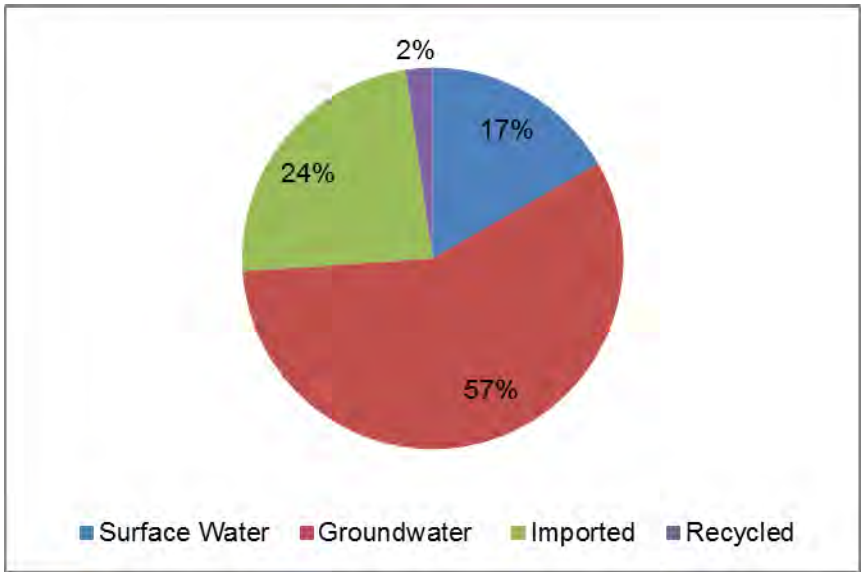
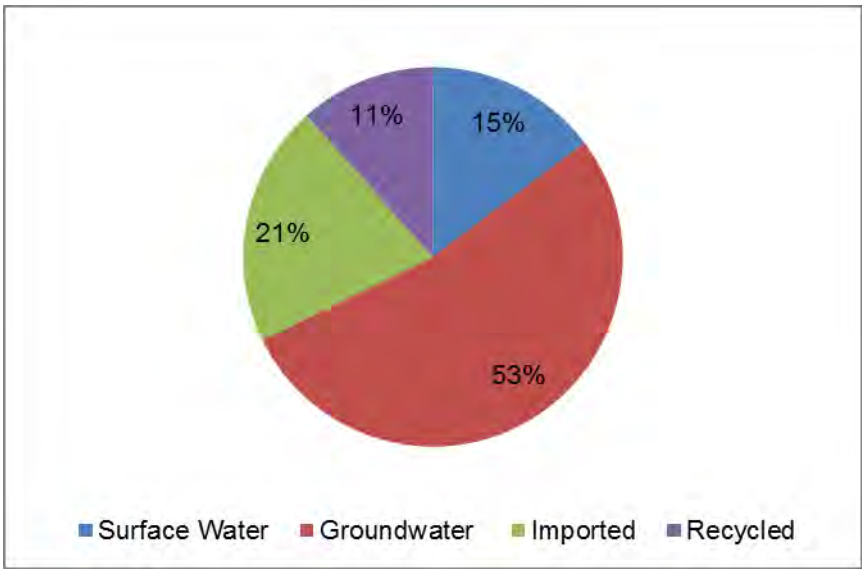


FIGURE ES-3
FUTURE (2035) WATER SUPPLIES



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 20% 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

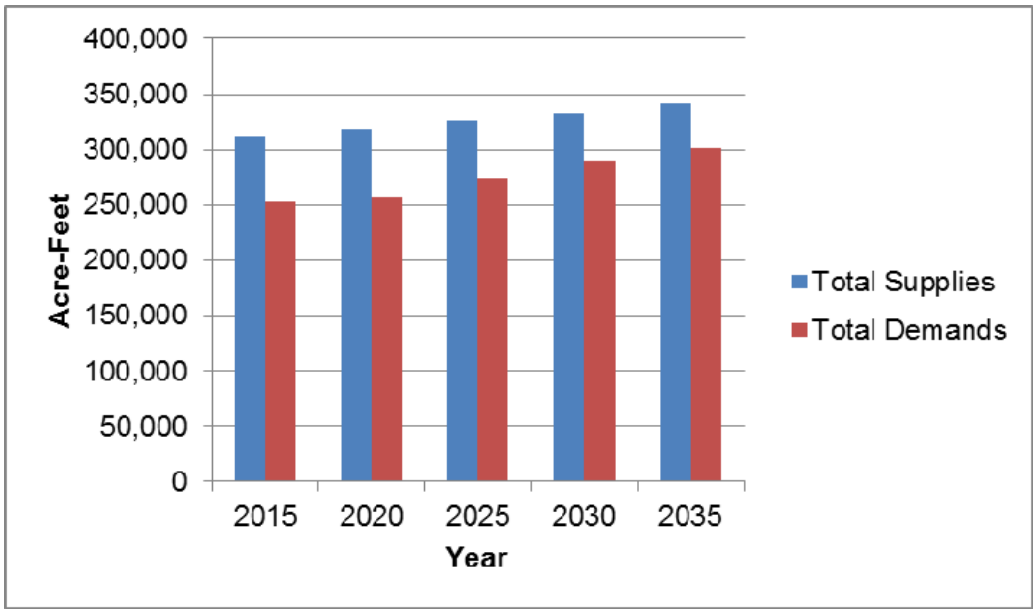


FIGURE ES-5
COMPARISON OF ESTIMATED SUPPLIES VS ESTIMATED DEMANDS IN A SINGLE-DRY YEAR

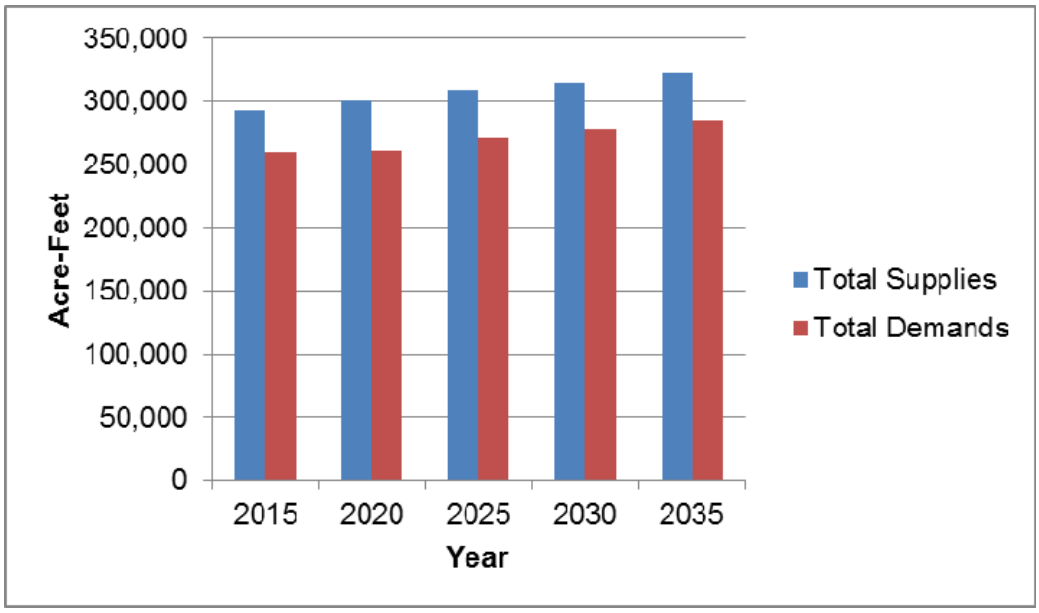
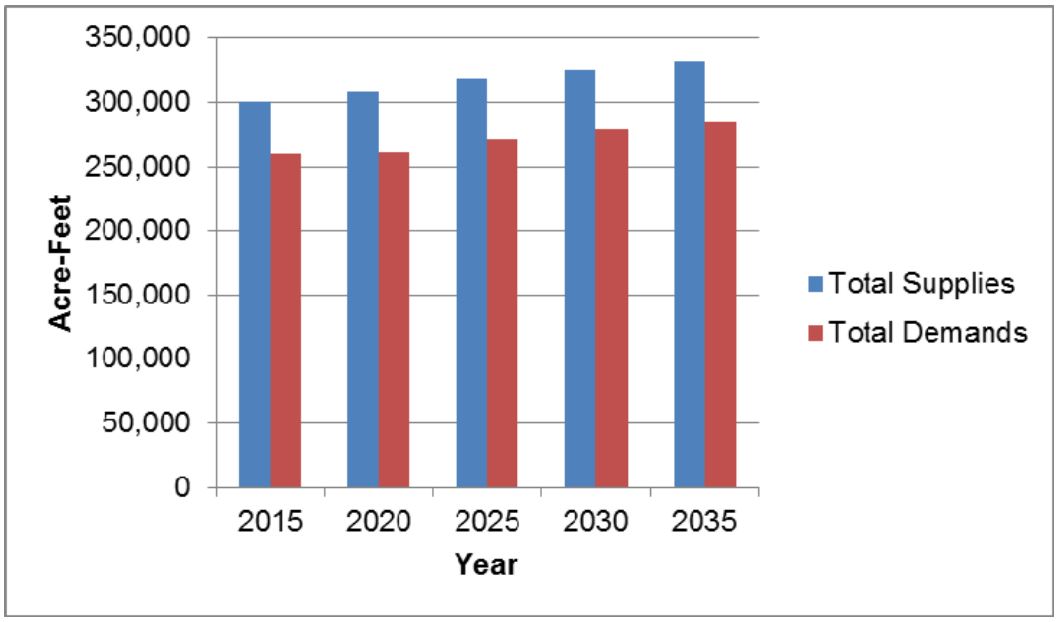


FIGURE ES-6
COMPARISON OF ESTIMATED SUPPLIES VS ESTIMATED DEMANDS IN A MULTIPLE-DRY YEAR PERIOD

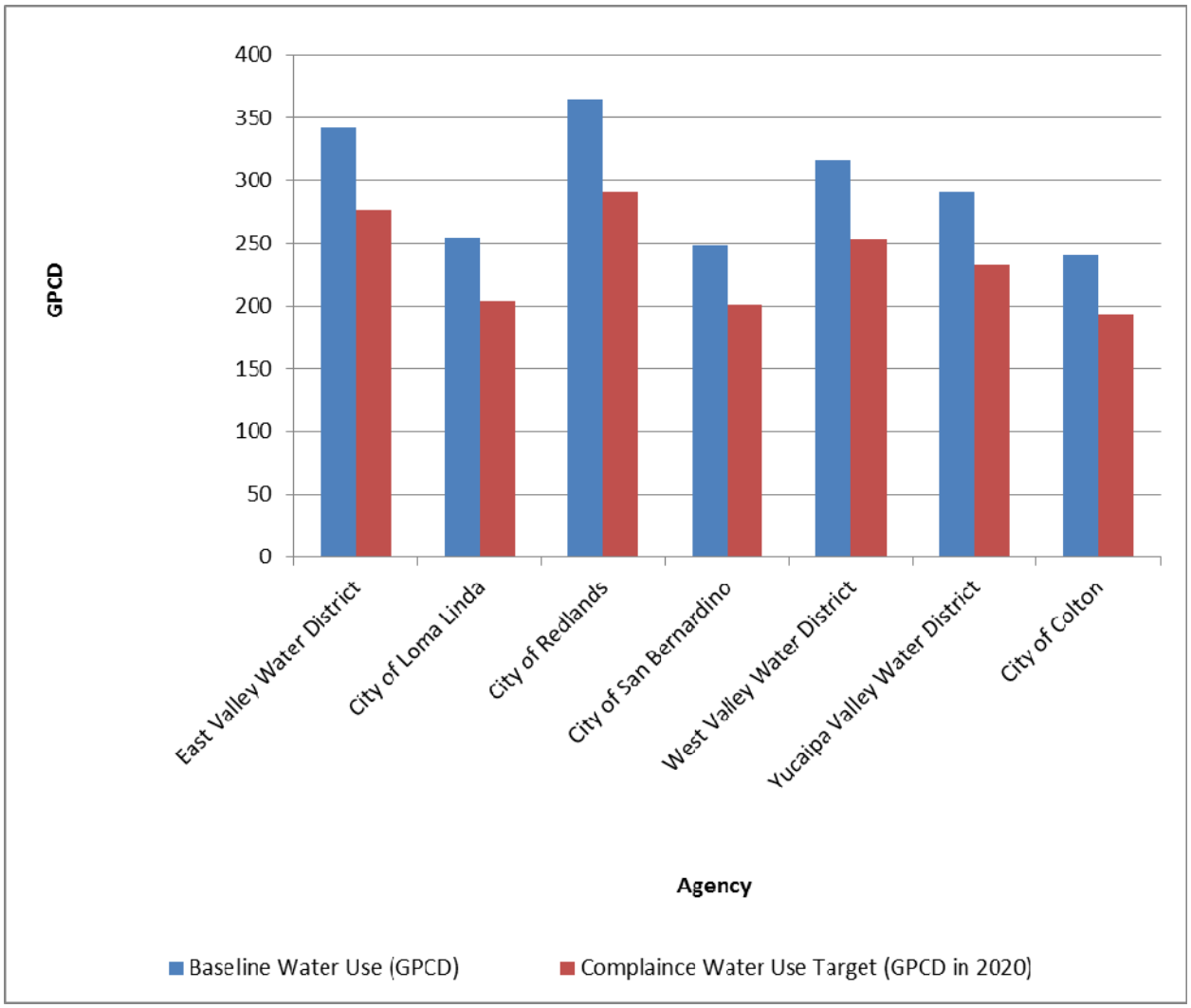


Compliance with the Water Conservation Act of 2009 (SBX7-7)

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.

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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

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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. Amendments to the RUWMP were adopted in November 2012.

[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 2551 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 10-13	§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)		§2.9, pg 2-31	§2.9, pg 2-31	§2.9, pg 2-31	§2.9, pg 2-31	§2.9, pg 2-31	§2.9, pg 2-31	§2.9, pg 2-31	§2.9, pg 2-31
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 10-36	§11.8.7, Table 11-31, pg 11-32	Table 12-37, pg 12-58	§13.8.7, Table 13-27, pg 13-32
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 2-14	§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 10-31	§11.8.2, pg 11-27	§12.7.2, pg 12-27	§13.8.2, pg 13-28
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 2-6	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 10-31	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 13-28
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 §2.2.7, pgs 2-5 to 2-14	§2.2.1 and §7.8.2, pgs 2-6 and 7-27	§2.2.1 and §8.8.2, pgs 2-6 and 8-24	§2.2.1, §2.2.4, §9.7.2, pgs 2-6, 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 2-6 to 2-11, 2-13 and 11-27	§2.2.1 to §2.2.3 and §12.7.2.1 to 12.7.2.3, pgs 2-11 to 2-13 and 12-31	§2.2.1 to §2.2.3 and §13.8.2, pgs 2-6 to 2-11 and 13-28
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 2-14	§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	§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 10-32	§11.8.2, Table 11-26, pg 11-27	§12.7.2, Table 12-30, pg 12-27	§13.8.2, Table 13-28, 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 10-32	§11.8.2, Table 11-27, pg 11-27	§12.7.2.4, Table 12-32, pg 12-35	§13.8.2, Table 13-24, pg 13-28
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 10-42	§11.10, pg 11-38	§12.9, pg 12-57	§13.10, pg 13-37
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.

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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
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 10-35	§11.8.5, pg 11-31	§12.7.6, pg 12-41	§13.8.5, pg 13-31
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 12-4	§13.3, pg 13-2
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 10-117	§11.7.1, pg 11-17	§12.6.1, pg 12-15	§13.7 and §13.7.1, pg 13-16
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, pg 12-14	§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 10-17	§11.7.1, pg 11-19	§12.6.1, pg 12-15	§13.7 and §13.7.1, pg 13-16
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 10-20	§11.7.4, pg 11-20	§12.6.2, pg 12-21	§13.7.4, pg 13-20
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 2-24	§7.8.6, pg 7-31	§8.8.6, pg 8-27	§9.4.2, pg 9-13	§10.8.4.3, pg 10-36	§11.8.6, pg 11-31	§12.7.4, pg 12-37	§13.8.6, pg 13-31
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 10-30	§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 10-15	§11.5.4, Table 11-18, pg 11-15	§12.5.4, pg 12-13	§13.5.4, Table 13-17, pg 13-14
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 10-38	§11.9.2, pg 11-33	§12.8.3, pg 12-44	§13.9.2, pg 13-33
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 10-41	§11.9.9, Table 11-33, pg 11-36	§12.8.6, pg 12-56	§13.9.6, Table 13-30, pg 13-36
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 10-37	§11.9.2, pg 11-33	§12.8.3, pg 12-44	§13.9.7, pg 13-37
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 10-38	§11.9, pg 11-32	§12.8.3, pg 12-44	§13.9.2, Table 13-29, pg 13-34
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 10-38	§11.9, pg 11-33	§12.8.3, pg 12-44	§13.9.2, Table 13-29, pg 13-34
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 10-40	§11.9.8, pg 11-36	§12.8.3, pg 12-44	§13.9.3, pg 13-35
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 10-41	§11.9.10, pg 11-37	§12.8.4, pg 12-56	§13.9.4, pg 13-35
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 10-41	§11.9.11, pg 11-38	§12.8.5, pg 12-56	§13.9.5, pg 13-36
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 10-33	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, pg 13-30
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 10-33	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, Table 13-26, pg 13-30
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 10-33	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, Table 13-26, pg 13-30

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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
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 10-33	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, pg 13-30
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 13-30
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 10-34	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, Table 13-26, pg 13-30
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 10-35	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, pg 13-30
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 10-34	§11.8.4, pg 11-30	§12.7.4, pg 12-37	§13.8.4, pg 13-30
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)		§2.8, Tables 2-8 to 2-10	§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 10-42	§11.10, Tables 11-34 to 11-36, pg 11-38	§12.9, Tables 12-37 to 12-39, pg 12-57	§13.10, Tables 13-31 to 13-33, pg 13-37
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.							

Notes:

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.

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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 adopted the 2010 RUWMP in June and July 2011. In early 2012 some agencies participating in the RUWMP identified desired changes to the document. In addition some clarifications to the document text were requested by DWR. This Amendment to the RUWMP was adopted by the participating agencies in November 2012 <insert final date at final>. Following adoption, the Amended RUWMP was submitted to DWR, the California State Library, and any city or county within which Valley District or any of the purveyors provides water supplies within 30 days of Board approval. Resolutions adopting the Amended RUWMP are provided in Appendix H.

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
April 26, 2011	7th Public Meeting (San Bernardino Agencies)	Update on UWMP Guidebook, Water Demand Calculations, Low Income Demand Calculations, Notices and Hearings, Schedule

Date	Event	Purpose
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	Board/Council Adoptions	Adoption Hearing or Board/Council Meetings for Final UWMP
July 2011	Plan Submittal	File Final UWMP with DWR within 30 days of adoption
October-November 2012	Public Notice and Hearings on Amended RUWMP	Discuss changes to the 2010 RUWMP
November 2012	Board/Council Adoptions	Review and adoption of Amended RUWMP by Boards and Councils
December 2012	Amended Plan Submittal	File Amended RUWMP with DWR within 30 days of adoption

1.4.4 Resources Maximization

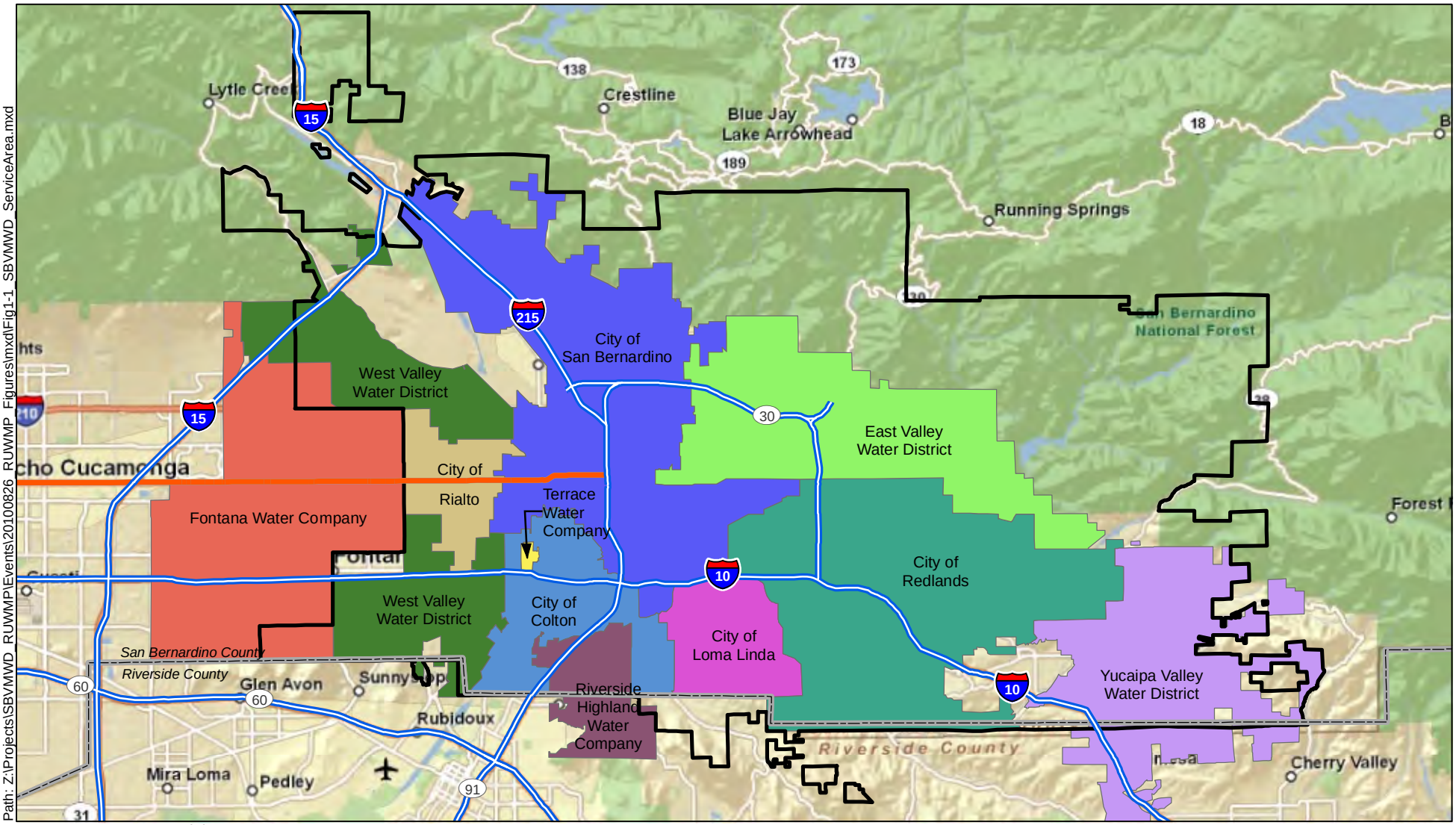
Several documents were developed to enable Valley District and the purveyors to maximize the use of available resources and minimize use of imported water, including the East Valley 2005 UWMP, Redlands 2005 UWMP, SBMWD 2005 UWMP, West Valley 2005 UWMP, YVWD 2005 UWMP, and the 2007 Integrated Regional 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.

Legend

San Bernardino Valley Municipal 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

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

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Figure 1-1

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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.

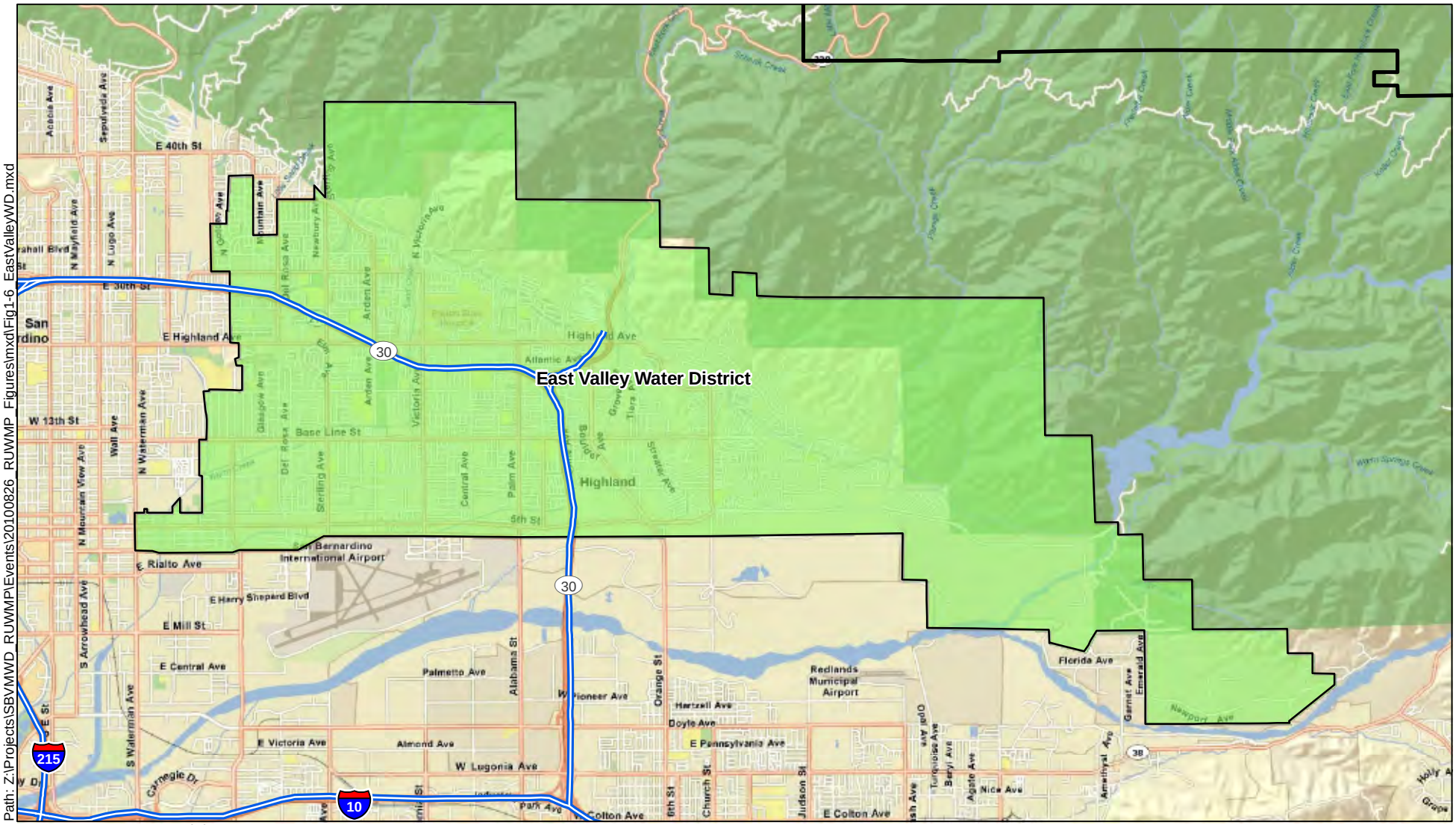
1.5.2.4 City of San Bernardino

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



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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

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

East Valley Water District Service Area

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Figure 1-2

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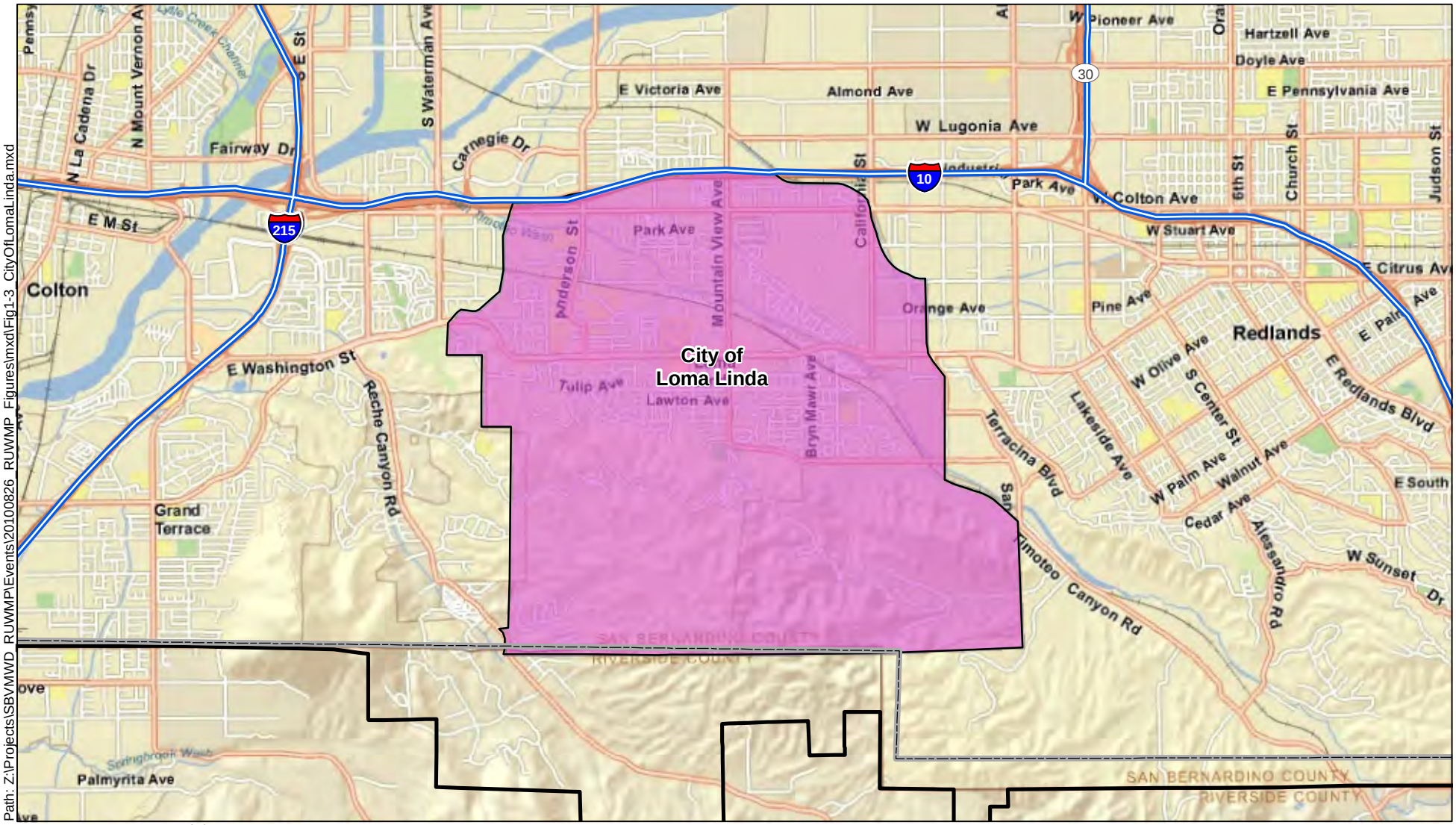

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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

Legend

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

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Scale: Miles

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

City of Loma Linda
Water Service Area

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Figure 1-3

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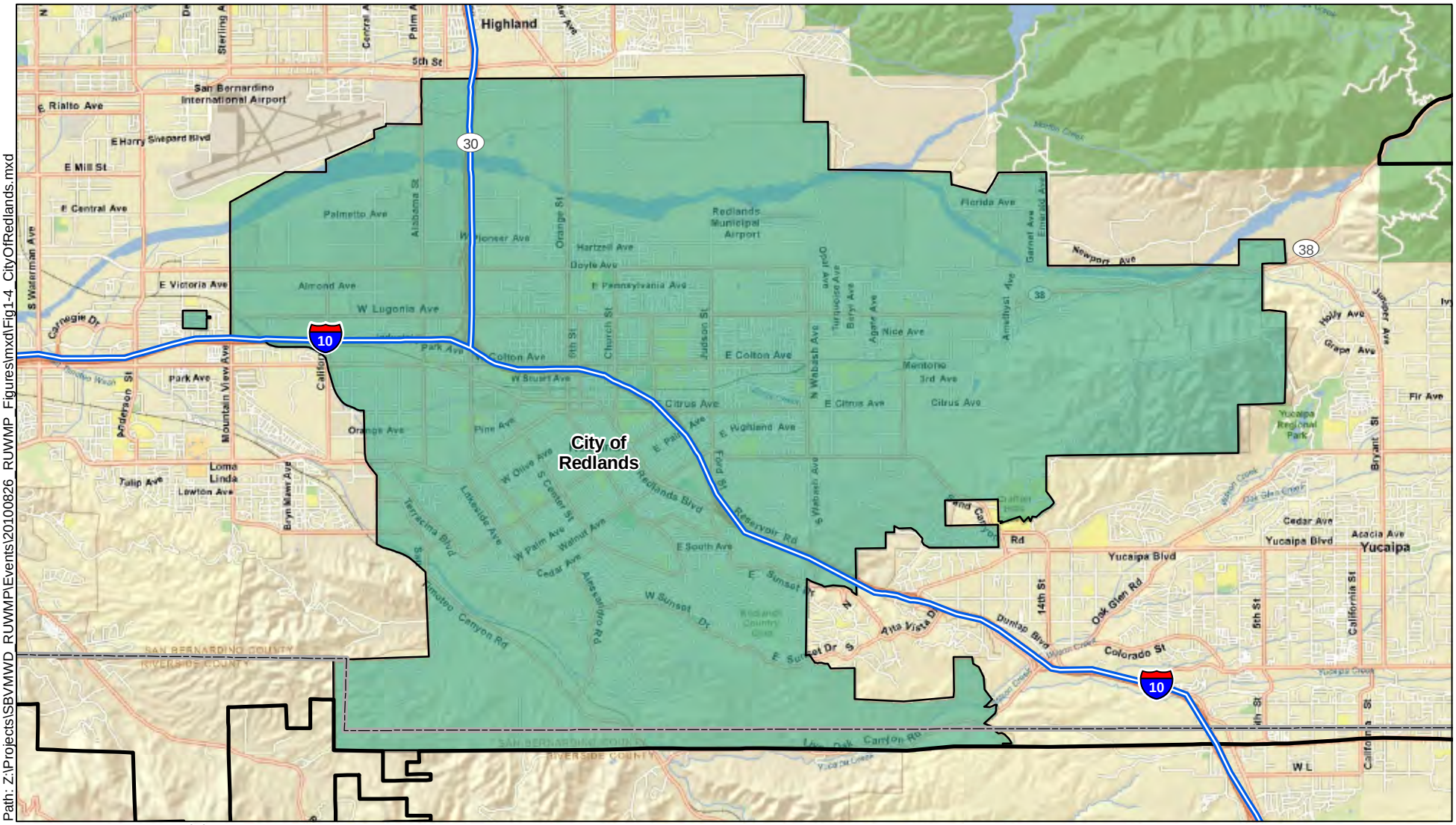

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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

Legend

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

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

City of Redlands
Municipal Utilities Department
Water Service Area

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Figure 1-4

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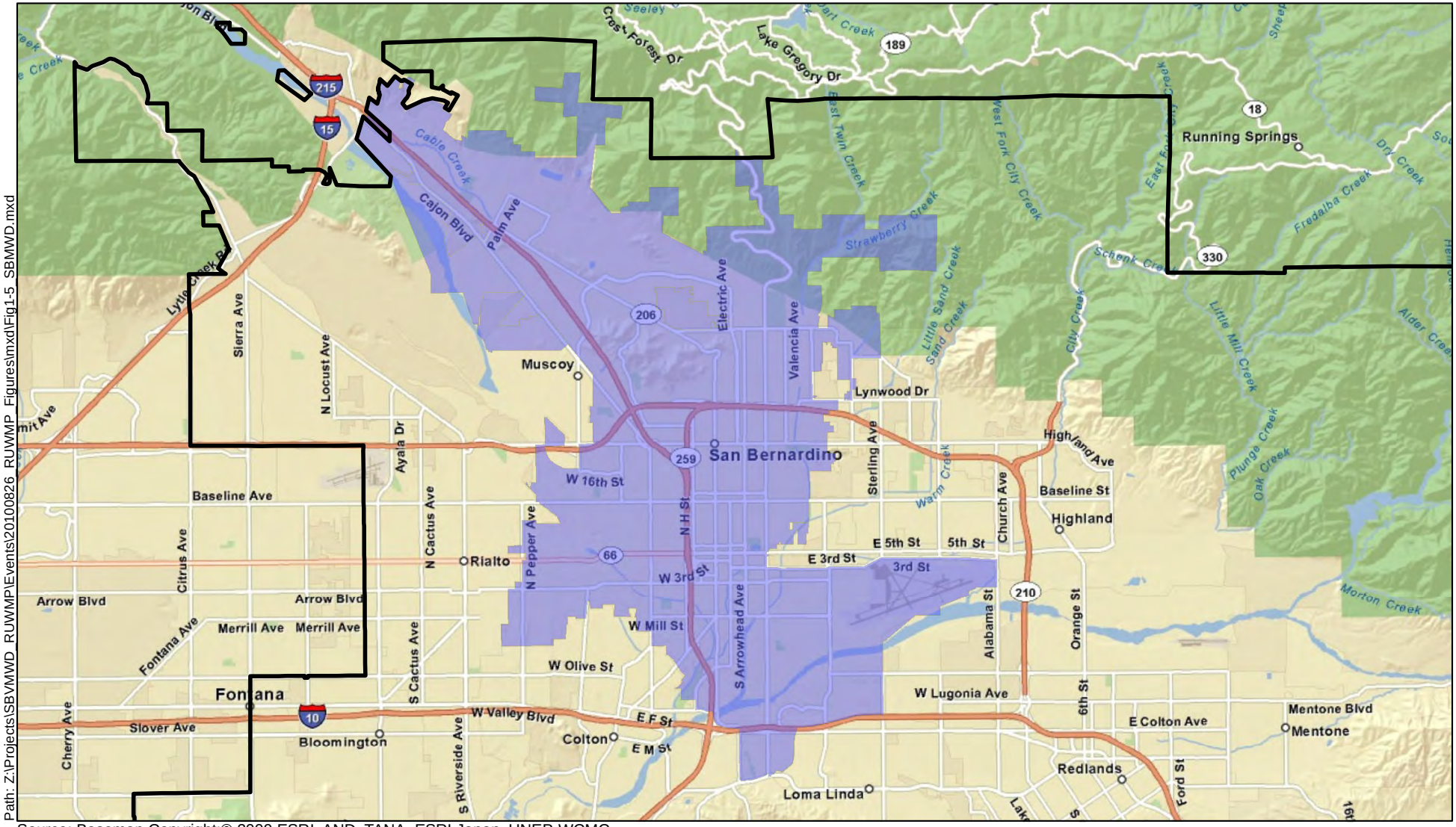

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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

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Legend

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

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Scale: Miles

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

San Bernardino Municipal Water Department Service Area

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Figure 1-5

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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.

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

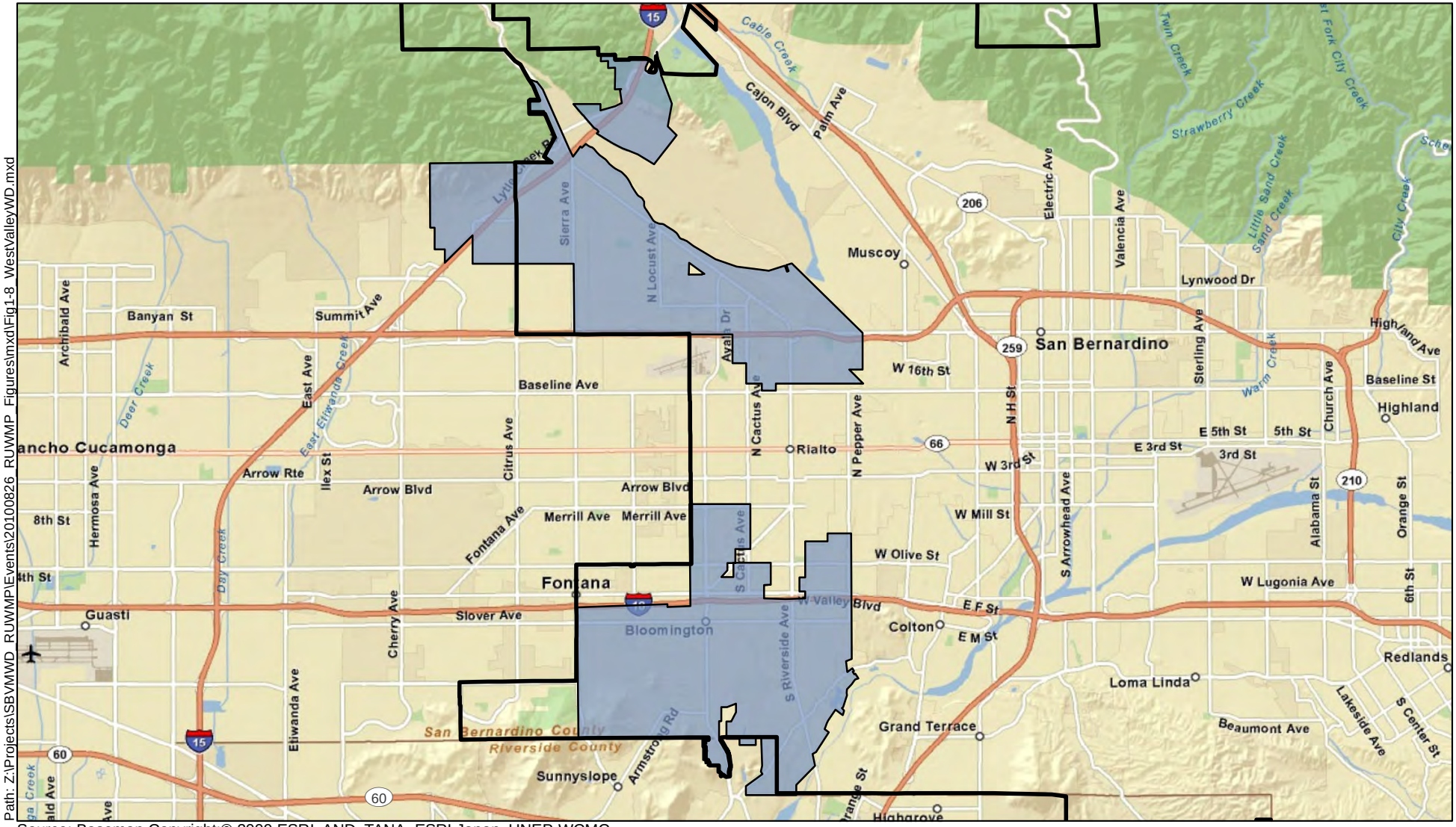
Climate is a primary factor affecting water management in the San Bernardino Valley.

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.



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

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

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Figure 1-6

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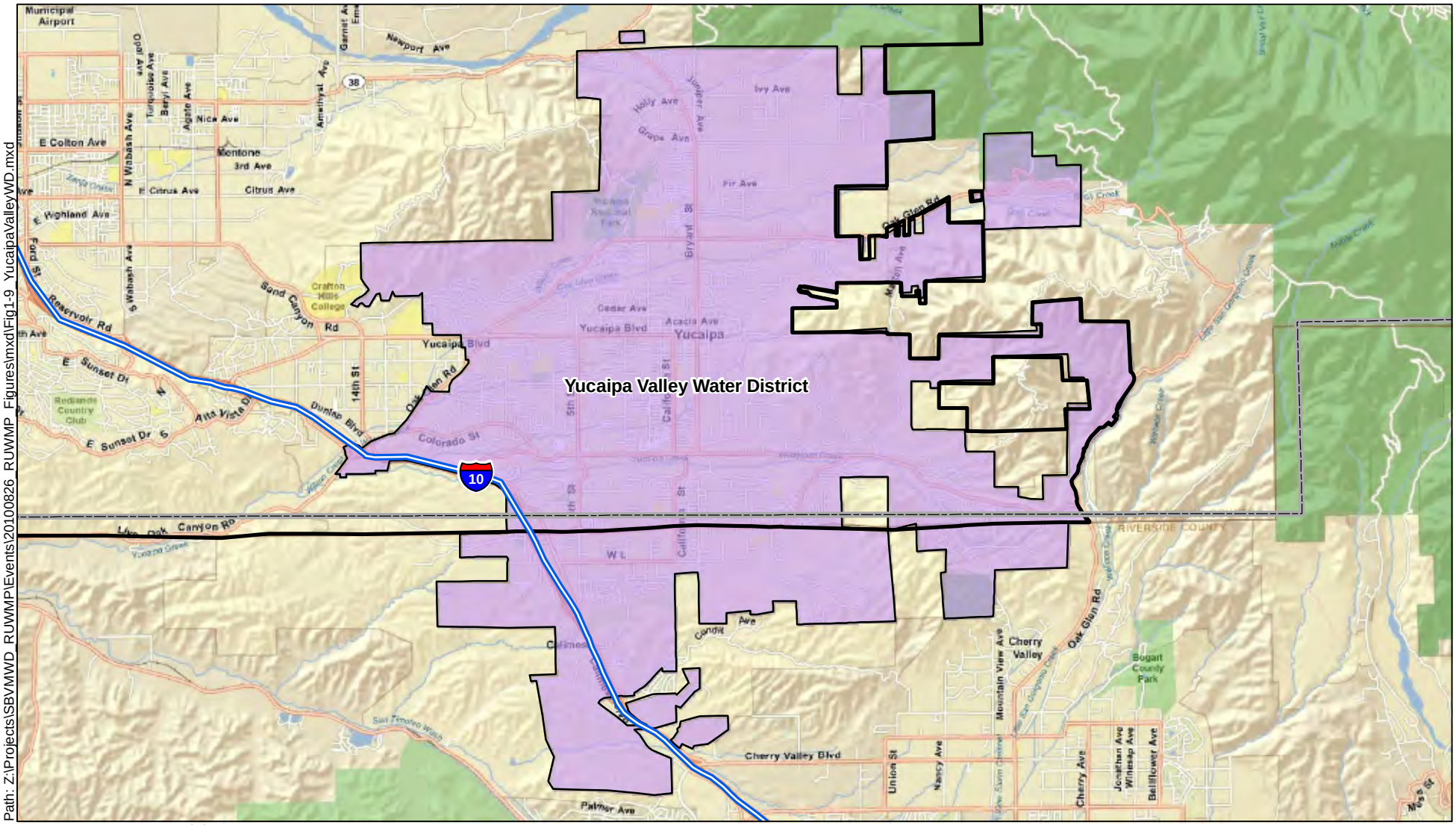

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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

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- San Bernardino Valley Municipal Water District
- Yucaipa 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

Yucaipa Valley Water District Water Service Area

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Figure 1-7

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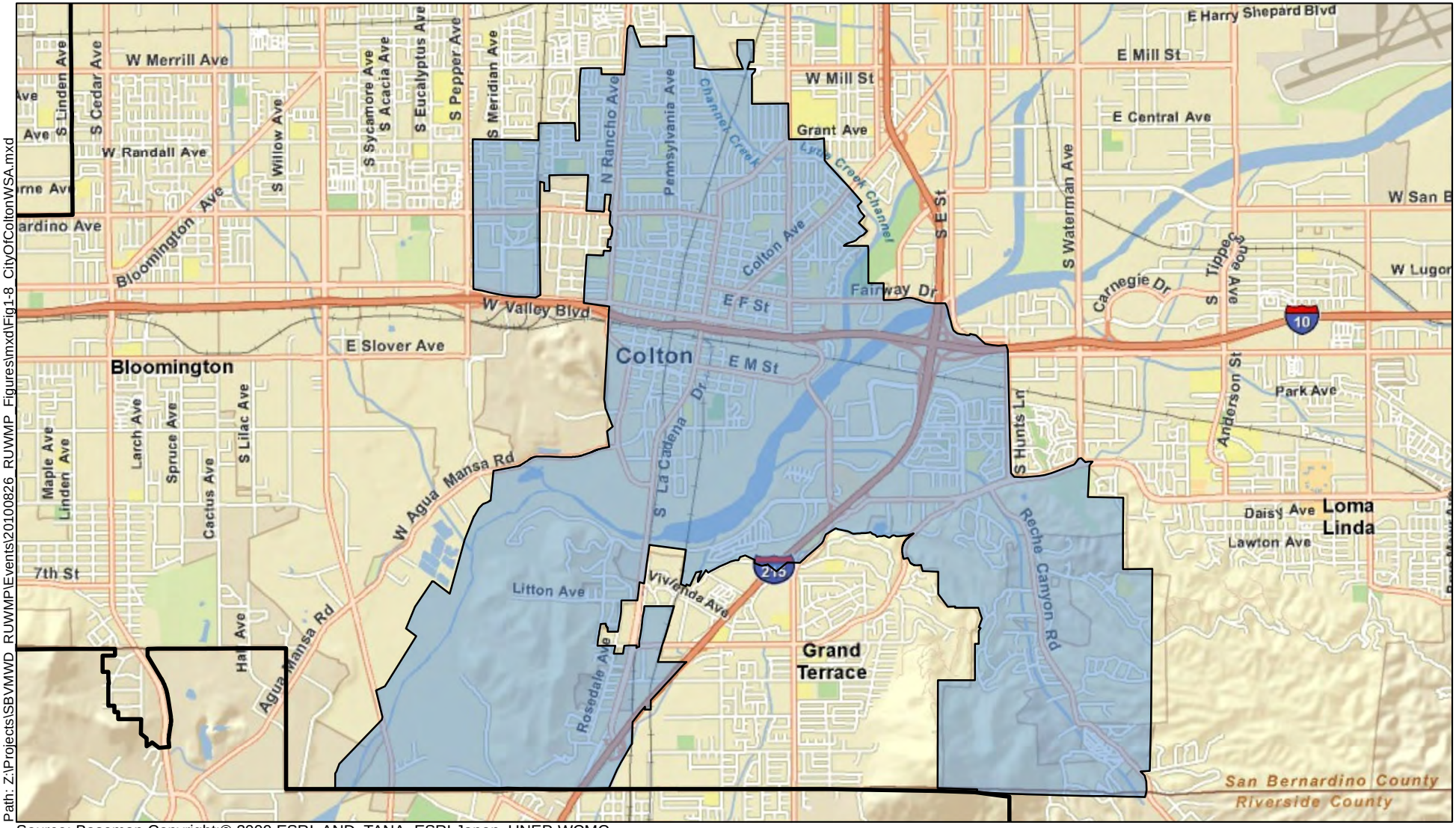

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Water District boundaries courtesy of San Bernardino Valley Municipal Water District.

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Legend

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

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Scale: Miles

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

City of Colton
Public Utilities Department
Water Service Area

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Figure 1-8

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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 (AF) 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

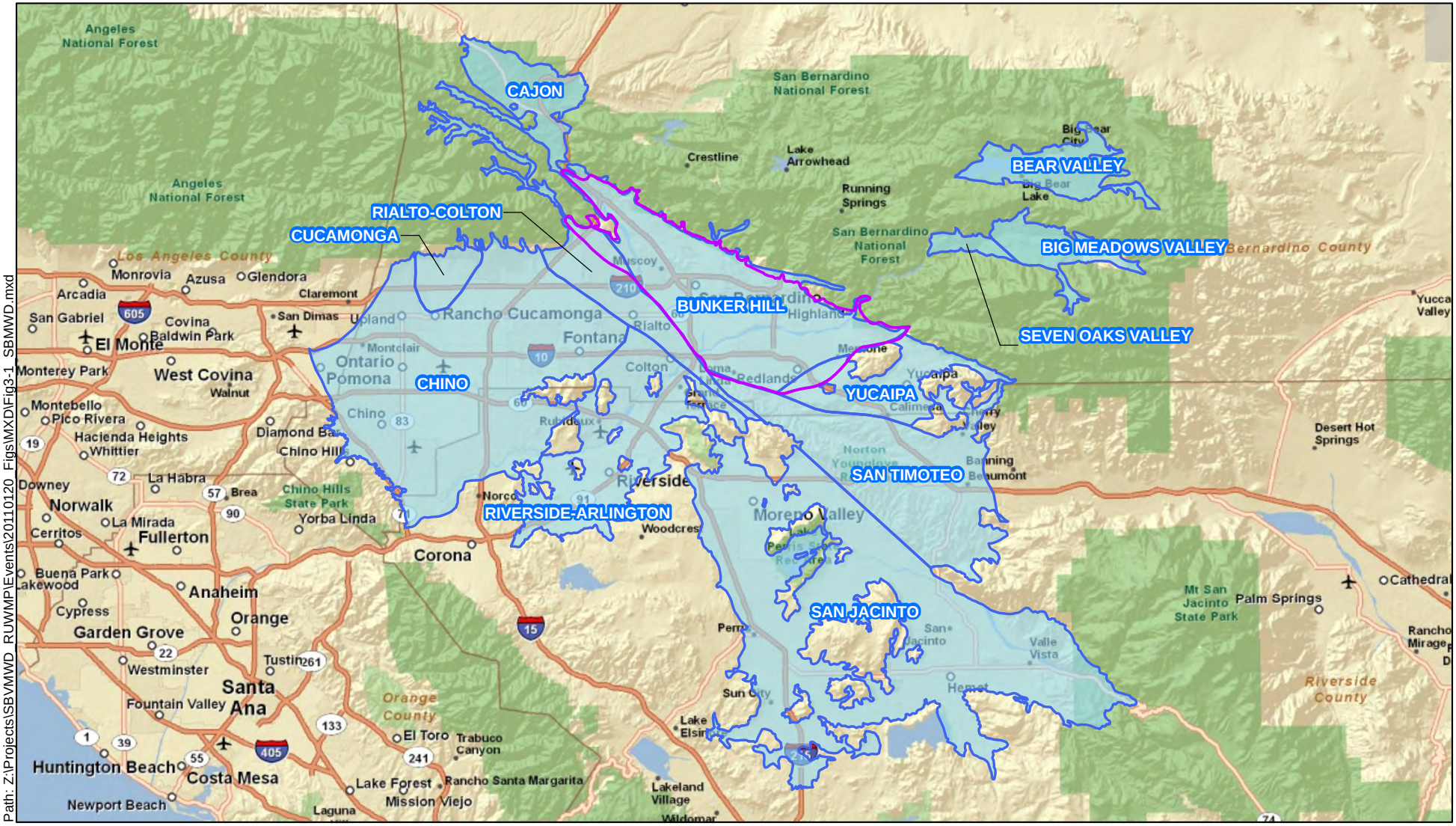
Groundwater is a major source of water supply for the San Bernardino Valley. This section provides a description of local surface water and groundwater management in the San Bernardino Valley, including court judgments, groundwater management plans, and groundwater pumping rights.

2.2.1 The San Bernardino Basin Area

The SBBA was defined by, and adjudicated in gross, by the Western-San Bernardino Judgment (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). Plaintiff agencies in Riverside County are allocated 64,862 AFY (does not include any additional groundwater banking performed by Riverside County agencies). The allocation for the other than plaintiff (non plaintiff) agencies is 167,238 AFY (in the Valley District service area). The Western-San Bernardino Watermaster provides an annual accounting of both the plaintiff and non plaintiff extractions. The plaintiffs may not exceed their allocation. The non plaintiffs may exceed their allocation but may be required to offset the amount they exceed their allocation by importing replenishment water. The Watermaster bases the replenishment water requirement on the cumulative accounting of non plaintiff extractions. In years when the total non plaintiff extractions are less than their allocation, a “credit” is given. The Watermaster can also provide a credit for any new supplies such as new conservation. In years when total extractions are greater than their allocation, a “debit” is given. The Watermaster can also provide a debit for the export of water outside the SBBA in excess of the amount recorded during the base period (1959-1963). If the net accumulated result is a deficit condition, then replenishment water must be provided from outside the watershed such as water imported from the State Water Project. As of the accounting performed for the 2010 Annual Western-San Bernardino Watermaster Report, Valley District has 217,274 AF of net credit accumulated in the SBBA. However, the analysis in the RUWMP assumes the worst case scenario where there is no accumulated credit (see Table 3-1). 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

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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	416,346	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 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 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).

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 to be composed of three other groundwater basins, 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 1,500 feet, water bearing sediments within the Beaumont Basin exist to depths of 700 to 1,000 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 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 AF. 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 AFY. 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.

2.2.7 No Man's Land Subbasin

Fontana Water Company and the 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." Fontana Water Company plans to extract 3,600 AFY from the basin. The City of Rialto also plans to extract water from No Man's Land. Total projected supplies from "No Man's Land" are 9,000 AFY as described in the 2010 Urban Water Management Plans for Fontana Water Company and the City of Rialto (Fontana Water Company 2010 UWMP Table 9; City of Rialto 2010 UWMP, Table 2-5).

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 (64,862 AF) 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 64,862 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 167,238 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 to 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

Valley District, Western, and the San Bernardino Valley Water Conservation District entered into a settlement agreement on August 9, 2005 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 monitoring wells indicate concentrations are less than 1 micrograms per liter (µg/L). However, 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 3 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 the entire 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 and nitrogen in groundwater is an on-going water quality challenge 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.

[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.

- 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.

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 underground storage basins, retail purveyors, 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 Recycled Water

Recycled water is being developed by individual agencies in the San Bernardino Valley. Potential recycled water supplies for each retailer are described in their respective chapters. 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. Anticipated recycled water supplies are documented in Tables 2-8, 2-9, and 2-10.

2.6.3 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 and 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 AF in 2010). San Bernardino agencies will continue to evaluate the viability of desalinated water supplies.

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

Tables 2-8 through 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
Oak Glen	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)]	128,238	128,238	128,238	128,238	128,238	128,238
SBBA- Return Flows Extraction above the Safe Yield [(b)]	-	-	-	-	-	551
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	-	-	3,000	3,000	3,000	3,000
No Man's Land	4,700	4,700	4,700	4,700	4,700	4,700
Sub-Total Groundwater	*171,713*	*175,713*	*180,313*	*180,313*	*180,313*	*180,864*
SWP Water						
Direct Deliveries	21,790	21,683	20,079	20,749	24,055	24,122
SWP Storage [(c)]	41,822	41,929	43,533	42,863	37,505	37,438
Return Flow Direct Deliveries [(d)]	7,844	7,806	7,228	7,470	8,660	8,684
Sub-Total SWP Water [(e)]	*71,456*	*71,418*	*70,840*	*71,082*	*70,220*	*70,244*
Recycled Water						
City of Redlands, City of San Bernardino, Yucaipa Valley Water District [(f)]	*6,764*	*13,960*	*17,161*	*24,599*	*32,462*	*39,526*
Total All Supplies	**300,083**	**311,241**	**318,464**	**326,144**	**333,145**	**340,784**

Notes:

(a) The San Bernardino Basin is managed whereby total safe yield is a combination of Surface Water and Groundwater totaling 232,100 AFY. Per the *Western* Judgment, supply available to the Valley District service area is 167,238 AFY. A decrease in available surface water in any given year does not change available yield from the basin.

(b) Estimated based on demands. Return flow credits are 36% of volume extracted that is greater than non plaintiff safe yield (167,238 AF). See Table 3-1.

(c) Assumes SWP Water is stored in wet years so that it can supplement lower deliveries of SWP water in dry years.

(d) Assumes 36% return flow for direct imported water deliveries (see Table 3-2 for estimate of direct deliveries).

(e) Does not include SWP water from San Gorgonio Pass Water Agency.

(f) See Tables 9-32, 10-33, and 12-37. For purposes of SBx7-7 compliance, recycled water 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
Oak Glen	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)]	145,738	145,738	145,738	145,738	145,738	145,738
SBBA- Return Flows Extraction above the Safe Yield [(d)]	-	-	-	-	-	600
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	-	-	3,000	3,000	3,000	3,000
No Man's Land	4,700	4,700	4,700	4,700	4,700	4,700
Sub-Total Groundwater	*188,613*	*188,613*	*193,213*	*194,813*	*194,813*	*195,413*
SWP Water						
SWP Deliveries [(e)]	13,338	13,338	13,338	13,338	12,312	12,312
SWP from Storage [(f)]	50,274	50,274	50,274	50,274	49,248	49,248
Return Flow Direct Deliveries [(g)]	4,802	4,802	4,802	4,802	4,432	4,432
Sub-Total SWP Water [(h)]	*68,414*	*68,414*	*68,414*	*68,414*	*65,992*	*65,992*
Recycled Water						
City of Redlands, City of San Bernardino, Yucaipa Valley Water District [(i)]	*6,764*	*13,960*	*17,161*	*24,599*	*32,462*	*39,526*
Total All Supplies	**285,466**	**292,662**	**300,463**	**309,501**	**314,942**	**322,606**

Notes:

(a) The San Bernardino Basin is managed whereby total safe yield is a combination of Surface Water and Groundwater totaling 232,100 AFY. Per the *Western* Judgment, supply available to the Valley District service area is 167,238 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 to 63,612 AF) available through a combination of SWP deliveries and SWP from storage.

(g) Assumes 36% return flow for direct imported water deliveries (see Table 3-2 for estimate of direct deliveries).

(h) Does not include SWP from San Gorgonio Pass Water Agency.

(i) See Tables 9-32, 10-33, and 12-37. For purposes of SBx7-7 compliance, recycled water 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
Oak Glen	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)]	143,838	143,838	143,838	143,838	143,838	143,838
SBBA- Return Flows Extraction above the Safe Yield [(d)]	-	-	-	-	-	600
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	-	-	3,000	3,000	3,000	3,000
No Man's Land	4,700	4,700	4,700	4,700	4,700	4,700
Sub-Total Groundwater	*187,637*	*187,637*	*192,063*	*193,663*	*193,663*	*194,263*
SWP Water						
SWP Deliveries [(e)]	33,858	33,858	33,858	33,858	35,910	35,910
SWP from Storage [(f)]	29,754	29,754	29,754	29,754	25,650	25,650
Return Flow Direct Deliveries [(g)]	12,189	12,189	12,189	12,189	12,928	12,928
Sub-Total SWP Water [g]	*75,801*	*75,801*	*75,801*	*75,801*	*74,488*	*74,488*
Recycled Water						
City of Redlands, City of San Bernardino, Yucaipa Valley Water District [(h)]	*6,764*	*13,960*	*17,161*	*24,599*	*32,462*	*39,526*
Total All Supplies	**293,777**	**300,973**	**308,600**	**317,638**	**324,188**	**331,852**

Notes:

(a) The San Bernardino Basin is managed whereby total safe yield is a combination of Surface Water and Groundwater totaling 232,100 AFY. Per the *Western* Judgment, supply available to the Valley District service area is 167,238 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) Mutli-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 to 63,612 AF) available through a combination of SWP deliveries and SWP from storage.

(g) Assumes 36% return flow for direct imported water deliveries (see Table 3-2 for estimate of direct deliveries).

(h) Does not include SWP from San Gorgonio Pass Water Agency.

(i) See Tables 9-32, 10-33, and 12-37. For purposes of SBx7-7 compliance, recycled water is considered to be a local rather than regional source.

2.9 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 Recharge Obligation

As detailed in Section 2.2.1, groundwater in the SBBA is adjudicated, in gross, by the terms of the Western Judgment. An obligation to recharge the basin is triggered whenever the Watermaster determines the basin is in a net accumulated deficit condition. Table 3-1 estimates SBBA demands from 2015 to 2035 including any recharge obligation. The amount of the recharge obligation conservatively assumes the worst case scenario where there are no credits to offset the debits.

TABLE 3-1
POTENTIAL RECHARGE OBLIGATION IN THE SBBA

	2015	2020	2025	2030	2035
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[(a)]	114,187	112,060	118,657	121,319	124,687
Fontana Water Company, Marygold Mutual Water Company, Muscoy Mutual Water Company, City of Rialto, Terrace Water Company, Other/Private[(b)]	45,338	44,682	44,382	44,082	44,082
Total Estimated Demands by Non-Plaintiffs	*159,525*	*156,742*	*163,039*	*165,401*	*168,769*
Safe Yield	167,238	167,238	167,238	167,238	167,238
Balance	(7,713)	(10,496)	(4,199)	(1,837)	1,531
Return flow credits for over extraction (36% of volume extracted that is greater than 167,238 AF).	0	0	0	0	(551)
Return flow credits for imported water deliveries[(c)]	(1,645)	(2,206)	(2,914)	(3,626)	(3,877)
Potential Recharge Obligation/(Credit)[(d)]	(9,358)	(12,702)	(7,113)	(5,462)	(2,897)

Notes:
(a) Estimated from data provided in Chapters 7 through 13 of this UWMP
(b) Data from 2007 IRWMP for Marygold Mutual WC, Muscoy Mutual WC, Terrace WC, Other/Private. For Fontana Water Company and City of Rialto data taken from 2010 UWMPs. Estimated assuming each groundwater basin will provide a similar percentage of overall demands as occurred 2005-2009.
(c) 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
(d) If Total Demands by Non-Plaintiffs less any return flow credits is greater than 167,238 AF then the difference is a recharge obligation. If Total Demands by Non-Plaintiffs less any return flow credits is less than 167,238 AF then there is a credit.

3.2 Demands for Seven Oaks Supply

As described in Section 2.6.1, Valley District and Western anticipate using water made available by Seven Oaks Dam for direct deliveries, groundwater recharge and storage. In a normal year the Seven Oaks supply available to the Valley District service area is estimated to be around 10,800 AF (Table 2-8), with no supply anticipated in a single-dry or multiple dry years.

3.3 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.

3.3.1 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”. Valley District anticipates making direct deliveries of imported water to East Valley Water District, the City of Redlands, City of San Bernardino, West Valley Water District, Yucaipa Valley Water District, Fontana Water Company, and Crestline-Lake Arrowhead Water Company.

3.3.2 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.

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.

3.3.3 Storage of Imported Water

One of the primary water management strategies in the area is to store imported water when it is available so that it can be used during drought periods. The amount of SWP water that is planned to be stored for later pumping is shown in Table 3-2.

3.3.4 Total Anticipated Demands on Imported Water from Valley District

Table 3-2 summarizes potential total demands for imported water from Valley District during the period of this Plan.

TABLE 3-2
ESTIMATE TOTAL DEMANDS FOR IMPORTED WATER 2015 TO 2035 (AF)

	2015	2020	2025	2030	2035
Direct Deliveries[(a)]	21,683	20,079	20,749	24,055	24,122
Big Bear Municipal Water District/Big Bear Lake	6,500	6,500	6,500	6,500	6,500
Total Demands	*28,183*	*26,579*	*27,249*	*30,555*	*30,622*
Water for Recharge/Groundwater Pumping[(b)]	35,429	37,033	36,363	31,005	30,938
Total Imported Water Demands	**63,612**	**63,612**	**63,612**	**61,560**	**61,560**

Notes:
(a) Demands for imported water for East Valley Water District, City of Redlands, City of San Bernardino, West Valley Water District, and Yucaipa Valley Water District provided as part of this RUWMP. Demands for Fontana Water Company estimated from 2010 Fontana Water Company Urban Water Management Plan. Demands for Crestline-Lake Arrowhead Water Company from 2007 IRWMP.
(b) Imported water not used for direct deliveries or deliveries to Big Bear Municipal Water District will be recharged to support groundwater pumping.

3.4 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 3-3).

TABLE 3-3
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

3.5 Demands for Other Water Resources

The Rialto-Colton Subbasin, Riverside-Arlington Subbasin (including the Riverside North Basin) Chino Basin, and Yucaipa Subbasin are within the Valley District service area and are important supplies for several agencies participating in this plan. The Beaumont and San Timoteo groundwater basins are not within the Valley District service area, but are utilized by YVWD. Table 3-4 provides an estimate of demands for supplies from these basins from the agencies participating in the UWMP.

TABLE 3-4
DEMANDS FOR GROUNDWATER RESOURCES OTHER THAN THE SBBA 2015 TO 2035 (AF)

	2015	2020	2025	2030	2035
Yucaipa Basin	6,085	6,077	6,094	6,110	6,110
Chino Basin	15,000	15,900	15,900	15,900	15,900
Rialto-Colton Basin	19,552	21,141	21,777	22,544	23,920
North Riverside	2,897	2,766	2,811	2,900	3,024
Beaumont Basin	384	384	384	384	384
San Timoteo Basin	230	230	230	230	230
No Man's Land	5,819	7,913	9,000	9,000	9,000
Total	**49,967**	**54,411**	**56,196**	**57,068**	**58,568**

Notes:
(a) Data for agencies participating in this UWMP, estimated from data provided in Chapters 7 through 13 of this UWMP.
(b) For Fontana Water Company and City of Rialto data taken from 2010 UWMPs. Estimated assuming each groundwater basin will provide a similar percentage of overall demands as occurred 2005-2009.

In addition to regional water sources (SBBA water and other local surface and groundwater, imported water), some water agencies have plans to use recycled water. Table 3-5 provides summarizes the anticipated future demand for recycled water.

TABLE 3-5
DEMANDS FOR RECYCLED WATER 2015 TO 2035 (AF)

	2015	2020	2025	2030	2035
City of Redlands[(a)]	2,224	3,040	3,290	3,290	3,290
City of San Bernardino[(b)]	5,600	7,000	13,000	19,600	25,500
Yucaipa Valley Water District[(c)]	6,136	7,121	8,309	9,572	10,736
Total Recycled Water	*13,960*	*17,161*	*24,599*	*32,462*	*39,526*

Notes:
(a) See Table 9-32.
(b) See Table 10-33.
(c) See Table 12-37.

3.6 Total Demands

Table 3-6 presents an estimate of total demands for agencies within Valley District.

TABLE 3-6
TOTAL DEMAND BY AGENCY 2015 TO 2035 (AF)

	2015	2020	2025	2030	2035
East Valley Water District[(a)]	22,925	24,721	29,235	33,814	38,461
City of Loma Linda[(a)]	5,811	5,478	5,819	6,181	6,565
City of Redlands[(a)]	30,208	33,030	36,925	39,005	39,005
City of San Bernardino[(a)]	51,928	48,839	50,591	52,409	54,296
West Valley Water District[(a)]	23,964	27,526	32,143	34,646	38,109
Yucaipa Valley Water District[(a)]	20,331	18,651	19,105	22,460	23,865
City of Colton[(a)]	13,010	12,608	13,000	13,770	14,853
Fontana Water Company[(b)]	42,519	44,613	45,700	45,700	45,700
City of Rialto[(c)]	11,676	10,964	10,964	10,964	10,964
Marygold Mutual Water Company[(d)]	1,500	1,500	1,500	1,500	1,500
Muscoy Mutual Water Company[(d)]	2,100	2,100	2,100	2,100	2,100
Terrace Water Company[(d)]	900	900	900	900	900
Crestline Lake Arrowhead Water Company[(e)]	100	100	100	100	100
Big Bear Municipal Water District[(f)]	6,500	6,500	6,500	6,500	6,500
Other/Private[(d)]	19,900	19,600	19,300	19,000	19,000
Total	**253,372**	**257,129**	**273,882**	**289,049**	**301,918**

Notes:
(a) From Chapters 7 through 13 of this UWMP. Demands after accounting for conservation.
(b) Estimated demands for SBBA water, direct deliveries of imported water, and No Man's Land groundwater, does not include demands for recycled water from IEUA. From 2010 Fontana Water Company UWMP.
(c) Estimated demands for SBBA, Rialto Basin groundwater, No Man's Land groundwater, and North Riverside Groundwater from 2010 City of Rialto UWMP.
(d) From 2007 IRWMP.
(e) Estimated demands for SWP water from Valley District. From 2007 IRWMP.
(f) Estimated demands for SWP water in lieu of Big Bear Lake releases.

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 percent 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 5 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 3-6 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 (Table 2-8)[(a)]	311,241	318,464	326,144	333,145	340,784
Total Demands (from Table 3-6)[(a)]	253,372	257,129	273,882	289,049	301,918
Surplus/Deficit in Normal Year	57,869	61,335	52,262	44,096	38,866
Difference as % of Supply	19%	19%	16%	13%	11%
Difference as % of Demand	23%	24%	19%	15%	13%

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

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 (Table 2-9)[(a)]	292,662	300,463	309,501	314,942	322,606
Total Demands (from Table 3-6)[(a), (b)]	260,389	261,110	271,234	278,860	285,152
Surplus/Deficit in Single-Dry Year	32,273	39,352	38,267	36,082	37,454
Difference as % of Supply	11%	13%	12%	11%	12%
Difference as % of Demand	12%	15%	14%	13%	13%

Notes:
(a) Does not include supplies or demands for imported water to be supplies by San Gorgonio Pass Water Agency.
(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 (Table 2-10)[(a)]	300,973	308,600	317,638	324,188	331,852
Total Demands (from Table 3-6)[(a), (b)]	260,389	261,110	271,234	278,860	285,152
Surplus/Deficit in Multiple-Dry Year	40,584	47,490	46,404	45,327	46,699
Difference as % of Supply	13%	15%	15%	14%	14%
Difference as % of Demand	16%	18%	17%	16%	16%

Notes:
(a) Does not include supplies or demands for imported water to be supplies by San Gorgonio Pass Water Agency.
(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

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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

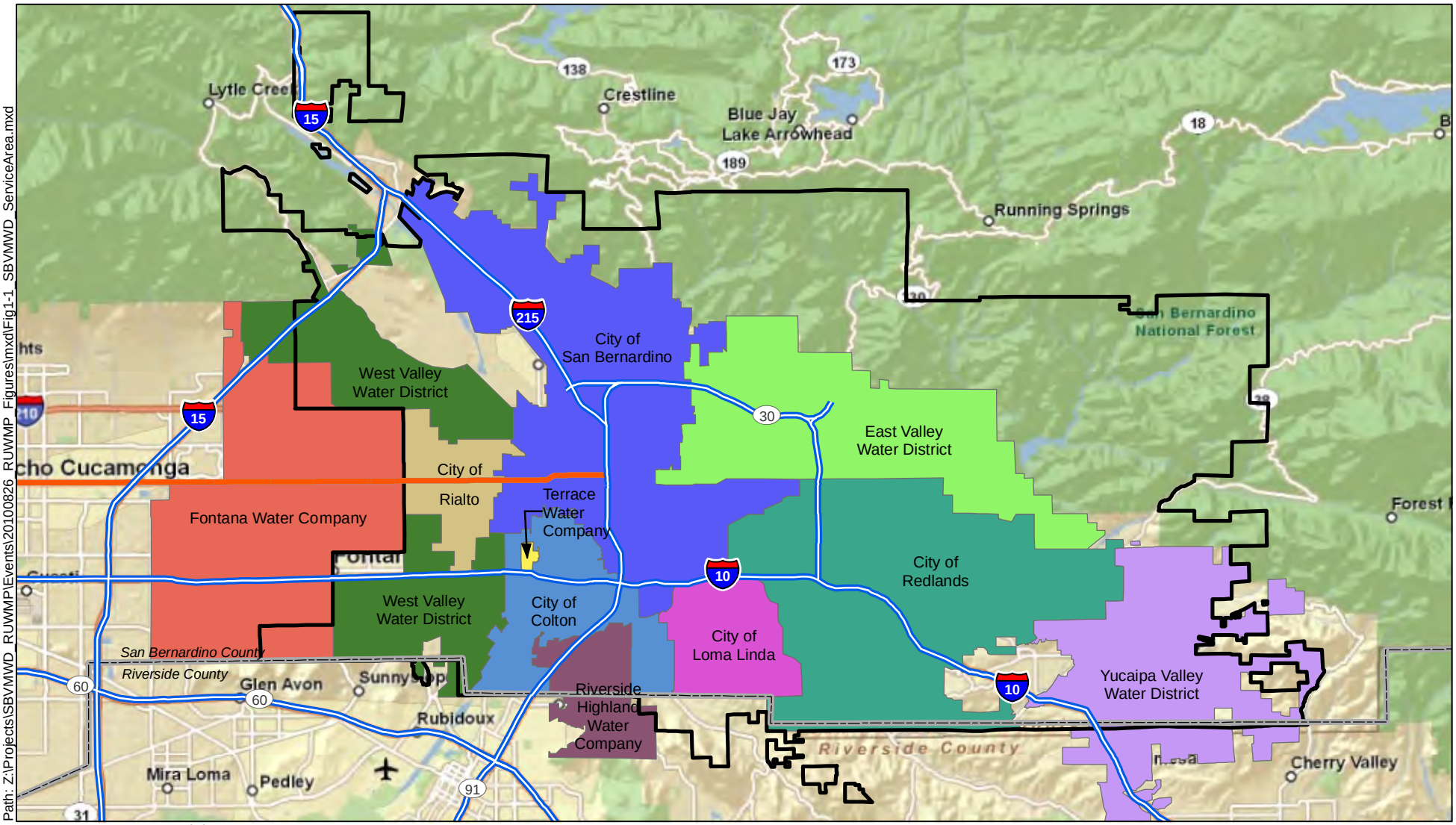
The climate within Valley District's service area is characterized by warm, dry summers and mild winters with moderate amounts of rainfall. Mean annual temperatures average 64.1°F, with summer high temperatures (June through September) in the low 80s and winter lows in the upper 30s. The average annual 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

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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 6-1

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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

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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 19,251 acres, or 30.08 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

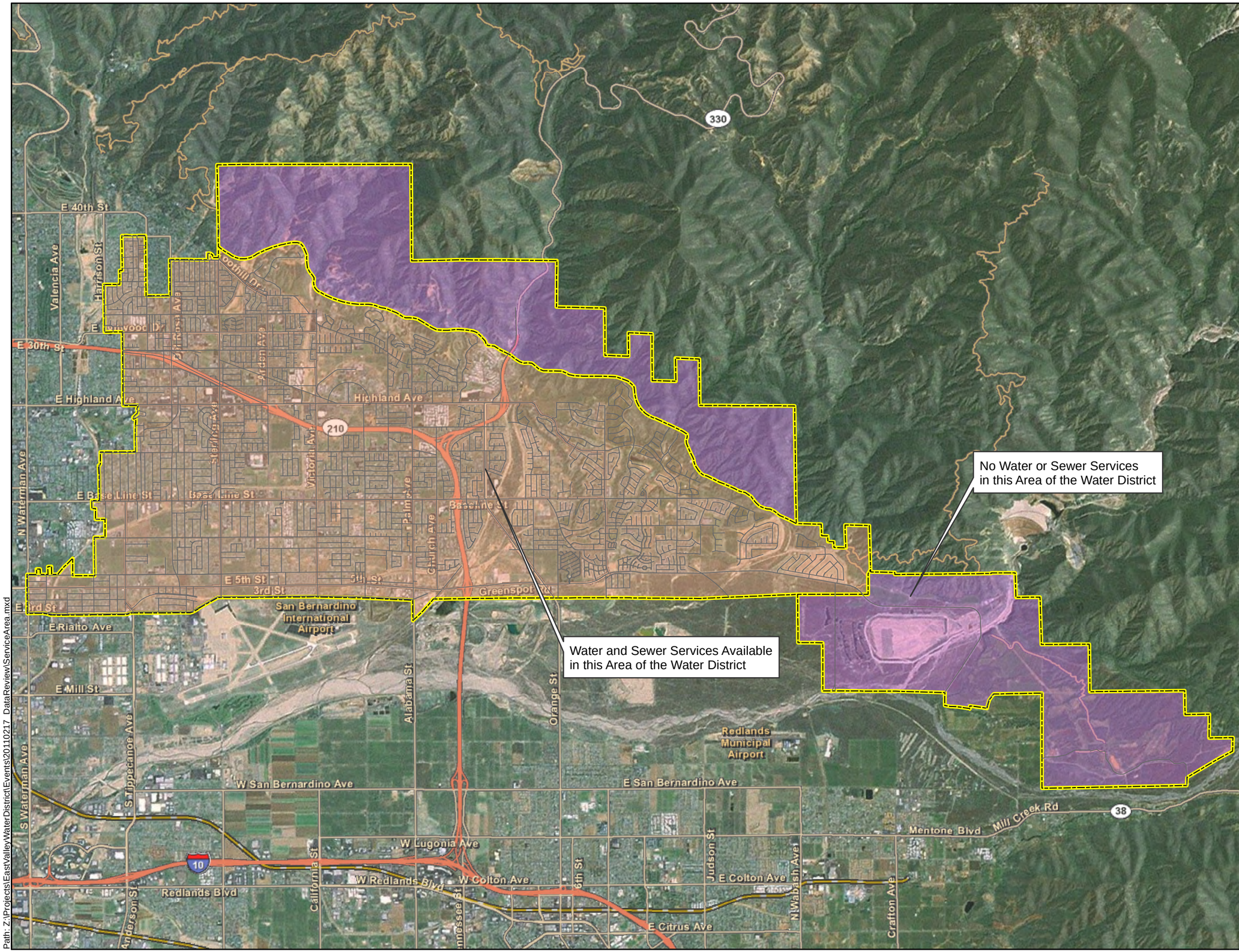
	2010	2015	2020	2025	2030	2035	Data Source
Service area population	63,055	66,157	80,212	106,218	121,666	137,369	Estimated from SCAG

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

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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

Water Use Sectors	Metered # of accounts	Metered Volume (AFY)	Not Metered # of accounts	Not Metered Volume (AFY)	Total 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 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.

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[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.

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.

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 6 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 3 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

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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.

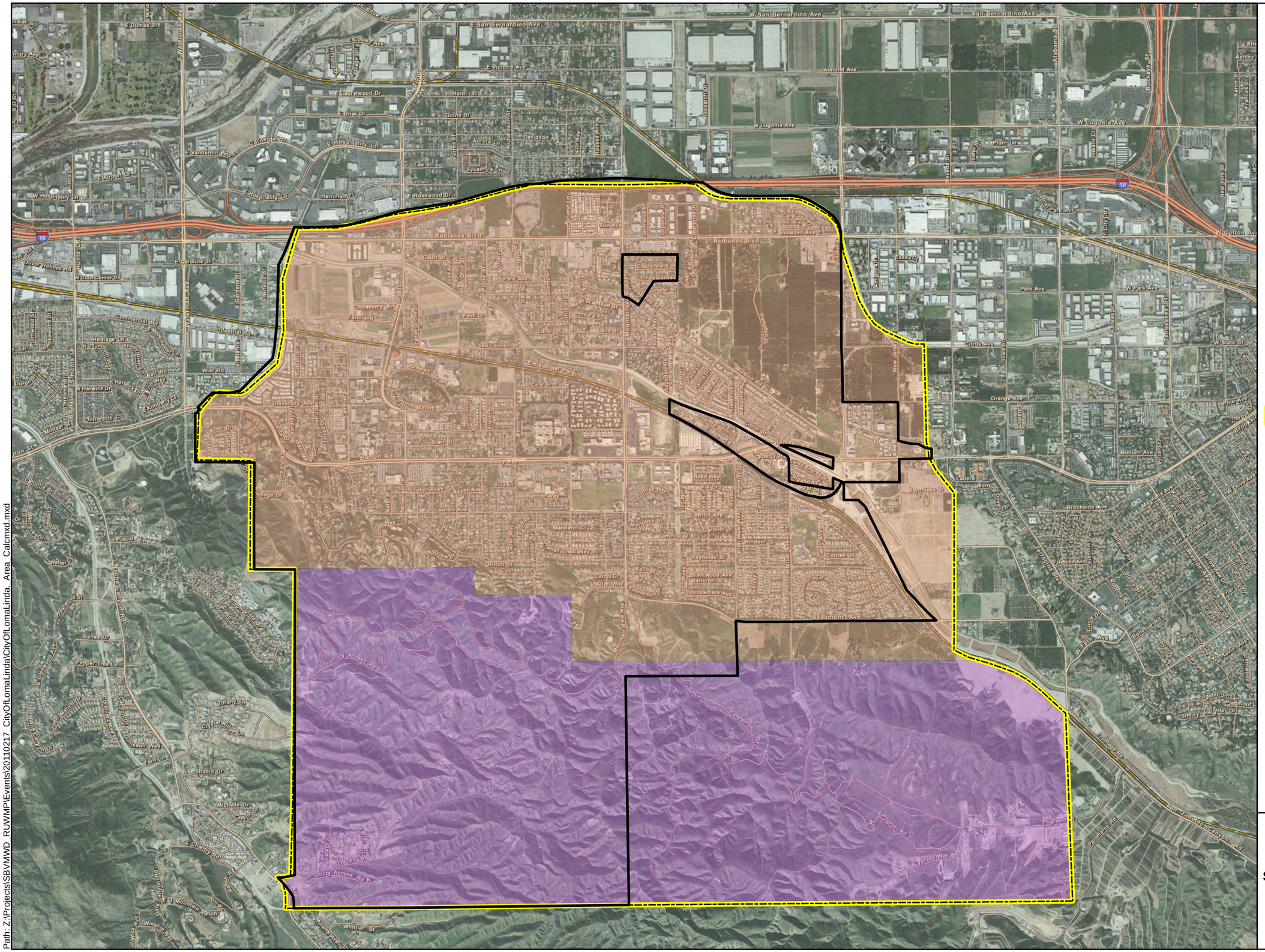
The climate in the San Bernardino Valley is modified by the cold California Current in the Pacific Ocean, the mountain ranges that outline the Los Angeles Basin and interior valleys, and the deserts to the north and east. From fall through spring, Santa Ana winds affect the region. When high pressure 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

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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 5 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 10-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:

5. Eighty percent of the urban water supplier's baseline per capita daily water use

6. 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.

7. 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.

8. 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

Water Use Sectors	Metered # of accounts	Metered Volume (AFY)	Not metered # of accounts	Not metered Volume (AFY)	Total 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

	2025 Metered		2030 Metered		2035 Metered	
Water Use Sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**# of accounts**	**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 5 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 5 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 5 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 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.

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.

[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.

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

DWR DMM Review Table
Cost Effectiveness Summary

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)	30

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 10 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
BMP5: CII WBICs Rebates	8	$1,000	$1,468	0.7	$186
BMP5: CII WBICs Direct Install	8	$1,000	$4,894	0.2	$621
BMP5: CII Precision Nozzles Distr.	6	$805	$2,936	0.3	$502
BMP5: Dedicated Irrigation Surveys	52	$6,943	$15,428	0.5	$299
BMP9: CII Indoor Surveys	66	$8,331	$543,750	0.0	$8,274

	Lifetime Water Savings (AF)	Cumulative Value of Saved Water ($)	Annual Costs ($)	B/C	$/AF
BMP9: CII Performance Based Program	66	$8,331	$8,629	1.0	$131
BMP9: CII HE Washer Rebates	177	$19,612	$18,022	1.1	$102
BMP9: CII HET Rebates	113	$13,295	$33,784	0.4	$298
BMP9: CII HE Urinal Rebates	126	$14,564	$57,340	0.3	$456
BMP9: CII ULV Urinal Rebates	126	$14,564	$49,376	0.3	$393
BMP9: 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 3 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 2-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 3-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 3 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 20 years in 5 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

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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.

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).

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

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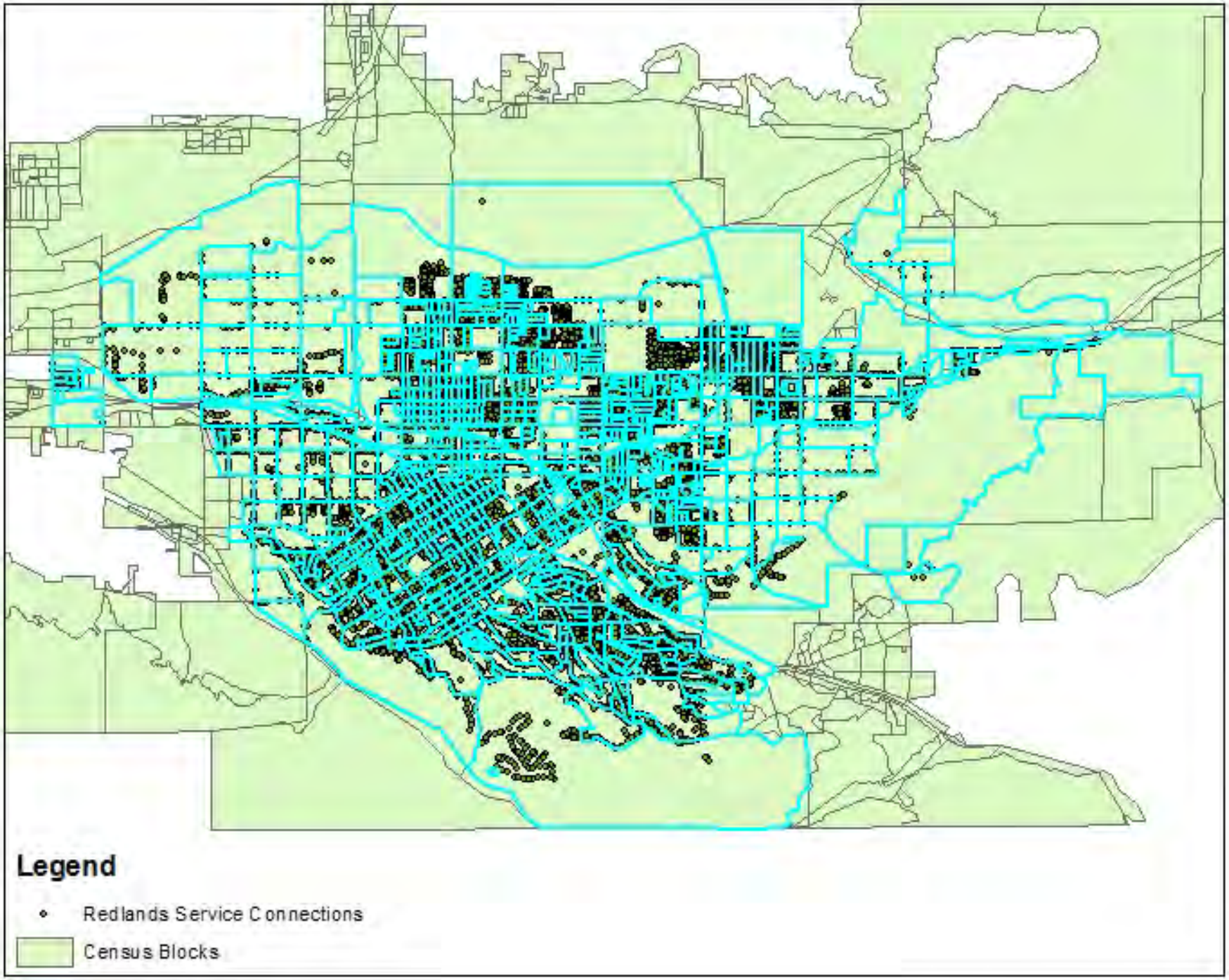

The areas outlined in blue are the census blocks that are included in the City of Redlands' service area.

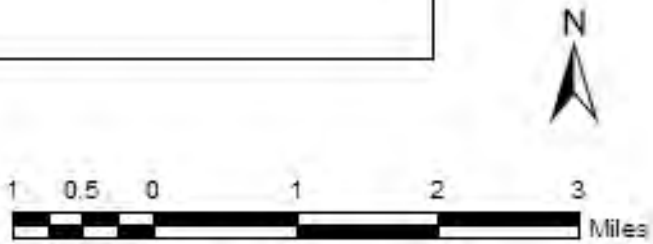

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TABLE 9-2
CLIMATE

	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

Note: 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 System Population	Daily System Gross Water Use (MGD)	Annual Daily per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
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

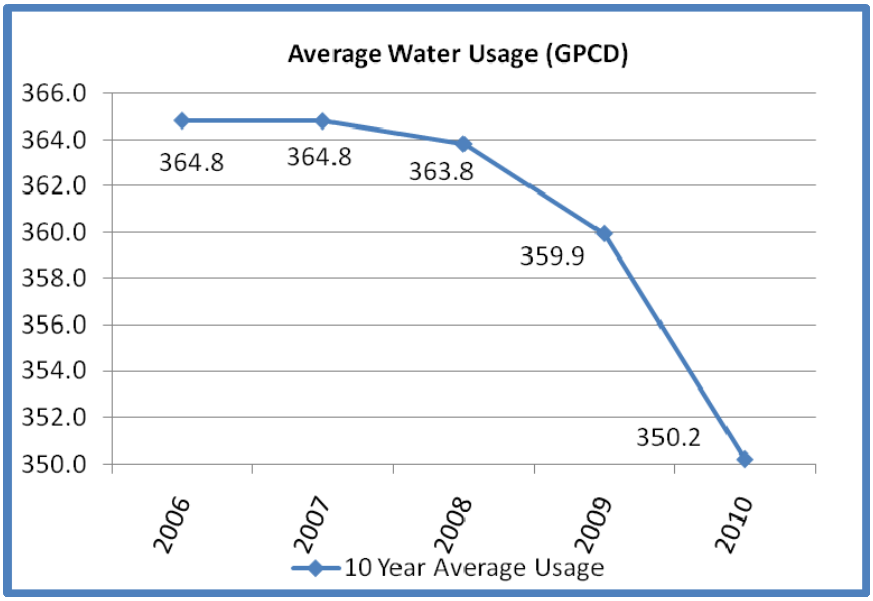


Table 9-11 provides the data on the Maximum Allowable GPCD. The Maximum Allowable GPCD is based on 95 percent of the 5-year average base gross water use. In this case 95 percent of the 5-year GPCD is 341.7 GPCD. The Compliance Water Use Target, under Method 1 is 291.8 GPCD and is less than the Maximum 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).

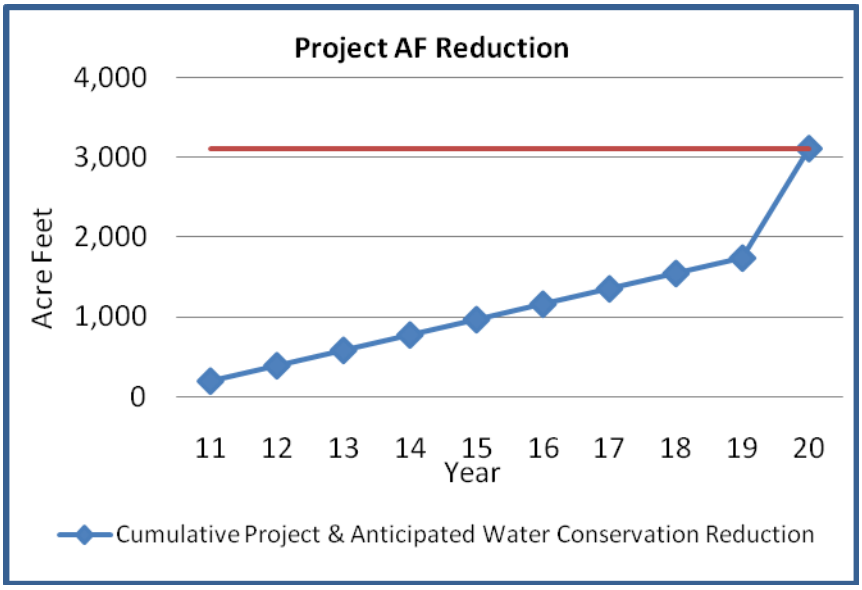
The impact of the revenue reduction is partly offset by the marginal cost to provide and deliver the water. Based on an average marginal power cost to provide and boost groundwater the revenue impact is reduced approximately $136 per acre foot. With this reduction the impact to the utility is estimated 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.

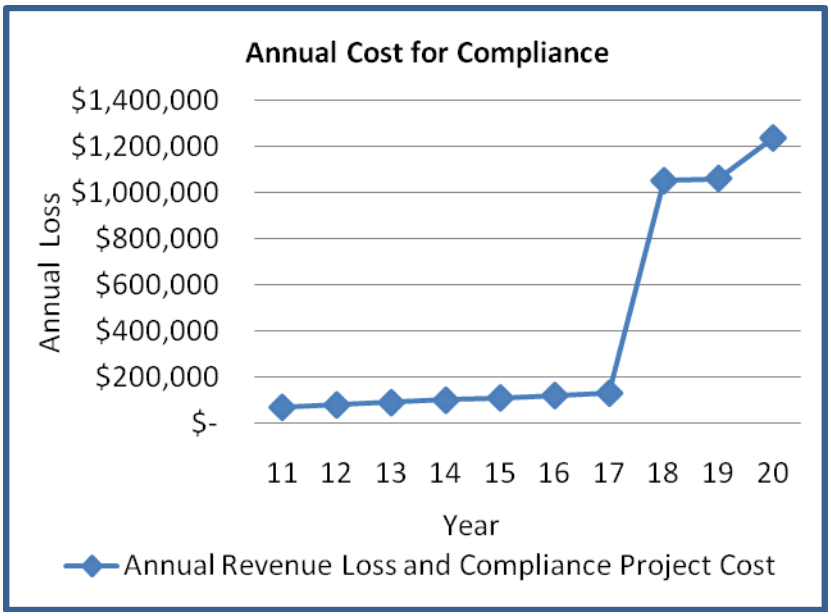
Table 9-13 shows the scheduled water production reductions based on a schedule of programs that are identified in Chapter 9.6. Each year additional savings are achieved as new customers reduce their consumption. Based on estimated implementation by 2015 Redlands will achieve the full required reduction.

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
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

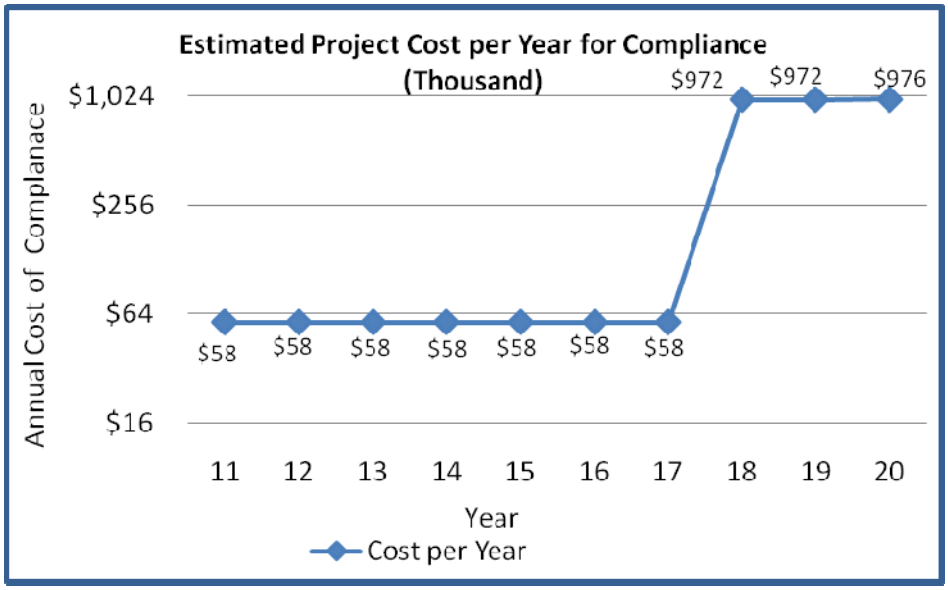
Upon purchase and installation of an approved WaterSense toilet, city customers would receive a rebate. By offering incentives for the purchase and installation of WaterSense toilets Redlands will encourage customers to purchase these toilets, therefore reducing water consumption. By establishing this 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 9-31 shoes 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

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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

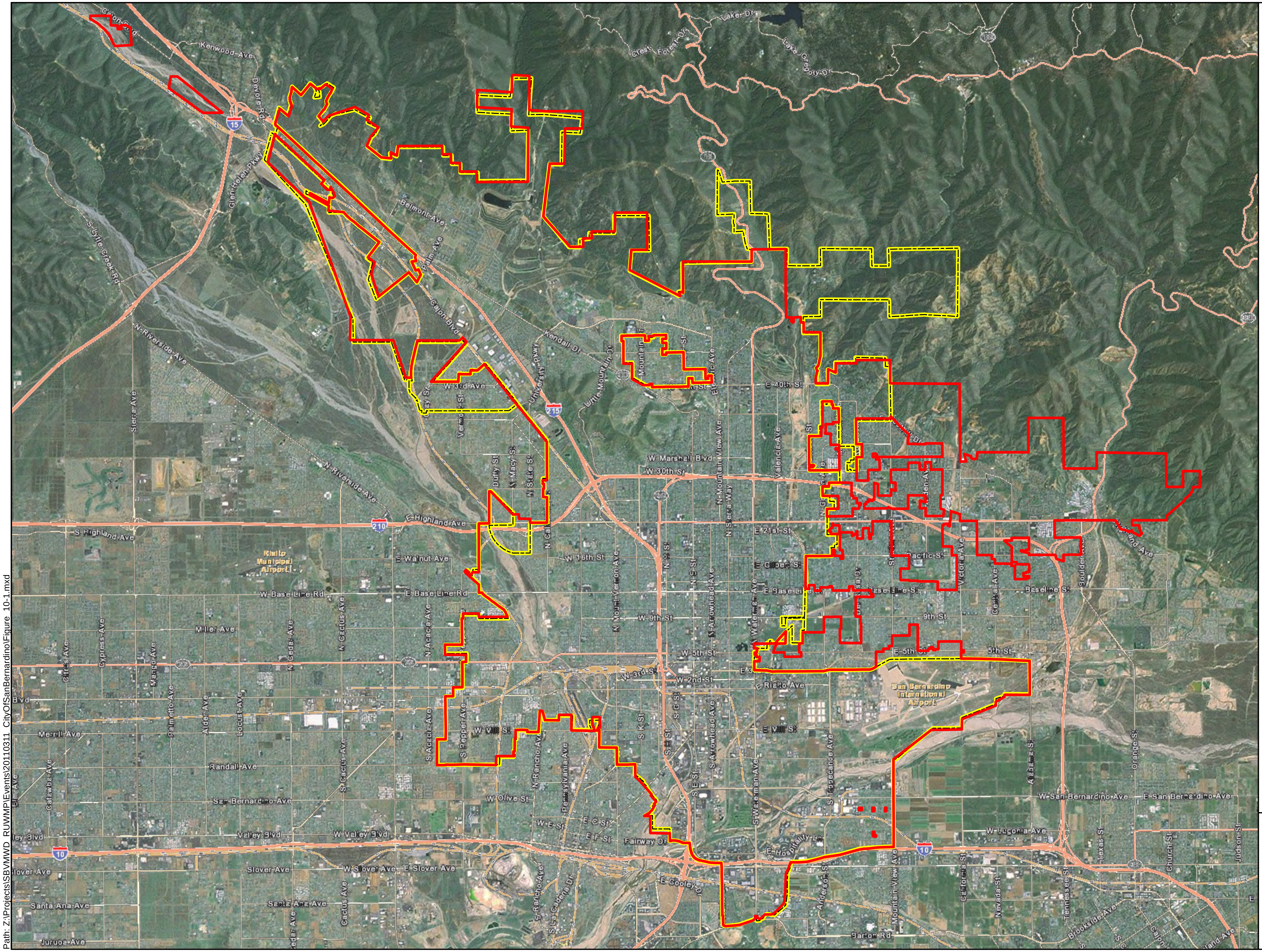
The climate within SBMWD's service area is characterized by warm, dry summers and mild winters with moderate amounts of rainfall. Mean annual temperatures average 64.1°F, with summer high temperatures (June through September) in the low-80s and winter lows in the upper 30s. The average annual maximum 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.



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Legend

- City of San Bernardino Boundary
- City of San Bernardino Water Service Area

N

0 3,500 7,000 Feet

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

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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:

9. Eighty percent of the urban water supplier's baseline GPCD.

10. 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.

11. 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.

12. 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. The San Bernardino Municipal Water Department is a Category 2 supplier (as defined in the Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use). The San Bernardino Municipal Water Department baseline population projections are based on GIS analysis of the service area and data from the US Census. As part of its 2005 Urban Water Management Plan, the San Bernardino Municipal Water Department evaluated individual Census Blocks within the water service area and determined population within the water service area. As part of the 2005 Urban Water Management Plan it was determined that in 2000, the Municipal Water Department served a population approximately 88 percent of the population contained in the City of San Bernardino. Shortly thereafter, the water department service area expanded. As part of the 2010 Urban Water Management Plan, a GIS map of the service area was used. Individual Census Blocks within the water service area were evaluated and the population estimated. In those instances where the water service area did not include the entire Census Block it was assumed that the population in that Census Block related to the percentage of physical area occupied by the water service area for that Census Block. In instances where it was clear that the water service area included the entire urbanized portion of the Census Block, then all the population of that Census Block was assumed to be within the water service area. This analysis determined that the water service area included 90 percent of the population of the City of San Bernardino. Because it was necessary to estimate population for years between 2000 and 2010, to be conservative it was assumed that the water service area included a population of 90 percent of the City in all years. The 90 percent assumption had to be used to account for the change in the service area between 2000 and 2010. City of San Bernardino population for years 1990, 2000, and 2010 was directly taken from Census data and the water service area was assumed to contain 90 percent of this population. Population for non-census years was estimated assuming consistent exponential growth 1990-2000 and 2000-2010.

The method described above was the preferred method for estimating population in the City of San Bernardino Municipal Water Department service area during the SBx7-7 Baseline Period. However, the Alternative Methodology for Service Area Population, as described in Appendix A of the Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (DWR February 2011) was also considered. Steps to complete the Alternative Methodology for Service Area Population include:

1. Finalize Census Blocks in the 2000 Distribution Area
2. Scale Population Information for Census Blocks to Distribution Area
3. Obtain Population by Structure Type
4. Obtain Active Connections Data (by multi-family and single-family connections)
5. Develop Population Estimates for Non-Census Years

As described earlier, the year 2000 service area boundary is not known and it would be necessary again to make a simplifying assumption about what percentage of the City was served by the water department. Further, the data to do Step 4 is not available; the City of San Bernardino did not categorize its connections into single-family or multi-family until after year 2000. Data needed to estimate the number of single-family or multi-family connections, in year 2000, in a given Census Block Group, was not available. For these reasons the Alternative Methodology for Service Area Population was not used for the City of San Bernardino.

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
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, the City of San Bernardino and 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 5 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 utilizes the community liaison as the conservation coordinator. 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 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.

[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.

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 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

DWR DMM Review Table
Cost Effectiveness Summary

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

DWR DMM Review Table
Cost Effectiveness Summary

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

TABLE 10-23
COST EFFECTIVENESS OF WSS TOILETS FOR MULTI-FAMILY RESIDENTIAL CUSTOMERS

DWR DMM Review Table
Cost Effectiveness Summary

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

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 ($)	Annual Costs ($)	B/C	$/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: CII Cash for Grass (Turf rebates)					
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 Performance Based Program	764	$119,074	$100,295	1.2	$131
BMP9: CII HE Washer Rebates	2,057	$280,328	$209,481	1.3	$102
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

DWR DMM Review Table
Cost Effectiveness Summary

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 6, 12, and 18 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 led 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 an 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 20 years in 5 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]	57,697	61,049	63,239	65,512	67,870
Conservation	5,770	12,210	12,648	13,102	13,574
Total Adjusted Demands	51,928	48,839	50,591	52,409	54,296
Surplus/Deficit in Normal Year	**16,711**	**27,011**	**37,073**	**41,855**	**45,868**
Difference as % of Supply	**24%**	**36%**	**42%**	**44%**	**46%**
Difference as % of Demand	**32%**	**55%**	**73%**	**80%**	**84%**

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]	63,467	67,154	69,563	72,063	74,657
Conservation	6,347	13,431	13,913	14,413	14,931
Total Adjusted Demands	57,120	53,723	55,650	57,650	59,725
Surplus/Deficit in Normal Year	**11,519**	**22,127**	**32,014**	**36,614**	**40,439**
Difference as % of Supply	**17%**	**29%**	**37%**	**39%**	**40%**
Difference as % of Demand	**20%**	**41%**	**58%**	**64%**	**68%**

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)]	57,120	53,723	55,650	57,650	59,725
	Difference	11,519	22,127	32,014	36,614	40,439
	Difference as % of Supply	17%	29%	37%	39%	40%
	Difference as % of Demand	20%	41%	58%	64%	68%
Multiple-Dry Year Second Year Supply	Supply Totals[(a)]	68,639	75,850	87,664	94,264	100,164
	Demand Totals[(b)]	57,120	53,723	55,650	57,650	59,725
	Difference	11,519	22,127	32,014	36,614	40,439
	Difference as % of Supply	17%	29%	37%	39%	40%
	Difference as % of Demand	20%	41%	58%	64%	68%
Multiple-Dry Year Third Year Supply	Supply Totals[(a)]	68,639	75,850	87,664	94,264	100,164
	Demand Totals[(b)]	57,120	53,723	55,650	57,650	59,725
	Difference	11,519	22,127	32,014	36,614	40,439
	Difference as % of Supply	17%	29%	37%	39%	40%
	Difference as % of Demand	20%	41%	58%	64%	68%

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

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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

Note: 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 7-year cycle. Summer temperatures commonly are above 85°F and may exceed 103°F (Table 11-2).

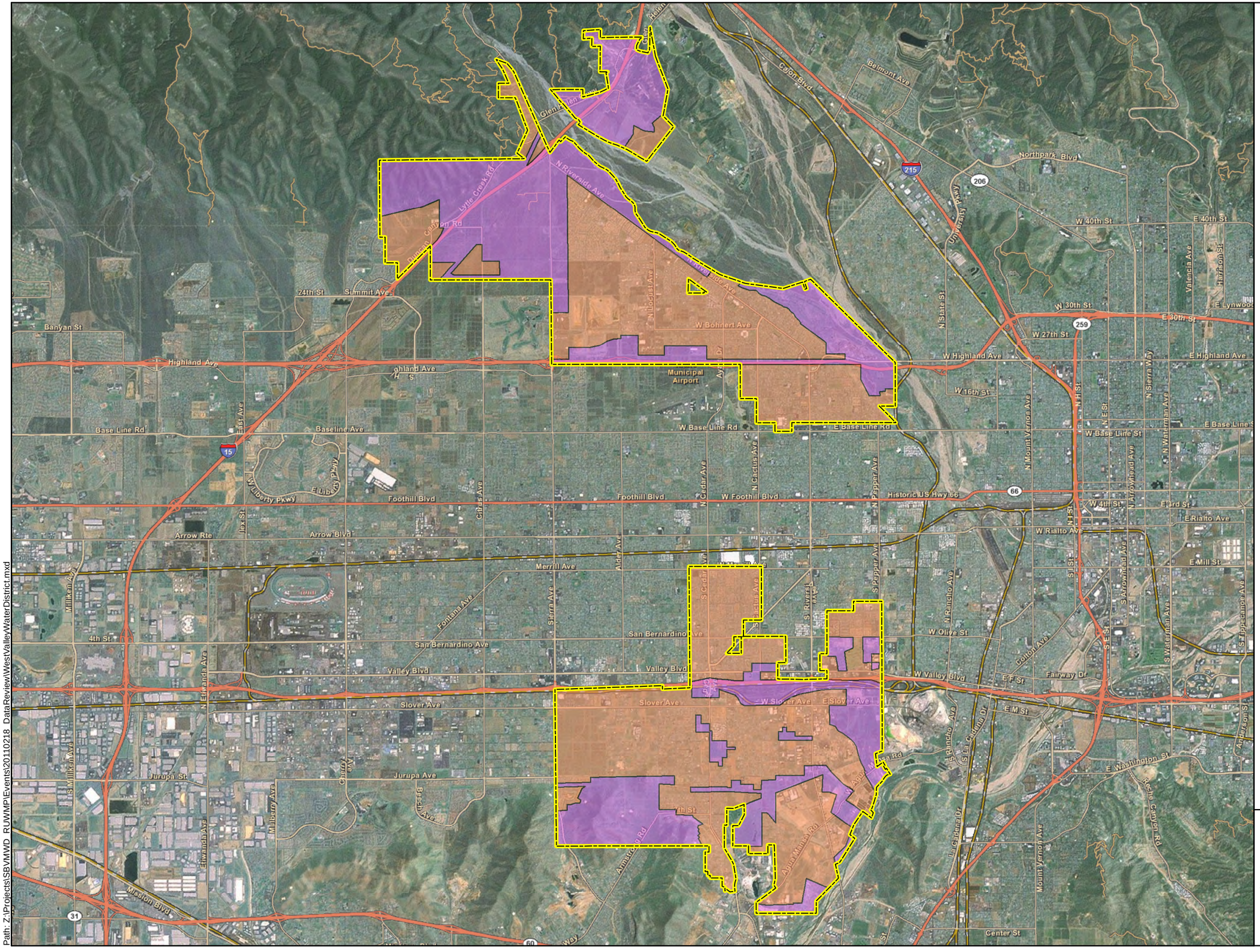
ETo was obtained from the Department of Water Resources' California Irrigation Management Information System (CIMIS). Since no station is located in the WVWD service area, data from the nearest CIMIS station was used. The station is located at the University of California, Riverside (Station 44). Average 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

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Figure 11-1

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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 5 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 10-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 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*. 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 8 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

	Metered		Not metered		Total
Water Use Sectors	**# of accounts**	**Volume (AFY)**	**# of accounts**	**Volume (AFY)**	**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 5 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 5 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 10 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 Residential Development

This DMM encourages replacement of old plumbing fixtures with plumbing fixtures with WSS[1] 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[2] 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.

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 WVWD'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.

[1] 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.

[2] 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.

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 1 year) - a surcharge of $100 or 100 percent of the current water billing cycle, whichever is higher.
- Third Violation - (within 1 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 1 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 3 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 5 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.

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Chapter 12

Yucaipa Valley Water District

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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

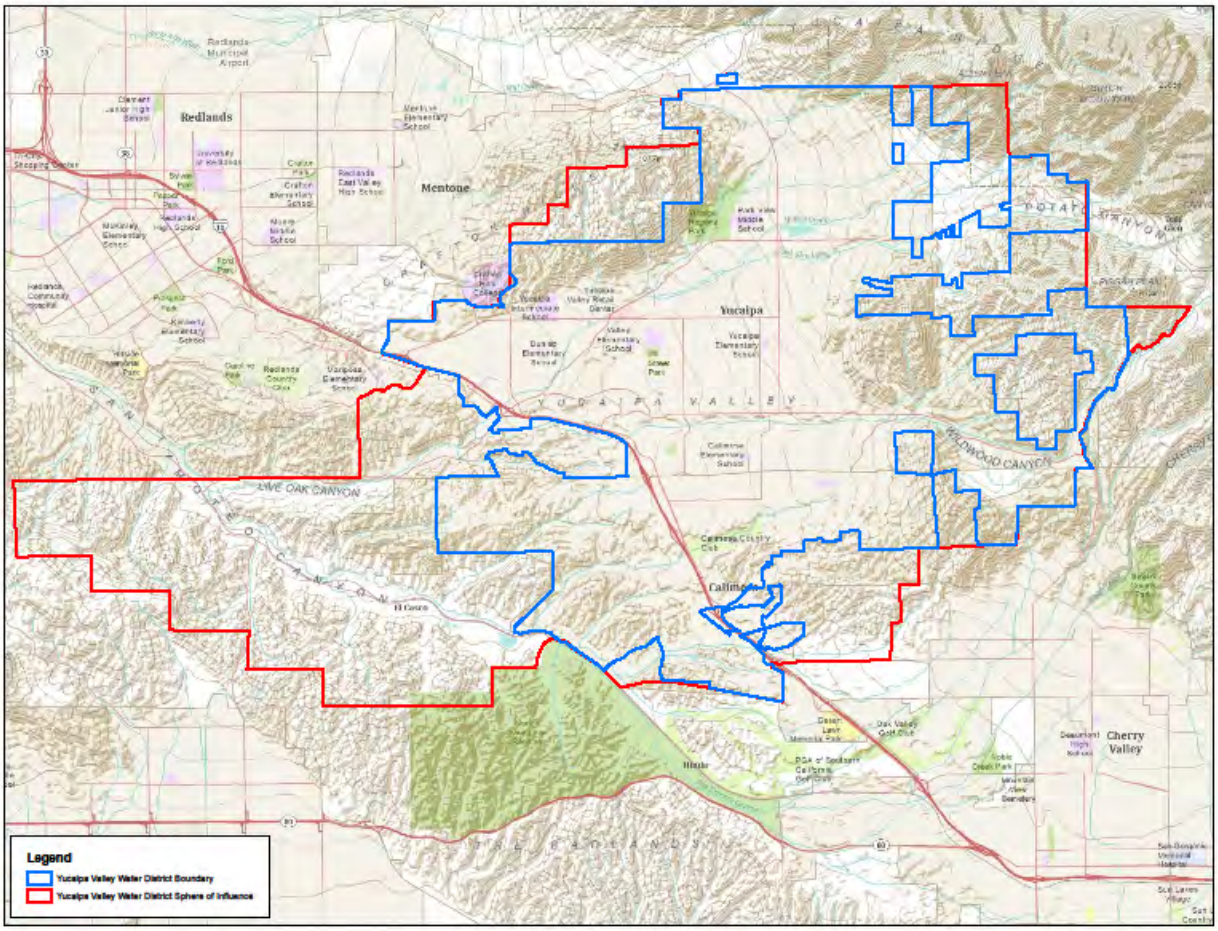


TABLE 12-2
POPULATION – CURRENT AND PROJECTED

	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)

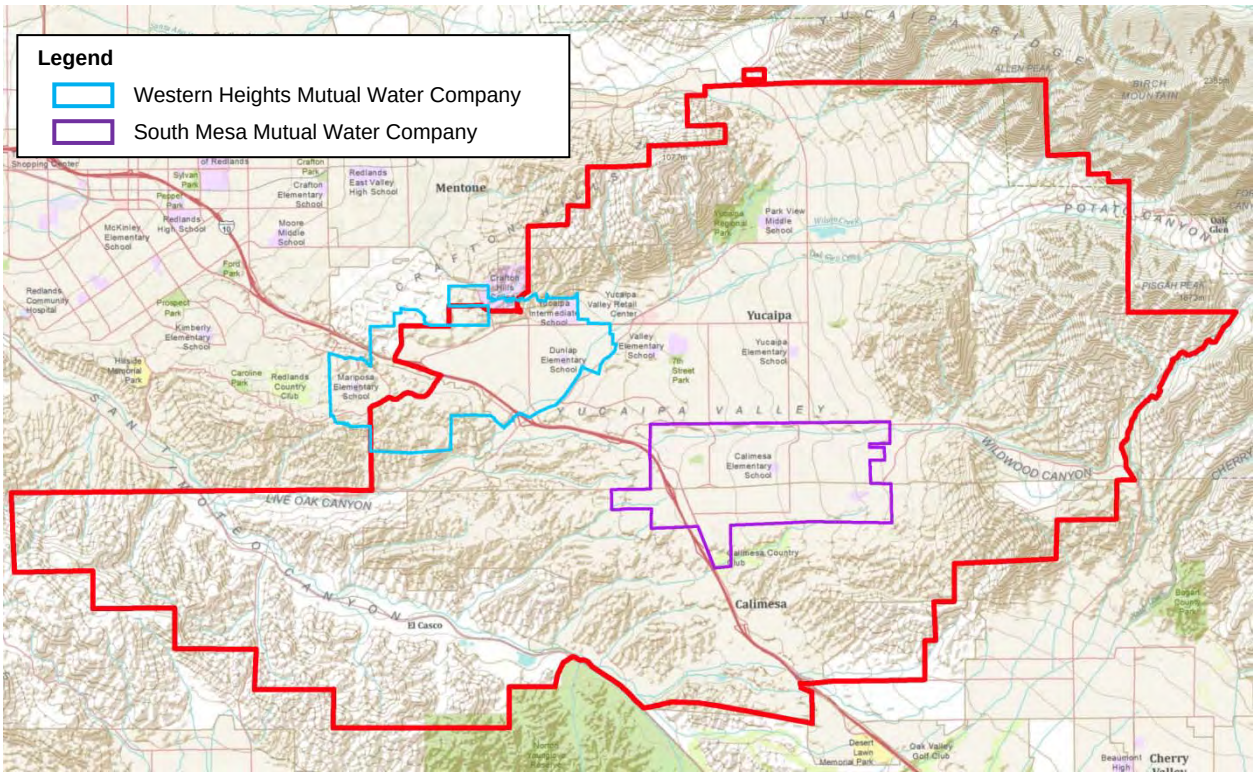
Note:
(a) The City of Calimesa and the City of Yucaipa provided population projections for the years 2020, 2030, 2040, and 2050. It is assumed that these projections include the portions of the unincorporated County areas that lie in the District's sphere of influence.

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

	Standard Monthly Avg. ET0 (inches)	Avg. Total Precipitation (inches)	Avg. Max. Temperature (degrees F)	Avg. Min. Temperature (degrees F)
January	3.32	2.67	64.7	39.3
February	2.41	2.65	66.1	41.3
March	4.62	2.31	69.1	43.6
April	5.58	1.18	73.7	46.8
May	6.32	0.48	78.5	51.1
June	5.37	0.11	86.7	55.2
July	7.60	0.06	94.5	60.3
August	6.68	0.15	94.2	60.6
September	5.89	0.29	90	57.5
October	4.40	0.70	81	51.2
November	3.18	1.14	72.6	44
December	2.08	1.79	65.9	39.6
Annual	57.45	13.53	78.1	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

Water Use Sectors	Metered # of accounts	Metered Volume (AFY)	Not Metered # of accounts	Not Metered Volume (AFY)	Total 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	1,064
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	7,173
Total	**12,346**	**18,699**

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*

In order to calculate Base Daily per Capita Water Use for past years, it was necessary to develop population estimates for past years. Yucaipa Valley Water District (YVWD) is a Category 2 supplier, as defined in the Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use. YVWD's boundary covers portions of the Cities of Yucaipa and Calimesa. In addition, two mutual water companies are located within the YVWD service area, Western Heights Mutual Water Company and South Mesa Water Company. The Category 2 method was used in order to subtract the population numbers from these two retailers.

GIS maps of the actual service area boundary were used along with 2010 Census Bureau data. Aerial imagery represented the base layer with the 2010 Census data shapefile overlay. Block group population numbers were counted within YVWD's boundaries. In areas where only a portion of block groups were within YVWD's service area, a percentage was estimated. In those block groups where the YVWD boundary did not include the entire Census Block it was assumed that the population in that Census Block related to the percentage of physical area occupied by the water service area for that Census Block. In instances where it was clear that the water service area included the entire urbanized portion of the Census Block, then all the population of that Census Block was assumed to be within the water service area.

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	1,586	2,175	2,826	3,546	4,333
System Losses	350	363	356	346	330
Total	*8,380*	*9,332*	*10,307*	*11,123*	*12,013*

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	8,380	9,322	10,307	11,123	12,013
Total	*22,413*	*23,936*	*25,568*	*27,186*	*28,786*

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 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 publically 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
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. (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

Notes:
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

Note: (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 50 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:

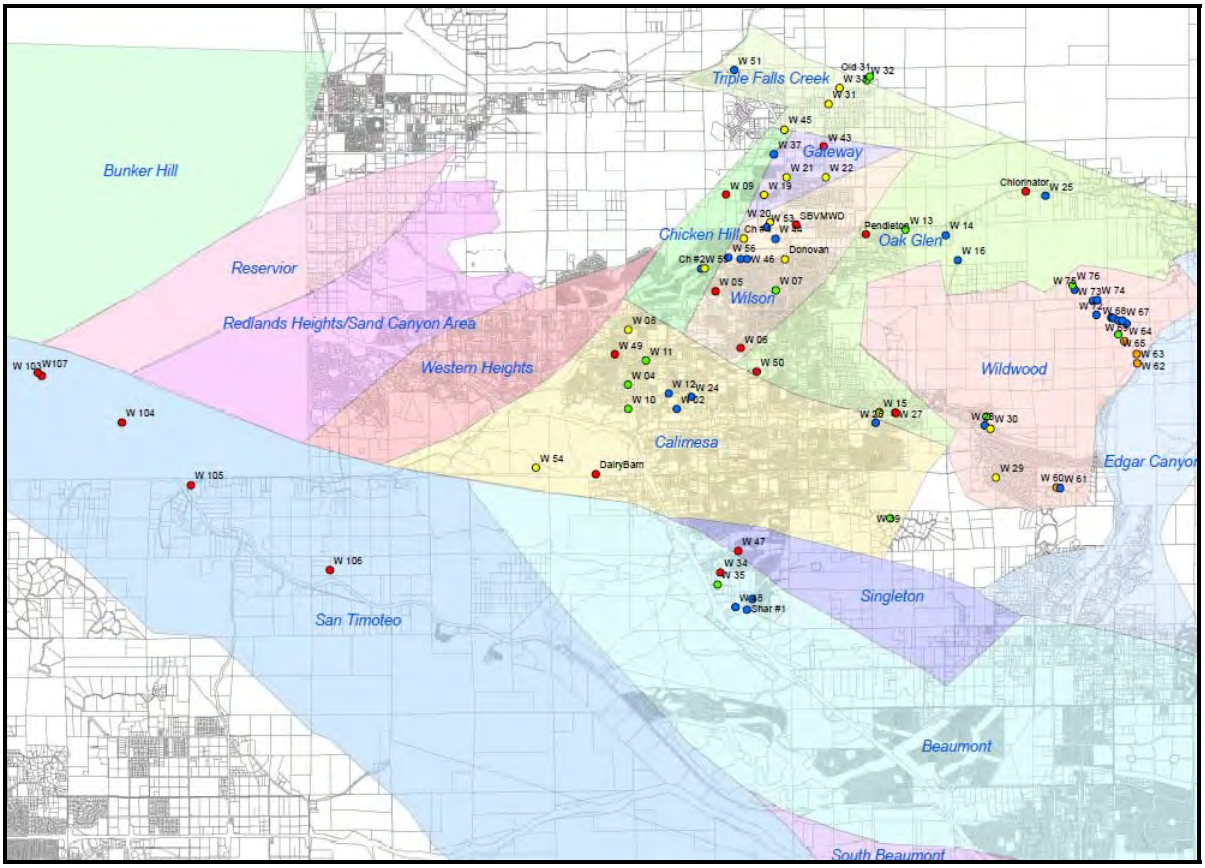
- Calimesa Basin
- Chicken Hill Basin
- Gateway Basin
- Oak Glen Basin
- Triple Falls Basin
- Western Heights Basin
- Wilson Basin
- Wildwood Basin

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 1500 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 Acre feet per year (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	384	384	384	384	384
San Timoteo Groundwater Basin	Metered	230	230	230	230	230
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 advocate of recycled water use and implementation in the Inland Empire. The Board of Directors has 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	6,136	7,121	8,309	9,572	10,736
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 1,046 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.

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 5-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

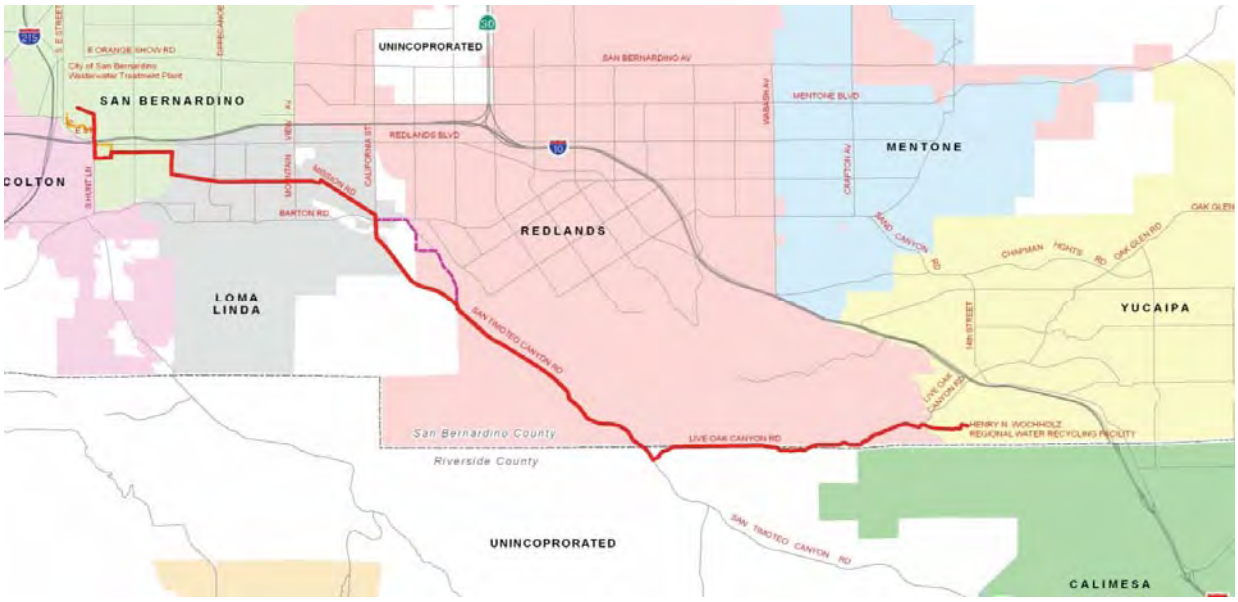
YVWD's Water Supply Renewal Project includes the construction of reverse osmosis membrane treatment at the Yucaipa Valley Regional Water Filtration Facility (YVRWFF) for the treatment of imported water supplies in compliance with the basin plan objectives set by the Regional Water Quality Control Board. 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	3,200	3,200	3,200
Local Surface Water	0	0	0	0	0
Recycled Water	1,586	2,175	2,826	3,546	4,333
Transfers/Exchanges	0	0	0	0	0
Total Planned Supplies	*1,586*	*3,775*	*6,026*	*6,746*	*7,533*
Total Existing and Planned Supplies	***28,278***	***34,118***	***37,898***	***40,186***	***42,615***
Demands without Additional Conservation	22,414	23,003	23,654	27,189	28,786
Conservation	2,083	4,352	4,549	4,729	4,891
Total Adjusted Demands	20,331	18,651	19,105	22,460	23,895
Surplus/Deficit in Normal Year	7,947	15,467	18,793	17,726	18,720
Difference as % of Supply	28%	45%	50%	44%	44%
Difference as % of Demand	39%	83%	98%	79%	78%

Note:
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	1,586	2,175	2,826	3,546	4,333
Transfers/Exchanges	0	0	0	0	0
Total Planned Supplies	*1,586*	*3,775*	*6,026*	*6,746*	*7,533*
Total Existing and Planned Supplies	***22,811***	***25,396***	***28,184***	***29,447***	***30,611***
Demands without Additional Conservation	24,497	25,086	25,737	26,457	31,231
Conservation	2,291	4,787	5,004	5,201	5,380
Total Adjusted Demands	22,206	20,299	20,733	21,256	25,851
Surplus/Deficit in Single-Dry Year	2,191	6,247	8,169	8,641	9,092
Difference as % of Supply	10%	25%	29%	29%	30%
Difference as % of Demand	10%	31%	39%	41%	35%

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)]	24,935	25,396	28,184	29,447	30,611
	Demand Totals[(b)]	22,206	21,324	22,841	24,352	25,852
	Difference	2,729	4,072	5,343	5,095	4,759
	Difference as % of Supply	11%	16%	19%	17%	16%
	Difference as % of Demand	12%	19%	23%	21%	18%
Multiple-Dry Year Second Year Supply	Supply Totals[(a)]	24,935	25,396	28,184	29,447	30,611
	Demand Totals[(b)]	22,206	21,324	22,841	24,352	25,852
	Difference	2,729	4,072	5,343	5,095	4,759
	Difference as % of Supply	11%	16%	19%	17%	16%
	Difference as % of Demand	12%	19%	23%	21%	18%
Multiple-Dry Year Third Year Supply	Supply Totals[(a)]	24,935	25,396	28,184	29,447	30,611
	Demand Totals[(b)]	22,206	21,324	22,841	24,352	25,852
	Difference	2,729	4,072	5,343	5,095	4,759
	Difference as % of Supply	11%	16%	19%	17%	16%
	Difference as % of Demand	12%	19%	23%	21%	18%

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

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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

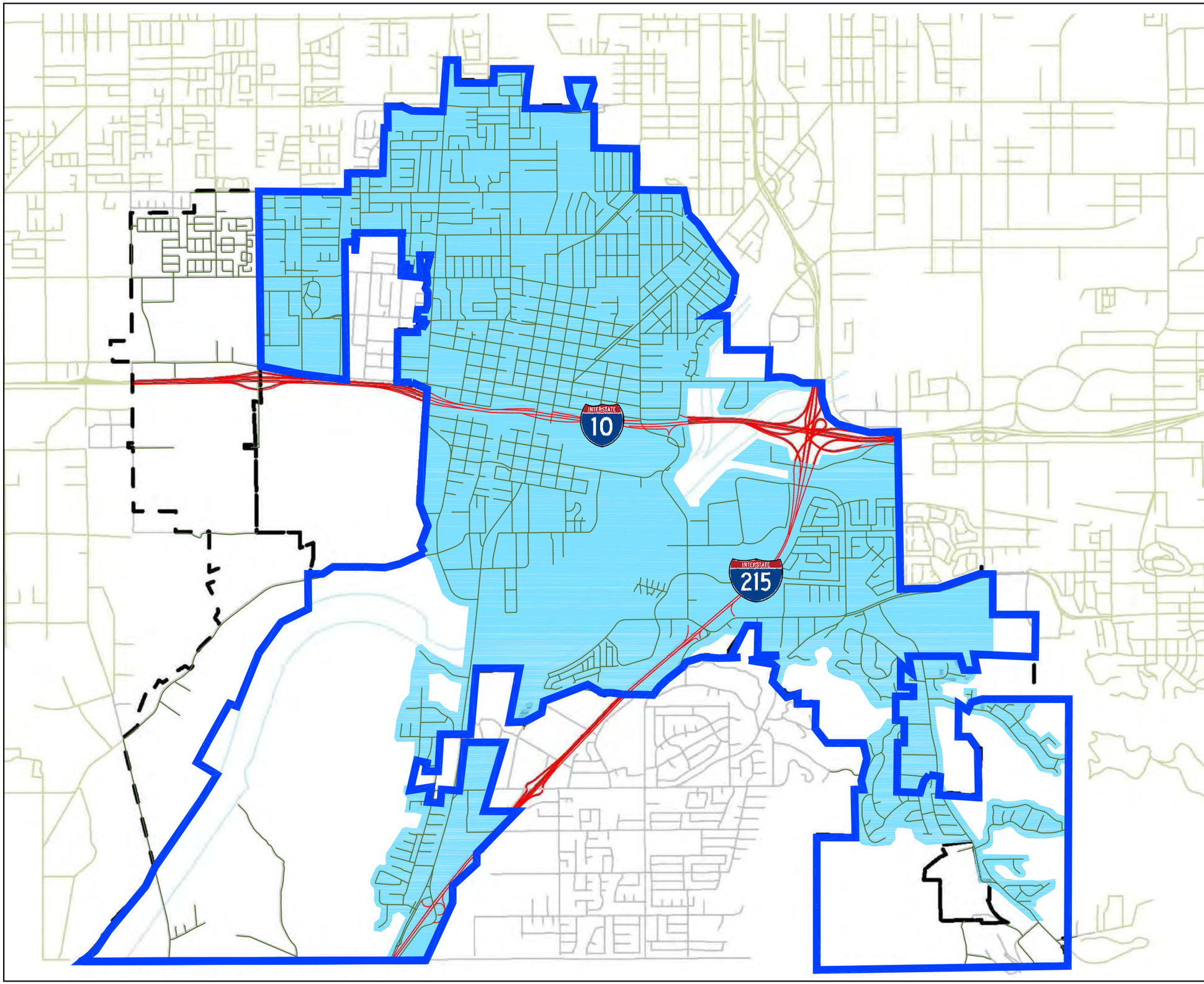
	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average ETo	7.22	6.92	5.35	4.05	2.94	2.56	56.37
Average Rainfall (inches)	0.04	0.15	0.33	0.71	1.32	2.38	16.10
Average Temperature (ºF)	77.7	77.8	74.0	66.4	58.5	53.2	63.9

Note:
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

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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 5 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 10-year average ending no earlier than 2004 and no later than 2010 (or a 15-year average if 10 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. The City of Colton is a Category 3 water supplier (as defined in the Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use). Limited data exists on the water service area. The City does not have a GIS system, but does have a map of the year 2010 service area. As part of the 2010 UWMP, a consultant digitized the available map and then used the digitized boundary to evaluate population within the City of Colton water service area. Individual Census Blocks within the water service area were evaluated and the population estimated. In those instances where the water service area did not include the entire Census Block it was assumed that population in that Census Block related to the percentage of physical area occupied by the water service area for that Census Block. In instances where it was clear that the water service area included the

entire urbanized portion of the Census Block, then all the population of that Census Block was assumed to be within the water service area. This analysis determined that the City of Colton water service area contained 90 percent of the population of the City of Colton in 2010. However, the specific area served by the City of Colton Water Department is not known for years prior to 2010. The assumption was made that, similar to the present, in past years the water service area comprised approximately 90 percent of the City population. This assumption was necessary to estimate water service area population for the period 1995 to 2010. City of Colton population for years 1990, 2000, and 2010 was directly taken from Census data and the water service area was assumed to contain 90 percent of this population. Population for non-census years was estimated assuming consistent exponential growth 1990-2000 and 2000-2010.

The method described above was the preferred method for estimating population in the City of Colton water service area during the SBx7-7 Baseline Period. However, the Alternative Methodology for Service Area Population, as described in Appendix A of the Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (DWR February 2011) was also considered. Steps to complete the Alternative Methodology for Service Area Population include:

1. Finalize Census Blocks in the 2000 Distribution Area
2. Scale Population Information for Census Blocks to Distribution Area
3. Obtain Population by Structure Type
4. Obtain Active Connections Data (by multi-family and single-family connections)
5. Develop Population Estimates for Non-Census Years

As described earlier, the year 2000 service area boundary is not know and it would be necessary again to make a simplifying assumption about what percentage of the City was served by the water system. Further, the data to do Step 4 is not available; the City of Colton does not categorize its connections into single-family or multi-family. From the data available it is not possible to determine the number of active connections in a given year. Data needed to estimate the number of single-family or multi-family connections, in year 2000, in a given Census Block Group, was not available. For these reasons the Alternative Methodology for Service Area Population was not used for the City of Colton. 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 Information Required for DMMs Implemented or Scheduled for Implementation

For DMMs being implemented or scheduled to be implemented within the next 5 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.

13.7.2 Information Required for DMMs Not Implemented or Scheduled for Implementation

For those DMMs not implemented or not scheduled to be implemented within the next 5 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

13.7.3 DMMs Currently Being Implemented or Scheduled for Implementation

This section describes DMMs that Colton is currently implementing or is scheduled to implement.

13.7.3.1 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.

13.7.3.2 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.

13.7.3.3 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.

13.7.3.4 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.

13.7.3.5 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 5 years, Colton is implementing this DMM.

13.7.3.6 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. 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.

13.7.3.7 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.

13.7.3.8 Water Sense Specification for 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.

[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.

13.7.4 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).

13.7.4.1 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.

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

13.7.4.2 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 10 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 10 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

13.7.4.3 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.

13.7.4.4 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)	Cumulative 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

13.7.4.5 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

13.7.4.6 Wholesale Agency Assistance Programs

This DMM is not applicable to Colton, which is strictly a municipal water supplier.

13.7.5 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.

13.04.200 - 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 24 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 13-24
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 5 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, or ponds, unless such water is recycled.	At all times
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

Prohibition	Stage when Prohibition Becomes Mandatory
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 3-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 3 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 5 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.

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