2010 URBAN WATER MANAGEMENT PLAN

December 15, 2010

Zone 7 Water Agency
Livermore, CA

2010 URBAN WATER MANAGEMENT PLAN

Prepared by:

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Enclosure

CD containing the 2005 Groundwater Management Plan and the 2009 Update

ACRONYMS AND DEFINITIONS

The following terms and acronyms have been used throughout this UWMP to improve document clarity and readability.

ACWD	Alameda County Water District
ADWF	Average Dry Weather Flow
AF	Acre-feet
AFA	Acre-feet annually
Basin	Livermore-Amador Valley Groundwater Basin
BBID	Byron-Bethany Irrigation District
BMP	Best Management Practices
Cal Water	California Water Service Company
CCWD	Contra Costa Water District
CII	Commercial, Industrial, & Institutional
CIMIS	California Irrigation Management Information System
CoVWR	Committee of Valley Water Retailers
CUWCC	California Urban Water Conservation Council
DERWA	DSRSD-EBMUD Recycled Water Authority
District	Alameda County Flood Control and Water Conservation District
District Act	Act 205 of the California Uncodified Water Code
DMM	Demand Management Measures
DSRSD	Dublin San Ramon Services District
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EOC	Emergency Operations Center
ETo	Evapotranspiration rate based on standard grass as reference
GMP	Groundwater Management Plan
HET	High-Efficiency Toilet
LAVWMA	Livermore-Amador Valley Water Management Agency
Livermore	City of Livermore
M&I	Municipal and Industrial
Main Basin	The portion of the Livermore-Amador Valley Groundwater Basin that contains high-yielding aquifers and good quality groundwater.
mgd	Million gallons per day
MOU	Memorandum of Understanding Regarding Urban Water Conservation in California
Msl	Mean sea level
Pleasanton	City of Pleasanton
Retailers	Cal Water, DSRSD, Livermore, and Pleasanton
RWQCB	Regional Water Quality Control Board
SB 7	Senate Bill X7-7 related to 20% water conservation by 2020
SBA	South Bay Aqueduct
SCVWD	Santa Clara Valley Water District
SFPUC	San Francisco Public Utilities Commission
SMP	Salt Management Plan

SRVRWP	San Ramon Valley Recycled Water Program
State	State of California
SWP	State Water Project
TDS	Total Dissolved Solids
TWRG	Tri-Valley Water Retailers Group
UWMP	Urban Water Management Plan
UWMP Act	California Urban Water Management Planning Act
Yuba Accord	Lower Yuba River Accord
Zone 7	Zone 7 of the Alameda County Flood Control and Water Conservation District (also referred to as Zone 7 Water Agency)
Zone 7 Board	Zone 7 Water Agency Board of Directors

1. INTRODUCTION

This 2010 Urban Water Management Plan (UWMP) has been prepared in response to the California Urban Water Management Planning Act (UWMP Act), Water Code Division 6, Part 2.6, Sections 10610 through 10650. The UWMP Act requires every urban water supplier that provides water for municipal purposes either directly or indirectly to more than 3,000 customers, or supplies more than 3,000 acre-feet of water annually (AFA), to prepare and adopt an UWMP.

The urban water supplier must then update and adopt the UWMP every five years on or before December 31, in years ending in zero or five. An urban water supplier that does not prepare, adopt, and submit an UWMP to the California Department of Water Resources (DWR) is ineligible to receive drought assistance from the State of California (State). For 2010, the State has extended the submission deadline to July 1, 2011 in order to give water suppliers sufficient time to meet the new requirements under Senate Bill SBX7-7 (SB 7). SB 7 is intended to reduce per capita water consumption in California by 20 percent by the year 2020.

The purpose of this chapter is to give an overview of the UWMP process and the contents of this UWMP.

1.1 PREVIOUS URBAN WATER MANAGEMENT PLANS

In 2009, Zone 7 of the Alameda County Flood Control and Water Conservation District, also known as the Zone 7 Water Agency (Zone 7), supplied over 40,000 acre-feet (AF) of municipal and industrial water; therefore, Zone 7 is subject to the requirements of the UWMP Act. Zone 7 adopted its first UWMP in 1985, and then prepared an updated UWMP in 1991, in cooperation with three of the retailers supplied by Zone 7 [City of Livermore (Livermore), City of Pleasanton (Pleasanton), and Dublin San Ramon Services District (DSRSD)]. Zone 7 prepared and adopted a Water Shortage Contingency Plan in January 1992, and then updated and adopted a UWMP, which included a Water Shortage Contingency Plan, in 1995, 2000, and 2005. The 2005 UWMP was approved (i.e., “verified for completeness”) by DWR in early 2006.

1.2 THE PURPOSE OF THE 2010 UWMP

This 2010 UWMP updates and supersedes all previous UWMPs prepared by Zone 7. Zone 7 is almost exclusively a water wholesaler that provides water for municipal and industrial purposes indirectly through four retail urban water suppliers (Retailers) in the Livermore-Amador Valley; consequently, this UWMP addresses global water demand, water supply, and water resource management for this region. Additional details are included in the UWMPs prepared by the Retailers: DSRSD, Livermore, Pleasanton, and California Water Service Company (Cal Water). Zone 7 directly serves six retail customers, which is significantly fewer than 3,000 customers; at a 5-year average demand of 300 acre-feet, this demand represents less than 1% of the total demand in the service area. Retail customers include commercial and institutional water users as described in more detail in Section 9.3.2. Zone 7 also serves untreated water to agricultural customers as described in Section 2.3.

As a wholesaler, Zone 7 coordinates its water conservation efforts with its Retailers; therefore, this UWMP focuses on Zone 7's water conservation activities, and will not include a detailed description of the individual conservation programs implemented by the Retailers.

The California Environmental Quality Act (CEQA) does not apply to the preparation and adoption of a UWMP.[1]

1.3 PLAN CONTENTS AND ORGANIZATION

Assembly Bill 797 established the UWMP Act in 1983. The latest version of the UWMP Act, which contains the current requirements for the UWMP, is provided in Appendix A. This UWMP was prepared in accordance with those requirements. Table 1-1 provides a roadmap of where each of those requirements is addressed in this UWMP (in order of the referenced water code section). As noted in Table 1-1, this UWMP also includes a Water Shortage Contingency Plan (Chapter 13) as required under Section 10632 of the Water Code.

1.4 CHANGES FROM THE 2005 UWMP

This UWMP addresses all new relevant legislation enacted between 2005 and 2010, most notably SB 7, as described above, and Senate Bill 1087, related to the provision of water supply to lower income households. The implementation of SB 7 primarily rests with the Retailers; however, Zone 7 is incorporating the demand reductions expected from the Retailers in its planning, and water supply and demand analysis.

In late 2009, Zone 7 began its efforts to update its Water System Master Plan. This update involves a significant departure from the previous planning methodology used by Zone 7, which assumed a repetition of historical patterns. To make its planning more robust, Zone 7 developed a new risk model to develop probability curves for hydrologic conditions, incorporating potential variations from the historical hydrologic sequence. The dynamic model also allows for a more rigorous year-by-year analysis of water system operations in response to hydrologic conditions. Data from the Department of Water Resources' (DWR's) 2009 State Water Project Reliability Report[2] (Reliability Report) were incorporated into the model; unlike the 2005 version, this Reliability Report accounts for potential climate change impacts. The updated data from DWR also reflect recent Biological Opinions related to fish impacts of the State Water Project (SWP) and the associated operational restrictions and estimated supply reductions as of late 2009.

To be more consistent with DWR guidelines, median values were used instead of average values for the water supply quantities (e.g., SWP and Arroyo del Valle) during normal water years.

Finally, the Demand Management Measures discussion (Chapter 10) was reformatted to be consistent with the new guidelines from the California Urban Water Conservation Council, with reference to the relevant Water Code Section 10631(f) designation.

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[1] See Water Code Section 10652.
[2] DWR, 2010. 2009 State Water Project Reliability Report.

Table 1-1. Roadmap of Water Code Requirements and Corresponding UWMP Sections

Water Code Section	UWMP Chapter	UWMP Section	Content Description
10620(d)	3	3.1	Agency Coordination
10620 (f)	3	3.2	Resource Maximization / Import Minimization Plan
10621 (a)	1	1.1-1.4	Updated Plan in Years Ending in Five and Zero
10621 (b)	4	4.1	City and County Notification and Participation
10631(a)	2	2.1-2.4	Service Area Information
10631(b)	5	5.1-5.5	Water Sources
10631(b) (1)-(4)	6		Water Sources - Groundwater
10631(c) (1-3)	7	7.1-7.6	Reliability of Supply Sources
10631(d)	8	8.1-8.3	Transfer & Exchange Opportunities
10631(e) (1) (2) (3)	9	9.1-9.3	Water Use By Customer Type
10631(f)(1) (2) (3) (4) and 10631(g) and 10631(j)	10	10.1-10.2	Demand Management Measures (DMMs)
10631 (h)	11	11.1-11.3	Planned Water Supply Projects & Programs
10631(i)	12	12.1-12.3	Opportunities for Development of Desalinated Water
10631.5	10	10.1-10.2	Determination of DMM Implementation
10632(a)	13	13.1-13.6	Water Shortage Contingency Plan
10632(b)	13	13.2	Three-Year Minimum Water Supply
10632(c)	13	13.3	Preparation for Catastrophic Water Supply Interruption
10632(d)	13	13.4	Prohibitions against specific water use practices during water shortages
10632 (e)	13	13.6	Consumption Reduction Methods
10632 (f)	13	13.6	Excessive use penalties or charges for excessive use
10632(g)	13	13.5	Revenue and Expenditure Impacts
10632(i)	13	13.6	Reduction Measuring Mechanism
10633	14	14.3	Recycled Water Agency Plan
10633 (a)	14	14.2	Description of Wastewater System
10633	14	14.1	Recycled Water Plan Coordination
10633(a-d)	14	14.2	Wastewater Disposal and Current Use
10633(e)	14	14.3	Projected Uses of Recycled Water
10633 (f)	14	14.3	Plan to Optimize Use of Recycled Water
10634	15	15.1-15.4	Water Quality Impacts on Availability of Supply
10635(a)	16	Tables 16-3(a) to (c)	Water Service Reliability – Normal, Dry, and Multiple Dry Years
10635 (b)	17	17.0	Provision of Water Service Reliability Section to Cities/ Counties Within Service Area

Water Code Section	UWMP Chapter	UWMP Section	Content Description
10642	4, 17	4.1, 17.0	Public Participation
10643	10	10.1-10.2	Review of Implementation of 2000 UWMP
10644 (a)	4	4.1	Provision of 2005 UWMP to Local Governments
10645	4	4.1	Places Where UWMP is Available For Public Review
10656, 10657	17	17.0	UWMP Adoption & Implementation

2. GENERAL SERVICE AREA

Water Code Section 10631(a)

2.1 BACKGROUND

Zone 7 of Alameda County Flood Control and Water Conservation District (Zone 7) is one of ten active zones of the Alameda County Flood Control and Water Conservation District (District).

2.1.1 Alameda County Flood Control and Water Conservation District

The District was created in 1949 by the California State Legislature through passage of Act 205 of the California Uncodified Water Code (District Act) to provide control of flood and storm waters and to conserve water for beneficial uses. The District is also vested with the power to store water in surface or underground reservoirs within or outside of the District for the common benefit of the District; conserve and reclaim water for present and future use within the District; appropriate and acquire water and water rights; and import water into the District.

The District is further authorized by the District Act to prevent interference with or diminution of, or to declare rights in the natural flow of any stream or surface or subterranean supply of waters used or useful for any purpose of the District and to prevent contamination, pollution or otherwise rendering unfit for beneficial use the surface or subsurface water used or useful in the District.

The District is also authorized to levy replenishment assessments upon the production of groundwater from all water-producing facilities, whether public or private, within the District.

2.1.2 Zone 7 Water Agency

The history of Zone 7 as a water resource management agency can be traced to the mid-1950s, when the Livermore-Amador Valley was primarily rural in character, with a population of approximately 30,000 people. The area faced a number of problems, including groundwater overdraft, poor drainage and flood hazards, and an uncertainty over the status of future water supplies. It was against this backdrop that the residents of the Livermore-Amador Valley voted, in 1957, to create Zone 7 Water Agency or Zone 7.

Zone 7 is governed by a seven-member board of directors (Zone 7 Board). Each director is elected at-large by residents within Zone 7's service area to a four-year term. The Zone 7 Board sets policy and provides direction to agency management and staff.

In 2003, the legislature passed Assembly Bill 1125 and gave the Zone 7 Board full authority and autonomy to govern matters solely affecting Zone 7 independently of the Alameda County Board of Supervisors. The Alameda County Board of Supervisors, acting as the District Board of Supervisors, solely governs the other nine zones of the District.

2.1.2.1 Zone 7 – A Wholesale Water Agency

Zone 7 is the water wholesaler for the Livermore-Amador Valley, also known as the Tri-Valley Area[3], in addition to serving as the area's flood control agency. Zone 7 supplies untreated water for agriculture, and treated drinking water to four retail water supply agencies (Retailers):

- California Water Service Company (Cal Water),
- Dublin San Ramon Services District (DSRSD),
- City of Livermore (Livermore), and
- City of Pleasanton (Pleasanton).

These Retailers deliver water for municipal and industrial (M&I) purposes within their individual service areas.

Over 2002 and 2003, the Retailers signed the "Tri-Valley Water Retailers Cooperation Agreement" (Agreement), which provides a framework for cooperation amongst the Retailers to enhance their abilities to serve their customers. The Committee of Valley Water Retailers (CoVWR), consisting of two governing body or senior management staff representatives from each retailer, was formed as part of the Agreement. The Tri-Valley Water Retailers Group (TWRG), consisting of staff from each retailer, was also formed to administer the actions called for under the Agreement, to develop consensus on issues of mutual concern, and to prepare an Annual Report for approval by the CoVWR[4]. The CoVWR and the TWRG serve as forums for the Retailers to discuss issues of common interest and to communicate the Retailers' position on such issues to Zone 7.

2.1.2.2 Key Management and Administrative Activities

Zone 7's key management responsibilities include:

- providing a wholesale treated drinking water supply;
- monitoring and protecting water quality;
- operating and maintaining a water treatment system; and
- managing regional flood and storm water for public safety and protection of property.

Under Zone 7's Groundwater Management Program, Zone 7 administers oversight of the local groundwater basin, the Livermore Valley Groundwater Basin (Main Basin), and prevents groundwater overdraft. The Main Basin is the portion of the Livermore-Amador Valley Groundwater Basin that contains high-yielding aquifers and good quality groundwater. Within this capacity, Zone 7 monitors groundwater extractions and imports water to both artificially recharge the Main Basin (to supplement natural recharge) and to provide potable water through

[3] The Tri-Valley Area includes the City of Dublin, City of Livermore, City of Pleasanton, and part of the City of San Ramon.

[4] West Yost Associates, 2010. DRAFT Tri-Valley Water Retailers Annual Report Fiscal Year 2009/10.

direct treatment (thus allowing local agencies to reduce pumping demands on the Basin). Zone 7's groundwater management policies and programs are described in the Groundwater Management Plan[5], which is included as a CD attachment. Every year Zone 7 completes an update of its Groundwater Management Program. The most recent update was completed in May 2010 for the 2009 water year[6].

2.2 SERVICE AREA

2.2.1 Location of the Service Area

Zone 7's water service area is located about 40 miles south-east of San Francisco, and encompasses an area of approximately 425 square miles of the eastern portion of Alameda County, including the Livermore-Amador Valley, Sunol Valley, and portions of the Diablo Range. Zone 7's service area also overlies the Alameda Creek Watershed. This watershed encompasses almost 700 square miles, and extends from Altamont Pass to the east, San Francisco Bay to the west, Mount Diablo to the north, and Mount Hamilton to the south. Figure 2-1 illustrates the location of Zone 7's service area.

2.2.2 Major Streams and Arroyos in the Service Area

Major streams in Zone 7's service area include the Arroyo del Valle, Arroyo Mocho, Arroyo Las Positas, Alamo Canal, South San Ramon Creek, and Tassajara Creek (see Figure 2-1). Both the Arroyo del Valle and Arroyo Mocho originate in the woodland forests of the Burnt Hills region in Santa Clara County, in the sub-watershed above Lake Del Valle. The Arroyo del Valle and Arroyo Mocho have the largest drainage areas within the Zone 7 service area.

The Arroyo del Valle flows into Lake Del Valle above Lang Canyon, and then continues its journey below the Del Valle Dam and flows westerly through a regional park on the southern border of Livermore and reaches Pleasanton. The Arroyo del Valle then flows southwesterly through the historic downtown region of Pleasanton and joins the Arroyo de la Laguna.

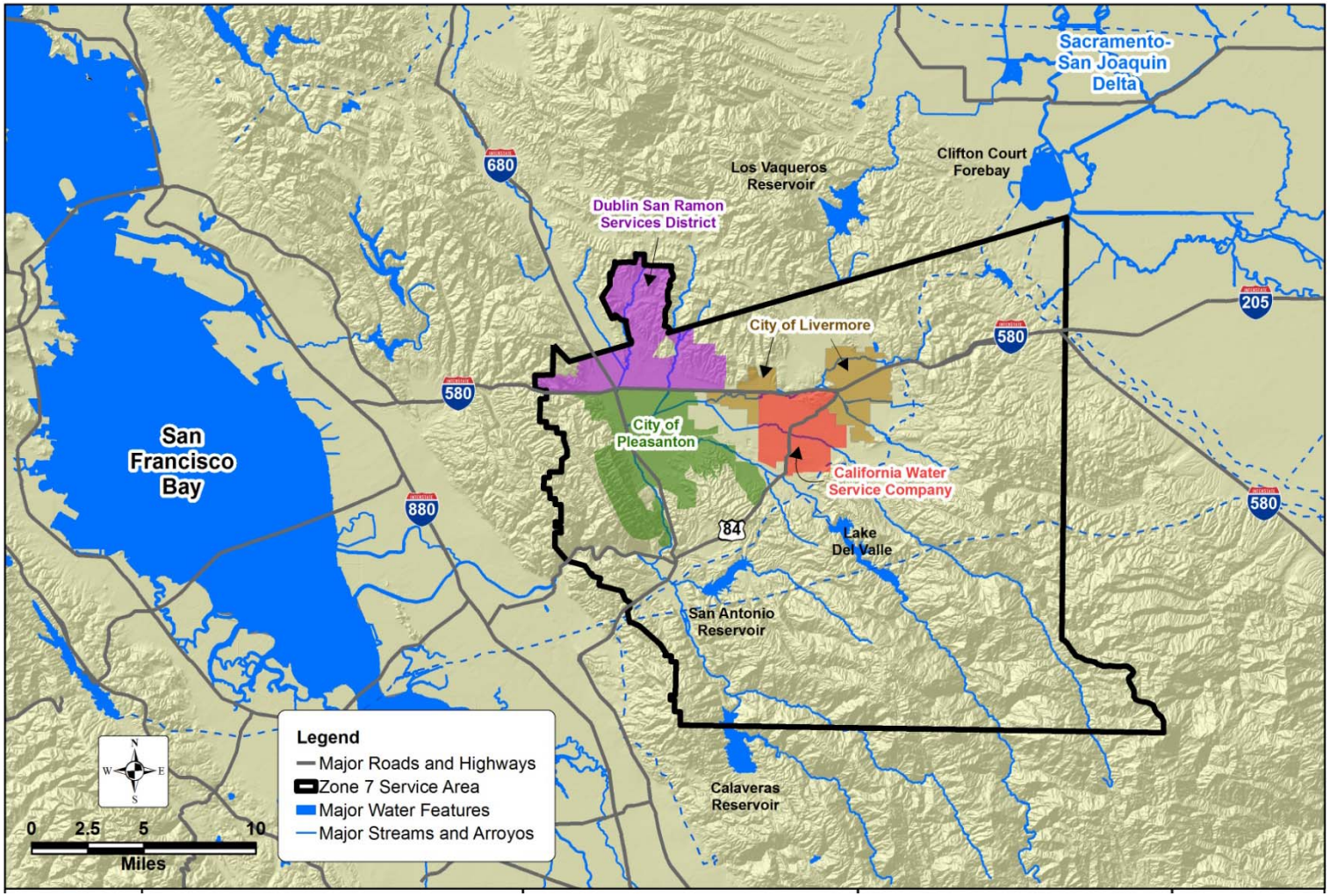
The Arroyo Mocho remains a natural waterway as it flows southwest through the oak woodlands east of Livermore, and then flows through the southern portion of Livermore; from there, it becomes an improved channel and proceeds through the gravel mining area west of Livermore and meets the Arroyo Las Positas in Pleasanton. This stream is also a major component of Zone 7's groundwater recharge program. At the request of Zone 7, the Department of Water Resources (DWR) releases water into both Arroyo Mocho and Arroyo del Valle for groundwater recharge purposes that also provide secondary aesthetic and environmental benefits.

The Arroyo Las Positas mainly flows westerly along I-580, and is fed by the Arroyo Seco, Altamont Creek, Cayetano Creek, Collier Canyon Creek, and Cottonwood Creek. In northeast Pleasanton, the Arroyo Las Positas joins the Arroyo Mocho, where the streambed becomes a

[5] Jones and Stokes, 2005. Groundwater Management Plan for the Livermore-Amador Valley Groundwater Basin.
[6] Zone 7 Water Agency, 2010. Annual Report for the Groundwater Management Program: 2009 Water Year.

wide, trapezoidal-shaped flood control channel. The Arroyo Mocho then flows into the Arroyo de la Laguna, which is a tributary of Alameda Creek.

Figure 2-1. Location of Zone 7 Water Agency's Service Area



2.3 EXISTING WATER USE SECTORS

Zone 7's service area is home to a diverse, vibrant, and rapidly growing community that supports a population of approximately 216,000 people and a myriad of vital and dynamic commercial, agricultural, and industrial enterprises. The eastern reaches of Zone 7's service area include oil wells and acres of energy generating windmills, while other areas include large employers such as AT&T, Oracle, Providian Financial, SAP, and Lawrence Livermore National Laboratory. This area also supports a number of award-winning wineries. Examples of industrial water users include: Applied Biosystems (biotech), Clorox Services Company (chemical company), Roche Molecular Systems (medical research and development), and A-1 Enterprise (waste hauler).

As discussed previously, Zone 7 provides wholesale treated water to the Retailers, who use this water for M&I purposes within their service areas; through this arrangement, Zone 7 indirectly serves approximately 66,000 residential, commercial, industrial, institutional, and landscape water use accounts. Two of the Retailers—DSRSD and Livermore—also provide recycled water for landscape irrigation to supplement treated water supply. In addition to supplying treated water, Zone 7 also supplies raw or untreated water for agricultural purposes to 3,500 acres in the service area, primarily consisting of vineyards in the southern portion of the Livermore Valley. Agriculture in the Livermore area also produces olives, pistachios, and prime beef.

As shown in Table 2-1, water accounts within Zone 7's service area are primarily residential (90%). Water use details are further discussed in Chapter 9.

Table 2-1. 2009 Accounts by Water Use Sectors Directly and Indirectly Served by Zone 7[(a)]

Water Use Sector	Accounts	% of Total
Single-Family Residential	57,198	86%
Multi-Family Residential	2,327	4%
Commercial/Institutional	3,807	6%
Industrial	175	0.3%
Landscape	1,844	3%
Agriculture	14	0.02%
Other	868	1%
TOTAL	**66,233**	**100%**

[(a)] Based on data provided by Cal Water, DSRSD, Livermore, and Pleasanton, and Zone 7's annual water supply reports. These values do not include recycled water, but do include untreated surface water provided to agriculture.

2.4 POPULATION GROWTH

As shown on Figure 2-2, the population within Zone 7's service area has increased by 65% between 1990 and 2009, and is projected to grow by another 35% by 2040, from 216,000 in 2009 to 291,000; a majority of the projected growth occurs within the next 10 years. Population projections within Zone 7's service area over the next 20 years are presented in Table 2-2. As

shown in Table 2-2, the projected population within Zone 7's service area is within 10% of the projections previously presented in Zone 7's 2005 UWMP.

Figure 2-2. Historical and Projected Population within Zone 7's Service Area

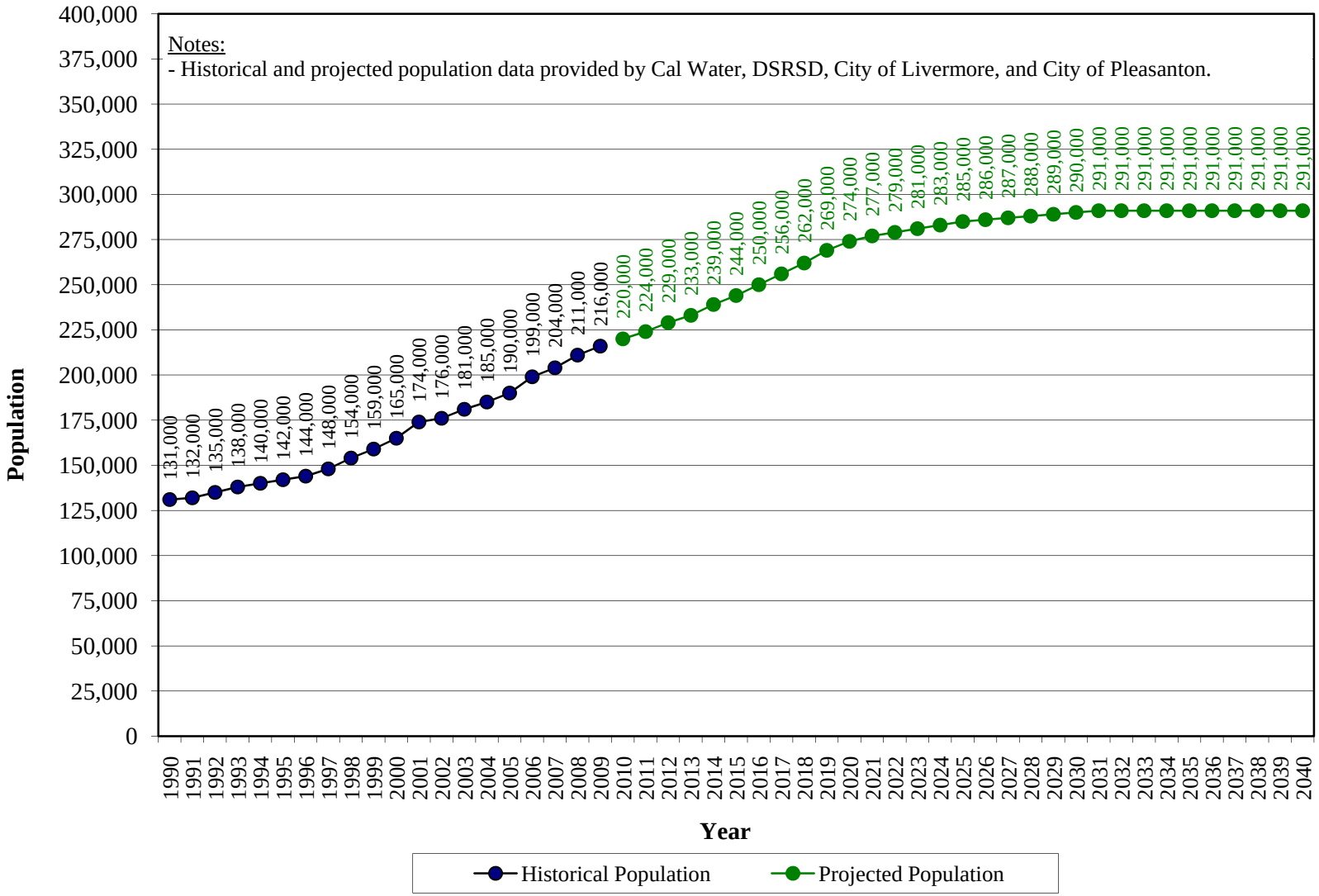


Table 2-2. Projected Population within Zone 7's Service Area[a]

UWMP Plan	Year					
	2009 (Current)	2010	2015	2020	2025	2030
2005	NA	225,000	247,000	255,000	263,000	264,000
2010	216,000	220,000	244,000	274,000	285,000	290,000
% Increase		-2.3%	-1.2%	6.9%	7.7%	9.0%

[a] Population data provided by Cal Water, DSRSD, Livermore, and Pleasanton.

2.5 CLIMATE

The climate within Zone 7's service area is best described as Mediterranean, characterized by hot, dry summers and cool, moist winters. Table 2-3 provides a more detailed picture of climate within Zone 7's service area, including average evapotranspiration (ETo)[7], temperature, and rainfall, while Figure 2-3 provides a graphical representation. As shown in Table 2-3, average annual precipitation is approximately 14.6 inches of water, while total evapotranspiration is approximately 49 inches of water; average monthly temperatures vary from 45 to 69 degrees Fahrenheit throughout the year.

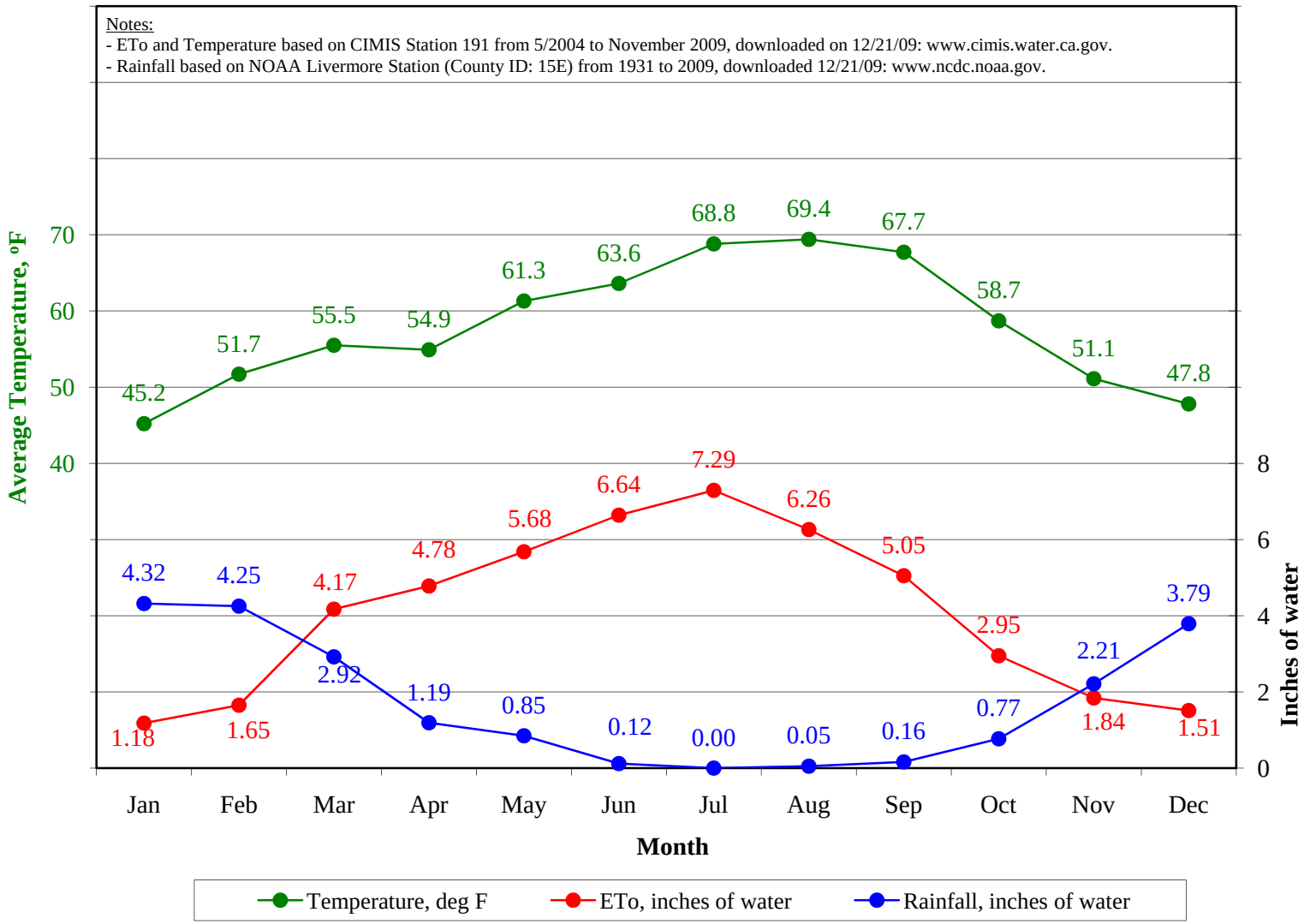
Table 2-3. Climate Data for Zone 7's Service Area

Weather Parameter	Month												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
ETo, inches of water[a],[b]	1.18	1.65	4.17	4.78	5.68	6.64	7.29	6.26	5.05	2.95	1.84	1.51	49.00
Average Temperature, °F[b]	45.2	51.7	55.5	54.9	61.3	63.6	68.8	69.4	67.7	58.7	51.1	47.8	--
Average Rainfall, inches of water[c]	2.96	2.50	2.18	1.07	0.48	0.11	0.02	0.04	0.24	0.69	1.64	2.64	14.57

[a] ETo = evapotranspiration based on standard grass as reference.
[b] Data for CIMIS Station 191 from May 2004 to November 2009, downloaded on 12/21/09: www.cimis.water.ca.gov.
[c] Obtained from Table 3.1-3 of the Annual Report for the Groundwater Management Program – 2009 Water Year (see CD attachment).

[7] Evapotranspiration based on standard grass as reference.

Figure 2-3. Climate Data



2.6 ZONE 7'S CONVEYANCE, TREATMENT, AND TRANSMISSION SYSTEM

Zone 7 has a robust water supply system consisting of aqueducts, surface water treatment plants, groundwater wells, demineralization facility, and transmission pipelines. Each is discussed below, while Figure 2-4 illustrates the location of Zone 7's major water system facilities.

2.6.1 South Bay Aqueduct

Zone 7 imports surface water from the State Water Project (SWP) through the South Bay Aqueduct (SBA) for direct use by agricultural users and for treatment, storage, and recharge for municipal and industrial customers. The SBA, which is operated by the DWR, starts from Byron Bethany Reservoir in the northeastern corner of Zone 7's service area, and then leaves the service area, southwest of San Antonio Reservoir. The SBA is described in more detail in Chapter 5.

2.6.2 Water Treatment Plants

Zone 7 operates two water treatment plants: the Del Valle Water Treatment Plant (DVWTP) and the Patterson Pass Water Treatment Plant (PPWTP).

2.6.2.1 Del Valle Water Treatment Plant

The DVWTP is located along the SBA, just south of Lake Del Valle, and has a capacity of 40 mgd. It can receive water either directly from the SBA or from Lake Del Valle. The treatment processes include coagulation, flocculation, clarification, multi-media filtration, and chlorine disinfection. In addition, chloramine is used to maintain a disinfectant residual in the distribution system.[8]

2.6.2.2 Patterson Pass Water Treatment Plant

The PPWTP is located along the SBA, just south of Interstate 580, and has a capacity of 19 mgd.[9] Because PPWTP is upstream of Lake Del Valle, it is not able to receive water directly from this water supply source[10] and instead has a small raw water reservoir onsite operated by DWR (more details on water supply sources can be found in Chapter 5). There are two separate, parallel treatment plants on the plant site: a conventional plant and an ultrafiltration plant. The two plants share the same water source, finished-water clearwell, and solids handling facilities, but are operated independently of each other by Zone 7 staff.

The treatment processes in the conventional system include coagulation, flocculation, sedimentation, dual-media filtration, and chlorine disinfection. The ultrafiltration plant consists of coagulation, flocculation, sedimentation, an Aquasource ultrafiltration membrane system, and

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[8] Zone 7, 2009. Del Valle Water Treatment Plant Site Specific BMPs Plan. September.

[9] Zone 7, 2009. Patterson Pass Water Treatment Plan Site Specific BMPs Plan. September.

[10] PPWTP can put water supply diverted under an existing water right permit to beneficial use through exchanges with other SWP contractors.

chlorine disinfection. In addition, chloramine is used to maintain a disinfectant residual in the distribution system.

2.6.3 Zone 7 Groundwater Wells

Zone 7 owns and operates nine municipal supply wells located in four well fields: the Chain of Lakes, Hopyard, Mocho, and Stoneridge well fields. All four well fields have a combined peak capacity of 40 mgd. Groundwater is chloraminated to match the disinfectant residual in the transmission system.

Construction of a Well at the Chain of Lakes Well Field

2.6.4 Mocho Groundwater Demineralization Facility

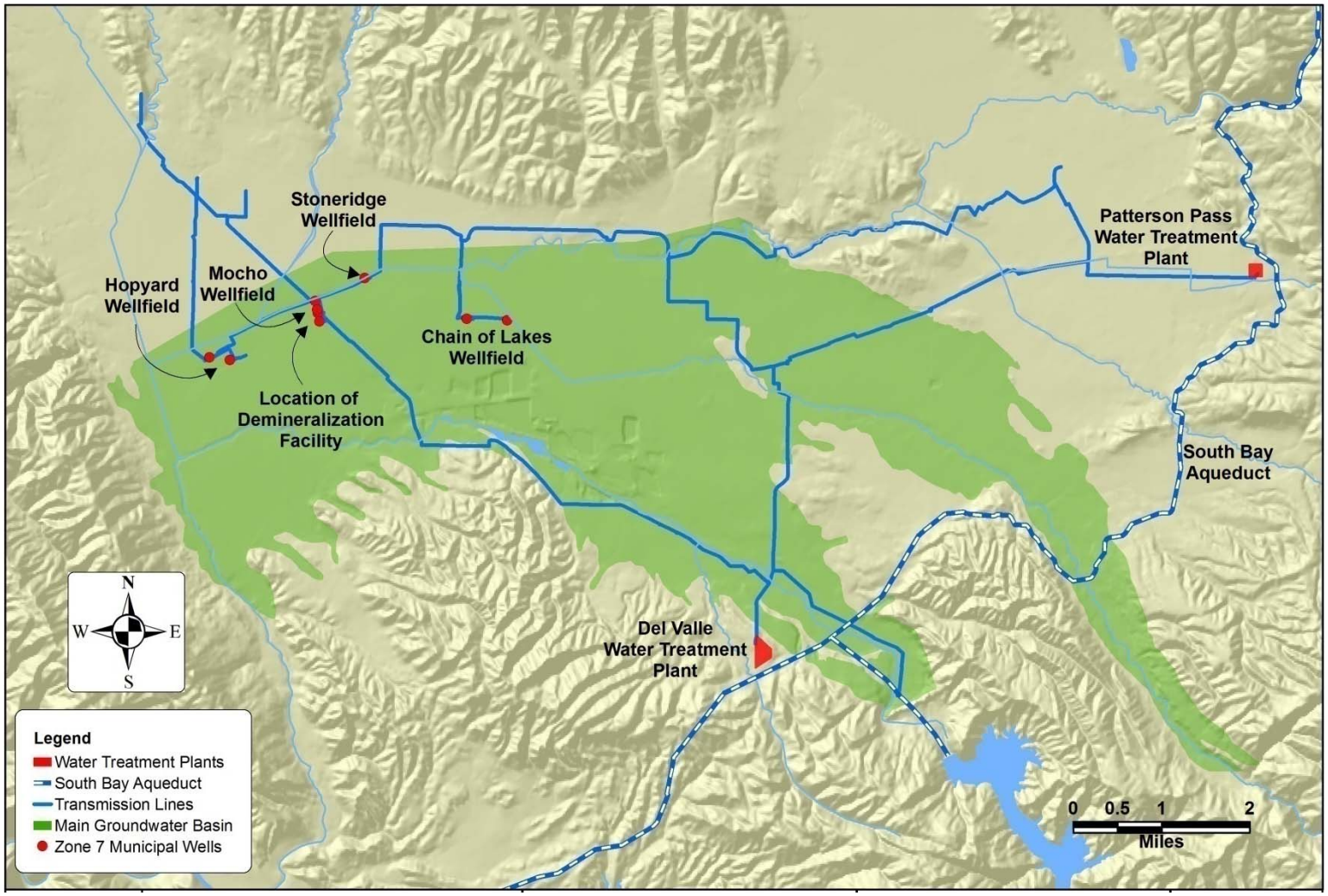
At the Mocho well field, there is also a reverse osmosis membrane-based demineralization facility designed to improve delivered water quality and mitigate salt build-up in the groundwater basin; it is described in more detail in Chapter 6. Construction of this facility, which can produce up to 6.1 mgd of demineralized water, was completed in 2009.

2.6.5 Transmission System

Zone 7's transmission system consists of approximately 35 miles of pipeline ranging from 12 to 42 inches in diameter. Elevations across the transmission system range from 600 to 680 feet above mean seal level (msl) on the eastern side of the service area, to approximately 330 feet above msl on the western side of the service area.

Construction of El Charro Pipeline in 2009

Figure 2-4. Zone 7's Major Treated Water System Facilities



3. AGENCY COORDINATION

Water Code Section 10620

The purpose of this chapter is to describe the coordination of the development of this Urban Water Management Plan (UWMP) with the relevant agencies. It also discusses how Zone 7 uses various water management tools to maximize resources and minimize the need to import water.

3.1 COORDINATION WITH OTHER AGENCIES

As a first step in the preparation of the 2010 UWMP, Zone 7 Water Agency (Zone 7) held a kick-off meeting with technical staff from its water retailers (Retailers): City of Livermore (Livermore), City of Pleasanton (Pleasanton), Dublin San Ramon Services District (DSRSD), and California Water Service Company (Cal Water). The purpose of the kick-off meeting, which was conducted in June 2009, was to coordinate the preparation of Zone 7's and the Retailers' 2010 UWMP to ensure consistency among them, particularly with respect to projected water demands and future water supplies. Zone 7 held three additional meetings with the Retailers over the UWMP development process period, between July 2009 and December 2010. The Retailers provided necessary information for the completion of this UWMP, particularly information on their population and water demand projections, wastewater management, water conservation plans, and recycled water plans. Zone 7 is also providing assistance to the Retailers in preparing their individual UWMPs.

As the wholesale water supplier to the Livermore-Amador Valley, Zone 7 notified the cities within the service area of the update process for the UWMP and the opportunity to submit comments on the Draft 2010 UWMP in compliance with Section 10642 of the Water Code. The Livermore-Amador Valley Water Management Agency was also given the opportunity to review the Draft 2010 UWMP. As a special agency within Alameda County, Zone 7 similarly coordinated with the Alameda County Planning Department. A 60-day notice of the public hearing was disseminated to cities within the service area and Alameda County. A public review period was conducted in the month of November 2010 before the public hearing at the December 2010 Zone 7 Board Meeting; the public hearing is intended to present the Draft 2010 UWMP, and receive and address comments from the public. As advertised in the local newspapers, the Draft 2010 UWMP was made available for public review and comment in public libraries, in the Zone 7 administrative office, on the Zone 7 website, and during the public hearing. Public notices are included in Appendix B.

A public hearing was conducted at one of the regular public meetings of the Zone 7 Water Agency Board of Directors (Zone 7 Board) held on December 15, 2010 to present the UWMP and obtain comments from the public.

Table 3-1. Agency Coordination for the 2010 UWMP Development

Agency	Participated in the UWMP development	Sent notice of public hearing and intention to adopt	Received copy of the draft	Commented on the Draft UWMP
Water Retailers				
California Water Service Company	X	X	X	X
City of Livermore	X	X	X	X
City of Pleasanton	X	X	X	X
Dublin San Ramon Services District	X	X	X	X
Other Water Management Agencies				
Department of Water Resources	X		X	X
Relevant Public Agencies				
Alameda County Planning Department		X	[(a)]	
City of Dublin Planning Department		X	[(a)]	
City of San Ramon Planning Department		X	[(a)]	
Livermore-Amador Valley Water Management Agency (LAVWMA)		X	[(a)]	
Alameda County Public Library – Dublin			X	
Livermore Public Library			X	
Pleasanton Public Library			X	

[(a)] Notified of availability of copies in public libraries, at the Zone 7 office, and online.

Zone 7 is strongly committed to coordinating with the Retailers on issues that affect their own operations. A key area in which Retailers are closely involved is water supply planning. Zone 7 conducts a review of the Sustainable Water Supply and develops water management strategies on an annual basis. This process is vetted in a number of forums, including public presentations to the Zone 7 Board, presentations to and discussions with the Tri-Valley Water Retailers Group (TWRG), and publication of the Annual Review of Sustainable Water Supply for Zone 7 Water Agency on the internet for public access. Zone 7 also regularly meets with the TWRG on other key issues such as budgeting, water quality issues, and others. The Retailers are also being consulted regularly on the update of the Water System Master Plan (WSMP).

As a contractor of the State Water Project (SWP) (discussed in more detail in Chapter 5), Zone 7 is heavily engaged with the Department of Water Resources (DWR). Zone 7 also regularly interacts with other water agencies receiving water from the SWP and serving a total of over 25

million people across the state. These interactions ensure that Zone 7 stays abreast of major water resource issues not just at the local level, but also at the regional and state levels.

3.2 RESOURCE MAXIMIZATION AND IMPORT MINIMIZATION

As discussed in more detail in Chapter 5, 83% of Zone 7's water supply is imported water derived from the SWP. Zone 7 continues to strive to develop local sources of water, and to diversify its water supply portfolio to generally increase reliability. An updated WSMP is to be completed in early 2011 (discussed further in Chapter 11), with the goal of developing a set of water supply and infrastructure portfolios that will provide the flexibility required to respond to an uncertain future caused by legal and environmental constraints in the Delta and climate change, and offer a reliable supply of high quality water to the Livermore-Amador Valley. One set of portfolios being developed is focused on sources within the Livermore-Amador Valley, such as recycled water, rainfall capture, and completion of facilities required to fully perfect Zone 7's water right permit for Arroyo del Valle. Water conservation also plays an important role in local water resource management; as described in Chapter 10, Zone 7 has been proactively implementing water demand management measures in the service area in cooperation with the Retailers.

To optimize use of its local resources, Zone 7 practices conjunctive use of the Livermore Valley Groundwater Basin (Basin) (see Chapters 6 and 7), with local runoff from Arroyo del Valle stored in the local reservoir owned and operated by DWR (Lake Del Valle). Artificial recharge into the Basin utilizing stored local water or imported water from the SWP supplements natural recharge. More details about Zone 7's conjunctive use program can be found in Zone 7's Groundwater Management Plan[11] (attached as a CD).

Finally, Zone 7 has entered into several long-term water storage ("banking") agreements with agencies outside of the service area in Kern County (Semitropic Water Storage District and Cawelo Water District) to gain additional flexibility in managing fluctuations in supplies and providing water during drought and other emergency conditions. These agreements are described in Chapter 8.

[11] Jones and Stokes, 2005. Groundwater Management Plan for the Livermore-Amador Valley Groundwater Basin.

4. PUBLIC PARTICIPATION

Water Code Section 10642

The purpose of this chapter is to describe the level of public participation in the development of this Urban Water Management Plan (UWMP).

4.1 PUBLIC PARTICIPATION

The California Urban Water Management Planning Act (UWMP Act) requires each water agency to encourage the active involvement of the public in the development of the UWMP. Zone 7 Water Agency (Zone 7) sought public participation by allowing any interested member of the general community in the service area to have access to the Draft 2010 UWMP (Draft) starting in early November 2010. The Draft was made available for public inspection at local libraries (as listed in Table 3-1), as well as on Zone 7's website. In addition, Zone 7 had a hard copy of the Draft available for public review at the Zone 7 Administrative Office in Livermore, California. Copies of the Draft were sent for review and comment to all Zone 7 retail water supply agencies. Notice of the public hearing on December 15, 2010 was sent to the cities, Alameda County, and Livermore-Amador Valley Water Management Agency 60 days before the public hearing as required under Section 10642 of the Water Code. Public notices regarding the availability of the Draft for public inspection, and of the public hearing, were also posted in the local media (Valley Times and Tri-Valley Herald) twice in November (November 8 and 15, 2010), one week apart, and on the Zone 7 website. Public notices are included in Appendix B.

The public hearing was conducted on December 15, 2010 to allow for public comment on the Draft 2010 UWMP before being formally adopted by the Zone 7 Board of Directors. A copy of the Board resolution adopting the UWMP is attached as Appendix C.

5. WATER SUPPLY: SOURCES AND STORAGE OPTIONS

Water Code Section 10631

The purpose of this chapter is to describe Zone 7's water supply system. This system includes two major components: (1) incoming water supplies available through contracts and water rights and 2) accumulated water supplies in storage. Incoming water supplies consist of annually allocated imported surface water supply and local surface water runoff. Accumulated or "banked" water supplies are available in local and non-local storage locations.

Two of Zone 7's retailers, Dublin San Ramon Services District (DSRSD) and the City of Livermore (Livermore), also produce recycled water for their service areas; more details about recycled water are available in Chapter 14. The two other retailers in the service area, the City of Pleasanton (Pleasanton) and the California Water Service Company (Cal Water), pump groundwater in addition to the water supply provided to them by Zone 7. DSRSD has a contract with Zone 7 to pump groundwater on its behalf. More details about the Livermore Valley Groundwater Basin, which is used as a supply by the retailers as described above and as local storage by Zone 7, are provided in Chapter 6. Water transfers are discussed in more detail in Chapter 8.

In accordance with its reliability policy (Appendix D), Zone 7 continues to explore other options for acquiring additional future water supplies (see Chapter 11) such as desalination (see Chapter 12).

5.1 IMPORTED SURFACE WATER SUPPLY

Imported surface water is by far Zone 7's largest water source, providing over 80% of the treated water supplied to its customers on an annual basis. As described below, Zone 7 imports water from the State Water Project and surplus water from the Byron Bethany Irrigation District.

5.1.1 State Water Project

In November 1961, Zone 7 entered into a 75-year agreement with the Department of Water Resources (DWR) to receive water from the State Water Project (SWP). The SWP is the nation's largest publicly-built water storage and conveyance system and currently serves over 25 million people throughout California. SWP water originates within the Feather River watershed, is captured in and released from Lake Oroville, and flows through the Sacramento-San Joaquin Delta before it is conveyed by the South Bay Aqueduct (SBA) to Zone 7 or by the California Aqueduct to other south-of-Delta SWP contractors.

Supply from the SWP is delivered via the SBA. Over 90% of Zone 7's existing supply is conveyed through the SBA.

The SBA also delivers water to other water suppliers, namely Santa Clara Valley Water District and Alameda County Water District. Lake Del Valle is part of the SBA system and is used for storage of SWP water, as well as local runoff. At Zone 7, SWP water is used to meet treated water demands from municipal and industrial customers—both wholesale and retail—and untreated water demands from agricultural customers. It is also used to artificially recharge the local groundwater basin as discussed below in Section 5.3, or fill non-local storage.

5.1.1.1 Table A Allocation

Zone 7 has the ability to carry Table A water from one year to another. Zone 7's SWP carryover is stored in San Luis Reservoir

The primary allocation agreement between DWR and its SWP contractors is recorded in Articles 12(a) and 18(a) of the agreements and is based on each contractor's annual water delivery request. Each contractor is limited to an annual contractual amount as specified in Article 6(c) and Table A. Zone 7's current agreement or contract with the DWR is for the delivery of up to 80,619 acre-feet annually (AFA). This contract expires in 2036 with an option to renew for 75 years. In practice, the actual amount of SWP water available to Zone 7 under the Table A allocation process varies from year to year due to hydrologic conditions, water demands of other contractors, SWP facility capacity, and environmental/regulatory requirements. In January 2010, DWR issued the State Water Project Delivery Reliability Report for 2009[12] that estimates a long-term average yield of 60% of Table A amounts, equivalent to 48,400 AFA for Zone 7. The SWP provides a median yield in a normal water year of 51,400 AFA (approximately 64%) to Zone 7.

As a SWP contractor, Zone 7 has the option to carry over unused Table A water from one year to the next when there is available storage in San Luis Reservoir. This "carryover" water is also called Article 12e and 56c water. Article 12e water must be taken by March 31 of the following year, but Article 56c water may be carried over as long as San Luis Reservoir storage is available. When possible, Zone 7 typically sets aside between 10,000 to 15,000 acre-feet (AF) of carryover water from its SWP Table A allocation.

5.1.1.2 Article 21 Water (Interruptible or Surplus Water)

Under Article 21 of Zone 7's contract with DWR, Zone 7 also has access to excess water supply from the SWP that is available only if: 1) it does not interfere with SWP operations or Table A allocations, 2) excess water is available in the Delta, and 3) it will not be stored in the SWP system. Per the State Water Project Reliability Report for 2009[12], the projected yield from Article 21 is very low and does not represent a significant water supply for Zone 7.

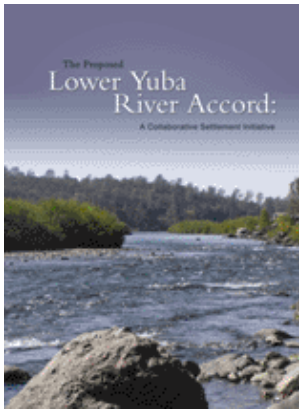
[12] DWR, 2010. State Water Project Delivery Reliability Report for 2009. (Available at http://baydeltaoffice.water.ca.gov/swpreliability/index.cfm).

5.1.1.3 Article 56d Water (Turnback Pool Water)

Article 56d is a contract provision that allows SWP contractors with unused Table A water to sell their water to contractors who have water needs that exceed their allocation for the year. Historically, only a few SWP contractors have been in a position to make Turnback Pool water available for purchase, particularly in normal or dry years. Zone 7 currently does not anticipate a significant amount of water supply to be available under Article 56d until there is a resolution to the current Delta crisis.

5.1.1.4 Yuba Accord

In 2008, Zone 7 entered into a contract with DWR to purchase additional water under the Lower Yuba River Accord (Yuba Accord). The contract expires in 2025. There are four different types ("Components") of water available; Zone 7 has the option to purchase Components 2 and 3 water during drought conditions, and Component 4 water when the Yuba County Water Agency has determined that it has water supply available to sell.



The annual amount of water supply available to Zone 7 during dry years under the Yuba Accord is relatively small: 159 AF in 2009 and approximately 1,000 AF in 2010. Zone 7 estimates average and median yields of 250 AFA and 145 AFA, respectively, under the Yuba Accord (see Chapter 7 for more detail).

5.1.2 Byron Bethany Irrigation District

The Byron Bethany Irrigation District (BBID) diverts water from the Sacramento-San Joaquin Delta (Delta) pursuant to a "Notice of Appropriation of Water" dated May 18, 1914[13]. Zone 7 entered into a 15-year contract with BBID, renewable every five years, for a minimum yield of 2,000 AFA and up to 5,000 AFA of water supply under this appropriation. Water purchased from BBID is delivered to Zone 7 via the SBA. The current contract was recently extended through 2030, with an option to extend through 2039. While Zone 7 has had a contract with BBID since 1998, Zone 7 has historically requested less than the full amount available; this will change in the future.

5.2 LOCAL SURFACE WATER RUNOFF

Zone 7, along with Alameda County Water District (ACWD), has water right permits to divert flows from Arroyo del Valle[14]. Runoff from the Arroyo del Valle watershed above Lake Del Valle is stored in the lake, which is managed by DWR. As noted above, Lake Del Valle is also used to store imported surface water deliveries from the SWP through late winter and spring. In late fall, DWR typically lowers lake levels in anticipation of runoff from winter storm events,

[13] Source: Mountain House Master Plan.
[14] Permit 11319 (Application 17002).

and to provide flood control capacity. Water supply in Lake Del Valle is made available to Zone 7 via the SBA through operating agreements with DWR. Inflows to Lake Del Valle, after accounting for permit conditions, are equally divided between ACWD and Zone 7.

A review of historic runoff from Arroyo del Valle from 1913 to 2008[15] indicates that the median inflow available to Zone 7 is approximately 7,100 AFA; Chapter 7 provides more detail on the reliability of supply from the Arroyo del Valle.

Supply from Arroyo del Valle is stored in Lake Del Valle

5.3 LOCAL STORAGE

Zone 7 has three options for local storage: storage in Lake Del Valle, storage in the local groundwater basin and, in the future, surface storage in the Chain of Lakes. Each of these is described below.

5.3.1 Lake Del Valle

As described above, Lake Del Valle is used to store runoff from the Arroyo del Valle watershed above the lake and also to store imported surface water deliveries from the SWP.

5.3.2 Livermore Valley Groundwater Basin

Zone 7 overlies the Livermore Valley Groundwater Basin (Basin); the Main Basin is the portion of the Livermore Valley Groundwater Basin that contains high-yielding aquifers and good quality groundwater.[16] It has an estimated storage capacity of about 254,000 AF. Detailed descriptions of the Main Basin are available in Zone 7's Groundwater Management Plan (GMP)[17], which is included as a CD attachment. Chapter 6 also provides more details on the Main Basin and its operation. ***DWR has not identified the Main Basin (DWR Basin No. 2-10) as either a basin in overdraft or a basin expected to be in overdraft.***

For Zone 7, the Basin is considered a storage facility and not a long-term water supply because Zone 7 does not have a groundwater-pumping quota, and only pumps groundwater it artificially recharges using its surface water supplies. As part of its conjunctive use program, Zone 7's policy is to maintain groundwater levels above historic lows in the Main Basin through artificial recharge of SWP water or locally-stored runoff from Arroyo del Valle. Currently, this is accomplished by releasing water to the arroyos for subsequent percolation and replenishment of the aquifers.[18] Zone 7 established historic lows based on the lowest measured groundwater

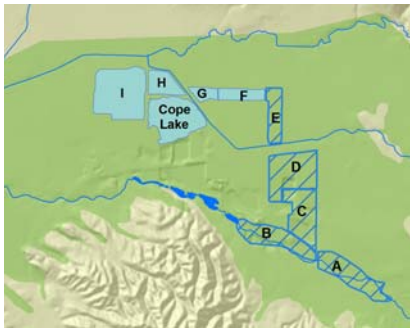
[15] Note that actual data is only available for the following years: 1912 (partial)-1930, 1942, 1944-1952, 1958–present. Gaps were filled using correlations with local rainfall.
[16] Zone 7, 2009. Annual Report for the Groundwater Management Program – 2008 Water Year. May.
[17] Jones & Stokes, 2005. Groundwater Management Plan for Livermore-Amador Valley Groundwater Basin.
[18] Zone 7, 2009. Annual Report for the Groundwater Management Program – 2008 Water Year. May.

elevations in various wells in the Main Basin; historical lows correspond to a groundwater storage volume of about 128,000 AF.[19] In general, the difference between water surface elevations when the Main Basin is full and water surface elevations when the Main Basin is at historic lows defines Zone 7's operational storage. Operational storage is about 126,000 AF based on Zone 7's experience operating the Main Basin.

5.3.3 Chain of Lakes – Lake I and Cope Lake

The Chain of Lakes refers to a series of ten mined out or active gravel quarry pits that have been or will be transferred to Zone 7 for water resources applications. These might include surface storage of stormwater or other local runoff, surface storage of water from the SWP, and/or use as groundwater recharge basins once mining has been completed. The ten quarry pits or lakes are named Cope Lake, and Lakes A through I.

Although the Chain of Lakes will ultimately cover approximately 2,000 acres and store approximately 100,000 AF of water, Zone 7 currently only owns Cope Lake and Lake I. Zone 7 expects to take ownership of Lake H sometime within the next five years, while the remaining lakes will be transferred to Zone 7 over the next 20 years.



The Chain of Lakes is located over the Main Basin, and will enhance Zone 7's existing artificial recharge activities

The Chain of Lakes will be used to store water supplies in wet years for later use during droughts, recharge the groundwater basin, capture additional flow from Arroyo del Valle, and help control flooding along the Arroyo Mocho and Arroyo Las Positas.

5.4 NON-LOCAL STORAGE

In addition to local storage, Zone 7 also participates in the two non-local (also called "out of basin") groundwater-banking programs described below; both banks are located in Kern County. Note that while these banking programs provide a water source during drought years, they represent water previously stored from Zone 7's surface water supplies during wet years. Therefore, they do not have a net contribution to Zone 7's water supply over the long-term and in fact result in some operational losses as described below. Furthermore, this banked water supply is only available when the SBA is operational.

5.4.1 Semitropic Water Storage District

Zone 7 originally acquired a storage capacity of 65,000 AF in the Semitropic Water Storage District (Semitropic) groundwater banking program in 1998. Subsequently, Zone 7 agreed to participate in Semitropic's Stored Water Recovery Unit, which increased pumpback capacity and allowed Zone 7 to contractually store an additional 13,000 AF. Zone 7 currently has a total of 78,000 AF of groundwater banking storage available to augment water supplies during drought

[19] Zone 7, 2010. Annual Report for the Groundwater Management Program – 2009 Water Year. May.

conditions. During non-drought periods, Zone 7 can put up to 5,883 AFA into the Semitropic groundwater bank. Note that a 10% loss is associated with water put into Semitropic. During a drought year, Zone 7 has the ability to request up to 9,100 AF of pumpback and any amount between 0 to 8,645 AF of exchange water; the availability of exchange water depends on projected SWP allocation. Pumpback is water that is pumped out of the Semitropic aquifer and into the SWP system. Exchange water is water that is transferred between Zone 7 and Semitropic by adjusting the amounts of Table A water allocated between Zone 7 and Semitropic. The agreement is in effect through December 31, 2035.

5.4.2 Cawelo Water District

Similar to the arrangements with Semitropic, Zone 7 has 120,000 AF of groundwater banking storage available with the Cawelo Water District, as executed in an agreement in 2006. During non-drought periods, Zone 7 can put into storage up to 5,000 AFA in the bank.[20] During droughts, Zone 7 has the ability to request up to 10,000 AFA of pumpback (or exchange water) from Cawelo. The agreement is in effect through December 31, 2035.

5.5 TOTAL SUPPLY AND STORAGE

Zone 7's existing water supply sources and storage options are summarized in Tables 5-1 and 5-2, respectively. The quantities listed in Table 5-1 are median quantities in normal water years. Under dry, drought, or emergency conditions, the percentage distribution of sources used by Zone 7 to meet demands may shift; in particular, Zone 7 is likely to tap into water stored in the various storage facilities listed in Table 5-2.

[20] Zone 7 only gets storage credit for 50% of the water provided to Cawelo. Per the existing contract, Zone 7 can normally only send 10,000 AF in any given year to Cawelo; therefore, the maximum contractual credit is 5,000 AFA (10,000 divided by 2).

Table 5-1. Zone 7's Existing Water Supply Sources in Normal Water Years[a]

Median Yields (Acre-Feet)		Year				
		2010	2015	2020	2025	2030
Imported Surface Water	SWP – Table A[b]	51,400	51,400	51,400	51,400	51,400
	SWP – Yuba Accord	145	145	145	145	0[c]
	BBID[d]	4,500	4,500	4,500	4,500	4,500
Local Runoff	Arroyo del Valle[e]	7,100	7,100	7,100	7,100	7,100
Total Water Supply		**63,145**	**63,145**	**63,145**	**63,145**	**63,000**

[a] Normal water years are defined as the median yield for this Urban Water Management Plan. The table does not show groundwater pumping from the Main Basin as it represents water stored from the sources already listed above.
[b] Zone 7's contractual Table A amount is 80,619 acre-feet annually; the amount listed here is the projected median yield, after correcting for carryover, in the 2009 State Water Project Delivery Reliability Report.
[c] The Yuba Accord contract ends in 2025.
[d] Byron Bethany Irrigation District. Historical deliveries cannot be used to develop water supply yields. A review of cumulative rainfall in 2009 and 2010 indicates that both years were at or above the historic median rainfall. Deliveries from this contract were 4,500 and 5,000 AF in 2009 and 2010, respectively. A yield of 4,500 AF was assumed available during normal water years.
[e] Based on inflow data (actual and estimated) and existing diversion or facility limitations. The median supply available is approximately 7,100 AF.

Table 5-2. Zone 7's Water Storage Options

Storage Option		Water in Storage through April 2010[a] (Acre-Feet)	Total Storage Capacity (Acre-Feet)
Local	Lake Del Valle	4,900	7,500
	Main Basin	74,000	126,000
Non-Local	Semitropic	78,100	78,000
	Cawelo	5,000	120,000
Total Storage		**162,000**	**324,000**

[a] As presented in the May 2010 Annual Review of Sustainable Water Supply for Zone 7 Water Agency. Note that Zone 7 also has "carryover" water available in the SWP, amounting to 20,500 as of April 2010.

6. GROUNDWATER

Water Code Section 10631(b)

Under Zone 7's Groundwater Management Program, Zone 7 administers oversight of the local groundwater basin, the Livermore Valley Groundwater Basin (Main Basin). The Main Basin is the portion of the Livermore-Amador Valley Groundwater Basin that contains high-yielding aquifers and good quality groundwater. As discussed in Chapter 5, Zone 7 uses the Main Basin as a storage facility and not as a supply: ***Zone 7 does not have a groundwater pumping quota and it can only pump groundwater it has recharged from its other supplies.***

This chapter describes in more detail the Livermore Valley Groundwater Basin and Zone 7's management and use of the Main Basin. Zone 7's strategy for managing the Main Basin is based on conjunctive use principles as described in detail in Zone 7's Groundwater Management Plan[21] (GMP), which was developed in accordance with Assembly Bill 3030 (AB 3030)[22] and is included as a CD attachment. The 2009 Annual Report for Zone 7's Groundwater Management Program is also included in the CD. A brief summary of the key elements of the GMP follows.

6.1 THE LIVERMORE VALLEY GROUNDWATER BASIN

As defined in DWR Bulletin 118 update 2003 *(California's Groundwater)*, the Livermore Valley Groundwater Basin (DWR Basin 2-10) extends from the Pleasanton Ridge east to the Altamont Hills and from the Livermore Uplands north to the Tassajara Uplands. *DWR has not identified Basin 2-10 as either in overdraft or expected to be in overdraft.* Surface drainage features include Arroyo del Valle, Arroyo Mocho, and Arroyo Las Positas as principal streams, with Alamo Creek, South San Ramon Creek and Tassajara Creek as minor streams. All streams converge on the west side of the basin to form Arroyo de la Laguna, flowing south and joining Alameda Creek in Sunol Valley, and ultimately draining to the San Francisco Bay. Some geologic structures restrict the lateral movement of groundwater, but the general groundwater gradient is from east to west, towards Arroyo de la Laguna, and from north to south along South San Ramon Creek and Arroyo del la Laguna.

The entire floor of the Livermore Valley and portions of the upland areas on all sides of the valley overlie groundwater-bearing materials. The materials are mostly continental deposits from alluvial fans, outwash plains, and lakes. They include valley-fill materials, the Livermore Formation, and the Tassajara Formation. Under most conditions, the valley-fill and Livermore Formation yield adequate to large quantities of groundwater to all types of wells, with the larger supply wells being located in the Main Basin. The Main Basin is composed of the Castle, Bernal, Amador, and Mocho II sub-basins.

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[21] Jones & Stokes, 2005. Groundwater Management Plan for Livermore-Amador Valley Groundwater Basin.

[22] AB 3030 (Sections 10750-10756 of the California Water Code) provides a systematic procedure for the development of a groundwater management plan by existing agencies.

6.2 GROUNDWATER QUANTITY

Zone 7 routinely monitors groundwater levels within the Main Basin. Two independent methods are used to estimate groundwater storage: 1) Hydrologic Inventory and 2) Nodal Groundwater Elevation. The Hydrologic Inventory method computes storage change each quarter from basin supply and demand data. This method can also be used to forecast future water storage conditions. The Nodal Groundwater Elevation method computes storage from hundreds of water level measurements. Figure 6-1 depicts Main Basin storage levels calculated using the two methods. Zone 7 is currently evaluating the reasons for the difference in results from the two methods; the mean of the two results is generally used as the estimate of total groundwater storage volume. As such, the Main Basin is estimated to have a total storage capacity of 254,000 acre-feet (AF), of which approximately 126,000 AF are available for Zone 7 operational storage.

As shown on Figure 6-1, the Main Basin went through an extended withdrawal from 1987 to 1992 due to drought. Figure 6-1 also shows the Main Basin responding to the current drought. At the end of the 2009 water year, there was 204,000 AF[23] of stored water in the Main Basin; of this amount, 76,000 AF of groundwater was available for Zone 7's use (as discussed below, the Main Basin is to be maintained at or above 128,000 AF at all times). This left 50,000 AF of available storage capacity for recharge activities at the end of the 2009 water year.

6.2.1. Artificial Recharge

Before the construction of the State Water Project (SWP) in the early 1960s, groundwater was the sole water source for the Livermore-Amador Valley. This resource has gone through several periods of extended withdrawal and subsequent recovery. In the 1960s, when approximately 110,000 AF of groundwater was extracted, the Main Basin reached its historic low of 128,000 AF. The Main Basin was allowed to recover from 1962 to 1983. It was during this era that Zone 7 first conducted a program of groundwater replenishment by recharging imported surface water via its streams ("in-stream recharge") for storage in the Main Basin, began supplying treated surface water to customers to augment groundwater supplies, and regulating municipal pumping by contractually establishing Independent Quotas (IQ) as discussed further below.

Figure 6-2 shows Zone 7's total annual artificial recharge amounts from 1974 to 2009. As discussed in Chapter 5, Zone 7's operational policy is to maintain the balance between the combination of natural and artificial recharge and withdrawal. This ensures that groundwater levels do not drop below the historic level of 128,000 AF.

Zone 7 plans to augment its current groundwater in-stream recharge capacity with off-stream recharge using the future Chain of Lakes facilities. As described in Chapter 5, reclaimed gravel quarries located in the central portion of the Livermore-Amador Valley are to be used for capturing additional local runoff and imported surface water, and recharging the Main Basin. Ultimately, the Chain of Lakes could cover 2,000 acres and store approximately 100,000 AF of

[23] Calculated as the average of the results from the two storage calculation methods. See Table 4.2-4 of the 2009 Annual Report for the Groundwater Management Program included as a CD attachment.

water as surface water. Zone 7 would store excess surface water during wet and/or normal years and use those supplies during dry years thereby increasing annual groundwater replenishment capability.

Although full implementation of this plan would not occur until after 2030, there would likely be opportunities to use individual gravel quarries or lakes as they become available. The first of these, Lake I, located off Arroyo Mocho, was dedicated to Zone 7 in June 2003. Zone 7 expects to take ownership of Lake H within the next five years.

In addition to Lake I, Zone 7 also acquired Cope Lake, a 220-acre former mining pit that was used as a settling pond by the gravel operators. Although largely sealed from the aquifer, and not a part of the Chain of Lakes, Cope Lake does offer some potential for other uses such as flood detention, settling, and water storage.

Figure 6-1. Main Basin Groundwater Storage

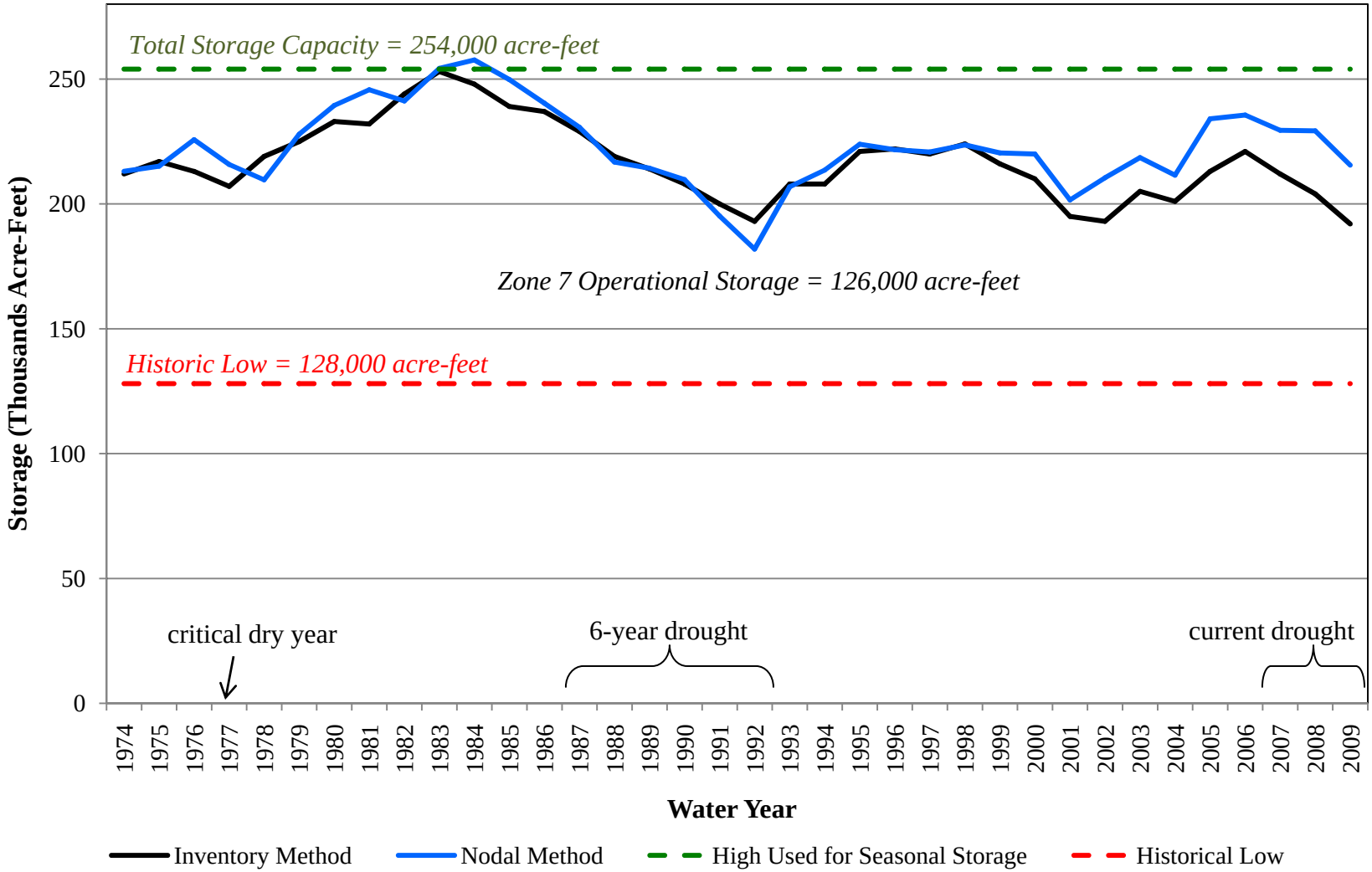
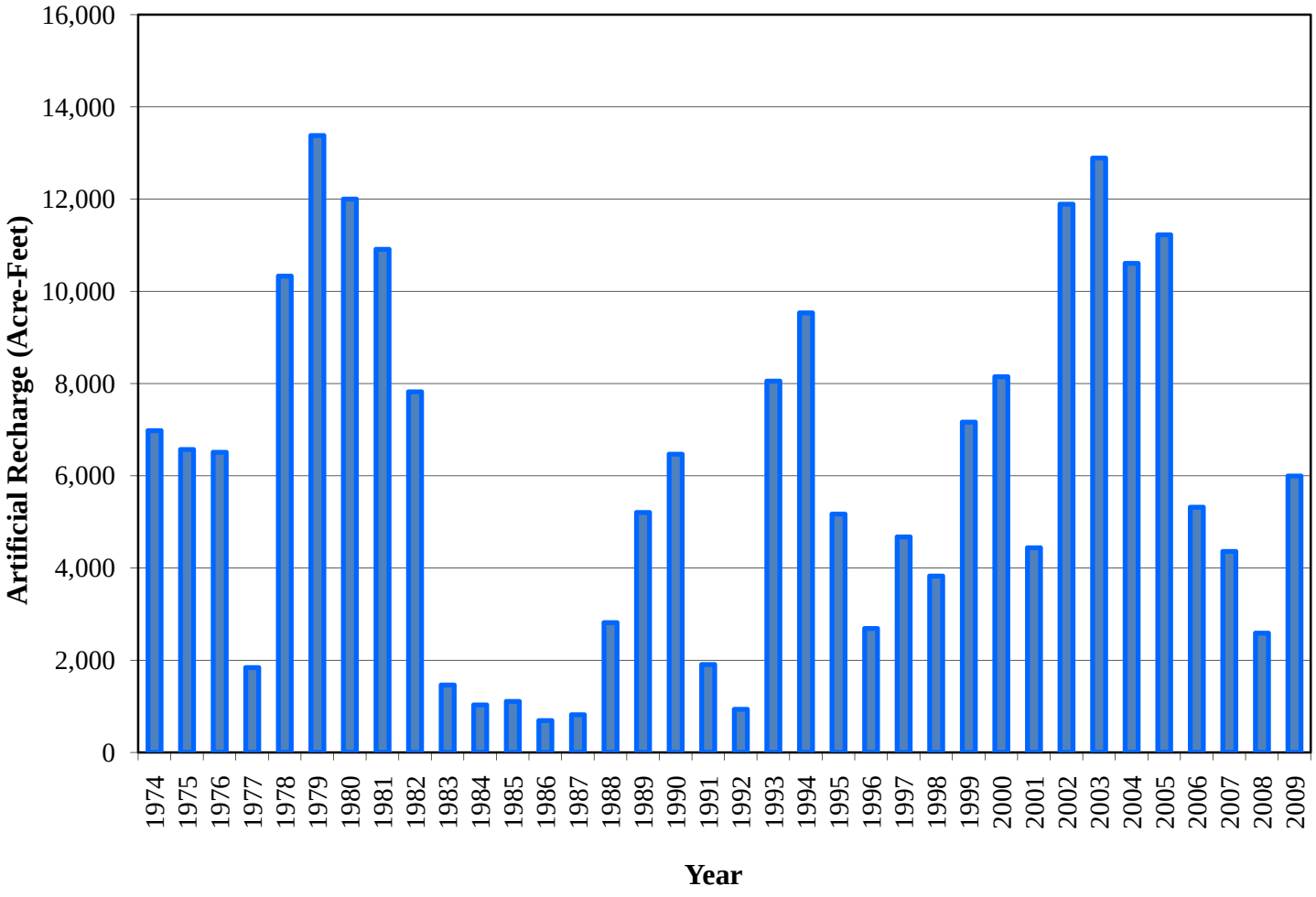


Figure 6-2. Zone 7 Historical Artificial Recharge Between 1974 and 2009



6.2.2. Current Sustainable Yield and Groundwater Pumping Quotas

Long-term natural sustainable yield is contractually defined as the average amount of groundwater annually replenished by natural recharge in the Main Basin—through percolation of rainfall, natural stream flow, and irrigation waters, and inflow of subsurface waters—and which can therefore be pumped without lowering the long-term average groundwater volume in storage. In contrast, "artificial recharge" is the aquifer replenishment that occurs from artificially induced or enhanced stream flow, as described in the previous section. With artificial recharge, more groundwater can be sustainably extracted from the Main Basin each year.

The natural sustainable yield of the Main Basin has been determined to be about 13,400 AFA, which is 10-11% of the total estimated useable groundwater storage. This long-term natural sustainable yield is based on over a century of hydrologic records and projections of future recharge conditions. Based on this sustainable yield value, California Water Service Company (Cal Water), Dublin San Ramon Services District (DSRSD), the City of Livermore (Livermore), and the City of Pleasanton (Pleasanton) (collectively referred to as the Retailers) are permitted to pump 7,245 AFA. Each retailer has an established "Groundwater Pumping Quota" (GPQ), formerly referred to as the "Independent Quota" in the original Municipal and Industrial water supply contract between Zone 7 and each retailer[24].

Pleasanton and Cal Water pump their own GPQ; they are also permitted to pump groundwater in excess of their GPQ under a recharge fee paid to Zone 7. This fee covers the cost of importing and recharging additional water into the Main Basin. Zone 7 pumps DSRSD's GPQ. The City of Livermore has not had any groundwater pumping capability for the last five to six years, and has therefore not pumped their GPQ over this time period. The balance of the natural sustainable yield is pumped for other municipal, agricultural, and gravel mining uses.

Zone 7's groundwater extraction for its treated water system does not use the natural sustainable yield from the Main Basin; instead, ***Zone 7 pumps only water that has been recharged as part of its artificial recharge program using its surface water supplies***. During high demands, groundwater is used to supplement surface water supply delivered via the South Bay Aqueduct (SBA). Groundwater is also used when the SBA is out of service due to maintenance and improvements or when Zone 7's surface water treatment plants are operating under reduced capacity due to construction, repairs, etc. Finally, Zone 7 taps into its stored groundwater under emergency or drought conditions, when there may be insufficient surface water supply available. Zone 7 also pumps groundwater out of the Main Basin during normal water years to help reduce the salt loading in the Main Basin. As discussed in Section 6.3, to achieve additional salt removal, a demineralization facility has been in operation starting in 2009. Zone 7 plans to recharge 9,200 acre-feet annually on average, which means that Zone 7 can pump an equivalent 9,200 acre-feet annually on average from the Main Basin as indicated in Table 6-1.

[24] The GPQs in acre-feet are as follows: Cal Water – 3,069, DSRSD – 645, Livermore – 31, and Pleasanton – 3,500.

Table 6-1. Zone 7 Projected Artificial Recharge and Groundwater Extraction for 2010-2030 during Normal Water Years[a]

Amount (Acre-Feet)	2010	2015	2020	2025	2030
Artificial Recharge	9,200	9,200	9,200	9,200	9,200
Groundwater Extraction	9,200	9,200	9,200	9,200	9,200

[a] Zone 7 does not have a groundwater pumping quota so it only pumps what it recharges.

6.2.3. Groundwater Pumping Capacity

Zone 7 has a total of nine wells available for pumping groundwater in the Hopyard, Mocho, Stoneridge, and Chain of Lakes well fields. Their sustained and peak capacities are summarized in Table 6-2 below, and their total extraction between 2005 and 2009 in AF are presented in Table 6-3.

Table 6-2. Zone 7 Groundwater Extraction Wells

Facility	Peak Capacity		Sustained Capacity[a]	
	GPM	MGD	MGD	AFA
Hopyard Well Field	4,910	7.1	6.4	7,160
Hopyard 6	3,800	5.5	5.0	5,540
Hopyard 9	1,110	1.6	1.4	1,610
Mocho 1 and 2 Well Field	4,580	6.6	5.9	6,650
Mocho 1	2,360	3.4	3.1	3,430
Mocho 2	2,220	3.2	2.9	3,230
Mocho 3 and 4 Well Field[b]	8,060	11.6	10.4	11,690
Mocho 3	4,170	6.0	5.4	6,050
Mocho 4	3,890	5.6	5.0	5,640
Stoneridge Well Field	4,650	6.7	6.0	6,750
Chain of Lakes Well Field	6,000	8.6	7.7	8,670
Chain of Lakes 1	2,500	3.6	3.2	3,630
Chain of Lakes 2	3,500	5.0	4.5	5,040
TOTAL	28,200	39	**35**	**40,920**

[a] Estimated as 90% of peak capacity.
[b] This does not include the reduction in net water production due to brine concentrate losses when the demineralization facility is operating.

6.3 GROUNDWATER QUALITY

The Main Basin is characterized by relatively good quality groundwater that meets all state and federal drinking water standards; groundwater is chloraminated simply to match the disinfectant residual in the distribution system. However, there has been a slow degradation of groundwater quality as evidenced by rising Total Dissolved Solids (TDS) and hardness levels over the last few decades. To address this problem, Zone 7 developed a Salt Management Plan (SMP)[25], which was approved by the Regional Water Quality Control Board in 2004 as a condition of the Master Waste Reuse Permit (for more details, see Chapter 14) and incorporated into Zone 7's GMP in 2005.

Zone 7 implements a wastewater and recycled water monitoring program as part of the GMP. In 2009, twenty percent of the recycled water produced in the service area was applied over the Main Basin[26]. Nitrates and salinity have historically been the primary water quality parameters of concern in recycled water, but nitrates have become less of a concern since 1995 when the City of Livermore Water Reclamation Plant—which, along with Dublin San Ramon Services District, is one of the two largest wastewater agencies in the area—stopped nitrifying its effluent. Salinity levels are being addressed through demineralization as described later in this section. In addition to recycled water application over the Main Basin, there are also approximately eighty septic tanks over the Main Basin that discharge their settled effluent but their use is not monitored.

To further manage the water quality in the Main Basin, Zone 7 also runs a Toxic Site Surveillance Program, documenting and tracking sites across the groundwater basin that pose a potential threat to drinking water supplies. Zone 7 works closely with the Regional Water Quality Control Board and the Alameda County Environmental Health in these efforts. In general, there are two types of contamination threatening the Livermore Valley Groundwater Basin: petroleum-based fuel products and industrial chemical contaminants. In 2009, Zone 7 tracked the progress of 81 active sites where groundwater contamination has been detected or contamination is threatening groundwater. Eleven of the sites are designated as high priority because of their proximity to drinking water supply wells (none of Zone 7's wells is affected) and occurrence in the Main Basin. Affected water supply well owners are employing granular activated carbon to remove contamination prior to water consumption. More details on the affected sites and their remediation can be found in the Annual Report for the Groundwater Management Program – 2009 Water Year[27].

As part of its efforts to address salinity in the Main Basin, Zone 7 completed construction of a wellhead demineralization facility in 2009. Employing a reverse osmosis membrane-based treatment system, this facility simultaneously allows for the removal and export of concentrated minerals or salts[28] from the Main Basin and the delivery of treated water with reduced TDS and hardness levels to Zone 7's customers. Table 6-3 lists the total annual amounts of groundwater

[25] Zone 7 Water Agency, 2004. Salt Management Plan.
[26] Zone 7 Water Agency, 2010. Annual Report for the Groundwater Management Program – 2009 Water Year.
[27] Zone 7 Water Agency, 2010. Annual Report for the Groundwater Management Program – 2009 Water Year.
[28] The brine concentrate resulting from the treatment system is exported to the San Francisco Bay via a regional wastewater export pipeline.

pumped by Zone 7 from 2005 to 2009, and the associated average water quality characteristics measured as TDS and hardness. Note that 2007 to 2009 were drought years, resulting in decreased availability of surface water from the SWP and increased use of groundwater by Zone 7 as a fraction of Zone 7's total water supply.

Table 6-3. Zone 7 Groundwater Production[(a)] and Quality (2005 – 2009)

Year	Groundwater Production (Acre-Feet)	% of Total Water Production	Total Dissolved Solids (mg/L)	Hardness (mg/L)
2005	5,167	13%	491	312
2006	4,198	10%	486	305
2007	4,004	9%	500	315
2008	8,127	18%	490	315
2009[(b)]	10,420	26%	419	274

[(a)] Zone 7 pumps only water that has been recharged as part of its artificial recharge program using its surface water supplies.
[(b)] Groundwater production net of demineralization loss of 492 AF. Lower TDS and hardness levels reflect demineralization facilities coming online in mid-2009.

As described above and in Chapter 5, conjunctive use of the Main Basin increases the reliability of Zone 7's water supply. Water reliability is discussed further in Chapter 7. The impacts of water quality on reliability are discussed in Chapter 15, and Zone 7's overall water service reliability is discussed in more detail in Chapter 16.

7. RELIABILITY OF SUPPLIES

Water Code Section 10631(c)

The purpose of this chapter is to discuss Zone 7's existing reliability policy, criteria for establishing the basis of water year, the projected reliability of each of Zone 7's water supply sources, and the maximum storage available during normal or drought conditions.

7.1 ZONE 7'S EXISTING WATER SUPPLY RELIABILITY POLICY

On August 18, 2004, Zone 7 adopted the Reliability Policy for Municipal and Industrial (M&I) Water Supplies (Resolution 04-2662).[29] This policy guides the management of Zone 7's M&I water supplies as well as its capital improvement program (CIP) through two goals:

- Goal 1: Meet 100% of M&I water demands over the next 20 years through average, single dry, and multiple dry years.[30]
- Goal 2: Meet 75% of maximum day demands with a major facility out of service.

Zone 7 is also updating its Water System Master Plan (WSMP) and expects to complete the update in early 2011 (see additional discussion in Chapter 11). As part of this update, Zone 7 will review the applicability of this policy.

7.2 BASIS OF WATER YEAR DATA

The quantity of supply available from each of Zone 7's water supply sources varies from one year to the next depending on hydrologic conditions. Consequently, Zone 7 reviewed historical data and developed a projected yield for each water supply source under three conditions: (1) normal water year, (2) single-dry year, and (3) multiple-dry years. In accordance with the Department of Water Resources' (DWR's) UWMP guidebook, each condition was defined as follows:

- *Normal Water Year:* The year in the historical sequence most closely representing median runoff or allocation levels and patterns.
- *Single-Dry Year:* The year with the lowest annual runoff or allocation in the historical sequence.
- *Multiple-Dry Year:* The lowest runoff or allocation for a consecutive 5-year period in the historical sequence.[31]

[29] A copy of Resolution 04-2662 is provided in Appendix D.
[30] Paraphrased – see Appendix D for actual text.
[31] The Water System Master Plan update is currently evaluating the impacts of a 6-year or longer drought.

7.3 RELIABILITY OF LOCAL RUNOFF FROM ARROYO DEL VALLE

Zone 7, along with Alameda County Water District (ACWD), has a water right permit[32] to divert runoff from Arroyo del Valle. This runoff is stored in Lake Del Valle (under operating agreement with DWR) and in the Main Basin of the Livermore Valley Groundwater Basin via artificial recharge. Inflows to Lake Del Valle, after accounting for permit conditions, are equally divided between ACWD and Zone 7. Together, Zone 7 and ACWD diversions cannot exceed 60,000 acre-feet annually (AFA).

Figure 7-1 illustrates historic inflow into Lake Del Valle from 1913 to 2008[33]. As shown on Figure 7-1, the year closest to the median inflow is 1932, while the lowest 5-year average is from 1987 to 1991. Figure 7-1 also indicates that there is nearly no inflow several times in the historic record; consequently, the analysis in this UWMP assumes that no inflow is available during a single dry year and uses a base year of 1977, which is also the base year for the single dry year for the State Water Project (SWP) (see Section 7.4).

Table 7-1 summarizes the basis of water year and available supply for Zone 7 under existing conditions from local runoff under its Arroyo del Valle water right permit.[34]

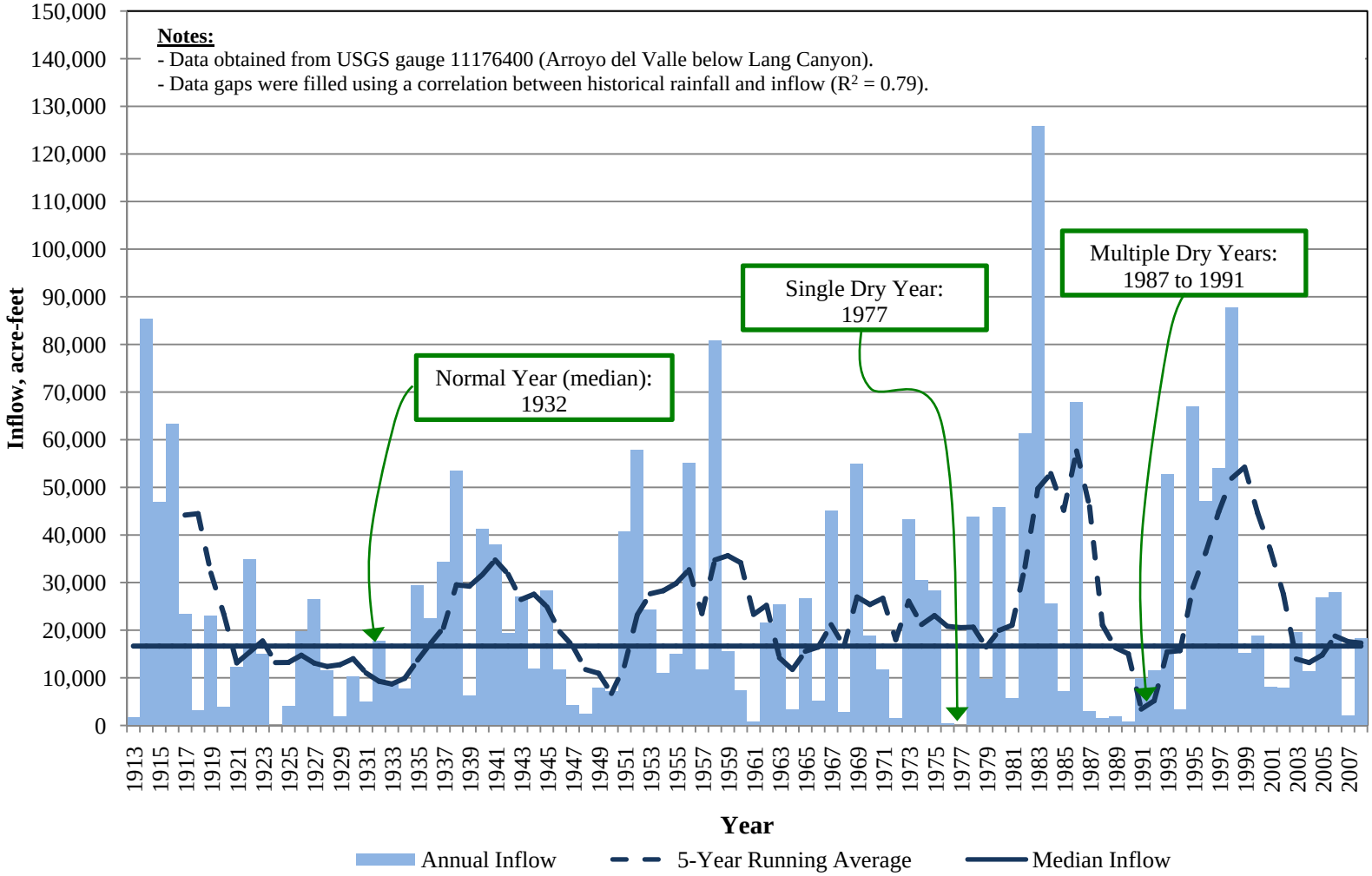
Table 7-1. Basis of Water Year and Available Supply: Arroyo del Valle[(a)]

Water Year Type	Base Year(s)	2010 to 2030	
		Yield, AFA	% of Normal
Normal[(b)]	1932	7,100	100%
Single-Dry	1977	0	0%
Multiple-Dry	Year 1 (1987)	930	27.0%
	Year 2 (1988)	350	10.2%
	Year 3 (1989)	520	15.1%
	Year 4 (1990)	150	4.4%
	Year 5 (1991)	4,400	78.2%

[(a)] Based on inflow from 1913 to 2008 (USGS gauge 11176400)—using actual and estimated data—and existing diversion or facility constraints.
[(b)] Long-term average is approximately 7,300 AF under existing conditions. Median of 7,100 AF was used in this UWMP per DWR guidelines.

[32] Permit 11319 (Application 17002)
[33] Note that actual data is only available for the following years: 1912 (partial)-1930, 1942, 1944-1952, 1958–present. Gaps were filled using correlations with local rainfall.
[34] Zone 7 should have the ability to increase the yield under this permit once quarry operations are completed in the Chain of Lakes.

Figure 7-1. Historical Inflow from Arroyo del Valle



7.4 RELIABILITY OF SUPPLY FROM THE STATE WATER PROJECT

Zone 7's long-term contract with DWR for SWP water provides Zone 7 access to Table A Water, Article 21 Water, Turnback Pool Water, Carryover, and Yuba Accord water. The reliability of each of these components is discussed below in more detail.

7.4.1 Table A Water

Zone 7 currently has a long-term contract[35] with DWR for 80,619 AFA of Table A amount, which represents Zone 7's maximum annual entitlement through this contract. Each year, DWR allocates a portion of this annual entitlement (up to 100%) depending on hydrologic conditions, DWR's operation of the SWP, and legal and environmental constraints.

Before 2007, DWR indicated that the long-term average yield from the SWP was approximately 76% of Zone 7's Table A amount, or approximately 61,300 AFA.[36] However, in 2007, DWR downgraded the water delivery reliability of the SWP due to federally imposed pumping restrictions – the restrictions were put in place due to concerns over declines in pelagic organisms in the Delta, primarily the decline of the Delta Smelt.

In August 2008, DWR published the final SWP Delivery Reliability Report 2007, which officially reduced the projected long-term average yield from the SWP to 66% of Zone 7's Table A amount, or approximately 53,200 AFA; this action reduced Zone 7's sustainable supply by 8,100 AFA (61,300 minus 53,200 AFA).

In August 2010, DWR released the final 2009 SWP Delivery Reliability Report (2009 Reliability Report); this version of the biennially-issued report included quantification of the impacts of biological opinions for species in the Delta (e.g., Salmon) issued in 2008 and new studies completed on climate change. The 2009 Reliability Report indicated that the long-term average yield from the SWP is 60% of Zone 7's Table A amount, or approximately 48,400 AFA, and the median yield is 51,400 AFA or approximately 64%; note, however, that the biological opinions are being revised per recent Federal Court rulings issued in spring and fall 2010.

Figure 7-2 illustrates projected SWP allocations from 1922 to 2003 using the results presented in the 2009 Reliability Report. As shown on Figure 7-2, the year closest to the median allocation is 1942, while the lowest 5-year average is from 1988 to 1992. Figure 7-2 also indicates that the lowest allocation occurs in 1977. Table 7-2 summarizes the basis of water year and available supply for Zone 7 from the SWP.

[35] Zone 7's contract with DWR expires in 2036 with an option to renew for 75 years.
[36] DWR, 2005. The State Water Project Delivery Reliability Report 2005.

Figure 7-2. Projected Allocation of State Water Project Water

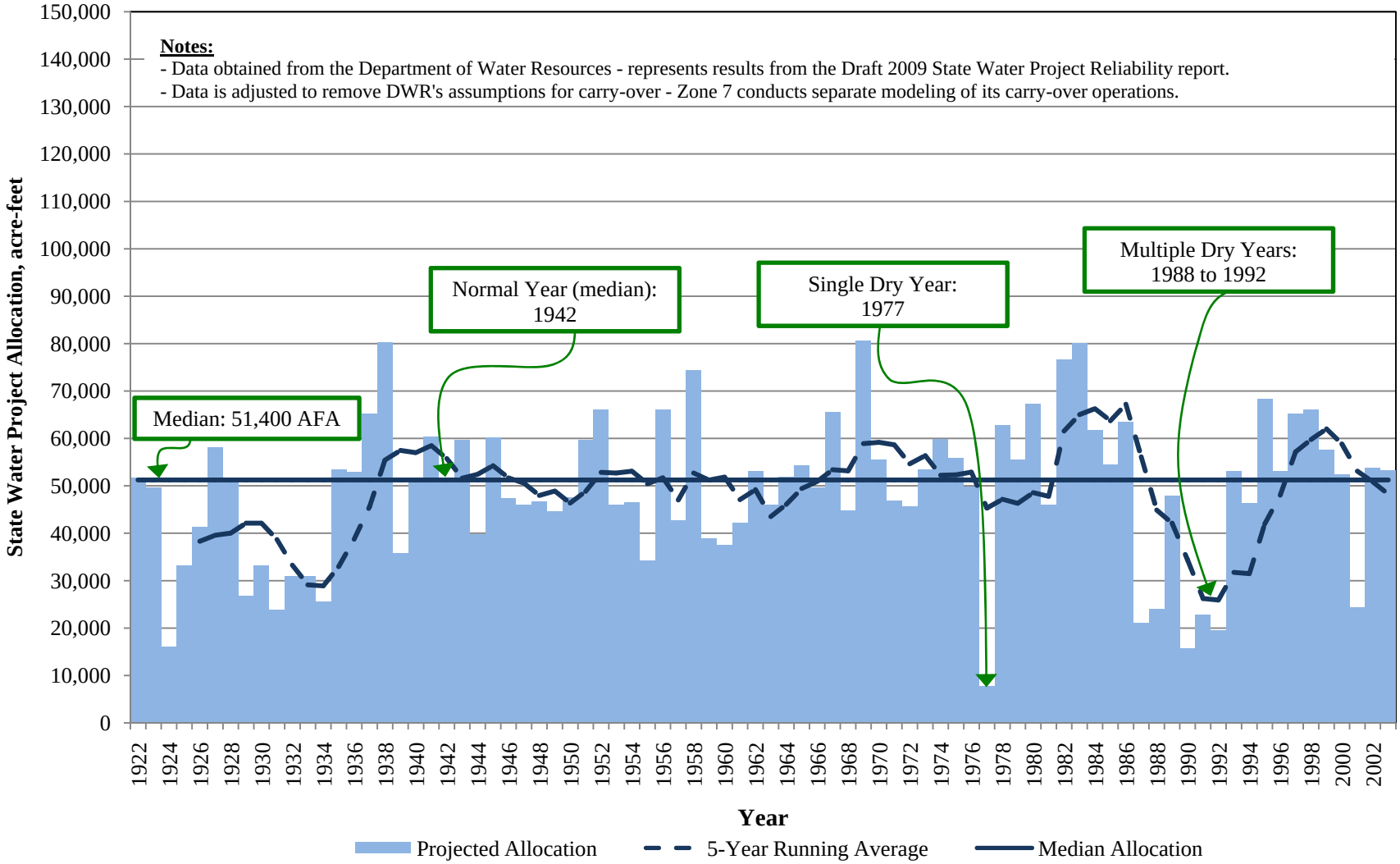


Table 7-2. Basis of Water Year and Available Supply: Table A Water[(a)]

Water Year Type	Base Year(s)	2010 to 2030	
		Yield, AFA	% of Normal
Normal	1942	51,400	100%
Single-Dry	1977	8,000	15.6%
Multiple-Dry	Year 1 (1988)	23,900	46.5%
	Year 2 (1989)	47,800	93.0%
	Year 3 (1990)	15,700	30.5%
	Year 4 (1991)	22,700	44.2%
	Year 5 (1992)	19,500	37.9%

[(a)] Obtained from DWR's 2009 Reliability Report - Future 2029 Scenario with Climate Change

7.4.2 Article 21 Water and Turnback Pool Water

As a contractor of the SWP, Zone 7 also has access to Article 21 water (formerly called surplus water) and Article 56d water (turnback pool water). Zone 7 generally incorporates any Article 21 water into its year to year operations; however, the projected yield from Article 21 water will likely be very low due to pumping restrictions in the Delta, and was not included in this UWMP for conservative planning-level purposes.

Article 56d is a provision that allows contractors with excess water to sell their water to contractors that have water needs. Typically, there is very little water available in dry years but more available in wet years. However, Zone 7 staff does not expect a significant amount of Article 56d water to be available in the future until there is a resolution to existing pumping restrictions in the Delta and therefore, Article 56d water was not included in this UWMP for conservative planning-level purposes.

7.4.3 Carryover

As a SWP contractor, Zone 7 has the ability to carry water from one year to the next in San Luis Reservoir – also called Article 56(c) water. The amount that Zone 7 can carry from one year to the next depends on DWR's allocation for that year. For example, if allocations are equal to or less than 50 percent of Zone 7's Table A amount, then carryover is limited to 25% of Zone 7's total Table A amount, or approximately 20,200 AFA (0.25 x 80,619 AFA). However, if allocations are equal to or greater than 75% of Zone 7's Table A amount, then carryover is limited to 50% of Zone 7's total Table A amount, or approximately 40,300 AFA (0.50 x 80,619 AFA). As part of its operating agreement with DWR, Zone 7 also has the ability to carry inflow from Arroyo del Valle in Lake Del Valle from one year to the next.

Typically, any carryover into a normal water year would be used in that year; however, a similar amount of current year supply would also be carried over for use in the following year. Therefore, this UWMP assumes that no carryover is available to meet water demands in a normal

water year. For conservative planning-level purposes in this UWMP, total carryover (both SWP and Arroyo del Valle runoff) was limited to the maximum carryover established by DWR in San Luis Reservoir.

Table 7-3 summarizes the maximum available carryover that would likely be available under normal, single-dry, and multiple-dry years; base years were chosen to match those for the SWP. The actual availability of carryover during a multiple-dry year event was determined using a newly developed water supply model; the results of this modeling are reflected in Chapter 16.

Table 7-3. Maximum Carryover Available to Zone 7 for Use in Following Year[a,b,c]

Water Year Type	Base Year(s)	2010 to 2030
Normal	1942	0
Single-Dry	1977	20,200
Multiple-Dry	Year 1 (1988)	20,200
	Year 2 (1989)	27,600[c]
	Year 3 (1990)	20,200
	Year 4 (1991)	20,200
	Year 5 (1992)	20,200

(a) Carryover includes both SWP and Del Valle supplies. Maximum carryover limited to DWR limits in San Luis Reservoir.
(b) Allocations used to predict maximum carryover were based on DWR's 2009 Reliability Report.
(c) The SWP allocation in 1989 is higher than 50% thereby allowing a higher maximum carryover for this year.

7.4.4 Yuba Accord Supply

In 2008, Zone 7 entered into an agreement to purchase additional water from DWR as part of the Lower Yuba River Accord; the contract expires in 2025. The contract specifies four different conditions (four components) for which Zone 7 can obtain water. The first component is not available to Zone 7, while the second and third components are available during drought conditions. The fourth component is available when Yuba County Water Agency has determined it has water supplies available to sell.

The annual amount of water available in dry years is small - only 159 AF was available in 2009, and only 1,100 are-feet will likely be available in 2010.[37] As Zone 7 gains experience using this new contract and is able to better define potential long-term yields, then Zone 7 may incorporate more of it into the long-term water supply portfolio. For planning-level purposes, Zone 7

[37] Even though approximately 1,100 acre-feet was available, Zone 7 only purchased 400 AF of Component 3 water in 2010.

included a projected median yield of 145 AFA for this UWMP.[38] Table 7-4 summarizes the available supply under each water year type. Base years were chosen to match those of the SWP.

Table 7-4. Basis of Water Year and Available Supply: Yuba Accord Water[(a)]

Water Year Type	Base Year(s)	2010 to 2025[(b)]	
		Yield, AFA	% of Normal
Normal Water Year	1922 to 2003[(c)]	145	100%
Single-Dry Year[(d)]	1977	676	270%
Multiple-Dry Years[(d)]	Year 1 to 5 (1988 to 1992)	676	270%

(a) Without component 4 water, this is essentially a dry year water supply; consequently, more water is available in drought years than other years. For planning-level purposes, only 145 AF was assumed available during normal water years.
(b) Contract ends in 2025.
(c) Based on median yield between 1922 and 2003.
(d) Only includes Components 2 and 3 water.

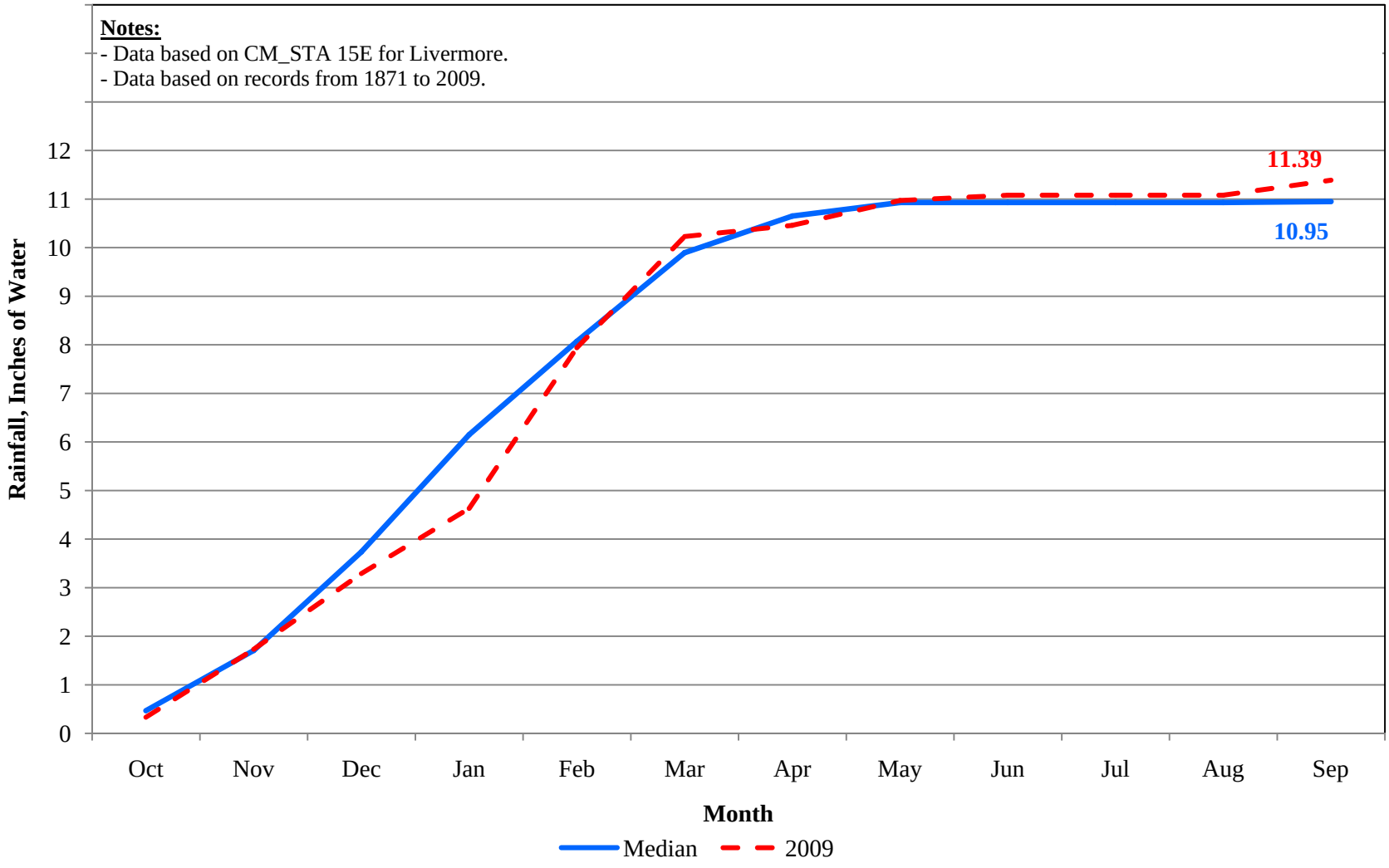
7.5 RELIABILITY OF BBID CONTRACT

Byron Bethany Irrigation District (BBID) diverts water from the Sacramento-San Joaquin Delta (Delta) pursuant to a "Notice of Appropriation of Water" dated May 18, 1914.[39] Zone 7 entered into a long-term contract with BBID for a minimum yield of 2,000 AFA and up to 5,000 AFA of water supply under this appropriation.[40,41] Water purchased from BBID via this contract is delivered to Zone 7 via the California Aqueduct and the South Bay Aqueduct for use in its service area.

Although Zone 7 has had this contract in place since 1998, Zone 7 has not always requested the full contract amount[42]; hence, historical deliveries could not be used to develop potential supply yields during various hydrologic conditions. In 2009, Zone 7 requested and received 4,500 AF. As shown on Figure 7-3, cumulative rainfall in 2009 was slightly above the historical median rainfall from 1871 to 2009, indicating that 4,500 AFA is likely to be available during normal water years.

[38] The median is based on varying the maximum yield of 676 acre-feet (only Components 2 and 3) during critically dry years to no water in wet years without considering Component 4 water.
[39] Source: Mountain House Master Plan.
[40] The Zone 7 Board certified the Environmental Impact Report for this water supply in 1999.
[41] The current contract was recently extended through 2030.
[42] Zone 7 will likely request its full contract amount in the future.

Figure 7-3. Cumulative Rainfall



For planning purposes in this UWMP, Zone 7 staff assumed that at least 4,500 AFA would be available during normal water years, but that only 2,000 AF would be available during drought years.[43] Table 7-5 summarizes the available supply under each water year type. Base years were chosen to match those of the SWP.

Table 7-5. Basis of Water Year and Available Supply: BBID

Water Year Type	Base Year(s)	2010 to 2030	
		Yield, AFA	% of Normal
Normal Water Year[(a)]	1942	4,500	100%
Single-Dry Year	1977	2,000	44%
Multiple-Dry Years	Year 1 to 5 (1988 to 1992)	2,000	44%

(a) Historical deliveries could not be used to develop water supply yields. A review of cumulative rainfall in 2009 indicated that 2009 was slightly above the historical median rainfall. Deliveries from this contract were 4,500 AF in 2009. A yield of 4,500 AF was assumed available during normal water years.

(b) The minimum contract yield is 2,000 AF; this was assumed available during single-dry and multiple-dry years.

7.6 ADDITIONAL RELIABILITY PROVIDED WITH STORAGE

In addition to its sources of water supply, Zone 7 also has storage available to meet water demands in either normal or dry conditions. The storage available during normal, single-dry, and multiple-dry years for each of Zone 7's storage programs is discussed below.

7.6.1 Reliability of Storage in the Main Basin

Zone 7's service area overlies the Livermore Valley Groundwater Basin as described in Chapter 6; the Main Basin is the portion of this groundwater basin that contains high-yielding aquifers and good quality groundwater.[44] For Zone 7, the Main Basin is considered a storage facility and not a long-term water supply because Zone 7 does not have a groundwater-pumping quota, and only pumps groundwater it artificially recharges. Zone 7 has actively managed the Main Basin for over 40 years, and administers a conjunctive use program that integrates both surface and groundwater supplies. [45]

Based on a review of current well capacities and groundwater modeling, Zone 7 estimates that it has the ability to pump approximately 26,200 AF over a one-year period. For conservative planning-level purposes in this UWMP, Zone 7 staff included limits on annual groundwater pumping during multiple dry years to ensure that water surface elevations remain above historic lows during a multiple-dry year event.[46] The pumping limit used in the analysis (14,000 AFA for

[43] Zone 7 is currently reviewing the potential to increase projected yields during drought years from its contract with BBID as part of the Water System Master Plan update.
[44] Zone 7, 2009. Annual Report for the Groundwater Management Program – 2008 Water Year. May.
[45] Zone 7, 2009. Annual Report for the Groundwater Management Program – 2008 Water Year. May.
[46] An example multiple-dry year event is the 6-year drought that occurred between 1987 and 1992.

5 years of a multiple dry-year event) was based on preliminary modeling conducted by Zone 7 staff.[47] Pumping during normal water years was limited to the recharge capacity (9,200 AFA – see Chapter 9) of existing arroyos.

Table 7-6 summarizes the available supply under each water year type. Base years were chosen to match those of the SWP.

Table 7-6. Basis of Water Year and Available Supply from Storage: Main Basin

Water Year Type	Base Year(s)	2010 to 2030	
		Yield, AFA	% of Normal
Normal Water Year	1942	9,200	100%
Single-Dry Year	1977	26,200	284%
Multiple-Dry Years	Year 1 to 5 (1988 to 1992)	14,000	152%

7.6.2. Reliability of Storage with Semitropic Water Storage District

Zone 7 has 78,000 AF of groundwater banking storage available through Semitropic Water Storage District (Semitropic) to augment water supplies during drought conditions. During non-drought periods, Zone 7 can store up to 5,883 AFA into the Semitropic groundwater bank. During droughts, Zone 7 has the ability to request 9,100 AF of pumpback and anywhere from 0 to 8,645 AF of exchange water; the availability of exchange water depends on projected SWP deliveries. Zone 7 does not rely on water stored in Semitropic during normal water years.

Table 7-7 summarizes the projected Semitropic stored water that would likely be available under normal, single-dry, and multiple-dry years. Base years were chosen to match those of the SWP.

[47] Zone 7 conducted a preliminary analysis using the calibrated groundwater model to determine the average annual pumping limit that maximizes the recovery of groundwater basin storage during a 6-year drought, assuming average conditions that existed between 1987 and 1992, and only with existing facilities.

Table 7-7. Maximum Pumpback and Exchange Water Available from Semitropic[(a)]

Water Year Type	Base Year(s)	2010 to 2030 Yield, AFA
Normal Water Year	1942	0
Single-Dry Year	1977	9,100
Multiple-Dry Years	Year 1 (1988)	10,700
	Year 2 (1989)	13,600
	Year 3 (1990)	9,600
	Year 4 (1991)	10,500
	Year 5 (1992)	10,100

[(a)] Maximum supply available to Zone 7 includes 9,100 AF of pumpback plus exchange water. Exchange water availability depends on SWP allocations. Allocations used to predict maximum carryover were based on DWR's 2009 Reliability Report.

7.6.3. Reliability of Storage with Cawelo Groundwater Banking Program

Zone 7 has 120,000 AF of groundwater banking storage available with Cawelo Water District (Cawelo) to augment water supplies during drought conditions. During non-drought periods, Zone 7 can put 5,000 AFA into the bank.[48] During droughts, Zone 7 has the ability to request 10,000 AFA of pumpback. Table 7-8 summarizes the maximum Cawelo stored water supply that would be available under normal, single-dry, and multiple-dry years. Base years were chosen to match those of the SWP.

Table 7-8. Maximum Stored Water Available from Cawelo

Water Year Type	Base Year(s)	2010 to 2030 Yield, AFA
Normal Water Year	1942	0
Single-Dry Year	1977	10,000
Multiple-Dry Years	Year 1 to 5 (1988 to 1992)	10,000

[48] Zone 7 only gets storage credit for 50% of the water provided to Cawelo. Per the existing contract, Zone 7 can only send 10,000 acre-feet in any given year to Cawelo; therefore, the maximum contractual credit is 5,000 acre-feet (10,000 divided by 2).

7.7 TOTAL SUPPLY RELIABILITY

In summary, Zone 7 relies on both incoming surface water supplies and previously stored surface water in the local groundwater basin and two non-local groundwater banking programs to meet its demands. The estimated amounts of water available during various hydrologic conditions are summarized in Table 7-9 below; the values presented reflect the expected range of water supply available based on historic use records, hydrologic records, and existing supplies and storage options. Additionally, to make its planning more robust, Zone 7 developed a new risk model that incorporates potential variations from the historical hydrologic sequence. This new dynamic model also allows for a more rigorous year-by-year analysis of water system operations in response to hydrologic conditions. The results of the risk model are presented in Chapter 16, which evaluates water service reliability.

Table 7-9. Summary of Estimated Available Water Based on Hydrologic Records and Existing Supplies and Storage Options

Water Source	Yields (Acre-Feet Annually)		
	Normal Year[a]	Single-Dry Year[b]	Multiple-Dry Years[c]
Arroyo del Valle	7,100	0	150 - 4,400
SWP – Table A	51,400	8,000	15,700 - 47,800
SWP – Carryover	0	20,200	20,200 - 27,600
SWP – Yuba Accord	145	676	676
BBID	4,500	2,000	2,000
From storage:			
Main Basin	9,200	26,200	14,000
Semitropic	0	9,100	9,600 - 13,600
Cawelo	0	10,000	10,000
TOTAL	**72,345**	**76,176**	**72,326 - 120,076**

[a] Based on median runoff or allocation levels and patterns.
[b] Based on the lowest annual runoff or allocation in the historical sequence.
[c] Based on the lowest runoff or allocation for a consecutive 5-year period in the historical sequence.

8. WATER TRANSFERS – SUPPLIES AND STORAGE

Water Code Section 10631(d)

To protect its customers in the event of a prolonged drought and to maintain its goal of 100% reliability even under extreme drought conditions, Zone 7 has entered into several long-term water transfer agreements that supplement its regular water supplies; other agreements also provide for additional storage capacity ("banking") outside of Zone 7. The purpose of this chapter is to describe these agreements for water supplies and storage.

Note that while additional storage capacity supports Zone 7's ability to provide water during dry years, stored water represents water delivered from Zone 7's other surface water supplies during normal and wet years. Therefore, storage facilities have a "zero" net contribution to Zone 7's water supply.

8.1 ADDITIONAL SUPPLIES THROUGH WATER TRANSFERS

8.1.1 State Water Project Allocation

As discussed in Chapter 5, surface water imported by the State Water Project (SWP) is by far Zone 7's largest water source, providing over 80% of Zone 7's total water supply. Zone 7 first entered into a 75-year agreement with the Department of Water Resources (DWR), the operator of the SWP, in November 1961, as recorded in a document referred to as "Table A". As the SWP was expanded and as Zone 7 demands increased over the years, Zone 7's Table A amount was increased, reaching the amount of 46,000 acre-feet annually (AFA) in 1997.

Since 1997, Zone 7 increased its supply from the SWP through a series of five permanent transfers. In December 1999, Zone 7 secured Table A SWP allocations from Lost Hills Water District of 15,000 AFA and Berrenda Mesa Water District of 7,000 AFA. In December 2000, 10,000 AFA of SWP allocation from Belridge Water Storage District was acquired. An additional 2,219 AFA was obtained from the same source in October 2003. Finally, 400 AFA of water was acquired from the Tulare Lake Basin Water Storage District in 2003. Together, these transfers have raised Zone 7's current Table A allocation to 80,619 AFA.

8.1.2 Byron Bethany Irrigation District

Zone 7 entered into a short-term water transfer demonstration project in 1994 with Byron Bethany Irrigation District (BBID), which provided a minimum supplemental water supply of 2,000 AFA. This was a five-year agreement with a potential to purchase up to 5,000 AFA. In 1998, Zone 7 and BBID agreed to convert the short-term agreement into a long-term 15-year contract, renewable every five years up to a total of 30 years. Water purchased from the BBID is delivered to Zone 7 via the SBA. The current contract was recently extended through 2030 with an option to extend through 2039.

8.1.3 Yuba Accord

In 2008, Zone 7 entered into a contract with DWR to purchase additional water under the Lower Yuba River Accord (Yuba Accord). The contract expires in 2025. Water is primarily available during dry years under the Yuba Accord, and the amount is relatively small: 159 AF in 2009 and approximately 1,000 AF in 2010. Zone 7 estimates a long-term average yield and median yield of 250 AFA and 145 AFA, respectively, under the Yuba Accord.

8.2 WATER STORAGE OUTSIDE ZONE 7

In addition to the above agreements for additional water sources, Zone 7 has purchased storage capacity in non-local groundwater banks located in Kern County (see Chapter 5 for additional details). Through an agreement with the Semitropic Water Storage District (Semitropic), Zone 7 has 78,000 AF of groundwater banking storage available to augment water supplies during drought conditions. Similar to the arrangements with Semitropic, Zone 7 also has 120,000 AF of groundwater banking storage available with the Cawelo Water District (Cawelo). During non-drought periods, Zone 7 can store up to 5,000 AFA in the Cawelo bank.[49] During droughts, Zone 7 has the ability to request up to 10,000 AF of pumpback from Cawelo.

8.3 TOTAL WATER TRANSFER AND STORAGE AGREEMENTS

Table 8-1. Zone 7's Water Transfer and Storage Agreements

Source/Agency	Contract Amount (AFA)	Term/Expiration
Water Supply Sources		
Zone 7 SWP Allocation as of 1997	*46,000*	Until 11/20/2036
SWP Contract Transfers to Zone 7:		
Lost Hills Water District	*15,000*	Until 11/20/2036
Berrenda Mesa Water District	*7,000*	Until 11/20/2036
Belridge Water Storage District	*12,219*	Until 11/20/2036
Tulare Lake Basin Water Storage District	*400*	Until 11/20/2036
Total SWP - Table A[(a)]	80,619	
Byron Bethany Irrigation District (BBID)	5,000	2030, with option to extend to 2039
SWP - Yuba Accord	No fixed cap	2025
Water Storage Options (Maximum Amount Allowed for Storage Annually)		
Semitropic Water Storage District	5,883	Until 12/31/2035
Cawelo Water District	5,000	Until 12/31/2035

(a) This is the maximum amount specified in Zone 7's contract with DWR. Actual deliveries vary based on hydrologic conditions and other factors.

[49] Zone 7 only gets storage credit for 50% of the water provided to Cawelo. Per the existing contract, Zone 7 can only send 10,000 AF in any given year to Cawelo; therefore, the maximum contractual credit is 5,000 AFA.

9. PAST, PRESENT, AND PROJECTED WATER DEMANDS

Water Code Section 10631(e)

The purpose of this chapter is to describe Zone 7 Water Agency's (Zone 7's) past, present, and projected water demands, and the portion of Zone 7's water supplies, including Zone 7's unaccounted-for water, which must meet the total demand in the Livermore-Amador Valley[50].

9.1 PAST WATER DEMANDS SERVED BY ZONE 7

Table 9-1 presents historical water demands met by Zone 7 within Zone 7's service area between 1990 and 2009. As shown in Table 9-1, water use currently served by Zone 7 has approximately doubled since the early 1990s. A majority of this increase is associated with water served to Zone 7's four water supply retailers (Retailers): California Water Service Company (Cal Water), Dublin San Ramon Services District (DSRSD), City of Livermore (Livermore), and City of Pleasanton (Pleasanton). Table 9-1 also indicates that unaccounted-for water has increased by 1,000 to 2,000 acre-feet (AF) after 2003; potential reasons for this increase are discussed in Section 9.3.4.

Table 9-2 presents the historical Municipal and Industrial (M&I) per capita demand served by Zone 7 and the Retailers (includes all groundwater pumping). M&I demand is derived by subtracting untreated surface water demand from the total water demand listed in Table 9-1. As shown in Table 9-2, per capita demands have stayed above the historical average of 213 gallons per capita per day (gpcd) over the last ten years; however, more recently, there has been a downward trend and the five-year average is now very close to the historical average at 215 gpcd.

Figure 9-1 compares historical M&I per capita demand to precipitation, which is used as an indicator of outdoor water demands. As shown, the demand pattern is generally responsive to the pattern of precipitation: that is, with an increasing rainfall trend, there is a decreasing trend in water demand.

[50] Livermore-Amador Valley includes the City of Dublin, City of Livermore, and City of Pleasanton, and is also known as the Tri-Valley.

Table 9-1. Historical Water Demand in the Zone 7 Service Area (Acre-Feet)

Year	Total Municipal and Industrial Water Use Served by Zone 7				Untreated Water for Agriculture[d]	Total Demand on Zone 7	Retailer Pumping (GPQs)	Total Water Demand
	Retailers[a]	Zone 7 Retail[b]	UAFW[c]	Total				
1990	23,869	1,070	1,876	26,815	3,170	29,985	5,882	35,867
1991	14,831	500	754	16,085	1,845	17,930	9,730	27,660
1992	20,714	1,010	1	21,725	2,344	24,069	6,447	30,516
1993	23,926	1,200	59	25,185	1,782	26,967	4,146	31,113
1994	22,734	680	691	24,105	1,985	26,090	6,598	32,688
1995	28,519	1,190	316	30,025	3,481	33,506	1,819	35,325
1996	29,901	790	4	30,695	4,329	35,024	2,920	37,944
1997	28,802	780	63	29,645	6,287	35,932	7,602	43,534
1998	26,640	510	5	27,155	4,370	31,525	7,573	39,098
1999	32,292	240	3	32,535	5,607	38,142	6,934	45,076
2000	34,632	270	423	35,325	5,899	41,224	6,826	48,050
2001	36,601	320	24	36,945	4,845	41,790	7,237	49,027
2002	38,176	260	4	38,440	3,523	41,963	6,981	48,944
2003	38,169	370	1,321	39,860	3,359	43,219	6,911	50,130
2004	42,371	770	819	43,960	3,422	47,382	6,573	53,955
2005	38,912	282	1,676	40,870	3,309	44,179	6,583	50,762
2006	40,414	316	1,064	41,794	3,488	45,282	6,581	51,863
2007	43,132	312	1,940	45,384	3,642	49,026	6,434	55,461
2008	42,982	270	1,649	44,901	4,164	49,065	6,026	55,091
2009	38,083	233	1,900	40,216	4,920	45,136	6,569	51,705
Historical Average	32,285	569	730	33,583	3,789	37,372	6,319	43,691
10-Year Average	39,347	340	1,082	40,770	4,057	44,827	6,672	51,499
5-Year Average	40,700	300	1,600	42,600	3,900	46,500	6,400	53,000

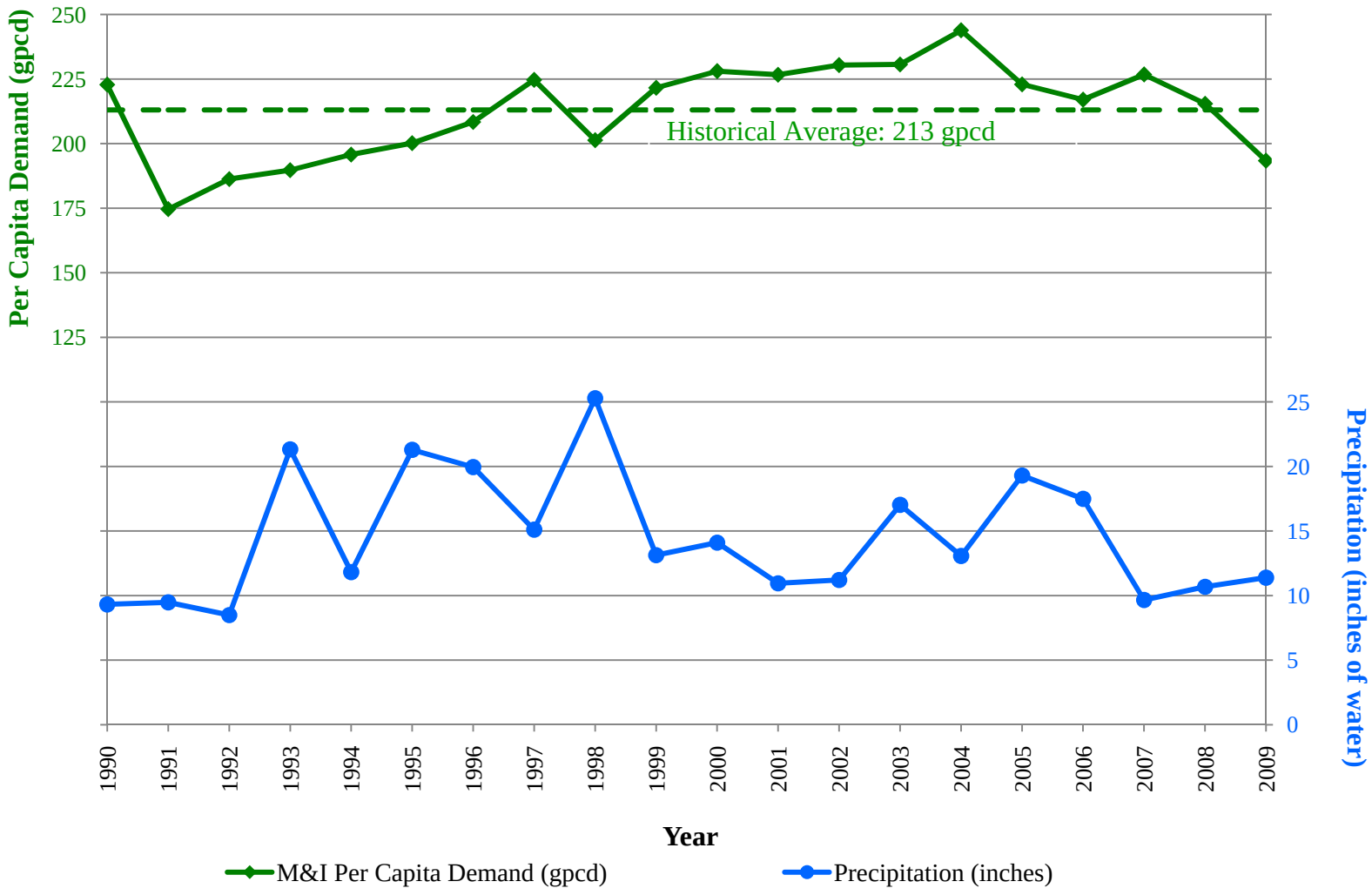
[a] Data collected from the Retailers and from the Zone 7 Annual Supply Reports (WR OM1 and WR OM3). Includes groundwater pumping quota for DSRSD (but not for the other retailers).
[b] Zone 7 directly serves six customers with potable water - data based on historical records.
[c] Unaccounted-for water (UAFW) is based on the difference between total production and actual deliveries. Production is water purchased from the State Water Project plus Zone 7 groundwater pumping minus brine concentrate losses (beginning in 2009 when the demineralization facility started operating).
[d] Zone 7 serves 74 customers through 7 accounts with untreated surface water.

Table 9-2. Historical M&I Per Capita Water Demands in the Zone 7 Service Area

Year	Total Water Demand in the Service Area (Gallons)[a]	Total Municipal and Industrial (M&I) Demand in the Service Area (Gallons)[b]	Total Population[c]	M&I Per Capita Demand (gpcd)	Precipitation (inches)[d]
1990	32,018,113	29,188,313	131,000	223	9
1991	24,692,006	23,045,009	132,000	175	9
1992	27,240,758	25,148,312	135,000	186	8
1993	27,774,133	26,183,375	138,000	190	21
1994	29,180,194	27,408,221	140,000	196	12
1995	31,533,975	28,426,551	142,000	200	21
1996	33,871,819	30,007,400	144,000	208	20
1997	38,862,055	33,249,766	148,000	225	15
1998	34,902,155	31,001,137	154,000	201	25
1999	40,238,273	35,233,007	159,000	222	13
2000	42,893,609	37,627,680	165,000	228	14
2001	43,765,482	39,440,439	174,000	227	11
2002	43,691,729	40,546,812	176,000	230	11
2003	44,750,192	41,751,675	181,000	231	17
2004	48,164,287	45,109,531	185,000	244	13
2005	45,314,135	42,360,252	190,000	223	19
2006	46,297,583	43,183,909	199,000	217	17
2007	49,508,893	46,257,746	204,000	227	10
2008	49,178,982	45,461,856	211,000	215	11
2009	46,156,104	41,764,111	216,000	193	11
Historical Average			166,200	213	15
10-Year Average			190,100	224	13
5-Year Average			204,000	215	14

[a] Data collected from the Retailers and from the Zone 7 Annual Supply Reports (WR OM1 and WR OM3). Includes all groundwater pumped for and by the Retailers.
[b] Total water demand minus untreated water for agriculture served by Zone 7.
[c] Data provided by the Retailers.
[d] Source: http://wwwcimis.water.ca.gov/.

Figure 9-1. Comparison of Historical Municipal and Industrial (M&I) Per Capita Demand Served by Zone 7 (Gallons Per Capita Per Day, gpcd) to Precipitation (inches)



9.2 BREAKDOWN OF WATER ACCOUNTS AND USE BY SECTOR IN 2009

As a wholesale water agency, Zone 7 does not track water use by individual water use sectors (e.g., Single Family Residential or Commercial). However, Zone 7 indirectly serves these sectors by supplying water to the four Retailers. Tables 9-3a and 9-3b present the breakdowns of water accounts and water use by sector in the service area, including those customers served directly by Zone 7 and including the water produced by the Retailers using their groundwater pumping quotas (see Chapter 6). Agricultural accounts, which are served untreated surface water by Zone 7, are included, while recycled water accounts are not included in these tables.

Table 9-3a. Breakdown of Water Accounts by Sector in the Service Area in 2009[(a)]

Water Use Sector	Cal Water	DSRSD	Livermore	Pleasanton	Zone 7	Total	% of Total
Single-Family Residential	16,466	13,303	7,988	19,441	-	57,198	86%
Multi- Family Residential	82	2,000	20	225	-	2,327	4%
Commercial/Institutional	1,301	432	1,084	984	6	3,807	6%
Industrial	1	168	-	6	-	175	0.3%
Landscape	-	420	440	984	-	1,844	3%
Agriculture	-	-	-	7	7	14	0.02%
Other	19	676	173	-	-	868	1%
TOTAL	**17,869**	**16,999**	**9,705**	**21,647**	**13**	**66,233**	**100%**

[(a)] Based on data provided by Cal Water, DSRSD, Livermore, and Pleasanton, and Zone 7's annual water supply reports. These values do not include recycled water, but do include untreated surface water provided to agriculture.

Table 9-3b. Breakdown of Water Use by Sector in the Service Area in 2009[a]

Water Use Sector	Cal Water	DSRSD	Livermore	Pleasanton	Zone 7	Total	% of Total
Single-Family Residential	7,597	4,722	3,224	9,484		25,027	49%
Multi-Family Residential[b]	561	1,196	N/A	760		4,726	5%
Commercial/Institutional	2,483	1,423	2,576	1,504	233	6,010	16%
Industrial	-	261	-	73		334	1%
Landscape		1,463	436	4,679		6,577	13%
Agriculture		-	-	-	4,920	4,920	10%
Other	14	6	-	-		20	0%
Unaccounted-for Water	359	457	129	916	1,900	3,762	7%
TOTAL[c]	**11,014**	**9,528**	**6,365**	**17,416**	**7,053**	**51,375**	**100%**

[a] Based on data provided by Cal Water, DSRSD, Livermore, and Pleasanton, and Zone 7's annual water supply reports. These values do not include recycled water, but do include untreated surface water provided to agriculture. These values include the total potable water supply provided by the Retailers to their customers, and therefore include groundwater-pumping quotas in 2009: DSRSD – 645 AF, Pleasanton – 3,505 AF, and Cal Water – 3,064 AF.
[b] For Livermore, this value is included under commercial/institutional.
[c] Note that because of the different accounting methods used by the various agencies, there is a minor discrepancy (<1%) between the total shown here (51,375 AF) and the total shown in Table 9-1 (51,705 AF).

As shown in Table 9-3b, three of the top water use sectors by volume are: residential (54%), commercial/institutional (16%), and landscape (13%).

9.3 PROJECTED WATER DEMANDS

Projected water requirements for Zone 7 were estimated by evaluating demands for the Retailers, Zone 7's retail customers, untreated customers, unaccounted-for water, potential future water conservation savings, and water required for groundwater recharge. Each is discussed in more detail below.

9.3.1 Water Supply Retailers Served by Zone 7

Zone 7 obtained projected water demands from each of the Retailers through a series of stakeholder and one-on-one meetings[51]. Table 9-4 presents the amounts of water supply required from Zone 7 by the Retailers. These amounts do not include groundwater pumped by three of the four retailers under their groundwater-pumping quotas (GPQ) to meet the rest of their demands: Cal Water (3,069 AF), Pleasanton (3,500 AF), and Livermore (31 AF); Zone 7 pumps DSRSD's GPQ of 645 AF and this amount is included in the table. DSRSD and Livermore currently

[51] Zone 7 staff met with and collected water demand and supply information from these four retailers during June, August, and September 2009, and in January 2010 as part of developing this UWMP. Additional information was provided by the Retailers throughout 2010.

produce recycled water to supplement their water supplies; recycled water demands are not included in the table.

The water demand projections presented in Table 9-4 do not include additional water conservation efforts that may result from more aggressive water conservation programs undertaken by the Retailers to comply with recent California legislation (i.e., California's 20x2020 Program). Additional water conservation that may result from California's 20x2020 Program is discussed in Section 9.3.5.

In compliance with Senate Bill 1087 *(SB 1087; Projected Water Use for Lower Income Households)*, the projected demands presented in Table 9-4 include the projected water use for single-family and multi-family residential housing for low-income households. Zone 7's current policy, as discussed in Chapter 7, is to meet 100% of projected demands[52]. Zone 7 is therefore planning to meet 100% of the water demand associated with low-income households as required in SB 1087.

Table 9-4. Supply Required from Zone 7 for the Retailers (Acre-Feet)[(a)]

Retailer	*2005 (Actual)*	2010[(b)]	2015[(c)]	2020[(d)]	2025[(d)]	2030[(d)]
Cal Water	*8,108*	9,200	9,400	10,700	12,200	12,300
DSRSD[(f)]	*9,626*	13,100	14,100	16,100	18,200	19,200
Livermore[(f)]	*6,625*	7,400	7,400	8,200	8,200	8,200
Pleasanton	*14,553*	16,600	17,500	18,700	19,700	20,700
Required from Zone 7[(e)]	*38,912*	46,300	48,400	53,700	58,300	60,400

(a) All values rounded to the nearest 100 AF for projected demands (2010-2030).
(b) Based on 2009 5-Year Delivery Requests and data collected from Retailers for the UWMP.
(c) Based on 2010 5-Year Delivery Requests and data collected from the Retailers for the UWMP.
(d) Based on data collected from the Retailers for the UWMP.
(e) Includes demands associated with low-income households. These amounts do not include groundwater pumped by three of the four retailers under their groundwater-pumping quotas (GPQ) to meet the rest of their demands: Cal Water (3,069 AF), Pleasanton (3,500 AF), and Livermore (31 AF); Zone 7 pumps DSRSD's GPQ of 645 AF and this amount is included in the table.
(f) DSRSD and Livermore currently produce recycled water to supplement their water supplies; recycled water demands are not included in the table.

9.3.2 Zone 7 Retail Demand

Zone 7 sells treated water directly to several smaller customers within the service area. These commercial/institutional customers currently include the Dublin Housing Authority (DHA), East

[52] The merits of this policy are being reviewed as part of the Water System Master Plan.

Bay Regional Parks District (EBRPD), Department of Water Resources (DWR)[53], Livermore Area Regional Parks District (LARPD), Lawrence Livermore National Laboratory (LLNL), Veterans Association (VA) Hospital, and Wente Winery.

Figure 9-2 illustrates the historical water demand from Zone 7's retail customers between 1999 and 2009. As shown on Figure 9-2, water demand for these direct retail customers has been relatively steady for the past 10 years with the exception of 2004. The spike in water demand in 2004 is the result of additional water supplied to LLNL resulting from an interruption in supplies provided to LLNL via the Hetch-Hetchy Aqueduct by San Francisco Public Utilities Commission.

For planning purposes in this analysis, Zone 7 staff assumed that water demands for Zone 7's retail customers would be equal to the average demand observed over the past 10 years, which is approximately 300 AF after rounding to the nearest 100 AF. The additional water demand spike resulting from LLNL is relatively infrequent, and can likely be accommodated using existing facilities. Table 9-5 presents the projected supply required from Zone 7 for its retail customers.

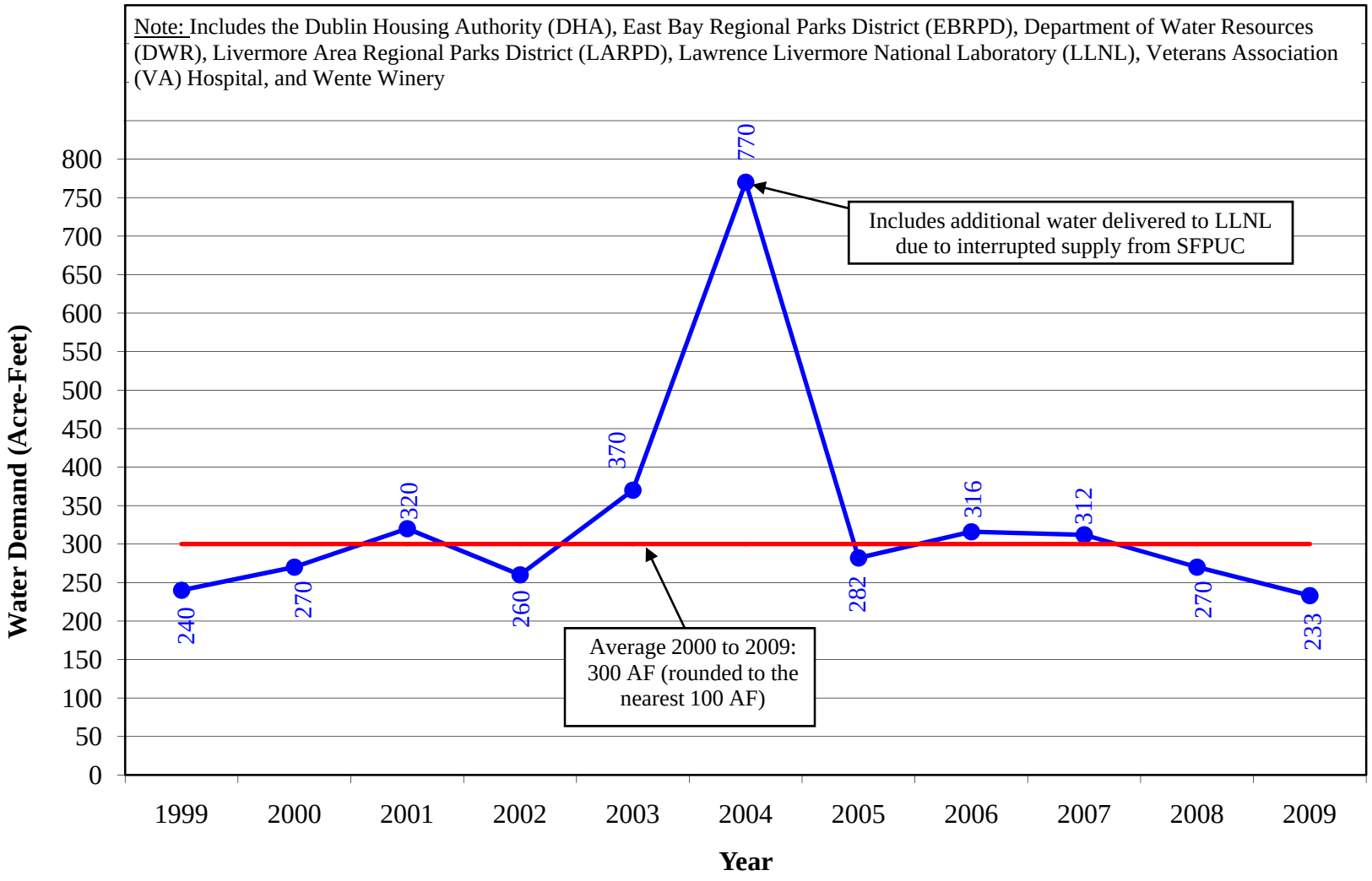
Table 9-5. Projected Supply Required for Zone 7's Retail Customers (Acre-Feet)[(a)]

Year	*2005 (Actual)*	2010	2015	2020	2025	2030
Required from Zone 7	*282*	300	300	300	300	300

[(a)] Demand based on the average delivery between 2000 and 2009 rounded to the nearest 100 AF.

[53] DWR has a storage/corporation yard located along the South Bay Aqueduct that requires treated water.

Figure 9-2. Historical Zone 7 Retail Customer Demand (Acre-Feet)



9.3.3 Zone 7's Untreated Water Demand

Zone 7 currently supplies untreated surface water to seven contract customers through eleven South Bay Aqueduct (SBA) turnouts. These seven turnout customers then branch into 74 different agricultural customers.

Figure 9-3 presents historical untreated water demands between 1985 and 2009. As shown on Figure 9-3, untreated water demands significantly increased between 1994 and 1997, and then experienced a significant decrease between 1999 and 2009; 1998 was a wet year (i.e., demands were being partially met by rainfall). This large decrease is the result of agricultural acreage being taken out of production and water conservation efforts – water conservation has reduced agricultural unit water use from approximately 1.5 AF/acre to 0.7 AF/acre (a 50% decrease).

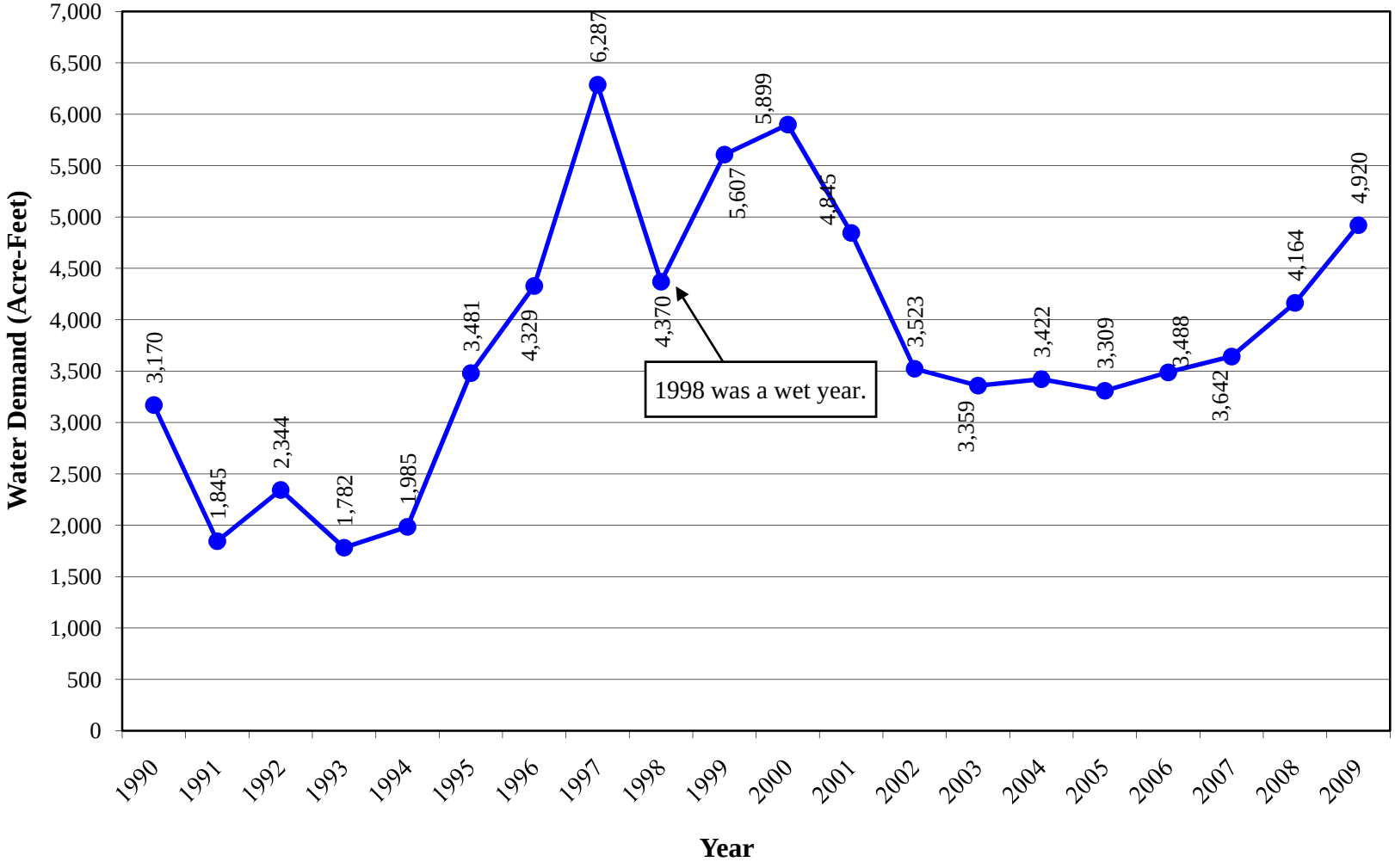
As part of its operational planning, Zone 7 collects demand projections over the next five years (2010 to 2014) from its untreated water customers. Preliminary results from this five-year projection indicate that untreated demands will remain constant at approximately 4,500 AF per year over the next five years. However, Zone 7 has existing contractual obligations up to 8,250 AFA; it is unknown when untreated water demands could increase to 8,250 AF. Consequently, for planning purposes in this Urban Water Management Plan (UWMP), it was assumed that untreated water demand would increase linearly from 4,500 AF in 2015 to 8,300 AF in 2030. Table 9-6 presents the projected supply required for Zone 7's untreated water customers.

Table 9-6. Supply Required for Zone 7's Untreated Water Customers (Acre-Feet)[(a)]

Year	*2005 (Actual)*	2010	2015	2020	2025	2030
Required from Zone 7	*3,309*	4,500	4,500	5,700	6,900	8,300

[(a)] Assumes demand increases linearly from 4,500 AF in 2014 to 8,250 AF in 2030; demands rounded to the nearest 100 AF for planning purposes.

Figure 9-3. Historical Zone 7 Untreated Water Demand (Acre-Feet)



9.3.4 Zone 7's Unaccounted-for Water

For planning purposes in this UWMP, unaccounted-for water is the difference between total production (water delivered from the SBA to water treatment plants and groundwater pumped from Zone 7 wells[54]) and the total deliveries made at each of Zone 7's transmission system turnouts. Figure 9-4 illustrates historical unaccounted-for water within Zone 7's system from 1985 to 2009. As shown on Figure 9-4, unaccounted-for water has historically been extremely low (less than 1%); however, starting in 2003, it increased significantly, and averaged approximately 4% between 2003 and 2009. One or all of the following likely caused the increased unaccounted-for water identified on Figure 9-4:

- water losses associated with Zone 7's water treatment plants,
- water losses associated with system flushing,
- meter calibration and reading errors, and/or
- transmission system leakage.

Without knowing the cause, and given the consistency of the losses, Zone 7 staff assumed that unaccounted-for water continues to average approximately 4% per year for planning purposes. Losses through the disposal of brine concentrate from the demineralization facility are accounted for separately and incorporated into "storage losses" as discussed in Section 9.3.7. As noted in Chapter 11, Zone 7 will be reviewing the cause for the increase in unaccounted-for water as part of the Water System Master Plan update. Table 9-7 presents the projected supply required from Zone 7 to cover Zone 7's unaccounted-for water.

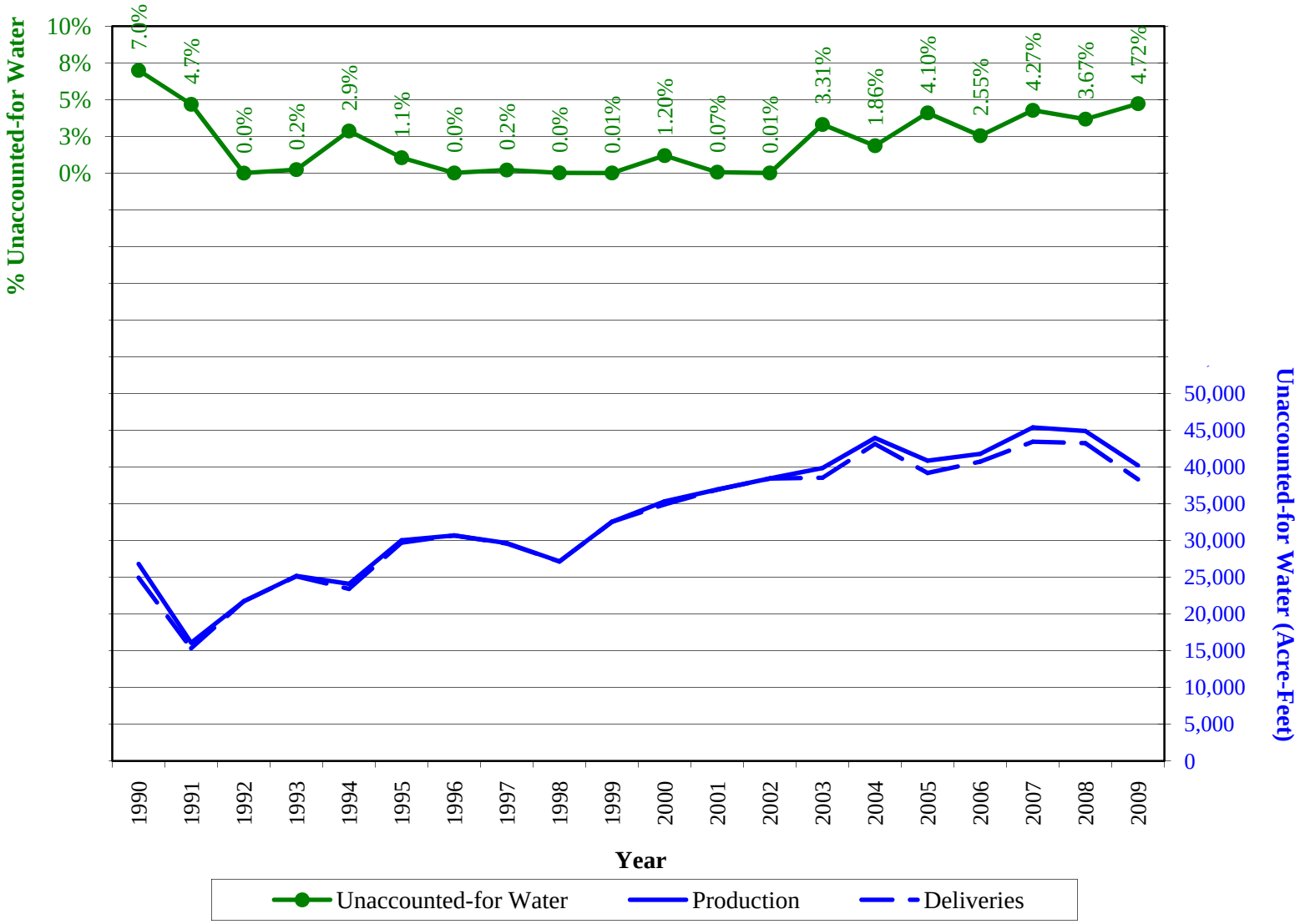
Table 9-7. Supply Required for Zone 7's Unaccounted-for Water (Acre-Feet)[(a)]

Year	*2005 (Actual)*	2010	2015	2020	2025	2030
Required from Zone 7	*1,676*	1,800	1,900	2,200	2,300	2,400

[(a)] Unaccounted-for water is based on total projected demands and the average unaccounted-for water percentage losses between 2003 and 2009.

[54] Since 2009, this amount is net of groundwater demineralization losses through brine concentrate disposal.

Figure 9-4. Historical Zone 7 Unaccounted-for Water (Acre-Feet and % of Total Supply)



9.3.5 Water Conservation (20 by 2020)

In November 2009, the California legislature passed Senate Bill SBX7-7 (SB 7). SB 7 created a framework for future planning and actions by water supply retailers and agricultural water suppliers to reduce California's water use. More specifically, SB 7 required water supply retailers to reduce their per capita water consumption 20 percent from their baseline by 2020.

Although Zone 7 is not subject to the requirements of SB 7 because it is a wholesale water agency, Zone 7 fully supports the existing and planned efforts of the Retailers within the service area to comply with this new law. To estimate the potential water conservation savings for Zone 7's service area resulting from implementation of SB 7, Zone 7 calculated a regional average baseline daily per capita consumption (227 gallons per capita per day, gpcd) over a ten-year period (1999 to 2008) based on the total potable water demand in the service area. The total potable water demand included retailer demands from Zone 7, groundwater pumping quotas, direct retail demand, and unaccounted-for water. The regional target for daily per capita consumption was then calculated assuming a 20% reduction from the baseline by 2020 (181 gpcd). Applying this target to the regional demand and population projections (derived from individual retailer data) resulted in an estimated target regional demand reduction of 7,200 acre-feet in 2020. The interim regional demand reduction target for 2015 was assumed to be half of this amount at 3,600 acre-feet.

The methodology described above is consistent with Methodology 1 of the SB 7 DWR guidelines[55]. The resulting demand reduction estimates are presented in Table 9-8 below. These estimates were developed by Zone 7 for planning purposes only; the Retailers will be calculating their individual targets for compliance with SB 7 as they prepare their individual UWMPs.

Table 9-8. Projected Water Conservation Savings or Demand Reductions Under SB 7 (Acre-Feet)[(a,b)]

Year	2010	2015	2020
Demand Reductions	0	3,600	7,200

[(a)] Projected regional water conservation savings estimated by Zone 7 based on data provided by Cal Water, DSRSD, Livermore, and Pleasanton.

[(b)] Note that if Zone 7 is able to reduce its unaccounted-for water demand from 4% to 2% of the total system demand by 2020 (a demand reduction of 1,100 acre-feet), the estimated demand reduction from the retailers under SB 7 will be the remaining 6,100 acre-feet of the 7,200 acre-feet in 2020.

9.3.6 Projected Supply Required for Zone 7's Artificial Recharge Activities

As discussed in Chapters 5 and 6, Zone 7 considers the local groundwater basin as a storage facility and not a long-term water supply because Zone 7 does not have a groundwater pumping quota; Zone 7 only pumps the groundwater it artificially recharges. For planning-level purposes in this UWMP, Zone 7 assumed that groundwater pumping in normal water years was equal to the long-term average recharge capacity of its existing recharge activities.

[55] DWR, 2010. Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use.

Planning-level analysis completed by Zone 7 staff indicates that Zone 7 could recharge, on average, as much as 9,200 AFA via artificial recharge activities in the Arroyo Mocho and Arroyo del Valle.[56] Although Zone 7 will eventually have additional recharge capacity available via the Chain of Lakes (see Chapter 5), existing artificial recharge capacity is limited to the local arroyos.

Consequently, for conservative planning-level purposes in this UWMP, Zone 7 assumed that it must artificially recharge, on average, at least 9,200 AF of water into the groundwater basin during normal water years so that it can also pump 9,200 AF of groundwater during normal water years.

Table 9-9. Supply Required for Zone 7's Artificial Recharge Activities (Acre-Feet)[(a)]

Year	*2005 (Actual)*	2010	2015	2020	2025	2030
Required from Zone 7	*12,260*	9,200	9,200	9,200	9,200	9,200

[(a)] Based on an analysis completed by Zone 7 staff of historical recharge capacity on the Arroyo Mocho and Arroyo del Valle.

9.3.7 Projected Supply Required for Storage and Demineralization Losses

As discussed in Chapter 5, there are storage losses associated with Zone 7's artificial recharge and groundwater banking programs (e.g., 10% loss associated with storing water in Semitropic and 50% for Cawelo Water District). These losses are calculated as a percentage of the amount of water placed into storage; consequently, over time, these storage losses will decrease as the amounts of water placed into storage decrease (e.g., because the storage facilities are full or there is no excess water available to bank). As noted in Section 9.3.4, water is also lost through the disposal of brine concentrate from the demineralization process. Table 9-10 presents the projected storage and demineralization losses over the next 20 years based on modeling conducted by Zone 7 staff.

Table 9-10. Supply Required for Storage and Demineralization Losses (Acre-Feet)[(a,b)]

Year	*2005 (Actual)*	2010	2015	2020	2025	2030
Required from Zone 7	*1,800*	6,300	5,100	3,600	2,500	1,500

[(a)] Based on an analysis completed by Zone 7 staff.
[(b)] Storage losses will decrease over time due to insufficient water supplies (i.e., less filling) or if storage is filled (i.e., no need to fill).

[56] Zone 7 staff used its newly developed water supply model to estimate the average and median recharge capacities along the Arroyo Mocho and Arroyo del Valle. This analysis indicated that the median and average were nearly identical at approximately 9,200 AF. Actual recharge may be significantly more or less than this estimate.

9.3.8 Total Projected Water Demand on Zone 7's Existing Water Supply System

Table 9-11 presents the total projected water demands within the Livermore-Amador Valley that would need to be met with Zone 7's existing water supply system. As shown in Table 9-11, there is a high and a low water demand projection depending on whether additional water conservation (see Table 9-8) is included in the projection; this was done because Zone 7 does not have control over how much water savings can actually be realized at the retail level.

Table 9-11 also shows that the supply required from Zone 7 to meet water demands within the Livermore-Amador Valley will increase by 25 percent (from 66,200 to 82,700 AF) without additional water conservation and by 14 percent (from 66,200 to 75,500 AF) with additional water conservation between 2010 and 2030.

Table 9-11. Projected Normal Year Water Demands Used in this UWMP[(a)]

Year	*2005 (Actual)*	2010	2015	2020	2025	2030
Retailers	*38,912*	44,100	47,200	53,300	58,300	61,000
Zone 7 Retail	*282*	300	300	300	300	300
Untreated	*3,309*	4,500	4,500	5,700	6,900	8,300
Unaccounted-for Water	*1,676*	1,800	1,900	2,200	2,300	2,400
Artificial Recharge	*12,260*	9,200	9,200	9,200	9,200	9,200
Storage and Demineralization Losses	*1,800*	6,300	5,100	3,600	2,500	1,500
High Water Demand	*58,239*	66,200	68,200	74,300	79,500	82,700
Water Conservation		0	-3,600	-7,200	-7,200	-7,200
Low Water Demand		66,200	64,600	67,100	72,300	75,500

[(a)] During single-dry and multiple-dry years, water demands will not include artificial recharge or storage losses because there will likely not be any artificial recharge or groundwater banking activities occurring.

10. WATER DEMAND MANAGEMENT MEASURES

Water Code Section 10631

The purpose of this chapter is to discuss Zone 7 Water Agency's (Zone 7's) water conservation or demand management program, which Zone 7 views as a critical element of any water resources strategy developed for the Livermore-Amador Valley. In 2008, Zone 7 became a signatory to the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) and therefore is a member of the California Urban Water Conservation Council (Council). As a Council member, Zone 7 has committed to make a good faith effort to implement the Best Management Practices (BMPs) in urban water demand management that are relevant to wholesale water agencies. Furthermore, Zone 7 is supporting the City of Livermore, the City of Pleasanton, Dublin San Ramon Services District, and California Water Service Company (collectively referred to as the "Retailers") with other BMPs where feasible. A summary of the Council's BMPs—based on the updated format—and Zone 7's implementation efforts is presented in Table 10-1 below. Each demand management measure (DMM) category is discussed in more detail in the following sections. For the DMMs required for wholesalers, the Water Code Section 10631(f) designation is referenced in bold in each heading.

Table 10-1. California Urban Water Conservation Council Best Management Practices (BMPs)

BMP Category and Description[a]				Required for Zone 7?	Does Zone 7 implement BMP?
Foundational - Utility Operations	Operations	1.1.1	Conservation coordinator **(DMM L)**	Yes	Yes
		1.1.2	Water waste prevention ordinances or terms of service	No	Yes
		1.1.3	Wholesale agency assistance to retailers **(DMM J)**	Yes	Yes
	Water Loss	1.2	System water audits and leak detection and repair **(DMM C)**	Yes	Yes
	Metering	1.3	Metering and volume-based billing **(DMM D)**	Yes	Yes
	Pricing	1.4	Conservation pricing **(DMM K)**	Yes	No
Foundational - Education		2.1	Public educational programs	No	Yes
		2.2	School educational programs	No	Yes
OPTIONAL					
Programmatic - Residential		3.1-3.5	Residential assistance with leak detections, landscape water surveys, water-efficient appliances	No	Yes[c]
Programmatic - CII[b]		4.1-4.2	Commercial, industrial, and institutional assistance with water demand reduction	No	Yes
Programmatic - Landscape		5.1-5.3	Water demand reduction for large landscapes	No	Yes

[a] CII = Commercial, Industrial, and Institutional
[b] The Water Code Section 10631(f) designation of the Demand Management Measure (DMM) is noted in bold.
[c] Zone 7 provides support in the implementation of landscape surveys and water-efficient appliances only.

10.1 IMPLEMENTATION OF DEMAND MANAGEMENT MEASURES

10.1.1 Foundational – Utility Operations

*10.1.1.1 Conservation Coordinator **(DMM L)***

Zone 7 began implementation of this DMM in January 1992 after the adoption of the Zone 7 Board Resolution 1506, which committed Zone 7 to the implementation and support of water conservation Best Management Practices "that are uniquely suitable for and beneficial to the Zone 7 area." Zone 7 has had a full-time Water Conservation Coordinator (or equivalent) since 1996. The contact information for the current full-time Water Conservation Coordinator is listed below:

Name and Title: Robyn Navarra, Water Conservation Coordinator
Address: 100 North Canyons Parkway, Livermore, CA 94551
Contact: 925.454.5065 (tel), 925.454.5726 (fax), rnavarra@zone7water.com

The Water Conservation Coordinator is responsible for Zone 7's conservation program planning, implementation, and evaluation, and for coordinating those efforts with the Retailers. Program activities, done in coordination with Zone 7's public outreach department, include community workshops and other events, school education programs, rebate and giveaway programs, and others. The Coordinator also serves in various conservation-oriented subcommittees in regional and state organizations, including the California Urban Water Association (CUWA) and the California Urban Water Conservation Council (CUWCC). Finally, the Coordinator tracks conservation-related state legislation and local ordinances and integrates them into the program development process to ensure timely compliance. Robyn Navarra has held the position since 2008; she has ten years of experience in the water industry and over twenty years of experience in public outreach. Zone 7's Public Information Officer, Boni Brewer, also plays a key role in Zone 7's conservation efforts, overseeing the development of brochures, workshops, website messaging, newsletters, public events, and other forms of communication with the public. Contractors assist both the Water Conservation Coordinator and the Public Information Officer with their activities. Table 10-2 below summarizes funding for staff time on Zone 7's conservation activities.

Table 10-2. Funding for Zone 7 Staff Time on Conservation Activities

Year	2005-06	2006-07[(a)]	2007-08	2008-09	2009-10	2010-11 *(Projected)*
Number of Staff Involved	3	3	3	2	2	2
Number of Equivalent Full-Time Position/s	1	1	1	1.1	1.1	1.1
Expenditures	82,000	32,000	99,000	93,000	89,000	90,000

[(a)] The reduced expenditure reflects staff transition in 2006-07.

10.1.1.2 Water Waste Prevention

This DMM is not directly applicable to Zone 7; however, Zone 7 does have a water conservation clause in its contracts with its retailer water supply agencies which states, "*Zone 7 will undertake and support water conservation programs. To that end, Zone 7 will develop, implement or participate in such programs and enter into agreements with other contractors and other entities to make more efficient use of water supplies through water conservation programs so long as such agreements serve a beneficial purpose to the residents of Zone 7*." To Zone 7's knowledge, there are currently no general water waste ordinances in Zone 7's service area; however, each of the cities served by Zone 7 has adopted water-efficient landscape ordinances as discussed in Section 10.1.5. The retailers also have water conservation plans/ordinances in place that take effect when their water demands cannot be met. Pleasanton's Water Conservation Ordinance, for

example, lists the voluntary and mandatory reductions in water consumption that will be implemented under different "stages" of water supply reduction.

10.1.1.3 Wholesale Agency Assistance ***(DMM J)***

As the water wholesaler for the Livermore-Amador Valley, Zone 7 supports the Retailers' water conservation programs in five ways: 1) providing overall coordination of the conservation program for the entire area, 2) providing financial and technical assistance on retailer efforts in implementing BMPs in their service areas, 3) actively participating in regional and state water conservation organizations, 4) pursuing grant funding to benefit the Retailers, and 5) advising the Retailers on current legislative activities on water conservation. Zone 7's Conservation Coordinator oversees conservation program planning for the service area and coordinates very closely with the Retailers' equivalent staff members.

To encourage BMP implementation in the service area, Zone 7 funds giveaways such as water conservation kits, sprinkler keys, and others (see Table 10-5); co-sponsors public information efforts, workshops, and conservation campaigns (e.g., Water-Wise Gardening program and California Water Awareness Campaign; see Table 10-5); and contributes to an accreditation program for training plumbers in water-efficient technologies to increase technical expertise in the service area. Through the Zone 7's Conservation Coordinator's active involvement in conservation-oriented subcommittees in regional and state organizations (see Section 10.1.1.1), she is able track conservation-related legislation, grant opportunities (e.g., Proposition 50), and technological developments that affect and benefit the Retailers.

10.1.1.4 System Water Audits and Leak Detection and Repair ***(DMM C)***

Zone 7 implements this DMM by conducting a monthly audit of water production and delivery records to determine any losses within the transmission system. By comparing production amounts from Zone 7's water treatment plants and wells to total deliveries to the Retailers and other customers, an overall water balance is calculated to identify possible meter problems and to detect leaks. For the period from 2005 through 2009, annual overall losses ("unaccounted-for water") for Zone 7's system averaged 4% of total production (Table 10-3), which is within a reasonable range given that the error in meter readings is estimated at ±2-3%. However, Zone 7 plans to investigate the cause for the apparent increase in unaccounted-for water that began in 2003 (see Section 9.3.4) as part of the Water System Master Plan update.

Table 10-3. Zone 7 Treated Water Production, Deliveries, and Unaccounted-for Water (Acre-Feet)

	2005	2006	2007	2008	2009[c]
Total Production	40,869	41,794	45,384	44,901	40,216
Total Delivery	39,194	40,730	43,444	43,252	38,316
Unaccounted-for Water[a]	1,675	1,064	1,940	1,649	1,900
Unaccounted-for Water (%)[b]	4.1%	2.5%	4.3%	3.7%	4.7%
Average					3.9%

[a] Total production minus total delivery.
[b] (Unaccounted-for water in acre-feet/Total production in acre-feet) x 100%.
[c] Total production for 2009 is net of groundwater demineralization concentrate losses.

All facilities served by Zone 7 are metered. Raw and treated water meters are inspected and calibrated annually as part of Zone 7's preventive maintenance program. Flows in Zone 7's major facilities are monitored continuously via a SCADA system, which facilitates the detection of leaks and other problems in the system. Any reports of leaks are investigated immediately and corrected.

10.1.1.5 Metering and Volume-Based Billing ***(DMM D)***

All water sales by Zone 7 are metered, and wholesale and retail customers are billed based on volumes delivered. Meters are read every month and bills are issued monthly.

10.1.1.6 Conservation Pricing ***(DMM K)***

Under the Council's new format, this DMM is directed towards retail agencies. However, conservation pricing applies to both retailers and wholesalers in the Water Code. As noted previously, Zone 7 is primarily a wholesaler for four major water providers that in turn sell water to homes and businesses; however, Zone 7 does provide water directly to six retail customers, whose demand is approximately 1% of the total demand for the service area. These retail customers, like the wholesale customers, are similarly billed based on a tiered rate structure that reflects reduced unit costs with increasing consumption as required for cost-recovery purposes, and not for water conservation purposes.

10.1.2 Foundational – Education

10.1.2.1 Public Programs

Zone 7 has been implementing programs to inform and educate the general public about the value of water and to promote water conservation for many years. These programs include meetings with community, political, and business leaders to increase their level of awareness about water issues; establishing a cooperative relationship with the media by responding promptly to requests for information and being forthright in any dealings with them; making presentations to community organizations and participating at community events such as Earth Day celebrations, the Livermore Wine Country Festival, Home and Garden Shows, and the

annual Alameda County Fair; and developing and distributing a variety of educational media (newsletters, water conservation tools, CDs, etc.) to residents in the service area. In addition, Zone 7 has been making contributions to regional and state water conservation campaigns and other efforts. These activities, and the associated expenditures, are discussed further below and summarized in Tables 10-4 and 10-5.

Table 10-4. Summary of Zone 7's Public Information Programs – Number of Events

Events	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11 (Projected)
Community events	15	20	23	25	27	28
Water-Wise Gardening Workshops	-	-	-	3	3	3

Table 10-5. Summary of Zone 7's Expenditures for Public Programs

Program	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11 (Projected)
Public Information						
Water-Wise Gardening Website and CDs	$10,500			$6,500	$5,000	$5,000
Community Events - Contractor Support	$30,000	$56,750	$45,000	$48,700	$48,200	$48,200
Water Conservation Postcards			$17,000	$17,000	$17,000	$17,000
Waterways Newsletters			$75,000	$75,000	$75,000	$75,000
Conservation Fliers for Businesses				$2,000		
Classroom Presentations	$66,000	$62,700	$65,000	$68,500	$75,000	$75,000
Subtotal	$106,500	$119,450	$202,000	$217,700	$220,200	$220,200
Contributions to State/Regional Conservation Campaigns						
Water Saving Heroes Regional Campaign			$15,000			
East Bay's Bringing Back the Natives Garden Tours			$2,000		$1,000	
California Water Awareness Campaign			$2,050	$1,500	$2,050	$2,050
Water Conservation Showcase Sponsorship	$500			$500	$750	$750
San Francisco Estuary Project			$1,500			
Subtotal	$500	$0	$20,550	$2,000	$3,800	$2,800
Giveaways						
Drought-tolerant Poppy Seed Packs				$1,000		
Toothbrushes with Water Conservation Message				$1,200	$754	$761
Water Conservation Kits				$1,800		
Sprinkler Keys				$3,060	$1,875	
Subtotal	$0	$0	$0	$7,060	$2,629	$761
TOTAL	**$107,000**	**$119,450**	**$222,550**	**$226,760**	**$226,629**	**$223,761**

Water-Wise Gardening Program: Much of Zone 7's service area includes residences with landscaped yards. In 2003, Zone 7 worked with a software developer to develop a Water-Wise Gardening instructional CD for free distribution to residents in its service area to support attractive yet water-efficient landscapes based on climate and other conditions specific to the Tri-Valley area. An additional set of 3,000 CDs was produced in 2005. This CD was updated and converted to a web-based version in 2008, providing increased functionality and additional information. During calendar year 2009, the website had nearly 3,000 unique visitors. In addition to the website, which replaces the costlier and out-of-date CDs, Zone 7 has also been conducting—in cooperation with the Retailers—hands-on Water-Wise Gardening workshops since 2008 in all three of the cities served by Zone 7. Finally, Zone 7 has created a "Perfect Plants for Our Valley" brochure that focuses on water-use efficiency.

Community Events: Zone 7's public outreach activities have increasingly focused on water conservation over the years. The Water Conservation Coordinator and/or the Public Information Officer participate in community events such as: Home and Garden Shows, Earth Day events in Livermore and Pleasanton, the Livermore Wine Festival, the annual Alameda County Fair, Dublin Pride Week, and others. At these events, Zone 7 staff conduct "how-to" conserve demonstrations, display educational posters, and are available to answer questions about water issues and to hand out giveaways (described below). In addition, Zone 7 has been hosting conservation displays at local libraries.

Water Conservation Postcards: Starting in FY 2007-08, Zone 7 has been annually mailing out a postcard each autumn advising residents throughout the service area to adjust their irrigation system timers and irrigation schedules, reviving a program that was first implemented in FY 2004-05. The postcards are distributed to more than 60,000 addresses targeting single-family homes.

Waterways Newsletters: Although Zone 7's area-wide newsletters (mailed to approximately 80,000 commercial and residential customers) cover a variety of topics, all include at least some water conservation messaging. A number of newsletters has predominantly covered water conservation, including one devoted to local water saving heroes. Each of the three newsletters costs approximately $25,000 for design, printing and mailing ($75,000 annually), plus in-house staff time for writing/editing (15-18 hours per newsletter).

Business-Targeted Outreach: Since the previous UWMP, Zone 7 has been increasing overall outreach to local businesses. In FY 2006-07, Zone 7 staffed a table with conservation information during an environmental-awareness event for employees of Carl Zeiss Meditec in Dublin and sponsored an irrigation workshop for landscape professionals with key messages including water conservation. In FY 2008-09, Zone 7 staffed a water conservation booth at Sybase's Health & Wellness Expo that drew 800 employees. Staff also made presentations on water conservation to the Pleasanton Chamber of Commerce's Leadership Pleasanton class and to employees at Life Technologies in Pleasanton. Furthermore, Zone 7 spearheaded an effort with the retailers to distribute water conservation fliers geared to local businesses through inserts in three different Chamber of Commerce newsletters. Zone 7 paid approximately $2,000 for the development and printing of the fliers and retailers paid to have them included as inserts. Zone 7 staff made conservation presentations to two Rotary Clubs during 2008-09. Finally, in FY 2009-10, the Large Landscape Audit Survey program was piloted by Zone 7 and the retailers, targeting the highest 20% non-residential water users in the area (see Section 10.1.5).

Contributions to Regional and State Campaigns: Zone 7 contributed $15,000 to the Water Saving Heroes Bay Area regional campaign in FY 2007-08, and has contributed $1,000-2,000 to the East Bay's Bringing Back the Natives garden tour over the last few years. Zone 7 also contributes about $1,500-2,000 annually to the California Water Awareness Campaign, which in 2008 launched the *Nice Save!* campaign. Zone 7 has been a regular co-sponsor of the annual Water Conservation Showcase held at the Pacific Energy Center in San Francisco, which provides information on water-conserving strategies to building designers, managers and operators; Zone 7 water conservation materials are also distributed at this event. Locally, in 2008, 2009, and 2010, Zone 7 co-sponsored the nine-week Family Fun Film Festival at the Regal Hacienda Cinemas in Dublin as a way to disseminate water conservation messages, including those developed by the regional Water Saving Heroes campaign; this event facilitated outreach to several thousand children and adults.

Giveaways: An increasing number of giveaways at community events (e.g., workshops, fairs, etc.) are associated with water conservation, including: drought-tolerant poppy seed packs, toothbrushes with conservation messages, dye tabs to detect toilet leaks, water-conserving showerheads and aerators, sprinkler keys (to reduce over-spraying), and magazines with water-wise gardening information. Over the last two fiscal years, Zone 7 has spent about $10,000 on giveaways. In addition, Zone 7 developed a demonstration model on fixing toilet leaks in 2009.

10.1.2.2 School Programs ***(DMM H)***

Starting in September 2002, Zone 7 has been implementing an extremely progressive school education program. As the regional water wholesaler, this program provides regional consistency of water education messages. Zone 7 coordinates its efforts with the Retailers in furnishing water conservation and educational materials to area schools, and also works directly with primary and secondary schools. Water education literature, facility tours, teachers' aides, and classroom presentations are provided by Zone 7 at no charge. Zone 7 also actively participates in school assemblies and science fairs. The numbers of classroom presentations, assemblies, and science fairs that Zone 7 engaged in over the last five years are presented in Table 10-6. These types of activities reached approximately 8,250 students in the 2009-10 school year alone.

Table 10-6. Numbers of Classroom Presentations, Assemblies, and Science Fairs

Grades	Year					
	Actual					*Planned*
	2005-06[b]	2006-07	2007-08	2008-09	2009-10[a]	*2010-11*
K-3[c]	47	50	76	109	280	*280*
4-6[c]	15	15	62	49	60	*60*
7-8[d]	5	5	5	5	1	*3*
High School[e]	2	2	2	3	2	*3*
Expenditures[f]	$66,000	$62,700	$65,000	$68,500	$75,000	*$75,000*

[a] Reflects a large increase due to efficiency measures and to Zone 7's taking on classes previously handled by DSRSD.
[b] Includes development of revised curriculum introduced in 2006-07 school year and at outreach events.
[c] Number of classroom presentations.
[d] Number of school assemblies.
[e] Number of science fairs/other events.
[f] These are Zone 7 contract costs only and do not reflect in-house staff time.

Approximately 25 percent of classroom presentations deal exclusively with water conservation, with the remainder dealing with other water resource topics such as groundwater management, watershed protection, and others. However, starting in school year 2007-08, classroom presentations have included a conservation message at the beginning and end of every classroom visit, regardless of the specific subject matter. The 50-minute presentations use grade-level appropriate printed materials from the Water Education Foundation, Zone 7, and the Retailers; engaging demonstrations and hands-on activities are also part of the presentations. Teachers are provided with a water resource directory for further exploration of water issues in their classroom and copies of Zone 7 lesson plans. After each presentation, teachers are asked to complete evaluation forms designed to assess the effectiveness of the presentation and solicit suggestions for improvement. Zone 7 has been receiving overwhelmingly positive feedback from teachers, citing the relevance of the materials to state educational requirements and the high information retention rate amongst students—especially when it comes to water conservation

principles. While classroom presentations have historically targeted younger students, in 2010, Zone 7 began developing additional curricula for higher grade levels (middle to high school) dealing specifically with conservation among other topics. In addition, Zone 7 has been providing *Water for Tomorrow* magazines, developed by the Association of California Water Agencies (ACWA) and National Geographic, to middle school and high school science teachers as supplemental educational materials on the value of water and how it impacts people in California.

Zone 7's classroom curricula meet state education framework requirements in the following areas: Life, Earth and Physical Sciences, Ecology and Biology, Earth and Life History, Shaping the Earth's Surface and Investigation and Experimentation. Requirements for these areas are different at each grade level and are met through the use of printed materials appropriate for each grade level, instruction from a credentialed teacher, and demonstration of key concepts.

The impact of school education programs on water use can be estimated by assuming that students who are exposed to such programs reduce their water use through behavioral changes. These changes include simple acts such as turning the water off while brushing teeth and washing hands, and taking shorter showers. Students may also contribute to further water conservation efforts by encouraging their parents to turn off the hose while washing cars and to water their lawns for shorter times and earlier in the day, and by reporting leaks and drippy faucets to their parents. Zone 7 estimates that the actions described above could result in a net reduction in water use between 5 to 10 gallons per day (gpd) per student, potentially resulting in a water savings for 2009-10 of:

8,250 students x 5-10 gpd x 365 days/year = 15-30 million gallons saved per year or 46-92 AFA.

10.1.3 Programmatic – Residential

As noted above, BMPs under this category are optional; nonetheless, as a wholesaler, Zone 7 is supporting the Retailers on programs that are related to these BMPs.

10.1.3.1 Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

As a treated water wholesaler, Zone 7 does not directly serve single-family or multi-family residential customers. Zone 7 is currently not involved in water survey programs for residential customers.

10.1.3.2 Residential Plumbing Retrofit

In partnership with its retailers, Zone 7 is funding and managing a program that distributes high-quality low-flow showerheads (rated at 2.0 gallons per minute [gpm] or less), toilet displacement devices, toilet flappers, and faucet aerators (rated at 0.5 gpm or less) to residences requesting them for free. Zone 7 distributes a limited number as prizes at public outreach events while the retailers distribute them upon request from customers. In addition, rebates are provided for high-efficiency washers and toilets as described in the next two sections. These giveaways and rebates are advertised on Zone 7 and Retailers' websites and mailer inserts, and at public events.

10.1.3.3 High-Efficiency Washing Machine Rebate Programs

The High-Efficiency Clothes Washer Rebate Program has been available to Livermore-Amador Valley water customers since 1999. Until June 2007, Zone 7's program was a service area-specific program. In 2008, Zone 7 partnered with other San Francisco Bay Area water agencies and Pacific Gas and Electric (PG&E) on a regional strategy to increase water and energy efficiency. Referred to as the "Bay Area Regional High-Efficiency Washer Rebate Program," this effort has increased program visibility with the public and with appliance retailers throughout the region. Over the last five years, rebate amounts have ranged between $50 to $125 for the water portion of the rebate, depending on the water efficiency level of the eligible clothes washer model. In 2008, a grant from Proposition 50 (Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002) contributed $50 towards each rebate; however, funds were exhausted in 2009. Over the last five years, Zone 7 has provided 9,749 rebates, with a total of 153 AF of water saved as shown in Table 10-7. Zone 7 plans to continue to implement this DMM.

Table 10-7. High-Efficiency Washing Machine Rebate Program

Fiscal Year	2005-06	2006-07	2007-08	2008-09	2009-10	Total
Rebate Amount ($)	50 or 100	50 or 100	50 or 100	90 or 125	90 or 125	
No. of Rebates Paid	1,673	1,679	880	2,838	2,679	9,749
Rebate Expenditures ($)[(a)]	$15,125	$150,000	$81,850	$346,665	$334,875	$928,515
Rebate Processing Costs ($)[(b)]	$18,582	$19,522	$11,896	$17,028	$20,659	$87,687
Water Savings (AFA)[(c)]	26	26	14	44	42	153

(a) Amount spent on rebates only; includes CALFED grant of $50/rebate.
(b) Program Administration Fees paid to administrator.
(c) Based on an estimated annual savings of 5,100 gallons/machine from the THELMA study.

10.1.3.4 Residential High-Efficiency Toilet Replacement Program

Zone 7 began an Ultra-Low Flush Toilet (ULFT) rebate program in 1994, offering financial incentives to replace toilets that use 3.5 gallons-per-flush (gpf) or higher with a ULFT that uses only 1.6 gpf. In July 2008, Zone 7 upgraded the program to a High-Efficiency Toilet (HET) replacement program, reflecting technical advancements and the availability of toilets that use 1.28 gpf or less. The program was also expanded to include commercial and multi-family residential customers in 2010. Table 10-8 shows a summary of the number of rebates, expenditures, and estimated annual water savings for the toilet replacement program.

Table 10-8. Ultra-Low Flush and High-Efficiency Toilet Rebate Program

Fiscal Year	2005-06	2006-07	2007-08	2008-09	2009-10	Total
Rebate Amount (maximum)	$75	$75	$90	$150	$150	
No. of Rebates Paid	394	412	568	1,273	1,059	3,706
Rebate Expenditures ($)[a]	$30,304	$30,900	$60,000	$190,950	$141,750	$453,904
Water Savings (AFA)[b]	18	18	20	48	43	147

[a] Amount spent on rebates only.
[b] For 2005-2007: based on an estimated savings of 40 gallons/day per ultra-low flush toilet (ULFT) per household. For 2008-2010: based on an estimated savings of 30 gallons/day per ULFT and 36 gallons/day per high-efficiency toilet (HET) per household (the revised numbers reflect updated data from more recent studies).

Between July 2005 and July 2008, 1,374 rebates were provided in the Zone 7 service area for ULFTs/HETs. Due to popular demand, funding for the toilet replacement program was more than tripled in July 2008, allowing for the distribution of approximately 2,332 rebates for ULFTs/HETs between July 2008 to June 2010. ULFTs were slowly phased out starting in mid-2008.

Zone 7, in cooperation with the retailers, administers the HET program. To streamline the process, online application and electronic filing for the HET rebate became available in 2010.

Currently, Zone 7 and the retailers are developing a program that would fund and facilitate the direct installation of HETs in disadvantaged communities in the service area.

To further promote water conservation, Zone 7 provided $9,000 in funding in 2010 towards GreenPlumbers USA, an accreditation program that trains plumbers in water-efficient technologies. Among other benefits, the accredited plumbers from the program will be placed on a short-list of eligible plumbers for hire in the direct HET installation program under development for disadvantaged communities. As of 2010, six plumbers have been accredited in the Zone 7 service area. Zone 7 plans to continue to support this program.

10.1.4 Programmatic – Commercial, Industrial, and Institutional Accounts

As a wholesaler, Zone 7 normally deals with retail water supply agencies rather than individual Commercial, Industrial, and Institutional (CII) customer accounts; however, Zone 7 does have one commercial account and four institutional accounts. These accounts represent only a small fraction (approximately 1%) of Zone 7's total treated water deliveries. Nonetheless, in 2009, Zone 7 began implementing a program that offers water conservation programs aimed specifically at CII accounts, including free outdoor water audit surveys for the top 20% commercial water account users (see Section 10.1.5) and free indoor and outdoor water audit surveys to schools in the Tri-Valley area. Schools that upgrade their irrigation hardware are funded at 100%, while other CII customers are given up to $5,000 in matching funds. As another

component of the CII water audit program, Zone 7 has assisted the Alameda County Green Business Program in providing water audits to businesses seeking certification.

10.1.5 Programmatic - Landscape

This DMM is not applicable to Zone 7 since it does not directly serve any large landscape customers. However, Zone 7 has been supportive of efforts to reduce water consumption for large landscapes in its service area. Over the years, Zone 7 has conducted landscape irrigation workshops for contractors and parks maintenance personnel. Zone 7 has also partnered with one of the Retailers, California Water Services Company, in funding a landscape audit of area schools. In April 2004, Zone 7 and the Department of Water Resources installed a California Irrigation Management Information System (CIMIS) station in the service area. The CIMIS station assists landscape professionals in determining an appropriate irrigation schedule for the properties they manage, leading to more efficient water use. The data obtained from this station is also available for use by any irrigation customer in developing a water budget. The approximate cost for the CIMIS station installation project was $15,000 and Zone 7 continues to provide monthly maintenance and communication equipment to the unit.

More recently, in 2009, Zone 7 led the development and implementation of the Large Landscape Survey Audit Support pilot program for CII water users. Based on the water consumption data provided by retailers, the highest 20% non-residential water users in the Livermore-Amador Valley were identified and offered a free water survey on all pre-existing landscapes. The survey is conducted according to the State Model Efficient Landscape Ordinance guidelines, codified in Title 23 of the California Code of Regulations (Sections 490-492), as required by the Water Conservation in Landscaping Act (Government Code, Section 65591 et seq.). Landscape plans, including irrigation system layout and scheduling, are reviewed for efficiency. A list of recommended improvements is provided to the customer, accompanied by an incentive program (matching funds up to $5,000) to assist the customer in implementing the recommendations.

Each of the cities within Zone 7's service area has adopted water-efficient landscape ordinances.

11. PLANNED WATER SUPPLY PROGRAMS AND PROJECTS

Water Code Section 10631(h)

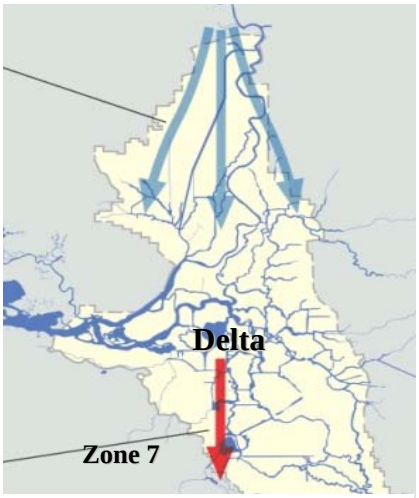
The purpose of this chapter is to discuss the programs and projects Zone 7 is undertaking to ensure that a reliable and high-quality water supply is available to meet the demands of the Livermore-Amador Valley.

In November 2009, Zone 7 Water Agency (Zone 7) completed an evaluation of the ability of existing water supplies and the existing conveyance, treatment, and transmission system (existing facilities) to meet water demands through buildout of adopted general plans. A revised analysis was also completed in July 2010.[57,58] Both analyses indicated that Zone 7's water supply is at risk and subject to a very uncertain future due to recent court rulings, biological opinions associated with the Sacramento-San Joaquin Delta (Delta), and climate change.

11.1 LONG-TERM "DELTA FIX"

Zone 7 currently has a long-term contract with the Department of Water Resources (DWR) for a maximum annual amount of 80,619 acre-feet (AF) of Table A water from the State Water Project (SWP). As described in Chapter 5, this source represents over 80% of Zone 7's supply and is therefore critical to the overall reliability of Zone 7's water system. Each year, DWR allocates a portion of this annual amount—up to 100%—depending on hydrologic conditions, DWR's operation of the SWP, and legal and environmental constraints.

From 2005 to 2009, DWR reduced the projected long-term average allocation of Table A water from approximately 76% to 60% due to projected impacts associated with pumping restrictions in the Delta and climate change. This decrease in reliability from the SWP has reduced Zone 7's sustainable water supplies by approximately 12,900 acre-feet (AF).[59]



Zone 7 is part of the BDCP and DHCCP, which would lead to solutions in the Delta that would increase SWP reliability.

As a contractor of the SWP, Zone 7 is working very closely with DWR and other water agencies, environmental groups, and regulators to develop the Bay Delta Conservation Plan (BDCP) and the Delta Habitat Conservation and Conveyance Plan (DHCCP). The goal of the BDCP is to provide for both species/habitat protection and improved reliability of water supplies from the Delta. The purpose of the DHCCP is to develop alternatives for conveying SWP (and Central Valley Project) water across the Delta in

[57] Zone 7 Water Agency, 2009. Interoffice Memo – Water Supply Update. November 18.
[58] Zone 7 Water Agency, 2010. Water System Master Plan Update to the Zone 7 Board of Directors. July 21.
[59] Reduction = 80,619 AF x (76% - 60%)

an environmentally sound manner. The DHCCP will develop an Environmental Impact Report (EIR)/Environmental Impact Study (EIS), along with the preliminary design needed to support a decision and ultimately to construct alternative Delta Conveyance facilities that would result in increased reliability.

11.2 WATER SYSTEM MASTER PLAN UPDATE

Zone 7 staff is diligently working with Zone 7's water supply retailers to develop a Water System Master Plan (WSMP) that will provide a flexible roadmap to meet the water supply needs of the Livermore-Amador Valley through buildout of adopted general plans. As part of this work effort, Zone 7 staff developed an extensive list of potential water supply options in parallel with the efforts to develop a Delta Fix as described above. A copy of this list is provided in Appendix E. Zone 7 expects to complete the WSMP update in early 2011.

A few of the larger water supply projects include, but are not limited to, the following:

- Recycled water
- Long-term or permanent water transfers
- Desalination

Each of these is discussed in more detail below.

11.2.1 Recycled Water

Zone 7 does not currently produce or distribute recycled water directly; however, two local water supply retailers (City of Livermore [Livermore] and Dublin San Ramon Services District [DSRSD]) have developed significant recycled water systems. Although small in comparison to Zone 7's other water supply sources,[60] recycled water is an important component of the total supply portfolio for the Livermore-Amador Valley as it represents a reliable drought-resistant supply.

Zone 7 is working with the Retailers to evaluate increasing local recycled water supplies, which could provide 3,400 to 17,300 AF of new supply.

As part of the WSMP and Zone 7's support for recycled water use, Zone 7 is working closely with Livermore, DSRSD, the City of Pleasanton (Pleasanton), and California Water Service Company (Cal Water) (collectively, the "Retailers") to review the potential for increasing recycled water use within the Livermore-Amador Valley. Based on a preliminary review of existing facilities and available wastewater (see water supply options list in Appendix E), it appears that approximately 3,400 AF of additional recycled water could be produced without

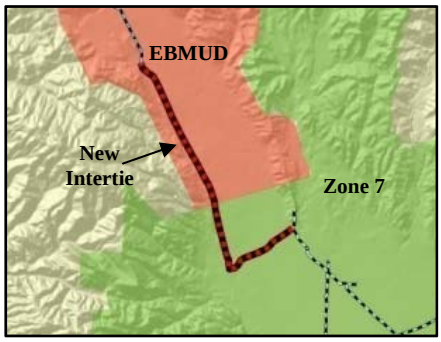
[60] DSRSD and Livermore project that they will produce a combined total recycled water supply of approximately 5,900 AF, which is less than 10% of Zone 7's other water supplies.

storage and that as much as 17,300 AF could be produced if sufficient storage were available.

Zone 7 will continue to work with the Retailers to review the merits of increased recycled water use in the Livermore-Amador Valley and identify potential opportunities for storage. As part of this review, Zone 7 will also ensure that water quality goals for the Main Basin are achieved and additional mitigation is provided if necessary. The Salt Management Plan will be updated to reflect any relevant changes. Additional information on recycled water is provided in Chapter 14.

11.2.2 Long-Term or Permanent Water Transfers

Zone 7 is also working with other Bay Area water agencies to review the potential for purchasing long-term water transfers that could be wheeled to Zone 7 without using the Delta. One example would be working with the East Bay Municipal Utility District (EBMUD) to purchase a water supply north of the Delta that would be diverted from the Sacramento River at the Freeport Regional Water Project intake, wheeled through EBMUD facilities and delivered to Zone 7 through a new EBMUD/Zone 7 intertie. Preliminary estimates indicate that this project could provide Zone 7 with as much as 14,000 AF per year of new water supply in dry years when EBMUD would be utilizing the Freeport Project.



Zone 7 is reviewing intertie options with EBMUD that could facilitate non-Delta water transfers, which could provide a new water supply

11.2.3 Desalination

Zone 7 joined the BARDP in June 2010 to evaluate the potential for receiving up to 11,200 AF of new water supply

In June 2010, Zone 7 officially joined the Bay Area Regional Desalination Project (BARDP). The BARDP is a joint effort between five Bay Area water agencies to evaluate the feasibility of a regional desalination facility. As a partner in the BARDP, Zone 7 is evaluating the feasibility of receiving up to 11,200 AF from the BARDP during normal years, and 5,600 AF during dry years, when the other agencies will have a demand for desalinated water.

Among other benefits, desalinated water offers the significant benefits of providing a drought-resistant supply to Zone 7 and diversifying Zone 7's water supply portfolio; thereby, increasing system reliability. The most likely scenario is that water would be wheeled through EBMUD's distribution system; Zone 7 would receive treated water at a proposed intertie in the western part of its service area.

Additional information on desalination and the BARDP is provided in Chapter 12.

11.3 KEY WATER SUPPLY FACILITY IMPROVEMENTS

In addition to the procurement of new water supplies, Zone 7 is also in the process of improving its facilities to reduce system losses and increase capacity. As noted previously, Zone 7 plans to undertake an investigation to reduce unaccounted-for water from 4% to 2% of total demand.

Two key projects designed to increase system capacity include expansion of surface water treatment capacity and increased artificial recharge via the Chain of Lakes, as described below.

11.3.1 Expansion of Surface Water Treatment Capacity

Between 2004 and 2007, Zone 7 completed design of the Altamont Water Treatment Plant (AWTP) and Altamont Pipeline (APL), and awarded a contract for constructing the first half of the APL, called the Livermore Reach, in April 2008. Zone 7 completed construction and testing of the Livermore Reach in September 2009.[61]

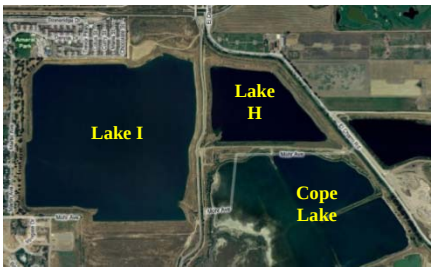
Based on a slower than anticipated growth in M&I water demands and the concerns over capital and energy costs, Zone 7 decided to conduct a peer review of the proposed AWTP site and treatment process before proceeding with construction. The peer review was completed in December 2009.[62] Based on the analysis completed, the only viable alternative to the existing AWTP site was an expansion of the existing Patterson Pass Water Treatment Plant (PPWTP). The analysis also indicated that economics alone would not necessarily determine whether expanding the PPWTP is better for Zone 7's long-term needs because the difference in costs between the two options is within the contingency estimates typically used for planning purposes for Zone 7's Capital Improvement Program (CIP).

Zone 7 is evaluating the potential for either building a new water treatment plant or expanding an existing water treatment plant.

Other factors that Zone 7 staff will evaluate, as part of the proposed Water System Master Plan, will likely drive the decision to either construct the proposed AWTP, expand the PPWTP, or neither. The major factors influencing this decision include anticipated M&I water demands (including 20% conservation by 2020 and peak day demands), capacity available in the South Bay Aqueduct (SBA), and revision of existing policies and criteria.

11.3.2 Increased Artificial Recharge via the Chain of Lakes

As previously discussed in Chapter 5, the Chain of Lakes refers to a series of ten mined out or active gravel quarry pits that have been or will be converted into surface water storage facilities and/or groundwater recharge basins once mining has been completed. The ten quarry pits or lakes are named Cope Lake, and Lakes A through I. Zone 7 currently owns only Cope Lake and Lake I, but expects to take ownership of



Zone 7 is evaluating enhanced artificial recharge using Lakes H and I.

[61] Zone 7 constructed the Livermore Reach first because it provided a valuable interconnection within Zone 7's existing transmission system regardless of whether Zone 7 constructed the AWTP or remaining portion of the APL.
[62] WQTS, 2009. Peer Review of the Altamont Water Treatment Plant Site and Treatment Process Report.

Lake H sometime within the next five years. It is anticipated that the other seven lakes will not be dedicated to Zone 7 until after 2030.

Once Zone 7 owns both Lakes H and I, Zone 7 will have the ability to direct surface water, with a new diversion structure, into Lake H. Water would then flow into Lake I through an existing conduit and then recharge into the Main Basin. This enhanced recharge will greatly improve the likelihood of having sufficient water in the local groundwater basin to meet projected water demands during drought conditions. The addition of surface water to the lakes will also help offset evaporative losses from the groundwater basin due to the existence of the gravel quarry pits, and help protect the groundwater basin from salt build-up.

11.4 NEW SUPPLY ASSUMPTIONS FOR THE UWMP

Zone 7 is committed to providing a reliable supply of high quality water to the Livermore-Amador Valley, and the WSMP is a key program necessary to meet this goal in the face of an uncertain future. Through development of the WSMP and development of new water supplies, Zone 7 is confident that implementation of the WSMP will provide sufficient water supplies to meet the needs of existing and future customers.

Based on a review of potential new water supplies (see Appendix E and discussion in previous sections), Zone 7 anticipates that it can secure a new water supply to reliably meet projected demands. The amounts of these new water supplies are summarized in Table 11-1. As indicated in the table below, 10,500 AF of new supply is projected to be available during normal water years, while 6,100 AF of new supply would only be available during dry years; these values are based on the estimated demands to be met by Zone 7. Base years were chosen to match those of the SWP. As will be shown in Chapter 16, the projected supplies in Table 11-1 are included in the supply and demand comparison for planning-level purposes in this UWMP.

Table 11-1. Projected New Water Supply

Water Year Type	Base Year(s)	2020 to 2030	
		Yield, AF	% of Normal
Normal	1942	10,500	100%
Single-Dry	1977	6,100	57%
Multiple-Dry	Year 1 to 5 (1988 to 1992)	6,100	57%

12. DEVELOPMENT OF DESALINATED WATER

Water Code Section 10631(i)

The purpose of this chapter is to describe the efforts being undertaken by Zone 7 Water Agency (Zone 7) in exploring the feasibility of a regional desalination project in partnership with other water agencies in the San Francisco Bay Area (Bay Area). Zone 7's desalination (or demineralization) of its groundwater supply, which was implemented in 2009, is discussed in Chapter 6.

12.1 OVERVIEW

Since 2003, the Bay Area's four largest water agencies—Contra Costa Water District (CCWD), East Bay Municipal Utility District (EBMUD), San Francisco Public Utilities Commission (SFPUC), and Santa Clara Valley Water District (SCVWD)—have been working together to evaluate the feasibility of a regional desalination facility to improve water supply reliability for the more than five million people served by these agencies. The project, called the Bay Area Regional Desalination Project (BARDP), has the following benefits[63]:

- minimize potential adverse environmental impacts associated with the construction of separate desalination plants in close proximity to one another and construction of other new facilities;
- provide substantial cost savings through economies of scale, such as pooling resources and sharing of project administration, as compared to individual projects conducted separately by the agencies;
- promote a strong regional cooperation concept by joint ownership, operation, and management of a regional desalination facility that will serve the needs of multiple water providers in northern California;
- provide water during emergencies such as earthquakes or levee failures;
- provide a supplemental water supply source during extended droughts; and
- allow major facilities, such as treatment plants, water pipelines, and pump stations, to be taken out of service for maintenance or repairs.

The BARDP is primarily intended to provide dry-year or emergency supply to the agencies above. Zone 7 was invited to join the BARDP in March 2010 as a potential recipient of desalinated water during normal and dry water years, and officially joined in June 2010.

[63] MWH, 2010. Bay Area Regional Desalination Project: Pilot Testing at Mallard Slough – Pilot Plant Engineering Report.

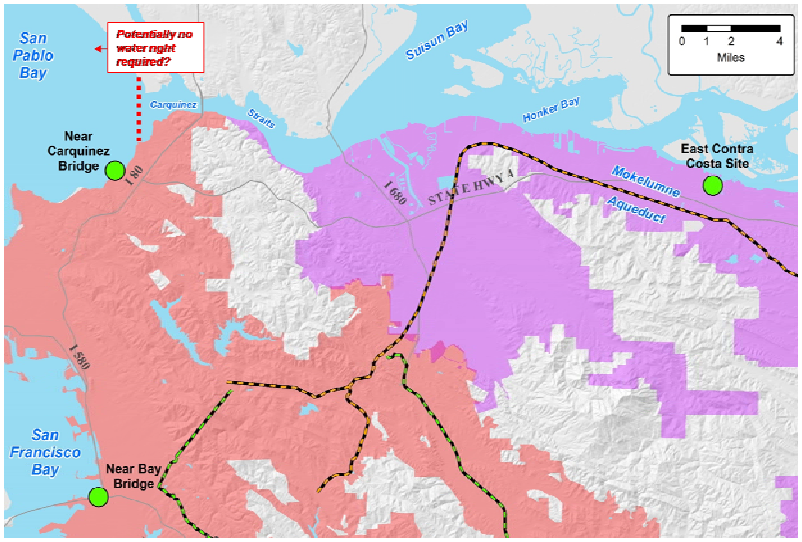
12.2 COMPLETED WORK

A Pre-Feasibility Study[64] was conducted for the BARDP in 2003, which found that a regional desalination facility in the Bay Area is feasible. A Feasibility Study[65] subsequently completed in June 2007 identified at least three Bay Area locations that are suitable for siting such a facility: east Contra Costa (Bay/Delta water), near the Bay Bridge in Oakland (Bay seawater), and on the western shore of the San Francisco peninsula (ocean seawater). Institutional options (e.g., Joint Powers Authority), institutional mechanisms, criteria for the evaluation of optimal desalination sites, and public stakeholder outreach for the BARDP were also part of the scope of the Feasibility Study.

A pilot test at CCWD's Mallard Slough Pump Station site—located in east Contra Costa County—was recommended to collect data on technical feasibility, assess the potential environmental impacts, and fill in the data gaps on the desalination process in an estuarine environment. The Pilot Study[63] was started in October 2008 and continued through April 2009; it evaluated two types of ultra-filtration pre-treatment membranes, two types of reverse osmosis (RO) membranes, and one nanofiltration membrane. In addition, the Pilot Study developed cost estimates for the desalination plant construction and operation.

The BARDP received funding from Proposition 50 (the Water Security, Clean Drinking Water, Coastal and Beach Protection Act) for both the Feasibility Study and the Pilot Study, covering 50% of project costs. Furthermore, the BARDP was authorized to receive $4 million in federal grants under the Water Resources Development Act of 2007, Section 5158 (88).

12.3 ONGOING EFFORTS



Site alternatives being considered under the BARDP. Water would likely be wheeled through EBMUD's system to Zone 7's facilities south of the area shown above.

Ongoing efforts have been focused on developing an institutional framework for the BARDP, particularly issues related to: the acquisition of any requisite water rights, the advantages and disadvantages of different site alternatives, wheeling arrangements, cost-sharing principles, and magnitudes and timing of the demands for desalinated water. Currently, the BARDP partners are exploring the pros and cons of 1) using modified versions of CCWD's existing license (or

[64] URS, 2003. Bay Area Regional Desalination Project Pre-Feasibility Study.
[65] URS, 2007. Bay Area Regional Desalination Project Feasibility Study.

license and permit) in east Contra Costa, 2) acquiring a new water right, and 3) siting a desalination plant where a water right is likely not required (west of Carquinez Straits). The State Water Resources Control Board (SWRCB) is being consulted on water rights and other related issues. The BARDP partners are currently considering a desalination plant production rate between 10 to 30 million gallons per day (mgd), depending on the demands of the individual agencies and the water rights limitations of the selected site.

At this exploratory stage, Zone 7 is considering the feasibility of receiving up to 11,200 acre-feet (AF) from the BARDP during normal years, and up to 5,600 AF during dry years, when the other agencies will have a demand for desalinated water. Among other benefits, desalinated water offers the significant benefits of providing a drought-resistant supply to Zone 7 and diversifying Zone 7's water supply portfolio, thereby increasing system reliability. The most likely scenario is that water would be wheeled through EBMUD's distribution system; treated water would be received by Zone 7 at a newly-constructed intertie in the western part of its service area. The intertie would have the added benefit of proving an emergency connection between EBMUD and Zone 7, increasing both agencies' system reliability.

13. WATER SHORTAGE CONTINGENCY PLAN

Water Code Section 10632

The purpose of this chapter is to present Zone 7's Water Shortage Contingency Plan, which addresses the following seven components as required by California Water Code Section 10632 (a–i):

- Stages of Action [10632 (a)]
- Three Year Minimum Water Supply [10632 (b)]
- Catastrophic Water Supply Interruption [10632 (c)]
- Prohibitions During Water Shortages [10632 (d-f)
- Impacts of Drought Actions on Revenues and Expenditures [10632 (g)]
- Water Shortage Contingency Ordinance [10632 (h)]
- Reduction Measuring Mechanisms [10632 (i)]

Zone 7's Reliability Policy for Municipal and Industrial Water Supplies (Resolution No. 04-2662 adopted in August 2004; included as Appendix D) calls for Zone 7 to "*meet 100% of its treated water customers water supply needs…*" during an average water year, single dry water year, and multiple dry water years[66] and "*provide sufficient treated water production capacity and infrastructure to meet at least 75% of the maximum daily…demands should any one of Zone 7's major...facilities experience an unplanned outage*". Furthermore, if Zone 7 finds that the goals above might not be met, then the Zone 7 Board will consider remedial actions (e.g., voluntary conservation, mandatory rationing, acquisition of additional supplies, moratorium on new water connections, etc.) that will bring Zone 7 into substantial compliance. The process of evaluating such remedial actions to address forecasted differences between water supply and demand over the next twenty years is described in Chapter 11. While Chapter 11 discusses Zone 7's long-term planning efforts, this chapter focuses on Zone 7's real-time response to a water shortage.

Note that Zone 7's 2005 Water Shortage Contingency Plan was adopted by the Zone 7 Board in 2005 as part of the 2005 UWMP. This Water Shortage Contingency Plan supersedes that document.

[66]Water years are defined as follows in Resolution 04-2662: **average water year** – statistical average quantity of water from all of the water supplies available to Zone 7 on a contractual or legal basis based on the historical hydrologic records available to Zone 7; **single dry water year** – for the purposes of meeting the requirements of the UWMP, the Zone 7 staff will identify and justify the selection of a calendar year from the historic record that represents the lowest yield from all normally contracted or legally available supplies; **multiple dry water years** – for the purposes of meeting the requirements of the UWMP, the Zone 7 staff will identify and justify the selection of three or more consecutive dry years from the historic record that represent the lowest yields from all normally contracted or legally available supplies.

13.1 STAGES OF ACTION

Zone 7 has established two stages of action for the purposes of water supply shortage contingency planning: 1) partial losses of supply and 2) catastrophic loss of a major supply. Each is discussed in more detail below. Since Zone 7 operates as a wholesale water agency, it has not adopted ordinances or imposed mandatory provisions restricting the use of water and does not set or enforce consumption limits at the retail level. As a result, this contingency plan does not include per capita allotment, penalties, or incentives for conservation for any customer sector. The development of such mechanisms is left to the authority of the retail water supply agencies.

13.1.1 Stage 1: Partial Losses of Supply

Stage 1 is simply defined as a reduction in water delivery from the State Water Project (SWP) that is less than 100% *and* that leads to a deficit between water supply and water demand. Since the SWP provides over 80% of Zone 7's water supply, this definition includes a 50% supply shortage scenario as required by the Water Code. Under Stage 1, Section B (Water Service Provisions) of Subsection 14 (Availability of Water) of Zone 7's Municipal and Industrial Water Supply Contract or Terms and Conditions applies:

> *"In any year in which a shortage occurs due to drought or other cause in the supply of water available for delivery to Each Contractor such that the supply to Zone 7 is less than the total amount included in the approved delivery schedule of Each Contractor for that year, Zone 7 shall reduce deliveries to Each Contractor in an amount that results in a reduction of total water used within Contractor's service area that is equal to the percent reduction for total water used within Zone 7's service area for that year, all as determined by Zone 7; provided, that Zone 7 may apportion on another basis if such is required to meet minimum demands for domestic supply, fire protection, or public health during the year".*

The clause above gives Zone 7 the authority to determine the water supply reductions necessary for each retailer to achieve equitable overall reductions across the service area, while accounting for the groundwater resources available to each retailer. As noted in Chapter 6, three of the four retailers have access to groundwater; the City of Livermore relies on Zone 7 for all of its potable water supply. Retailers determine the priorities for the use of the water supply available to them, as described in their Urban Water Management Plans (UWMPs).

In general, Zone 7 and the retailers have cooperated effectively in handling water shortage situations. During the South Bay Aqueduct (SBA) outage in June 2001, for example, Zone 7 prepared daily water supply operations plans and coordinated production and delivery of SWP water closely with the retailers during the month-long outage. Additionally, during the critically dry year of 1991—when the SWP was only able to deliver 20% of Zone 7's requested deliveries—the 25% voluntary conservation goal was essentially met in the Livermore-Amador Valley through the coordinated efforts of Zone 7 and the retailers.

As part of its contingency planning, Zone 7 factors into its Annual Operational Plans the possibility of a dry or critically dry year occurring with consequent reductions in SWP deliveries.

13.1.2 Stage 2: Catastrophic Loss of a Major Supply

Stage 2 is defined as the loss of water delivery through the SBA as the result of a catastrophic event, such as an earthquake. Under this condition, Zone 7's water supply could be reduced by over 80%. To meet 75% of the estimated maximum day treated water demands, Zone 7 plans to operate its wells and make use of water stored in Lake Del Valle, which will be conveyed to the Del Valle Water Treatment Plant. Patterson Pass Water Treatment Plant can only receive water from the SBA; therefore, it would be shut down during an SBA outage.

According to the Department of Water Resources (DWR)[67], the worst disruption to SWP deliveries would likely result from a moderate to a large earthquake, causing multiple Delta islands levee failures and cessation of exports from the Delta of up to a year. Under this scenario and under current conditions, Zone 7 estimates that it would be able to make full deliveries to the retailers during non-summer months using a combination of groundwater and Arroyo del Valle runoff stored in Lake Del Valle. During the peak demand of the summer months, however, Zone 7 will need to reduce deliveries to the retailers as described under Stage 1. Zone 7 analysis shows that Zone 7 has sufficient groundwater supply to serve the indoor water use needs of the service area over a one-year period; the availability of water supply for outdoor water use during the summer months will depend on the amount of water available in Lake Del Valle. Under this scenario, untreated water customers normally served via the SBA would not be able to receive water.

13.2 THREE-YEAR MINIMUM WATER SUPPLY

An estimate of the minimum water supply available during the next three years based on the driest three-year historic sequence for Zone 7's water supplies is presented in Table 13-1. Note that the years in which the minimum supplies have historically occurred are different between the imported surface water and local runoff, as determined by local hydrological conditions, water supply infrastructure, and other conditions. A more detailed description of the estimates of the minimum water supplies can be found in Chapter 7.

Table 13-1. Three-Year Estimated Minimum Water Supply[(a)] (Acre-Feet Annually)

Acre-Feet Annually		Year			
		2011	2012	2013	Normal
Imported Surface Water	SWP[(b)] – Table A	15,700	22,700	19,500	51,400
	SWP[(b)] – Yuba Accord	676	676	676	145
	BBID[(c)]	2,000	2,000	2,000	4,000
Local Runoff	Arroyo del Valle	350	520	150	3,440
	Total Water Supply	18,726	25,896	22,326	58,985

[(a)] Based on the driest three-year historic sequence applicable for each water supply.
[(b)] State Water Project
[(c)] Byron-Bethany Irrigation District

[67] DWR, 2009. 2009 State Water Project Delivery Reliability Report.

13.3 CATASTROPHIC WATER SUPPLY INTERRUPTION

A catastrophic water supply interruption due to a regional power outage, an earthquake, or other disaster would trigger Stage 2, as described in Section 13.1.2.

Zone 7 has prepared an Emergency Operations Plan that deals with a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster. Zone 7 also has an Emergency Operations Center (EOC) and EOC Staff made up of personnel representing different skills and disciplines within Zone 7. The EOC Staff train regularly to maintain proficiency and would respond in the event of a natural or man-made emergency.

As noted in Section 13.1.2, even if there were a complete interruption of deliveries from the SBA, Zone 7 would still be able to meet its current water demands with existing facilities during non-summer months using groundwater and water stored in Lake Del Valle. Deliveries to retailers would be reduced as necessary during the summer months in compliance with the contract stipulation on reduction equity across the service area. The retailers' water shortage contingency plans and the associated voluntary and mandatory water consumption reductions would go into effect. Under this scenario, untreated water customers reliant on the SBA would receive no water.

Zone 7 has emergency generators (both portable and dedicated) at strategic locations in preparation for any regional power outage. These generators would allow both the Del Valle Water Treatment Plant and the Patterson Pass Water Treatment Plant to continue operating even under a power outage. Assuming no interruptions in surface water supply, Zone 7 would be able to provide service to all treated water contractors. If warranted by demand, Zone 7 would also operate the wells, which have either a dedicated generator in place (Mocho 1) or have the necessary hook-ups installed for connection to a portable generator. If the power failure were to occur during high demand season (i.e., summer months), Zone 7 would be unable to meet hourly peak demands throughout the distribution system.

Damage to the Del Valle Branch Pipeline in December 2009

The recent break in the Del Valle Branch pipeline, which is owned and operated by DWR as part of the SWP and delivers water from Lake Del Valle to the SBA is a good illustration of how Zone 7 has handled catastrophic interruption in water supply from the SWP during non-summer months. For the third year in a row, expansion work was being performed on the portion of the SBA between the South Bay Pumping Plant and Del Valle Check 7, interrupting the delivery of water from the Delta. This shutdown was scheduled for mid-November through mid-January, when demands are lower and water could be released from Lake Del Valle. In late December 2009, sudden failure of the Del Valle Branch pipeline near the

surge tank resulted in the complete cut-off of supply from Lake Del Valle within hours. Combined with the SBA repairs, this essentially resulted in 100% supply loss from the SWP. In response, Zone 7 switched to 100% groundwater supply until the planned SBA outage ended in mid-January 2010; Zone 7 continued to rely on a combination of Delta-derived SWP water and groundwater until the Del Valle Branch pipeline was back online in mid-April 2010. During this time, no reductions in water supply to the retailers were necessary, and Zone 7 coordinated with the retailers on a regular basis.

13.4 PROHIBITIONS AND ORDINANCES

As mentioned previously, Zone 7 operates as a wholesale water agency. As such, Zone 7 ***does not have direct authority to restrict the specific use of treated water for purposes such as street cleaning, etc. at the individual customer level***. However, Zone 7 does have provisions for allocating water supply shortages to retailers as set forth in its contracts with the retailers. Zone 7 also ***does not have the direct authority to levy penalties and charges for excess use at the individual customer level***.

As a result, this chapter does not include per capita allotment, penalties, or incentives for conservation for any customer sector. (Programs implemented by Zone 7 as part of its normal demand management or conservation program are described in Chapter 10). Mandatory prohibitions during water shortages are enacted by the individual retailers, as detailed in their UWMPs, Water Shortage Contingency Plans, and city ordinances (e.g., City of Pleasanton Water Conservation Ordinance 2010). Zone 7 fully supports actions taken by the retailers to curb water consumption in response to water shortages.

13.5 IMPACTS OF DROUGHT ACTIONS ON REVENUES AND EXPENDITURES

Delivery reductions to retailers, as discussed in Section 13.1, above, result in revenue losses. As an enterprise, Zone 7 is required to recover all expenditures from revenues. In anticipation of revenue losses from delivery reductions due to droughts (and catastrophic events), Zone 7 initiated a Drought Contingency Funding Program after the 1991 drought. Under this program, Zone 7 maintains a number of reserve funds to ensure that there is adequate funding for emergencies, cash flow requirements, capital improvement plans, and future operating requirements while avoiding significant rate fluctuations due to changes in funding needs from one year to the next.

The two types of reserves that most specifically apply to droughts and other emergency situations are the Emergency/Operating Reserves and the Rate Stabilization Reserve. The Emergency/Operating Reserves are designated by the Zone 7 Board of Directors (Board) for providing for emergencies and cash flow requirements. The Rate Stabilization Reserve, which is currently maintained at $5 million, is designated by the Board to provide funds to offset losses in revenue and other unanticipated costs. The target for this reserve is based on two years of 10% reduction in revenue due to a drought or a disaster.

Funding for reserves is incorporated into the regular water rate, which is adjusted every year as necessary.

13.6 REDUCTION MEASURING MECHANISMS

The Urban Water Management Planning Act requires a mechanism for determining actual reductions in water use in response to conservation measures implemented under the Zone 7 Water Agency Water Shortage Contingency Plan.

As noted in Section 13.4, Zone 7 has not adopted ordinances or imposed mandatory prohibitions restricting the use of water, and does not set or enforce consumption limits at the retail level. However, Zone 7 is committed to working with and supporting the retailers in the implementation of their Water Shortage Contingency Plans.

Zone 7 staff continuously monitors water production rates and water deliveries at the turnouts to retailers. Records of total water volumes provided to each retailer are prepared daily. These monitoring systems will ensure that Zone 7 is making the necessary reductions in water deliveries to the retailers in case of drought or other emergencies.

14. RECYCLED WATER PLAN

Water Code Section 10632(a-i)

The purpose of this chapter is to discuss the following items: coordination of recycled water use in the service area; wastewater collection, treatment, and disposal practices; recycled water production; and ongoing efforts to optimize recycled water use in the service area.

Zone 7 Water Agency (Zone 7) does not currently produce or distribute recycled water directly. Recycled water treatment and distribution is managed by two retail water supply agencies within the Zone 7 service area that also manage wastewater: Dublin San Ramon Services District (DSRSD) and the City of Livermore (Livermore). In 2009, 3,100 acre-feet (AF) of recycled water was supplied by Livermore and DSRSD. Although small in comparison to the other sources, recycled water does form an important drought-resistant component of regional water supply. Further details regarding the two local recycled water programs are available in the Urban Water Management Plans (UWMPs) prepared by these two agencies.

14.1 COORDINATION

In 1992, Zone 7, in conjunction with DSRSD and Livermore, conducted a water recycling study for the Livermore-Amador Valley that concluded that recycled water can provide a safe and cost-effective source of water supply. The Zone 7 Board of Directors (Board) is committed to continually supporting the search for safe, economically feasible, and publicly-acceptable methods to increase local water resources. This includes the optimal use of recycled water, in cooperation with DSRSD and Livermore.

Plans for water recycling within the Zone 7 service area are coordinated amongst Zone 7 Water Agency, the water retailers, the wastewater agencies (Livermore and DSRSD), the regulatory agencies such as the California Department of Public Health and the Regional Water Quality Control Board (RWQCB), and planning agencies such as the City of Livermore Community Development Department. Zone 7 reviews recycled water plans both from a water supply management perspective and from a groundwater protection perspective. Given Zone 7's integral role in water supply and groundwater management in the Livermore-Amador Valley, Zone 7 is a co-permittee under the Master Waste Reuse Permit issued by the RWQCB in December 1993 (Order No. 93-159).

The permit required the development of a Salt Management Plan[68] to assess cumulative salt loading impacts on the Livermore Valley Groundwater Basin (Basin). The Salt Management Plan identified demineralization with export of the brine stream as the best means of mitigating salt loading in the Basin. The Salt Management Plan has been incorporated into the more comprehensive Groundwater Management Plan[69] developed in September 2005 (included as a

[68] Zone 7 Water Agency, 2004. Salt Management Plan.
[69] Jones and Stokes, 2005. Groundwater Management Plan for the Livermore-Amador Valley Groundwater Basin.

CD attachment). Both documents were developed in close consultation with a technical advisory group composed of water retailer representatives and a Zone 7 citizens committee. The RWQCB approved the SMP in October 2004.

14.2 WASTEWATER QUANTITY, QUALITY AND CURRENT USES

DSRSD and Livermore collect all of the wastewater produced within the city limits of Pleasanton, Dublin, and Livermore, and portions of San Ramon. Wastewater transport out of the area is handled through the Livermore-Amador Valley Water Management Agency (LAVWMA), a joint powers authority (JPA) composed of DSRSD, Livermore, and Pleasanton. Since 1979, LAVWMA has owned the conveyance facilities that ship treated wastewater from the treatment plants west over the Dublin grade, and eventually to the East Bay Discharge Authority, which dechlorinates the effluent and discharges it through a deepwater pipeline into San Francisco Bay.

In Livermore, tertiary-treated water (mono-filtration followed by ultraviolet [UV] disinfection) is used to irrigate Livermore's Municipal Golf Course, Las Positas College, business parks along the north side of I-580 and the west side of Highway 84, and Highway 84 corridor landscapes. Livermore has been irrigating its golf course with recycled water since the 1960s. In Livermore, recycled water use was 988 AF in 2009. Livermore's facilities can produce up to 5,600 acre-feet annually (AFA)[70] should the demand increase.

In 1995, DSRSD and East Bay Municipal Utility District (EBMUD), a major water retailer, formed a JPA called the "DSRSD-EBMUD Recycled Water Authority" (DERWA). This entity operates the San Ramon Valley Recycled Water Program (SRVRWP), which supplies recycled water to portions of DSRSD's and EBMUD's service areas. Through the SRVRWP, DSRSD began supplying tertiary-treated water (sand filtration or microfiltration followed by UV disinfection) in 2006 for landscape irrigation. As of August 2007, SRVRWP was providing recycled water to over 170 customer sites. Its facilities are sized to provide up to 3,700 AF of recycled water annually to DSRSD and an additional 2,700 AF to EBMUD[71]. In 2009, DSRSD supplied 2,100 AF of recycled water.

A summary of the wastewater quantities collected and treated, and the quantity that meets recycled water standards (Title 22), in the Zone 7 service area is presented in Table 14-1. For details of wastewater collection and treatment systems, quantities treated, excess recycled water capacity not currently being distributed to non-potable customers, and type, place and quantity of use, refer to the UWMPs of DSRSD and Livermore. Nearly all of the recycled water is used for landscape irrigation in the service area.

[70] City of Livermore, 2005. Livermore Municipal Water 2005 Urban Water Management Plan.
[71] http://www.derwa.org/pdf/DERWA_quick_facts.pdf

Table 14-1. Wastewater Collection and Treatment (Acre-Feet Annually)

Year	2005		2010		*Projected*			
	Projected[(b)]	Actual	Projected[(b)]	Estimated	*2015*	*2020*	*2025*	*2030*
Wastewater Collected and Treated[(a)]	20,400	20,462	22,400	20,000	*22,500*	*24,800*	*26,000*	*28,000*
Quantity that Meets Recycled Water Standards	2,700	2,020	4,000	3,400	*4,300*	*5,600*	*5,900*	*5,900*

(a) Wastewater collected and treated by Livermore as presented in their 2005 UWMP. DSRSD values as provided to Zone 7 in 2009.
(b) Projections as reported in the 2005 UWMP.

All of the wastewater collected by DSRSD and Livermore undergo, at a minimum, secondary treatment. Wastewater is also disinfected and dechlorinated prior to discharge to the San Francisco Bay. After secondary treatment, the recycled water stream undergoes filtration and disinfection to meet Title 22 standards as described above.

14.3 POTENTIAL AND PROJECTED USE, OPTIMIZATION PLAN WITH INCENTIVES

Within Zone 7's service area, there are a number of potential uses for recycled water including agricultural and landscape irrigation, fire protection, industrial use, construction, wetlands, and other miscellaneous uses. Some of these are already occurring (e.g., landscape irrigation), while others (e.g., agricultural irrigation) have not yet been implemented. By 2030, DSRSD and Livermore estimate a total demand of 5,900 AFA, accounting for the projected development and growth in recycled water infrastructure.

As the groundwater basin management agency, Zone 7 is cognizant of the potential salt loading impacts arising out of recycled water use. Zone 7 has taken a pro-active approach to mitigate such impacts particularly within the Main Basin, as described in the Groundwater Management Plan[69] (see CD attachment). Zone 7 is currently operating a demineralization facility to balance the salt loading in the Main Basin. The demineralization facility has the added benefit of providing softer water to Zone 7's potable water customers in the western portion of Zone 7's service area, where there is a regional concentration of groundwater production facilities. Expansion of recycled water use over the groundwater basin will require additional measures to mitigate the associated additional salt loading.

Recognizing that recycled water is an important part of a complete water resource management program for the Livermore-Amador Valley, Zone 7 is incorporating its use in future water supply planning. In joint efforts with DSRSD and Livermore, Zone 7 plans to continually support the search for safe, economically feasible, and publicly acceptable methods to increase local water resources by optimizing the use of recycled water.

15. WATER QUALITY IMPACTS ON RELIABILITY

Water Code Section 10634

Zone 7 Water Agency (Zone 7) does not anticipate that water quality will negatively impact its ability to provide a reliable supply of water over the next 20 years, although water quality is certainly a key consideration in Zone 7's Water Supply Master Plan efforts. The purpose of this chapter is to describe the water quality issues associated with Zone 7's water supplies. Imported and local water supply sources are discussed separately below, as well as storage options.

15.1 IMPORTED SURFACE WATER SUPPLY

As described in Chapter 5, imported surface water from the State Water Project (SWP) is by far Zone 7's largest water source, providing over 80% of the treated water supplied to its retail customers. Much of this imported surface water is derived from the Feather River watershed, in the northern part of California, and ultimately flows through the Sacramento-San Joaquin Delta (Delta) before it is conveyed by the California Aqueduct and the South Bay Aqueduct (SBA) to Zone 7's water facilities.

Zone 7's other imported surface water supply, the Byron Bethany Irrigation District (BBID), is also linked to the Delta: BBID diverts water from the Delta and provides water to Zone 7 via the SBA.

There are some important water quality considerations associated with the water that moves through the Delta. In 1982, the Department of Water Resources (DWR) formed the Interagency Delta Health Aspects Monitoring Program to monitor water quality in the Delta for human health protection. The program was renamed the Municipal Water Quality Investigations Program (MWQI Program) in 1990. From a municipal water supply perspective, water quality issues in the Delta are associated with salinity from seawater intrusion; wastewater effluent discharges; agricultural drainages from the islands; and recreational activities. Water quality issues of specific concern to Zone 7 are:

- *taste and odor (T&O)* - primarily a problem in the warmer months, when algal blooms may be present. It can affect supplies from the Delta and from Lake Del Valle. Algae produce geosmin and 2-methylisoborneol (MIB), which are key taste and odor-causing compounds in surface water supply. Zone 7 currently treats T&O using powdered activated carbon (PAC), which is of limited effectiveness under high levels of geosmin and MIB. High levels of T&O in surface water require a switch to groundwater supplies.

- *total and dissolved organic carbon (TOC/DOC*) – levels of organic carbon affect the amounts of coagulant and disinfectant chemicals used at Zone 7's water treatment plants (WTPs), and therefore result in higher costs. In addition, the formation of disinfectant byproducts is dependent upon the amount of TOC/DOC. TOC/DOC levels have historically not affected the amount of imported surface water supply available to Zone 7.

- *turbidity* – like TOC/DOC, turbidity affects the amounts of chemicals used at the WTPs, and Zone 7's ability to meet drinking water standards. Turbidity levels have historically not affected the amount of imported surface water supply available to Zone 7.

- *salinity or total dissolved solids (TDS)* – salinity is a water quality parameter that has significant impacts on SWP operations and the availability of water. To meet the salinity objectives in the Delta, water exports from the Delta may be restricted, reducing the amount of water supply available during certain times of the year.

As noted in Chapter 11, Zone 7 and other SWP contractors are currently working with the DWR and other key stakeholders in the development of a "Delta Fix" to address the challenges—including water quality issues—related to the transport of water through the Delta. The Delta Habitat Conservation and Conveyance Program (DHCCP), in conjunction with the Bay Delta Conservation Plan (BDCP), is expected to increase the reliability of supplies from the Delta.

To protect water quality once the water from the Delta reaches the SBA, recipients of water from the SBA (Alameda County Water District, Santa Clara Valley Water District, and Zone 7; known collectively as the SBA Contractors) developed the SBA Watershed Protection Program Plan in 2008[72]. The SBA Watershed Protection Program Plan is designed to protect the SBA system, including Lake Del Valle and Bethany Reservoir, from identified potential contaminant sources (e.g., septic tanks) for urban water supply purposes, as well as agricultural, recreational, and environmental uses.

15.2 LOCAL SURFACE WATER RUNOFF

Runoff from the Arroyo del Valle watershed above Lake Del Valle is stored in the lake. Lake Del Valle is also used to store SWP imported surface water deliveries through late winter and spring. In general, the water quality of Arroyo del Valle runoff is good, and does not affect the reliability of this water supply. As noted above, water collected from the local watershed is protected under the SBA Watershed Protection Program Plan.

15.3 LOCAL STORAGE

Zone 7 has three options for local storage: storage in Lake Del Valle, storage in the Main Basin and, in the future, surface storage in the Chain of Lakes. The Chain of Lakes will also be used for groundwater recharge.

A water quality issue associated with Lake Del Valle is the occurrence of taste and odor as described in Section 15.1.

The Main Basin is characterized by relatively good quality groundwater that meets all state and federal drinking water standards. Groundwater is chloraminated to maintain consistent disinfectant residual in the distribution system and to preserve delivered water quality. However,

[72] ESA, 2008. SBA Watershed Protection Program Plan.

there has been a slow degradation of groundwater quality as evidenced by rising Total Dissolved Solids (TDS) and hardness levels over the last few decades. To address this problem, Zone 7 developed a Salt Management Plan (SMP)[73], which was approved by the Regional Water Quality Control Board in 2004. As part of this SMP, Zone 7 completed construction of a wellhead demineralization facility in 2009. Employing a reverse osmosis membrane-based treatment system, this facility simultaneously allows for the removal and export of salts[74] from the Main Basin and the delivery to customers of treated water with reduced TDS and hardness levels.

The Water System Master Plan update currently under development (see Chapter 11) addresses the need for salt mitigation under the various water supply options—including future use of the Chain of Lakes—that are being considered.

15.4 NON-LOCAL STORAGE

In addition to local storage, Zone 7 also has storage contracts with two non-local groundwater-banking districts in Kern County: the Semitropic Water Storage District (Semitropic) and Cawelo Water District. Zone 7 stores water into these banks during non-drought conditions to have supply available during droughts.

The presence of elevated levels of arsenic in a portion of the Semitropic groundwater bank is a water quality issue that needs to be addressed. During a drought, Zone 7 will take an additional amount of water from the SWP equal to the amount requested from Semitropic. Semitropic will then replace this water downstream on behalf of Zone 7 by pumping water into the California Aqueduct for use by contractors downstream of Semitropic; the water quality of this "pump-in" water will therefore have an effect on these contractors. Arsenic criteria were established for this pump-in by the DWR Facilitation Group to mitigate any impacts to the downstream contractors, and DWR, Semitropic, and the banking partners have been testing arsenic treatment options since 2008. While the presence of arsenic in the Semitropic groundwater bank is likely to increase the cost of this water storage option, it is not likely to affect its overall reliability.

[73] Zone 7 Water Agency, 2004. Salt Management Plan.
[74] The brine concentrate resulting from the treatment system is exported to the San Francisco Bay via a regional wastewater export pipeline.

16. WATER SERVICE RELIABILITY

Water Code Section 10635

The purpose of this chapter is to present Zone 7 Water Agency's (Zone 7's) assessment of the reliability of its water service during normal, single dry, and multiple dry water years. To perform this assessment, projected water supplies were compared against projected water demands over the next twenty years in five-year increments. Tables 16-1, 16-2, and 16-3 present these comparisons for normal, single dry, and multiple dry water years, respectively. The tables present demand scenarios without potential water conservation ("High Water Demand") and with potential water conservation ("Low Water Demand") associated with Senate Bill SBX7-7[75] (SB 7). Projected water supplies include the projected new water supplies presented in Table 11-1.

Zone 7's water supply sources are described in more detail in Chapters 5, 6, and 8. Chapter 7 presents an analysis of the reliability of these existing supplies. For more details on the projected demands, see Chapter 9. Planned programs and projects designed to increase Zone 7's water system reliability are discussed in Chapter 11. Zone 7's current policy is to meet 100% of projected demands over the next 20 years; however, as discussed in Chapter 11, Zone 7 is evaluating the merits of this policy as part of the Water System Master Plan (WSMP) update.

Under normal water years, Zone 7 does not anticipate any difficulty in meeting projected water demands, with or without additional conservation measures, assuming Zone 7 can successfully implement planned programs and projects (Table 16-1). Note that a portion of the water demand during a normal water year includes the storage of water supply for use during dry years. The maximum potential shortage—based on the High Water Demand scenario—could be as high as 10,500 acre-feet (AF) between 2020 and 2030 if Zone 7 cannot implement planned programs and projects.

Under single dry years, Zone 7 does not expect shortages through 2030 with the implementation of planned programs and projects (Table 16-2). The maximum potential shortage—based on the High Water Demand scenario—could be as high as 8,700 AF between 2020 and 2030 if Zone 7 cannot implement planned programs and projects. The maximum potential shortage during single dry years is lower than that for normal water years because Zone 7 makes use of its stored water distributed between the local groundwater basin and the banking programs in Kern County.

Finally, under multiple dry years, planned programs and projects have similarly been designed to prevent any shortages. Zone 7's analysis indicates that, without such programs and projects, shortages of up to 36,000 AF can be expected under a multiple dry year scenario ending in 2030 based on the High Water Demand scenario. The water supply amounts shown in Tables 16-3(a) through (d)—as well as in the other tables—reflect the results of analysis using Zone 7's newly developed water supply model, which uses Monte Carlo methods for incorporating uncertainty.

[75] Discussed in more detail in Section 9.3.5.

The higher water supply availability during the second year of each multiple dry year scenario is primarily due to the occurrence of a wet year in the midst of the dry year sequence that was used in the model. This sequence is based on the 1988 to 1992 drought as shown on Figure 7-2.

In summary, Zone 7 is aggressively developing a strategy via the WSMP for providing a reliable, high-quality water supply that will meet the needs of the Livermore-Amador Valley through buildout of adopted general plans. As part of its strategy, Zone 7 will also re-evaluate its current reliability policy.

Table 16-1. Comparison of Projected Water Supply and Demand in Normal Water Years (Acre-Feet)[a]

Supply and Demand Component		Year				
		2010	2015	2020	2025	2030
Imported Supplies	State Water Project[b]	51,400	51,400	51,400	51,400	51,400
	BBID[c]	4,500	4,500	4,500	4,500	4,500
	Yuba Accord[d]	145	145	145	145	0
Local Supplies	Arroyo del Valle[e]	7,100	7,100	7,100	7,100	7,100
Storage	Zone 7 Wells[f,g]	9,200	9,200	9,200	9,200	9,200
	Semitropic[h]	0	0	0	0	0
	Cawelo[h]	0	0	0	0	0
Planned Programs and Projects[i]		0	0	10,500	10,500	10,500
Total Water Supply		72,350	72,350	82,850	82,850	82,700
High Water Demand[j]		66,200	68,200	74,300	79,500	82,700
Comparison	Difference	6,150	4,150	8,550	3,350	0
	Difference as % of Supply	9%	6%	10%	4%	0%
	Difference as % of Demand	9%	6%	12%	4%	0%
Low Water Demand[k]		66,200	64,600	67,100	72,300	75,500
Comparison	Difference	6,150	7,750	15,750	10,550	7,200
	Difference as % of Supply	9%	11%	19%	13%	9%
	Difference as % of Demand	9%	12%	23%	15%	10%
Potential Shortage without Planned Programs and Projects[l]		0	0	(2,000)	(7,200)	(10,500)

Notes for Table 16-1

[a] Normal water years are defined as the median runoff or allocation years.
[b] Projected median allocation from State Water Project is approximately 64% (51,400 divided by 80,619 AF) of Zone 7's Table A amount per the 2009 Reliability Report.
[c] Zone 7's contract with BBID provides up to 5,000 acre-feet, and at least 2,000 acre-feet is available in a single dry year. Zone 7 staff has estimated the yield of this contract to be 4,500 acre-feet during a normal water year.
[d] Zone 7 has a contract with DWR for water available through the Yuba Accord; the contract ends in 2025. There are four components within the contract that provide water; however, Component 1 water is used for environmental purposes and the potential yield from Component 4 water is unknown. Consequently, for conservative planning-level purposes, only Components 2 through 3 water were used in this Urban Water Management Plan.
[e] Most of the runoff from the Arroyo del Valle watershed occurs in the winter and spring. Until the Chain of Lakes is available for diverting runoff, actual yield is limited to that which can be treated and delivered directly. Although the long-term average is7,300 acre-feet, the median supply of 7,100 acre-feet was used per UWMP guidelines.
[f] Zone 7 only pumps groundwater previously recharged - quantities already account for demineralization losses.
[g] Does not include groundwater pumping quotas.
[h] Stored water supply is not intended for normal water year conditions, but for use in dry years.
[i] See Table 11-1. As discussed in Chapter 11, Zone 7 is updating its Water System Master Plan, and is either pursuing or identifying several future water supplies, including a Delta Fix, recycled water, water transfers, and desalination.
[j] Includes municipal, industrial, and agricultural demands. Does not include potential water conservation savings associated with Senate Bill SBX7-7.
[k] Includes municipal, industrial, and agricultural demands. Includes potential water conservation savings associated with Senate Bill SBX7-7.
[l] Based on the High Water Demand scenario.

Table 16-2. Comparison of Projected Water Supply and Demand in Single Dry Years (Acre-Feet)[a]

Supply and Demand Component		Year				
		2010	2015	2020	2025	2030
Imported Supplies	State Water Project (10% Allocation)[b]	8,000	8,000	8,000	8,000	8,000
	Carry Over[c]	24,000	17,000	13,000	10,000	8,000
	BBID[d]	2,000	2,000	2,000	2,000	2,000
	Yuba Accord[e]	676	676	676	676	0
Local Supplies	Arroyo del Valle[f]	0	0	0	0	0
Storage	Groundwater[g]	26,200	26,200	26,200	26,200	26,200
	Semitropic[h]	9,100	9,100	9,100	9,100	9,100
	Cawelo[i]	5,000	10,000	10,000	10,000	10,000
Planned Programs and Projects[j]	Additional Supply in Existing Storage	0	0	1,000	7,000	6,000
	New Dry Year Supply	0	0	6,100	6,100	6,100
Total Water Supply		75,000	73,000	76,100	79,100	75,400
High Water Demand[k]		50,700	53,900	61,500	67,800	72,000
Comparison	Difference	24,300	19,100	14,600	11,300	3,400
	Difference as % of Supply	32%	26%	19%	14.3%	4.5%
	Difference as % of Demand	48%	35%	24%	16.7%	4.7%
Low Water Demand[l]		50,700	50,300	54,300	60,600	64,800
Comparison	Difference	24,300	22,700	21,800	18,500	10,600
	Difference as % of Supply	32%	31%	29%	23%	14%
	Difference as % of Demand	48%	45%	40%	31%	16%
Potential Shortage without Planned Programs and Projects[m]		0	0	0	(1,800)	(8,700)

Notes for Table 16-2

[a] Single dry year corresponds to lowest runoff or allocation.
[b] DWR's 2009 Reliability report indicates the minimum allocation is 10%, or approximately 8,000 acre-feet (0.10 x 80,619) - this corresponds to 1977 conditions.
[c] Carryover represents the ability to carry water from the previous year into the next. The availability of carryover decreases in the future as demands increase because more of the supply is used in the current year and is unavailable to "carry" into the following year. During a single dry year, all of the carryover is used, and there is no surplus supply to carry into the following year.
[d] Zone 7's contract with BBID provides up to 5,000 acre-feet, and at least 2,000 acre-feet in a single dry year.
[e] Zone 7 has a contract with DWR for water available through the Yuba Accord; the contract ends in 2025. For conservative planning-level purposes, only Components 2 through 3 water were used in this Urban Water Management Plan.
[f] There is no Arroyo del Valle supply available to Zone 7 in a single dry year.
[g] Zone 7 has sufficient groundwater pumping capacity to withdraw 26,200 acre-feet of stored supply. Does not include groundwater pumping quotas.
[h] Only includes Zone 7's contracted pumpback amount. SWP allocation during 1977 conditions precludes the availability of exchange water.
[i] For planning-level purposes, it is assumed that Zone 7 will have at least 10,000 acre-feet in Cawelo by 2015.
[j] See table 11-1. As discussed in Chapter 11, Zone 7 is updating its Water System Master Plan, and is either pursuing or identifying several future water supplies, including a Delta Fix, recycled water, water transfers, and desalination.
[k] Includes municipal, industrial, and agricultural demands. Does not include potential water conservation savings associated with Senate Bill SBX7-7.
[l] Includes municipal, industrial, and agricultural demands. Includes potential water conservation savings associated with Senate Bill SBX7-7.
[m] Based on the High Water Demand scenario.

Tables 16-3(a). Comparisons of Projected Water Supply and Demand in Multiple Dry Years (Acre-Feet)[a] Ending in 2015

Supply and Demand Component		Year				
		2011 (Year 1)	2012 (Year 2)	2013 (Year 3)	2014 (Year 4)	2015 (Year 5)
Imported Supplies	State Water Project[b]	23,900	47,800	15,700	22,700	19,500
	Carry Over[c]	21,000	20,200	27,600	18,100	15,600
	BBID[d]	2,000	2,000	2,000	2,000	2,000
	Yuba Accord[e]	676	676	676	676	676
Local Supplies	Arroyo del Valle[f]	930	350	520	150	4,400
Storage	Groundwater[g]	14,000	9,200	14,000	14,000	14,000
	Semitropic[h]	10,700	13,600	9,600	10,500	10,100
	Cawelo[i]	0	0	0	0	8,000
Planned Programs and Projects[j]	Additional Supply in Carry Over	0	0	0	0	0
	Additional Supply in Existing Storage	0	0	0	0	0
	New Dry Year Supply	0	0	0	0	0
Total Water Supply		73,206	93,826	70,096	68,126	74,276
High Water Demand[k]		51,300	52,000	52,600	53,300	53,900
Comparison	Difference	21,906	41,826	17,496	14,826	20,376
	Difference as % of Supply	30%	45%	25%	22%	27%
	Difference as % of Demand	43%	80%	33%	28%	38%
Low Water Demand[l]		50,600	50,500	50,500	50,400	50,300
Comparison	Difference	22,606	43,326	19,596	17,726	23,976
	Difference as % of Supply	31%	46%	28%	26%	32%
	Difference as % of Demand	45%	86%	39%	35%	48%
Potential Shortage without Planned Programs and Projects[m]		0	0	0	0	0

Tables 16-3(b). Comparisons of Projected Water Supply and Demand in Multiple Dry Years (Acre-Feet)[a] Ending in 2020

Supply and Demand Component		Year				
		2016 (Year 1)	2017 (Year 2)	2018 (Year 3)	2019 (Year 4)	2020 (Year 5)
Imported Supplies	State Water Project[b]	23,900	47,800	15,700	22,700	19,500
	Carry Over[c]	16,000	12,400	27,600	11,400	10,300
	BBID[d]	2,000	2,000	2,000	2,000	2,000
	Yuba Accord[e]	676	676	676	676	676
Local Supplies	Arroyo del Valle[f]	930	350	520	150	4,400
Storage	Groundwater[g]	14,000	14,000	14,000	14,000	14,000
	Semitropic[h]	10,700	13,600	9,600	10,500	10,100
	Cawelo[i]	0	0	0	9,000	10,000
Planned Programs and Projects[j]	Additional Supply in Carry Over	0	0	0	0	0
	Additional Supply in Existing Storage	0	0	0	0	0
	New Dry Year Supply	0	0	0	0	6,100
Total Water Supply		68,200	90,800	70,100	70,400	77,100
High Water Demand[k]		55,400	56,900	58,500	60,000	61,500
Comparison	Difference	12,800	33,900	11,600	10,400	15,600
	Difference as % of Supply	19%	37%	17%	15%	20%
	Difference as % of Demand	23%	60%	20%	17%	25%
Low Water Demand[l]		51,100	51,900	52,700	53,500	54,300
Comparison	Difference	17,100	38,900	17,400	16,900	22,800
	Difference as % of Supply	25%	43%	25%	24%	30%
	Difference as % of Demand	33%	75%	33%	32%	42%
Potential Shortage without Planned Programs and Projects[m]		0	0	0	0	0

Tables 16-3(c). Comparisons of Projected Water Supply and Demand in Multiple Dry Years (Acre-Feet)[a] Ending in 2025

Supply and Demand Component		Year				
		2021 (Year 1)	2022 (Year 2)	2023 (Year 3)	2024 (Year 4)	2025 (Year 5)
Imported Supplies	State Water Project[b]	23,900	47,800	15,700	22,700	19,500
	Carry Over[c]	13,000	2,300	16,600	0	0
	BBID[d]	2,000	2,000	2,000	2,000	2,000
	Yuba Accord[e]	676	676	676	676	676
Local Supplies	Arroyo del Valle[f]	930	350	520	150	4,400
Storage	Groundwater[g]	14,000	14,000	14,000	14,000	7,000
	Semitropic[h]	10,700	13,600	9,600	10,500	10,100
	Cawelo[i]	0	0	4,000	10,000	10,000
Planned Programs and Projects[j]	Additional Supply in Carry Over	4,000	10,200	11,000	16,900	16,500
	Additional Supply in Existing Storage	0	0	2,000	0	7,000
	New Dry Year Supply	6,100	6,100	6,100	6,100	6,100
Total Water Supply		75,300	97,000	82,200	83,000	83,300
High Water Demand[k]		62,800	64,000	65,300	66,500	67,800
Comparison	Difference	12,500	33,000	16,900	16,500	15,500
	Difference as % of Supply	17%	34%	21%	20%	19%
	Difference as % of Demand	20%	52%	26%	25%	23%
Low Water Demand[l]		55,600	56,800	58,100	59,300	60,600
Comparison	Difference	19,700	40,200	24,100	23,700	22,700
	Difference as % of Supply	26%	41%	29%	29%	27%
	Difference as % of Demand	35%	71%	41%	40%	37%
Potential Shortage without Planned Programs and Projects[m]		0	0	(2,200)	(6,500)	(14,100)

Tables 16-3(d). Comparisons of Projected Water Supply and Demand in Multiple Dry Years (Acre-Feet)[a] Ending in 2030

Supply and Demand Component		Year				
		2026 (Year 1)	2027 (Year 2)	2028 (Year 3)	2029 (Year 4)	2030 (Year 5)
Imported Supplies	State Water Project[b]	23,900	47,800	15,700	22,700	19,500
	Carry Over[c]	10,000	0	100	0	0
	BBID[d]	2,000	2,000	2,000	2,000	2,000
	Yuba Accord[e]	0	0	0	0	0
Local Supplies	Arroyo del Valle[f]	930	350	520	150	4,400
Storage	Groundwater[g]	14,000	14,000	6,000	0	0
	Semitropic[h]	10,700	2,600	9,600	10,500	10,100
	Cawelo[i]	1,300	3,000	10,000	2,700	0
Planned Programs and Projects[j]	Additional Supply in Carry Over	6,000	6,300	24,300	12,000	6,300
	Additional Supply in Existing Storage	0	11,700	8,000	21,300	24,000
	New Dry Year Supply	6,100	6,100	6,100	6,100	6,100
Total Water Supply		74,900	93,900	82,300	77,500	72,400
High Water Demand[k]		68,600	69,500	70,300	71,200	72,000
Comparison	Difference	6,300	24,400	12,000	6,300	400
	Difference as % of Supply	8%	26%	15%	8%	1%
	Difference as % of Demand	9%	35%	17%	9%	1%
Low Water Demand[l]		61,400	62,300	63,100	64,000	64,800
Comparison	Difference	13,500	31,600	19,200	13,500	7,600
	Difference as % of Supply	18%	34%	23%	17%	10%
	Difference as % of Demand	22%	51%	30%	21%	12%
Potential Shortage without Planned Programs and Projects[m]		(5,800)	0	(26,400)	(33,200)	(36,000)

Notes for Table 16-3

[a] The multiple dry year period corresponds to the lowest consecutive 5-year projected runoff or allocation. Each five year period is a new five-year drought.
[b] Median Table A amount was used as the normal year allocation. Based on DWR's 2009 Reliability report, the lowest consecutive 5-year allocation is over 1988 to 1992.
[c] Carryover represents the ability to carry water from the previous year into the next, and includes both the SWP and Lake Del Valle. The availability of carryover decreases in the future as demands increase because more of the supply is used in the current year and is unavailable to "carry" into the following year.
[d] Zone 7's contract with BBID provides up to 5,000 acre-feet, and at least 2,000 acre-feet over a multi year drought.
[e] Zone 7 has a contract with DWR for water available through the Yuba Accord; the contract ends in 2025. For conservative planning-level purposes, only Components 2 and 3 water were used in this Urban Water Management Plan.
[f] Most of the runoff from the Arroyo del Valle watershed occurs in the winter and spring. Until the Chain of Lakes is available for diverting runoff, actual yield is limited to that which can be treated and delivered directly. Although the long-term average yield is 7,300 acre-feet the median supply of 7,100 acre-feet was used in normal water years per UWMP Guidelines. The lowest consecutive 5-year runoff occurred over 1987 to1991.
[g] Zone 7 only pumps groundwater previously recharged. Does not include groundwater pumping quotas.
[h] Includes Zone 7's contracted pump back amount (9,100 af) and available exchange water. Exchange water depends on SWP allocation.
[i] For planning-level purposes, it is assumed that Zone 7 will have at least 10,000 acre-feet in Cawelo by 2015.
[j] As discussed in Chapter 11, Zone 7 is updating its Water System Master Plan, and is either pursuing or identifying several future water supplies, including a Delta Fix, recycled water, water transfers, and desalination.
[k] Includes municipal, industrial, and agricultural demands. Does not include potential water conservation savings associated with Senate Bill SBX7-7 or voluntary water conservation savings.
[l] Includes municipal, industrial, and agricultural demands. Includes potential water conservation savings associated with Senate Bill SBX7-7.
[m] Based on the High Water Demand scenario.

17. UWMP ADOPTION AND IMPLEMENTATION

Water Code Sections 10640-10645

Zone 7 Water Agency (Zone 7) has taken (or will take) all the required steps in adopting this 2010 Urban Water Management Plan (UWMP) as indicated below:

- A copy of the adoption resolution by the Zone 7 Board of Directors is attached in Appendix C.
- Zone 7 has reviewed the Demand Management Measures (DMMs) identified in the 2005 UWMP and determined that Zone 7's current Water Conservation Program is consistent with the applicable DMMs. In fact, Zone 7 continues to improve its Water Conservation Program by streamlining the rebate application program, improving coordination with the retailers, expanding the free water audit survey program to include commercial and institutional customer accounts, and others.
- While Zone 7 does not implement recycled water projects, it continues to work with retailers in the development of their recycled water plans. These plans are integrated into Zone 7's Water System Master Plan update efforts.
- Zone 7 will make the 2010 UWMP available for a 30-day public review period starting on the day that the 2010 UWMP is submitted to the Department of Water Resources (DWR).
- Zone 7 will provide copies of the final adopted 2010 UWMP—including the reliability and supply and demand sections—to DWR, the California State Library, its four water supply retail agencies (including the Cities of Pleasanton and Livermore), the Cities of Dublin and San Ramon, and Alameda County within 30 days of adoption. Any amendments or changes will similarly be distributed.

Finally, as discussed in Chapter 4, Zone 7 has actively sought wide public participation in the development of this 2010 UWMP using various media. Notice of the availability of the Draft UWMP and the public hearing was widely disseminated in local newspapers (Appendix B). A public review period was conducted in the month of November. A public hearing was subsequently conducted on December 15, 2010 to present the revised UWMP and to allow for further public comment before formal adoption by the Zone 7 Board of Directors.

Appendix A

UWMP Act

Established: AB 797, Klehs, 1983
Amended: AB 2661, Klehs, 1990
AB 11X, Filante, 1991
AB 1869, Speier, 1991
AB 892, Frazee, 1993
SB 1017, McCorquodale, 1994
AB 2853, Cortese, 1994
AB 1845, Cortese, 1995
SB 1011, Polanco, 1995
AB 2552, Bates, 2000
SB 553, Kelley, 2000
SB 610, Costa, 2001
AB 901, Daucher, 2001
SB 672, Machado, 2001
SB 1348, Brulte, 2002
SB 1384, Costa, 2002
SB 1518, Torlakson, 2002
AB 105, Wiggins, 2004
SB 318, Alpert, 2004
SB 1087, Florez, 2005
SBX7 7, Steinberg, 2009

CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING

CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS
Article 1. General Provisions

10620.

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d)

(1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) 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.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) 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.

10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall 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.

(c) 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).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. 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 and shall be in five-year increments to 20 years or as far as data is available.

(b) 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). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) 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.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

For basins that have not been adjudicated, 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.

(3) 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.

(4) 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.

(c) 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:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

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.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e)

(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, 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.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of 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.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) 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.

(4) 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.

(g) 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.

(h) Include a description of 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.

(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(j) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the ‘‘Memorandum of Understanding Regarding Urban Water Conservation in California,’’ dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

(k) 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), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each 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.

(f) Penalties or charges for excessive use, where applicable.

(g) 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.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall 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, and shall include all of the following:

(a) A description of 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.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) 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.

(f) A description of 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.

(g) 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.

10634. 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.

Article 2.5 Water Service Reliability

10635.

(a) 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.

(b) 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.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Articl 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. 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. 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. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) An urban water supplier shall file with the department 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 filed with the department and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. 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.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water

supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

10657.

(a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

Appendix B

Public Notices

Flores, Amparo

From: Brewer, Boni
Sent: Friday, October 15, 2010 8:46 AM
To: Dan Smith; rwerner; J Freeman; Bert Michalczyk (michalczyk@dsrsd.com); Ed Cummings (cummings@lavwma.com); 'jeffbaker@dublin.ca.gov'; 'pwong@sanramon.ca.gov'; 'albert.lopez@acgov.org'; 'roberta.goulart@dcd.cccounty.us'; 'fwedingt@ebmud.com'
Subject: Urban Water Management Plan

NOTICE OF REVIEW & POTENTIAL AMENDMENTS
Urban Water Management Plan
October 15, 2010

Zone 7 Water Agency is a water wholesaler serving more than 200,000 people in Pleasanton, Livermore and Dublin in Alameda County, and the Dougherty Valley area of San Ramon in Contra Costa County. It sells treated water to four retailers: the City of Pleasanton, City of Livermore, Dublin San Ramon Services District and California Water Service Company.

As an urban water provider, Zone 7 prepares an Urban Water Management Plan aimed at analyzing and planning for a reliable water supply over a 20-year planning horizon considering normal, dry and multiple dry years.

This is to notify cities and counties within which Zone 7 provides water that on December 15, 2010, the Zone 7 Board of Directors plans to conduct a public meeting on, and consider adoption of, the Agency's draft Urban Water Management Plan as required under section 10610 et seq. of the California Water Code. The hearing will be part of a regularly scheduled Board meeting to begin at 7 p.m. at Zone 7 Administrative Offices, 100 North Canyons Parkway, Livermore.

Zone 7 plans to make a copy of the Draft Urban Water Management Plan available for download from its website, www.zone7water.com, on or around November 2, 2010. Comments on the draft Urban Water Management Plan prior to the public hearing can be provided to Amparo Flores at aflores@zone7water.com, by 5 p.m. on November 30, 2010.

If you would prefer a copy to be mailed to you, please contact Boni Brewer, Public Information Officer, at (925) 454-5015.

Boni Brewer
Public Information Officer
Zone 7 Water Agency
100 North Canyons Parkway
Livermore, CA 94551
925-454-5015
bbrewer@zone7water.com

NOTICE OF PUBLIC HEARING AND PUBLIC REVIEW PERIOD
Urban Water Management Plan

Zone 7 Water Agency is a water wholesaler serving more than 200,000 people in Pleasanton, Livermore, Dublin and the Dougherty Valley area of San Ramon. It sells treated water to four retailers: the City of Pleasanton, City of Livermore, Dublin San Ramon Services District and California Water Service Company.

As an urban water provider, Zone 7 every five years prepares an Urban Water Management Plan aimed at analyzing and planning for a reliable water supply over a 20-year planning horizon considering normal, dry and multiple dry years.

This is to notify the public that at its meeting to begin at 7 p.m. on December 15, 2010, the Zone 7 Water Agency Board of Directors plans to conduct a public hearing on, and consider adoption of, the Agency's Draft Urban Water Management Plan as required under Section 10610 et seq. of the California Water Code. The hearing will be held at Zone 7 Administrative Offices, 100 North Canyons Parkway, Livermore.

A copy of the Draft Urban Water Management Plan is available for public review at the Zone 7 Water Agency office at 100 North Canyons Parkway in Livermore, on the website, www.zone7water.com, and at the following local libraries:

Livermore Public Library
1188 South Livermore Ave., Livermore

Pleasanton Public Library
400 Old Bernal Ave., Pleasanton

Alameda County Public Library in Dublin
200 Civic Plaza, Dublin

Public comment will be welcome at the hearing and you are encouraged to comment before then, if possible, by contacting Amparo Flores at aflores@zone7water.com**.** If you have any questions regarding this notice, contact Boni Brewer, Public Information Officer, at (925) 454-5015.

NOTICE OF PUBLIC HEARING AND PUBLIC REVIEW PERIOD
Urban Water Management Plan

Zone 7 Water Agency is a water wholesaler serving more than 200,000 people in Pleasanton, Livermore, Dublin and the Dougherty Valley area of San Ramon. It sells treated water to four retailers: the City of Pleasanton, City of Livermore, Dublin San Ramon Services District and California Water Service Company.

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Alameda County Public Library in Dublin
200 Civic Plaza, Dublin

Public comment will be welcome at the hearing and you are encouraged to comment before then, if possible, by contacting Amparo Flores at aflores@zone7water.com. If you have any questions regarding this notice, contact Boni Brewer, Public Information Officer, at (925) 454-5015.

TVH#3746321
Nov 8, 15, 2010

NOTICE OF PUBLIC HEARING AND PUBLIC REVIEW PERIOD
Urban Water Management Plan

Zone 7 Water Agency is a water wholesaler serving more than 200,000 people in Pleasanton, Livermore, Dublin and the Dougherty Valley area of San Ramon. It sells treated water to four retailers: the City of Pleasanton, City of Livermore, Dublin San Ramon Services District and California Water Service Company.

As an urban water provider, Zone 7 every five years prepares an Urban Water Management Plan aimed at analyzing and planning for a reliable water supply over a 20-year planning horizon considering normal, dry and multiple dry years.

This is to notify the public that at its meeting to begin at 7 p.m. on December 15, 2010, the Zone 7 Water Agency Board of Directors plans to conduct a public hearing on, and consider adoption of, the Agency's Draft Urban Water Management Plan as required under Section 10610 et seq. of the California Water Code. The hearing will be held at Zone 7 Administrative Offices, 100 North Canyons Parkway, Livermore.

A copy of the Draft Urban Water Management Plan is available for public review at the Zone 7 Water Agency office at 100 North Canyons Parkway in Livermore, on the website, www.zone7water.com, and at the following local libraries:

Livermore Public Library
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Pleasanton Public Library
400 Old Bernal Ave., Pleasanton

Alameda County Public Library in Dublin
200 Civic Plaza, Dublin

Public comment will be welcome at the hearing and you are encouraged to comment before then, if possible, by contacting Amparo Flores at aflores@zone7water.com. If you have any questions regarding this notice, contact Boni Brewer, Public Information Officer, at (925) 454-5015.

PT/VT#3746311
Nov 8, 15, 2010

Appendix C

Board Resolution No. 11-4058: Adoption of the 2010 UWMP

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
BOARD OF DIRECTORS

RESOLUTION NO 11-4058

INTRODUCED BY DIRECTOR PALMER
SECONDED BY DIRECTOR QUIGLEY

Adoption of the 2010 Urban Water Management Plan, Including the Water Shortage Contingency Plan

WHEREAS, the Assembly Bill, commonly known as the Urban Water Management Planning Act (Water Code Division 6, Part 2.6, Sections 10610 through 10650), requires all urban water purveyors serving more than 3,000 customers either directly or indirectly, or more than 3,000 acre-feet of water annually, to prepare and submit a plan, or plan update, once every five years; and

WHEREAS, said plan is for the purpose of evaluating and developing water management policies to achieve conservation and efficient use of urban water supplies; and

WHEREAS, Zone 7 Water Agency is the overall water management agency for the Livermore-Amador Valley, including the cities of Dublin, Livermore, Pleasanton and a portion of San Ramon; and

WHEREAS, Zone 7 Water Agency's 2005 Urban Water Management Plan was approved by the California Department of Water Resources in early 2006; and

WHEREAS, Zone 7 Water Agency has prepared and circulated for public review an updated Draft 2010 Urban Water Management Plan, which includes the required Water Shortage Contingency Plan; and

WHEREAS, a public hearing regarding the Draft 2010 Urban Water Management Plan was properly noticed and held to receive comments.

NOW, THEREFORE, BE IT RESOLVED that the Draft 2010 Urban Water Management Plan be approved as the 2010 Urban Water Management Plan for Zone 7 Water Agency; and

BE IT FURTHER RESOLVED that Zone 7 reaffirms its commitment to maintain the long-term reliability of its water supply; and

BE IT FURTHER RESOLVED that the 2010 Urban Water Management Plan be filed with the California Department of Water Resources.

ADOPTED BY THE FOLLOWING VOTE:

AYES: DIRECTORS FIGUERS, GRECI, MACHAEVICH, MOORE, PALMER, QUIGLEY, STEVENS

NOES: NONE

ABSENT: NONE

ABSTAIN: NONE

I certify that the foregoing is a correct copy of a Resolution adopted by the Board of Directors of Zone 7 of Alameda County Flood Control and Water Conservation District on

December 15, 2010

By _____
President, Board of Directors

Appendix D

Board Resolution 04-2662: Reliability Policy

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO 04-2662

INTRODUCED BY DIRECTOR MARCHAND
SECONDED BY DIRECTOR CONCANNON

Reliability Policy for Municipal & Industrial Water Supplies

WHEREAS, the Zone 7 Board of Directors desires to maintain a highly reliable Municipal and Industrial (M&I) water supply system so that existing and future M&I water demands can be met during varying hydrologic conditions; and

WHEREAS, the Board has an obligation to communicate to its M&I customers and municipalities within its service area the ability of the Zone's water supply system to meet projected water demands.

WHEREAS, the Board on May 15, 2002 adopted Resolution No. 02-2382 setting forth its Reliability Policy for Municipal & Industrial Water Supplies; and

WHEREAS, the Zone's current water supply policy includes a provision for a valley-wide groundwater production capability to meet 75% of valley-wide M&I demand in the event of an outage of the South Bay Aqueduct; and

WHEREAS, the Board desires to revise the Reliability Policy to include all Zone 7 water supply facilities and to clarify demand levels for planning purposes;

NOW, THEREFORE, BE IT RESOLVED that the Board hereby rescinds Resolution No. 02-2382 adopting the May 15, 2002 Reliability Policy for Municipal & Industrial Water Supplies; and

BE IT FURTHER RESOLVED that the Board hereby adopts the following policy goals regarding reliability[1] to guide the management of the Zone's M&I water supplies as well as its Capital Improvement Program (CIP)[2]:

GOAL 1. Meet 100% of its treated water customers water supply needs in accordance with Zone 7's most current Contracts for M&I Water Supply, including existing and projected demands for the next 20 years as specified in Zone 7's Urban Water Management Plan, (UWMP), which will be coordinated with Zone 7's M&I water Contractors. Zone 7 will endeavor to meet this goal during an average water year[3], a single dry water year[4], and multiple dry water years[5], and

GOAL 2: Provide sufficient treated water production capacity and infrastructure to meet at least 75% of the maximum daily M&I contractual demands should any one of Zone 7's major supply, production or transmission facilities experience an extended unplanned outage.

BE IT FURTHER RESOLVED that to ensure that this Board policy is carried out effectively, the Zone 7 General Manager will provide a water supply status report to the Board every five years with the Zone 7 Urban Water Management Plan that specifies how these goals can be, or are being, achieved.

If the General Manager finds that the goals might not be met, then the Board will hold a public hearing within two months of the General Manager's finding to consider remedial actions that will bring the Zone into substantial compliance with the stated reliability goals. Remedial actions may include, but are not limited to, voluntary conservation or mandatory rationing to reduce water demands, acquisition of additional water supplies, and/or a moratorium on new water connections. After reviewing staff analyses and information gathered at the public hearing, the Board shall, as expeditiously as is feasible, take any additional actions that are necessary to meet the reliability goals during the following five-year period; and

BE IT FURTHER RESOLVED that the Zone 7 General Manager shall prepare an Annual Review of the Sustainable Water Supply Report which includes the following information:

(1) An estimate of the current annual average water demand for M&I water as well as a five-year projection based on the same information used to prepare the UWMP and CIP;

(2) A summary of available water supplies[6] to Zone 7 at the beginning of the calendar year;

(3) A comparison of current water demands with the available water supplies; and

(4) A discussion of water conservation requirements and other long-term water supply programs needed to meet Zone 7 M&I water demands for a single dry water year and multiple dry years, as specified in the Zone's UWMP.

A summary of this review will be provided to M & I customers.

Definitions

[1]**Reliability**—the ability of a water supply system to provide water during varying hydrologic conditions without the need for reductions in water use.

[2]**Capital Improvement Program (CIP)**—the CIP is the Zone's formal program for developing surface and ground water supplies, along with associated infrastructure, including import water conveyance facilities, surface water treatment plants, groundwater wells, and M&I water transmission system to meet projected water demands.

[3]**Average water year**—the statistical average quantity of water from all of the water supplies available to Zone 7 on a contractual or legal basis (e.g., surface water runoff to Del Valle reservoir), based on the historical hydrologic records available to Zone 7.

[4]**Single dry water year**—for the purposes of meeting the requirements of the UWMP, the Zone 7 staff will identify and justify the selection of a calendar year from the historic record that represents the lowest yield from all normally contracted or legally available supplies.

[5]**Multiple dry water years**—for the purposes of meeting the requirements of the UWMP, the Zone 7 staff will identify and justify the selection of three or more consecutive dry years from the historic record that represent the lowest yields from all normally contracted or legally available supplies.

[6]**Available water supplies** consist solely of (1) water supplies that the Zone 7 has contracted for (e.g., listed under Schedule A of the State Water Contract, dry-year water options, special contracts with other water districts, etc.) and (2) water actually stored in surface and subsurface reservoirs.

ADOPTED BY THE FOLLOWING VOTE:

AYES: DIRECTORS CONCANNON, GRECI, KOHNEN, MARCHAND, QUIGLEY

NOES: NONE

ABSENT: DIRECTORS KALTHOFF, STEVENS

ABSTAIN: NONE

I certify that the foregoing is a correct copy of a resolution Adopted by the Board of Directors of Zone 7 of Alameda County Flood Control and Water Conservation District on

August 18, 2004

By _____

Vice - President, Board of Directors

Appendix E

Summary of Potential Water Supply Options Being Considered in the 2010 Water System Master Plan

Appendix E. Summary of Potential Water Supply Options Being Considered in the 2010 Water System Master Plan

Water Supply Option or Strategy	Availability[a]	Dry Year Yield[b]		Average Annual Yield[c]		Peak Day Capacity, mgd[d]	Estimated Timing: Supply is Available to Zone 7[e]	Total Costs *(does not reflect funding source)*			Comments
		af	mgd	af	mgd			Capital Cost, $[f]	Annual Operation and Maintenance Cost, $/year[g]	Total Amortized Cost, $/acre-foot[h]	
Increase Yield from Existing Supplies											
Delta Conveyance *(increase long-term average yield of existing State Water Project contract)*	Depends on hydrologic conditions	no change	no change	15,300	13.6	0	2020 - 2030	$97,000,000 to $142,000,000	$380,000 to $420,000	$500 to $700	This project involves fixing the Delta to increase the long-term average yield from existing State Water Project contract. The additional supply from Delta Conveyance is based on an increased long-term average yield of 60% to 79%. The costs, timing, and yield are not within Zone 7's control.
Arroyo Valle Water Right *(re-operation of Lake Del Valle)*	Depends on hydrologic conditions	no change	no change	600	0.9	0	2015 - 2020	$500,000 to $1,000,000	$48,000	$140 to $200	The water supply yield is based on reoperation of Lake Del Valle - lower level to 20,000 af, instead of 25,000 af between Sep and Dec to capture more inflow. Cost is for coordination and moving EBRP intake located within the lake.
Byron Bethany Irrigation District *(maximize existing contract)*	Available during all hydrologic conditions	3,000	2.7	3,000	2.7	0	2011 - 2015	$50,000 to $100,000	$850,000	$285	Zone 7 is currently renewing its contract with BBID. Although the contract provides up to 5,000 acre-feet of water, 2,000 acre-feet has been used for planning. This supply is based on a study that will help justify the use of a higher yield from this contract. Additional O&M expenses for treating and delivery the supply every year.
New or Additional Surface Water Supplies											
Additional State Water Project Water *(increase contract above 80,619 af)*	Depends on hydrologic conditions	10% to 30% of Contract Amount	10% to 30% of Contract Amount	60% of Contract Amount	60% of Contract Amount	0	2015 - 2020	$10,000 to $12,500 per acre-foot.	$130	$840 to $1,050	The availability of water depends on price and the willingness of State Water Contractors to sell. The cost is based on historical and recent sales. Cost range based on 25% increase between last sale and time Zone 7 decides to purchase State Water Project Water (next 10 years).
Long-term Non-State Water Project Purchase, Transfer, or Contract *(not spot market water)*	Depends on hydrologic conditions	5,600	5.0	8,600	7.7	5.0	2015 - 2020	$32,000,000 to $46,000,000	$335 to $480 per af	$700 to $1,100	The availability of non-State Water Project Water transfers (e.g., a new BBID supply) depends on price and willingness of wholesale water agencies to sell. Costs are based on joint EBMUD-Zone 7 purchase of water supply and wheeling through EBMUD's Freeport Project and Distribution system.
Los Vaqueros Reservoir Expansion	Depends on hydrologic conditions	0 to 8,300	7.4	0 to 8,300	7.4	0	2015 - 2020	$32,400,000 to $212,000,000	$420,000 to $2,800,000	$330 to $2,200	Total yield to SBA contractors could be 25,000 af, or 8,300 for Zone 7. Yield ranges from 0 to 8,300 af because it is unknown whether unappropriated Delta water rights actually exist. Cost range reflects with and without Federal and State Project participation.

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Stormwater Runoff and Rainfall Capture											
Arroyo Mocho Water Rights	Depends on hydrologic conditions	< 200	< 0.18	900 to 1,800	0.8 to 1.6	0	2020 - 2030	$3,800,000	$410,000	$400 to $800	This supply is a new water right on the Arroyo Mocho. The supply can only be used to recharge the local groundwater basin; there is no existing way to capture and treat the supply. Additionally, the Arroyo Mocho Diversion project must be completed before the water right can be perfected. Supply and cost range reflects the potential allocation to prior rights.
Arroyo Las Positas Water Rights	Depends on hydrologic conditions	< 200	< 0.18	800 to 1,600	0.7 to 1.4	0	2020 - 2030	$5,600,000	$412,000	$500 to $1,100	This supply is a new water right on the Arroyo Las Positas. Natural runoff from the Alkali Sink and inflow from the groundwater basin diminish the water quality in the Arroyo Las Positas during low flows. There is no existing way to capture and treat the supply; therefore, these costs only include capture for groundwater recharge. Costs assume completion of the StreamWISE diversion project for Flood Control. Supply and cost range reflects allocation to prior rights.
Tassajara and San Ramon Valley Creek runoff	--	--	--	--	--	--	--	--	--	--	Both of these creeks are located on the western edge of Zone 7's service area. At this time, there is no practical way to capture, store, or treat this supply.
End User Local Rain Capture for Recharge *(Low Impact Development)*	--	--	--	--	--	--	--	--	--	--	This supply is generated by directing onsite stormwater to vegetated or rock swales which then permeate water into the groundwater basin. Analysis indicates that a majority of applicable areas are located in Livermore. Zone 7 has not land use authority. Long-term supply planning cannot rely on end-user to implement and maintain each and every swale.
End User Local Rain Capture for Irrigation *(residential, commercial, institutional roof top capture)*	Available during all hydrologic conditions *(storage is less than yield during driest year on record)*	220 to 860	0.2 to 0.8	220 to 860	0.2 to 0.8	0	2015 - 2040	$94,000,000 to $395,000,000	$9,400,000 to $39,500,000	$73,600 to $79,300	Supply based on average roof size and storing two months of available supply, while the range depends on the ability to retrofit existing accounts with a rainwater capture system. Costs do not include regulatory oversight or inspection of the systems. It was assumed that this supply would not provide peak day capacity because there is little to no control over when customers decide to use their water. There is always a minimum amount of rainfall, so dry year supply is based on minimum historical rainfall of 5.2 inches.
Additional Non-Local Groundwater											
Transfers: Purchase of Agricultural Land	--	--	--	--	--	--	--	--	--	--	Significant institutional, legal, and political barriers would likely prevent implementing either of these two supply options. Most irrigation districts and cities would probably oppose any such activities. Consequently, these options were not evaluated as part of this analysis.
Transfers: Purchase of M&I Land	--	--	--	--	--	--	--	--	--	--	

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Water Supply Option or Strategy		Availability[a]	Dry Year Yield[b] af	Dry Year Yield[b] mgd	Average Annual Yield[c] af	Average Annual Yield[c] mgd	Peak Day Capacity, mgd[d]	Estimated Timing: Supply is Available to Zone 7[e]	Total Costs *(does not reflect funding source)* Capital Cost, $[f]	Annual Operation and Maintenance Cost, $/year[g]	Total Amortized Cost, $/acre-foot[h]	Comments
Recycled Water for Livermore-Amador Valley *(Water Demand Reduction for Zone 7 Water Agency)*												
City of Pleasanton	Direct use (without Storage)	Available during all hydrologic conditions	1,400	1.2	1,400	1.2	2.4	2015 - 2020	$14,100,000	$1,000,000	$1,500	This project would treat the City's secondary effluent to meet irrigation demands without storage. City of Pleasanton has no facilities; this option assumes the City constructs a new facility to treat all supplies that do not require storage. A lower cost option maybe available if the City uses DSRSD's existing facilities.
	Indirect use (with Storage)	Available during all hydrologic conditions	2,700 to 4,300	2.4 to 3.8	2,700 to 4,300	2.4 to 3.8	4.8 to 9.6	2020 - 2030	$29,000,000 to $73,900,000	$2,000,000 to $3,300,000	$1,500 to $2,000	This project would store tertiary water during shoulder months. Range is based on no new tertiary capacity required for shoulder month supply versus additional tertiary capacity, and storage in the Chain of Lakes versus storage in Sunol.
Dublin San Ramon Services District	Direct use (without Storage)	--	--	--	--	--	--	--	--	--	--	DSRSD has additional secondary effluent, but it requires storage; all summer month supply is fully allocated.
	Indirect use (with Storage)	Available during all hydrologic conditions	6,200	5.5	6,200	5.5	11.0	2020 - 2030	$66,600,000 to $91,500,000	$4,700,000	$1,500 to $1,800	This project would store tertiary water during shoulder months. DSRSD has sufficient capacity today to treat all of their shoulder month supply. The cost range reflects storage in the Chain of Lakes versus storage in Sunol.
City of Livermore	Direct use (without Storage)	Available during all hydrologic conditions	2,000	1.8	2,000	1.8	3.6	2015 - 2020	$20,100,000	$1,500,000	$1,500	This project would expand the City's system to treat additional water for delivery in the summer months. Pipeline costs do not include retrofits.
	Indirect use (with Storage)	Available during all hydrologic conditions	4,500 to 6,800	4.0 to 6.1	4,500 to 6,800	4.0 to 6.1	8.0 to 12.2	2020 - 2030	$48,400,000 to $106,000,000	$3,400,000 to $5,200,000	$1,500 to $1,900	This project would store tertiary water during shoulder months. Range is based on no new tertiary capacity required for direct use versus additional tertiary capacity and storage in the Chain of Lakes versus storage in Sunol.
End User Greywater Reuse for Residential Irrigation		Available during all hydrologic conditions	1,200 to 7,800	1.1 to 7.0	1,200 to 7,800	1.1 to 7.0	2.2 to 14.0	Builds up over time from 2015 to buildout	$20,000,000 to $143,000,000	$3,000,000 to $21,000,000	$3,700 to $4,000	This project involves capturing greywater from sinks, showers, bathtubs, and washing machines, filtering it, and using it for irrigation of lawns and gardens. Yield depends on retrofit of existing homes versus only new development. Additional analysis would be required to evaluate the potential impacts on water quality.
Groundwater Injection: Recycled Water *(recharge groundwater basin with recycled water treated with reverse osmosis technology)*		Available during all hydrologic conditions	Additional Supply in Main Basin: 2,800 af/yr	Additional Supply in Main Basin: 2.5	Additional Supply in Main Basin: 2,800 af/yr	Additional Supply in Main Basin: 2.5	0	2015 - 2020	$21,500,000 to $34,200,000	$1,400,000	$1,100 to $1,500	This project involves injecting treated recycled water into the Main Basin to increase local storage supply. Costs include rehabilitation of exiting RO unit, a new pipeline for Zone 7's Demineralization Facility, and a new injection well. Additional analysis required to verify travel distance/timing from existing potable production wells. Cost range reflects uncertainty of RO rehabilitation, cost to purchase secondary effluent, and Livermore participation.

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Agricultural Waste Stream Reuse	Available during all hydrologic conditions	< 100	< 0.1	< 100	< 0.1	> 0.2	--	--	--	--	A cursory review of potential water supply savings from reuse of process wastewater and residual capture of stormwater runoff at the five largest vineyards indicates that the savings are within the rounding error of future water supply needs (e.g., < 100 acre-feet). Although the savings may be significant for an individual grower, they are significantly smaller than the projected need of the Livermore-Amador Valley.
Commercial/Industrial Waste Stream Reuse	--	--	--	--	--	--	--	--	--	--	This water supply option would likely be implemented through water conservation programs, including SBX7-7; therefore, this option was not evaluated as part of this analysis.
Purchase Existing Well to Increase Recycled Water Supply in Summer Months (Yara Yara Well)	Available during all hydrologic conditions	280	0.25	280	0.25	0.75	2011 - 2015	$4,500,000	$28,000	$1,270	This project involves purchasing an existing well, located on the fringe of the Fringe Basins, and using this well to offset peak irrigation recycled water demands. Discussions with Zone 7 Groundwater staff indicate that the well would not likely be able to sustain 0.75 mgd for very long given its location in the Tassajara Formation and outside of any of the Fringe Basins. Cost assumptions based on meetings with Zone 7's water supply retailers and discussions with Zone 7's O&M Staff. The costs do not include additional piping required to add the well to DSRSD's recycled water system. Assumes the well is used at 0.75 mgd for 122 days per year.
Desalination											
Bay Area Regional Desalination Project	Available during all hydrologic conditions	5,150	5	5,150 to 9,800	5 to 8.7	5	2015 - 2020	$67,900,000	$2,680,000 to $5,100,000	$1,200 to $1,600	Based on discussions with the BARD Project member agencies and recent feasibility and pilot testing results. Participation would be subject to member agency approval.
ACWD Entitlement Exchange	Available during all hydrologic conditions	4,100	3.7	4,100	3.7	0 to 3.7	2020 - 2025	$70,000,000	$4,000,000	$2,200	This water supply option includes construction of a phase 3 desalination facility for ACWD, and in exchange for another supply either along the South Bay Aqueduct or the Hetch-Hetchy Aqueduct (e.g., Table A Water) at 80% of yield.
Demineralization of Groundwater											
Fringe Basin Development *(including Mocho Sub basin I)*	--	--	--	--	--	--	--	--	--	--	Per discussions with Zone 7 groundwater staff, potential yields from the fringe basins are extremely low, and any water pumped would likely require demineralization. A significant amount of additional study would be required to establish potential yields and costs.

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			af	mgd	af	mgd			Capital Cost, $[f]	Annual Operation and Maintenance Cost, $/year[g]	Total Amortized Cost, $/acre-foot[h]	
Operational Improvements												
Loss Reduction	Reduce Mocho Demineralization Losses (20% to 15%)	Available during all hydrologic conditions	260	0.23	260	0.230	0	2011 - 2015	$100,000	$0	$30	Influent water quality test results collected during design were less than the detection limit; consequently, the detection limit was used to design the brine waste (20%). This water supply project assumes a new study is conducted that reviews actual water quality results that recommend reoperation of the demineralization facility with only 15% losses instead of 20% losses.
	Reduce Unaccounted-for Water Losses	Available during all hydrologic conditions	1,300	1.1	1,300	1.1	2.2	2011 - 2015	$500,000	$100,000	$100	Historical records indicate that unaccounted-for water losses were less than 2% between 1995 and 2002. After 2002, unaccounted-for water losses increased to about 4% on average. This water supply project assumes a new study is conducted that reviews and corrects this increase.
	Reduce Well Startup Waste	Available during all hydrologic conditions	< 100	< 0.1	< 100	< 0.1	0	--	--	--	--	A cursory review of potential water supply savings from capture of water discharged to waste during each startup of existing groundwater wells indicates that the savings are within the rounding error of future water supply needs (e.g., < 100 acre-feet).
	Capture Gravel Mining Exports	Available during all hydrologic conditions	3,500 af of groundwater storage saved.	3.0 of groundwater storage saved.	3,500 af of groundwater storage saved.	3.0 of groundwater storage saved.	0	2011 - 2015	$140,000 to $700,000	$11,000 to $700,000 *(larger cost due to equipment rental)*	$7 to $220 per acre-foot of groundwater storage	Estimates completed by Zone 7 staff indicate that mining exports associated with gravel quarry operations could increase to as high as 3,500 acre-feet per year over the next 10 years or beyond. This project captures these exports and stores the water for recharge. Some of the methods proposed to capture the exports may require the use of Lake H, which does not become Zone 7's until sometime after 2014.
	Reduce Cawelo and Semitropic Losses	--	--	--	--	--	--	--	--	--	--	The planned-losses associated with use of Zone 7's non-local storage are specified in contracts, and in the case of Semitropic Water Storage District, involve many different parties. The institutional and political hurdles to changing assumed losses are significant, and likely insurmountable.

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Recharge Capacity	In-Lieu Recharge of Main Basin per Existing Contracts	Depends on hydrologic conditions	0	0	Additional Recharge in Main Basin: 500 to 830 af/yr	Additional Recharge in Main Basin: 0.4 to 0.7	0	2011 - 2020	$200,000	$40,000 to $66,400	$100 to $110 per acre-foot of additional storage	Zone 7 currently practices in-lieu recharge activities within its own operations. Per existing contracts with Zone 7's retailers, Zone 7 has the option of implementing in-lieu recharge activities associated with the use of their groundwater pumping quotas. Although this project does not provide new water supplies, it does increase the rate at which drought storage can be recovered during a drought or replenished during drought recovery - both reduce the chance of a shortage.
	Aquifer Storage and Recovery in Main Basin	Depends on hydrologic conditions & system capacity	0	0	Additional recharge in Main Basin: 3,000 af/yr	Additional Supply in Main Basin: 2.7	0	2015 - 2020	$2,400,000	$600,000	$260 per acre-foot of additional storage	The purpose of this project is to increase Zone 7's ability to conjunctively use the local groundwater basin through injection of treated surface water. This project is likely a back-up in case recharge within the Chain of Lakes is limited. Costs reflect additional analysis and study to correct clogging issues experienced by Zone 7 during previous attempts to implement an ASR program, and only include retrofit of Chain of Lakes 1 and 2.
	In Stream Infiltration Swale/Wetlands	Depends on hydrologic conditions	0	0	Additional Supply in Main Basin: 830 af/yr	Additional Recharge in Main Basin: 0.7	0	2015 - 2020	$7,800,000	$1,560,000	$2600 per acre-foot of additional storage	The purpose of this project is to enhance Zone 7's ability to recharge imported surface water through the Arryou Mocho. This project is likely a back-up in case recharge in the Chain of Lakes is limited. The project is limited to Arroyo Mocho because recharge capacity in Arroyo Valle starts downstream of the Chain of Lakes.
	Chain of Lakes Diversion *(Arroyo Mocho)*	Facility - not supply.	0	0	Additional Supply in Main Basin: 3,000 af/yr	Additional Supply in Main Basin: 2.7	0	2015 - 2020	$2,000,000	$410,000	$180 per acre-foot of additional storage	Water supply yield is based on estimated evaporative loss reduction once the diversion structure is installed. The intended purpose of the project is to increase Zone 7's artificial recharge capacity in the main groundwater basin, which increases the rate at which storage reserves are replenished during drought recovery - both reduce the chance of a shortage.
	Chain of Lakes Diversion *(Arroyo Valle)*	Depends on hydrologic conditions	0	0	3,800	3.4	0	> 2030	$5,000,000	$250,000	$160	After mining of Lake A is completed, sometime around 2030, Zone 7 will have the ability to capture flood releases from Lake Del Valle and store those releases in the Chain of Lakes. This supply can only be used to recharge the local groundwater basin; there is no existing way to capture and treat the supply for direct use. Zone 7 would likely need to construct fish screens and obtain any required reoperation permits.
	Intertie with EBMUD or SFPUC	Facilitates wheeling of 5,600 af	Facilitates wheeling of 5 mgd	Facilitates wheeling of 8,600 af	Facilitates wheeling of 7.7 mgd	up to 10 mgd	Facilitates wheeling of 8,600 af	2015 - 2020	$18,000,000 to $35,000,000	$100,000	$160 to $310	This project involves constructing a new intertie with EBMUD, SFPUC, or both. The intertie would help Zone 7 take delivery of excess supplies during normal and wet years, and then provide water to the participating agency during dry years. These costs are included in the costs of either the non-SWP water transfer or the Bay Area Regional Desalination Project.

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Water Conservation											
SBX7-7 *(20% by 2020)*	Available during all hydrologic conditions	3,000 to 7,000	2.7 to 6.2	3,000 to 7,000	2.7 to 6.2	5.4 to 12.5	2015 - 2020	Depends on the methodology used by each water supply retailer.	Depends on the methodology used by each water supply retailer.	Depends on the methodology used by each water supply retailer.	In November 2009, the California legislature passed SBX 7-7, which requires Water Retailers to reduce baseline per capita demands by 20% by 2020. The purpose of this project is to capture potential savings from this new law. Estimates are based on analysis conducted by Zone 7 staff using the new requirements, and represent conservative estimates.

[a] Availablility refers to the hydrologic conditions the water supply is available.
[b] DRY YEAR YIELD: The supply available during single dry or multiple dry years.
[c] AVERAGE YIELD: The long-term average supply available over various hydrologic conditions.
[d] Capacity available to help meet maximum day demands during the summer months. Unless limited by facilities, based on a peaking factor of 2.0 times the average supply.
[e] Potential timing is the projected years that the supply would become available to Zone 7, after planning, design, CEQA, and construction.
[f] Capital costs include all of the additional one-time costs to obtain, convey, treat, and deliver the water supply.
[g] Operation and Maintenance costs include all of the annual expenses necessary to maintain the supply (e.g., power and chemical costs).
[h] For comparative purposes, all costs were amortized based on 6 percent interest over a 30 year term.

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	Aquifer Storage and Recovery in Main Basin	Depends on hydrologic conditions & system capacity	0	0	Additional recharge in Main Basin: 3,000 af/yr	Additional Supply in Main Basin: 2.7	0	2015 - 2020	$2,400,000	$600,000	$260 per acre-foot of additional storage	The purpose of this project is to increase Zone 7's ability to conjunctively use the local groundwater basin through injection of treated surface water. This project is likely a back-up in case recharge within the Chain of Lakes is limited. Costs reflect additional analysis and study to correct clogging issues experienced by Zone 7 during previous attempts to implement an ASR program, and only include retrofit of Chain of Lakes 1 and 2.
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	Chain of Lakes Diversion *(Arroyo Valle)*	Depends on hydrologic conditions	0	0	3,800	3.4	0	> 2030	$5,000,000	$250,000	$160	After mining of Lake A is completed, sometime around 2030, Zone 7 will have the ability to capture flood releases from Lake Del Valle and store those releases in the Chain of Lakes. This supply can only be used to recharge the local groundwater basin; there is no existing way to capture and treat the supply for direct use. Zone 7 would likely need to construct fish screens and obtain any required reoperation permits.
	Intertie with EBMUD or SFPUC	Facilitates wheeling of 5,600 af	Facilitates wheeling of 5 mgd	Facilitates wheeling of 8,600 af	Facilitates wheeling of 7.7 mgd	up to 10 mgd	Facilitates wheeling of 8,600 af	2015 - 2020	$18,000,000 to $35,000,000	$100,000	$160 to $310	This project involves constructing a new intertie with EBMUD, SFPUC, or both. The intertie would help Zone 7 take delivery of excess supplies during normal and wet years, and then provide water to the participating agency during dry years. These costs are included in the costs of either the non-SWP water transfer or the Bay Area Regional Desalination Project.

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		af	mgd	af	mgd			Capital Cost, $[f]	Annual Operation and Maintenance Cost, $/year[g]	Total Amortized Cost, $/acre-foot[h]	
Water Conservation											
SBX7-7 *(20% by 2020)*	Available during all hydrologic conditions	3,000 to 7,000	2.7 to 6.2	3,000 to 7,000	2.7 to 6.2	5.4 to 12.5	2015 - 2020	Depends on the methodology used by each water supply retailer.	Depends on the methodology used by each water supply retailer.	Depends on the methodology used by each water supply retailer.	In November 2009, the California legislature passed SBX 7-7, which requires Water Retailers to reduce baseline per capita demands by 20% by 2020. The purpose of this project is to capture potential savings from this new law. Estimates are based on analysis conducted by Zone 7 staff using the new requirements, and represent conservative estimates.

[a] Availablility refers to the hydrologic conditions the water supply is available.
[b] DRY YEAR YIELD: The supply available during single dry or multiple dry years.
[c] AVERAGE YIELD: The long-term average supply available over various hydrologic conditions.
[d] Capacity available to help meet maximum day demands during the summer months. Unless limited by facilities, based on a peaking factor of 2.0 times the average supply.
[e] Potential timing is the projected years that the supply would become available to Zone 7, after planning, design, CEQA, and construction.
[f] Capital costs include all of the additional one-time costs to obtain, convey, treat, and deliver the water supply.
[g] Operation and Maintenance costs include all of the annual expenses necessary to maintain the supply (e.g., power and chemical costs).
[h] For comparative purposes, all costs were amortized based on 6 percent interest over a 30 year term.

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