Elsinore Valley Municipal Water District Urban Water Management Plan

Final

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LIST OF ACRONYMS AND ABBREVIATION

Abbreviation	Explanation
AB	Assembly Bill
AVP	Auld Valley Pipeline
AWWA	American Water Works Association
BMPs	Best Management Practices
CAFR	Comprehensive Annual Financial Report
CALGreen	California Green Building Code Standards
cfs	cubic feet per second
CII	Commercial, Industrial, and Institutional
CLWTP	Canyon Lake Water Treatment Plant
CUWCC	California Urban Water Conservation Council
DBP	Disinfection By-Product
DMMs	Demand Management Measures
DOC	Dissolved Organic Carbon
DWR	California Department of Water Resources
EFZ	Elsinore Fault Zone
ETo	Reference Evapotranspiration

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EWD	Elsinore Water District
EVMWD	Elsinore Valley Municipal Water District
FY	Fiscal Year
GIS	Geographic Information System
gpcd	gallons per capita daily
gpf	gallons per flush
gpm	gallons per minute
GPS	Global Positioning System
GWMP	Groundwater Management Plan
HET	High Efficiency Toilet
HOAs	Home Owner Associations
LESJWA	Lake Elsinore-San Jacinto Watershed Authority
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
MAWA	Maximum Applied Water Allowance
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
Metropolitan	Metropolitan Water District of Southern California
MG	million gallon
mgd	million gallons per day
MOU	Memorandum of Understanding
msl	mean sea level
MWELO	Model Water Efficient Landscape Ordinance
PEIR	Program Environmental Impact Report
POA	Canyon Lake Property Owners Association
Program	California 20x2020 Program
RCCDR	Riverside County Center for Demographics Research
RCWD	Rancho California Water District
RHNA	Regional Housing Need Allocation
RWQCB	Regional Water Quality Control Board
RUWMP	Regional Water Urban Water Management Plan
SB	Senate Bill

SB x7-7 Steinberg	Senate Bill 7 of the 7th Extraordinary Session
SCAG	Southern California Association of Governments
SWP	State Water Project
SWRCB	California State Water Resources Control Board
TDS	Total Dissolved Solids
TDSA	Temescal Domestic Service Area
TTHMs	Total Trihalomethanes
TVEDP	Temecula Valley Effluent Disposal Pipeline
TVP	Temescal Valley Pipeline
TWC	Temescal Water Company
ULFTs	Ultra Flow Flush Toilets
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Plan Act
WBIC	Weather-Based Irrigation Controllers
WDSMP	Water Distribution System Master Plan
Western MWD	Western Municipal Water District
WRDP	Water Resources Development Plan
WSDM	Water Shortage and Drought Management Plan
WSS	WaterSense Specification

EXECUTIVE SUMMARY

Elsinore Valley Municipal Water District (EVMWD) prepared an Urban Water Management Plan (UWMP) in year 2000 in compliance with the Urban Water Management Plan Act (UWMP Act), which was adopted by EVMWD's Board of Directors on December 22, 1999 (Montgomery Watson/Maddaus Water Management/The Weber Group, 2000). An update to the 2000 UWMP was prepared in 2005. This UWMP is an update of the 2005 UWMP and incorporates a number of significant changes to the UWMP legislation and to the region's water planning and management activities that have taken place in the last five years. The Board of Directors of EVMWD will adopt this UWMP on June 9, 2011.

SYSTEM DESCRIPTION

This UWMP covers EVMWD's Elsinore and Temescal Divisions. The Elsinore Division makes up the majority of the service area with approximately 39,000 accounts, encompassing an area of 96 square miles. The Temescal Division is isolated from the Elsinore Division and is located to the northwest of the Elsinore Division. It covers an area of approximately 2.5 square miles and has approximately 500 accounts.

The residents within the EVMWD boundary are served by one of three water service agencies: EVMWD, Elsinore Water District (EWD), and The Farm Mutual Water Company. The latter two are located entirely within EVMWD boundaries, and obtain most of their water wholesale from EVMWD. It is likely that EWD will undergo dissolution in the near-future and will be incorporated as a part of EVMWD's service area.

POPULATION AND GROWTH

Estimates developed by the Riverside County Center for Demographics Research (RCCDR) are used to forecast growth within EVMWD's service area. RCCDR developed population, household, and employment projections by census tract for Riverside County. These projections are presented in **Table ES- 1** and depicted on **Figure ES- 1**.

Table ES- 1
Population, Employment, and Housing Forecasts for EVMWD's Service Area

Year	2010	2015	2020	2025	2030	2035
Population	123,375	136,133	149,852	162,626	174,579	185,102
Employment	19,411	24,699	27,458	32,272	37,086	41,900
Housing	41,757	46,388	51,297	55,774	59,921	63,888

Source: Riverside County Center for Demographics Research, 2010

Forecasts are presented for both, the Elsinore Division and the Temescal Division.

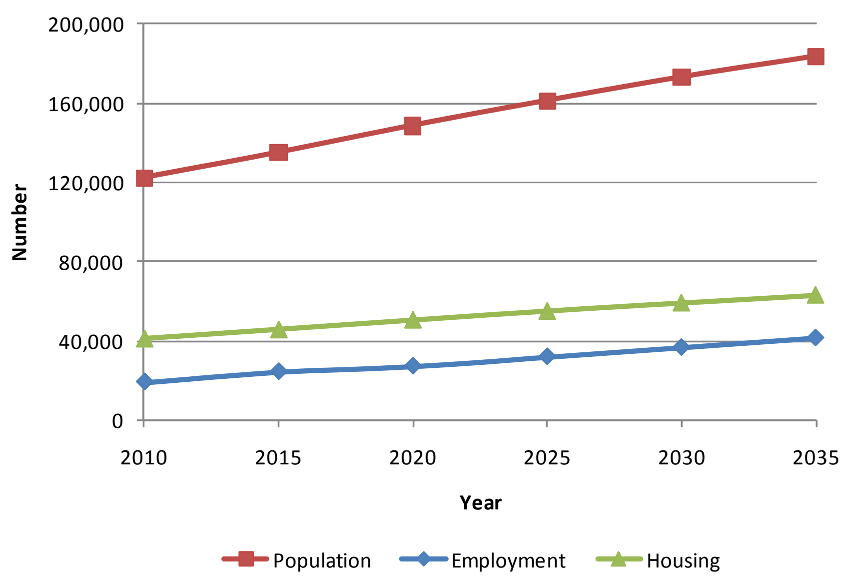


Figure ES- 1

Projected Population, Employment and Housing within the EVMWD Service Area

Population within the EVMWD service area is projected to increase from 123,375 in 2010 to 185,102 in 2035 at a rate of 2.0 percent per annum. Employment is projected to increase from 19,411 in 2010 to 41,900 in 2035 at a rate of 4.6 percent per annum. Housing is projected to increase from 41,757 in 2010 to 63,888 in 2035 at a rate of 2.1 percent per annum. The population forecasts discussed above are used to develop demand projections for EVMWD's service area.

WATER DEMANDS

Existing Water Demands

EVMWD serves a total of 37,250 potable service connections and has a normalized average annual potable demand of approximately 32,000 acre-ft/yr. EVMWD also has non-potable (recycled) water customers in the Canyon Hills, Canyon Lake, and Horsethief Canyon regions. Existing recycled water use for irrigation is approximately 450 acre-ft/yr. Under existing conditions, recycled water is also used for maintaining lake levels in Lake Elsinore and is discharged to Temescal Wash for environmental enhancement.

One of the most significant changes in the UWMP law since the 2005 UWMP cycle is the addition of water conservation targets as specified in Senate Bill x7-7 (SB x7-7). SB x7-7 requires all public water agencies to implement appropriate conservation measures to reduce their water demands by 20 percent by year 2020. The 20 percent reduction is to be achieved from a baseline demand and would serve as a water use target. SB x7-7 also requires that all public agencies achieve incremental progress towards the water use target by reducing the per capita usage by 10 percent by December 31, 2015.

Methods to calculate baseline demands and water use targets have been developed by the California Department of Water Resources (DWR) in accordance with the law, and are provided in the DWR Guidebook (DWR, 2011). The law provides flexibility to the agency preparing the UWMP to develop baseline demands and water use targets using methodologies of their choice.

Baseline Water Demand and Water Use Target

A continuous 10-year period starting from 1999 and ending at 2008 is used as the 10-year base period for EVMWD. The baseline demand for EVMWD expressed also as base daily per capita water use is 248 gallons per capita per day (gpcd). The baseline demand is computed using EVMWD's service area population and gross water use for each year in the base period.

DWR published four methods to determine the urban water use target. Methods 1 through 3 were established in the Water Conservation Bill of 2009. Method 4 was subsequently prepared by DWR and an advisory committee consistent with the requirements of Section 10608.20 of the Water Code. An urban water purveyor can use any one of the four methods to determine its interim and 2020 water use targets. These methods are briefly summarized below:

- **Method 1** Target water use is 80 percent of the 10-year base daily per capita water use.

- **Method 2** Target water use is the summation of three performance standards: indoor residential use; outdoor landscape use; and commercial, industrial, and institutional (CII) use.
- **Method 3** Target water use is 95 percent of the regional 2020 water conservation goal.
- **Method 4** Target water use is obtained by subtracting water savings from indoor residential use; unmetered water deliveries; CII use; landscape use; and system water loss from the 10-year base daily per capita water use.

EVMWD's interim and 2020 water use targets are determined using Method 2, which is the summation of three performance standards: indoor residential use; outdoor landscape use; and commercial, industrial, and institutional. EVMWD's water use target computed by this methodology is 244 gpcd.

EVMWD's 5-year baseline per capita water use is 253 gpcd. DWR requires that if the urban water use target is greater than 95 percent of the five-year base daily per capita water use value, then the urban water use target is adjusted to be 95 percent of the 5-year base daily per capita water use value. Since the urban water target use calculated using Method 2 is greater than the 95 percent of the 5-year baseline daily per capita water use, the urban water use target is adjusted to be 95 percent of the 5-year base daily per capita water use value, which equals to 240 gpcd.

Water Demand Projections

Future potable water demands are calculated based on population projections and the water use target (240 gpcd) for EVMWD's service area. Potable demands are expected to double by 2035. Projected wholesale potable water sales to the Farm Mutual Water Company are also included in **Table ES- 2**.

The table also includes recycled water use within EVMWD's service area. The future average recycled water demand is projected to be approximately 2,430 acre-ft/yr in the Wildomar area. The entire demand will constitute potable to recycled water conversions that will occur in the planning horizon of this UWMP. Construction of facilities in the Wildomar area has been completed and is expected to become operational in 2011. Construction of facilities in the Summerly area is currently on-going while facilities for the Tuscany area are currently being designed. Other uses for recycled water include discharge to Lake Elsinore for maintaining water levels and discharge along Temescal Wash for environmental enhancement. The total potable and recycled water demand for EVMWD's service area is presented in **Table ES- 2**.

Table ES- 2 Total Water Use

Water Use	2005	2010	2015	2020	2025	2030	2035
Total water deliveries	26,564	25,057	36,791	39,796	43,189	46,363	49,158
Sales to other water agencies[1]	1,020	780	501	542	588	631	669
Additional water uses and losses[2]	0	13,450	14,015	14,906	15,431	15,431	15,431
Total	27,584	39,287	51,306	55,244	59,208	62,426	65,258

[1] *Sales to other water agencies are taken into account for in the calculation of "Total Water Delivery".*
[2] *System losses are taken into account for in the calculation of "Total Water Delivery".*

SYSTEM SUPPLIES

Existing Supplies

EVMWD obtains its potable water supplies from imported water from Metropolitan, local surface water from Canyon Lake, and local groundwater from the Elsinore Basin. EVMWD has access to groundwater from Elsinore Basin, Coldwater Basin, San Bernardino Bunker Hill Basin, Rialto-Colton and Riverside-North Basin. Almost all of the groundwater production that is used for potable use occurs in the Elsinore Basin. Imported water supply is purchased from the Metropolitan via Eastern Municipal Water District and Western Municipal Water District.

EVMWD's existing recycled water demands are supplied by tertiary-treated wastewater from the Regional WRF, Railroad Canyon WRF, and Horsethief WRF. In the effort to minimize the need for imported water, EVMWD plans to expand its recycled water system to provide recycled water for irrigation users and to maintain water levels in Lake Elsinore during normal and dry years.

Future Supplies

Since EVMWD's population is expected to increase in the next 25 years, additional water supply sources are necessary to meet future growth. Future supplies include the construction of a pump station that would increase the TVP capacity and plans to address Elsinore Groundwater Basin's overdraft condition through the implementation of the Back Basin Groundwater Storage Project as part of the Elsinore Basin GWMP. EVMWD also plans to complete three groundwater projects in the next five years: Terra Cotta well, Cereal 1 and Corydon well blending pipeline and Palomar well replacement. The available water supply from these projects under different hydrologies is presented in **Table ES- 3**.

Table ES- 3 Future Water Supply Projects

Project name[2]	Projected start date	Projected completion date	Potential project constraints	Normal-year supply	Single-dry year supply	Multiple-dry year supply
20-inch Diameter Blending Pipeline (Cereal 1 and Corydon)	2011	2012	None	0[1]	2,000	1,600
Palomar Well Replacement	2015	2015	None	0[1]	1,000	800
Temescal Valley Pipeline Pumping Station	2013	2015	None	12,900	12,900	12,900
Back Basin Groundwater Storage Phase II	2024	2025	None	0[1]	4,200	3,900
North Basin Aquifer Storage and Recovery	2024	2025	None	0[1]	1,400	1,300
Total				12,900	21,500	20,500

(1) *It is assumed that groundwater production will not exceed the natural recharge volume for the Elsinore Basin. Therefore, it is assumed that the addition of new groundwater wells will not increase groundwater production during normal years.*
(2) *These projects are identified in EVMWD's Water Resources Management Plan (MWH,2007)*

The summary of the water supplies from various water supply sources under a normal year hydrology is presented in **Table ES- 4**.

Table ES- 4 Water Supplies – Current and Projected

Water Supply Sources		2010	2015	2020	2025	2030	2035
Water purchased from	Wholesaler supplied volume (yes/no)						
Metropolitan	Yes	35,200	48,100	48,100	48,100	48,100	48,100
Supplier-produced groundwater[1]		2,978	6,750	6,750	6,750	6,750	6,750
Supplier-produced surface water[2]		4,900	4,900	4,900	4,900	4,900	4,900
Recycled Water[3]		449	1,014	1,905	2,430	2,430	2,430
Lake Replenishment and Discharge to Temescal Wash		8,401	8,401	8,401	8,401	8,401	8,401
Total		51,928	69,165	70,056	70,581	70,581	70,581

(1) *Assumes that groundwater pumping in the Elsinore and the Coldwater Basins will not exceed the natural recharge in the basins. Natural recharge in the Elsinore Basin is 5,500 acre-ft/yr while natural recharge in the Coldwater Basin is 1,250 acre-ft/yr*
(2) *Represents production from the Canyon Lake WTP during a median year hydrology (MWH, 2009)*
(3) *Assumes that all recycled water produced at EVMWD's Regional Plant is used for replenishment of water levels in Lake Elsinore and discharged along Temescal Wash for environmental enhancement.*

WATER SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING

EVMWD's water supplies are surface water from Canyon Lake, groundwater pumping, and imported water from Metropolitan Water District of Southern California (Metropolitan) via the Temescal Valley Pipeline (TVP) and Auld Valley Pipeline (AVP). Water supply from these sources is predicted to be fully reliable through 2030.

Local Surface Water Reliability

Local inflows to the Canyon Lake are treated at the Canyon Lake Water Treatment Plant (CLWTP). There is limited hydrologic data documenting inflows to the lake. The reliability of supplies at the CLWTP is dependent on local hydrology and is reduced during dry year conditions. **Table ES- 5** summarizes the historical flows (natural runoff) to the Canyon Lake WTP.

Table ES- 5 Summary of Historical Flows to Canyon Lake WTP (1993 through 2009)

Criteria	Annual Flows (acre-ft/yr)
Average	2,530
Minimum (Single Dry Year)	750
Maximum (Wet Year)	6,550
Minimum, 3-Year Average (Multiple Dry Years)	1,930

Note: In 2002, the Canyon Lake WTP was not operational due to construction at the facility.

Groundwater Supply Reliability

EVMWD is the largest pumper in the Elsinore Basin accounting for approximately 95 percent of the total production. Groundwater supply from the Elsinore Basin is considered to be a reliable source of supply up to the long-term natural recharge of the groundwater basin. During a normal year, the well pumps are not operated regularly during winter months when demands are low. However, during dry years, the well pumps can be used to extract groundwater throughout the year increasing total extraction. EVMWD's conjunctive use program recharges imported water in the Elsinore Basin during wet years enhancing groundwater supply reliability. Conjunctive use and artificial recharge programs instituted by EVMWD over the past several years and continued implementation of such programs in the future is expected to result in satisfactory management of the Elsinore Basin.

Imported Water Supply Reliability

Per Metropolitan's Regional Water Urban Water Management Plan (RUWMP), Metropolitan indicates that its existing supplies are adequate to meet the projected demands in all hydrologic conditions through 2035 (Metropolitan, 2010). Implementation of planned supplies by Metropolitan increases reliability and maintains an adequate reserve. Based on Metropolitan's 2010 RUWMP, it is assumed that imported water is fully reliable during average, dry, and wet years.

Water Shortage Contingency Planning

EVMWD adopted a Water Shortage Contingency Plan on February 5, 1992. The key elements of the EVMWD's Water Shortage Contingency Plan are ordinances with phased water use restrictions and a drought rate structure. EVMWD has two water shortage ordinances: Nos. 78 and 81, presented in **Appendix D**. The drought plan stages and reduction goals (applied to the base years specified in the ordinances) are presented in **Table ES- 6**. Determination of a Stage I, II, III, IV or V condition is at the discretion of EVMWD's General Manager in consultation with the Board of Directors. EVMWD does not have a Stage V reduction for its retail customers. For its wholesale customers, a Stage V reduction would result in a mandatory reduction of 20 percent. A mandatory reduction of 50 percent would occur under Stage V for retail agricultural customers with interruptible deliveries. However, EVMWD does not serve any customer with interruptible deliveries. During a Stage I shortage, while a water usage reduction to meet a reduction goal is voluntary (as indicated in **Table ES- 6**), the restrictions on water-use activities shown in **Table ES- 7** are mandatory.

Table ES- 6 Water Supply Shortage Stages and Conditions

Stage	Voluntary or Mandatory Reduction	Reduction Goal (%)			
		Retail Customers (Firm Deliveries)	Wholesale Customers (Firm Deliveries)	Retail Customers (Interruptible Deliveries)	Retail Agricultural Customers (Interruptible Deliveries)
I	Voluntary	10	10	Non-specific	Non-specific
II	Mandatory	5	5	20	20
III	Mandatory	10	10	30	30
IV	Mandatory	15	15	40	40
V	Mandatory	N/A	20	N/A	50

The mandatory water use restrictions and actions are detailed in Ordinances No. 78 and 81. Key prohibited actions by stage are presented in Table ES- 7. EVMWD does not have customers with interruptible deliveries at this time. Examples of water consumption reduction methods and the projected percent of reduction are presented in Table ES- 8.

Table ES- 7 Water Shortage Contingency – Mandatory Prohibitions

Prohibitions	Stage When Prohibition Becomes Mandatory
No landscape irrigation between 11am and 4pm	I
No runoff from irrigation	I
Water efficient landscaping encouraged	I
No landscape irrigation between 6am and 6pm unless hand-held hose or drip irrigation or reclaimed water is used	II
Irrigation only three times per week	II
No water served in restaurants unless requested	II
Irrigation only twice a week	III
Commercial car washing using recycled water only	III
No filling swimming pools	III
No golf course watering, except greens, unless reclaimed water is used	III
Irrigation only once a week	IV
Water rationing by customer class	IV
No turf planting at new homes until drought is over	IV

EVMWD's mandatory water use restrictions are detailed in Ordinance No. 78 and 81. Some of the reduction methods are ongoing efforts and do not have a specified stage at which they take effect. More detailed information on the stages at which the methods take effect is listed below:

Table ES- 8 Water Shortage Contingency – Consumption Reduction Methods

Consumption Reduction Methods	Stage When Method Takes Effect	Projected Reduction (%)
Demand Reduction Program	Varies	Varies with Stage
Voluntary Rationing	Stage 1	10 (Total)
Education Program	Ongoing	10 (Total)
Plumbing Fixture Replacement	Ongoing	10 (Total)
Mandatory Rationing	Stage 4	Up to 50 (Total)
Flow Restrictions	Not Specified	Up to 50 (Total)
Use Prohibitions	Stage 1	Up to 50 (Total)

Water Supply Sufficiency

A comparison of projected supplies and demands over different hydrologies reveals that sufficient supply exists to meet demands. **Table ES- 9**, **Table ES- 10**, **Table ES- 11** show the projected normal year, single-dry and multiple-dry-year supply and demand comparison through 2035, respectively. The projected supplies include the future water supply projects discussed earlier in this section. Dry year demands are assumed to be approximately 9 percent higher than normal year demands.

Table ES- 9 Supply and Demand Comparison – Normal Year

	2015	2020	2025	2030	2035
Supply totals	69,165	70,056	70,581	70,581	70,581
Demand totals	51,306	55,244	59,208	62,426	65,258
Difference	17,858	14,812	11,373	8,155	5,323
Difference as % of Supply	25.8%	21.1%	16.1%	11.6%	7.5%
Difference as % of Demand	34.8%	26.8%	19.2%	13.1%	8.2%

Table ES- 10 Supply and Demand Comparison – Single Dry Year

	2015	2020	2025	2030	2035
Supply totals	77,765	78,656	79,181	79,181	79,181
Demand totals	56,027	60,326	64,655	68,169	71,262
Difference	21,738	18,329	14,526	11,012	7,919
Difference as % of Supply	28.0%	23.3%	18.3%	13.9%	10.0%
Difference as % of Demand	38.8%	30.4%	22.5%	16.2%	11.1%

Table ES- 11 Supply and Demand Comparison – Multiple Dry-Year Events

	2015	2020	2025	2030	2035
Supply totals	76,765	77,656	78,181	78,181	78,181
Demand totals	56,027	60,326	64,655	68,169	71,262
Difference	20,738	17,329	13,526	10,012	6,919
Difference as % of Supply	27.0%	22.3%	17.3%	12.8%	8.9%
Difference as % of Demand	37.0%	28.7%	20.9%	14.7%	9.7%

DEMAND MANAGEMENT MEASURES

Demand management measures (DMMs) are mechanisms a water supplier implements to increase water conservation. EVMWD became a signatory to the California Urban Water Conservation Council (CUWCC) MOU regarding Urban Water Conservation in California on December

11, 2002. As part of the MOU, EVMWD needs to implement several Best Management Practices (BMPs) as part of its water conservation program. The initial term of the MOU commenced on September 1, 1991 and will be in effect for ten years, after which it is automatically renewed on an annual basis for all signatories unless a signatory withdraws. EVMWD signed the MOU in December 2002, so the initial term ends in December 2012. However, the MOU was recently amended in June 2010 and full implementation of the BMPs is now required by 2018. EVMWD plans to achieve full coverage of each BMP no later than FY 2018. A copy of the EVMWD's 2009-2010 Coverage Report is presented in the **Appendix F** to provide documentation of DMM implementation.

SECTION 1 PLAN PREPARATION

Elsinore Valley Municipal Water District (EVMWD) prepared an Urban Water Management Plan (UWMP) in year 2000 in compliance with the Urban Water Management Plan Act (UWMP Act), which was adopted by EVMWD's Board of Directors on December 22, 1999 (Montgomery Watson/Maddaus Water Management/The Weber Group, 2000). An updated UWMP (MWH, 2005) was completed to incorporate changes in the region's water planning and management activities. This UWMP is an update of the 2005 document that incorporates a number of significant changes to the UWMP legislation and to the region's water planning and management activities that have taken place in the last five years. These changes include, but are not limited to, the development of EVMWD's Water Resources Management Plan (MWH, 2006) and the startup of the conjunctive use program.

This section provides an overview of the UWMP Act and the recent legislative changes that affect the UWMP Act. The section further describes the coordination effort undertaken by EVMWD during the preparation of the 2010 UWMP with other agencies. The section concludes with an overview of the report organization.

Each section and subsection in this report is organized to generally follow the outline presented in the California Department of Water Resources (DWR) *Guidebook to Assist Urban Water Supplier to Prepare a 2010 UWMP*, dated March 2011 (DWR, 2011). For the benefit of the reader, pertinent sections of the UWMP Act or requirements described in the Guidebook are cited in the beginning of each subsection in italicized fonts where necessary. This is followed by a discussion of the elements that address the Guidebook requirements.

1.1 OVERVIEW OF THE URBAN WATER MANAGEMENT PLANNING ACT

Assembly Bill (AB) 797 established the UWMP Act on September 21, 1983. Passage of this law by the California Legislature recognized that water is a limited resource and that efficient water use and conservation would be actively pursued throughout the State. The UWMP Act requires water suppliers in California, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet per year (acre-ft/yr) of water, to prepare and adopt a plan every five years which defines their current and future water use, sources of supply, source reliability, and existing conservation measures. The UWMP Act requires that each water supplier prepare or update its UWMP every five years in years ending in five and zero. The plan is to be submitted to DWR.

Senate Bill (SB) 610, passed in 2001, requires that UWMPs be used as the basis for water supply assessments for new large developments (500 or more dwelling units or equivalent demand). Since SB 610 required the demonstration of water supply adequacy for 20 years, DWR has suggested that new UWMPs be prepared with a 25-year planning horizon so the UWMP demand and supply projections will be valid for use in WSAs until the next UWMP update in 2015.

The most recent amendment to the UWMP Act was Senate Bill 7 of the 7th Extraordinary Session (SB x7-7 Steinberg) passed in 2009, which requires a 20 percent reduction in per capita use by the year 2020 (discussed in more detail later in this section). Usually, UWMPs are due to DWR on December 31 in years ending in zero and five. But, in order to provide enough time to address SB x7-7 requirements, DWR provided a time extension to water suppliers during the 2010 cycle. According to DWR's schedule, the UWMPs should be prepared and adopted by water suppliers by July 1, 2011 and are due to DWR by July 31, 2011.

In recognition of the state requirements, EVMWD has prepared this 2010 UWMP. The purpose of the plan is to document EVMWD's projected water demands and its plans for delivering water supplies to EVMWD's water service area through 2035. This plan includes all information necessary to meet the requirements of California Water Code Division 6, Part 2.6 (Sections 10610-10657) of the UWMP Act as updated in 2010.

1.2 SIGNIFICANT CHANGES TO UWMP Act SINCE 2005

1.2.1 Senate Bill x7-7 Water Conservation

One of the most significant changes in the UWMP law since the 2005 UWMP cycle is the addition of water conservation targets as specified in SB x7-7. The California 20x2020 Program (Program) is a statewide municipal water conservation program. In February 2008, Governor Arnold Schwarzenegger established a statewide goal of 20 percent reduction in urban per capita use of potable water by the year 2020. Urban water users in California consume 8.7 million AFY of potable water; under the Program, Californians would save enough water (approximately 1.74 million AFY) to serve more than two million families each year. The California State Water Resources Control Board (SWRCB) in concert with DWR and five other state agencies prepared the *20x2020 Water Conservation Plan,* which sets forth a statewide road map to maximize the state's urban water efficiency and conservation opportunities between 2009 and 2020, and beyond (SWRCB, 2010).

SB x7-7 was passed in the state Senate and Assembly in late 2009 to mandate the Program. This bill requires a statewide reduction in urban per capita water usage of 20 percent by December 31, 2020. The bill also requires that the state achieves incremental progress towards the goal by reducing the per capita usage by 10 percent by December 31, 2015. The bill requires each urban water supplier to develop interim and final urban water use targets consistent with the requirements of the bill. Urban water suppliers are required to comply with the requirements established by the bill on or before July 1, 2016 in order to be eligible for state water grants or loans.

DWR has developed specific guidelines to address the SB x7-7 requirements in the 2010 UWMP. These requirements are addressed in the subsequent sections of this report.

1.2.2 DWR Methodologies for Baseline and Target Calculations to Comply with SB x7-7 Requirements

As described earlier, SB x7-7 requires all public water agencies to implement appropriate conservation measures to reduce their water demands by 20 percent by year 2020. Methods to calculate baseline demands and water use targets have been developed by DWR in accordance with the law, and are provided in the DWR Guidebook. The law provides flexibility to the agency preparing the UWMP to develop baseline demands and water use targets using methodologies of their choice.

There are currently two methods listed in the DWR Guidebook in accordance with SB x7-7 on how to establish a baseline demand (designated as *base daily per capita water use*):

- 10-year average per capita use for periods ranging from 1995-2004 to 2001-2010
- 15-year average if recycled water use is greater than or equal to 10 percent of the demand

The law requires each retail water supplier to develop urban water use targets by July 1, 2011 using one of the following methods:

1. Eighty (80) percent of the urban retail water supplier's base daily per capita water use.
2. The per capita daily water use that is estimated using the sum of the following performance standards:
   a. For indoor residential water use, 55 gallons per capita daily (gpcd) water use as a provisional standard. Upon completion of the DWR's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.
   b. For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the state's Model Water Efficient Landscape Ordinance.
   c. For commercial, industrial, and institutional (CII) uses, a 10-percent reduction in water use from the baseline CII water use by 2020.
3. Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). For the South Coast hydrologic region, this target is 142 gpcd. However, this method does not appear to be applicable to EVMWD. This method is for agencies which currently have low per capita usage and it requires them to reduce their usage by at least five percent (Section 10608.22).

4. The difference between the base daily per capita water use and the estimated water savings from indoor residential use, unmetered water deliveries, CII use, landscape use, and system water loss.

A more detailed description of these methodologies is provided in Section 3 – System Demands of this report.

1.3 COORDINATION

#4 - Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable (10620(d)(2)).

#6 - Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision (10621(b)).

#54 - The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan (10635(b)).

#55 - Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan (10642).

#56 - Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area (10642).

1.3.1 Inter-Agency Coordination

EVMWD coordinated the preparation of this UWMP with Metropolitan Water District of Southern California (Metropolitan), Western Municipal Water District (Western MWD), Eastern Municipal Water District (Eastern MWD), the Elsinore Water District (EWD), the County of Riverside Planning Department, the cities of Canyon Lake, Lake Elsinore, Murietta and Wildomar, The Farm Mutual Water Company, and other interested parties. The actions EVMWD has taken to coordinate the preparation of this UWMP with these agencies are summarized in **Table 1-1**.

Table 1-1 Coordination with Appropriate Agencies (Same as Table 1 in 2010 UWMP Guidebook)

Agency	Participated in Developing the Plan	Commented on the draft?	Attended public meetings?	Was contacted for assistance?	Was sent a copy of the draft plan?	Was sent a notice of intention to adopt?	Not Involved / No Information
Metropolitan					X	X	
Eastern MWD					X	X	
Western MWD					X	X	
Elsinore Water District					X	X	
The Farm Mutual Water Company					X	X	
County of Riverside Planning Department				X		X	
City of Canyon Lake				X		X	
City of Lake Elsinore				X		X	
City of Murietta				X		X	
City of Wildomar				X		X	

1.3.2 Resource Maximization and Import Minimization Plan

EVMWD has implemented several water management strategies in efforts to maximize local resources and minimize the need for imported water. Currently, EVMWD is pumping groundwater from local basins: Elsinore, San Bernardino Bunker Hill, Rialto-Colton and Riverside North, and Coldwater. In addition, EVMWD treats water from Canyon Lake according to an agreement with the Canyon Lake Property Owners Association (POA) that requires the maintenance of a minimum lake elevation. EVMWD also uses recycled water for irrigation use, and plans on identifying and implementing further opportunities for recycled use in the future. By implementing such a water management strategy, EVMWD aims to minimize imported water use to the extent that local water resources allow.

1.3.3 City and County Notification and Participation

A letter of notification was sent to the Cities of Lake Elsinore, Canyon Lake, Murrieta, Wildomar and the County of Riverside Planning Department on January 25, 2011 pursuant to Section 10621(b) of the Water Code. This letter contained notification of the UWMP update and the request for comments during the update process.

1.4 PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

#7 - The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640) (10621(c)).

#57 - After the hearing, the plan shall be adopted as prepared or as modified after the hearing (10642).

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

#59 - An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption (10644(a)).

#60 - Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours (10645).

1.4.1 Plan Development and Public Participation

EVMWD followed its normal procedures for reviewing and adopting the UWMP:

- Review by staff of a preliminary draft of the UWMP at Water Planning Committee (May 2, 2011);
- Workshop on the UWMP with the Board of Directors at Study Session (May 18, 2011);
- Draft plan made available to public thirty days before public hearing. Copies of the report were on file at the EVMWD office at 31315 Chaney Street, Lake Elsinore, CA (May 23, 2011)
- Legal notice published in the Press-Enterprise (May 26, 2011);
- Public hearing held at a regular EVMWD Board Meeting (June 9, 2011); and
- Adoption by resolution at EVMWD Board Meeting (June 9, 2011).

1.4.2 Resolution for Adopting the Plan

The Board of Directors of EVMWD adopted this UWMP on June 9, 2011. A copy of this adopted resolution is presented in Appendix G.

1.4.3 Distribution of the 2010 UWMP

The final EVMWD 2010 UWMP will be distributed to the following entities:

- Metropolitan Water District of Southern California;
- Eastern Municipal Water District;
- Western Municipal Water District;
- Elsinore Water District;

- The Farm Mutual Water Company;
- County of Riverside Planning Department;
- City of Lake Elsinore;
- City of Canyon Lake;
- City of Wildomar;
- City of Murietta; and
- County of Riverside Planning Department.

Copies of the 2010 UWMP are available to the public upon request.

1.5 REPORT ORGANIZATION

The report is organized into following sections:

Section 1 – Introduction

Section 2 – System Description

Section 3 – System Demands

Section 4 – System Supplies

Section 5 – Water Supply Reliability and Water Shortage Contingency Planning

Section 6 – Demand Management Measures

SECTION 2 SYSTEM DESCRIPTION

2.1 SERVICE AREA PHYSICAL DESCRIPTION

#8 - Describe the service area of the supplier (10631(a)).

The Elsinore Valley Municipal Water District (EVMWD) was formed in 1950 under the Municipal Water District Act of 1911. Having a 96 square mile service area (EVMWD, 2004c), EVMWD provides water and wastewater services to the cities of Lake Elsinore, Canyon Lake, Wildomar, and Murrieta. In addition, EVMWD serves the unincorporated communities of the Farm, Cleveland Ranch, Meadowbrook, Lakeland Village, Rancho Capistrano – El Cariso Village, Horsethief Canyon, and Temescal Canyon.

2.1.1 EVMWD Service Area

EVMWD's service area is divided into two divisions: the Elsinore Division and the Temescal Division. The map of the service area is shown on **Figure 2-1.** The Elsinore Division makes up the majority of the service area with approximately 39,000 accounts, encompassing an area of 96 square miles. The Temescal Division is isolated from the Elsinore Division and is located to the northwest of the Elsinore Division. It covers an area of approximately 2.5 square miles and has approximately 500 accounts.

2.1.2 History of EVMWD

EVMWD was incorporated on December 23, 1950, under the provisions of the California Municipal Water District Act of 1911. The purpose of EVMWD is to finance, construct, operate, and maintain water and wastewater systems serving properties within EVMWD's boundaries. EVMWD was formed to protect local water supplies and import supplemental water to alleviate water shortages. At the time of its incorporation, EVMWD had too low of an assessed valuation to become a member of the Metropolitan Water District of Southern California (Metropolitan), which was formed in 1928 by a legislative act to provide supplemental water for its member agencies in Southern California. Western Municipal Water District (Western MWD) was formed in 1954 under the Municipal Water District Act of 1911 to bring supplemental water from Metropolitan to growing western Riverside County. Following Western MWD's annexation to Metropolitan, EVMWD was annexed to Western MWD's service area in 1954 (EVMWD, 2005a).

A bond election was held in 1955 that provided $1,600,000 in capital funding for transmission, storage, treatment, and limited distribution facilities for the importation and distribution of Metropolitan water within EVMWD. Subsequent negotiations with the Temescal Water Company (TWC) resulted in the Railroad Canyon Storage Agreement (1955), which provided EVMWD with 3,000 acre-feet of storage capacity in Railroad Canyon Reservoir (EVMWD, 2005a).

During 1956 and 1957, construction proceeded on the Lake Elsinore loop transmission system and Improvement District No. 1. Also during this period, several small mutual water companies petitioned EVMWD to accept their physical facilities and operate them. These were Elsinore Valley Mutual, Kilmeny Lot Owner's Mutual, Landowner's Mutual, Grand Avenue Mutual, Lake-view Mutual, and Clayton Mutual water companies. The first delivery of Metropolitan water started on April 8, 1957 (EVMWD, 2005a).

In July 1962, Improvement District No. 2 encompassing the Meadowbrook area was formed, which increased the EVMWD service area by one-third. Services were extended to the El Cariso area by the formation of Improvement Districts 3A and 4 and to the Eucalyptus Grove area by the formation of Assessment District 65-1 under the Improvement Act of 1911. During 1967-68, Improvement District U-1 serving the Rancho Capistrano area was formed. The formation of Improvement District U-2 during 1967-68, serving the Canyon Lake Development, was the initial step to providing sewer service within EVMWD. In 1969, the assets of South Elsinore Mutual Water Company were purchased, and the services in that area were consolidated with regular operations. The acquisition of the TWC in 1989 increased the service area of EVMWD to the Temescal Valley. This portion of District's service area became the Temescal Division (EVMWD, 2005a).

Today, the residents within the EVMWD boundary are served by one of three water service agencies: EVMWD, EWD, and The Farm Mutual Water Company. The latter two are located entirely within EVMWD boundaries, and obtain most of their water wholesale from EVMWD. It is likely that EWD will undergo dissolution and will be incorporated as a part of EVMWD's service area in the future. EVMWD also provides wastewater and recycled water service to customers. EVMWD is legally empowered, but does not currently, provide services for storm water disposal facilities, and fire protection facilities.

As a municipal water district, EVMWD has the authority to act in its own name to make and enter into contracts; to incur debts, liabilities, or obligations; and to issue bonds, notes, warrants, and other evidences of indebtedness. EVMWD also has the authority to collect revenues in the form of rates and charges for facilities and services provided. EVMWD has the power to levy *ad valorem* (property) taxes and acquire property and rights-of-way by eminent domain procedures.

2.1.3 Service Area Climate

#9 - (Describe the service area) climate (10631(a)).

The area served by EVMWD generally experiences pleasant weather for most part of the year. On an average, July and August are the warmest months of the year. The highest recorded temperature in EVMWD's service area was 115°F in 1960. On average, December is the coolest month of the year. The lowest recorded temperature in EVMWD's service area was 10°F in 1974. On average, February is the wettest month of the year. The historical average low and high temperatures and average precipitation for EVMWD's service area are shown in **Table 2-1**.

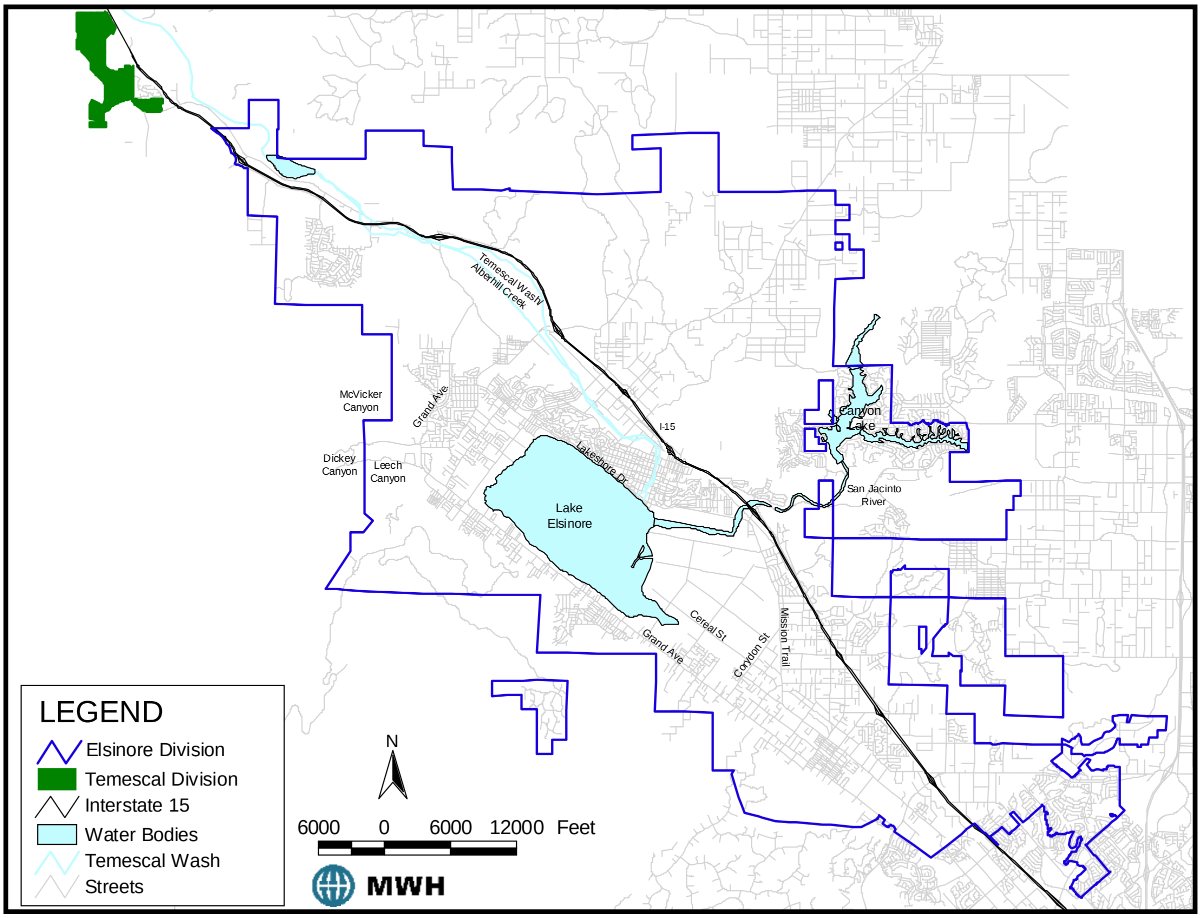


Figure 2-1
EVMWD Service Area

Table 2-1
Climate Data for Lake Elsinore, California

Month	Average Low (°F)	Average High (°F)	Average Precipitation (Inches)
January	38°	66°	2.8"
February	40°	68°	2.96"
March	43°	71°	2.29"
April	46°	77°	0.56"
May	51°	83°	0.22"
June	56°	91°	0.02"
July	61°	98°	0.10"
August	62°	98°	0.12"
September	58°	93°	0.30"
October	51°	84°	0.36"
November	42°	73°	0.78"
December	37°	67°	1.58"

Source: Lake Elsinore, CA: Weather Facts, www.weather.com
Lake Elsinore Historical Weather Averages, www.Intellicast.com

2.2 SERVICE AREA POPULATION

#10 - (Describe the service area) current and project population…The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier…(10631(a)).

#11 -…(population projections) shall be in five-year increments to 20 years or as far as data is available (10631(a)).

#12 - Describe…other demographic factors affecting the supplier's water management planning (10631(a)).

Population projections can be used to anticipate future water needs, while employment projections are useful in estimating water demands specifically related to certain classes of users (daytime, commercial and industrial, etc.). Since at the time of the preparation of this Urban Water Management Plan, final 2010 census data was not available from the United States Census Bureau. Consequently, estimates developed by the Riverside County Center for Demographics Research (RCCDR) are used.

RCCDR developed population, household, and employment projections by census tract for Riverside County. These data are used to develop population, household, and employment projections for EVMWD's service area. Geographic Information System (GIS) layers of EVMWD's service area and the census tracts are used to determine which tracts fell within EVMWD's service area. If only a portion of a tract falls within EVMWD's service area, then estimates for population, households, and employment are pro-rated based on the total area of the census tract. These projections are presented in **Table 2-2. Figure 2-2** presents the population, employment, and housing forecasts for EVMWD's service area.

Table 2-2
Population, Employment, and Housing Forecasts for EVMWD's Service Area (Same as Table 2 in 2010 UWMP Guidebook)

Year	2010	2015	2020	2025	2030	2035
Population	123,375	136,133	149,852	162,626	174,579	185,102
Employment	19,411	24,699	27,458	32,272	37,086	41,900
Housing	41,757	46,388	51,297	55,774	59,921	63,888

Source: Riverside County Center for Demographics Research, 2010
Forecasts are presented for both, the Elsinore Division and the Temescal Division.

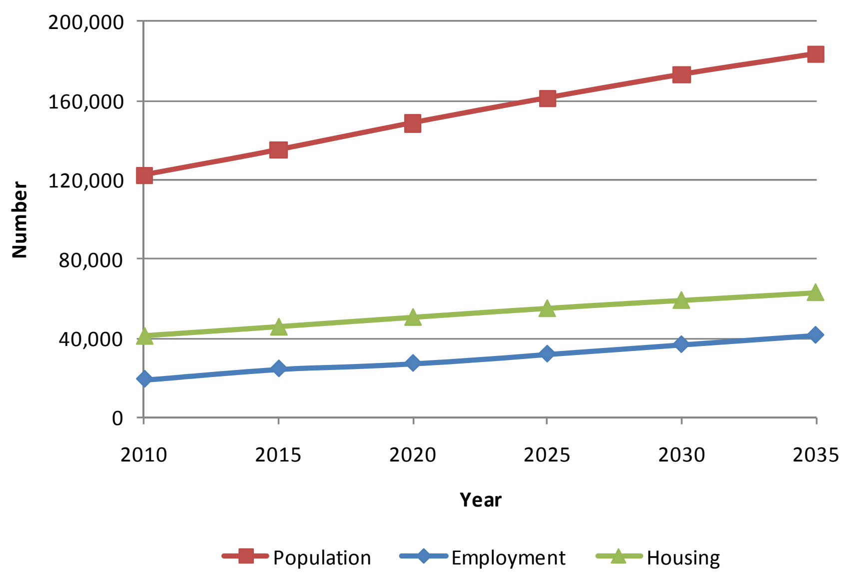


Figure 2-2
Projected Population, Employment and Housing within the EVMWD Service Area

Population within the EVMWD service area is projected to increase from 123,375 in 2010 to 185,102 in 2035 at a rate of 2.0 percent per annum. Employment is projected to increase from 19,411 in 2010 to 41,900 in 2035 at a rate of 4.6 percent per annum. Housing is projected to increase from 41,757 in 2010 to 63,888 in 2035 at a rate of 2.1 percent per annum.

The population forecasts developed in this section is used to develop demand projections for EVMWD's service area. **Section 3 System Demands** discusses EVMWD's water current and future water needs.

SECTION 3 SYSTEM DEMANDS

This section presents the Elsinore Valley Municipal Water District's (EVMWD) existing and projected water demands by water use category for the planning horizon of the 2010 Urban Water Management Plan (UWMP). Future demand projections are based on the interim (2015) and urban water use targets (2020) for EVMWD. The background information and approach used to develop the EVMWD's future water demands are presented in this section.

3.1 BASELINES AND TARGETS

#1 - An urban retail water supplier shall include in its urban water management plan…due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data (10608.20(e)).

3.1.1 Base Period

Senate Bill x7-7 (SB x7-7 Steinberg) requires that urban water purveyors reduce their per capita water use by 20 percent by 2020. In order to provide a point of comparison for the 2020 urban water use target, a baseline per capita water use is established for EVMWD's service area. The baseline per capita water use is developed using water consumption and population data over a 10-year base period. The calculations for selecting the base period and developing the baseline water use are presented in *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water U*se published by the California Department of Water Resources (DWR, 2011).

The first step in calculating the baseline water use is to define the base period. Water Code Section 10608.20 states that the base period must end no earlier than December 31, 2004 and no later than December 31, 2010. The length of the base period may be between 10 to 15 continuous years based on the following two scenarios:

- If recycled water makes up for less than 10 percent of 2008 retail water deliveries, the base period must be 10 continuous years.
- If recycled water makes up for 10 percent or more of 2008 retail water deliveries, the base period may be extended to a maximum of 15 continuous years.

EVMWD's water supply sources, including recycled water supply, for 2008 are shown in **Table 3-1**. Since recycled water supply is only one percent of the total 2008 retail deliveries, a continuous 10-year period starting from 1999 and ending at 2008 is used as the base period. Total water deliveries for the selected 10-year period are provided by EVMWD. Water Code Section 10608.22 indicates that calculation of a base daily per capita water use determined by using a 5-year base period will be used to confirm that the urban water use target meets a minimum threshold. The 5-year continuous base period is to end no earlier than December 31, 2007 and no later than December 31, 2010. A continuous 5-year period starting in 2003 and ending in 2007 is used as the 5-year base period for EVMWD.

Table 3-1 Base Period Ranges (Same as Table 13 in 2010 UWMP Guidebook)

Base	Parameter	Value	Units
10- to 15-year base period	2008 total water deliveries(1)	29,728	Acre-feet per year
	2008 total volume of delivered recycled water(2)	438	Acre-feet per year
	2008 recycled water as a percent of total deliveries	1	percent
	Number of years in base period	10	years
	Year beginning base period range	1999	
	Year ending base period range	2008	
5-year base period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range[3]	2007	

(1) Obtained from EVMWD's water sales data for 2008.
(2) Recycled water data provided by EVMWD for 2008.

3.1.2 Baseline Water Use

Table 3-2 presents the per capita water consumption within EVMWD's service area. EVMWD's annual gross water use for the period 1999-2008 is calculated using the total production from all potable water sources which consist of groundwater production wells, surface water treated at the Canyon Lake Water Treatment Plant, and imported water purchased from Metropolitan Water District of Southern California (Metropolitan) through Western Municipal Water District (Western MWD) via the Temescal Valley Pipeline (TVP) and through Eastern Municipal Water District (Eastern MWD) via the Auld Valley Pipeline (AVP). Recycled water use is not included in the calculation of the baseline water use. Population for EVMWD's service area for the period 1999-2008 is obtained from EVMWD's WDSMP (MWH, 2007). Population for 2006 and 2007 is estimated based on estimates developed by the Riverside County Centre for Demographic Research (RCCDR).

Using the service area population and gross water use, the daily per capita water use is calculated for each year in the base period. The average daily per capita water use taken over the entire base period gives the base daily per capita water use. This equation used to compute the base daily per capita water use is shown below:

$$Daily\ Per\ Capita\ Water\ Use\ (gpcd) = \frac{gross\ water\ use\ (mgd) \times \left(\frac{10^6 gal}{1\ million\ gal}\right)}{population}$$

The daily per capita water use for the 10-year base period is shown in **Table 3-2**.

Table 3-2 Base Daily Per Capita Water Use – 10-year Range (Same as Table 14 in 2010 UWMP Guidebook)

Base period year		Distribution System Population[3]	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1	1999	78,123	20	250
Year 2	2000	80,603	21	259
Year 3	2001	84,513	20	231
Year 4	2002	88,423	22	245
Year 5	2003	92,333	22	240
Year 6	2004	96,243	24	250
Year 7	2005	100,153	25	246
Year 8	2006[1]	108,625	28	261
Year 9	2007[2]	112,861	30	267
Year 10	2008	117,097	27	227
Base Daily Per Capita Water Use				248

(1), (2) Population data for these years was obtained by linear interpolation from 2005 and 2008 population data reported by the RCCDR.
(3) Population for areas served by EWD and the Farm Mutual Water Company is included in Table 3-2.
mgd = million gallons per day
gpcd = gallons per capita per day

Water production for the five-year base period and the corresponding service area population is shown in **Table 3-3**. The five-year base daily per capita water use is computed using a methodology similar to the computation of the ten-year base daily per capita water use. If the five-year baseline per capita water use is less than or equal to 100 gpcd, no adjustments to the urban water use target are needed. If the five-year baseline per capita water use is greater than 100 gpcd, 95 percent of the five-year baseline per capita water use is calculated and is compared to the urban water use target. If the urban water use target is greater than 95 percent of the five-year base daily per capita water use value, then the urban water use target is adjusted to be 95 percent of the 5-year base daily per capita water use value. If the urban water use target is less than 95 percent of the five-year base daily per capita water use, no adjustments to the urban water use target are needed.

Table 3-3 Base Daily Per Capita Water Use – 5-year Range (Same as Table 15 in 2010 UWMP Guidebook)

Base period year		Distribution System Population	Daily system gross water use (mgd)(3)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	92,333	22	240
Year 2	2004	96,243	24	250
Year 3	2005	100,153	25	246
Year 4	2006(1)	108,625	28	261
Year 5	2007(2)	112,861	30	267
Base Daily Per Capita Water Use				253

(1), (2) Population data for these years was obtained by linear interpolation using 2005 and 2008 population data reported by the RCCDR.
(3) Gross water use data is obtained from EVMWD's billing data

3.1.3 Water Use Targets

DWR published four methods to determine the urban water use target. Methods 1 through 3 were established in the Water Conservation Bill of 2009. Method 4 was subsequently prepared by DWR and an advisory committee consistent with the requirements of Section 10608.20 of the Water Code. An urban water purveyor can use any one of the four methods to determine its interim and 2020 water use targets. These methods are briefly summarized below:

- **Method 1** Target water use is 80 percent of the 10-year base daily per capita water use.
- **Method 2** Target water use is the summation of three performance standards: indoor residential use; outdoor landscape use; and commercial, industrial, and institutional (CII) use.
- **Method 3** Target water use is 95 percent of the regional 2020 water conservation goal.
- **Method 4** Target water use is obtained by subtracting water savings from indoor residential use; unmetered water deliveries; CII use; landscape use; and system water loss from the 10-year base daily per capita water use.

EVMWD's interim and 2020 water use targets are determined using Method 2. Water use is categorized into indoor residential use; outdoor landscape use; and commercial, industrial, and institutional (CII) use in this method. This method is described in detail in the following subsections.

3.1.3.1 Indoor Residential Use

The Water Code Section 10608.20 (b)(2)(A) sets a provisional standard for efficient indoor use (55 gpcd) that the urban retail water suppliers using Method 2 must use to determine their 2020 water use target. According to Section 10608.42, DWR is required to submit a report to the Legislation in 2016 that will include recommendations on changes to water use efficiency standards to reflect updated efficiency information and technological changes. DWR will conduct a study to assess whether the provisional indoor residential standard of 55 gpcd should be adjusted. Hence, the 2020 target calculated using Method 2 may be subject to change should the Legislature change the indoor residential standard based on the report DWR submits in 2016.

3.1.3.2 Landscaped Area Water Use

The calculation of Landscaped Area Water Use requires a preliminary estimate of landscaped area within EVMWD's service area in 2020. For final compliance-year calculations in 2020, the estimate of the landscape area provided in this report will be updated using one of the several techniques prescribed by DWR. Methodology 6 of *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* allows the water supplier to use one or a combination of the following techniques in measuring the landscaped area for final compliance-year calculations:

1. Field-based measurement – may be accomplished by physical measurement using devices such as a total station, measuring wheel and compass, global positioning system (GPS) or other devices having accuracy similar to these devices.
2. Measuring with remote sensing – may be measured by using remote sensing to identify the landscaped areas in conjunction with a geographic information system (GIS) representation of the parcels in the water supplier's service area. It must be verified for accuracy by comparing its results to the results of field-based measurement for a subset of parcels selected using random sampling.
3. Using sampling to estimate landscaped area on small parcels – may be calculated by measuring the percentage of total parcel area that is landscaped in a sample of similar parcels and applying that percentage to the remaining parcels. This may be used only for parcels with a total land area of 24,000 square feet or less.
4. Other measurement techniques – may use another technique to measure landscaped area but must meet similar conditions to those described above for remote sensing.

Since the Landscaped Area Water Use is defined as a daily per capita rate of water use, service area population is used in calculating Landscaped Area Water Use. The five steps used in calculating the Landscaped Area Water Use are listed as follows:

1. Identify applicable Model Water Efficient Landscape Ordinance (MWELO), either 1992 or 2010, for each unit area.
2. Estimated irrigated landscaped area for each unit area.
3. Determine reference evapotranspiration for each unit area.
4. Use the Maximum Applied Water Allowance (MAWA) equation from the applicable MWELO to calculate annual volume of landscaped area water use.
5. Convert annual volume to GPCD.

EVMWD estimated its 2010 landscape area while developing budget-based water rates. Parcel sizes for EVMWD residential customers and the actual water usage relative to size of the parcel are analyzed as part of the outdoor budget calculation. The parcels are classified into five categories based on their size. For domestic customers, EVMWD calculated the landscape area by measuring the irrigated area for each parcel by overlaying a GIS layer of parcels on an aerial imagery of EVMWD's service area. EVMWD sent out letters to all residential customers asking them to verify the estimated irrigated areas within their parcels. The estimates were further refined based on customer input.

For irrigation connections, EVMWD sent letters to the customers asking them to estimate the irrigated area and provide supporting maps and drawings of the irrigated area within their parcels. EVMWD verified these estimates by overlaying a GIS layer of parcels on an aerial imagery of EVMWD's service area. The estimates were then refined to reflect the acreage estimated using GIS. This exercise revealed that approximately 60 percent of EVMWD's total parcel area is irrigated.

For landscaped areas installed before January 1, 2010, DWR specifies that the MAWA equation and all applicable criteria from the 1992 version of the ordinance or its equivalent shall be used. Since the data are compiled before January 1, 2010, the reference evapotranspiration (ETo) for Elsinore (55 inches per year) from the 1992 version of the ordinance is used. The total Landscaped Area Water Use of all parcels is computed using the MAWA equations provided in Appendix B of the *Methodologies for Calculating Baseline and Compliance Urban per Capita Water Use* (DWR, 2011). For landscaped areas that are installed before January 1, 2010, the MAWA equation and all applicable definition of terms from the original 1992 version of the ordinance are as follows:

MAWA = (ETo) X (Conversion Factor) X (ET Adjustment Factor X Landscaped Area)

For landscaped areas that are installed after January 1, 2010, the MAWA equation and all applicable definition of terms from the 2009 version of the ordinance are as follows:

MAWA = (ETo) X (Conversion Factor) X [(ET Adjustment Factor X Landscaped Area) + (Additional Water Allowance X Special Landscape Area)]

It is assumed that all landscape area developed between 2010 and 2020 will be due to residential developments. It is assumed that there will be no additional agricultural areas developed after 2010.

Landscaped Area developed after January 1, 2010 = (Population Projected in 2020 – Population in 2009) / (Number of people per Housing Unit) X (Median of Landscaped Area per Housing Unit)

The values for each component of the equation are shown in **Table 3-4**. The MAWA value must be converted from annual to daily use because the Landscaped Area Water Use is defined in units of gpcd. After dividing the MAWA value by the 2020 service area population and 365 days, the Landscaped Area Water Use is calculated to be 164 gpcd.

Table 3-4 Landscape Area Water Use Calculation

Description	Value	Units
For Landscaped areas installed before January 1, 2010		
ETo	55	inches per year
Conversion Factor (inches/year to gallons/sq.ft/year)	0.62	
LA = Landscaped Area	291,000,000	square feet
ET Adjustment Factor	0.80	
MAWA = ETo X Conversion Factor X LA X ET	7,900,000,000	gallons per year
For Landscaped areas installed after January 1, 2010		
ETo	55	inches per year
Conversion Factor (inches/year to gallons/sq.ft/year)	0.62	
LA = Landscaped Area	43,000,000	square feet
ET Adjustment Factor	0.70	
Additional Water Allowance	0.30	
Special Landscaped Area(1)	0	square feet
Service Population in 2020	149,852	
Landscaped Area Water Use = MAWA / Service Population/365	164	gpcd

(1) It is assumed that there will be no additional Special Landscape Area within EVMWD's service area between 2010 and 2020.

3.1.4 Baseline CII Water Use

The CII data for the baseline period (1999 to 2008) is obtained from EVMWD's billing data. The volume of the Baseline CII Water Use for each year is divided by the service area population to obtain the annual daily per capita water use, as shown in **Table 3-5**. The Baseline CII Water Use is the average of the annual daily per capita water use over the 10-year base period. A 10 percent reduction in the Baseline CII Water Use constitutes the CII component of the 2020 target water use computed using Method 2. EVMWD's CII water use data does not include any multi-family residential water use.

Table 3-5 Base CII Water Use – 10-year Range

Base period year		Distribution System Population	Daily system CII water use (mgd)(1)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1	1999	78,123	1.20	15.3
Year 2	2000	80,603	1.56	19.3
Year 3	2001	84,513	1.62	19.2
Year 4	2002	88,423	1.65	18.7
Year 5	2003	92,333	1.71	18.6
Year 6	2004	96,243	2.03	21.0
Year 7	2005	100,153	2.19	21.8
Year 8	2006	108,625	1.74	16.0
Year 9	2007	112,861	1.69	15.0
Year 10	2008	117,097	1.41	12.0
			Baseline CII Water Use	17.7
			Factor	90 percent
			Method 2 – CII Water Use Target = Baseline CII Water Use x Factor	15.9

(1) CII use data is obtained from EVMWD's billing data

The urban water target is the summation of the three components, indoor residential use; outdoor landscape use; and commercial, industrial, and institutional (CII) use, calculated in the above sections. The totals are adjusted for water loss to be consistent with the baseline daily per capita water use and equal 244 gpcd.

Table 3-6 Urban Water Target Use – Method 2

Technical Methodologies	Values	Units
a) Indoor Residential Water Use (Default Value)	55	gpcd
b) Landscaped Area Water Use	164	gpcd
c) Baseline Commercial, Industrial and Institutional (CII) Water Use	16	gpcd
Subtotal (a+b+c)	253	gpcd
Average Water Loss(1)	4%	
Method 2 – Urban Water Target Use (Adjusted for Water Loss)	244	gpcd
5-year Baseline Daily Per Capita Water Use	253	gpcd
95% of 5-year Baseline Daily Per Capita Water Use	240	gpcd

(1) Average water loss is calculated by dividing the difference between the total production and consumption water volume by the total production water volume over the 10-year period (1999-2008).

Since the urban water target use calculated using Method 2 is greater than the 95 percent of the 5-year baseline daily per capita water use, as shown in **Table 3-6**, the urban water target is adjusted to be 95 percent of the 5-year baseline daily per capita water use (253 gpcd as shown in **Table 3-3**), which is 240 gpcd. It should be noted that the water target of 240 gpcd is based on a preliminary estimate of 2020 landscaped area and will be revised during final-year (2020) compliance calculations.

3.2 Water Demands

#25 - Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) single-family residential; (B) multifamily; (C) commercial; (D) industrial; (E) institutional and governmental; (F) landscape; (G) sales to other agencies; (H) saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; (I) agricultural (10631(e)(1) and (2)).

3.2.1 Existing Water Demands

EVMWD serves a total of 37,250 potable service connections, with a normalized average annual demand of approximately 32,000 acre-ft/yr. EVMWD also provides wholesale water supply to the Elsinore Water District and the Farm Mutual Water Company. Historical water use for each water use sector: for the years 2005 and 2010 are presented in **Table 3-7** and **Table 3-8**.

Table 3-7 Actual Water Deliveries for 2005 (Same as Table 3 in 2010 UWMP Guidebook)

Water use sectors	2005 Metered Total (acre-feet per year) Volume(1)
Single family	14,765
Multi-family	824
Commercial	552
Industrial	1,629
Institutional/governmental	342
Landscape	5,193
Agriculture	2,316
Wholesale(2)	540
Other(3)	1,423
Total	27,584

(1) *Obtained from EVMWD's 2005 billing data*
(2) *Wholesale refers to deliveries to EWD and the Farm Mutual Water Company*
(3) *Other refers to water used for tract construction, hydrant water etc.*

Table 3-8 Actual Water Deliveries for 2010 (Same as Table 4 in 2010 UWMP Guidebook)

Water use sectors	2010 Metered Total (acre-feet per year) Volume(1)
Single family	13,829
Multi-family	772
Commercial	517
Industrial	1,526
Institutional/governmental	320
Landscape	4,865
Agriculture	2,170
Wholesale(2)	505
Other(3)	1,333
Total	25,837

(1) Obtained from EVMWD's billing data
(2) Wholesale refers to deliveries to EWD and the Farm Mutual Water Company
(3) Other refers to water used for tract construction, hydrant water etc.

3.2.2 Future Potable Water Demands

Future potable water demands are based on population projections for EVMWD's service area which are presented in **Section 2 System Description**. Existing (year 2010) demands are calculated as the product of the 2010 population and the 10-year baseline per capita water use. Starting from 2020, future demands are calculated as the product of the population and the target water use (240 gpcd) established for EVMWD using Method 2. It should be noted that the water use target developed using Method 2 will be updated during final-year compliance calculations in 2020. The water demand for 2015 is halfway between the 2010 and 2020 water demand consistent with the interim water use target for 2015. Water use projections for years 2015 and 2020 are presented in **Table 3-9** and **Table 3-10** respectively. Water use projections for years 2025, 2030, and 2035 are presented in **Table 3-11**.

For demand projections by water use sector, it is assumed that there will be no increase in agricultural demands within EVMWD's service area. It is assumed that wholesale demands will go down in the future with the dissolution of EWD and its incorporation within EVMWD's service area. Based on a review of water use sector data for the past 10 years, it is observed that the distribution of water consumption between different water use classes remains fairly consistent. Therefore, it is assumed that the proportions of water use by sector in the future will be equal to the sector proportions of 2010 water use.

Table 3-9 Projected Water Deliveries for 2015 (Same as Table 5 in 2010 UWMP Guidebook)

Water use sectors	2015 Metered Total (acre-feet per year) Volume(1)
Single family	20,159
Multi-family	1,312
Commercial	945
Industrial	2,401
Institutional/governmental	660
Landscape	7,220
Agriculture	2,170
Wholesale	501
Other	1,924
Total	37,292

(1) It is assumed that the proportion of the individual water use sectors contributing to total demand will be the same as historical years

Table 3-10 Projected Water Deliveries for 2020 (Same as Table 6 in 2010 UWMP Guidebook)

Water use sectors	2020 Metered Total (acre-feet per year) Volume(1)
Single family	21,836
Multi-family	1,449
Commercial	1,052
Industrial	2,627
Institutional/governmental	744
Landscape	7,839
Agriculture	2,170
Wholesale	542
Other	2,081
Total	40,338

(1) It is assumed that the proportion of the individual water use sectors contributing to total demand will be the same as historical years

Table 3-11 Projected Water Deliveries for 2025, 2030, and 2035 (Same as Table 7 in 2010 UWMP Guidebook)

Water Use Sectors	2025 Metered(1) (acre-feet per year)	2030 Metered(1) (acre-feet per year)	2035 Metered(1) (acre-feet per year)
Single family	23,728	25,498	27,057
Multi-family	1,603	1,747	1,875
Commercial	1,173	1,285	1,385
Industrial	2,881	3,120	3,330
Institutional/governmental	838	926	1,004
Landscape	8,538	9,192	9,768
Agriculture	2,170	2,170	2,170
Wholesale	588	631	669
Other	2,258	2,424	2,571
Total	43,777	46,995	49,827

(1) It is assumed that the proportion of the individual water use sectors contributing to total demand will be the same as historical years

3.2.3 Existing Recycled Water Demands

EVMWD currently has non-potable (recycled) water customers in the Canyon Hills, Canyon Lake, and Horsethief Canyon regions. Recycled water customers in the Canyon Hills and Canyon Lake regions are served with tertiary-treated recycled water from the Railroad Canyon WRF. Recycled water customers in Horsethief Canyon are served with tertiary-treated recycled water from Horsethief Canyon WRF. The entire effluent flow from these two plants is used for non-potable irrigation demands, except during wet weather, when effluent from the Railroad Canyon WRF is discharged into the on-site percolation ponds or the influent is bypassed around the Railroad Canyon WRF and sent to the Regional WRF for treatment and disposal. The 2010 recycled water demands in the Canyon Hills/Canyon Lake and Horsethief Canyon regions is approximately 449 acre-ft/yr.

The Regional WRF discharges its effluent to maintain the level of Lake Elsinore usually during normal and dry years and the remaining portion (minimum is 0.5 mgd per EVMWD's permit) into the Temescal Wash. An additional water demand that impacts EVMWD's water supply balance is Lake Elsinore stabilization. Based on a settlement agreement between EVMWD and the City of Lake Elsinore, EVMWD must release water into Lake Elsinore when the water surface elevation is less than 1,240 ft (Superior Court, 2003). Lake replenishment is only necessary in normal and dry years, as there is sufficient surface runoff in wet years to maintain adequate lake levels. Based on hydrologic analyses prepared for EVMWD and the Lake Elsinore-San Jacinto Watershed Authority (LESJWA), maintaining the level of Lake Elsinore requires an average of about 5,900 acre-ft/yr of replenishment water and up to 10,300 acre-ft/yr during dry years (MWH, 2005b). EVMWD was issued a NPDES permit for the Regional WRF that allows it to treat up to 8 mgd and discharge up to 7.5 mgd into Lake Elsinore for lake stabilization, 0.5 mgd to Temescal Wash for wetland enhancement and any remaining effluent for non-potable use (Regional Water Quality Control Board (RWQCB), 2005).

3.2.4 Future Recycled Water Demands

EVMWD currently serves non-potable water customers in Canyon Hills/Canyon Lake and Horsethief Canyon regions with recycled water. EVMWD plans to expand its non-potable water system in the Wildomar, Tuscany Hills, and Summerly (Golf Course) regions in phases, with delivery of recycled water from Rancho California Water District (RCWD) and Eastern MWD. The future average recycled water demand is projected to increase to approximately 2,430 acre-ft/yr by 2025. The entire demand will constitute potable to recycled water conversions.

3.2.5 Future Wholesale Water Demands

EVMWD provides wholesale water to the Farm Mutual Water Company and the Elsinore Water District. In 2010, EMVWD provided 460 and 320 acre-feet of wholesale water, respectively, to these two customers. It is assumed that the dissolution of EWD and its incorporation within EVMWD's service area will occur by 2015. Future demand for the Farm Mutual Water Company is included in the demand projections. It is assumed that demand in the area served by the Farm Mutual Water Company will increase proportionally to the water demand increase within EVMWD's service area. Wholesale water projections are presented in **Table 3-12**.

Table 3-12 Sales to other water agencies (Same as Table 9 in 2010 UWMP Guidebook)

Water Distributed	2005 (acre-feet per year)	2010 (acre-feet per year)	2015 (acre-feet per year)	2020 (acre-feet per year)	2025 (acre-feet per year)	2030 (acre-feet per year)	2035 (acre-feet per year)
Elsinore Water District [1]	600	320	0	0	0	0	0
Farm Mutual Water Company [2]	420	460	501	542	588	631	669
Total	1,020	780	501	542	588	631	669

(1) It is assumed that the dissolution and incorporation of EWD in EVMWD's service area will occur by 2015.
(2) It is assumed that growth in the areas served by the Farm Mutual Water Company will be consistent with future growth within EVMWD's service area

3.2.6 Low Income Projected Water Demands

#34 - The water use projections required by Section 10631 shall include projected water use for single-family and multi-family residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier (10631.1(a)).

A low income household is defined as a household that has an income lower than 80 percent of the county's median income. EVMWD requested future low-income housing project information from the cities within its service area. For unincorporated areas within EVMWD's service boundary, a request for similar information was made to the Riverside County's Planning Department. Canyon Lake and Murrieta were the only two cities that responded. Canyon Lake responded that there are no current low-income housing units within its boundaries and no such housing units are planned in the near-future. Murrieta provided information on the number of existing and proposed low-income housing units within its boundaries. For the agencies that did not respond, projections developed by the Southern California Association of Governments (SCAG) Regional Housing Need Allocation (RHNA) Plan – Planning Period (January 1, 2006 – June 30, 2014) are used to forecast the number of low income housing units for the 2015-2035 period.

As a first step, projected low-income households for each City and unincorporated areas within EVMWD's service area are extracted from SCAG RHNA data. This analysis assumes a linear interpolation between 2006 and 2014 low-income projects as identified in the SCAG RHNA data. Using, 2010 as the base year the projected additional low-income households for the EVMWD's service area are presented in **Table 3-13**.

Further, based on population estimates developed by the California Department of Finance for 2010, the number of persons per household for each city was determined. The demands associated with the low-income households are then calculated by multiplying the number of people in each category with the target per capita water use (222 gpcd) adjusted for CII usage. The results of this analysis are presented in **Table 3-14**.

Table 3-13
Future Projections -Additional Low-Income Households

EVMWD Cities and Unincorporated Areas of Riverside County	2015	2020	2025	2030	2035
Lake Elsinore	1,284	2,567	3,851	5,135	6,418
Murrieta	122	122	122	122	122
Wildomar and Unincorporated Areas	101	203	304	405	507
Canyon Lake	0	0	0	0	0
Total	1,507	2,892	4,277	5,662	7,047

(1) Low income household data obtained from SCAG RHNA

Table 3-14
Future Projected Lower Income Water Demands (Same as Table 8 in 2010 UWMP Guidebook)

Low Income Water Demands	2015 (acre-ft/yr)	2020 (acre-ft/yr)	2025 (acre-ft/yr)	2030 (acre-ft/yr)	2035 (acre-ft/yr)
Total	1,253	2,412	3,571	4,730	5,889

3.2.7 Additional Water Uses and Losses

Table 3-15 presents additional water uses and losses within EVMWD's service area. No water is presently used or projected to be used for saline barriers as there are none within the service area. EVMWD has an on-going conjunctive use program with Metropolitan. As part of this program, during any fiscal year (beginning on July 1st and ending on June 30th) Metropolitan may deliver up to 3,000 acre-ft of water for storage in the Elsinore Basin. The District's dual-purpose wells are used to inject these deliveries into the Elsinore Basin.

For a normal hydrology year, total amount of water that can be realistically injected into the Elsinore Basin is approximately 4,600 acre-ft/year. If groundwater storage obligations (3,000 acre-ft/year) from the Metropolitan Storage Program need to be met during the injection operations, approximately 1,600 acre-ft/year of water can be used for groundwater basin replenishment. During dry years when imported water supplies are reduced, no injection would take place. Instead, EVMWD would extract a portion of the stored water to offset reduced imported water deliveries.

It is assumed that water losses will remain consistent at four percent (see footnote on **Table 3-6** explaining water loss calculations) of total production over the planning horizon of this Urban Water Management Plan.

Table 3-15 Additional water uses and losses (Same as Table 10 in 2010 UWMP Guidebook)

Water Use	2010	2015	2020	2025	2030	2035
Groundwater recharge[1]	4,600	4,600	4,600	4,600	4,600	4,600
Recycled Water	449	1,014	1,905	2,430	2,430	2,430
Lake Replenishment and Temescal Wash (Recycled Water)[2]	8,401	8,401	8,401	8,401	8,401	8,401
Total[3]	13,450	14,015	14,906	15,431	15,431	15,431

[1] Groundwater recharge volume is based for a median year hydrology and is obtained from EVMWD's Water Supply Optimization Plan (MWH, 2009).
[2] Assumes that all recycled water that is not used to meet existing or projected demands is used for replenishment of water levels in Lake Elsinore.
[3] System losses are included in the forecasted water deliveries presented in Table 3-7 to Table 3-11. Average annual system losses over the 1999-2008 baseline period are approximately 4 percent.

3.2.8 Total Water Uses

Summarizing the water delivery and system water loss data, **Table 3-16** provides total water use from 2005 through 2035.

Table 3-16
Total Water Use (Same as Table 11 in 2010 UWMP Guidebook)

Water Use	2005	2010	2015	2020	2025	2030	2035
Total water deliveries	26,564	25,057	36,791	39,796	43,189	46,363	49,158
Sales to other water agencies	1,020	780	501	542	588	631	669
Additional water uses and losses[1]	0	13,450	14,015	14,906	15,431	15,431	15,431
Total	27,584	39,287	51,306	55,244	59,208	62,426	65,258

[2] System losses are taken into account for in the calculation of "Total Water Delivery".

3.3 Water Demand Projections

#33. Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c) (10631(k)).

EVMWD purchases treated imported Metropolitan water through the AVP and the TVP. **Table 3-17** presents imported water requirements for EVMWD's service area.

Table 3-17 EVMWD Demand Projections Provided to Western Municipal Water District (Same as Table 12 in 2010 UWMP Guidebook)

Wholesaler	Contracted Volume (acre-feet per year)	2010 (acre-feet per year)	2015 (acre-feet per year)	2020 (acre-feet per year)	2025 (acre-feet per year)	2030 (acre-feet per year)	2035 (acre-feet per year)
Metropolitan	49,100[1]	25,645	28,692	31,738	35,177	38,395	41,227

[1] Contracted volume is the summation of available capacity at the following imported connections:
TVP =14,200
AVP = 27,000
WR-31 = 7,900
The actual available capacity at WR-31 is 69 cfs (approximately 50,000 acre-ft/yr). However, the available water supplies to EVMWD are limited by the treatment capacity at the Canyon Lake WTP which is 7 mgd (approximately 7,900 acre-ft/yr)

3.4 Water Use Reduction Plan

#2 - Urban wholesale water suppliers shall include in the urban water management plans…an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part (10608.36). Urban retail water suppliers are to prepare a plan for implementing the Water Conservation Bill

of 2009 requirements and conduct a public meeting which includes consideration of economic impacts (CWC §10608.26).

Urban water use is expected to grow significantly in the future as development occurs. EVMWD is implementing a number of on-going water conservation programs for both large landscape customers and residential customers. Landscape audit programs and rebates for replacements of lawns with water-efficient landscaping have been implemented. EVMWD also offers financial support, technical support, staff resources, and regional programs to the retail end-users of its wholesale customers. EVMWD allows the water retailers' customers to directly participate in EVMWD's programs. For example, customers of EWD and the Farm Mutual Water Company are eligible for retrofit kits, audits, and rebates just as EVMWD's retail customers are. See **Section 6 Demand Management** Measures for details on EVMWD's water use reduction programs.

SECTION 4 SYSTEM SUPPLIES

This section discusses EVMWD's current and projected water supplies. This includes a description of origin of the existing supply sources, their capacity, and source limitations. A discussion on future supply sources is also presented including an evaluation of options such as expanded recycled water use, desalination, and water transfers and exchanges. A discussion on each groundwater basin used for potable water supply by EVMWD is also presented.

4.1 WATER SOURCES

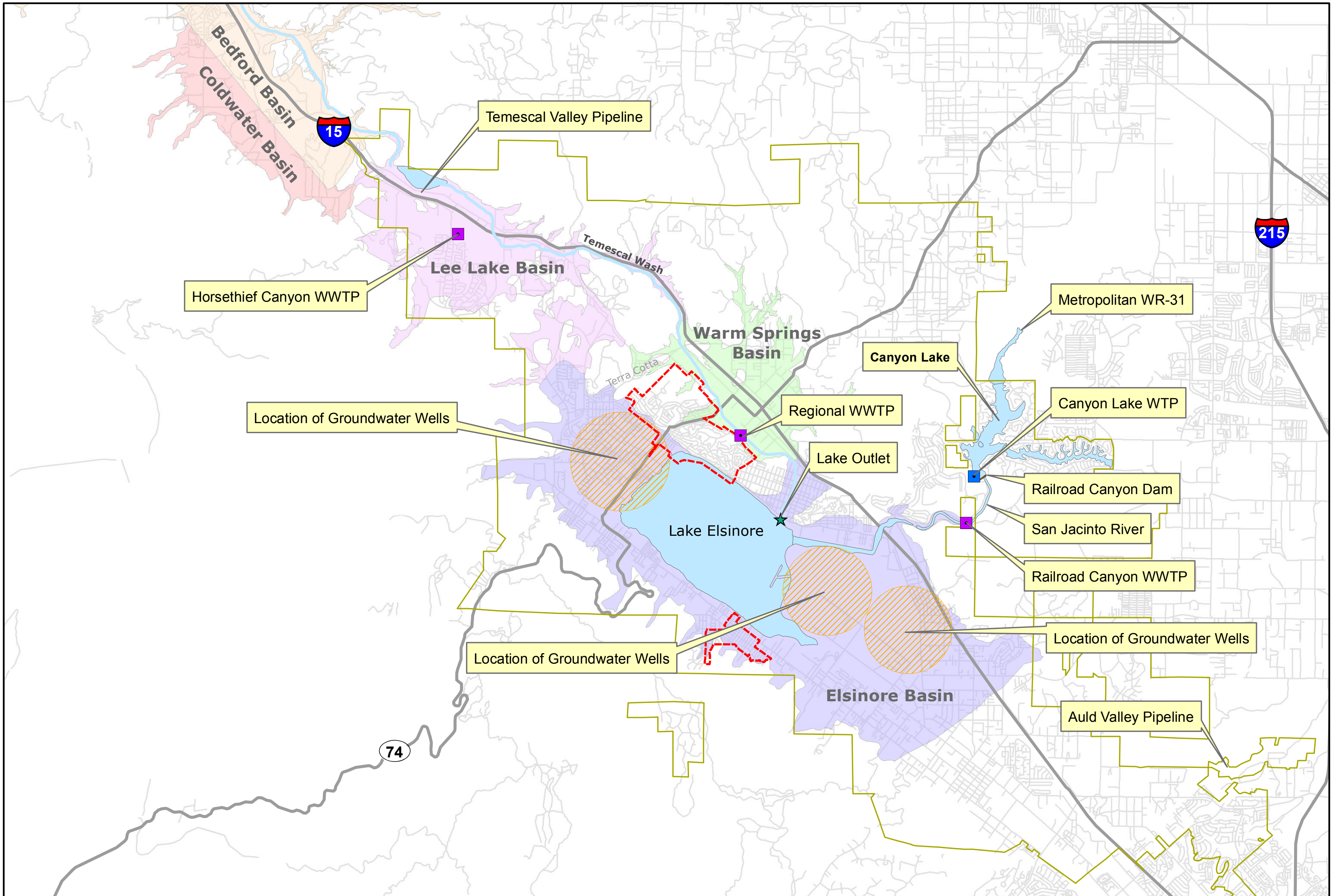
#13 - Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a) (10631(b)).

EVMWD obtains its potable water supplies from imported water from Metropolitan, local surface water from Canyon Lake, and local groundwater from the Elsinore Basin. The locations of these sources are presented in **Figure 4-1**. EVMWD has access to groundwater from Elsinore Basin, Coldwater Basin Basin, San Bernardino Bunker Hill Basin, Rialto-Colton and Riverside-North Basin. Almost all of the groundwater production that is used for potable use occurs in the Elsinore Basin. There are a few domestic wells in the Temescal Valley Basin; however, their production is less than one percent of the total production for domestic use recorded in the Elsinore Basin. EVMWD does not have the infrastructure to convey groundwater from the San Bernardino Bunker Hill Basin, Rialto-Colton and Riverside-North Basin to its service area.

Figure 4-2 shows the annual production of each supply source for the period 1992 to 2010 for EVMWD's service area. Over the past few years with the implementation of Back Basin groundwater storage projects, EVMWD has reduced its groundwater pumping to an amount that is close to its annual average natural recharge of 5,500 acre-ft/yr. Surface water supplies are highly variable and dependent on local runoff conditions. Imported water deliveries have increased significantly in the last five years in response to growth trends.

Imported water supply is purchased from the Metropolitan Water District of Southern California (Metropolitan) via Eastern Municipal Water District (Eastern MWD) and Western Municipal Water District (Western MWD). As shown in **Figure 4-2**, imported water use has increased significantly to meet growth in EVMWD's service area.

A summary of supply capabilities of the existing water sources is presented in **Table 4-1**. Details on each supply source are provided in the following paragraphs:



Key to Features

- Lake Outlet
- Wastewater Treatment Plant
- Water Treatment Plant
- Surface Water Bodies
- Temescal Wash
- EWD Boundary
- EVMWD Boundary

0 3,650 7,300 14,600 Feet

Document: \\uspas1netapp1\MUNI\Clients\Elsinore Valley MWD\UWMP 2010\14 Electronic Files\GIS\MXD

Date: May 19, 2011

Locations of Existing Potable Water Supply Sources

Figure 4-1

MWH

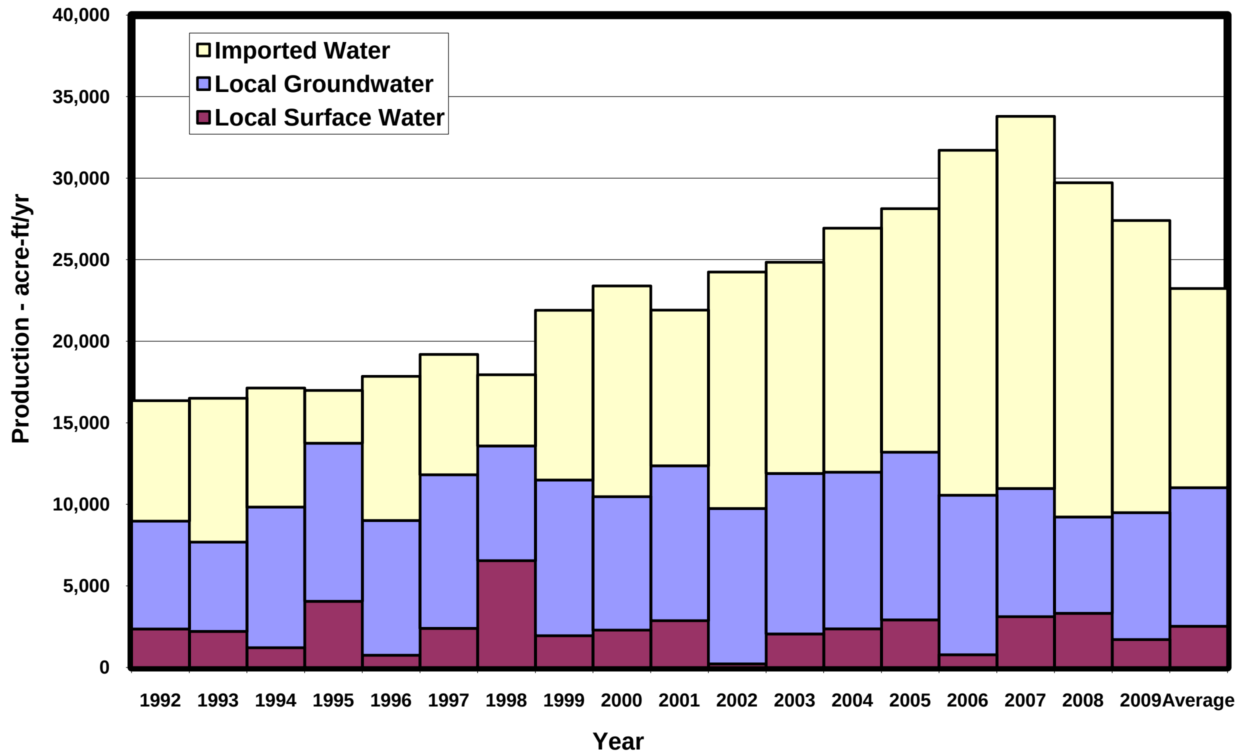


Figure 4-2
Quantities of Existing Water Supply Sources

Table 4-1
Existing Potable Water Sources

Water Supply Source	Capacity (acre-ft/yr)	Average Year (acre-ft/yr)
Canyon Lake(1)	7,900	4,900
Groundwater Extraction	17,300	3,700
Groundwater Injection (2)	-7,600	-4,600
TVP	14,200	12,700(3)
AVP	27,000	22,500(3)
Total Potable Supplies	66,500	43,800

(1) Natural inflow volumes for Canyon Lake are developed using hydrology data from 1993-2009
(2) Assumes that surplus water is available for injection only during average and wet year hydrologies. Injection volumes are obtained from EVMWD's Water Supply Optimization Plan (WSOP) (MWH, 2009)
(3) Assumes that only 83 percent of capacity at TVP and AVP is available during average years

4.1.1 Treated Imported Water

Metropolitan was formed in 1928 by an act of the State Legislature to provide supplemental water for its member agencies in Southern California. Western MWD was formed in 1954 under the Municipal Water District Act of 1911 to bring supplemental water from Metropolitan to growing western Riverside County. Following Western MWD's annexation to Metropolitan,

Section 4
System Supplies

EVMWD was annexed to Western's service area in 1954. As a member agency of Western, EVMWD purchases treated imported Metropolitan water from Western MWD through the Auld Valley Pipeline (AVP) and the Temescal Valley Pipeline (TVP). The AVP and the TVP are located on the southeastern and northwestern end of EVMWD's distribution system respectively.

4.1.1.1 Auld Valley Pipeline

EVMWD entered into the Water Facility Capacity Agreement for the AVP with the Eastern MWD on November 21, 1986. Based on this agreement, EVMWD has the rights to purchase or acquire a maximum flow rate of 37.5 cubic feet per second (cfs) (24.2 million gallons per day (mgd) or approximately 27,100 acre-ft/yr if used continuously) from Eastern MWD through the Metropolitan Connection EM-17. Eastern MWD sells imported water for the AVP to Western MWD, which in turn sells the water to EVMWD through an Interagency Water Sales Agreement (September 14, 1988). This imported water is a blend of State Water Project (SWP) and Colorado River Aqueduct water. Prior to conveyance to the AVP, the water is treated at Metropolitan's R. A. Skinner Filtration Plant.

4.1.1.2 Temescal Valley Pipeline

In addition to the AVP, EVMWD obtains imported water from the TVP through Western MWD. The source of this water is SWP water that originates from Metropolitan's Mills Filtration Plant in Riverside. The Mills Gravity Pipeline (also known as the Woodcrest Pipeline), which is owned, operated and maintained by Western MWD, runs westerly to its termination point near the intersection of Cajalco Road and Temescal Valley Road. According to the Water Distribution System Master Plan (WDSMP) (MWH, 2007), the EVMWD connection at the pipeline terminus has a design capacity of 41 cfs (26.5 mgd or approximately 29,700 acre-ft/yr). Water is transferred from the Mills Gravity Pipeline to the TVP at the Woodcrest vault, located in Corona at the intersection of Temescal Canyon Road and La Gloria Street, (MWH, 2007) completed in February 2002. The current hydraulic capacity of the TVP is 19.6 cfs (12.7 mgd or 14,190 acre-ft/yr) based on gravity flow from the Woodcrest Pipeline. The TVP was designed to convey up to 41 cfs (26.5 mgd or 29,700 acre-ft/yr) with the construction of a booster pumping station. The TVP project was developed to provide additional water supplies from sources located north of the EVMWD service area. It includes an 8 million gallon (MG) terminal storage reservoir, transmission mains, and appurtenances.

On August 23, 2001, EVMWD entered into a reciprocal use agreement with Western MWD that provided EVMWD with a conditional right to use 9 cfs of capacity in the Mills Gravity Pipeline. In return for the imported water capacity, EVMWD granted Western MWD entitlement to water acquired from the Meeks and Daley rights (EVMWD 2001a, 2001b). This agreement is automatically extended annually unless terminated by either party in accordance with termination provision of the agreement.

A separate lease agreement between EVMWD and Western MWD provides EVMWD with the ability to use up to 5 cfs (3.2 mgd or 3,620 acre-ft/yr) of additional capacity from the Mills Gravity Pipeline on a temporary basis (EVMWD, 2001c). On August 8, 2002, the EVMWD Board of Directors approved an amendment to the lease agreement to lease an additional 7 cfs (4.5 mgd or 5,068 acre-ft/yr) from the Mills Pipeline, increasing the total lease capacity to 12 cfs (7.8 mgd or 8,688 acre-ft/yr) (EVMWD, 2002b). In addition to the lease capacity from the Mills Pipeline, EVMWD also has an "exchange of assets" with its Temescal Water Division to supply a capacity of 9 cfs (5.8 mgd or 6,516 acre-ft/yr) (EVMWD, 2002c). Thus, EVMWD can currently obtain up to 21 cfs (13.6 mgd or approximately 15,200 acre-ft/yr) of water from the TVP. However, it would require additional pumping capacity for supply greater than 14,200 acre-ft/yr.

Table 4-2 presents the projected imported water supplies that will be obtained via the TVP and the AVP during average year hydrologies.

Table 4-2 Wholesale supplies — existing and planned sources of water (Same as Table 17 in 2010 UWMP Guidebook)

Wholesale sources	Maximum Capacity (acre-ft/yr)	2015 (acre-ft/yr)	2020 (acre-ft/yr)	2025 (acre-ft/yr)	2030 (acre-ft/yr)	2035 (acre-ft/yr)
Western Municipal Water District (Temescal Valley Pipeline)(1)	14,200	12,700	12,700	12,700	12,700	12,700
Eastern Municipal Water District (Auld Valley Pipeline)(1)	27,000	22,500	22,500	22,500	22,500	22,500
WR 31	50,000	7,900	7,900	7,900	7,900	7,900

(1) Assumes that only 83 percent of capacity at TVP and AVP is available during average years

4.1.2 Local Surface Water

The second water supply source for EVMWD is surface water obtained from Canyon Lake, also referred to as the Railroad Canyon Reservoir. Canyon Lake was constructed in 1928 by the Temescal Water Company (TWC) to store water for agricultural use in the area. Formed by Railroad Canyon Dam, Canyon Lake impounds water from the San Jacinto River, Salt Creek and local surface runoff. With a spillway elevation of 1381.76 ft above mean sea level (msl), the reservoir originally had a capacity of about 12,000 acre-ft. However, siltation has decreased the capacity of the lake. Based on information in EVMWD's Water Distribution System Master Plan (WDSMP) (MWH, 2007), Canyon Lake's current storage capacity is approximately 4,600 acre-feet (1,500 MG). The lake is being dredged to restore a portion of the lost capacity. The Railroad Canyon Storage Agreement between EVMWD and TWC that was approved in October 1955 allowed EVMWD to store approximately 3,000 acre-feet of water in Canyon Lake and treat that water at the Canyon Lake Water Treatment Plant (CLWTP) before distribution. In August 1989, EVMWD acquired the assets and water rights of the TWC including Canyon Lake. The

Canyon Lake Property Owners Association (POA) leases the surface rights to the lake and fringe land around the lake for recreational purposes under an agreement dating from 1968. The lease agreement between EVMWD and the Canyon Lake POA requires that the minimum lake elevation be kept at 1372 ft msl at any time of the year. EVMWD typically discontinues operation of its WTP if the lake level is expected to drop below 1,372 ft. If the level falls below 1,372 feet, EVMWD is required to purchase Metropolitan water to maintain the minimum lake elevation.

Hydrologic data documenting the inflows to Canyon Lake is limited to the period 1993-2009. The United States Geological Survey (USGS) maintains gauging stations on the San Jacinto River and Salt Creek upstream of Canyon Lake. During periods of high runoff, Canyon Lake fills and spills into the San Jacinto River where it flows into Lake Elsinore.

Through the acquisition of the TWC, EVMWD has the rights to divert up to 12,000 acre-ft/yr of natural drainage from the San Jacinto River from about December 1 to about June 1 of each season and store that water in the Railroad Canyon Reservoir pursuant to Water Rights License 1533 (SDPW, 1935). A subsequent license allows the diversion 2.4 cfs of San Jacinto River water from about April 1 to about May 31 of each season pursuant to Water Rights License 6327 (SWRB, 1961). In settlement of litigation regarding the release of water into Lake Elsinore, EVMWD and the City of Lake Elsinore agreed that EVMWD would not treat more than 8,000 acre-ft/yr (about 7.1 mgd continuous flow) of San Jacinto River flows in any water year at EVMWD's Canyon Lake Water Treatment Plant. This 8,000 acre-ft/yr limit applies only to San Jacinto River runoff and excludes any imported water conveyed in the river channel.

Other sources of water for Canyon Lake include untreated imported water from Metropolitan connections WR-18A (Colorado River water) and WR-31 (SWP water). Each of these two imported water connections has a capacity of 69 cfs (44.6 mgd). EVMWD could purchase the imported water from Metropolitan through Western MWD, which would be discharged into the San Jacinto River near Nuevo and flow downstream to Canyon Lake. EVMWD has not purchased water from the Metropolitan connection WR-18A since 1989 because the high TDS in Colorado River supply adversely affects wastewater effluent quality. Construction of Metropolitan connection WR-31 was completed in December 2003. In recent years, EVMWD has purchased imported raw water via the WR-31 connection for treatment at the Canyon Lake WTP.

Some percentage of the water released into the San Jacinto River percolates into the intervening groundwater basins before it reaches Canyon Lake. It is estimated that approximately 89 percent of any water purchased from these connections reaches the lake (MWH, 2009). Consequently, such releases are typically made in the wet season when the river has natural flows to minimize losses. In spite of the lack of recent use, EVMWD currently has the ability to supplement its Canyon Lake supply with raw imported water in the event of a water shortage. Treating raw water purchased from Metropolitan at the Canyon Lake WTP may be more economical if the plant can be operated continuously at a flow rate of 7 mgd (MWH, 2009).

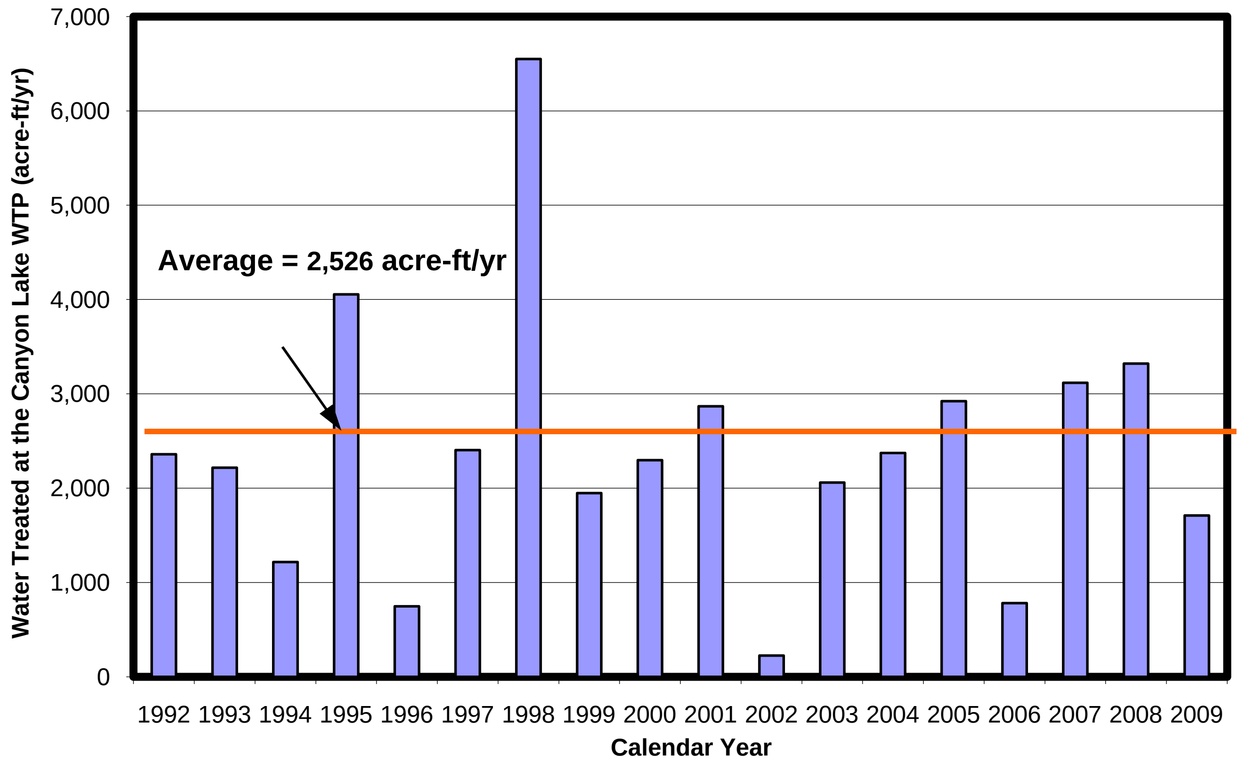


Figure 4-3
Canyon Lake WTP Production

Figure 4-3 depicts the amount of water treated at the Canyon Lake WTP for EVMWD in fiscal years 1992 to 2009. The figure shows that the average water treated at the Canyon Lake WTP and distributed to the EVMWD service area is approximately 2,526 acre-ft/yr. **Table 4-3** summarizes the historical flows (natural runoff) to the Canyon Lake WTP.

Table 4-3 Summary of Historical Flows to Canyon Lake WTP, 1993 through 2009

Criteria	Annual Flows (acre-ft/yr)
Average	2,530
Minimum (Single Dry Year)	750
Maximum (Wet Year)	6,550
Minimum, 3-Year Average (Multiple Dry Years)	1,930

Note: In 2002, the Canyon Lake WTP was not operational due to construction at the facility.

The Canyon Lake WTP has a design capacity of 9 mgd (13.9 cfs). However, running the plant at capacity greater than 7 mgd (10.9 cfs) adversely affects the treated water quality and quality can be maintained as long as plant is operated at a maximum flow of 7 mgd (10.9 cfs). Water from Canyon Lake is pumped to the treatment plant through the intake pumping station. The plant normally operates between April and October to provide additional water for summer demands (MWH, 2002). **Table 4-4** presents the projected supplies from the Canyon Lake WTP for the planning horizon of this Urban Water Management Plan.

Table 4-4 Projected Supplies from the Canyon Lake WTP

Source	2015 (acre-ft/yr)	2020 (acre-ft/yr)	2025 (acre-ft/yr)	2030 (acre-ft/yr)	2035 (acre-ft/yr)
Canyon Lake WTP	4,900	4,900	4,900	4,900	4,900

Note: Supply volumes provided above represent flows expected at the Canyon Lake WTP under an average hydrology year without purchases from Metropolitan

4.1.3 Groundwater

#4 - (Is) groundwater…identified as an existing or planned source of water available to the supplier…(10631(b))?

#15 - (Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management (10631(b)(1)).

#16 - (Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater (10631(b)(2)).

#17 - For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board (10631(b)(2)).

#18 - (Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree (10631(b)(2)).

#19 - For basins that have not been adjudicated, (provide) information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition (10631(b)(2)).

#20 - (Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records (10631(b)(3)).

#21 - (Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records (10631(b)(4)).

4.1.3.1 Elsinore Basin

The Elsinore Basin is the major source of potable groundwater supply for EVMWD, Elsinore Water District (EWD), and other private groundwater producers. The Elsinore Basin is located in a graben (a down-dropped geologic block) created by two major fault zones: the Glen Ivy Fault Zone to the northeast and the Wildomar Fault Zone to the southeast. The groundwater basin encompasses approximately 25 square miles of valley fill including Lake Elsinore, which covers about 3,600 acres of the basin. The surface water drainage area tributary to the basin consists of 42 square miles of mountain and valley area. Major streams include McVicker Canyon, Leach Canyon, Dickey Canyon, and the San Jacinto River, which drain into Lake Elsinore and provide a portion of the basin recharge. **Figure 4-4** presents the location of the groundwater basin, the tributary watershed that drains into the basin, surrounding streams, and other bodies of water. The California Department of Water Resources has designated the Elsinore Basin as Basin No. 8-4 and is located within the Santa River watershed. Further information on the basin is presented in DWR Bulletin 118 California's Groundwater (California Department of Water Resources (DWR), 2003).

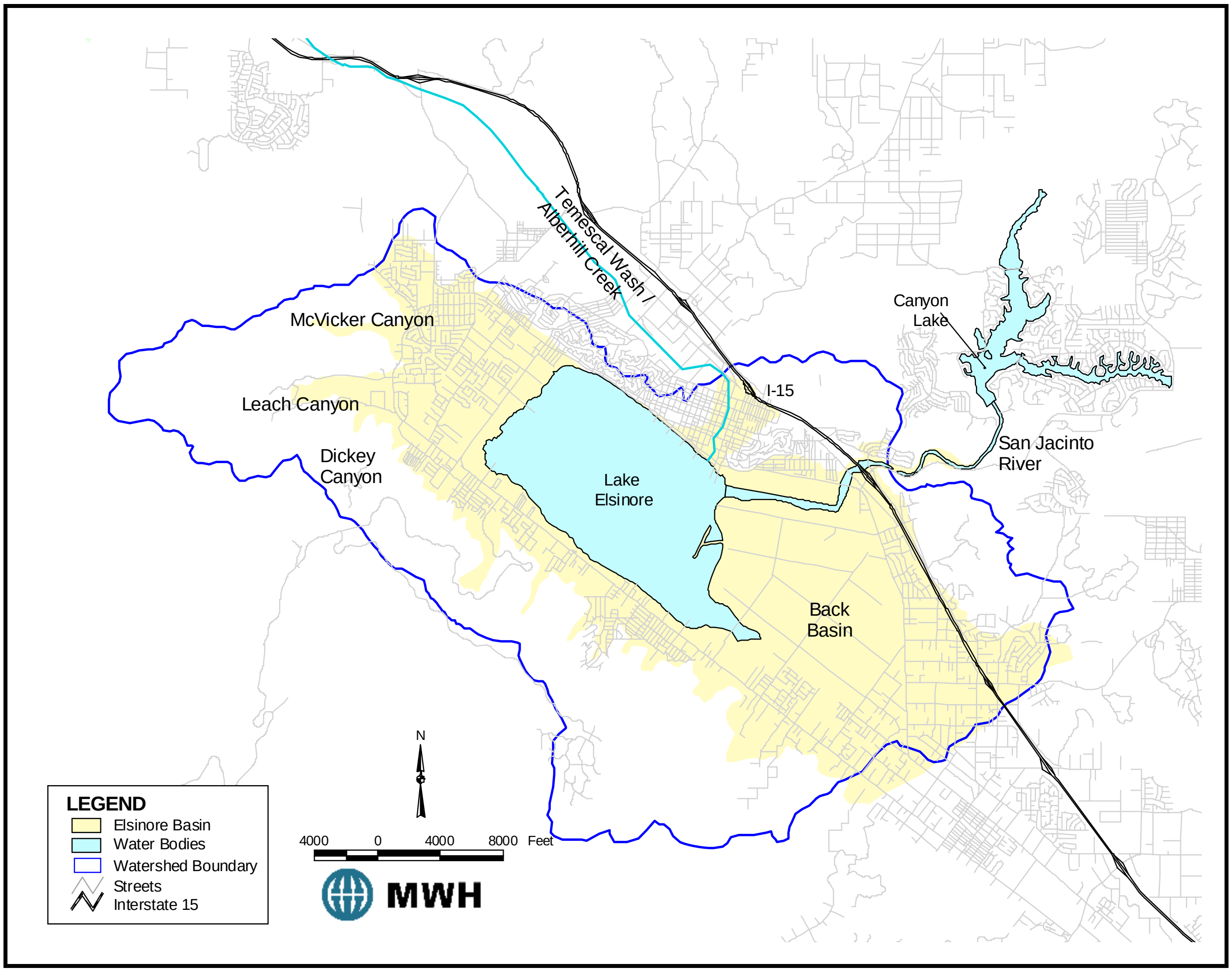


Figure 4-4
Elsinore Groundwater Basin

The graben which forms the basin has been filled with unconsolidated alluvial and lacustrine deposits through geologic time. On the margins of the basin, older Pleistocene and Holocene channel and fan alluvial deposits are exposed, while along active stream channels and the center of the basin, recent alluvial deposits are present. The more recent alluvium has obscured evidence of faulting in the central portions of the basin. The unconsolidated deposits which filled the basin form the primary productive aquifers of the Elsinore Basin.

The Elsinore Basin consists of sand, gravel, and silt deposits which reach a maximum depth of approximately 2,000 feet. Evaluation of lithologic and geophysical logs indicates that relatively thin impermeable layers of clay are present at various depths. These lenses of silt and clay can sometimes be correlated in adjacent wells, but do not form a horizontally-continuous confining layer that is present one a basin-wide scale. The highest transmissivity of the aquifer is found southeast of Lake Elsinore in the so-called “Back Basin” area, where the thickness of alluvial deposits is interpreted to be the greatest. In this area, transmissivity ranges from approximately 10,000 to 20,000 square feet per day.

Northwest of Lake Elsinore, aquifer transmissivity is lower, on the order of 2,000 to 5,000 square feet per day (MWH 2005). The northwestern portion of the basin is relatively shallow, and there is evidence of the presence of lacustrine deposits of the ancestral Lake Elsinore, which are expected to have relatively low hydraulic conductivity and transmissivity. Based upon the thickness of the deposits in which transmissivity estimates are available, horizontal hydraulic conductivity in the Elsinore Basin ranges from about 3 feet per day in the area north of the Lake to about 19 feet per day in the Back Basin area. This range in hydraulic conductivity is consistent with a silty sand lithology, which is present throughout the Elsinore Basin. Storage coefficients estimated from aquifer tests range from 1 x 10-2 to 1 x 10-5, consistent with a semi-confined or confined aquifer system.

No direct measurements of vertical hydraulic conductivity are available for the Elsinore Basin. However, the vertical hydraulic conductivity is expected to be much less (in some cases orders of magnitude) than the horizontal hydraulic conductivity. The lenses of sediments with low hydraulic conductivity (such as silt and clay lenses shown on the cross sections) typically have a relatively insignificant effect on horizontal conductivity, dramatic effect on vertical conductivity. The low vertical hydraulic conductivity associated with sediments in the basin is consistent with the relatively low storage coefficients calculated from aquifer tests in which the effects of delayed yield from dewatering of the aquifer are not observed.

Groundwater production accounts for approximately 30 percent to 40 percent of EVMWD’s total supplies. In the Elsinore Basin, EVMWD has seven operating potable groundwater wells with a total production capacity of 17,140 acre-ft/yr (15.4 mgd) as presented in **Table 4-5**. Summerly and Diamond are the most recently equipped production wells and began production in 2008. In the recent past, three groundwater wells went out of service due to water quality and operational issues. Production at Cereal 1 and Corydon has been temporarily suspended due to the presence of high levels of arsenic; consequently, these wells are not included in **Table 4-5**. The Palomar well collapsed and has been out of service since 2006.

Table 4-5 Existing Active EVMWD Groundwater Wells Production Capacity

Groundwater Well	Capacity (acre-ft/yr)
Cereal St # 3	3,230
Cereal St # 4	3,230
Joy St	1,620
Lincoln St	1,300
Machado	2,020
Summerly	2,890
Diamond	2,880
Total	17,140

Table 4-6 presents the annual volume of groundwater pumped from the Elsinore Basin between 2005 and 2010.

Table 4-6 Groundwater – Volume Pumped in Past Five Years (Same as Table 18 in 2010 UWMP Guidebook)

Basin name(s)	Metered or Unmetered	2006 (acre-ft/yr)	2007 (acre-ft/yr)	2008 (acre-ft/yr)	2009 (acre-ft/yr)	2010 (acre-ft/yr)
Elsinore Basin	Metered	9,786	7,851	5,904	7,787	2,529
Coldwater Basin	Metered	627	593	583	499	449
Total Groundwater Pumped		10,413	8,444	6,487	8,286	2,978
Groundwater as a percent of total water supply		32.8%	24.99%	21.82%	29.79%	11.53%

Water rights for the Elsinore Basin are not adjudicated (MWH, 2005b). According to EVMWD's Elsinore Basin Groundwater Management Plan (GWMP) (**Appendix C**), approximately 94 percent of groundwater produced by the basin is pumped by EVMWD, which serves a 96 mile square area in western Riverside County. Other groundwater producers include Elsinore Water District (EWD) and private well owners. Historically, EWD, which supplies water to customers in two detached service areas one located north of the lake with the City of Lake Elsinore and the Lakeland Village community, pumped approximately five percent of total groundwater production from the basin. However, due to low water levels, EWD purchases all of its water requirements from EVMWD. Local pumpers with private wells only account for less than one percent of basin production (MWH, 2005b).

The GWMP also summarizes inflows to the Elsinore Basin which include infiltration of local precipitation, runoff from the surrounding watershed, infiltration from the San Jacinto River prior to reaching Lake Elsinore, and return flows from either irrigation or domestic use. Groundwater inflows are estimated to average 5,500 acre-ft/yr based on a 41-year (1961-2001) hydrologic analysis conducted for the GWMP. This natural inflow is roughly equal to the average yield of the basin because there are no natural outflows from the basin. Groundwater pumping to meet water demands accounts for essentially the entire outflow from the basin. **Figure 4-5** presents groundwater levels at Corydon well. The figure indicates a decline in groundwater levels over time. Active groundwater management and conjunctive use programs have been implemented by EVMWD to balance the Elsinore Basin inflows and outflows. DWR Bulletin 118 does not identify the Elsinore Basin to be in a state of overdraft.

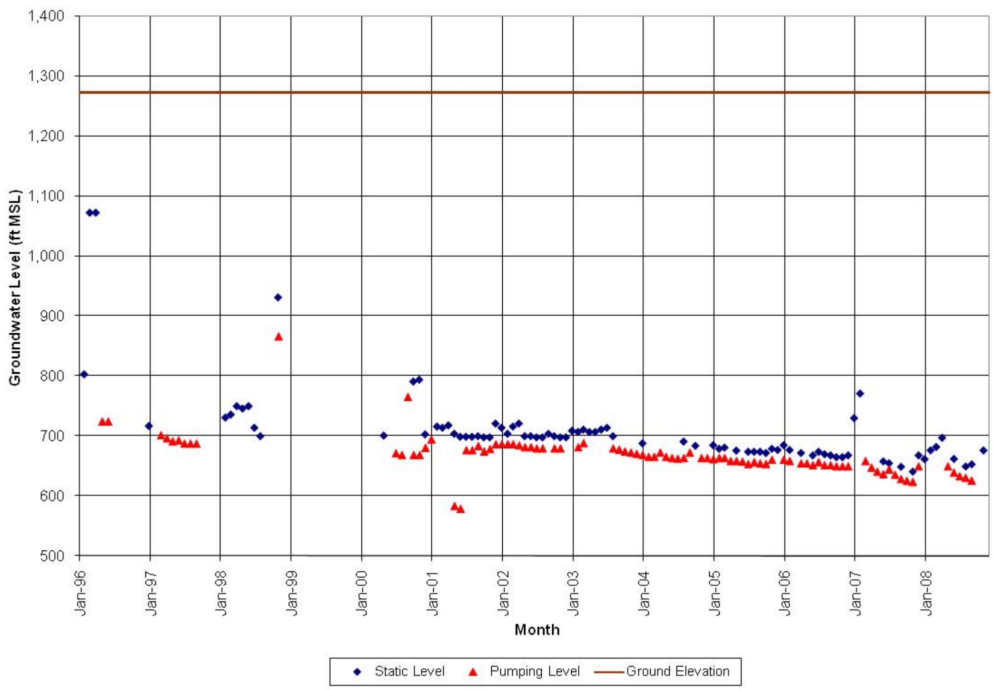


Figure 4-5
Groundwater Levels – Corydon Well

EVMWD adopted a Groundwater Management Plan (GWMP) (MWH, 2005) in 2005 which identified conjunctive use projects as an important element of basin management. Direct recharge projects that utilize the groundwater basin as a storage facility and allow for the extraction of stored water for use during drought and high demand periods were identified, designed, and constructed. These direct recharge projects were funded by the Metropolitan as part of a groundwater storage program. During any fiscal year (beginning on July 1st and ending on June 30th) Metropolitan may deliver up to 3,000 acre-ft of water for storage in the Elsinore Basin. EVMWD's dual-purpose wells are used to inject these deliveries in the Elsinore Basin. Metropolitan may also extract up to 4,000 acre-ft of water stored in the Elsinore Basin as part of the Groundwater Storage Program. During a fiscal year when stored Metropolitan deliveries are extracted, supply from the EVMWD's imported water sources is reduced by an equal amount.

4.1.3.2 Coldwater Basin Groundwater

EVMWD pumps groundwater from wells located in the Temescal Valley to serve users in its Temescal Division. The wells draw from the Coldwater Basin, Lee Lake Basin, and the Bedford Basin. Only three wells, all in Coldwater Basin, are used for potable supply. The rest of the wells are used for non-potable purposes. (MWH, 2004a).

The Coldwater Basin is an unadjudicated basin located about 8 miles southeast of the City of Corona within the Temescal Valley southwest of Interstate 15. The basin covers about 1,680 acres. Major surface water drainages include Coldwater, Anderson, Bixby, Mayhew, and Brown Canyons, which surround the western and southern boundaries of the groundwater basin.

The Coldwater Basin lies within a down-dropped block between the North Glen Ivy and South Glen Ivy faults, which are associated with the right lateral strike-slip-dominated Elsinore Fault Zone (EFZ). The EFZ extends approximately 200 km from Baja California north to the Corona area. The Coldwater Basin is surrounded by the metamorphic, volcanic and granitic basement rocks of the Santa Ana Mountains to the south and west, and the Bedford groundwater basin, which is located to the north and east and is separated from the Coldwater Basin by the North Glen Ivy fault. In a recharge feasibility study, MWH reviewed and compiled available data to evaluate the geometry and update the hydrogeologic conceptual model for the Coldwater Basin (MWH, 2005a). Based upon the data compiled as part of that report, the Coldwater Basin watershed contains the following stratigraphic units: alluvium, Bedford Canyon Formation, volcanic rocks, and granitic basement rocks. Only the alluvium produces significant groundwater resources.

There do not appear to be any significant confining layers within the alluvium except in the northwestern portion of the basin where there is substantial clay. Currently, water levels are generally declining throughout the basin. However, historical records indicate that the basin is very responsive to changes in operational and climatic conditions. Recharge to the alluvium occurs along the margins of the basin through Mayhew, Coldwater, Anderson, Bixby and Brown Canyons. Faults within the basin appear to be complete barriers to subsurface flow except where gravel pits cross the faults.

The total basin storage volume is estimated to be approximately 74,800 acre-ft based upon a specific yield ranging from 7 to 9 percent. The estimated groundwater in storage as of September 2000 was 41,600 acre-ft (about 55 percent full). The estimated cumulative loss in storage in the Coldwater Basin between 1977 and 2000 was approximately 10,000 acre-ft (MWH, 2004b).

For the period between 1991 and 2000, an average of 6,300 acre-feet per year (acre-ft/yr) of groundwater was produced from the basin. The principal groundwater producers in the basin are the EVMWD and the City of Corona, which account for all but about 200 acre-ft/yr of the total average groundwater production in the basin. Other pumpers in the basin are agricultural users and the gravel pit owners. Approximately one-third of the total basin groundwater extraction from 1991 to 2000 was produced from EVMWD's wells, while two-thirds of the total groundwater production was produced from the City of Corona's wells. District wells serve agricultural and municipal users in the Coldwater Basin area (MWH, 2004b).

Since 1998, groundwater levels within the Coldwater Basin have been declining at a rate of about 50 feet per year throughout the basin. Groundwater levels in many wells are at or below the previous historic low levels of the mid-1970s. Most shallow groundwater wells, particularly in the center of the basin, are currently dry. This water level decline is the result of both an extended period of low rainfall and increased groundwater production in the basin. More groundwater is being extracted each year than is being replenished naturally causing groundwater to be taken from storage. Previous estimates of the basin yield have ranged from 3,100 acre-ft/yr to 5,300 acre-ft/yr. Groundwater extraction over the past several years has exceeded these estimates. Because the groundwater basin is only 800 feet deep, this supply, if not augmented, will not be available in the future at current extraction rates. (MWH, 2004b)

A review of pumping records from 1991 to 2001 from the "Coldwater Basin Recharge Feasibility Study" (MWH, 2004b) shows that EVMWD has withdrawn about 25 percent of the total volume pumped. Assuming the total basin yield is about 5,200 acre-feet/year, EVMWD could expect to have about 1,250 acre-feet/year available.

The current source capacities of the Station 71, Station 72, and Mayhew wells are 630, 450, and 330 gallon per minute (gpm) respectively. If all three wells were to run for 24 hours a day and 365 days a year, there is a total pumping capacity of 2.03 mgd and 2,274 acre-ft/yr (MWH, 2001a). Therefore, for estimating the supply availability, EVMWD's share of the safe yield is the limiting value at 1,250 acre-feet/year. Since this combined well capacity supplying potable water is below safe yield estimates of the Coldwater Basin, the total pumping capacity is assumed as the projected supply availability for the Temescal Domestic Service Area (TDSA), defined as the portion of Temescal Division using potable supply.

DWR Bulletin 118 does not identify the Elsinore Basin to be in a state of overdraft. **Table 4-6** presents the annual volume of groundwater pumped from the Coldwater Basin between 2005 and 2010.

4.1.4 Other Groundwater Supplies

EVMWD's acquisition of the Temescal Water Company (TWC) in August 1989 resulted in its ownership of 51.9 percent of the stock in three mutual water companies – Meeks and Daley Water Company, Agua Mansa Water Company and Alta Mesa Water Company. This stock provides water rights and production/conveyance capacity from these three mutual water companies' to use its facilities and water supply sources. The TWC acquisition also provided

EVMWD entitlements to “canal carrying rights” in the Gage Canal and the Riverside Canal, including rights to the Palm Avenue Well that is located in Grand Terrace, Riverside County. The mutual water companies also have rights to pump 7,833 acre-ft/yr of water from the San Bernardino Bunker Hill Basin of which 7,515 acre-ft/yr may be exported to Riverside County (Western-San Bernardino Watermaster, 2003). Through its shareholder ownership, EVMWD’s annual allotment from the Bunker Hill Basin is approximately 3,900 acre-feet. In addition, EVMWD’s stock ownership entitles it to groundwater in the unadjudicated Rialto-Colton and Riverside-North Basins. EVMWD’s Water Resources Development Plan (WRDP) (1997) estimated the total water available to EVMWD from these basins to be 7,152 acre-ft/yr (Montgomery Watson/Black & Veatch, 1997). Presently, EVMWD does not have the infrastructure available to deliver water available from these groundwater basins to its service area in the Elsinore Division.

Table 4-7 provides a summary of the available groundwater supply pumping and projected volume to be pumped per basin respectively. **Table 4-7** assumes that net groundwater production from the Elsinore and the Coldwater Basins will remain constant in the future and will be equal to the estimated yield of the each basin. This assumption is based on the premise that all future growth within EVMWD’s service area will be met by imported water supplies.

Table 4-7 Groundwater — Volume Projected to be Pumped (Same as Table 19 in 2010 UWMP Guidebook)

Basin name(s)	2015	2020	2025	2030	2035
Elsinore Groundwater Basin(1)	5,500	5,500	5,500	5,500	5,500
San Bernardino Bunker Hill Basin(2)	0	0	0	0	0
Rialto-Colton and Riverside North Basins(2)	0	0	0	0	0
Coldwater Basin(3)	1,250	1,250	1,250	1,250	1,250
Total groundwater pumped	6,750	6,750	6,750	6,750	6,750
Percent of total water supply	9.8%	9.64%	9.56%	9.56%	9.56%

(1) The estimated safe yield of the Elsinore Basin is 5,500 acre-ft/yr
(2) EVMWD does not have conveyance facilities to transfer water from these basins to EVMWD's service area
(3) The value here is based on the upper limit of the estimated safe yield and historical share of total withdrawal by EVMWD.

4.2 TRANSFER OPPORTUNITIES

#24 - Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis (10631(d)).

On August 23, 2001, EVMWD entered into a reciprocal use agreement with Western MWD that provided EVMWD with a conditional right to use 9 cfs of capacity in the Mills Gravity Pipeline. In return for the imported water capacity, EVMWD granted Western MWD entitlement to groundwater acquired from the Meeks and Daley rights (EVMWD, 2001a).

A separate lease agreement between EVMWD and Western MWD provides EVMWD with up to 5 cfs (3.2 mgd or 3,620 acre-ft/yr) of additional capacity from the Mills Gravity Pipeline on a temporary basis (EVMWD, 2001b). On August 8, 2002, the EVMWD Board of Directors approved a lease agreement amendment to lease an additional 7 cfs (4.5 mgd or 5,068 acre-ft/yr) from the Mills Pipeline, increasing the total lease capacity to 12 cfs (7.8 mgd or 8,688 acre-ft/yr) (EVMWD, 2002a). In addition to the lease capacity from the Mills Pipeline, EVMWD also has an "exchange of assets" with the Temescal Water Division to supply a capacity of 9 cfs (5.8 mgd or 6,516 acre-ft/yr) (EVMWD, 2002b). Thus, EVMWD contractually has the water rights for up to 21 cfs (13.6 mgd or approximately 15,200 acre-ft/yr) of water from the TVP as shown in **Table 4-8**.

These transfers provide EVMWD additional capacity in the Mills Gravity Pipeline. These transfers do not represent additional supplies available to EVMWD via the Mills Gravity Pipeline.

Table 4-8 Transfer and Exchange Opportunities (Same as Table 20 in 2010 UWMP Guidebook)

Transfer agency	Transfer or exchange	Short term or long term	Proposed Volume (acre-ft/yr)
Western MWD	Exchange	Long Term	0

4.3 DESALINATED WATER OPPORTUNITIES

#31 - Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply (10631(i)).

EVMWD has no plans for the development of desalinated water for use as a long-term water supply. EVMWD is not located near an ocean water supply, and the groundwater extracted from the EVMWD's wells does not have a high enough salinity content to warrant desalination.

4.4 RECYCLED WATER OPPORTUNITIES

#44. Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area (10633).

#45. (Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal (10633(a)).

#46. (Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project (10633(b)).

#47. (Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use (10633(c)).

#48. (Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses (10633(d)).

#49. (Describe) the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision (10633(e)).

#50. (Describe the) actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year (10633(f)).

#51. (Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use (10633(g)).

4.4.1 Existing Wastewater System

EVMWD currently operates three wastewater treatment facilities: the Regional WWTP, Horsethief Canyon WWTP, and Railroad Canyon WWTP. In addition, flow in the southern part of EVMWD's service area is treated at the Santa Rosa WRF operated by the Rancho California Water District (RCWD). These four treatment plants serve four major service areas within the EVMWD's wastewater collection system. Each service area consists of gravity collectors, trunk lines, lift stations, and force mains, which convey flow to the treatment plants. The regional area contains 21 lift stations, the Canyon Lake area 7 lift stations, and the Horsethief area 2 lift stations. A large portion of EVMWD's wastewater collection system consists of 8-inch through 15-

inch diameter collector and trunk sewer lines. In addition to these collector and trunk lines, EVMWD has two major interceptor sewers which range in size from 12-inch diameter to 27-inch diameter. EVMWD's system also contains 30 force mains, ranging in size from 4-inch to 16-inch in diameter. Details regarding the flows associated with each WRF are discussed in the following sections.

In the effort to minimize the need for imported water, EVMWD plans to expand its recycled water system to provide recycled water for irrigation users and to maintain water levels in Lake Elsinore during normal and dry years.

4.4.2 Existing Recycled Water Supplies

EVMWD's non-potable demands are supplied by tertiary-treated wastewater from the Regional WRF, Railroad Canyon WRF, and Horsethief WRF. Historically, EVMWD has used the treated effluent from Railroad Canyon WRF and Horsethief WRF for irrigation, except during storm events when the influent from Railroad Canyon WRF is bypassed to the Regional WRF and/or the effluent is discharged into percolation ponds. The Horsethief WRF is a peaking plant that balances supply with demand. Excess effluent from the Horsethief WRF that cannot be used for recycled water irrigation is sent to local percolation ponds for disposal. Effluent from the Regional WRF is typically discharged into Lake Elsinore for makeup water and discharged into Temescal Wash to meet environmental requirements when Lake Elsinore levels are high.

Table 4-9 summarizes the recycled water production as reported in EVMWD's 2009 Comprehensive Annual Financial Report (CAFR). It should be noted that a portion of the wastewater flows collected by EVMWD is diverted to the RCWD Santa Rosa WRF (Southern) for treatment and disposal.

4.4.2.1 Railroad Canyon WRF and Horsethief Canyon WRF

The effluent from Railroad Canyon WRF and Horsethief Canyon WRF receives tertiary treatment and meets Title 22 requirements for recycled water use. The current rated capacity for Railroad Canyon WRF and Horsethief Canyon WRF are 1.2 mgd and 0.5 mgd, respectively. Based on the number of active accounts in 2009, the flows are approximately 0.70 mgd to Railroad Canyon WRF and 0.38 mgd to Horsethief Canyon WRF (EVMWD CAFR, 2009). Most of the treated wastewater from Railroad Canyon WRF is delivered to the Canyon Lake Golf Course during the summer months, with excess effluent either to on-site percolation ponds or bypassed to the Regional WRF. Treated recycled water from Horsethief Canyon is distributed to local landscape irrigation users with excess effluent sent to local percolation ponds

Table 4-9 Historical Recycled Water Available Production

Year[1]	Horsethief Canyon WRF (MGD)	Railroad Canyon WRF (MGD)	Regional WRF (MGD)	RCWD Santa Rosa WRF (MGD)[2]	Total Production (MGD)
1999	0.22	0.93	3.70	0.80	5.65
2000	0.26	0.95	3.71	0.80	5.72
2001	0.32	0.93	3.79	0.81	5.85
2002	0.38	0.91	3.73	1.18	6.19
2003	0.47	0.88	4.09	1.25	6.69
2004	0.43	0.88	4.46	1.28	7.05
2005	0.42	0.75	5.63	1.37	8.18
2006	0.43	0.84	5.53	1.26	8.06
2007	0.40	0.83	5.31	1.26	7.80
2008	0.39	0.79	5.53	0.99	7.70
2009	0.38	0.70	4.90	0.99[3]	6.86

Source: 2009 EVMWD Comprehensive Annual Financial Report.

1 Years shown are fiscal years for 1999 to 2008 and calendar year for 2009 except for RCWD Santa Rosa WRF which is fiscal year.

2 EVMWD influent portion only

3 Assumed number based on 2008 data

4.4.2.2 Regional WRF

The Regional WRF has a current rated capacity of 8 mgd. The wastewater effluent is treated with tertiary treatment and phosphorus removal to Title 22 requirements and then discharged to Temescal Wash and/or Lake Elsinore. Based on data provided by EVMWD, the annual average flow at the Regional WRF in 2010 was 6.0 mgd.

In March 2005, EVMWD received a NPDES permit from the Regional Board to discharge effluent into Lake Elsinore. The Regional Board is in the process of updating the permit and a new permit is anticipated to be issued in 2011.

In addition, EVMWD has an agreement with Eastern MWD to purchase excess recycled water from Eastern MWD for lake stabilization. Under this agreement, EVMWD can purchase between 5,000 and 30,000 acre-ft/yr of surplus effluent. This recycled water originates from Eastern MWD's Moreno Valley and Perris Valley WRFs and normally only available during wet periods when Eastern MWD's recycled water usage is low and its storage facilities are full; however, EVMWD usually only needs to augment Lake Elsinore during normal and dry years. This recycled water would be delivered to EVMWD through Eastern MWD's Temescal Pipeline that parallels the San Jacinto River and terminates at Wasson Sill, a topographic divide on Temescal Wash that separates flows between Lake Elsinore and the Santa Ana River.

4.4.2.3 Eastern MWD and Rancho California WD

Eastern MWD currently operates the Temecula Valley Regional WRF and RCWD operates the Santa Rosa WRF (Southern). The Temecula Valley Regional WRF has a current capacity to treat 12 mgd to Title 22 requirements and the Southern facility has the capacity to treat up to 1.54 mgd of EVMWD's wastewater flow. Eastern MWD completed construction of the Temecula Valley Effluent Disposal Pipeline (TVEDP) that would convey effluent from the Temecula Valley Regional WRF and RCWD Santa Rosa WRF to Temescal Wash for disposal. This facility allows Eastern MWD and RCWD to avoid costly nutrient removal facilities required for discharge to the Santa Margarita River. This pipeline passes through EVMWD's service area. Since EVMWD contributed approximately 0.99 mgd of flow in 2008 to RCWD (EVMWD CAFR, 2008), EVMWD is entitled to receive this amount of recycled water from this facility per an agreement between EVMWD, RCWD, and Eastern MWD. Under this agreement, EVMWD is entitled to up to 1 mgd of recycled water flow via the TVDEP with a not-to-exceed maximum flow rate of 1.54 mgd. In addition, the flows cannot exceed the amount of raw wastewater that EVMWD conveys to RCWD's Santa Rosa WRF.

In addition, under this agreement Eastern MWD has the option to sell EVMWD additional recycled water through the TVEDP on an as-needed basis. Eastern MWD currently retains and stores as much recycled water as possible within its system to supply its customers before providing recycled water to other agencies. Once its storage ponds are full, Eastern MWD discharges water to Temescal Wash through the TVEDP (primarily in the winter months). In addition, as described above, EVMWD has an agreement with Eastern MWD to purchase excess recycled water from Eastern MWD. Projections for future wastewater collection and treatment and recycled water production are shown in **Table 4-10**.

4.4.3 Existing and Projected Recycled Water Demands

Presently, effluent produced from the Horsethief Canyon WRF and the Railroad Canyon WRF is used for irrigation. Effluent from the Horsethief Canyon WRF is used for local irrigation. Excess effluent is discharged to on-site percolation ponds. Recycled water at the Railroad Canyon WRF is used for local irrigation and also for the providing supplemental irrigation at the Canyon Lake golf course. Excess effluent from this plant is also discharged to on-site percolation ponds. Recycled water produced at the Regional Plant is used to maintain water levels at Lake Elsinore and surplus effluent is discharged along Temescal Wash.

EVMWD developed a Recycled Water Project Facilities Planning Report (Kennedy-Jenks, 2006) to identify potential recycled water use within its service area. The report identified potential customers with an average annual demand of approximately 2,500 acre-ft. Conversion from potable to recycled water accounts for a significant portion of the projected demands. Delivering recycled water to potential customers in EVMWD's service area is technically and economically feasible.

Since then, EVMWD has started the design and construction of a recycled water distribution system within its service area. Construction of facilities in the Wildomar area has been completed and is expected to become operational in 2011. Construction of facilities in the Summerly area is currently on-going while facilities for the Tuscany area are currently being designed. Table 4-11 presents the projected recycled water demands within EVMWD's service area.

Table 4-10 Recycled Water Supplies (Same as Table 21 in 2010 UWMP Guidebook)

Type of Wastewater	2005 (acre-feet/yr)	2010[1] (acre-feet/yr)	2015 (acre-feet/yr)	2020 (acre-feet/yr)	2025 (acre-feet/yr)	2030 (acre-feet/yr)
Wastewater collected & treated in service area	9,195	8,400	16,890	20,238	22,915	25,166
Volume that meets recycled water standard	9,195	8,400	16,890	20,238	22,915	25,166

Source: Table is obtained from EVMWD's Wastewater Master Plan (Carollo, 2008)
(1) 2010 data is based on wastewater flow data recorded by EVMWD

Table 4-11 Recycled Water Demands (Same as Table 22 in 2010 UWMP Guidebook)

Recycled Water Demand	Treatment Level	2010 (acre-ft/yr)	2015 (acre-ft/yr)	2020 (acre-ft/yr)	2025 (acre-ft/yr)	2030 (acre-ft/yr)	2035 (acre-ft/yr)
Recycled Water Demands[1]	Title 22	8,850	9,415	10,306	10,831	10,831	10,831
Total		8,850	9,415	10,306	10,831	10,831	10,831

(1) Recycled water demands represent the sum of projected recycled water use in the Wildomar area and the recycled water utilization from the Regional WRF, Railroad Canyon WRF, and the Horsethief WRF

The future average recycled water demand is projected to increase to approximately 10,831 acre-ft/yr. In addition to the use of recycled water for stabilizing levels at Lake Elsinore and the discharge of recycled water along Temescal Wash for environmental enhancement, the entire demand will constitute potable to recycled water conversions that will occur in the planning horizon of this UWMP. The amount of recycled water being used within EVMWD's service area is summarized in **Table 4-12.**

Table 4-12 Recycled Water – Potential Future Use (Same as Table 23 in 2010 UWMP Guidebook)

User type	Description	Feasibility	2015 (acre-ft/yr)	2020 (acre-ft/yr)	2025 (acre-ft/yr)	2030 (acre-ft/yr)	2035 (acre-ft/yr)
Landscape irrigation	Irrigation of parks, schools, churches and residential facilities	High	899	1,790	2,315	2,315	2,315
Golf Course Irrigation	Summerly and Railroad Canyon Golf Course	High	115	115	115	115	115
Lake Replenishment and Environmental Enhancement	Lake Replenishment and Discharge to Temescal Wash	Existing	8,401	8,401	8,401	8,401	8,401
Total			9,415	10,306	10,831	10,831	10,831

(1) Assumes that recycled water from the Regional WRF will be discharged into Lake Elsinore for lake level replenishment and to Temescal Wash for environmental enhancement.

4.4.4 Future Recycled Water Supply Capacity

EVMWD's existing recycled water capacity is 23.2 mgd. Supplies from Eastern MWD are only on an as-available basis and are contingent on the availability of surplus recycled water from Eastern MWD's water reclamation facilities. It is likely that an expansion of the Regional WRF will occur to address future growth. In addition, the Alberhill WRF is expected to be online in the near-future. Available recycled water production capacity in year 2030 is presented in **Table 4-13**.

Table 4-13 Maximum Available Future Recycled Water Production Capacity (Year 2030)

Treatment Facility	Existing Capacity (MGD)	Year 2030 Capacity (MGD)(3)
Horsethief WRF	0.5	0.7
Railroad Canyon WRF	1.2	1.4
Alberhill WRF	-	2.1
Regional WRF	8.0	16.7
Santa Rosa WRF (Southern)(1)	1.5	1.5
Temecula Valley Regional WRF(2)	12.0	12.0
Total Supply (mgd)	23.2	34.4
Total Supply (acre-ft/yr)	26,000	38,500

(1) The maximum recycled water supply that EVMWD is entitled to under the agreement with RCWD is 1.54 mgd, but cannot be greater than the raw wastewater that EVMWD sends to Southern WRF which is approximately 1 mgd.
(2) Eastern MWD has the option to sell the recycled water to EVMWD on an as-needed basis.
(3) Year 2030 projections are obtained from EVMWD's Wastewater Master Plan (Carollo, 2008)

Table 4-14 presents a comparison of the actual 2010 recycled water use and the projections made for 2010 recycled water use in the 2005 Urban Water Management Plan. As discussed earlier, EVMWD's recycled water system in the Wildomar area will be operational in 2011.

Table 4-14 Recycled Water – 2005 UWMP Use Projection Compared to 2010 Actual (Same as Table 24 in 2010 UWMP Guidebook)

Use type	2010 actual use	2005 Projection for 2010
Landscape irrigation	273	1,120(1)
Golf course irrigation	35	0
Lake Replenishment and Discharge to Temescal Wash	2,345	5,900
Total	2,653	7,020

(1) *Projections of landscape irrigation in the 2005 UWMP included recycled water irrigation at golf courses*

4.4.5 Plan to Optimize Recycled Water Use

EVMWD has implemented a mandatory use ordinance which requires all new customers to use recycled water for areas in which facilities exist. In order to encourage the use of recycled water, EVMWD offers recycled water at rates lower than potable water to those customers who are willing to convert from potable water to recycled water. Table 4-15 presents the projected volume of recycled water demands within EVMWD's service area due to such incentives.

Table 4-15 Methods to Encourage Recycled Water Use (Same as Table 25 in 2010 UWMP Guidebook)

Actions	Projected Results					
	2010	2015	2020	2025	2030	2035
Financial incentives						
Delivering recycled water at lower rates than potable water	8,850	9,415	10,306	10,831	10,831	10,831
Total	8,850	9,415	10,306	10,831	10,831	10,831

4.5 FUTURE WATER PROJECTS

#30. (Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program (10631(h)).

4.5.1 Projected Potable Water Supplies

Since EVMWD's population is expected to increase in the next 25 years, additional water supply sources are necessary to meet future potable water demands. While supplies are sufficient to meet normal year demands, additional infrastructure such as pumping facilities and conveyance facilities will be required to meet peak demands under maximum day conditions (MDD). **Table 4-16** presents EVMWD's demands under MDD conditions.

Table 4-16 Demands in EVMWD's Service Area under MDD Conditions

Demand Projections (acre-ft/yr)	2010	2015	2020	2025	2030	2035
Average Demand	25,837	36,971	39,970	43,354	46,551	49,378
Maximum Day Demand (mgd)	46	66	71	77	83	88

The following section describes EVMWD's plans for future water supply infrastructure development. Future supplies include the construction of a pump station that would increase the TVP capacity and the installation of groundwater wells in the Back Basin as identified Elsinore Basin GWMP (MWH, 2005).

4.5.2 Future Groundwater Projects

EVMWD plans to complete three groundwater projects in the next five years: Terra Cotta well, Cereal 1 and Corydon well blending pipeline and Palomar well replacement.

4.5.2.1 Terra Cotta Well (North Basin Well)

The GWMP recommended construction of three dual-purpose injection/extraction wells to be located in the area north of Lake Elsinore. One existing well would be converted to dual-purpose and two new dual-purpose deep wells would be constructed. The Terra Cotta Well, one of the two proposed deep wells, was drilled in 2008. Groundwater production has not been initiated at the Terra Cotta well as well is currently not equipped. Approximately 1,200 gpm of additional supply capacity would be made available through this well. During winters of wet and average years, water will be injected into the groundwater basin, while water will be extracted from the groundwater basin during summers of average and dry years. The Terra Cotta well construction and equipping was included in Fiscal Year (FY) 2008-09 budgets. The well is estimated to be operational by 2012.

4.5.2.2 Pipeline Blending

The Cereal 1 and Corydon wells are not currently operated due to elevated arsenic levels in the groundwater pumped. EVMWD has proposed a plan to construct a 20-inch diameter pipeline from the Cereal 1 and Corydon wells to blend with water from the Diamond and Summerly wells to comply with arsenic maximum containment level of. The pipeline is proposed to be constructed by 2015. Construction of the pipeline will restore approximately 2,700 gpm of pumping capacity. The construction of blending pipeline is included in EVMWD's FY 2009-10 budget. The pipeline construction is estimated to be completed by 2015.

4.5.2.3 Palomar Well Replacement

The Palomar well collapsed in 2008. EVMWD has proposed a plan to replace this well by year 2015. Environmental documentation has not begun for the Palomar well replacement. The Palomar well replacement is currently not budgeted and may be included in FY 2011-12 budget. Approximately 500 gpm of additional capacity will be available with the replacement of this well.

4.5.3 Future Treated Imported Water

Additional imported water supplies would be obtained from the TVP through construction of the TVP pumping station. Water may also be obtained from the Riverside-Corona Feeder project.

4.5.3.1 Temescal Valley Pipeline Pumping Station

The TVP was designed to deliver up to 41 cfs (26.5 mgd). However, to achieve this capacity a pumping station is required to increase the hydraulic grade line sufficiently to overcome the increased headloss associated with the higher flow rate. EVMWD has already selected a site for this pumping station. EVMWD's total usage rights and lease capacity from the TVP connection on the Mills Gravity Pipeline is currently 21 cfs. There is currently unallocated capacity in the Mills Gravity Pipeline. EVMWD intends to contract for additional capacity in the Mills Gravity Pipeline with Western MWD when the capacity is required and has already begun discussions with Western MWD about acquiring the needed capacity.

In 2008, EVMWD prepared a program environmental impact report (PEIR) on the WDSMP. The project-level impacts of the TVP Pump Station are covered in the PEIR. EVMWD has accounted for the construction of the pumping station as part of its FY 2011-12 budget. The preliminary design of the pump station is currently in progress and will be followed by final design and construction, which is estimated to be completed by 2015.

The future projects discussed in this section are summarized in **Table 4-17**. Details such as the amount of water supply available to EVMWD in average, single-dry, and multiple-dry years are also provided in the table. The summary of the water supplies from various water supply sources is presented in **Table 4-18**.

Table 4-17 Future Water Supply Projects (Same as Table 26 in 2010 UWMP Guidebook)

Project name[2]	Projected start date	Projected completion date	Potential project constraints	Normal-year supply	Single-dry year supply	Multiple-dry year supply
20-inch Diameter Blending Pipeline (Cereal 1 and Corydon)	2011	2012	None	0[1]	2,000	1,600
Palomar Well Replacement	2015	2015	None	0[1]	1,000	800
Temescal Valley Pipeline Pumping Station	2013	2015	None	12,900	12,900	12,900
Back Basin Groundwater Storage Phase II	2024	2025	None	0[1]	4,200	3,900
North Basin Aquifer Storage and Recovery	2024	2025	None	0[1]	1,400	1,300
Total				12,900	21,500	20,500

(1) It is assumed that groundwater production will not exceed the natural recharge volume for the Elsinore Basin. Therefore, it is assumed that the addition of new groundwater wells will not increase groundwater production during normal years.
(2) These projects are identified in EVMWD's Water Resources Management Plan (MWH,2007)

Table 4-18 Water Supplies – Current and Projected (Same as Table 16 in 2010 UWMP Guidebook)

Water Supply Sources		2010	2015	2020	2025	2030	2035
Water purchased from	Wholesaler supplied volume (yes/no)						
Metropolitan	Yes	35,200	48,100	48,100	48,100	48,100	48,100
Supplier-produced groundwater[1]		2,978	6,750	6,750	6,750	6,750	6,750
Supplier-produced surface water[2]		4,900	4,900	4,900	4,900	4,900	4,900
Recycled Water[3]		449	1,014	1,905	2,430	2,430	2,430
Lake Replenishment and Discharge to Temescal Wash		8,401	8,401	8,401	8,401	8,401	8,401
Total		51,928	69,165	70,056	70,581	70,581	70,581

(1) Assumes that groundwater pumping in the Elsinore and the Coldwater Basins will not exceed the natural recharge in the basins. Natural recharge in the Elsinore Basin is 5,500 acre-ft/yr while natural recharge in the Coldwater Basin is 1,250 acre-ft/yr
(2) Represents production from the Canyon Lake WTP during a median year hydrology (MWH, 2009)
(3) Assumes that all recycled water produced at EVMWD's Regional Plant is used for replenishment of water levels in Lake Elsinore and discharged along Temescal Wash for environmental enhancement.

SECTION 5 WATER SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING

This section compares projected water supplies and demands, as well as assesses the overall reliability of EVMWD's future supplies. Variation in water sources as a result of emergency or other external influences, as well as EVMWD's drought contingency plan, are also discussed in this section.

5.1 WATER SUPPLY RELIABILITY

#5. An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions (10620(f)).

#23. For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable (10631(c)(2)).

EVMWD's water supplies are surface water from Canyon Lake, groundwater pumping, and imported water from Metropolitan Water District of Southern California (Metropolitan) via the Temescal Valley Pipeline (TVP) and Auld Valley Pipeline (AVP). Water supply from these sources is predicted to be fully reliable through 2030.

5.1.1 Imported Water Supply Reliability

Per Metropolitan's Regional Water Urban Water Management Plan (RUWMP), Metropolitan indicates that its existing supplies are adequate to meet the projected demands in all hydrologic conditions through 2035 (Metropolitan, 2010). Implementation of planned supplies by Metropolitan increases reliability and maintains an adequate reserve. Based on Metropolitan's 2010 RUWMP, it is assumed that imported water is fully reliable during average, dry, and wet years. Therefore, it is assumed that Metropolitan will have sufficient supplies to meet all demands during wet and average years.

EVMWD adopted a Groundwater Management Plan (GWMP) (MWH, 2005) in 2005 which identified conjunctive use projects as an important element of basin management. Direct recharge projects that utilize the groundwater basin as a storage facility and allow for the extraction of stored water for use during drought and high demand periods were identified, designed, and constructed. These direct recharge projects were funded by the Metropolitan as part of a groundwater storage program. During any fiscal year (beginning on July 1st and ending on June 30th) Metropolitan may deliver up to 3,000 acre-ft of water for storage in the Elsinore Basin. EVMWD's dual-purpose wells are used to inject these deliveries in the Elsinore Basin. Metropolitan may also extract up to 4,000 acre-ft of water stored in the Elsinore Basin as part of the Groundwater Storage Program. During a fiscal year when stored Metropolitan deliveries are extracted, supply from the EVMWD's imported water sources is reduced by an equal amount.

Although Metropolitan has reported that it will be fully reliable until 2035, in order to plan for uncertainties associated with imported water supplies, this report assumes that Metropolitan will extract upto 4,000 acre-ft annually during single dry and multiple dry years from the Groundwater Storage Program.

5.1.2 Groundwater Supply Reliability

EVMWD is the largest pumper in the Elsinore Basin accounting for approximately 95 percent of the total production. Groundwater supply from the Elsinore Basin is considered to be a reliable source of supply up to the long-term natural recharge of the groundwater basin. During a normal year, the well pumps are not operated regularly during winter months when demands are low. However, during dry years, the well pumps can be used to extract groundwater throughout the year increasing total extraction. EVMWD's conjunctive use program recharges imported water in the Elsinore Basin during wet years enhancing groundwater supply reliability. Conjunctive use and artificial recharge programs instituted by EVMWD over the past several years and continued implementation of such programs in the future is expected to result in satisfactory management of the Elsinore Basin.

5.1.3 Local Surface Water Supply Reliability

Local inflows to the Canyon Lake are treated at the Canyon Lake Water Treatment Plant (CLWTP). There is limited hydrologic data documenting inflows to the lake. The reliability of supplies at the CLWTP is dependent on local hydrology and is reduced during dry year conditions. **Table 5-1** summarizes the historical flows (natural runoff) to the Canyon Lake WTP.

Table 5-1 Summary of Historical Flows to Canyon Lake WTP (1993 through 2009)

Criteria	Annual Flows (acre-ft/yr)
Average	2,530
Minimum (Single Dry Year)	750
Maximum (Wet Year)	6,550
Minimum, 3-Year Average (Multiple Dry Years)	1,930

Note: In 2002, the Canyon Lake WTP was not operational due to construction at the facility.

Table 5-2 indicates the factors that can potentially impact supply deliveries from EVMWD's water sources, including legal, environmental, water quality and climatic issues. As discussed previously, the reliability of supplies at the CLWTP is dependent on local hydrology and is reduced during dry year conditions. A review of historical data indicates a reduction of upto 50 percent in available natural recharge at Canyon Lake during dry years from average or normal year flows.

While the presence of arsenic in groundwater is likely to impact groundwater production, EVMWD has constructed arsenic treatment and removal facilities to address water quality issues. Groundwater is not expected to be impacted by any other factor listed above.

As discussed previously, since Metropolitan has reported that it will be fully reliable under all hydrologies till 2035, imported water supplies are assumed to be reliable. However, during dry years it is assumed that Metropolitan may also extract up to 4,000 acre-ft of water stored in the Elsinore Basin as part of the Groundwater Storage Program. This is approximately a 10 percent reduction over existing imported water supply capacity available to EVMWD.

Table 5-2 Factors Resulting in Inconsistency of Supply (Same as Table 29 in 2010 UWMP Guidebook)

Water Supply Sources[1]	Specific Source Name, If Any	Limitation Quantification	Legal	Environmental	Water Quality	Climatic	Additional Information
Local Surface Water	Canyon Lake	50 percent				X	
Local Groundwater	Groundwater Wells	None			X		
Imported Water	TVP/AVP	10 percent	X	X		X	

5.2 IMPACTS OF WATER QUALITY ON RELIABILITY

#52. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability (10634).

5.2.1 Surface Water

Canyon Lake water has elevated concentration of disinfection by-product (DBP) precursors, mainly dissolved organic carbon (DOC) and bromide. As a result, when CLWTP is in operation, DBP concentrations above the current 80 µg/L regulatory limit for total trihalomethanes (TTHMs) have been reported. EVMWD is currently evaluating a new disinfection profile to meet the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) and Stage 2 D/DBP Rule. Canyon Lake has the highest Total Dissolved Solids (TDS) among all of EVMWD's water sources. The highest running annual average of TDS in treated water from Canyon Lake is 680 mg/L. However, salinity is not an issue in the Canyon Lake water as it is well below the secondary MCL of 1,000 mg/L for TDS and water from the plant is mixed with other lower salinity sources.

With the proposed implementation of UV disinfection facilities at the WTP, it is expected that Canyon Lake water quality will not affect supply reliability at the WTP.

5.2.2 Groundwater

The presence of nitrates and arsenic in groundwater is a concern in the Elsinore Basin. Nitrates are added to the groundwater via septic systems and agricultural discharges. Groundwater from the Elsinore Division system and the Temescal Division system had an average nitrate (as N) level of 4.5 mg/L. The Maximum Contaminant Level (MCL) and Maximum Contaminant Level Goal (MCLG) for nitrate (as N) is 10 mg/L.

EVMWD is proactively investigating and has implemented solutions to mitigate high arsenic concentrations in groundwater. EVMWD has a treatment facility to remove the naturally-occurring arsenic from groundwater. In addition, a blending pipeline is proposed to blend production from Cereal 1 and Corydon wells with the production from Summerly and Diamond wells to reduce arsenic concentrations. Overall, the Elsinore Basin groundwater quality is considered to be good. EVMWD does not anticipate any groundwater quality to have adverse impacts on supply reliability.

5.2.3 Imported Water

EVMWD obtains all of its imported water supply from Metropolitan through Western and Eastern MWDs. Metropolitan recognizes the importance of the quality of its water supplies, and to the extent possible, is concentrating on maintaining the quality of its source water and developing water management programs that protect and enhance water quality. These management programs recognize that any contaminants that cannot be sufficiently controlled through protection of source waters must be handled through changed water treatment protocols or blending.

Imported Metropolitan water treated at Skinner Filtration Plant is conveyed to EVMWD through the AVP. The TDS content of this water supply, which is primarily Colorado River water, ranges between 440 to 640 mg/L. In 1999, Metropolitan adopted a policy to maintain the TDS concentration at 500 mg/L (secondary standards for drinking water) or less. This is being accomplished by blending the Colorado River water, which has TDS levels as high as 700 mg/l, with SWP water that has an average TDS of about 300 mg/L. Imported Metropolitan water treated at Mills Filtration Plan is conveyed to EVMWD through the TVP. The TDS content of this water supply has an average TDS of about 315 mg/L.

Currently there are no restrictions on water supply due to imported water quality. As presented in **Table 5-3**, no projected water supply changes are anticipated due to water quality impacts from any of EVMWD's sources.

Table 5-3
Water Quality — Current And Projected Water Supply Impacts (Same as Table 30 in 2010 UWMP Guidebook)

Water source	Description of condition	2010 (acre-ft/year)	2015 (acre-ft/year)	2020 (acre-ft/year)	2025 (acre-ft/year)	2030 (acre-ft/year)	2035 (acre-ft/year)
Surface Water – Canyon Lake Runoff	Good	0	0	0	0	0	0
Groundwater	Good	0	0	0	0	0	0
Imported Water – AVP	Good	0	0	0	0	0	0
Imported Water – TVP	Good	0	0	0	0	0	0

5.3 WATER SHORTAGE CONTINGENCY PLANNING

#37. Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster (10632(c)).

#38. Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning (10632(d)).

#39. Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply (10632(e)).

#40. Penalties or charges for excessive use, where applicable (10632(f)).

5.3.1 Stages of Action

EVMWD adopted a Water Shortage Contingency Plan on February 5, 1992. This section provides a summary of that plan in order to meet the requirements of the UWMP Act. The discussion in this section focuses on potable water.

EVMWD's Water Shortage Contingency Plan (James M. Montgomery Consulting Engineers, 1992) was prepared to comply with Assembly Bill 11x (1991). The bill modified Section 10632 of the California Water Code and required every urban water supplier to file a plan, because of the worsening 1986–1992 drought. Key requirements of the current Section 10632 are summarized and discussed in the following sections.

The key elements of the EVMWD's Water Shortage Contingency Plan are ordinances with phased water use restrictions and a drought rate structure. EVMWD has two water shortage ordinances: Nos. 78 and 81, presented in **Appendix D**. The drought plan stages and reduction goals (applied to the base years specified in the ordinances) are presented in **Table 5-4**. Determination of a Stage I, II, III, IV or V condition is at the discretion of EVMWD's General Manager in consultation with the Board of Directors. EVMWD does not have a Stage V reduction for its retail customers. For its wholesale customers, a Stage V reduction would result in a mandatory reduction of 20 percent. A mandatory reduction of 50 percent would occur under Stage V for retail agricultural customers with interruptible deliveries. However, EVMWD does not serve any customer with interruptible deliveries.

Table 5-4
Water Supply Shortage Stages and Conditions

Stage	Voluntary or Mandatory Reduction	Reduction Goal (%)			
		Retail Customers (Firm Deliveries)	Wholesale Customers (Firm Deliveries)	Retail Customers (Interruptible Deliveries)	Retail Agricultural Customers (Interruptible Deliveries)
I	Voluntary	10	10	Non-specific	Non-specific
II	Mandatory	5	5	20	20
III	Mandatory	10	10	30	30
IV	Mandatory	15	15	40	40
V	Mandatory	N/A	20	N/A	50

The trigger levels (to move from one stage to the next) depend on the local water situation and actions taken by Metropolitan. Metropolitan's actions represent the principal trigger(s) for EVMWD's action, because cutbacks in the imported water supply to EVMWD will require action to mitigate those impacts.

5.3.2 Prohibitions, Penalties, and Consumption Reductions

The mandatory water use restrictions and actions are detailed in Ordinances No. 78 and 81. Key prohibited actions by stage are presented in **Table 5-5.** EVMWD does not have customers with interruptible deliveries at this time. During a Stage I shortage, while a water usage reduction to meet a reduction goal is voluntary (as indicated in **Table 5-4**), the restrictions on water-use activities shown in **Table 5-5** are mandatory. Examples of water consumption reduction methods and the projected percent of reduction are presented in **Table 5-6**. EVMWD's water shortage ordinances include customer penalties for non-compliance. These include warnings, fines, flow restrictions, and finally, water service shut-offs. Penalties and charges for non-compliance are summarized in **Table 5-7.**

Table 5-5 Water Shortage Contingency – Mandatory Prohibitions (Same as Table 36 in 2010 UWMP Guidebook)

Prohibitions	Stage When Prohibition Becomes Mandatory
No landscape irrigation between 11am and 4pm	I
No runoff from irrigation	I
Water efficient landscaping encouraged	I
No landscape irrigation between 6am and 6pm unless hand-held hose or drip irrigation or reclaimed water is used	II
Irrigation only three times per week	II
No water served in restaurants unless requested	II
Irrigation only twice a week	III
Commercial car washing using recycled water only	III
No filling swimming pools	III
No golf course watering, except greens, unless reclaimed water is used	III
Irrigation only once a week	IV
Water rationing by customer class	IV
No turf planting at new homes until drought is over	IV

EVMWD's mandatory water use restrictions are detailed in Ordinance No. 78 and 81. Some of the reduction methods are ongoing efforts and do not have a specified stage at which they take effect. More detailed information on the stages at which the methods take effect is listed below:

Table 5-6 Water Shortage Contingency – Consumption Reduction Methods (Same as Table 37 in 2010 UWMP Guidebook)

Consumption Reduction Methods	Stage When Method Takes Effect	Projected Reduction (%)
Demand Reduction Program	Varies	Varies with Stage
Voluntary Rationing	Stage 1	10 (Total)
Education Program	Ongoing	10 (Total)
Plumbing Fixture Replacement	Ongoing	10 (Total)
Mandatory Rationing	Stage 4	Up to 50 (Total)
Flow Restrictions	Not Specified	Up to 50 (Total)
Use Prohibitions	Stage 1	Up to 50 (Total)

Penalties and charges are imposed for violations during mandatory water reductions. The penalty surcharges vary for each stage of mandatory water reduction.

Table 5-7 Water Shortage Contingency – Penalties and Charges (Same as Table 38 in 2010 UWMP Guidebook)

Penalties or Charges	Stage When Penalty Takes Effect
First Violation – Notice of Non-Compliance	Varies
Second Violation – Fine, Flow Restriction, or Water Service Shutoff	Varies
Referral of Misdemeanor Charge	Varies

5.3.3 Catastrophic Supply Interruption Program

Ordinances No. 78 and 81 also apply to water supply emergencies due to disasters other than droughts. In the ordinance, an "emergency supply shortage" is defined as "any water shortage caused by an earthquake, loss of electrical power, pipeline breakage, or any other threatened or existing water shortage caused by a disaster or facility failure which results in EVMWD inability to meet the water demands of its customers." Response to emergency supply shortages are identical to droughts and the water shortage stages previously discussed apply. These actions are summarized in **Table 5-8**.

Table 5-8
Preparation Actions for a Catastrophic Supply Interruption

Possible Catastrophe	Summary of Actions
Regional Power Outage Earthquake Pipeline Break Facility Failure Any Other	• Implement Ordinances No. 78 and 81 • Declare emergency supply shortage • Notify public of emergency supply shortage condition • Prohibit non-essential water usage • Require reduction of water usage to specified goals • Enforce penalties for non-compliance • Enact incentive/disincentive water rates • Develop emergency water management plans if more stringent conservation measures are required • Establish task force to develop ongoing conservation measures/programs

5.4 ANALYSIS OF REVENUE IMPACTS OF REDUCED SALES DURING SHORTAGES

#41. An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments (10632(g)).

A reduction in the amount of water consumed will lead to a reduction in revenue and expenses for EVMWD. These reductions will impact EVMWD's ability to finance its operations during periods of water shortages. Revenue reductions are calculated based upon the following assumptions:

- Water reduction goals by stage in **Table 5-4** are met
- Percentage of revenue from retail customers versus wholesale customers would remain stable at 2009 levels
- There are no customers with interruptible deliveries
- Revenue from 2011 to 2013 is projected by scaling up 2009 revenues by the projected quantity of water delivered

Table 5-9 presents a summary of projected revenue percent reduction by stage and year for water years 2011 through 2013. The revenue reduction is the total reduction corresponding to that stage, not an incremental reduction from one stage to the next. Also note that the revenue reduction in Stage I is calculated assuming EVMWD's *voluntary* water usage reduction goal is met. This voluntary goal is the same as the *mandatory* reduction goal in Stage III (see **Table 5-4),** hence the percent reduction in revenue for Stages I and III are the same. However, it should be noted that EVMWD has the option of adjusting water rates during shortages to minimize or offset revenue reductions.

Table 5-9 Percent Revenue Reduction Due to Water Shortage

Stage	2011	2012	2013
I	10%	10%	10%
II	5%	5%	5%
III	10%	10%	10%
IV	15%	15%	15%
V	15%	15%	15%

Expenditures by EVMWD are also expected to decrease in the event of a water shortage. Reductions are expected in water purchases, groundwater pumping expenses, and booster pumping expenses. Expense reductions were calculated based upon the following assumptions:

- Water reduction goals shown in **Table 5-4** by stage are met
- There are no customers with interruptible deliveries
- Expenses from 2011 to 2013 is projected by scaling up 2009 expenses by the projected quantity of water delivered
- The unit price for savings from reduced water purchases is for imported water
- Water pumping and booster pumping expenses would be reduced in proportion to the reduction in quantity delivered

For the purposes of this analysis, water supply costs from Metropolitan are not expected to increase in times of water shortages. However, rates may change if actual supply availability and/or customer demands are considerably different than their assumed conditions. Reduced water purchases are calculated using Metropolitan Tier 2 rates for treated water, plus the higher of the two possible surcharges from wholesale suppliers. One surcharge of $10/acre-foot would be paid to Western MWD for delivery through the TVP and the other surcharge of $11/acre-foot would be paid to Eastern MWD for delivery through the AVP (see Section 3 for details), so the AVP surcharge was used in the calculation. A projection of percent reduced expenses by stage and water year is presented in **Table 5-10**.

Table 5-10 Percent Reduced Expenses Due to Water Shortage

Stage	2011	2012	2013
I	4.7%	4.7%	4.7%
II	2.3%	2.3%	2.3%
III	4.7%	4.7%	4.7%
IV	7.0%	7.0%	7.0%
V	7.0%	7.0%	7.0%

Methods of compensating for the reduced revenue include penalties for excess water use and rate increases for customers. Penalties for excess water use encourage conservation in turn, further reducing revenue from water sales, but penalties generally only provide a small amount of revenue. If the water shortage is deemed temporary, a rate increase may not be required.

For long-term shortages, immediate rate increases may be considered. A consequence of rate increases may be further conservation by customers. EVMWD would not change fixed domestic monthly service charges during a water shortage because these charges provide revenue for operational expenditures.

EVMWD originally prepared its Water Shortage Contingency Plan and Ordinances No. 78 and 81 to correspond with Metropolitan's 1990 "Incremental Interruption and Conservation Plan." That plan was put into place during the 1987-1992 statewide drought and has since been superceded by Metropolitan's Water Shortage and Drought Management (WSDM) Plan, (Metropolitan, 1999).

EVMWD will revise its water shortage ordinances and Water Shortage Contingency Plan to coordinate with Metropolitan's WSDM Plan. That plan sets forth Metropolitan's intended actions in the event of a surplus or shortage in supply, the availability of resources and water demands, and how the plan fits into the framework of Metropolitan's regional resource management. EVMWD will also revise its Water Shortage Contingency Plan and drought ordinances to reflect changes to its rate structure, customer base and new developments, water usage patterns, and the addition of recycled water services. These revisions will include an update to the number of water shortage stages, and the water usage reduction goals. EVMWD will also add a description of monitoring and actions needed to determine compliance in order to support the enforcement activities set forth.

5.5 DROUGHT PLANNING

#22. Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) an average water year, (B) a single dry water year, (C) multiple dry water years (10631(c)(1)).

#36. An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply (10632(b)).

EVMWD obtains its potable water supplies from local groundwater, local surface water from Canyon Lake, and imported water from Metropolitan. For this report, the following definitions are adopted for average/normal, single-dry, multiple-dry, and wet years, which are summarized in **Table 5-11**:

- Average/normal year – Statistical average of 50 years of historical hydrologic observations.
- Single dry year – A repeat of the 1977 hydrologic conditions, except where noted.
- Multiple dry years – A repeat of the 1990 – 1992 multi-year drought condition that occurred twice in the past 77 years.
- Wet year – A repeat of the 1998 above normal hydrologic condition.

Table 5-11 Basis of Water Year Data (Same as Table 27 in 2010 UWMP Guidebook)

Water Year Type(1)	Base Year(s)
Average Water Year	Statistical average of 50 years
Single-Dry Water Year	1977
Multiple-Dry Water Years	1990-1992

(1) Hydrologic data for the Canyon Lake is available only for the 1993-2009 period. Hydrologic simulations from EVMWD's Water Supply Optimization Model (MWH, 2009) are used to determine single dry year and multiple dry year values for Canyon Lake.

Table 5-12 presents a summary of the supply reliability of EVMWD's supplies under different hydrologies under 2010 conditions. The assumptions made for the amount of supplies available from the various sources are discussed in **Section 4 System Supplies**.

Table 5-12 Supply Reliability – Current Water Sources (Same as Table 31 in 2010 UWMP Guidebook)

Water supply sources	Average/Normal Water Year Supply (acre-ft/year)	Single Dry Water Year Supply (acre-ft/year)	Multiple Dry Water Year Supply (acre-ft/year)
Canyon Lake WTP(1)	4,900	2,500	3,000
Groundwater Extraction	3,700	11,300	10,000
Groundwater Injection(2)	-4,600	0	0
TVP(3,4)	12,700	10,700	10,700
AVP(3,4)	22,500	20,500	20,500
Total	43,800	45,000	44,200
Percent of normal year:	100%	102.7%	100.9%

(1) Natural inflow volumes for Canyon Lake are developed using hydrology data from 1993-2009
(2) It is assumed that surplus water is available for injection only during average and wet year hydrologies. Injection volumes are obtained from EVMWD's Water Supply Optimization Plan (WSOP) (MWH, 2009)
(3) It is assumed that only 83 percent of capacity at TVP and AVP is available during average years
(4) It is assumed that Metropolitan will extract 4,000 acre-ft/yr from the Groundwater Storage Program during single dry and multiple dry years

Table 5-13 summarizes the available water supplies to meet average annual demands during average/normal, single-dry and multiple-dry years under 2010 conditions.

Table 5-13 Supply Reliability – 2010 Conditions (Same as Table 28 in 2010 UWMP Guidebook)

Average / Normal Water Year (acre-ft/year)	Single Dry Water Year (acre-ft/year)	Multiple Dry Water Years (acre-ft/year) Average
43,800	45,000	44,200
Percent of Average/Normal Year:	102.7%	100.9%

#53. Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier (10635(a)).

5.5.1 Projected normal water year supply and demand

The projected normal water year supply includes local groundwater and surface water as well as imported Metropolitan water sources. Projected water demand totals are based on demand forecasts presented in **Section 3 – System Demands**. Projected supply totals are based on supply forecasts presented in **Section 4 – System Supplies**. **Table 5-14** provides the projected normal year supply and demand comparison until 2035. Current and anticipated future supplies are sufficient to meet the projected normal year water demand through 2035.

Table 5-14 Supply and Demand Comparison – Normal Year (Same as Table 32 in 2010 UWMP Guidebook)

	2015	2020	2025	2030	2035
Supply totals(1)	69,165	70,056	70,581	70,581	70,581
Demand totals(2)	51,306	55,244	59,208	62,426	65,258
Difference	17,858	14,812	11,373	8,155	5,323
Difference as % of Supply	25.8%	21.1%	16.1%	11.6%	7.5%
Difference as % of Demand	34.8%	26.8%	19.2%	13.1%	8.2%

(1) Supply totals are obtained from Table 4-19.
(2) Demand totals are obtained from Table 3-16.

5.5.2 Projected Single Dry-Year Supply and Demand

A comparison of supplies and demands reveals that sufficient supply exists to meet demands for single dry year requirements. As described in the Water Shortage Contingency Plan, dry years may prompt additional water conservation measures to ensure sufficient supply is maintained. **Table 5-15** shows the projected single dry year supply and demand comparison until 2035. Current and anticipated future supplies are sufficient to meet the projected single dry-year water demand through 2035. Based on a review of historical data for EVMWD, it is observed that dry year demands are approximately 9 percent higher than average year demands. The demands used for single dry year and multiple dry year hydrologies are adjusted accordingly to reflect historical conditions.

Table 5-15 Supply and Demand Comparison – Single Dry Year (Same as Table 33 in 2010 UWMP Guidebook)

	2015	2020	2025	2030	2035
Supply totals(1)	77,765	78,656	79,181	79,181	79,181
Demand totals(2)	56,027	60,326	64,655	68,169	71,262
Difference	21,738	18,329	14,526	11,012	7,919
Difference as % of Supply	28.0%	23.3%	18.3%	13.9%	10.0%
Difference as % of Demand	38.8%	30.4%	22.5%	16.2%	11.1%

(1) Supply totals shown in Table 4-19 are adjusted to reflect single dry year conditions
(2) Demand totals shown in Table 3-16 are adjusted by 9 percent to reflect dry year conditions

5.5.3 Projected Multiple Dry-Year Supply and Demand

A comparison of supplies and demands reveals that sufficient supply exists to meet demands for multiple dry year requirements and, similar to single dry-year supply, dry years may prompt additional water conservation measures to ensure sufficient supply is maintained. **Table 5-16** shows the projected multiple-dry-year supply and demand comparison through 2030. Current and anticipated future supplies are sufficient to meet the projected multiple dry-year demand through 2030.

Table 5-16 Supply and Demand Comparison – Multiple Dry-Year Events (Same as Table 34 in 2010 UWMP Guidebook)

	2015	2020	2025	2030	2035
Supply totals(1)	76,765	77,656	78,181	78,181	78,181
Demand totals(2)	56,027	60,326	64,655	68,169	71,262
Difference	20,738	17,329	13,526	10,012	6,919
Difference as % of Supply	27.0%	22.3%	17.3%	12.8%	8.9%
Difference as % of Demand	37.0%	28.7%	20.9%	14.7%	9.7%

(1) Supply totals shown in Table 4-19 are adjusted to reflect multiple dry year conditions
(2) Demand totals shown in Table 3-16 are adjusted by 9 percent to reflect dry year conditions

5.5.4 Stages of Action During a 50 Percent Reduction

#35. Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage (10632(a)).

Stage V in EVMWD's Water Shortage Contingency Plan requires only retail agricultural customers with interruptible deliveries to reduce water use by 50 percent during a water shortage. Wholesale customers with firm deliveries are required to reduce water consumption by 20 percent during a Stage V shortage. Determination of a Stage I, II, III, IV, or V condition is at the discretion of EVMWD's General Manager in consultation with the Board of Directors.

Stages of action that EVMWD would undertake in response to water supply shortages are presented in **Table 5-4**. **Table 5-5** and **Table 5-6** present mandatory prohibitions and methods to reduce consumption respectively during shortage years. Depending on the severity of the water shortage, such as a 50 percent reduction in available supplies during a single dry year, EVMWD may impose more stringent restrictions on water use than those currently identified by the Water Shortage Contingency Plan.

#43. A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis 10632(i).

EVMWD has metered connections to monitor customer use on a monthly basis. It is recommended that EVMWD adopt a mechanism for determining actual reductions on a monthly basis by establishing a baseline period for normal water use and comparing that to actual monthly usage. A summary of EVMWD's monitoring mechanisms is presented in **Table 5-17.**

Table 5-17
Water Use Monitoring Mechanisms

Mechanisms for Determining Actual Reductions	Type and Quality of Data Expected
Monitor monthly billed water usage and compare usage to baseline.	Quality of billing data expected to be sufficient to evaluate effectiveness of actions taken.

SECTION 6 DEMAND MANAGEMENT MEASURES

#26. (Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following: (A) water survey programs for single-family residential and multifamily residential customers; (B) residential plumbing retrofit; (C) system water audits, leak detection, and repair; (D) metering with commodity rates for all new connections and retrofit of existing connections; (E) large landscape conservation programs and incentives; (F) high-efficiency washing machine rebate programs; (G) public information programs; (H) school education programs; (I) conservation programs for commercial, industrial, and institutional accounts; (J) wholesale agency programs; (K) conservation pricing;(L) water conservation coordinator; (M) water waste prohibition; (N) residential ultra-low-flush toilet replacement programs (10631(f)(1) and (2).

#27. A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan (10631(f)(3)).
#28. An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand (10631(f)(4)).

#29. An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following: (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation (10631(g)).

6.1 DEMAND MANAGEMENT MEASURES

Demand management measures (DMMs) are mechanisms a water supplier implements to increase water conservation. EVMWD became a signatory to the California Urban Water Conservation Council (CUWCC) MOU regarding Urban Water Conservation in California on December 11, 2002. EVMWD's 2009-2010 Coverage Report is presented in the **Appendix F** to provide documentation of DMM implementation.

6.1.1 Review of Water Demands

Conservation measures should target water use sectors that have the highest demand or where water savings can be achieved at a low cost. The major focus of EVMWD's conservation program is on residential water use, both single and multi-family, because they comprise almost 73 percent of the total water use in EVMWD's service area in 2010. Many of the homes are now built with water-efficient plumbing fixtures to comply with state and local ordinances, so conservation of outdoor water uses is emphasized.

6.1.2 List of Best Management Practices

The intent of the Best Management Practices (BMPs) is to encourage water utilities to evaluate a number of measures and use those that are appropriate as the cornerstone of their conservation program. All customer classes are targeted by BMPs to make a comprehensive water conservation program.

The current list of BMPs in California contains five categories. The list developed in 1991 by the CUWCC contained 16 measures. The list was changed in 1997 when four measures were dropped, two new ones added, and revisions were made to others. The list was last amended in 2008 to organize the 14 BMPs into the following five categories:

1. Utility Operations
2. Education
3. Residential
4. Landscape
5. Commercial, Industrial and Institutional (CII)

Both Utility Operations and Education are designated “Foundational BMPs” because they are considered to be essential water conservation activities and are adopted for implementation by all signatories to the MOU as ongoing practices with no time limits. The remaining BMPs are “Programmatic BMPs”.

Table 6-1 lists the BMPs from the MOU with their targeted customer categories.

Table 6-1 Best Management Practices with Targeted Customer Categories

New BMP Category		Old BMP Number and Name	Targeted Customer Categories
Utility Operations	Water Loss Control	3.System Water Audits, Leak Detection, and Repair	System
	Metering	4. Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	All
	Operations	10. Wholesale Agency Assistance Programs	All (not applicable to retail customers)
	Operations	12. Water Conservation Coordinator	All
	Operations	13. Water Waste Prohibition	All
	Pricing	11. Conservation Pricing	All
Education	Public Information Program	7. Public Information Programs	All
	School Education Program	8. School Education Programs	Residential
Residential		1. Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers	Single-Family and Multi-Family Residential
		2. Residential Plumbing Retrofit	Pre-1992 Single-Family and Multi-Family Residential Dwellings
		6. High-Efficiency Washing Machine Rebate Programs	New & Existing Residential
		14. Residential ULFT Replacement Programs	Residential
Commercial, Industrial, and Institutional		9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	CII
Landscape		5. Large Landscape Conservation Programs and Incentives	Irrigation Accounts

EVMWD has had an active water conservation program ever since the 1986-92 drought. The program will continue to expand as staffing and budget allows. Further discussion of the above listed BMPs and the steps EVMWD is taking to implement them is provided below.

In addition to implementation of all BMPs, the MOU requires that signatories achieve a specified level of coverage for each of the BMPs (EVMWD, 2004a). For most of the BMPs, there are multiple criteria to be checked in order to meet coverage requirements. For instance in the Residential – Water Survey program, there are two conditions for evaluating coverage. One condition requires EVMWD to provide landscape water surveys to an average of 1.5 percent per year of current single-family accounts during the first ten years after signing the MOU. The second condition requires that EVMWD will maintain a program at the level of high-bill complaints of no less than 0.75 percent per year of current single-family accounts and 0.75 percent per year of current multi-family units, after completing the ten-year 15 percent target.

Table 6-3 summarizes the criteria for coverage, whether coverage criteria are met, and required actions for EVMWD to achieve full compliance with the requirements of the MOU. If full coverage has already been achieved, "N/A" (not applicable) is indicated. The duration allowed for achieving full coverage varies by BMP. The maximum duration is 10 years from the date that initial implementation is required. Considering that BMP implementation started no later than fiscal year (FY) 2004-05, the maximum duration for full implementation ends in 2015. The expiration of agencies' signatures on the MOU is 10 years from the date of signature, which is December 2012 for EVMWD. After that point, each agency is to renew its commitment to the MOU on an annual basis. However, the MOU was recently amended in June 2010 and full implementation is now required by 2018. EVMWD plans to achieve full coverage of each BMP no later than FY 2018.

6.1.2.1 Utility Operations

(1) Water Conservation Coordinator

EVMWD must staff and maintain the conservation coordinator position and provide support staff as necessary. EVMWD has a water conservation coordinator. Duties of the coordinator are:

- Coordination and oversight of conservation programs and BMP implementation.
- Preparation and submittal of the progress reports to various parties.
- Communication and promotion of water conservation issues to senior agency management, coordination with operations and planning staff, preparation of an annual conservation budget, and preparation of water conservation plan updates.

EVMWD is in compliance with this requirement.

(2) Water Waste Prevention

EVMWD must enact and enforce measures prohibiting gutter flooding, single-pass cooling systems in new connections, non-recirculating systems in all new conveyor car wash and commercial laundry systems, and non-recycling decorative water fountains.

EVMWD adopted EVMWD Ordinance 185 "Prohibition of Water Waste" in November 2008 and was amended in June 2009. The ordinance is on file with the CUWCC and is included in **Appendix E**. EVMWD also follows the Riverside County's Ordinance 857, which is a comprehensive landscape ordinance including prohibitions on water waste. In addition, EVMWD is cooperating with the four cities in its service area to assist with enforcement of ordinance by providing door hangers notifying customers of water waste.

EVMWD also has fines in place for violations of water runoff and watering during the day.

(3) Wholesale Agency Assistance Programs

EVMWD must: offer financial support, technical support, staff resources, and regional programs to the retail end-users of its wholesale customers, to be in compliance with the coverage requirements. EVMWD is in compliance.

EVMWD supplies a small amount of wholesale water to two retail water utilities. EVMWD implemented this BMP by allowing the water retailers' customers to directly participate in EVMWD's programs. For example, they are eligible for retrofit kits, audits, and rebates just as EVMWD's retail customers are.

(4) Water Loss Control

EVMWD must do the following: (1) Standard Water Audit and Water Balance – Quantifying the current volume of apparent and real water loss, as well as completing the standard water audit and balance; (2) Validation – Developing a validated data set for all entries of the water audit and balance; (3) Economic Values – Determining the real loss recovery based on the Council's adopted Avoided Cost Model or equivalent model consistent with the Council's Avoided Cost Model; (4) Component Analysis – Analyzing apparent and real losses and their causes by quantity and type at least once every four years; (5) Interventions – Reducing real losses to the extent cost-effective; (6) Customer Leaks – Advising customers whenever it appears possible that leaks exist on the customer's side of the meter.

EVMWD tested the water meters. EVMWD also completed the training in the American Water Works Association (AWWA) Water Audit Method since the adoption of the BMP in 2008. EVMWD plans to complete training in Component Analysis Process and perform the process by 2018.

EVMWD has a full-time Preventive Maintenance Supervisor who implements regular leak detection and line surveys. EVMWD surveyed 6 miles of pipeline in FY 2009-2010. EVMWD demonstrated progress in Water Loss Performance by repairing all reported leaks and breaks, as well as locating and repairing unreported leaks, to the extent cost-effective. EVMWD also establishes and maintains record keeping for the repair of reported leaks and for the date/time leak are reported and leak location.

(5) Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

EVMWD must meet the following conditions to comply with the coverage requirements: (1) Meter for all new service connections; (2) Establish a program for retrofitting existing unmetered service connections; (3) Read meters and bill customers by volume of use; (4) Prepare a written plan, policy or program that includes a census of all meters and a currently approved schedule of meter testing, repair and meter replacement; (5) Identify intra- and inter-agency disincentives or barriers to retrofitting mixed use commercial accounts with dedicated landscape meters.

EVMWD has no unmetered accounts. EVMWD also requires meters for all new connections and bills by volume-of-use. EVMWD has submitted a meter repair plan to CUWCC for review. Therefore, EVMWD is in compliance with this requirement.

(6) Conservation Pricing

EVMWD must implement a conservation pricing rate structure.

EVMWD has adopted water budget rate structures to manage the water supply and encourage customers to conserve water. The customers will pay an increasing rate per hundred cubic feet as they increase the water usage. EVMWD is in compliance with this BMP and intends to keep this rate structure in place during the planning horizon of this UWMP.

6.1.2.2 Education

(1) Public Information Programs

EVMWD must implement and maintain a public information program to promote and educate customers about water conservation.

EVMWD has a public information program and therefore is in compliance. EVMWD will continue current programs, which include:

- Conducting Landscape Workshop in the fall and the spring
- Participating in the Unity in the Community Parade, the Community Water Conservation Festival, and the Lake Elsinore Children's Fair
- Participating in the statewide Water Awareness Month.
- Putting additional and updated conservation information on EVMWD's web site.
- Continuing to promote water conservation with water bill inserts in the spring and summer.

The public information program consists of legislative and community outreach programs, including an extensive water education program directed to public schools, and conservation programs directed to residential, commercial, and institutional customers. Annual landscape design classes are given to residential customers, along with water audits to commercial and industrial customers. Monthly billing inserts, website access, tours, and outreach through community events are also provided. All of the residential rebate programs are promoted on a regular basis. Community outreach is also extended with a sponsorship program that includes donations of bottled water which carry the conservation message to thousands of customers per year.

(2) School Education Programs

EVMWD must implement and maintain a school education program to promote water conservation.

Long-term results to eliminate wasteful water-use habits are best achieved by the education of youth. EVMWD has had a school education program since 1987 and has a good relationship with the local school district. The program utilizes educational and theatrical presentations, poster contests, printed educational materials, and science fair support to target school-age children. They, in turn, inform their parents of the importance of water conservation in Southern California. Teaching children to respect the value of water helps them grow into responsible adults with a conservation ethic. Educational material meets state education frameworks and grade appropriate materials are distributed to grade levels K-3, 4-6, 7-8, and high school. EVMWD plans to continue its program at current levels and look for new material to keep the program current and interesting to students on an on-going basis with the pretext of expanding the program over the next few years. Thus, EVMWD is in compliance with the requirements of this BMP.

6.1.2.3 Residential

6.1.2.4 Residential Assessment Program

The coverage requirements are: (1) Provide site-specific leak detection assistance; and (2) provide showerheads and faucet-aerators that meet the current water efficiency standard as stipulated in the Water Sense Specifications as needed.

EVMWD implemented water budgets for all domestic customers and irrigation customers in July 2009. These include allocations for indoor use at 60 gpcd and allocations for outdoor use based on ET data and irrigated area. For FY 2009-10, EVMWD documented a 16 percent reduction in water use after implementing water budgets.

EVMWD has seen a marked increase in requests for surveys and continues to offer surveys upon customer request and for those customers with very high bills. EVMWD has budgeted $20,000 for surveys in FY 2011-12. EVMWD will also contact customers with a letter, phone call or bill notice when very high use is noted. EVMWD will waive penalty rates when a customer fixes a leak.

Homes built before 1980 generally do not have low-flow showerheads, low-flush toilets, or faucet aerators. Even some homes built prior to 1992 may not have these devices because of poor plumbing code enforcement. The U.S. Energy Policy Act of 1992 has required 1.6 gallons per flush (gpf) toilets, 2.5 gallons per minute (gpm) showerheads, and 2.5 gpm faucets since January 1, 1994. The 2010 California Green Building Code Standards (CALGreen), which became effective January 1, 2011, requires a 20 percent reduction in the water use of plumbing fixtures compared to the previous requirements. As homeowners remodel older homes or replace plumbing fixtures, these older homes will, over many years, be brought up to code.

EVMWD implemented a targeted marketing strategy for distributing low-flow devices in 1997. Metropolitan launched a showerhead give-away program and distributed toilet water displacement devices, in which EVMWD assisted customers to participate. In January 2004, EVMWD launched its own showerhead give-away program for all customers whose homes were built before 1994. Customer notification is achieved through press releases, quarterly newsletters, flyers included with bills, cable TV public service announcements, and promotions at community outreach events, such as Water Festival. This program is totally funded by EVMWD. EVMWD also provides free 2.0 gpm showerheads to any customer upon request.

In addition to school-based education programs, students are asked to complete a home water survey with their family and discuss the results. Service groups like the Boy Scouts have also participated in conducting water surveys as part of a community service program.

6.1.2.5 Landscape Water Survey

Under the BMP coverage requirements, EVMWD is required to perform site-specific landscape water surveys. Home water surveys have been offered to attendees of EVMWD's annual landscape workshops. Surveys predominantly focus on outdoor water use, identifying water waste, improving water use efficiency, and preparing a customized lawn irrigation schedule. EVMWD educates customers about water conservation through two landscape workshops offered in the fall and the spring. EVMWD provides Rotator Sprinkler Nozzles to customers upon request. EVMWD also has robust ET-based water budgets for all Domestic and Landscape Irrigation customers. EVMWD is on track to be fully compliant with this BMP by 2018.

6.1.2.6 High-Efficiency Washing Machine Rebate Programs

Agencies must provide incentives or institute ordinances requiring the purchase of high-efficiency clothes washing machines that meet an average water factor value of 5.0. The water factor is amount of water use per cycle divided by the washing machine capacity, measured in gallons per cubic foot of laundry. EVMWD encourages customers to purchase high-efficiency (side-loading) washing machines. These washing machines can reduce water usage by about one-third, but are currently more expensive than conventional washing machines. EVMWD provides a rebate of $85 for high-efficiency washing machines with a Water Factor of 4.0 or less. Availability of the rebate is advertised in water bill inserts twice per year. Large home improvement stores including Home Depot, Lowe's, and Sears have all been informed about the appliance rebate program and are an integral part of promoting the rebate program to their customers.

6.1.2.7 WaterSense Specification (WSS) Toilets

EVMWD must provide incentives or ordinances requiring the replacement of existing toilets using 3.5 gpf or more with a toilet meeting WSS standards. EVMWD installed 3,000 High Efficiency Toilet (HET) Stealth toilets (0.8 gpf) by Niagara Conservation in FY 2010-11 and plans to install another 1,500 Stealth toilets in FY 2011-2012. EVMWD offered 1.28 gpf toilets to all large multi-family customers in FY 2009-10 and was only able to install 177 toilets out of 500 because nearly all customers had existing 1.6 gpf or ultra flow flush toilets (ULFTs).

6.1.2.8 Commercial, Industrial, and Institutional

EVMWD must do the following: (1) Implement measures on the CII list with well-documented savings that have been demonstrated for the purpose of documentation and reporting; and (2) Implement unique conservation measures to achieve the agency's water savings goals.

EVMWD has identified and ranked its CII accounts by use.

EVMWD has very few CII customers that use large amounts of water indoors and the water they use outdoors falls under the Large Landscape designation. EVMWD has concentrated on the landscape irrigation side as the best use of limited funds. EVMWD will implement a restaurant program and a commercial weather-based irrigation controllers (WBIC) program in FY 2011-12.

6.1.2.9 Landscape

EVMWD must provide non-residential customers with support and incentives to improve their landscape water use efficiency. EVMWD will be on track if at least 90 percent of all dedicated meters and 15 percent of all mixed-use and non-metered accounts receive the assistance by 2011. EVMWD provides non-residential customer support and incentives to improve their landscape water use efficiency. The support varies depending on whether the account has a dedicated landscape meter, which is common for larger sites.

All EVMWD Landscape Irrigation accounts are on ET-based water budgets with a robust rate structure. EVMWD installed 256 WBICs for large landscape accounts in FY 2008-09 and 102 in FY 2009-10. Nearly all home owner associations (HOAs), cities, and the Lake Elsinore Unified School District now have WBICs and EVMWD is monitoring water use and offering follow-up surveys to those customers. EVMWD funded a large portion of the cost of the WBICs and the installation. EVMWD is on track to be fully compliant with this BMP by 2018.

6.1.3 Schedule of DMM Implementation

Table 6-2 presents the implementation schedule required by the MOU for each BMP, as well as the actual dates of implementation for retail and wholesale customers, if known.

Table 6-2
Implementation Schedule

New BMP Category[1]			Required Implementation Date	Retail Implementation Actual Date	Wholesale Implementation Actual Date
Utility Operations	1.1.1	Water Conservation Coordinator	July 1, 2004	Implemented Mar. 18, 1991	Implemented Mar. 18, 1991
	1.1.2	Water Waste Prevention	July 1, 2004	Implemented December 11, 2008	NA
	1.1.3	Wholesale Agency Assistance Programs	July 1, 2005	N/A	Implemented
	1.2	Water Loss Control	July 1, 2004	Implemented July 1, 2009	NA
	1.3	Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	July 1, 2005	Implemented	NA
	1.4	Conservation Pricing	July 1, 2004	Implemented	Implemented
Education	2.1	Public Information Programs	July 1, 2004	Implemented	Implemented
	2.2	School Education Programs	July 1, 2004	Implemented Mar. 18, 1991	Implemented Mar. 18, 1991
Residential	3.1	Residential Assistance Program	December 10, 2004	On Jan. 1, 1997	NA
	3.2	Landscape Water Survey	July 1, 2004	On Sept. 15, 1991	NA
	3.3	High-Efficiency Washing Machine Rebate Programs	July 1, 2004	Implemented	NA
	3.4	WaterSense Specification Toilets (WSS)	July 1, 2004	Implemented Jan. 2001	NA
Commercial, Industrial, and Institutional	4	Commercial, Industrial, and Institutional	July 1, 2005	Implemented	NA
Landscape	5	Landscape	July 1, 2005	Implemented Jan. 1, 1994	NA

(1) California Urban Water Conservation Council (CUWCC), 2010. Memorandum of Understanding Regarding Urban Water Conservation in California, June 9, 2010.

6.1.4 Conservation Savings

Table 6-3 presents a summary of estimated savings in acre-feet per year (acre-ft/yr) for each of the BMPs as reported by EVMWD to CUWCC in the Total Savings Report for the year 2010. Water savings are estimated only for those BMPs for which savings can be quantified by EVMWD.

Table 6-3
Quantified Water Savings

New BMP Category			Quantified Water Savings (acre-ft/yr)
Utility Operations	1.1.1	Water Conservation Coordinator	Not Quantified
	1.1.2	Water Waste Prevention	Not Quantified
	1.1.3	Wholesale Agency Assistance Programs	Not Quantified
	1.2	Water Loss Control	Not Quantified
	1.3	Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	Not Quantified
	1.4	Conservation Pricing	Not Quantified
Education	2.1	Public Information Programs	Not Quantified
	2.2	School Education Programs	Not Quantified
Residential	3.1	Residential Assistance Program	9.7
	3.2	Landscape Water Survey	148
	3.3	High-Efficiency Washing Machine Rebate Programs	2
	3.4	WaterSense Specification Toilets (WSS)	13
Commercial, Industrial, and Institutional	4	Commercial, Industrial, and Institutional	
Landscape	5	Landscape	158
		Total	331

6.1.5 Coverage Compliance

The initial term of the MOU commenced on September 1, 1991 and will be in effect for ten years, after which it is automatically renewed on an annual basis for all signatories unless a signatory withdraws. EVMWD signed the MOU in December 2002, so the initial term ends in December 2012. However, the MOU was recently amended in June 2010 and full implementation is now required by 2018. EVMWD plans to achieve full coverage of each BMP no later than FY 2018. **Table 6-4** summarizes the coverage criteria, actions implemented by EVMWD, and actions to be completed in order to meet the requirements of the MOU for each BMP.

Table 6-4 BMP Coverage

BMP Category			On Track?	Coverage Criteria	Action completed by EVMWD	Actions To Meet Requirements by 2018
Utility Operations	1.1.1	Water Conservation Coordinator	YES	Agency shall staff and maintain the position of conservation coordinator and provide support staff as necessary.	EVMWD has had a conservation coordinator since 3/18/1991.	N/A
	1.1.2	Water Waste Prevention	YES	Implementation methods shall be enacting and enforcing measures prohibiting gutter flooding, single pass cooling systems in new connections, non-recirculating systems in all new conveyer car wash and commercial laundry systems, and non-recycling decorative water fountains.	EVMWD has adopted EVMWD Ordinance 185 in June 2009 in "Prohibition of Water Waste" that is on file with the CUWCC. EVMWD also follows the Riverside County's Ordinance 857, which is a comprehensive Landscape Ordinance including prohibitions on water waste. EVMWD is cooperating with the four local cities to assist with enforcement of ordinance by providing door hangers notifying customers of water waste. EVMWD has fines in place for violations of water runoff and watering during the day.	N/A
	1.1.3	Wholesale Agency Assistance Programs	YES	Implementation of Wholesale Agency Programs was required to begin by July 1, 2005. EVMWD must meet the following condition to comply with the coverage requirements: Offer financial support, technical support, staff resources, and regional programs to the retail end-users of its wholesale customers.	EVMWD supplies a small amount of wholesale water to two retail water utilities. EVMWD implemented this BMP by allowing the water retailers' customers to directly participate in EVMWD's conservation and rebate programs.	N/A
	1.2	Water Loss Control	YES	Implementation of this BMP was required to begin by July 1, 2004. EVMWD must do the following: (1) Standard Water Audit and Water Balance – Quantifying the current volume of apparent and real water loss, as well as completing the standard water audit and balance; (2) Validation – Developing a validated data set for all entries of the water audit and balance; (3) Economic Values – Determining the real loss recovery based on the Council's adopted Avoided Cost Model or equivalent model consistent with the Council's Avoided Cost Model; (4) Component Analysis – Analyzing apparent and real losses and their causes by quantity and type at least once every four years; (5) Interventions – Reducing real losses to the extent cost-effective; (6) Customer Leaks – Advising customers whenever it appears possible that leaks exist on the customer's side of the meter.	EVMWD tested Source, Import and Production meters and completed the training in the AWWA Water Audit Method since the adoption of the BMP in 2008. EVMWD has a full-time Preventive Maintenance Supervisor who implements regular leak detection and line surveys. EVMWD surveyed 6 miles of line in FY 2009-2010. EVMWD demonstrated progress in Water Loss Performance by repairing all reported leaks and breaks, as well as locating and repairing unreported leaks, to the extent cost-effective. EVMWD established and maintained record keeping for the repair of reported leaks for: Date/time leak reported and leak location.	EVMWD plans to complete training in Component Analysis Process and perform the process by 2018.
	1.3	Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	YES	Implementation of BMP was required to begin by July 1, 2005. EVMWD must meet the following conditions to comply with the coverage requirements: (1) Meter for all new service connections; (2) Establish a program for retrofitting existing unmetered service connections; (3) Read meters and bill customers by volume of use; (4) Prepare a written plan, policy or program that includes a census of all meters and a currently approved schedule of meter testing, repair and meter replacement; (5) Identify intra- and inter-agency disincentives or barriers to retrofitting mixed use commercial accounts with dedicated landscape meters.	EVMWD has no unmetered accounts. EVMWD also requires meters for all new connections and bills by volume-of-use. EVMWD has submitted a meter repair plan to CUWCC for review.	N/A
	1.4	Conservation Pricing	YES	Agency shall maintain rate structure consistent with the definition of conservation pricing. Implementation methods shall be at least as effective as eliminating non-conserving pricing and adopting conserving pricing. For signatories supplying both water and sewer service, this BMP applies to pricing of both water and sewer service. Signatories that supply water but not sewer service shall make good faith efforts to work with sewer agencies so that those sewer agencies adopt conservation pricing for sewer service.	Implemented a water budget-based water rate structure for all customers in 2009.	N/A

Table 6-4 (Continued) BMP Coverage

BMP Category			Coverage Met?	Coverage Criteria	Action completed by EVMWD	Actions To Meet Requirements by 2018
Education	2.1	Public Information Programs	YES	Implement and maintain a public information program to promote and educate customers about water conservation.	Implemented and maintained a public information program since YEAR.	N/A
	2.2	School Education Programs	YES	Implement and maintain a school education program to promote water conservation.	Implemented and maintained a school education program since YEAR.	N/A
Residential	3.1	Residential Assistance Program	YES	Implementation of this BMP was required to begin by December 10, 2004. The coverage requirements are: (1) Provide site-specific leak detection assistance; and (2) Provide showerheads and faucet-aerators that meet the current water efficiency standard as stipulated in the Water Sense Specifications as needed.	EVMWD implemented water budgets for all domestic customers and irrigation customers in July 2009. These include allocations for indoor use at 60 gpcd and allocations for outdoor use based on ET data and irrigated area. EVMWD continues to offer surveys upon customer request and for those customers with very high bills. EVMWD has budgeted $20,000 for surveys in FY 2011-2012. EVMWD will also contact customers with a letter, phone call or bill notice when very high use is noted. EVMWD will waive penalty rates when a customer fixes a leak. In January 2004, EVMWD launched its own showerhead give-away program for all customers whose homes were built before 1994. This program is totally funded by EVMWD. EVMWD also provides free 2.0 gallon per minutes (gpm) showerheads to any customer upon request.	N/A
	3.2	Landscape Water Survey	YES	Implementation of this BMP was required to begin by July 1, 2004 and EVMWD is required to perform site-specific landscape water surveys. EVMWD is considered on track if surveys are completed for 1.5 percent of accounts by 2005, 3.6 percent by 2006, 6.3 percent by 2007, 9.6 percent by 2008, 13.5 percent by 2009, and 15 percent by 2010.	Home water surveys have been offered to attendees of EVMWD's annual landscape workshops. Surveys predominantly focus on outdoor water use, identifying water waste, improving water use efficiency, and preparing a customized lawn irrigation schedule. EVMWD educates customers about water conservation through two landscape workshops offered in the fall and the spring. EVMWD provides MP Rotator Sprinkler Nozzles to customers upon request. EVMWD also has robust ET-based water budgets for all Domestic and Landscape Irrigation customers.	N/A
	3.3	High-Efficiency Washing Machine Rebate Programs	YES	Implementation of this BMP was required to begin by July 1, 2004. Agencies must provide incentives or institute ordinances requiring the purchase of high-efficiency clothes washing machines that meet an average water factor value of 5.0.	EVMWD provides a rebate of $85 for high-efficiency washing machines with a Water Factor of 4.0 or less.	N/A
	3.4	WaterSense Specification Toilets (WSS)	YES	Implementation of this BMP was required to begin by July 1, 2004. EVMWD must provide incentives or ordinances requiring the replacement of existing toilets using 3.5 or more gallons per flush (gpf) with a toilet meeting WSS.	EVMWD installed 3,000 HET Stealth toilets (0.8 gpf) by Niagara Conservation in FY 2010-2011 and plans to install another 1,500 Stealth toilets in FY 2011-2012. EVMWD offered 1.28 gpf toilets to all of our large multi-family customers in FY 2009-2010 and was only able to install 177 toilets out of 500 because nearly all customers had existing 1.6 gpf or ULFTs.	N/A

Table 6-4 (Continued) BMP Coverage

BMP Category			Coverage Met?	Coverage Criteria	Action completed by EVMWD	Actions To Meet Requirements by 2018
Commercial, Industrial, and Institutional	4	Commercial, Industrial, and Institutional	YES	Implementation of this BMP is required to begin by July 1, 2005. EVMWD must do the following: (1) Implement measures on the CII list with well-documented savings that have been demonstrated for the purpose of documentation and reporting; and (2) Implement unique conservation measures to achieve the agency's water savings goals.	EVMWD has identified and ranked by use the CII accounts. EVMWD has very few CII customers that use large amounts of water indoors and the water they use outdoors falls under the Large Landscape designation. EVMWD has concentrated on the landscape irrigation side as the best use of limited funds. EVMWD will implement a restaurant program and a commercial weather-based irrigation controllers (WBIC) program in FY 2011-2012.	EVMWD plans to implement measures that will increase water savings in CII use. EVMWD will implement the necessary actions to meet full compliance by 2018.
Landscape	5	Landscape	YES	Implementation of this BMP was required to begin by July 1, 2005. EVMWD must provide non-residential customers with support and incentives to improve their landscape water use efficiency.	EVMWD provides non-residential customer support and incentives to improve their landscape water use efficiency. The support varies depending on whether the account has a dedicated landscape meter, which is common for larger sites. All EVMWD Landscape Irrigation accounts are on ET-based water budgets with a robust rate structure. EVMWD installed 256 WBIC for large landscape accounts in FY 2008-09 and 102 in FY 2009-10. Nearly all Home Owner Association (HOA)'s, cities, and the Lake Elsinore Unified School District now have WBICs and EVMWD is monitoring water use and offering follow-up surveys to those customers. EVMWD funded a large portion of the cost of the WBICs and the installation.	EVMWD plans to provide incentives to its non-residential customers to improve landscape water use efficiency. EVMWD will implement the necessary actions to meet full compliance by 2018.

Sources: 1) California Urban Water Conservation Council (CUWCC), 2008. Memorandum of Understanding Regarding Urban Water Conservation in California, March 10, 2004.

6.1.6 Evaluation of DMMs Not Implemented

Water Code Section 10631(g):

(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:

Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.
Include a cost-benefit analysis, identifying total benefits and total costs.
Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

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.

EVMWD has implemented or plans to implement of all DMMs by 2018.

APPENDIX A REFERENCES

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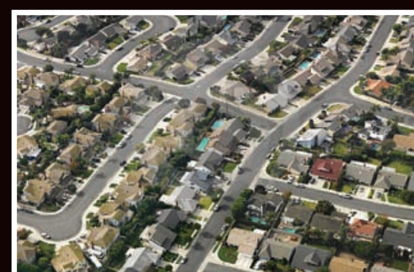

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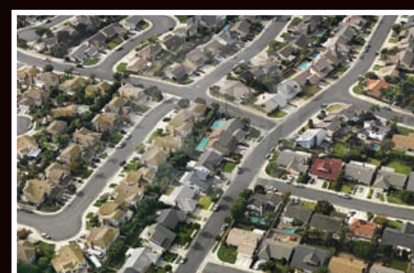


State of California

Natural Resources Agency

Department of Water Resources

Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan

Final

March 2011

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List of Acronyms and Abbreviations

AB	Assembly Bill
Act	Urban Water Management Planning Act
Baseline	base daily per capita water use
BMP(s)	best management practice(s)
CBDA	California Bay-Delta Authority[1]
CEQA	California Environmental Quality Act
CII	commercial, industrial, and institutional
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
CWSRF	Clean Water State Revolving Fund
DIRWM	Division of Integrated Regional Water Management
DMM(s)	demand management measure(s)
DOST	DWR online submittal tool
DWR	California Department of Water Resources
GHG	greenhouse gas
GPCD	gallons per capita per day
IRWM	Integrated Regional Water Management
IRWMP(s)	Integrated Regional Water Management Plan(s)
Method 4	Urban Water Use Target Method 4
MOU	Memorandum of Understanding
Plan (or UWMP)	Urban Water Management Plan
SB	Senate Bill
State Water Board	State Water Resources Control Board
USC	Urban Stakeholders Committee
USBR-MP	United States Bureau of Reclamation – Mid-Pacific Region
UWMP (or Plan)	Urban Water Management Plan
VWS	Verification of Water Supply
WSA	Water Supply Assessment

[1] The California Bay-Delta Authority has been replaced by the Delta Stewardship Council.

Use of This Guidebook

Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan (Guidebook) has been developed by the California Department of Water Resources (DWR) to assist urban water suppliers in complying with requirements of the Urban Water Management Planning Act (the UWMP Act) and the Water Conservation Bill of 2009. It is meant to help suppliers better understand UWMP Act requirements, but water suppliers are solely responsible for ensuring they've complied with the requirements of the UWMP Act or applicable laws.

For the purposes of this Guidebook and the UWMP Act, urban water suppliers with 3,000 or more service connections or supplying 3,000 or more acre-feet of water per year are to prepare a UWMP every five years.

Guidebook Organization

The Guidebook is organized into two parts.

- Part I: Preparing a UWMP — specific guidance for addressing stated Urban Water Management Plan (UWMP) requirements identified in the California Water Code (CWC).
- Part II: UWMP Supporting Information — detailed discussion of specific subjects or supporting documents related to preparing a UWMP.

Guidebook cross-references provide internal linkages to other locations where related information occurs.

⟺ Throughout this Guidebook, internal cross-references have been created to identify for the user other locations within this Guidebook where pertinent additional information is located. In the printed versions of the Guidebook, these cross-references occur as gray call-out boxes located in the left margin of the document. In the on-line version of this Guidebook (located at http://www.water.ca.gov/urbanwatermanagement/), these cross-references include links.

Additional documents and tools referenced in this Guidebook, but not included, can be accessed at the UWMP website at http://www.water.ca.gov/urbanwatermanagement/.

Guidebook Objectives

The Guidebook objectives focus on providing information on how to complete the required components for preparing an Urban Water Management Plan (referred to as UWMP or Plan). Specifically, the objectives are:

- Inform water suppliers of the UWMP requirements identified in the CWC.
- Describe the interrelationship between UWMP legislation and other regulations, including Senate Bill (SB) 610 Water Supply Assessments and SB 221 Written Verifications of Water Supply, Assembly Bill (AB) 1420 (implementation of

water demand management measures [DMMs]), and SBX7-7 Water Conservation Bill of 2009.

- Provide specific guidelines for developing base daily per capita water use, urban water use targets, and interim water use target to support compliance with the Water Conservation Bill of 2009.
- Discuss how climate change could impact water management planning and how it could be incorporated into a UWMP
- Describe how to electronically submit a completed 2010 UWMP

Urban Water Management Planning Background

The UWMP Act (California Water Code §10610 et seq.) requires urban water suppliers to report, describe, and evaluate:

Establishing baseline and target values is discussedin Part II, Section D. Incorporating baseline and target values into a UWMP is discussed in Part I, Section 3.

- Water deliveries and uses
- Water supply sources
- Efficient water uses
- DMMs, including implementation strategy and schedule

In addition, the Water Conservation Bill of 2009 requires urban water suppliers to report in their UWMPs base daily per capita water use (baseline), urban water use target, interim urban water use target, and compliance daily per capita water use.

The UWMP Act directs water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies are available to meet existing and future demands (CWC 10612 (b)). Urban water suppliers (see definition in Part II, Section P: Glossary) are required to assess current demands and supplies over a 20-year planning horizon and consider various drought scenarios. The UWMP Act also requires water shortage contingency planning and drought response actions be included in a UWMP.

See the definition of "urban water suppliers," along with other terms, in Part II, Section P.

UWMPs are to be prepared every five years by urban water suppliers with 3,000 or more service connections or supplying 3,000 or more acre-feet of water per year. Public and private utilities with multiple service areas within their districts should follow the guidelines below.

- Public utilities above the UWMP submittal threshold should include all service areas regardless of size.
- For private utilities, if a utility's district is above the threshold then all the service areas within that district should be included. If the utility district is below the UWMP threshold, a UWMP is not required for that district.
- One urban water use target should be determined for each UWMP.

The normal UWMP submittal cycle requires that they be prepared and submitted in December of years ending in five and zero. However, because of recent changes in UWMP requirements, State law has extended the deadline for the 2010 Plans to

July1, 2011. Although submitted in 2011, 2010 UWMPs will be referred to as 2010 UWMPs because they include 2010 water data and to retain consistency with the five-year submittal cycle.

The portion of the Water Conservation Bill of 2009 that applies to urban water conservation is included in Part II, Section L.

Based on legislative changes resulting from the November 2009 passage of SBX7-7 (hereafter referred to as the Water Conservation Bill of 2009), development of UWMPs will also enable water agencies and, in turn, the State of California to set targets and track progress toward decreasing daily per capita urban water use throughout the state. The portion of the Water Conservation Bill of 2009 that applies to urban water conservation is included in Part II, Section L, of this Guidebook.

A UWMP, including discussion of the status of a water supplier's implementation of DMMs, is required for an urban water supplier to be eligible for a water management grant or loan administered by DWR, the State Water Resources Control Board (State Water Board), or the Delta Stewardship Council (CWC §10631.5(a)). A current UWMP must also be maintained by the water supplier throughout the term of any grant or loan administered by DWR.

Changes to California law that apply to State water grant and loan eligibility are described in Part II, Section B.

Changes to California law require that, beginning in 2016, water suppliers comply with water conservation requirements established by the Water Conservation Bill of 2009 in order to be eligible for State water grants or loans. These changes are discussed further in Part II, Section B: Changes in Urban Water Management Plan Requirements Since 2005.

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Part I: Preparing a UWMP

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Part I: Preparing a UWMP

The UWMP Act and relevant portions of the Water Conservation Bill of 2009 are included in Part II, Sections K and L.

Part I of the Guidebook contains specific instructions for completing a UWMP based on the requirements identified in the UWMP Act (Part II, Section K) and the Water Conservation Bill of 2009 (Part II, Section L). It groups the requirements by topic and presents the topics in the order in which a water supplier may consider including them in a UWMP. Each section includes the legislative justification for the requirement, what is required for compliance, and tables the water supplier may consider including in its UWMP to provide required/requested data. Suggested information a water supplier may include in its UWMP, but that is not necessarily required by legislation, is also identified.

See Part II, Section I, for a checklist of the legislative requirements.

The legislative requirements for a 2010 UWMP are included in Part II, Section I, as a checklist[2]. Within Part I, the legislative requirements are numbered and correlate to the same numbers in the checklist. The numbers are based on the sequential occurrence within the legislation. Because the legislation is organized differently than the topics presented in this Guidebook and the recommended UWMP organization, the requirement numbers are not sequential.

UWMP Organization

DWR recommends, but does not require, that an urban water supplier use the general organization outlined below to prepare its 2010 UWMP. Part I of the Guidebook uses this same organization. Also listed below with each subheading are the specific legislative requirements included within each section.

Part I is organized as follows:

- **UWMP Section 1 — Plan Preparation**
  - Coordination (Checklist #4, #6, #54–#56)
  - Plan Adoption, Submittal, and Implementation (Checklist #7, #57–#60)
- **UWMP Section 2 — System Description**
  - Service Area Physical Description (Checklist #8, #9)
  - Service Area Population (Checklist #10–#12)
- **UWMP Section 3 — System Demands**
  - Baselines and Targets (Checklist #1)
  - Water Demands (Checklist #25, #34)
  - Water Demand Projections (Checklist #33)
  - Water Use Reduction Plan (Checklist #2)
- **UWMP Section 4 — System Supplies**
  - Water Sources (Checklist #13)
  - Groundwater (Checklist #4, #15–#21)
  - Transfer Opportunities (Checklist #24)

[2] Two versions of the checklist are included in Part II, Section I — one organized by legislative occurrence and the other by general subject.

  - Desalinated Water Opportunities (Checklist #31)
  - Recycled Water Opportunities (Checklist #44–#51)
  - Future Water Projects (Checklist #30)
- **UWMP Section 5 — Water Supply Reliability and Water Shortage Contingency Planning**
  - Water Supply Reliability (Checklist #5, #23)
  - Water Shortage Contingency Planning (Checklist #37–#42, #52)
  - Drought Planning (Checklist #22, #35, #36, #43, #53)
- **UWMP Section 6 — Demand Management Measures**
  - DMMs (Checklist #26–#29)
- **UWMP Section 7 — Climate Change (optional)**
- **UWMP Section 8 — Completed UWMP Checklist (optional)**

Retailer and Wholesaler Requirements

The CWC indicates that both urban wholesale and retail water suppliers are to prepare UWMPs. Wholesale and retail suppliers are also to coordinate and provide water use and supply information to each other during preparation of their respective UWMPs. Generally, the UWMP Act refers to "urban water suppliers," and the Water Conservation Bill of 2009 indicates that "all water suppliers increase efficiency," thus supporting the UWMP efforts of both wholesale and retail urban water suppliers. There are several instances within the CWC, though, where the requirements for wholesale and retail urban water suppliers differ. These include:

See Part II, Section E, for additional DMM discussion.

- DMMs: Wholesale suppliers provide documentation for DMMs C, D, J, K, and L (see Part II, Section E). Retail suppliers provide documentation for each DMM except J (see Part II, Section E).

See Part I, Section 3, and Part II, Section D, for additional baseline and target discussion.

- Baselines and Targets: Only retail urban water suppliers are required to develop base daily per capita use, interim urban water use target, and urban water use target values.
- Water use reduction: Wholesale suppliers are to provide "an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions" (CWC §10608.36). Retail suppliers are to "conduct at least one public hearing" that includes general discussion of "the urban retail water supplier's implementation plan for complying with" the Water Conservation Bill of 2009 (CWC §10608.26 [a]).

See Part II, Section I, for a checklist of the legislative requirements and Part II, Section K, for the UWMP Act reqirements.

- Lower income housing: Only retail urban water suppliers are required to address the lower income water supply projections required by CWC 10634(a) (see also Checklist #34).

UWMP Development Overview

A water supplier may be in one of several situations as the 2010 UWMP cycle begins. The water supplier could:

1. Have an existing UWMP to be updated with recent data and expanded to address new requirements
2. Have an existing UWMP that the water supplier may choose to restructure for various reasons
3. Be preparing a UWMP for the first time

The approach an urban water supplier uses in each of these situations will vary. Each situation is discussed briefly below. Then, the proposed UWMP outline and key issues are discussed, arranged by subject.

An urban water supplier should consider the following questions to help decide which of the three situations best fits the preparation of its UWMP:

- Have water supply or demand conditions, or both, changed since the preparation of the 2005 UWMP?
- Will known or upcoming water demand or supply changes occur within the 20-year UWMP planning horizon?
- Have there been modifications in the water system, such as annexations, divisions, or water supply contract changes?
- Have economic impacts from the recession changed water supply and demand issues for the urban water supplier?
- Did the 2007-2009 drought in California affect the water supply outlook for the urban water supplier?
- Has the water supplier's water shortage contingency plan included in the 2005 UWMP been updated to address both the 2007-2009 drought and the Urban Drought Guidebook 2008 Updated Edition (DWR 2008)?
- Is it the urban water supplier's intent to have the UWMP also support or meet the requirements for Water Supply Assessment (WSA) or Verification of Water Supply (VWS), or both? Guidebook Part II, Section F: Related Programs, has additional discussion on these related programs.

Information on the Water Supply Assessment and Verication of Water Supply programs is in Part II, Section F.

Specific changes to the California legislation directly addressing preparation of UWMPs is discussed in Guidebook Part II, Section B: Changes in Urban Water Management Plan Requirements Since 2005. The majority of these legislative changes are additional items to be included in the 2010 UWMPs. In general, an urban water supplier can consider that everything that was required to be included in the 2005 UWMPs is still required to be included in the 2010 UWMPs.

Changes to California legislation addressing the preparation of UWMPs is in Part II, Section B.

Some useful approaches for a UWMP preparer to take when planning 2010 UWMP preparation are:

- Use the DWR online submittal tool (DOST). It will help generate data tables to be included in a UWMP. It will also facilitate and prioritize the DWR review process.

The DOST User's Manual is included in Part II, Section H.

The UWMP checklist is included in Part II, Section I.

- Include the completed UWMP checklist (Part II, Section I). The DWR Review Sheet is not to be included in the water supplier's UWMP presented to a board for adoption.
- Ask for guidance or clarification. If there is a question about what to include in a UWMP prior to adoption, please contact a DWR regional team member. This could avoid the need to have additional information requested by DWR during the review process and the subsequent need to adopt an addendum or amendment.
- Describe why a UWMP requirement does not apply. If an urban water supplier considers that a UWMP requirement does not apply to it, a useful approach is to identify the requirement and provide a brief description of why the requirement does not apply. If a required element is not discussed, it could result in the UWMP not being determined to be 'complete'.

Updating an Existing UWMP

If an urban water supplier has an existing (2005) UWMP that has successfully met its needs since it was submitted, an urban water supplier may consider revising it as an initial step in preparing its 2010 UWMP. These considerations include:

- Having a completed 2005 UWMP
- Minimal changes to the 2005 UWMP components3, although additional requirements have been codified
- Whether the 2005 UWMP document has supported water supply efforts since it was prepared
- Whether there have been few changes to the urban water supplier's water system since 2005

If an urban water supplier does plan on using its 2005 UWMP as a basis for its 2010 UWMP, it is recommended that the urban water supplier address the following[4]:

- Review and update the urban water supplier's water supply and water demand changes
- Review and update present and future water supply and water demand estimates of suppliers providing water to the supplier, if applicable
- Review and update the Water Shortage Contingency Plan using the Urban Drought Guidebook 2008 Updated Edition as guidance and consider the urban water supplier's actions taken during the 2007-2009 drought, as applicable.
- Review and update the DMM summaries, including receipt of grants or loans, how they were used, and how they affected the urban water supplier
- Use Guidebook Part II, Section D: Baseline and Target Determination, to address the requirements of the Water Conservation Bill of 2009

In Part II, use Section D to determine a retail water supplier's baseline and targets.

[3] CWC Section 10657 expired on January 1, 2006. It was removed from the Urban Water Management Planning Act, but it was replaced by other language addressing funding eligibility.

[4] This list does not identify all items a water supplier would need to update if it is revising an approved 2005 UWMP.

Use Section F to review related programs and address other changes since 2005, use Section G for climate change guidance, and use Section N for UWMP tables.

- Review Guidebook Part II, Section F: Related Programs, and address other new changes that have occurred since 2005 that the urban water supplier should consider for its 2010 UWMP
- Consider addressing climate change issues discussed in Guidebook Part II, Section G: Guidance on Climate Change for Urban Water Management Plans
- Review the remainder of this Guidebook to verify that key points are considered in the 2010 UWMP

The 2005 UWMP tables have been restructured. This addresses some of the comments received by DWR after the 2005 UWMP submittals and the development of DOST. The new tables are included in Part II, Section N: Recommended UWMP Data Tables. If an urban water supplier is updating its 2005 UWMP for 2010, then the preparer may consider updating the existing tables and not developing new ones. The tables are now focused more on specific UWMP requirements and information stored in DOST.

Restructuring an Existing UWMP or Preparing a New UWMP

In preparing a UWMP, an urban water supplier should consider not only what is legally required but also what is needed to make it a comprehensive 20-year water supply planning document. There are required components that must be included in a UWMP which are determined by statutes passed by the Legislature. An urban water supplier has the discretion to present the required components in whatever manner best addresses the needs of the urban water supplier.

An urban water supplier considering extensively revising an existing UWMP or preparing a new one may consider the UWMP outline used in Part 1 of this guidebook. This outline organizes the UWMP requirements by subject matter.

Possible 2010 UWMP Organization

Each section in the proposed 2010 UWMP outline is discussed in the following sections, including:

- Required elements presented in italic text
- UWMP guidance and suggestions in plain text
- Other helpful information
- Suggested tables

Part II, Section I, contains the UWMP checklist.

Under each proposed UWMP section is the pertinent line from the UWMP checklist (Part II, Section I, of this Guidebook). The line retains the original checklist number. Guidance and suggestions from DWR on each line are then included as text or bulleted items. Suggested tables are identified after the checklist line and then again at the end of the section discussion.

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Section 1: Plan Preparation

UWMP Section 1 includes specific information on how the UWMP was prepared, coordinated with other agencies and the public, and adopted. It includes the following subsections:

- Coordination
- Plan Adoption, Submittal, and Implementation

Required Elements — Coordination

#4[5]. Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable (10620(d)(2)).

- Include each agency and organization contacted or involved in preparation, discussion, or coordination of the 2010 UWMP. Using Table 1[6] is an efficient way to indicate the external outreach required for the UWMP effort.
- Copies of outreach documents, comments, etc. may also be used to provide supporting documentation that outreach requirements were met.

#6. Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision (10621(b)).

- Provide documentation that "any city or county within which the supplier provides water supplies" was notified at least 60 days prior to the UWMP public hearing that the plan was being reviewed and changes were being considered.
- The supplier is not required to submit the revised plan to the cities or counties with this notification. The notification required is only that the plan is being reviewed.
- If Table 1 is included in the UWMP, indicate the agencies from which comments were received or where consultation occurred.

#54. The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan (10635(b)).

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[5] These numbers refer to the UWMP Checklist included in Part II, Section I.

[6] Tables identified in Sections 1 through 8 refer to the UWMP tables included in Section N.

- Provide written assurance that a copy of the 2010 UWMP will be provided to each city or county within or containing the water supplier’s boundary no later than 60 days after its submission to DWR.

#55. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan (10642).

- Provide names of the groups or organizations to which the water supplier reached out during the development and adoption of the UWMP. Information may be included in Table 1 to support this required element.

#56. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area (10642).

- Provide information on the hearing time and place, and notice of the availability of the UWMP for public review.
- Government Code 6066 states that “Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including therein the first day.”

Required Elements — Plan Adoption, Submittal, and Implementation

#7. The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640) (10621(c)).

- If a water supplier makes changes to the UWMP after the plan was adopted by its board of directors, the supplier must hold another public hearing and have its board readopt the plan.

#57. After the hearing, the plan shall be adopted as prepared or as modified after the hearing (10642).

- Include a copy of the adoption resolution in the UWMP.

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

- Provide discussion about how the 2010 UWMP will be implemented. Information on how the 2005 UWMP was implemented may also be helpful to provide.

#59. An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption (10644(a)).

- Provide documentation that within 30 days of submitting the UWMP to DWR, the adopted UWMP has been or will be submitted to the California State Library and any city or county to which the supplier provides water.

#60. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours. (10645).

See Part II, Section A, for further discussion of submitting an adopted UWMP. ⟺

- Provide documentation that within 30 days of submitting the UWMP to DWR, the adopted UWMP has been or will be available for public review during normal business hours.

Other Helpful Information

- The name of the UWMP preparer and contact information could also be included.

Suggested Table

Part II, Section N, contains blank UWMP tables. ⟺

One table (see Part II, Section N, for blank versions of the UWMP tables) is suggested for inclusion in UWMP Section 1.

- Table 1: Coordination with appropriate agencies

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Section 2: System Description

UWMP Section 2 describes the urban water system. It includes a description of the climate, population, and demographics. Also helpful to include are descriptions of the physical system (transmission, treatment, and distribution facilities) to support the Water Conservation Act of 2009 requirements, discussions of changes to the water system, the water supplier's organizational structure, and any issues that affect the water system. It includes the following subsections:

- Service Area Physical Description
- Service Area Population

Required Elements — Service Area Physical Description

#8. Describe the service area of the supplier (10631(a)).

- Provide a description of the physical and political attributes of the area being supplied water.
- Maps, tables, or photographs can be included to support the description of the system.

#9. (Describe the service area) climate (10631(a)).

- Climate data may be presented in tables (similar to 2005) or figures, or can be presented as ranges within the text of the UWMP along with general discussion of seasonal variability.

Required Elements — Service Area Population

#10. (Describe the service area) current and projected population . . . The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier . . . (10631(a)).

- Population estimates may be provided for both the entire urban water supplier and for the urban centers supplied by the water supplier's distribution system. Clearly indicate whether the population estimates are for the urban water supplier or the area directly served by the distribution system.
- Provide the source(s) of the population estimates.
- The population estimate for areas served by the distribution system is to be developed using the process described in Technical Methodology 2: Service Area Population (Part II, Section M).

Part II, Section M, contains technical methodologies.

#11. . . . (population projections) shall be in five-year increments to 20 years or as far as data is available (10631(a)).

- Current and projected population estimates are to be provided for the following years: 2010, 2015, 2020, 2025, and 2030.
- Population estimates may also be provided for 2035, if the water supplier intends to have 20-year water supply and demand estimates available until the completion of the 2015 UWMP. This enables a water supplier to have its 2010 UWMP support WSA and written VWS for five years.

#12. Describe . . . other demographic factors affecting the supplier's water management planning (10631(a)).

- Discussion of demographics should include anything affecting water supply issues that are appropriate and relevant to preparation of the 2010 UWMP, such as:
  - Housing
  - Employment
  - Customer base
  - Industry
  - Disadvantaged communities
  - Restrictions

Other Helpful Information

- Inclusion of maps to show the surrounding region and service area is helpful. Maps could show the urban water supplier boundaries and the service area used to determine the population projections.

Suggested Tables

Part II, Section N, contains blank UWMP tables.

One table (see Part II, Section N, for blank versions of the UWMP tables) is suggested for inclusion in UWMP Section 2:

- Table 2: Population — current and projected

Section 3: System Demands

This section describes the urban water system demands, including calculating its baseline (base daily per capita daily) water use and interim and urban water use targets. It quantifies the current water system demand by category and projects them over the planning horizon of the UWMP. These projections are to include water sales to other agencies, system water losses, and water use target compliance.

When calculating future water demands, a water supplier should be projecting demands based on the assumed reduction in per capita daily use determined from planning for and implementing actions associated with the Water Conservation Bill of 2009.

Part II, Section D, describes the approach and criteria for developing required baselines and targets.

The System Demands section of a UWMP also should include the detailed description of how an urban water supplier calculates its baseline and targets, following the technical methods and methodologies described in Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (For the Consistent Implementation of the Water Conservation Bill of 2009) (DWR 2010a). Background information and approach used to develop baselines and targets are also to be included. The approach and criteria for developing the required baselines and targets are thoroughly described in Part II, Section D: Baseline and Target Determination.

Required Elements — Baselines and Targets

#1. An urban retail water supplier shall include in its urban water management plan . . . due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data (10608.20(e)).

See Part II, Section D, for how to calculate the baselines and targets required under the Water Conservation Bill of 2009.

- See Guidebook Part II, Section D, for how to calculate the targets and baseline values required in the Water Conservation Bill of 2009.
- For determining baseline daily per capita water use, the 2008 recycled water supplied, and the 2008 total urban water supplied are to be provided to determine the number of years the retail water supplier can include in its base period range (10 to 15 years). Also include the actual start and end years for the selected range (Table 13). In Table 14, indicate the population served and water supplied served for each of the years within the 10- to 15-year range. In Table 15, indicate the population served and water supplied for each of the years within the 5-year range.
- The urban water supplier is to include in its UWMP how the values were determined and the sources of data used, consistent with the DWR methodologies (Part II, Section M).
- Indicate whether the baselines and targets are developed individually or regionally. If regionally, indicate the other members of the regional alliance.

See Part II, Section M, for technical methodologies.

- Indicate with method was used to determine the interim and urban water use target.

Required Elements — Water Demands

#25. Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; (I) Agricultural (10631(e)(1) and (2)).

- Provide the information identified in (A) through (F) and (I) using Tables 3 through 7.
- The demand projections provided should be consistent with a supplier's water use targets.
- Provide the names and water demands (actual and projected) of water sold to other agencies (G), using Table 9.
- Provide the actual and projected "other" water demands in Table 10, including those identified in (H) as well as recycled water not accounted for in Tables 3 though 7 and Table 9. Suppliers are encouraged to include in Table 10 as many water demand categories as possible, including water losses, to support subsequent assessment of water savings opportunities.
- Summarize the total water demands from the previous tables in Table 11.
- Discuss technical and economic feasibility of these projected uses, including the potential for the projects to be implemented.

#34. The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier (10631.1(a)).

- This applies to retail urban water suppliers only.
- Provide the estimated lower income water use projections for single-family and multi-family housing units (Table 8) identified in the housing elements of the general plans applicable to the water supplier's service area. The lower income water use projections should be included in the overall water use projections provided in Tables 3 through 7.
- The urban water supplier is to use city, county, or other applicable general plans and any housing element documents (Health & Safety Code §50079.5) to identify the planned lower income housing projects within its service area. The supplier may also rely on Regional Housing Needs Assessment or Regional Housing

Needs Plan information developed by the local council of governments, the California Department of Housing and Community Development. Estimate the single-family and multi-family water demands for 2015, 2020, 2025, and 2030.
- A lower income household is defined as 80 percent of median income, adjusted for family size.

Required Elements — Water Demand Projections

#33. Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c) (10631(k)).

- Retail water suppliers are to provide to DWR the water use projection data provided to each wholesale water agency (Table 12).
- Wholesale water suppliers are to provide to DWR the water supply projections provided to each retail water supplier.

Required Elements — Water Use Reduction Plan

#2. Urban wholesale water suppliers shall include in the urban water management plans . . . an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part (10608.36). Urban retail water suppliers are to prepare a plan for implementing the Water Conservation Bill of 2009 requirements and conduct a public meeting which includes consideration of economic impacts (CWC §10608.26).

- Wholesale water suppliers are required to include in their UWMPs discussions of programs they intend to implement to support water demand reduction goals. Although wholesale water suppliers are not required to determine baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, programs that the wholesale suppliers implement may support the retail water suppliers to attain their goals and targets.
- Retail water suppliers are to develop an implementation plan for compliance with the Water Conservation Bill of 2009. The plan should provide a general description of how the supplier intends to reduce per capita water use to meet its urban water use target. In developing the implementation plan, suppliers should avoid placing a disproportionate burden on any customer sector. The plan should also discuss any potential economic impacts that may result from the water use

reduction program. Suppliers of water to a US Department of Defense military installation should consider federal Executive Orders 13423 (*Strengthening Federal Environmental, Energy, and Transportation Management* (2007) and 13514 (*Federal Leadership in Environmental, Energy, and Economic Performance*), which identifies water use reductions targets for military facilities. The implementation plan should be included in the discussion of the supplier's urban water use target at the urban water management plan public hearing.

Other Helpful Information

The urban water supplier must provide documentation in its UWMP to enable DWR to review compliance with the Water Conservation Bill of 2009. This includes:

- A map of the water supply area, including key points of measurements for the gross water calculations.
- Specific methods and each step of the calculations used to determine the targets and baseline
- The sources of information for population and the method of making population estimates
- Metered or measured flows, including the type and period of measurement or the method of measuring, calculating, or estimating

In addition,

- Consider similar conditions to water supply conditions, to the extent possible.
- Include any other known water system demands or constraints.

Suggested Tables

See Part II, Section N, for blank UWMP tables.

Multiple tables (see Part II, Section N, for blank versions of the UWMP tables) are suggested for inclusion in UWMP Section 3:

- Table 3: Water deliveries — actual, 2005
- Table 4: Water deliveries — actual, 2010
- Table 5: Water deliveries — projected, 2015
- Table 6: Water deliveries — projected, 2020
- Table 7: Water deliveries — projected, 2025, 2030, and 2035
- Table 8: Low-income projected water demands
- Table 9: Sales to other water agencies
- Table 10: Additional water uses and losses
- Table 11: Total water use
- Table 12: Retail agency demand projections provided to wholesale suppliers
- Table 13: Base period ranges
- Table 14: Base daily per capita water use — 10- to 15-year range
- Table 15: Base daily per capita water use — 5-year range

Section 4: System Supplies

This section describes the sources of water available to the urban water supplier. It includes a description of each water source, source limitations (physical or political), water quality, and water exchange opportunities. Discussion can include surface water, groundwater, recycled water, desalinated water, stormwater, geothermal, and any other source water the water supplier considered part of its water supply "portfolio." Include information about planned future water supply projects. Discuss if wholesale water supplies are received from another supplier or provided to another water user. For water obtained from wholesale sources, the retail supplier can include in its UWMP a reference to the wholesalers UWMP and a brief summary of the water supply's origin.

For each water source type, include discussions on origin (there may be multiple origins for a particular water source—for example, desalinated water can be obtained from ocean water, brackish surface water, or brackish groundwater), customers, and use limitations. Provide discussion about average year water supplies and projects to increase water supply. Supply reliability issues are discussed in UWMP Section 5.

See Part I, Section 5, for a discussion of supply reliability issues.

For discussion of water transfers and exchanges, consider both short-term and long-term agreements and opportunities.

Required Elements — Water Sources

#13. Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a) (10631(b)).

- Provide information for each source of water are identified indicate the type and name of the water source for the years 2015, 2020, 2025, and 2030 (Table 17).
- Provide the name of each wholesale water supplier and state whether the amount of water provided in 2010 and projected into the future are provided by the wholesale supplier or determined by the retail agency (Table 16).
- Obtain from each wholesale water supplier the amount of water it projects to provide to the retail urban water supplier.
- Include water reused for municipal purposes that is not treated to Title 22 standards.

Required Elements — Groundwater

#14. (Is) groundwater . . . identified as an existing or planned source of water available to the supplier . . . (10631(b))?

- Indicate whether or not the water supplier directly obtains its own groundwater, or if it plans to develop groundwater resources within the planning horizon of the UWMP.

- If groundwater is, or planned to be, provided to the water supplier from another supplier, indicate the name of the supplier from which it is obtained.
- If the retail water supplier does not itself extract groundwater as a water supply, it does not need to provide the requested groundwater information. The water supplier that directly obtains the groundwater is required to provide that information. The retail water supplier does not have to address checklist numbers 16 through 21.

#15. (Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management (10631(b)(1)).

- The copy of the groundwater management plans may be provided electronically on a CD-ROM or in hard-copy format.

#16. (Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater (10631(b)(2)).

- Descriptions are to be provided for each groundwater basin from which groundwater is extracted.
- The description of the groundwater basin may include one or more maps and/or cross sections of the basin, the general location of the wells from which the supplier obtains its groundwater, a description of the depth and type of aquifer material present in the basin, the aquifers from which groundwater is extracted, and a description (and graphs) of changes in groundwater levels.
- Existing resources such as the DWR water data library (http://www.water.ca.gov/waterdatalibrary/) and California's Groundwater Update 2003, Bulletin 118 (available from http://www.water.ca.gov/groundwater/) may provide helpful information for the groundwater basin description. DWR has not updated Bulletin 118 since 2003. It is anticipated that the water supplier may use Bulletin 118 to provide background and general information on its groundwater basins, but also will provide some updated information on groundwater conditions.
- Include discussion of known groundwater quality and quantity issues that may impact present or future use of groundwater.

#17. For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board (10631(b)(2)).

- The copy of the adjudication(s) may be provided electronically on a CD-ROM or in hard-copy format.

#18. (Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree (10631(b)(2)).

- Indicate the volume of water the urban water supplier is legally allowed to pump.

#19. For basins that have not been adjudicated, (provide) information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition (10631(b)(2)).

- Provide known information about existing or potential groundwater conditions in the basin(s) from which groundwater is extracted. Bulletin 118 (DWR 2003) was the last comprehensive assessment of statewide groundwater conditions. Provide DWR's assessment of overdraft conditions from the 2003 update of Bulletin 118 or more current information if it is available.
- The "detailed description of the efforts being undertaken" to eliminate the long-term overdraft conditions would include discussion of any activities such as groundwater level monitoring, metering or measuring groundwater pumping, groundwater recharge, conjunctive use programs, water conservation, or alternative water supplies.

#20. (Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records (10631(b)(3)).

- Indicate the volume of water pumped every year between 2005 and 2010 (Table 18).
- Describe whether there were limitations or challenges obtaining groundwater during this time to indicate the "sufficiency" of groundwater pumped.

#21. (Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records (10631(b)(4)).

- Estimate of the volume of water projected to be pumped during the planning horizon of the UWMP (Table 19). The volume for 2010 included in Table 18 should be the same as that included for 2010 in Table 17.
- Provide a description of any changes or expansions planned for the groundwater supply.

Required Elements — Transfer Opportunities

#24. Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis (10631(d)).

- Indicate any planned or potential future water exchanges. Include the volumes estimated to be imported in Table 20. Table 20 should not include any existing exchange or transfer agreements.
- If there are both short-term and long-term exchange or transfer opportunities from a single source, provide them as separate line entries in Table 20.

Required Elements — Desalinated Water Opportunities

#31. Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply (10631(i)).

- List and discuss opportunities for development of desalinated water supplies (from ocean water, brackish surface water, and/or brackish groundwater) and indicate level to which desalination is being considered.
- If the water supplier considers there are no opportunities for development of desalinated water sources within the planning horizon of the 2010 UWMP, the supplier is to discuss why this is the case.

Required Elements — Recycled Water Opportunities

#44. Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area (10633).

- Coordinate with any facility or agency within the urban water supplier's service area regarding the existing and potential availability and uses of recycled water. Each of the types of organizations identified in the urban water management planning act (10633) should also be considered.
- The discussion of recycled water opportunities is to include description of existing recycled water applications within the service area and potential opportunities.
- Other potential sources of recycled water include facilities that may treat and discharge contaminated water.
- See Table I-2 in Part II, Section I, for additional recycled water discussion requirements.

See Table I-2 in Part II, Section I, for recycled water discussion requirements.

#45. (Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal (10633(a)).

- Contact the owners and operators of each wastewater collection and treatment systems in the supplier’s service area regarding the amount of wastewater collected and treated by each facility and the type of treatment processes used (Table 21). If multiple wastewater facilities exist, provide the required information for each facility.

#46. (Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project (10633(b)).

- Identify the quantities of wastewater currently being treated to recycled water standards (Title 22) within the urban water user’s service area (Table 21).
- Quantify the amount of recycled water that is currently being discharged and is available for use (Table 22).
- If there are limitations on the use of available recycled water, it may be helpful to provide information regarding the limitations and what could be done to address those limitations.

#47. (Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use (10633(c)).

- Quantify the amount of recycled water that is currently being used within the urban water supplier’s service area. Provide information regarding the amount and use of the recycled water (Table 23).
- For “other uses,” provide the type of use, for example, fire hydrant flushing or dust control.

#48. (Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses (10633(d)).

- Based on the existing recycled water use and planned recycled water projects, estimate the amount of recycled water that is projected to be used within the urban water supplier’s service area over the planning horizon of the UWMP (Table 23).
- Discuss technical and economic feasibility of these projected uses, including the potential for the projects to be implemented.

#49. (Describe) the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision (10633(e)).

- From the urban water supplier's 2005 UWMP, provide the 2010 projected estimates of recycled water use. Compare those estimates to the actual 2010 recycled water use (Table 24).

#50. (Describe the) actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year (10633(f)).

- Describe the approaches the urban water supplier is implementing or is planning to implement to increase or encourage the use of recycled water within its service area. At a minimum, discuss how financial incentives are being implemented.
- Provide estimates of the amount of additional recycled use that could be realized by implementing any of these actions (Table 25).

#51. (Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use (10633(g)).

- If the urban water supplier has prepared a recycled water master plan within the past five years, or similar document, that document may be provided to indicate how recycled water is planned to be implemented. Provide a brief summary of the plan within the text of the UWMP and either provide an electronic version on a separate CD-ROM or include as a printed attachment to the UWMP.
- If the urban water supplier has not prepared a recycled water master plan, provide information on each item specified in CWC 10633(g).

Required Elements — Future Water Projects

#30. (Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program (10631(h)).

- Provide the information indicated in 10631(h). Use Table 26 to summarize the additional water supply quantities planned by implementing each of these projects.

Other Helpful Information

- Use tables to clearly specify the sources of water available, how much is available, how much is used or planned to be used, and physical or timing-related limitations on receiving water from each source.
- Copies of groundwater management plans, adjudications, or recycled water master plans may be provided electronically on a CD-ROM, with pertinent points summarized in the main text of the UWMP.
- Consider developing a subsection for each major water "type" (i.e., surface water, groundwater, recycled water, etc). Then the UWMP requirements can be easily addressed.

Suggested Tables

See Part II, Section N, for blank UWMP tables.

Multiple tables (see Part II, Section N, for blank versions of the UWMP tables) are suggested for inclusion in UWMP Section 4:

- Table 16: Water supplies — current and projected
- Table 17: Wholesale supplies — existing and planned sources of water
- Table 18: Groundwater — volume pumped
- Table 19: Groundwater — volume projected to be pumped
- Table 20: Transfer and exchange opportunities
- Table 21: Recycled water — wastewater collection and treatment
- Table 22: Recycled water — non-recycled wastewater disposal
- Table 23: Recycled water — potential future use
- Table 24: Recycled water — 2005 UWMP use projection compared to 2010 actual
- Table 25: Methods to encourage recycled water use
- Table 26: Future water supply projects

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Section 5: Water Supply Reliability and Water Shortage Contingency Planning

UWMP Section 5:

- Compares projected water supplies and demands
- Assesses the overall reliability of future supplies regardless of drought or emergency conditions
- Discusses how an urban water suppliers water sources can vary as a result of emergency or other external influences such as system or other limitations, as well as the water supplier's planned response
- Describes the drought contingency plan—the water supplier's response and planning for changes or shortages in water supplies.

Specific guidance an urban water supplier should consider in preparing this part of a UWMP include:

- DWRs Urban Drought Guidebook 2008 Updated Edition
- DWRs California Drought Contingency Plan (2010)
- DWRs State Water Project Delivery Reliability Report 2009

Drought planning is to consider water supplies during single-dry and multiple-dry years. Single-dry and multiple-dry year conditions are usually based on historical records of annual runoff from a particular watershed. A multiple-dry year period is generally three or more consecutive years with the lowest average annual runoff. Single-dry and multiple-dry periods should be determined for each watershed (including wholesale sources, the State Water Project, the Colorado River, and the Central Valley Project) from which the water supplier receives a water supply. The information is often presented as a probability of exceedance or probability of occurrence. Many water suppliers have multiple water supply sources. To show how the total supply would be impacted, document the single-dry and multiple-dry year effects for each individual supply. Weather information is available at the National Weather Service website http://www.nws.noaa.gov/. Runoff data are available from DWR (http://cdec.water.ca.gov/), US Geological Survey (http://waterdata.usgs.gov/ca/nwis/sw), and the operators of local dams.

Use the following guidelines for drought conditions:

- *Average Year*[7] — a year or an averaged range of years in the historical sequence that most closely represents median runoff levels and patterns. It is defined as the median runoff over the previous 30 years or more. This median is recalculated every 10 years.

[7] The UWMP Act uses the term "normal." The term "average" is more commonly used to describe "median" conditions. Within this guidebook the terms "normal" and "average" are used interchangeably.

- *Single-dry year* — generally considered to be the lowest annual runoff for a watershed since the water-year beginning in 1903. Suppliers should determine this for each watershed from which they receive supplies.
- *Multiple-dry year period* — generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903. For example, 1928-1934 and 1987-1992 were the two multi-year periods of lowest average runoff during the 20th century in the Central Valley basin. Suppliers should determine this for each watershed from which they receive supplies.

Required Elements — Water Supply Reliability

#5. An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions (10620(f)).

#23. For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable (10631(c)(2)).

- For each of the water supply sources identified in Table 16, identify the potential issues that could result in reduction of the amount of water supply. The urban water supplier may provide any additional name of the source being described (for example, if the water category is "supplier-produced surface water," the urban water supplier may have multiple surface water sources that have different potential constraints). The urban water supplier may also provide information on the applicable amount of water, such as the volume of a reservoir or a river allocation. Additional information can also be provided on the nature of the limitation indicated in one of the preceding columns (Table 29).

Required Elements — Water Shortage Contingency Planning

#37. Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster (10632(c)).

#38. Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning (10632(d)).

#39. Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply (10632(e)).

#40. Penalties or charges for excessive use, where applicable (10632(f)).

- Identify what actions will be taken by a water supplier if there is a catastrophic reduction in water suppliers, as indicated in 10632(c). If the water supplier has other catastrophic reductions that it has considered in its planning, please identify those. Other catastrophic interruptions to consider could include flooding or fire.
- Indicate mandatory prohibitions in Table 36.
- Indicate consumption reduction methods in Table 37.
- Indicate penalties and charges for violating water shortage restrictions or prohibitions in Table 38.

#41. An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments (10632(g)).

- Assess how responding to water shortages affects revenues and expenditures. Indicate how the water supplier will address these potential impacts. Identify what actions will be taken by a water supplier if there is a catastrophic reduction in water suppliers, as indicated in 10632(c). Identify any other catastrophic reductions the water supplier considered in planning the UWMP. Other catastrophic interruptions could include flooding or fire.

#42. A draft water shortage contingency resolution or ordinance (10632(h)).

- If the water supplier has an approved or adopted water shortage contingency resolution or ordinance, include it in the UWMP. If one has not been approved or adopted, provide a draft version. If there has been any action for or against adoption since the completion of the most recent UWMP, consider including the additional discussion in the 2010 UWMP.

Required Elements — Water Quality

#52. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability (10634).

- Identify known or potential water quality issues that could impact water supplies. Water quality impacts may include natural and human-induced water quality issues in both groundwater and surface water resources. The potential quantitative impacts are to be summarized (Table 30).
- Discuss how these water quality issues will be addressed. Methods can include treatment or identification of additional water supply resources.
- Maps may be helpful to include.

Required Elements — Drought Planning

#22. Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) an average water year, (B) a single dry water year, (C) multiple dry water years (10631(c)(1)).

- Using above guidelines identifying average, single-dry, and multiple-dry water years, identify the specific years that meet the criteria for the urban water supplier (Table 27).
- Identify the actual water supply for each of the years identified in Table 27. Provide that information in Table 28. For each of the dry years, calculate what percentage the dry year water supply was, as compared to the “average/normal” year indicated in the first column of Table 28.

#35. Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage (10632(a)).

- A water supplier’s Drought Contingency or Water Supply Reliability Plan should identify the thresholds for implementation of various actions to support conservation. A water supplier may choose to attach its existing plan as an attachment to its 2010 UWMP. If so, briefly describe the different water emergency stages and the criteria for each stage, with a reference to the attachment. If a Drought Contingency or Water Supply Reliability Plan are not attached to the 2010 UWMP, provide sufficient information to describe each water emergency stage and the water conditions that occur for each stage (Table 35).
- Describe the actions a water supplier will perform if water supplies are reduced by 50 percent for a single year.

#36. An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply (10632(b)).

#43. A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis 10632(i).

- Discuss how the water supplier will measure and determine actual water savings by implementing the actions identified in the 2010 UWMP or in a separately prepared Drought Contingency or Water Supply Reliability Plan. If a separate plan is attached to the UWMP, the approach should be summarized in the UWMP.

#53. Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its

customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier (10635(a)).

- The urban water supplier is to determine water supplies and demands for normal (average), single-dry year, and multiple-dry years for 2010, 2015, 2020, 2025, and 2030. 2035 may be included. For the multiple-dry year sequences, the first year of the 3-year sequence should be the years ending in 0 or 5 (Tables 32, 33, and 34).
- The water supplier can determine these supplies and demands with their own analytical tools, if available. If analytical tools are used, then provide background information and a discussion of methodologies.
- If analytical tools are not available, then determine future demands (indicate methodologies) and use the percentage calculations determined in Table 28 and apply them to the supply estimates.
- Determine the difference between supply and demand. Show a negative value for years where demands are higher than supplies. The water supplier should calculate the supply/demand difference as a percentage of the estimated supply and then of the estimated demand.

Other Helpful Information

- Consider including a discussion on how potential climate change issues could affect potential water supplies.

Suggested Tables

See Part II, Section N, for blank UWMP tables.

⟺ Multiple tables (see Part II, Section N, for blank versions of the UWMP tables) are suggested for inclusion in UWMP Section 5:

- Table 27: Basis of water year data
- Table 28: Supply reliability — historic conditions
- Table 29: Factors resulting in inconsistency of supply
- Table 30: Water quality — current and projected water supply impacts
- Table 31: Supply reliability — current water sources
- Table 32: Supply and demand comparison — normal year
- Table 33: Supply and demand comparison — single dry year
- Table 34: Supply and demand comparison — multiple dry-year events
- Table 35: Water shortage contingency — rationing stages to address water supply shortages
- Table 36: Water shortage contingency — mandatory prohibitions

- Table 37: Water shortage contingency — consumptive reduction methods
- Table 38: Water shortage contingency — penalties and charges

Section 6: Demand Management Measures

Part II, Section E, describes DMMs.

DMMs are mechanisms a water supplier implements to increase water conservation. Suppliers must provide a description for each DMM listed in the legislation unless they document that is not locally cost effective. CUWCC members have the option of submitting their annual reports in lieu of describing the DMMs. Additional information on the DMMs is provided in Guidebook Part II, Section E: Demand Management Measures and Best Management Practices.

The goal of the DMM section in a UWMP is to provide a comprehensive description of the water conservation programs that are currently implemented and those planned to be implemented. The section should additionally provide general information on the measures the supplier plans to implement to meet its urban water use target.

Wholesale and retail urban water suppliers have different requirements for which DMMs, listed in Checklist #26, should be implemented. DWR requires wholesale urban water suppliers to address C, D, J, K, and L. Retail urban water suppliers are to address all DMMs except J.

Required Elements — DMMs

#26. (Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following: (A) water survey programs for single-family residential and multifamily residential customers; (B) residential plumbing retrofit; (C) system water audits, leak detection, and repair; (D) metering with commodity rates for all new connections and retrofit of existing connections; (E) large landscape conservation programs and incentives; (F) high-efficiency washing machine rebate programs; (G) public information programs; (H) school education programs; (I) conservation programs for commercial, industrial, and institutional accounts; (J) wholesale agency programs; (K) conservation pricing;(L) water conservation coordinator; (M) water waste prohibition; (N) residential ultra-low-flush toilet replacement programs (10631(f)(1) and (2).

#27. A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan (10631(f)(3)).

#28. An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand (10631(f)(4)).

#29. An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to

water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following: (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation (10631(g)).

- For each DMM that is currently being implemented or scheduled to be implemented, provide the following information:
    - The steps necessary to implement the measure.
    - A schedule of implementation.
    - A description of the methods the suppliers will use to evaluate the effectiveness of the DMMs implemented or described.
- The following topics should be considered where applicable in the discussion of each DMM being implemented or scheduled to be implemented. Additional information is encouraged, as necessary, to be provided to support the water supplier's DMM description.
    - How the DMM is or will be marketed or advertised.
    - Describe the measure itself (e.g., what is included in a residential survey, how much is the rebate, what topics are covered in school presentations).
    - Provide quantification (e.g., the number of surveys conducted, toilets rebated, large landscape accounts with budgets).
- For each DMM not implemented, the supplier is to provide the following information:
    - A cost benefit analysis that documents total costs and total benefits.
    - Discussion of economic and noneconomic factors cited above in checklist item #29.
    - Description of available funding available to implement any planned water supply project providing water at a higher unit cost.
    - Description of the water supplier's legal authority and ability to work with other agencies to implement the DMM.
- CUWCC members who are in full compliance with the CUWCC's memorandum of understanding can submit their 2009-2010 reports in lieu of describing the DMMs. Documentation of full compliance must be included on the annual report. See Part II, Section E, for additional discussion of the CUWCC BMP annual reports.

Part II, Section E, has further discussion of the CUWCC BMP reports. ⟺

Section 7: Climate Change (optional)

Additional discussion on climate change issues occurs in Part II, Section G.

DWR suggests that an urban water suppler consider in its 2010 UWMP potential water supply and demand effects related to climate change. Specific climate change requirements are included in either the UWMP Act or the Water Conservation Bill of 2009. However, inclusion of potential climate change impacts in a water supply planning document is consistent with other water supply programs and environmental requirements being implemented in California. Potential climate change impacts could also start to be observed and impacting water suppliers within the planning horizon of this document. Part II, Section G, addresses potential climate change issues and actions a water supplier may consider during its UWMP preparation.

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Section 8: Completed UWMP Checklist (optional)

Part II, Section I, contains a UWMP checklist.

The completed UWMP checklist (Part II, Section I) can be used by the water supplier to confirm that the required elements have been included in the UWMP before submittal. In addition, by adding page information to the far left column indicating where the required element can be found within the UWMP, the completed UWMP checklist can be submitted to DWR to support its review of the UWMP. This additional support can be helpful in expediting DWR's review of the submitted UWMP.

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Part II: UWMP Supporting Information

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Part II: UWMP Supporting Information

Part II of the Guidebook contains additional information that discusses or clarifies specific UWMP requirements or topics. It is grouped by subject so that it can be a useful reference for urban water suppliers as they prepare their 2010 UWMPs. The reference sections are:

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Section A: 2010 Urban Water Management Plan Schedule, Submittal, and Review

This section presents key schedule information for both preparing and adopting a UWMP, as well as for DWR submittal and review.

Schedule

The deadline for adoption of a water supplier's 2010 UWMP is July 1, 2011 (CWC §10608.20 (j)). This date is extended from the normal requirement of December 31 in years ending in five and zero (CWC §10621 (a)) to allow additional time for water suppliers to address the UWMP requirements in the Water Conservation Bill of 2009.

During the preparation and adoption of a UWMP, water suppliers must consider required timelines for public notifications and coordination with other water suppliers, agencies, and organizations. Some of these timelines are new for 2010. They are summarized here and included schematically in Table A-1. The time period depends on the date the water supplier adopts its UWMP. If the urban water supplier plans to adopt a UWMP on July 1, 2011, then the dates shown in Table A-1 apply. If the UWMP is adopted prior to July 1, then the other important dates will need to be adjusted accordingly.

Table A-1 Key water supplier dates for UWMP preparation and submittal, assuming a UWMP adoption of July 1, 2011[a]

Action	2011				
	May	June	July	Aug.	Sept.
Release notification for the adoption hearing (May 2, 2011)	◆				
Hold hearing for and adopt UWMP (July 1, 2011)			◆		
Submit UWMP to DWR, State Library, and city/county that receives water from supplier (July 30, 2011)			◆		
Provide copy of UWMP for public review (August 31, 2011)				◆	
Provide copies of UWMP to supplied entities (September 30, 2011)					◆

[a] The dates shown for each required action are based on an urban water supplier adopting its UWMP on July 1, 2011. If the UWMP adoption date is not July 1, 2011, then the dates shown will need to be adjusted accordingly.

60 days prior to Review/Adoption Hearing: The UWMP Act requires that a hearing be held prior to adoption of a UWMP (CWC §10642). At least 60 days prior to the hearing in which the UWMP is to be reviewed, a water supplier is to notify any city or county within which it delivers water (CWC §10621). This notification can take place at any time before the 60-day requirement. *Potential date: May2, 2011.*

Government Code 6066 is specified on Page 1-2 of this Guidebook.

Plan Availability and Public Hearing: The UWMP Act requires the water supplier make the Plan available for public inspection and hold a public hearing pursuant to Government Code 6066 (CWC § 10642). This hearing should also include specific discussion of the plan indicating present and proposed future measures, programs, and policies to help achieve the water use reductions (CWC §10608.26(a) and § 10608.36) to achieve compliance with both the requirements for the public hearing prior to adoption and the public discussion on the supplier's per capita water use reduction goals . *Potential date: 2 weeks prior to board adoption*.

30 days after Adoption: The water supplier must submit within 30 days after the UWMP adoption, the Plan along with copies of changes or amendments to DWR, the California State Library, and any city or county within which it supplies water. (CWC §10644(a)). *Potential date: August 1, 2011 (note: July 31, 2011, is a Sunday).*

30 days after Submission to DWR: The water supplier must provide a copy of the adopted UWMP for public review during normal business hours for the 30 days that follow its submission to DWR (CWC §10645). *Potential date: August 31, 2011.*

60 days after Submission to DWR: The water supplier must provide the reliability section and supply-and-demand section of the adopted UWMP to any city or county within which the supplier provides water within 60 days after submitting the adopted UWMP to DWR (CWC §10635(b)). *Potential date: September 30, 2011.*

Plan Submittal

UWMPs submitted to DWR must have a copy of the signed adoption. If the adoption is not included, a copy of the adoption will be requested. The UWMP will not be considered officially submitted until the copy of the adoption is received by DWR.

Beginning with 2010 UWMPs, the full documents may (but are not required to) be submitted to DWR by uploading them on the Internet. In addition, a water supplier can submit specific information required by the UWMP Act directly into an online data management tool. This online data submission is planned to address multiple objectives:

- Provide a consistent and streamlined mechanism for water suppliers to transmit UWMPs to DWR, which the Legislature and Governor directed with the enactment of Water Conservation Bill of 2009
- Acknowledge the significant electronic improvements that have occurred since UWMPs were submitted in 2005
- Support interagency and public exchange of data that water suppliers are required to submit to multiple State agencies
- Facilitate UWMP review

- Provide data storage to support future submissions
- Provide a mechanism to review data on regional and statewide levels to track progress toward meeting 20x2020 goals (further discussed in Part II, Section F: Related Programs) and recycled water and desalinated water use

In Part II, Section F discusses related programs, and Section H covers electronic submittal.

Online submission consists of two parts: submission of the data supplied in the UWMP and submission of the Plan itself. Specific instructions for data and Plan submittal are included in Part II, Section H: Electronic Submittal.

UWMP Data

In previous years, UWMP data have been submitted to DWR only in tables or within printed reports. With the 2010 UWMP cycle, data can be submitted to DWR through DOST. The water supplier can then use this electronic submission to generate the tables submitted as part of the UWMP.

Urban water suppliers can achieve multiple benefits by supporting the development of the data management system. First, water suppliers can track their submitted information. Second, suppliers can streamline subsequent UWMP submittals because it will not be necessary to re-enter basic information. Third, water suppliers will be able to store, track, and use their own data in a central location. Finally, the data will be easily retrieved and compiled into tables included in the UWMP.

UWMP Document

One printed and one electronic copy of the adopted UWMP are to be submitted to DWR. The date of submittal will be considered the earlier date of the Internet upload or receipt of the printed document.

Part II, Section H, includes instructions for electronic submittal.

The electronic version of the UWMP can be submitted by using DOST, sending a CD-ROM with the printed version, or via e-mail. The DOST electronic submittal instructions are included in Part II, Section H: Electronic Submittal. The printed copy of the UWMP is delivered to:

Department of Water Resources
Statewide Integrated Water Management
Water Use and Efficiency Branch
P.O. Box 942836
Sacramento, CA 94236-0001
Attention: Coordinator, Urban Water Management Plans

If delivered by courier or overnight carrier to DWR, use the following street address instead of the PO Box:

901 P Street
Sacramento, CA 95814

One printed copy of the UWMP is to be submitted to the California State Library at:

California State Library
Government Publications Section
P.O. Box 942837
Sacramento, CA 94237-0001
Attention: Coordinator, Urban Water Management Plans

If delivered by courier or overnight carrier to the California State Library, use the following street address instead of the PO Box:

900 N Street
Sacramento, CA 95814

Required Supporting Documents

The UWMP Act requires submittal of applicable supporting documents. Documents that may be considered a part of a UWMP include:

1. A copy of the resolution adopting the UWMP (CWC §10620(a))
2. A copy of the draft water shortage contingency resolution or ordinance (CWC §10632(h))
3. The CUWCC BMP reports that may be submitted as DMM documentation (CWC §10631.5(b)(e))
4. A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted according to CWC, Division 5, Part 2.75 (commencing with Section 10750) or any other specific authorization for groundwater management (CWC §10631(b)(1))
5. A copy of the order or decree adopted by the court or the State Water Board for adjudicated basins and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree (CWC §10631(b)(2))

The resolutions (Items 1 and 2) and the CUWCC reports (Item 3) must be submitted as integral parts of the UWMP because they are being provided as part of the DMM documentation and, therefore, are required for DMM compliance. Items 4 and 5 may be provided separately from the submitted UWMP in one of three ways:

- Separate electronic (as PDF only) files with the electronic submittal of the UWMP
- Electronic (as Portable Document Format [PDF] only) on a CD accompanying the paper submittal of the UWMP to DWR and the California State Library
- Printed copies with the paper submittal of the UWMP

Because content on the Internet is constantly changing, the submission of a website address alone will not comply with providing the required UWMP elements. Versions of documents in place at the time of the UWMP adoption are required to be submitted with the UWMP.

Plan Review

Part II, Section J, contains DWR review sheets.

DWR will review each UWMP to determine whether each required element is fully addressed according to the CWC. DWR staff will complete the review using 2010 review sheets (see Part II, Section J), which will become part of the UWMP record after the review process is complete. Urban water suppliers may want to go through the review sheets or UWMP checklist as they prepare their UWMPs to confirm that the required components are included in the UWMP to be adopted and then submitted to DWR. The checklist includes a column the water supplier may complete to identify for the DWR reviewer where the required element occurs within the submitted UWMP. The DWR checklist can be incorporated into a UWMP, but the DWR review sheet cannot.

Part II, Section H, contains instructions for electronic submittal.

If an urban water supplier completely submits its UWMP using DOST, there will be a prioritization of UWMP review by DWR. This will be explained further in Part II, Section H: Electronic Submittal.

Because of the linkage of a UWMP and a water supplier's eligibility for grants and loans, DWR makes every effort for timely review of submitted UWMPs. DWR will work with water suppliers and DWR Division of Integrated Regional Water Management (DIRWM) staff to complete the review of UWMPs required for grants and loan applications, depending on staff availability.

Tracking Plan Review

DOST will send water suppliers e-mails at key stages of the review process and enable tracking its progress. E-mail notices will be sent to the water supplier's designated UWMP administrator at the following review steps:

1. Submittal of electronic data through DOST
2. Uploading of a PDF or Word version of a UWMP
3. Assignment of the UWMP to a DWR region and/or reviewer
4. Beginning of the DWR review process
5. Completing the initial DWR review process and either determining that the UWMP meets existing CWC requirements or requesting additional information

It will also be possible to track the stage of the review process by accessing DOST.

DWR Review

CWC section 10644 (b) directs the department to submit a report to the Legislature summarizing the status of plans adopted. In meeting this directive, DWR will review submitted plans to determine if all the requirements of the UWMP Act have been addressed in the plan. After finishing the plan review, DWR will send a letter to the supplier informing it of how DWR will report on the status of its plan to the Legislature. For plans that have not addressed or met specific requirements, DWR will list the requirements that are missing or need to be revised. Missing or additional information can be added to a plan after it has been submitted to DWR. Adding information to a plan may require that the plan be amended.

Grant Eligibility

DWR's Integrated Regional Water Management (IRWM) and water conservation grants and certain water grants through other state agencies require that a supplier have a complete UWMP to receive funding. The IRWM and water conservation grant programs have defined "complete" to mean meeting all the urban water management requirements of the water code.

Regional Contacts

Contacts to answer questions regarding UWMP preparation, submittal, or review are listed in Table A-2. This list is also available on the DWR UWMP website. Figure A-1 shows the DWR regions.

Table A-2 Urban Water Management Plan DWR contacts[a]

Office	Contact	Phone	e-mail
Northern Region	Jessica Salinas Tito Cervantes	(530) 529-7355 (530) 529-7389	salinas@water.ca.gov cervante@water.ca.gov
North Central Region	Kim Rosmaier	(916) 376-9628	krosmaie@water.ca.gov
South Central Region	Luis Avila	(559) 230-3364	lgavila@water.ca.gov
Southern Region	Sergio Fierro David Inouye	(818) 543-4652 x247 (818) 500-1645 x246	sergiof@water.ca.gov davidi@water.ca.gov
Headquarters	Peter Brostrom Toni Pezzetti	(916) 651-7034 (916) 651-7024	brostrom@water.ca.gov tpezzett@water.ca.gov

[a] See http://www.water.ca.gov/urbanwatermanagement/ for the most current version of the regional DWR contacts.

Online Resources

The UWMP website (http://www.water.ca.gov/urbanwatermanagement) contains extensive reference material, including:

- Frequently Asked Questions (FAQs), which will be updated as new questions and answers occur before July 1, 2011
- Viewable version of the DWR Staff UWMP 2010 Review Sheet
- The 2010 UWMP Guidebook
- Copies of the UWMP Act and Water Conservation Bill of 2009
- A link to the 2005 UWMPs
- Other helpful publications
- Links to the DWR UWMP workshops and webinars

These materials should support the preparers of UWMPs. In addition, the website contains the link for submission of online comments and questions regarding the UWMP process and supporting information. An e-mail can also be sent to UWMP@water.ca.gov.

Figure A-1 California Department of Water Resources regions

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Section B: Changes in Urban Water Management Plan Requirements Since 2005

Part II, Section K, contains relevant portions of the California Water Code.

UWMP preparers are required to comply with the CWC. Numerous changes to relevant State law have occurred since urban water suppliers prepared their 2005 UWMPs. Changes occurred to the UWMP Act (CWC §10610 et seq., included as Part II, Section K) with enactment of the Water Conservation Bill of 2009 (CWC §10608) and other legislation. The Water Conservation Bill of 2009 requires that certain information be included in an urban retail water supplier's UWMP.

Changes to the UWMP Act

The overall intent of the UWMP Act and its requirements are similar to previous years—to describe an urban water supplier's water supplies and conservation efforts. Primary changes to UWMP requirements since 2005 address water conservation (through Water Conservation Bill of 2009) and DMMs (through AB 1420), but there are several other changes. Changes to the UWMP Act are summarized in Table B-1.

Table B-1 Changes[a] in the Urban Water Management Plan Act since 2005

Change	CWC citation	Summary[b]
Notification	10621(b)	*Added*: Provide at least 60 days notification to any city or county within which the supplier provides water for the public hearing required by Section 10642.
DMM Compliance	10631(j)	*Changed*: Members of the CUWCC will be considered in compliance with the DMM evaluation (10631 (f) and (g)) if they comply with all the provisions of the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated December 10, 2008 and by submitting their CUWCC annual reports.
Wholesale Suppliers Source Water	10631(j)	*Deleted:* Text identifying the specific types of water an urban water supplier may seek information from a wholesaler supplier. The option to seek information from a wholesale supplier is not deleted, just the identification of source water types.
Lower Income housing water use projections	10631.1	*Added:* Water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households (Health and Safety Code Section 50079.5) will be provided. These water use projections are to assist a supplier in complying with Government Code Section 65589.7 to grant priority of the provision of service to housing units affordable to lower income households.
Linkage of DMM to State grant or loan program	10631.5(a)	*Changed:* After January 1, 2009, eligibility for state-funded grants or loans will be conditioned on the implementation of Section 10631 DMMs. If a DMM is not currently being implemented, then the urban water supplier submits to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement.. If a DMM is not locally cost-effective (the present value of the local benefits is less than the present value of local costs to implement the DMM), then the water supplier will submit supporting documentation and the DWR will provide a determination within 120 days of UWMP submittal.

Change	**CWC citation**	**Summary**[b]
DMM Compliance	10631.5(b)	*Added:* DWR will consult with other agencies and public input and develop eligibility requirements for meeting compliance with DMM implementation. Determination of DMM compliance will be based on an individual water agencies implementation or participation with a regional group. An individual water agency will not be denied eligibility if another participating regional agency does not comply with each of the DMMs
Determination of Grant and Loan Eligibility	10631.5(c)	*Added:* Grant and loan eligibility, based on DMM compliance, will be included in the funding guidelines.
	10631.5(d)	*Added:* The administering agency will request and eligibility determination from DWR regarding “the requirements of this section”. DWR will respond within 60 days.
	10631.5(e)	*Added:* The water supplier may submit copies of its annual reports and other relevant documents to assist DWR in determining implementation or scheduling of the water suppliers DMMs. Water suppliers that are signatories of the CUWCC MOU may submit its annual reports to support its DMM activities.
	10631.5(f)	*Added:* “This section” is in effect only until July 1, 2016, after which it is repealed, unless another statute is enacted.
New DMM Independent Technical Panel	10631.7	*Added:* DWR, with the CUWCC, will convene a technical panel to provide information and recommendations to DWR and the Legislature on new DMMs, technologies, and approaches. There is further language on the panel members and timing.
Potential Recycled Water Uses	10633(d)	*Added:* Indirect potable reuse is to be considered as an option for a potential use of recycled water.
UWMP Distribution	10644(a)	*Added:* A copy of the UWMP will also be submitted to the California State Library no later than 30 days after its adoption
Exemplary UWMP Elements	10644(b)	*Added:* ‘Exemplary’ elements of individual plans are to be identified in the 2011 Legislative Report
Exemplary UWMP Elements	10644(c)	*Added:* (1), (2), and (3). Clarifying that “exemplary” DMMs are those that achieve water saving significantly above the levels established by DWR to meet the requirements of 10631.7. The results are to be distributed to the panel convened pursuant to Section 10631.7 and the public.
Retail Deadline	144644(j)(1)	*Added:* An urban retail water supplier is granted an extension to July 1, 2011, for adoption of an urban water management plan.
Wholesaler Deadline	144644(j)(2)	*Added:* An urban wholesale water supplier whose urban water management plan . . .is granted an extension to July 1, 2011, to permit coordination between an urban wholesale water supplier and urban retail water suppliers.
	10657	*Deleted.*

[a] Formatting or renumbering changes are not included in this table.

[b] This column provides a general summary of the specific changes in the UWMP Act. See the CWC citation (Part II, Section K) for the exact legislative wording.

UWMP Requirements in the Water Conservation Bill of 2009

The Water Conservation Bill of 2009(SBX7-7) was enacted in November 2009. To increase water use efficiency, it requires reduction of the statewide average per capita daily water consumption by 20 percent by December 31, 2020, and requires "all water suppliers to increase the efficiency of this essential resource" (10608.4(a)).

UWMP references and requirements cited in the Water Conservation Bill of 2009 are included in Table B-2.

Table B-2 UWMP requirements cited in Water Conservation Bill of 2009

CWC Citation	Summary
10608.20(e)	Include the baseline daily per capita water use, urban water use target, interim water use target, and compliance daily per capita water use. Provide basis for determination and supporting data references.
10608.20(g)	The 2015 UWMP can update the 2020 urban water use target.
10608.20(h)(2)	An urban retail water supplier shall use the methods developed by the department in compliance [with methodologies and criteria developed by DWR]
10608.20(j)	Deadline for adoption of a UWMP is extended to July 1, 2011 to allow use of the technical methodologies developed to establish baseline, target, interim target, and compliance daily per capita water use.
10608.36	Wholesale suppliers will provide an assessment of their present and proposed future measures, programs, and policies to achieve water use reduction required in SBX7 7.
10608.40	Urban water suppliers will report progress toward meeting urban water use targets in their UWMPs using a standardized form to be developed by DWR. *Note: This applies only to 2015 and 2020 UWMPs because they will report "progress" toward meeting targets established in this, the 2010 UWMP.*
10608.42	DWR will review the 2015 UWMPs and report to the Legislature the progress toward achieving a 20-percent reduction in urban water use by December 31, 2020.

Required UWMP Components

Part II, Section I, contains a UWMP checklist.

The UWMP Checklist (Part II, Section I) summarizes the required components of a 2010 UWMP and includes the CWC citation. Two checklists are presented, both with identical information but with different organization: one version is organized by CWC; the other by subject.

The checklists also contain a column for the water supplier to provide the page location of the requested/required information within its UWMP. This will support review of the UWMP by DWR staff. It is not required that this column be completed by the water supplier, but the UWMP preparer is more familiar with the specific document that was prepared and should be able to more quickly discern the information location. In addition, it helps the preparer do a final verification that the required information is provided in the UWMP.

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Section C: Regional Water Planning

Water suppliers may work through several mechanisms to regionally develop some or all of the components required for a 2010 UWMP. These options include:

- Preparing a regional UWMP
- Forming a regional alliance to develop interim and urban water use targets

Regional water management groups and preparation of Integrated Regional Water Management Plans (IRWMPs) have created a more cooperative approach to addressing water resources issues. Developing a cooperative 2010 UWMP may be a natural continuation of regional coordination. In support of continued collaboration, both the UWMP Act (Section 10620(d)(1)) and the Water Conservation Bill of 2009 (Section 10608.20(a)(1) and 10608.20) provide the mechanism for supporting development of regional UWMPs and water conservation targets. An urban water supplier can meet the requirements of the law by participating in area-wide, regional, watershed, or basin-wide urban water management and planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

Part II, Section M, contains technical methodologies. ⟺

With the expanded requirements of the 2010 UWMPs to address the Water Conservation Bill of 2009, DWR has prepared additional guidance to water suppliers for developing regional plans during the 2010 cycle. Methodology 9: Regional Compliance (see Part II, Section M: Water Conservation Bill of 2009 Technical Methodologies) provides specific instructions for cooperative reporting. Key aspects of the Regional Compliance Technical Methodology are summarized in the remainder of this Guidebook section.

Governing Entities

If a group of water agencies are planning to develop a regional UWMP or form a regional alliance,

- Regional UWMPs must contain a resolution adopted by each participating water supplier
- Regional alliance members must list their participation in the alliance in their individual UWMPs if they are submitting an individual UWMP but developing a regional alliance for the purpose of developing interim and urban water use targets

An interagency agreement may be considered, including contingencies.[8]

Regional UWMP Options

There are two ways to approach the preparation of a regional UWMP. The first is to prepare a single plan for multiple water suppliers. The second way is for each water

[8] DWR will not review or approve the terms of MOUs or legal agreements that water suppliers use to create and manage regional alliances. However, terms of the agreements must be consistent with all applicable sections of the CWC.

supplier to develop an individual UWMP that has some common elements developed and adopted by the group.

Developing a Regional UWMP

In 2005, five regional groups prepared and submitted cooperative UWMPs to DWR. These were from Castaic Lake Water Agency (for the water suppliers within the Santa Clarita Valley), Mojave Water Agency, Metropolitan Water District of Southern California, Inland Empire Utilities Agency, and West Basin Municipal Water District. Many of these regional plans were prepared in addition to UWMPs for individual water suppliers.

The groups that prepared regional UWMPs in 2005 did so under a variety of arrangements. Some were a part of the Integrated Regional Water Management (IRWM) process; others were prepared by the wholesale supplier and its retail agencies. It is the responsibility of the participating water suppliers to determine the best approach for its group. The approach used and the water supplier relationship should be clearly stated in the UWMP.

Preparation of a regional UWMP requires that each participating water supplier adopt the plan. If a single document is prepared and adopted by each water supplier, then documentation from each water supplier adopting the plan must be included in the final UWMP. If a regional plan is prepared and an individual agency also prepares its own submit separate UWMP, then its governing board adopts both the individual and regional plans.

Part II, Section M, contains technical methodologies. ⟺

If a regional UWMP is prepared, each water supplier must still comply with the Water Conservation Bill of 2009. Interim and urban water use targets can be determined regionally, if the applicable criteria—discussed below—are met for determining regional targets. See Methodology 9: Regional Compliance (Part II, Section M: Water Conservation Bill of 2009 Technical Methodologies) for additional information.

Common Elements of a UWMP

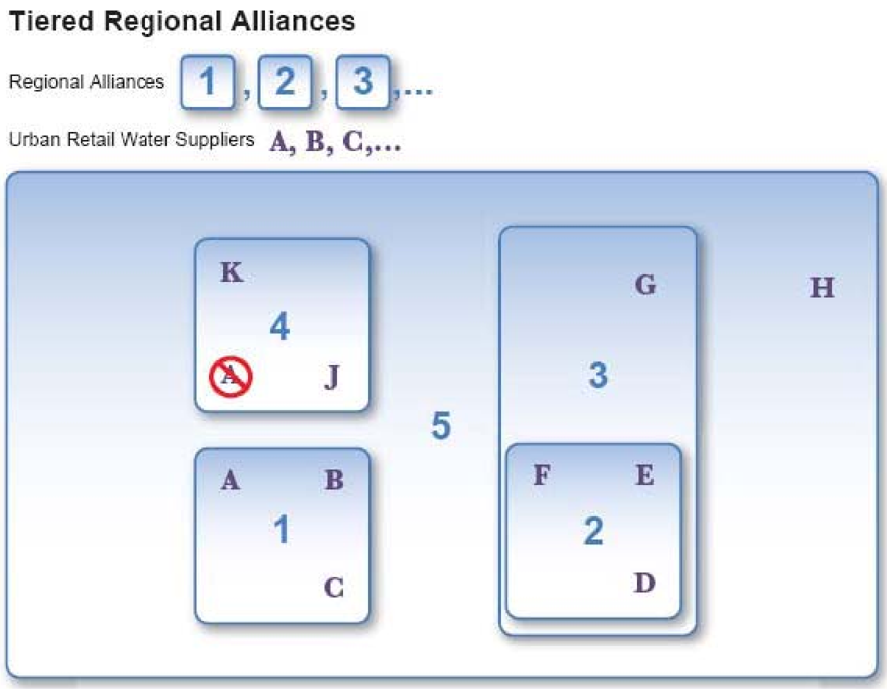
A group of water suppliers can prepare common elements of a UWMP. For example, each water supplier would prepare its own UWMP, but would prepare a regional Water Shortage Contingency Plan, which would be included (physically or electronically) in each UWMP. Each UWMP would indicate that the Water Shortage Contingency Plan was prepared in cooperation with the other identified water suppliers.

Forming a Regional Alliance for the Water Conservation Bill of 2009

The second condition in which a group of water suppliers can cooperatively participate during the urban water management planning process is related to complying with Water Conservation Bill of 2009 requirements. In this case, the water suppliers' cooperative participation is referred to as a regional alliance. This allows water suppliers to work toward cooperatively developing programs and meeting water conservation goals, but not necessarily submitting a regional UWMP.

Part II, Section M, contains technical methodologies.

Water suppliers can belong to more than one regional alliance, but these alliances must be tiered meaning the members of the smallest alliances must all be members of the larger alliances. (Figure C-1.) Technical Methodology 9: Regional Compliance (Part II, Section M) provides additional detail regarding the relationships within the tiered structure and how a water agency can participate in multiple regional alliances, as well as its limitations.



Three separate tiered alliances (Alliances 1, 3 and 4) occur within the regional alliance (Alliance 5). In addition, Alliance 3 has a sub-tiered alliance (Alliance 2). Water Agency A is a full member of Tiered Alliance 1. It can participate as a member of Alliance 4, but will not be included in water target calculations to prevent 'double-counting'. (DWR 2010a.)

Figure C-1 Tiered approach to regional alliances

Criteria

To form a regional alliance, the Regional Compliance Technical Methodology indicates water suppliers must meet at least one of the following criteria:

- Are recipients of water from a common wholesale water supplier. For this purpose, the State Water Project and the Central Valley Project are not considered wholesale water suppliers. Wholesale water suppliers are not required to establish and meet targets for daily per capita water use. Wholesale water suppliers serving in the role of a regional alliance are representing the urban retail water suppliers that are members of the alliance, and compliance with a regional target is on behalf of the member suppliers and not the wholesale water supplier itself.

- Are partners with a common regional agency authorized to plan and implement water conservation.
- Are part of a regional water management group as defined in CWC §10537.
- Are part of an IRWM funding area, which for this purpose means an IRWM planning area formally accepted by DWR through its IRWM Region Acceptance Process.
- Are located within the same hydrologic region, which for this purpose refers to the 10 hydrologic regions as shown in the California Water Plan. For situations where water suppliers may serve areas within more than one hydrologic region, the majority of each water supplier's Service Area Population must be located within the hydrologic region being identified as a regional alliance.
- Have appropriate geographic scales for which methodologies developed by DWR can be applied. For this provision, water suppliers' service area boundaries must be contiguous.

Reporting

Part II, Section M, contains technical methodologies.

Each regional alliance will develop its own set of interim and urban water use targets, which are to be included in each alliance's Regional Alliance Report. Part II, Section M: Water Conservation Bill of 2009 Technical Methodologies describes what is to be included in the Regional Alliance Report. Each water supplier will identify in its UWMP each regional alliance of which it is a member.

Each water supplier that is a member of one or more regional alliances will also report the interim and urban water use target values for each alliance. For example, Water Agency K (see Figure C-1) is a member of a sub-tiered regional alliance with Water Agency H, Tiered Alliance III, and the Regional Water Supplier Alliance. In its UWMP, it will identify each of these alliances, the interim and urban water use target values for each alliance, as well as the interim and urban water use targets for the agency itself.

Withdrawing or Separating from a Regional Alliance

If a water supplier withdraws from or is a member of a regional alliance that is later dissolved, the water supplier must inform DWR and comply individually with interim and urban water use targets. The water suppliers remaining in the regional alliance may either submit revised regional baseline or target data, or dissolve the alliance.

Section D: Baseline and Target Determination

Beginning with the 2010 UWMPs, SBX7-7 (CWC §10608 (e)) requires each urban retail water supplier to include the following in its UWMP.

- **Baseline daily per capita water use —** how much water is used within an urban water supplier's distribution system area on a per capita basis. It is determined using water use and population estimates from a defined range of years.
- **Urban water use target** — how much water is planned to be delivered in 2020 to each resident within an urban water supplier's distribution system area, taking into account water conservation practices that currently are and plan to be implemented.
- **Interim urban water use target** — the planned daily per capita water use in 2015, a value halfway between the baseline daily per capita water use and the urban water use target.

In 2015 and 2020, each water supplier will also determine a compliance daily per capita water use to assess progress toward meeting interim and 2020 urban water use targets. Determining and tracking use levels and targets will support the goal of reducing the state's per capita urban water consumption by 20 percent.

Part II, Section M, contains technical methodologies.

This section provides guidance on how to determine these numbers and what supporting information is to be included in a water suppliers' UWMP. The methodologies themselves are included in Part II, Section M.

Process Overview

The Water Conservation Bill of 2009 describes the overall process by which a water supplier complies with the requirements. It specifically identifies three of the four methods for establishing urban water use target and requires DWR to develop a fourth target method. Additionally, it requires DWR to develop technical methodologies for consistent implementation of the Water Conservation Bill of 2009 requirements. These technical methodologies and the fourth target method were developed in close consultation with the Urban Stakeholders Committee (USC) during spring and summer 2010.

Target methods are the four options an urban water supplier has to determine its urban water use target. They are referred to as Target Method 1, Target Method 2, etc. These methods identify specific steps water suppliers will follow to establish targets. Each urban water supplier (or regional alliance) must use one of the four target methods to perform the required calculations. Technical methodologies are procedures and guidance for conducting some of the specific steps identified in the target methods. There are nine technical methodologies. Multiple methodologies may be needed for completion of a target method calculation. Table D-1 shows the overall relationship between target methods and technical methodologies.

Table D-1 Relationship between target methods and technical methodologies

Technical Methodology	Step 1: Determine base daily per capita water use	Step 2: Determine urban water use target				Step 3: Compare urban water use target to minimum threshold	Step 4: Determine interim water use target	Future step: Compliance daily per capita water use
		Method 1 — 80 Percent	Method 2 - Performance Standards	Method 3 — 95 Percent of Hydrologic Region Target	Method 4 — Water Savings (provisional)			
1.Gross water use	•					•		
2.Service area population	•					•		
3.Base daily per capita use	•					•		
4.Baseline commercial, industrial and institutional water use			•					
5.Indoor residential water use			•					
6.Landscaped area water use			•					
7.Compliance daily per capita use								•
8.Criteria for compliance year adjustment								•
9.Regional Cooperation	•	•	•	•	•	•	•	•

The Water Conservation Bill of 2009 provides flexibility in how an urban water supplier determines the baseline and target numbers for its water service area. It also indicates that water suppliers can cooperatively determine and report progress toward achieving these targets through a regional alliance. A water supplier may determine the targets on a fiscal year or calendar year basis, but must clearly state in its UWMP the basis for its reporting[9].

Although the legislation provides flexibility in how an individual or group of water suppliers approaches baseline and target compliance, it also requires method and methodology consistency over time. So, technical methods and methodologies used by a water supplier to determine use levels and develop targets in 2010 are to be the same as those used in 2015 and 2020. A water supplier may select a different Target

[9] If a water supplier has options, DWR prefers reporting of annual water uses and determination of baseline and target values to be on a calendar year basis to provide consistency with other reporting, such as Public Water System Statistics forms. DWR realizes that this may not be possible for all water suppliers, however.

Method in its 2015 plan, but not in any amended 2015 plans or in 2020 plan. A water supplier has the opportunity to modify its target method during the implementation period, but any changes must be retroactive, as described in Technical Methodology 9: Regional Compliance.

Water Suppliers with Multiple Service Areas

Many water suppliers within the state have service areas that are at a physical distance from each other. This includes private water companies that operate separate water systems in different geographic regions of California, as well as public suppliers that operate multiple, physically separate distribution systems.

Public water suppliers that have multiple service areas can choose to set urban water use targets for each of its service areas, but the same target method must be used for each service area. If a public water supplier sets targets for individual service areas, it must also calculate a single target for the entire area it serves. The entire area target can be the population weighted average of the individual service area targets or calculated based on data from the entire area served.

Private water suppliers with multiple districts should create a UWMP for each district with water supply deliveries or number of connections above the UWMP submittal threshold. If a district has multiple service areas, the private suppliers can, similar to the public suppliers, set individual targets for each service area within a single district. Private suppliers are also to use the same target method for calculating individual service area targets within a single district. Private water suppliers that set individual targets for service areas within a district must also calculate a single urban water use target for the entire district. The district target can either be a weighted average of the individual service area targets or calculated based district wide data.

Baseline Periods

Two baseline periods are to be determined during the calculation of the base daily per capita water use. The legislation provides some flexibility in what actual periods of time are used to establish these baselines. This accounts for short-term water demand variations resulting from weather influences, as well as acknowledging the advances of water suppliers that have already begun using recycled water to reduce potable demands. The two baseline periods are:

- 10- to 15-year base period. This is a 10-year or 15-year continuous period used to calculate baseline per capita water use
- 5-year base period. This is a continuous 5-year period used to determine whether the 2020 per capita water use target meets the legislation’s minimum water use reduction requirements of at least a 5 percent reduction per capita water use.

If the urban retail water supplier’s base daily per capita water use calculated using the 5-year base period is 100 gallons per capita per day (GPCD) or less, then the urban water supplier is exempt from the 5 percent minimum required reduction. It must document in subsequent UWMPs in 2015 and 2020 that it has maintained the 100 GPCD compliance.

Meeting Water Conservation Bill of 2009 Requirements

There are four overall steps a water supplier completes to meet the 2010 UWMP requirements indentified in the Water Conservation Bill of 2009:

- Step 1: Determine Base Daily Per Capita Water Use
- Step 2: Determine Urban Water Use Target
- Step 3: Compare Urban Water Use Target to the 5-year Baseline
- Step 4: Determine Interim Urban Water Use Target

Part II, Section D, describes the approach for determining baseline and target information. Part II, Section H, includes instructions for electronic submittal.

These steps are shown in Figure D-1. The figure shows the overall approach to developing baseline and target values as well as which methodology to apply for each step of the process. Figure D-2 shows the specific actions to be completed in determining the baselines and targets required by the Water Conservation Bill of 2009. Part II, Section D: Baseline and Target Determination, describes the overall approach to each step. Detailed description of each step and how to interface with DOST is provided in Part II, Section H: Electronic Submittal.

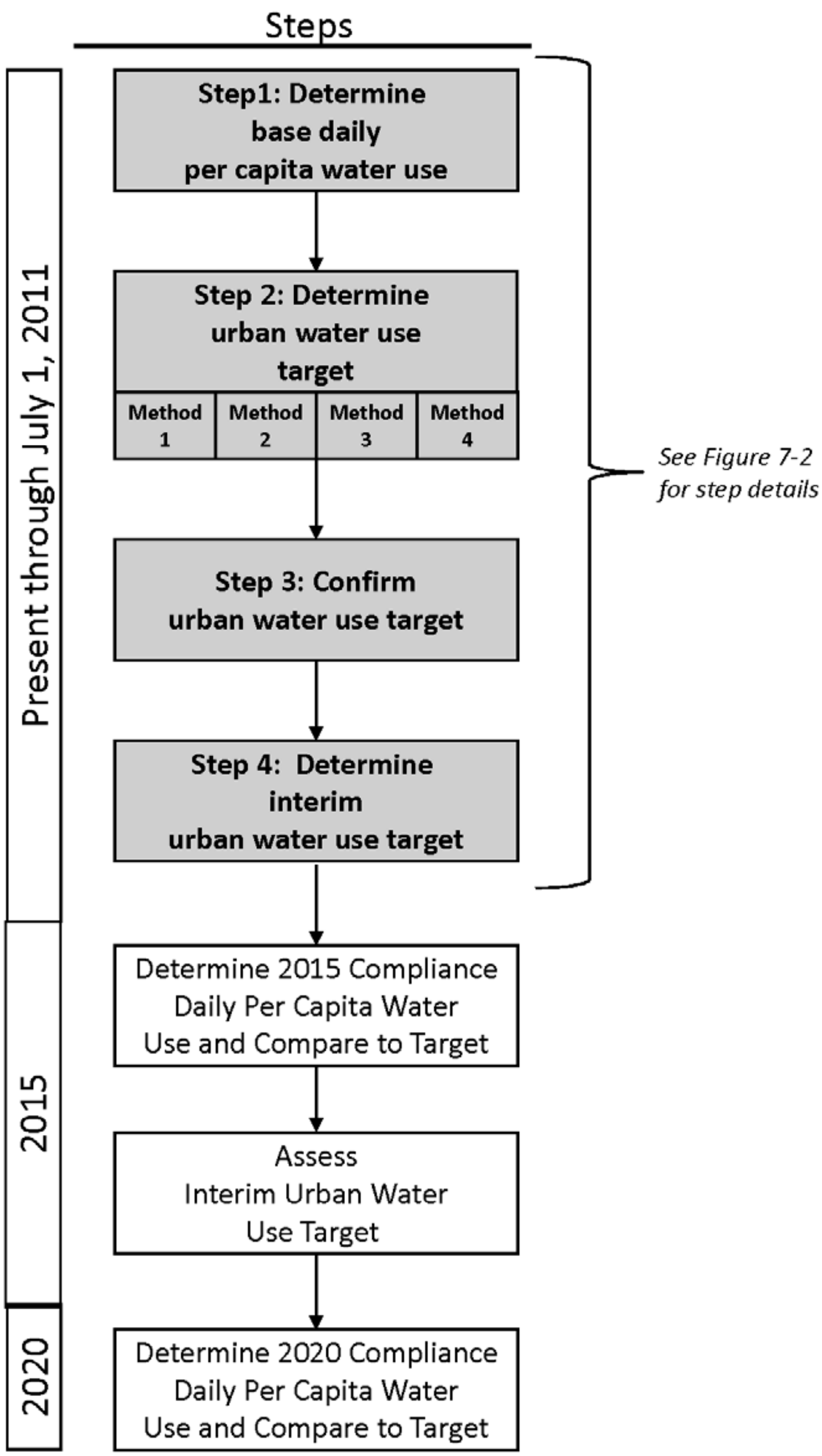


Figure D-1 General overview of developing water suppliers' SBX7-7 conservation goals

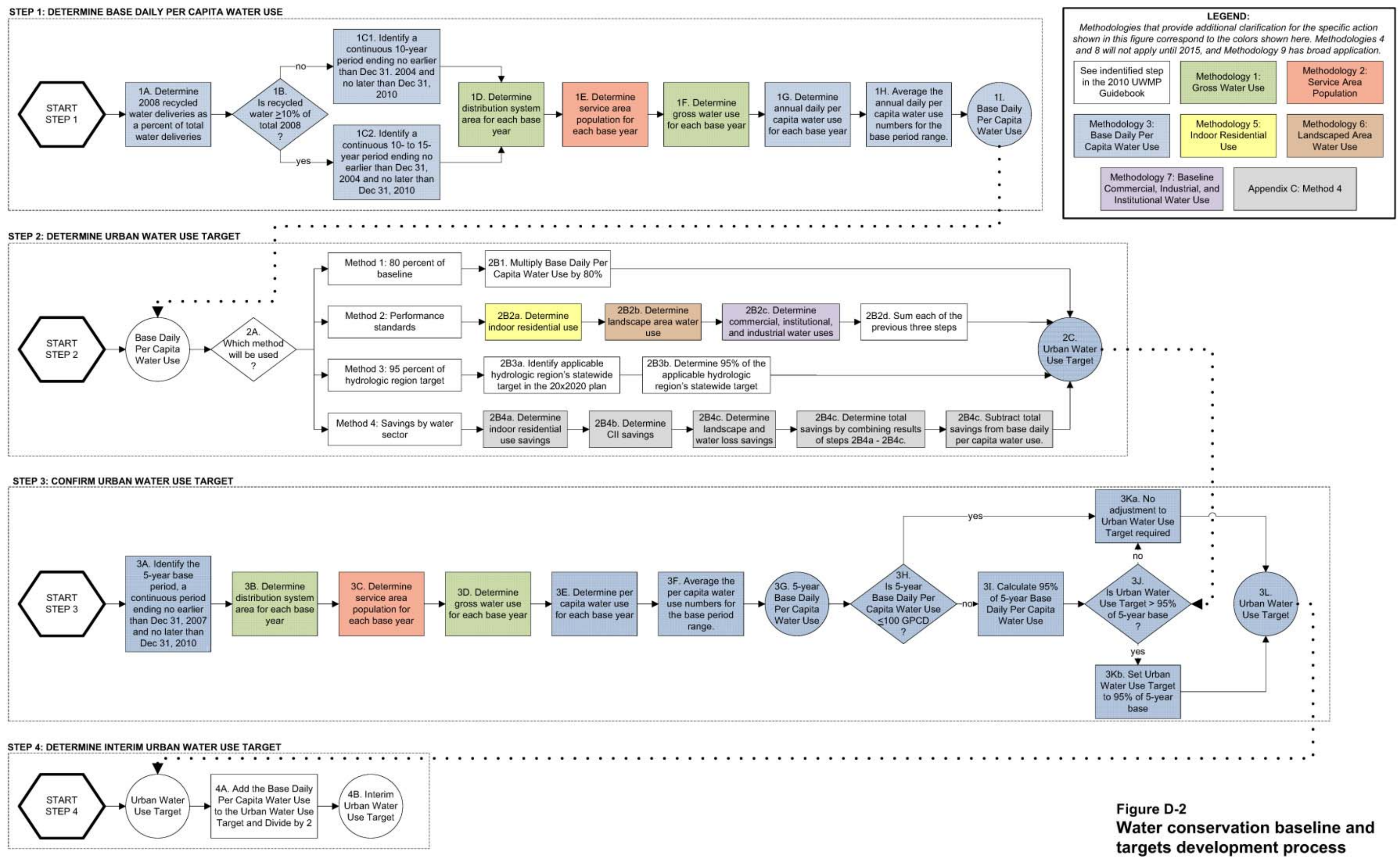


Figure D-2
Water conservation baseline and targets development process

Figure D-2 Details of developing SBX7-7 conservation goals (large format 11x17 available online)

Step 1: Determine Base Daily per Capita Water Use

The Water Conservation Bill of 2009 requires each urban retail water supplier to include in its UWMP an estimate of base daily per capita water use. Base daily per capita water use, measured in GPCD, is established for an initial period of time, which is referred to as the 10- to 15-year base period.

Three technical methodologies have been developed to support a water supplier in determining its base daily per capita water use:

- Technical Methodology 1: Gross Water Use
- Technical Methodology 2: Service Area Population
- Technical Methodology 3: Base Daily Per Capita Water Use

Part II, Section M, describes technical methodologies.

Figure D-2 shows the overall approach to determining the base daily per capita water use using these technical methodologies. The base daily per capita water use Technical Methodologies are included in Section M.

(Figure D-2 is also available formatted as an 11-by-17 figure online at http://www.water.ca.gov/urbanwatermanagement/guidebook/.)

Step 1A: Determine Supplier 10- to 15-year and 5-year Base Periods

Using Methodology 3 (Base Daily Per Capita Water Use), determine the percentage of recycled water to total water deliveries for the year 2008.

Step 1B: Decision — 2008 Recycled Water Percentage

Using Methodology 3 (Base Daily Per Capita Water Use) and the results from Step 1A, determine if the percentage of recycled water to total water deliveries for the year 2008 is 10 percent or greater. If yes, proceed to Step 1C2. If not, proceed to Step 1C1.

Steps 1C1 and 1C2: Determine 10- and 15-Year Base Period Ranges

Using Methodology 3 (Base Daily Per Capita Water Use), determine base period ranges for calculating the base daily per capita water use. For both steps 1C1 and 1C2, this is a continuous period of years with the end of the range ending between December 31, 2004, and December 31, 2010.

For Step 1C1, the range must be 10 years.

For Step 1C2, the range must be at least 10 years, but it may be as long as 15 years. It is acceptable to have a range somewhere between 10 and 15 years, but the range must be in full-year increments. In other words, a range of 12 years and 6 months is not acceptable.

Step 1D: Estimate Distribution System Area

The service area identifies the physical extent for which both the population and gross water use will be determined and, ultimately, the base daily per capita water use. For the purposes of implementing this legislation, the service area is equivalent to a water supplier's distribution system.

Using Step 2 of Methodology 1 (Gross Water Use), delineate the distribution system boundary for each of the base period years. A map is to be included in the UWMP that shows the Distribution System Boundary and any changes that occurred in the boundary during the base period. This map may be a single page using shading or various line types to show system area changes over the identified base period.

Step 1E: Estimate Service Area Population

Using Methodology 2 (Service Area Population), determine the service area population for each year of the baseline periods by using the estimates for the Distribution System Boundary during each of the years in the base period.

Step 1F: Calculate Gross Water Use

Using Steps 3 through 12 of Methodology 1 (Gross Water Use), complete the process for calculating gross water use. Steps 3 through 12 are to be performed for each of the base period years.

When calculating gross water use, industrial process water may be excluded in certain situations[10]. An urban retail water supplier may exclude up to 100 percent of process water use from its gross water use if any one of the following criteria is met in its service area:

(a) Total industrial water use is equal to or greater than 12 percent of gross water use.

(b) Total industrial water use is equal to or greater than 15 gallons per capita per day.

(c) Non-industrial water use is equal to or less than 120 gallons per capita per day if the water supplier has self-certified the sufficiency of its water conservation program with DWR under the provisions of Section 10631.5 of the CWC.

(d) The population within the supplier's service area meets the criteria for a disadvantaged community.

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[10] These exclusions are specified in the emergency regulation for industrial process water, which will expire in June 2011. DWR is currently working on having a permanent regulation in place before the expiration of the emergency regulation. The permanent regulation is not expected to differ substantially from the emergency regulation. However, agencies are strongly encouraged to check the Web page for the process water regulations for the full language of the regulation, all accompanying documents, and progress of these regulatory actions: http://www.water.ca.gov/wateruseefficiency/sb7/committees/urban/u5/.

Step 1G: Determine Annual Daily Per Capita Water Use

Using Table 4 of Technical Methodology 3, calculate the daily per capita water use for each base period year. Units are to be in GPCD.

Step 1H: Determine Base Daily Per Capita Water Use

Using Technical Methodology 3, calculate the base daily per capita water use for the entire base period by averaging the annual daily per capita water use values identified in Step 1G. Units are to be in GPCD.

Step 1I: Base Daily Per Capita Water Use

The base daily per capita water use value determined in Step 1H becomes the water supplier's base daily per capita water use value. It will be used in subsequent steps for identifying future water targets and estimating progress towards reducing per capita water use identified in the Water Conservation Bill of 2009.

Step 2: Determine Urban Water Use Target

The water supplier has four different methods to be considered for determining the urban water use target. Methods 1 through 3 were established by the Legislature in the Water Conservation Bill of 2009. Urban Water Use Target Method 4 (Method 4) subsequently was prepared by DWR and an advisory committee according to the requirements provided in the CWC (§10608.20(b)(4)). The four methods are:

- Method 1: 80% of Base Daily Per Capita Water Use (Step 2B1)
- Method 2: Performance Standards (Step 2B2)
- Method 3: 95% of Regional Target (Step 2B3)
- Method 4: Water Savings (provisional)[11] (Step 2B4)

Three technical methodologies have been developed to support a water supplier in determining its urban water use target, if Method 2 is used. These are:

- Technical Methodology 5: Indoor Residential Use
- Technical Methodology 6: Landscaped Area Water Use
- Technical Methodology 7: Baseline Commercial, Industrial, and Institutional Water Use

Method 4 was developed after the release of the Water Conservation Bill of 2009 Technical Methodologies (see Section M). Its development and application are presented in detail within Appendix D of Section M.

[11] Method 4: Water Savings is considered provisional because it will be updated in 2014, as required by CWC 10608.20(d).

Step 2A: Decision — Method Determination

Step 2A is the decision point a water supplier uses to identify which of these four methods it will use to determine the urban water use target.

Step 2B: Urban Water Use Target Methods

Step 2B1: Method 1 — 80% of Base Daily Per Capita Water Use. Method 1 has one step (Step 2B1a). Calculate 80 percent of the base daily per capita water use.

Step 2B2: Method 2 — Performance Standards. Method 2 consists of a series of 4 steps and uses actual water use data and estimates from the water supplier.

- Step 2B2a. Using Methodology 5, apply indoor residential water use.
- Step 2B2b. Using Methodology 6, determine the landscaped area.
- Step 2B2c. Using Methodology 7, determine the commercial, industrial, and institutional water use.
- Step 2B2d. Sum the results of Steps 2B2a, 2B2b, and 2B2c.

Figure F-1 in Part II, Section F, shows the hydrologic regions and goals for 2020.

Online tools are available at the UWMP Web page to help water suppliers identify the hydrologic basin(s) in which their district occurs.

Step 2B3: Method 3 — 95% of Regional Target. Method 3 consists of 2 steps.

- Step 2B3a. Identify the hydrologic region within which the water district occurs. Identify the 20x2020 target for the hydrologic region, shown in Figure F-1, in Section F. Online tools are available at http://www.water.ca.gov/urbanwatermanagement/technicalassistance/ to help water suppliers identify their hydrologic basin. If the water supplier's service area is within more than one hydrologic region, then proportionally calculate an intermediate 20x2020 target using the proportion that lies within each hydrologic region.
- Step 2B3b. Calculate 95% of the target for the hydrologic region (Figure D-3).

Step 2B4: Method 4 — Savings by Water Sector. This method identifies water savings obtained through identified practices and subtracts them from the base daily per capita water use value identified for the water supplier. This method is accomplished in 5 steps.

- Step 2B4a. Determine the indoor residential use savings.
- Step 2B4b. Determine the CII savings.
- Step 2B4c. Determine the landscape and water loss savings.
- Step 2B4d. Sum the results of Steps 2B4a, 2B4b, and 2B4c.
- Step 2B4e. Subtract the total savings from the water supplier's base daily per capita water use value.

Step 2C: Urban Water Use Target

The urban water use target value determined using one of the four identified methods will be used in Step 3 to confirm the urban water use target.

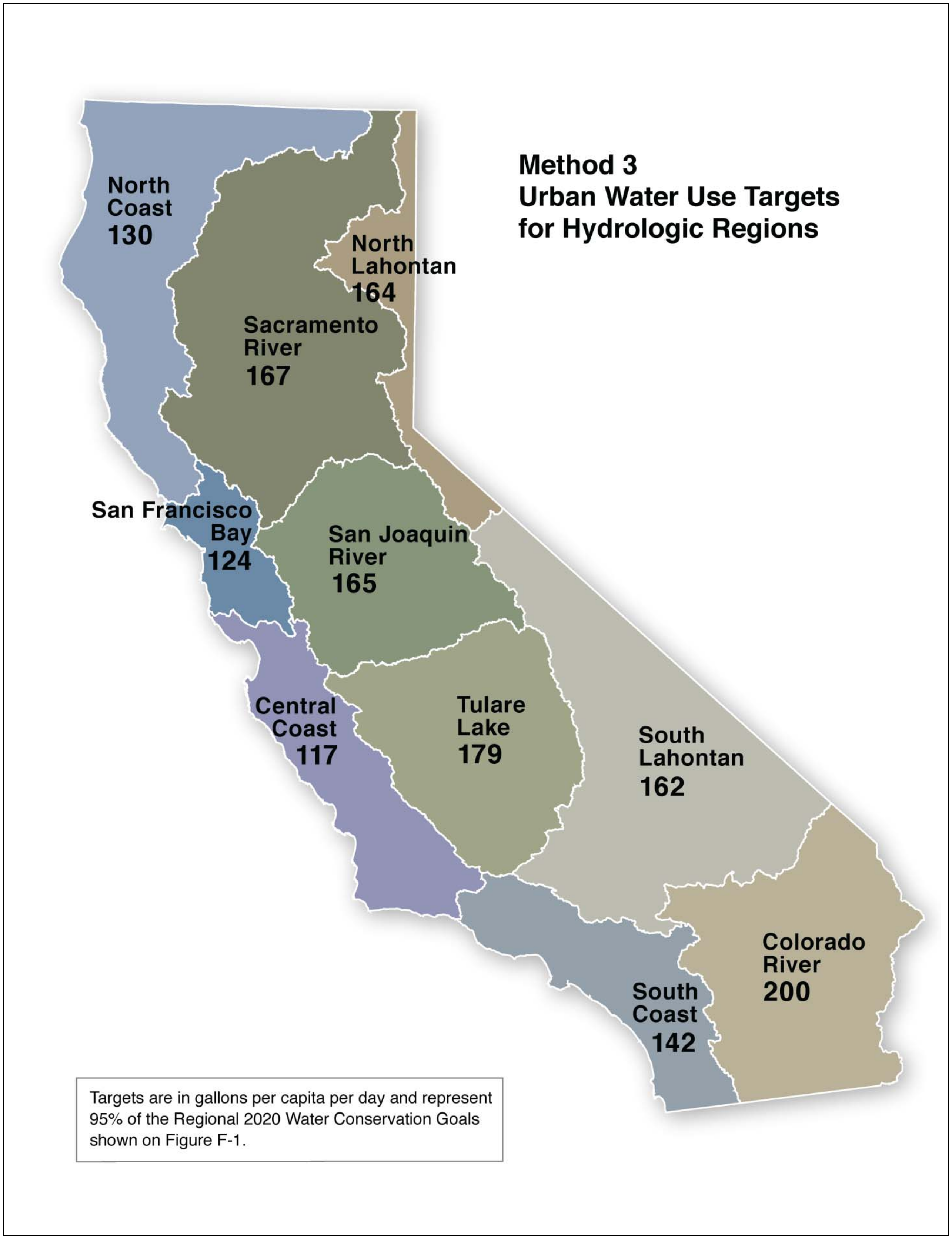

Figure D-3 Method 3 urban water use targets for hydrologic regions

Step 3: Confirm Urban Water Use Target

Step 3 confirms the water supplier's urban water use target determined in Step 2. It compares the urban water use target determined in Step 2 to a 5-year base daily per capita water use value to confirm that the urban water use target has met a minimum reduction established by statute. Adjustments are made, if necessary, so that the threshold is met.

Step 3A: Identify the 5-Year Base Period

CWC Section 10608.22 indicates that calculation of a base daily per capita water use determined by using a 5-year base period will be used to confirm that the urban water use target meets a minimum threshold. The 5-year continuous base period is to end no earlier than December 31, 2007, and no later than December 31, 2010.

Step 3B: Estimate Distribution System Area

This step is the same as Step 1D.

The service area identifies the physical extent for which both the population and gross water use will be determined, and then ultimately the base daily per capita water use. For the purposes of implementing this legislation, the service area is equivalent to a water supplier's distribution system.

Using Step 2 of Methodology 1 (Gross Water Use), delineate the distribution system boundary for each of the base period years. A map is to be included in the UWMP that shows the Distribution System Boundary and any changes that occurred in the boundary during the base period. This map may be a single page using shading or various line types to show system area changes over the identified base period.

Step 3C: Estimate Service Area Population

This step is the same as Step 1E.

Using Methodology 2 (Service Area Population), determine the service area population for each year of the baseline periods by using the estimates for the Distribution System Boundary during each of the years in the base period.

Step 3D: Calculate Gross Water Use

This step is the same as Step 1F.

Using Steps 3 through 12 of Methodology 1 (Gross Water Use), complete the process for calculating gross water use. Steps 3 through 12 are to be performed for each of the base period years.

Step 3E: Determine Annual Daily Per Capita Water Use

This step is the same as Step 1G.

Using Table 4 of Technical Methodology 3, calculate the daily per capita water use for each base period year. Units are to be in GPCD.

Step 3F: Determine 5-Year Base Daily Per Capita Water Use

This step is the same as Step 1H.

Using Technical Methodology 3, calculate the base daily per capita water use for the entire base period by averaging the annual daily per capita water use values identified in Step 1G. Units are to be in GPCD.

Step 3G: Determine 5-Year Base Daily Per Capita Water Use

The 5-year base daily per capita water use value identified in Step 5F will be used in the next series of steps to assess that the urban water use target determined in Step 2 meets minimum thresholds.

Step 3H: Decision — 5-Year Base Daily Per Capita Water Use

Is the 5-year base daily per capita water use value from Step 3G less than or equal to 100 GPCD? If so, proceed to Step 3Ka. If not, proceed to Step 3I.

Step 3I: Calculate 95% of 5-Year Base Daily Per Capita Water Use

Calculate 95% of 5-Year Base Daily Per Capita Water Use value determined in Step 3G.

Step 3J: Decision — Compare 5-Year Base Daily Per Capita Water Use and Urban Water Use Target

Determine whether the urban water use target is greater than 95 percent of the 5-year base daily per capita water use value determined in Step 3G. If yes, proceed to Step 3Kb. If no, proceed to Step 3Ka.

Steps 3Ka and Kb: Urban Water Use Target Adjustments

This step assesses the urban water use target and determines if additional adjustments are needed to the urban water use target.

Step 3Ka: No Adjustments

No adjustments to the urban water use target are needed.

Step 3Kb: Adjust Urban Water Use Target

If the urban water use target is greater than 95 percent of the 5-Year base daily per capita water use value determined in Step 3G, then the urban water use target is adjusted to be 95 percent of the 5-year base daily per capita water use value determined in Step 3G.

Step 3L: Urban Water Use Target

The value of the urban water use target confirmed in Steps 3Ka and 3Kb are established as the water supplier's urban water use target.

Step 4: Determine Interim Urban Water Use Target

Step 4A: Determine Interim Urban Water Use Target

To determine the interim urban water use target—the water use goal each water supplier is to achieve and report in the 2015 UWMP—add the base daily per capita water use to the urban water use target. Then divide by 2.

Step 4B: Interim Urban Water Use Target

The value of the interim urban water use target established in Step 4A is water supplier's interim urban water use target.

Section E: Demand Measurement Measures and Best Management Practices

DMMs are specific actions a water supplier takes to support its water conservation efforts. Specifically, the UWMP Act identifies 14 DMMs (CWC 10631(f)) that are to be evaluated in each UWMP. The 14 DMMs are:

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

These 14 DMMs correspond to the 14 BMPs listed and described in the CUWCC MOU that signatory water suppliers commit to implement as part of their urban water conservation programs. These 14 DMMs also correspond to the DMMs identified in DMM Implementation Compliance (AB 1420). DWR has consulted with the CUWCC and appropriate funding agencies and determined that DMMs will be equated with the BMPs as described in the CUWCC MOU for loan and grant funding eligibility purposes. Therefore, for the UWMP process, DMMs, and BMPs are referred to interchangeably as DMMs/BMPs.

DMMs and BMPs

The CUWCC has restructured the organization of its BMPs to group them according to type. Although the BMP names and organization have been modified, they still correlate to the DMMs identified in the UWMP Act. Table E-1 correlates the DMM names and the CUWCC BMP names and reorganization.

Table E-1 Demand management measures and California Urban Water Conservation Council BMP names

CUWCC BMP Organization and Names (2009 MOU)				**UWMP DMMs**	
Type	Category	BMP #	BMP name	DMM #	DMM name
Foundational	Operations Practices	1.1.1	Conservation Coordinator	L	Water conservation coordinator
		1.1.2	Water Waste Prevention	M	Water waste prohibition
		1.1.3	Wholesale Agency Assistance Programs	J	Wholesale agency programs
		1.2	Water Loss Control	C	System water audits, leak detection, and repair
		1.3	Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections	D	Metering with commodity rates for all new connections and retrofit of existing connections
		1.4	Retail Conservation Pricing	K	Conservation pricing
	Education Programs	2.1	Public Information Programs	G	Public information programs
		2.2	School Education Programs	H	School education programs
Programmatic	Residential	3.1	Residential assistance program	A	Water survey programs for single-family residential and multifamily residential customers[1]
				B	Residential plumbing retrofit
		3.2	Landscape water survey	A	Water survey programs for single-family residential and multifamily residential customers[1]
		3.3	High-Efficiency Clothes Washing Machine Financial Incentive Programs	F	High-efficiency washing machine rebate programs
		3.4	WaterSense Specification (WSS) toilets	N	Residential ultra-low-flush toilet replacement programs
	Commercial, Industrial, and Institutional	4	Commercial, Industrial, and Institutional	I	Conservation programs for commercial, industrial, and institutional accounts
	Landscape	5	Landscape	E	Large landscape conservation programs and incentives

[1] Components of DMM A (Water survey programs for single-family residential and multifamily residential customers) applies to both BMP 3.1 (Residential assistance program) and BMP 3.2 (Landscape water survey)

Documenting DMM Implementation

An urban water supplier's UWMP is to document its DMM implementation by either:

- Providing the required information for each DMM
- Submitting a copy of its 2009-2010 approved CUWCC BMP report, if the supplier is a signatory to the CUWCC MOU

An AB 1420 report submitted to DWR and determined by DWR to be eligible to receive funding, may have been prepared by an urban water supplier to document eligibility for grant and loan funding. However, this process does not fulfill all of the UWMP requirements. An urban water supplier may use the AB 1420 report as a part of its DMM reporting, but it must also provide:

- Descriptions of the specific actions the urban water supplier is taking to comply with the UWMP DMM requirements
- Additional economic documentation for any DMM the urban water supplier is not implementing

The UWMP Act clearly states that "all" DMMs are to be discussed (10631(f)); therefore, it is recommended that information on each DMM be presented, regardless of its implementation or potential for implementation. The DMM information a water supplier is to include, which depends upon the state of DMM implementation, is discussed further below.

DWR DMM Evaluation

The UWMP Act empowers DWR to determine whether the urban water supplier is implementing the identified DMMs. The UWMP Act in 10631.5(b)(2)(A) states:

". . . the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following: (i) Compliance on an individual basis [or] (ii) Compliance on a regional basis . . ."

In addition, 106351(e) states:

"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. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit annual reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures."

Therefore, in the 2010 UWMPs, DWR will be assessing how a water supplier is addressing each DMM and consulting with the CUWCC, when necessary, for BMP information regarding MOU signatories.

DWR will use the DMM review sheet (Part II, Section J) to assess each water supplier's compliance with the DMM requirements. The DMM review sheet is not included in DOST.

UWMP DMM Requirements

The UWMP Act identifies different information to be provided for DMMs "implemented, or schedule for implementation" and "not currently being implemented or scheduled for implementation."

DMMs Implemented and Scheduled for Implementation

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

- The year the DMM was implemented or is scheduled for implementation
- A comprehensive description of the DMM (see below)
- A description of the steps necessary to implement the measure (see below)
- An implementation schedule
- A description of the methods used to evaluate the effectiveness of the DMM
- Estimates, if available, of conservation savings and the effect of the savings on the suppliers' ability to further reduce demand

Each of these points is to be addressed for each DMM. If it is not applicable or information is not available, then provide the explanatory text.

A comprehensive description of the DMM may include:

- Components of the survey or activity
- Information or devices provided to customers
- Description of program venues
- Rebates or financial assistance provided
- Responsibilities of staff and activities performed
- Local ordinances that assist the agency with performing the DMM
- Follow-up with customers and results of follow-up

A description of steps necessary to implement the measure may include:

- Marketing strategy for customer enrollment
- Tracking of participation and results of participation
- Schedule strategy

The descriptions for the methods to evaluate DMM effectiveness may be the same for multiple implemented DMMs. This information can be provided in one paragraph with the corresponding DMMs listed. If the effectiveness is not evaluated, provide an explanation of it is not.

The descriptions for the estimate of conservation savings may be the same for multiple implemented DMMs. This information can be provided in one paragraph with the corresponding DMMs listed. If no estimates are available, provide an explanation of why they are not.

DMMs Not Implemented or Scheduled for Implementation

An evaluation of any DMM not implemented or scheduled for implementation within the next five years is to be included in the UWMP (CWC 10631(g)). The evaluation is to include:

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

The cost/benefit evaluation information used in the UWMP should provide the appropriate documentation in its benefit/cost analysis to avoid delay of any funding eligibility.

To be eligible for a water management grant or loan, a water supplier can either:

- Document that a DMM is not locally cost effective (CWC 10631.5(a)(4)) or
- Provide a schedule, financing plan, and budget for the implementation of the DMM (CWC 10631.5(a)(3)).

If a DMM is submitted as “not locally cost effective”—the present value of the local benefits of implementing a DMM is less than the present value of the local costs of implementing that measure—DWR will determine whether the documentation submitted demonstrates this requirement. If the documentation fails to demonstrate that a DMM is not locally cost effective, DWR will notify the water supplier within 120 days.

CUWCC BMP Annual Reports

CUWCC members have the option of submitting their 2009–2010 BMP annual reports in lieu of describing the DMMs in their UWMP if the supplier is in full compliance with the CUWCC’s Memorandum of Understanding Regarding Urban

Water Conservation in California (the CUWCC MOU). The submitted reports should have documentation from the CUWCC that supplier is in full compliance with the MOU. If the new CUWCC database is not completed or ready for use at the time a supplier is to release its plan for public review, the supplier can self-certify its full compliance with the MOU. For this purpose, a supplier will self-certify full compliance by supplying all the data required for documenting BMP, Flex Track Menu, or gallons per capita per day (GPCD) consumptions implementation. The supplier will also include documentation that coverage level for each BMP or equivalent program has been met. This documentation is to be included as part of the plan when it is released for public review and as adopted by the board.

USBR-MP Annual Water Management Plans

United States Bureau of Reclamation – Mid-Pacific Region (USBR-MP) annual water management plans cannot be submitted for DMM documentation.

DMM Compliance (AB 1420)

Part II, Section F, covers related programs.

Any urban water supplier that applies for grant or loan funds is eligible to comply with AB 1420. Compliance with AB 1420 is discussed in Part II, Section F: Related Programs.

Briefly, if an urban water supplier has obtained a determination of “compliant” from DWR, it means that the urban water supplier has met one of the following four criteria:

- Has, in the past, implemented all BMPs at a coverage level determined by the CUWCC MOU; or
- Is currently implementing all BMPs at a coverage level determined by the CUWCC MOU; or
- Has submitted a schedule, budget, and finance plan to implement all BMPs at a coverage level determined by CUWCC and commencing within the first year of the agreement for which grant funds are requested; or
- Has demonstrated by providing supporting documentation that certain BMPs are “not locally cost effective.”

State Water Board — Funding

Applicants for loan or grant funding from the State Water Board from the Clean Water State Revolving Fund (CWSRF) or the Water Recycling Funding Program must adopt a water conservation program. State Water Board applicants for grants and loans may submit an adopted UWMP instead of a water conservation program.

If an applicant for funding from the Water Recycling Funding Program is an urban water supplier subject to the UWMP Act, it must document that it has prepared and adopted a complete UWMP before a funding agreement can be executed.

The State Water Board determines eligibility either by referring to DWR's evaluation of DMM implementation or a water supplier's membership in the CUWCC. If a water supplier is not a CUWCC member, it is to provide in its UWMP detailed descriptions of its DMM activities or provide discussion and justification for each DMM not implemented or scheduled for implementation. Additional information regarding this eligibility requirement can be found at the State Water Board's Web site: http://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/docs/policy0309/policy09update_appf_h2ocons.pdf

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Section F: Related Programs

The UWMP process is intended to be consistent with and support other local, regional, and statewide water management processes. These include:

- California Water Plan
- Integrated Regional Water Management Plans (IRWMP, SB 1672)
- 20x2020 Water Conservation Plan
- City and County General Plans
- Water Conservation Bill of 2009 (SBX7-7)
- Water Supply Assessments (SB 610)
- Written Verifications of Water Supply (SB 221)
- Water Meters (AB 2572)
- Model Water Efficient Landscape Ordinance (AB 1881)
- and Cal Green
- DMM Implementation Compliance (AB 1420)
- CUWCC BMP

It is recommended, but not required, that the methodologies used to develop numbers and estimates common to these other planning and reporting efforts be consistent with those included in UWMPs. This enables stronger planning at the local, regional, and statewide levels and helps identify goals and track progress toward attaining them.

Brief summaries and the relationship to UWMPs are provided below.

California Water Plan Update

The California Water Plan Update provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California’s water future. The water plan, which was updated in 2009 and will be updated again in 2013, presents data and information on California’s water resources including water supply evaluations and assessments of agricultural, urban, and environmental water uses. The water plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the state’s water needs.

When the California Water Plan is updated, extensive data review of water conditions, water use, and water supplies occurs. Water conservation, water recycling, and desalination are important resources that are considered. Through UWMPs, water suppliers report their water use and supplies. With the submittal of the 2010 UWMPs, the creation of a comprehensive database will be available to support California Water Plan Update 2013.

Integrated Regional Water Management Plans

IRWM elements that may be part of a UWMP are addressed in Part II, Section C.

Since the Legislature passed the Integrated Regional Water Management Planning Act in 2000 (CWC §10530 et seq., added by Stats. 2002, c. 767), IRWM plans have been developed throughout the state. This process is working toward a more integrated approach to water management planning by providing the framework for local agencies to cooperatively manage available local and imported water supplies and improve water supply quality, quantity, and reliability. Many of these IRWM elements (CWC §10540 et seq.) are also part of a UWMP and can be addressed cooperatively during the UWMP process, if certain criteria are met. These will be discussed later in Part II, Section C: Regional Water Planning.

20x2020 Water Conservation Plan

As part of the plan for improving the Sacramento-San Joaquin Delta, Governor Schwarzenegger in February 2008 directed State water agencies to develop a plan to reduce statewide per capita urban water use 20 percent by the year 2020. This directive is described in the 20x2020 Water Conservation Plan (DWR and others 2010). Elements of this plan were included in the Water Conservation Bill of 2009.

The Water Conservation Plan proposed the Interim 2010 Statewide Target of 173 GPCD and the Final 2020 Statewide Target of 154 GPCD. In addition, interim and final targets are established for each of the state’s 10 hydrologic regions based on population, climate, and water use. The hydrologic region targets were incorporated into the Water Conservation Bill of 2009. Current water use and conservation targets vary among the regions due to many factors, such as land use patterns (lot sizes, square footage of irrigated landscape), the age and condition of the water distribution infrastructure (water losses), and industrial and socioeconomic characteristics (the cost of water and income level of residents). Interim and final targets for each hydrologic region are shown in Figure F-1.

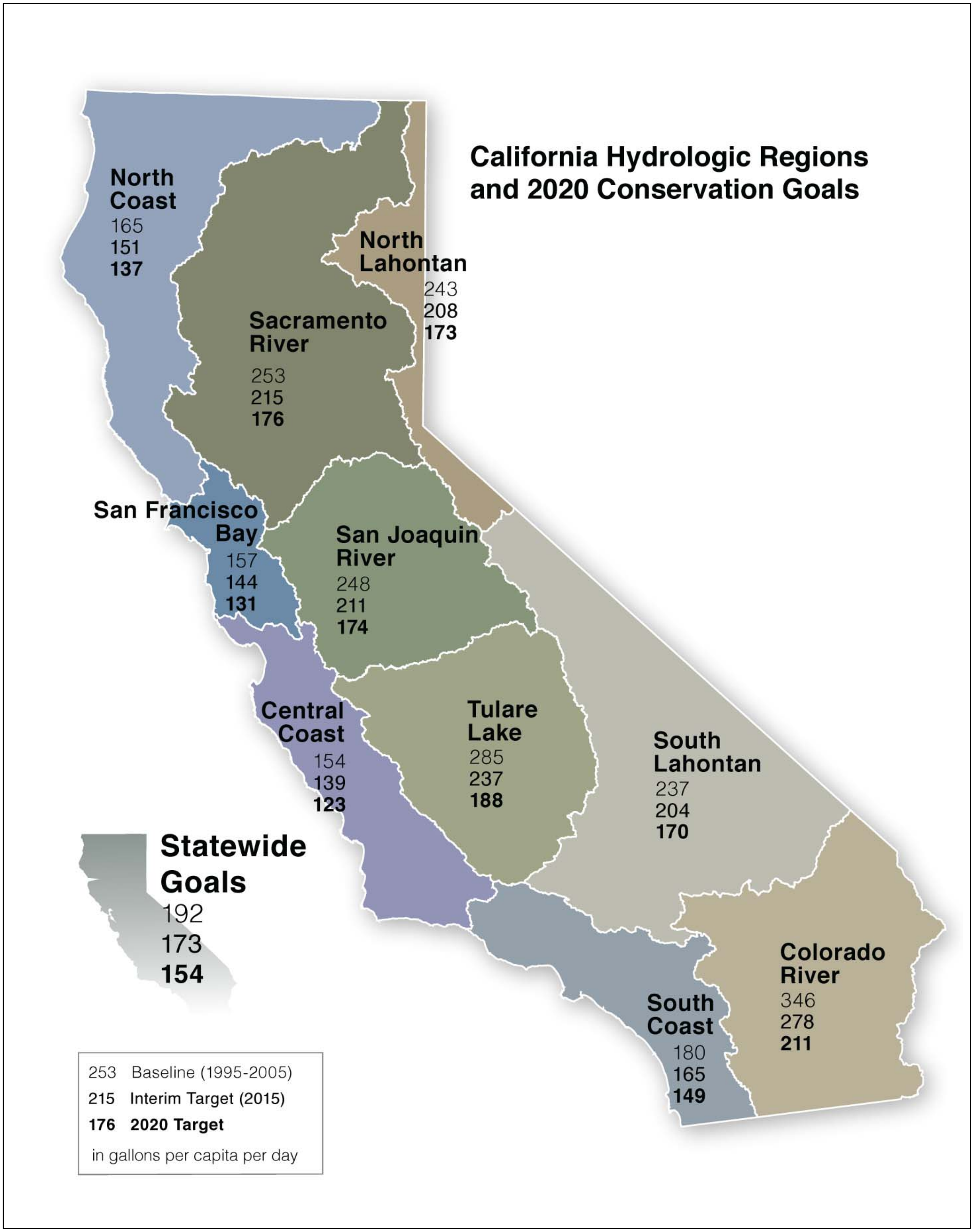

Figure F-1 California hydrologic regions and 2020 water conservation goals

City and County General Plans

General plans and UWMPs have a strong link. In support of the process to develop and update the two types of documents, there is frequently an iterative process by which water suppliers and planning agencies coordinate between planned development and water supply availability to support each process.

The UWMP planning process requires that a water supplier consider existing and planned water demands within the 20-year planning horizon. This includes water demands for projects identified in a general plan that occur within a water supplier's service area.

Water suppliers are often not the governmental agencies directly responsible for development of general plans, but a UWMP may be considered a supporting document for general plan development. In addition, under the California Environmental Quality Act (CEQA), a water supplier may be able to act as a responsible agency by reviewing land use plans or development proposals for determining whether the supplier has the ability to meet the planned water needs.

Water Conservation Bill of 2009 (SBX7-7)

The Water Conservation Bill of 2009 (SBX7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Bill of 2009 provides the regulatory framework to support the statewide reduction in urban per capita water use described in the 20x2020 Water Conservation Plan (DWR and others 2010). It also addresses agricultural water and commercial, industrial, and institutional (CII) water use.

Part II, Section D, describes the approach for determining baseline and target information.
Part II, Section B, describes changes in UWMP requirements since 2005.

Before California can achieve the Final 2020 Statewide Target of 154 GPCD, each water supplier must determine and report its existing baseline water consumption and establish either its own or cooperative targets. This reporting is to begin with the 2010 UWMP, which is required by the Water Conservation Bill of 2009. The specific steps each water supplier is to take for these analyses are presented in Part II, Section D: Baseline and Target Determination.

As described in Section B: Changes in Urban Water Management Plan Requirements Since 2005, SBX7-7 describes what is required of water suppliers to identify their water conservation targets and track their progress toward achieving those targets. It also requires that water suppliers document and report targets and progress in UWMPs (CWC §10608.20(e)).

Water Supply Assessments (SB 610 of 2001) and Written Verifications of Water Supply (SB 221 of 2001)

Water Supply Assessments (SB 610, CWC §10613 et seq., added by Stats. 2001, chapter 643) and Written Verifications of Water Supply (SB 221, CWC §66473.7, added by Stats. 2001, chapter 642) require urban water suppliers and cities and counties to coordinate local water supply availability and land use decisions to improve the link between information on water supply availability and certain land use decisions made by cities and counties. Both statutes were effective January 1, 2002, and require that detailed information regarding water availability be provided to the city and county decision-makers prior to approval of specified large development projects. Both SB 221 and SB 610 are project specific and apply to:

- Residential developments of more than 500 units,
- "Projects" as defined by SB 610 Projects that would increase the number of the public water system's existing service connections by 10 percent.

These laws are intended to ensure that a water supply to serve a project or new large subdivision is established before construction begins.

SB 610 requires that detailed information be included in a WSA, which is then included in the administrative record that serves as the evidentiary basis for an approval action by the city or county. SB 221 requires that the detailed information be included in a VWS. Because the requirements of the laws are data intensive and suppliers must provide the detailed information within a 90-day time frame, water suppliers can take advantage of a provision that allows them to use their UWMP as a foundational document for the WSA and VWS.

SB 610 and SB 221 are companion measures which seek to promote more collaborative planning between local water suppliers and cities and counties. Both statutes:

- Require detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of specified large development projects.
- Require this detailed information be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects.
- Recognize local control and decision making regarding the availability of water for projects and the approval of projects.
- Apply to a 500 unit residential development OR a project that would increase the number of the public water system's existing service connections by 10 percent.

Under SB 610, water assessments must be furnished to local governments for inclusion in any environmental documentation for certain projects (as defined in Water Code 10912 [a]) subject to CEQA. Under SB 221, approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply. The water supply reliability information required under SB 610 and SB 221 apply to both rapidly growing areas and those with stable populations or slow growth rate and/or not much commercial development.

If coordinated and comprehensive water supply planning is under way at the time that the SB 610 water assessment is prepared, compliance with SB 221 will be greatly facilitated. SB 221 is intended as a "fail safe" mechanism to ensure that collaboration on finding the needed water supplies to serve a new large subdivision occurs when it should—before construction begins.

Not every project that is subject to the requirements of SB 610 would also require the mandatory water verification of SB 221 (e.g., when there is no subdivision map approval). Conversely, not every project that is subject to the requirements of SB 221 would also require the environmental document to contain an SB 610 water supply assessment (WSA). Projects approved before January 1, 2002, were not subject to the requirements of SB 610 or SB 221; however, some projects may have been subject to the requirement to prepare a WSA as set forth in SB 901 of 1995 (Chapter 881, Statues of 1995).

A foundational document for compliance with both SB 610 and SB 221 is the UWMP. Both of these statutes repeatedly identify the UWMP as a planning document that, if properly prepared, can be used by a water supplier to meet the standards set forth in both statutes. Thorough UWMPs will allow water suppliers to use UWMPs as a foundation to fulfill the specific requirements of these two statutes. Cities, counties, water districts, property owners, and developers will all be able to utilize this document when planning for and proposing new projects.

UWMPs, SB 610, and SB 221 require water supply reliability information be provided in 5-year increments over a 20-year future planning horizon. The water supply reliability information in the UWMP can be used to help meet the SB 610 or SB 221 requirement if one of the following conditions is met:

- If the projected water demand associated with the proposed project was accounted for in the most recently adopted UWMP, the public water system may incorporate the requested information from the UWMP in preparing the elements of the assessment (CWC §10910(c)(2)); and
- The current UWMP provides at least 25 years of water supply reliability information and, therefore contains the required 20 years of information for a WSA or VWS.

Because of this second option, many suppliers have opted to develop their UWMPs with a 25- or 30-year planning horizon so the UWMP can be used to support the water supply reliability requirements of WSAs or VWSs. If a water supplier chooses to expand the period of time considered in its UWMP to support WSA and VWS compliance, then it only has to add the additional information to tables and text within its UWMP.

DWR's "Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001" is available at the DWR Water Use and Efficiency Branch website at: http://www.water.ca.gov/pubs/use/sb_610_sb_221_guidebook/guidebook.pdf.

Additional information about SB 610 and SB 221 is available at: http://www.water.ca.gov/urbanwatermanagement/SB610_SB221/.

Water Meters (AB 2572 of 2004)

CWC §529.5 requires that on or after January 1, 2010, any urban water supplier applying for State grant funds for wastewater treatment projects, water use efficiency projects, drinking water treatment projects, or for a permit for a new or expanded water supply, must demonstrate that it meets the water meter requirements in CWC §525 et seq.

Model Water Efficient Landscape Ordinance (AB 1881) and Cal Green

The Water Conservation in Landscaping Act of 2006 (Assembly Bill 1881, Laird) requires cities, counties, and charter cities and charter counties, to have adopted landscape water conservation ordinances by January 1, 2010. Pursuant to this law (CWC §490 et seq.), DWR has prepared a Model Water Efficient Landscape Ordinance (Model Ordinance) for use by local agencies. The Model Ordinance was approved by the Office of Administrative Law and became effective on September 10, 2009.

Effective January 1, 2010 local agency was to have either adopted the state Model Ordinance or crafted an ordinance to fit local conditions. Local agencies had the option of responding independently to the requirement or working collaboratively with one or more local agencies to develop and adopt a broader regional ordinance. If a local or regional ordinance was adopted, the only requirement was that it must be as effective as the Model Ordinance in conserving water.

Water efficient landscape ordinances will help agencies meet urban water management goals by limiting the water use per acre to a prescribed water budget. The Model Ordinance water budget is based on an evapotranspiration adjustment factor of 0.7, which allows a site-wide water budget of 70 percent of local evapotranspiration. The CUWCC BMP 5, Large Landscape Water Conservation, currently allows for a water budget based on an Evapotranspiration Adjustment Factor of 1.0. If new and rehabilitated landscapes adhere to the provisions of the Model Ordinance, the expected urban water needs can be lower than that expected under adherence to BMP 5.

The plant factor used in the water budget calculation assumes a plants ratio of 1/3 high water-use plants, to 1/3 moderate water-use plants, to 1/3 low-water use plants. By voluntarily increasing the percentage of low-water use plants, even more water savings can be realized. The local agencies of a region can take further action and require the selection of plants that require little supplemental irrigation as part of a water shortage contingency plan.

The Model Ordinance applies to non-residential and developer installed residential landscaping where the landscape area is at least 2500 Square feet. The Model Ordinance also applies to homeowner provided residential landscaping, where the landscape area is 5000 square feet or more.

As of August 1, 2010, approximately 311 local agencies have responded and notified DWR that they have adopted a water efficient landscape ordinance. Of those, 173 local ordinances have been adopted by local agencies and each of the local agencies have determined that the local ordinance is at least as effective as the State Model. Forty-eight agencies have adopted the State Model Ordinance and ninety have adopted the State Model in the interim as they develop a local ordinance to be adopted at a later date.

An additional landscape regulation passed since the Model Landscape Ordinance reinforces, and in some cases extends, the goal of water use efficiency in urban landscapes by addressing irrigation of smaller residential lots. The code is referred to as “Cal Green” and is an update to the California Green Building code jointly developed by the California Building Standards Commission and the Department of Housing and Community Development. Cal Green takes effect in January 2011. In single family residential landscapes of any size, it requires the use of irrigation controllers with weather-based or soil moisture sensor based technology and rain sensor technology. Non-residential landscapes use the provisions of the Model Ordinance as a baseline with voluntary tiers to achieve higher water savings to capture landscape projects that are not reviewed by the local land use authority. In addition, submeters are required for non-residential landscaped areas between 1,000 and 5,000 square feet, which exceeds current Water Code (CWC Code §535), which requires dedicated water submeters on new water service of non-residential properties with a landscape area of 5000 square feet or more.

Demand Management Measures Implementation Compliance (AB 1420 of 2007)

AB 1420 (Laird, Stats. 2007, ch. 628) amended the UWMP Act, (CWC §10610 et seq.). Effective January 1, 2009, AB 1420 requires that the terms of, and eligibility for, any water management grant or loan made to an urban water supplier and awarded or administered by DWR, State Water State Water Board, or California Bay-Delta Authority (CBDA) or its successor agency, be conditioned on the implementation of the water demand management measures (DMMs) described in CWC Section 10631(f). These DMMs correspond to the 14 BMPs listed and described in the CUWCC MOU. Based on this, DWR has consulted with the CUWCC and appropriate funding agencies, and determined that it will equate the DMMs with the BMPs described in the CUWCC MOU for loan and grant funding eligibility purposes.

AB 1420 focuses on documenting an urban water suppliers' eligibility for grants and loans, whether or not the supplier is a member of the CUWCC. It provides the mechanism by which a water supplier can record compliance with each of the 14 DMMs identified in the UWMP Act and, by extension, document eligibility. Water management grants and loans include programs and projects include those for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability and water supply augmentation. This funding includes, but is not limited to, funds made available pursuant to Public Resources Code Section 75026 (Integrated Regional Water Management Program).

AB 1420 requires:

- DWR, State Water Board, and CBDA to condition water management grants or loans made to an urban water supplier on the implementation of the DMMs (as noted above, the DMMs correspond to the BMPs described in the CUWCC MOU).
- DWR, in consultation with the State Water Board and the CBDA, to develop eligibility requirements that consider the CUWCCs BMPs.
- DWR to exercise its discretionary authority to determine whether an urban water supplier is eligible for a water management grant or loan.

Urban water suppliers may be eligible for a water management grant or loan if they demonstrate that they are implementing or scheduling the implementation of BMPs, as follows:

- The urban water supplier is currently implementing all BMPs at coverage requirement determined by the CUWCC MOU; or
- The urban water supplier has submitted a schedule, budget, and finance plan commencing within the first year of the agreement for which grant funds are requested to implement all BMPs at the coverage requirement determined by the CUWCC MOU; or
- The urban water supplier has demonstrated by providing supporting documentation that certain BMPs are "not locally cost effective." "Not locally cost effective" means that the present value of the local benefits of implementing a BMP is less than the present value of the local costs of implementing that BMP.

Past, current, and near future implementation of each BMP must together demonstrate that the urban water supplier is implementing BMPs at the coverage requirement determined by the CUWCC MOU.

AB 1420 allows for the implementation of alternative conservation approaches. For the purpose of loan and grant program this includes CUWCC Flex Track BMPs and/or other alternative conservation approaches. If an urban water supplier chooses to implement alternative conservation approaches, they must provide equal or greater water savings than the established BMPs.

Failure to implement BMPs and/or alternative conservation approaches may cause the Funding Agency, at its sole discretion, to halt disbursement of grant or loan funds, not pay any pending invoices, and pursue any other applicable legal remedy.

AB 1420 Submittals

Urban water suppliers must demonstrate that they are implementing all BMPs at the coverage requirement determined by the CUWCC MOU by completing AB 1420 Self-Certification Statement Table 1[12]. Table 1 provides an update of past and current BMP implementation, to demonstrate whether suppliers are implementing BMPs at the coverage requirement determined by the CUWCC MOU.

If urban water suppliers are not implementing all BMPs at the coverage requirement required, they may be eligible to receive grant and loan funds by providing a schedule, budget, and finance plan to implement all BMPs at the coverage requirement determined by the CUWCC MOU by filling out Table 2[13].

By signing Table 1, the authorized representative certifies under penalty of perjury that all information and claims regarding compliance, implementation of the BMPs, and financing plans are true and accurate. Falsification or inaccuracies in Tables 1 and 2 and in any supporting documents may, at the discretion of the Funding Agency, result in loss of all grant or loan funds to the applicant. Additionally, the Funding Agency may take legal action to recover any disbursed funds and refer the matter to the Attorney General's Office.

Urban water suppliers must also submit hard copies of any reports that support or substantiate claims made on Tables 1 and 2. These reports include urban water management plans, and the most recent BMP reports to the CUWCC as part of the Urban MOU. If the urban water supplier is not a CUWCC member, any reports on BMP implementation and/or alternative conservation approaches must be submitted to DWR in the CUWCC report format.

Urban water suppliers must complete updated Tables 1 and 2 for each grant or loan program. Updated information must include any changes in the implementation schedule, financing, budget, and level of coverage. If there are no updates or changes to Tables 1 and 2, then there is no need to re-submit these tables.

Regional Compliance

Compliance on a regional basis requires participation in a regional conservation program consisting of two or more urban water suppliers that achieve the level of conservation or water efficiency savings equivalent to the amount of conservation or saving achieved if each of the participating urban water suppliers implemented the

[12] www.water.ca.gov/wateruseefficiency/docs/compliance-ab1420-table1.xls

[13] www.water.ca.gov/wateruseefficiency/docs/compliance-ab1420-table2.xls

water DMMs. The urban water supplier administering the regional program shall provide participating urban water suppliers and DWR with data to demonstrate that the regional program is consistent with this clause. DWR shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements (WCC 10631.5(b)(2)(A)(ii).

DWR Determination

AB 1420 requires that DWR make a determination and respond to the Funding Agency within 60 days of the request. Urban water suppliers that do not submit a completed Table 1 may not be eligible to receive grant or loan funds.

More information on AB 1420 can be found at: http://www.water.ca.gov/wateruseefficiency/docs/compliance-ab1420.pdf.

California Urban Water Conservation Council Best Management Practices

The CUWCC BMP MOU:

- Expedites implementation of reasonable water conservation measures in urban areas and
- Establishes assumptions for use in calculating estimates of reliable future water conservation savings resulting from proven and reasonable conservation measures.

The MOU was first prepared in 1991 and has been updated numerous times, most recently in June 2010. The MOU identifies 14 water conservation BMPs that a water supplier can document as being implemented or as planned to be implemented. Water suppliers provide this documentation to the CUWCC every 2 years.

DMMs are described in Part II, Section E.

The MOU has been signed by more than 200 water agencies, which have agreed to implement the BMPs. Signatories of the MOU may provide copies of the completed and approved annual reports in UWMPs to demonstrate compliance with the DMMs. This is described further in Part II, Section E: Demand Management Measures and Best Management Practices.

More information about the BMP MOU is available at the CUWCC website: http://www.cuwcc.org/bmps.aspx.

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Section G: Guidance on Climate Change for Urban Water Management Plans

California is addressing the causes and impacts of climate change in a number of different forums. The Global Warming Solutions Act of 2006 (AB 32) clearly identified climate change as a "serious threat to the economic well-being, public health, natural resources, and the environment of California". The California Air Resources Board completed the Climate Change Scoping Plan (2008) to support implementation of AB 32 and the California Natural Resources Agency issued the Climate Change Adaptation Strategy (2009) to identify how California will adapt to expected climate changes.

Climate change and/or greenhouse gas (GHG) emissions must now be considered in:

- City and county general plans
- CEQA documents
- IRWMPs

By considering potential future water supply impacts resulting from climate changes in its UWMP, a water supplier facilitates integration of its UWMP with these documents and supports water management functions. As a water supplier evaluates potential water supply impacts resulting directly or indirectly from climate change, consideration should be given not only to local changes but also to statewide changes that could affect the supplier and its water supplies. If a water supplier is a member of an IRWM Regional Water Management Group or Stakeholder Group, it may consider referring to the climate change objectives of the IRWMP effort in its UWMP.

Background information and suggestions of factors to consider are provided here to assist urban water suppliers in their efforts to mitigate their GHG emissions and prepare for expected climate changes. Urban water suppliers are strongly encouraged to review the following information and use it to assess the GHG impacts of DMM implementation and analyze the vulnerability of water supply and demand to the impacts of climate change.

In addition, DWR and its partner agencies are in the process of preparing a comprehensive IRWM climate change handbook which will provide additional information for conducting climate change and GHG analysis at the watershed planning scale. The handbook is expected to be released in 2011.

Background

In 2008, DWR released a climate change white paper that focused on the impacts of climate change on the water resources of the state (DWR 2008). The white paper states (page 3):

While the exact conditions of future climate change remain uncertain, there is no doubt about the changes that have already happened. Analysis of paleoclimatic data (such as tree-ring reconstructions of streamflow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California and the west, including a pattern of recurring and extended droughts. The average early spring snowpack in the Sierra Nevada decreased by about 10 percent during the last century, a loss of 1.5 million acre-feet of snowpack storage (one acre-foot of water is enough for one to two families for one year). During the same period, sea level rose seven inches along California's coast. California's temperature has risen 1˚ F, mostly at night and during the winter, with higher elevations experiencing the highest increase. A disturbing pattern has also emerged in flood patterns; peak natural flows have increased on many of the state's rivers during the last 50 years. At the other extreme, many Southern California cities have experienced their lowest recorded annual precipitation twice within the past decade. In a span of only two years, Los Angeles experienced both its driest and wettest years on record.

These changes are very likely to intensify within the 20-year UWMP planning horizon. Because of this, as well as the climate change requirements in IRWMPs and CEQA, DWR is presenting in this Guidebook climate change issues that water supplies are encouraged to consider as they prepare their 2010 UWMPs.

Water Supplier Considerations

Climate change brings the prospect of both model-predicted and unforeseen changes to the environment that may physically affect cities and water districts. These potential changes include a more variable climate with risks of extreme climate events more severe than those in the recent hydrologic record, sea level rise, a hotter and drier climate, and the likelihood that more of the uplands precipitation will fall as rain and not as snow. Volume 1, Chapter 2 of the California Water Plan discusses the impacts of climate change in greater detail on pages 9 and 21-22.

Responding to climate change generally takes two forms: mitigation and adaptation. Mitigation is taking steps to reduce our contribution to the causes of climate change by reducing GHG emissions. Adaptation is the process of responding to the effects of climate change by modifying our systems and behaviors to function in a warmer climate.

Mitigation

In the water sector, climate change mitigation is generally achieved by reducing energy use, becoming more efficient with energy use, and/or substituting fossil fuel based energy sources for renewable energy sources. Because water requires energy to move, treat, use, and discharge, water conservation is also energy conservation. As each water supplier implements DMM/BMPs and determines its water conservation targets, it can also calculate conserved energy and GHGs not-emitted as a side benefit.

Once a water supplier has calculated the water conserved by a BMP, it is straightforward to convert that volume to conserved energy, and GHGs not-emitted. Additionally, water suppliers may want to reconsider DMMs that conserve water but do so at a significant increase in GHG emissions.

Adaptation

Climate change means more than hotter days. Continued warming of the climate system has considerable impact on the operation of most water districts. Snow in the Sierra Nevada provides 65 percent of California's water supply. Predictions indicate that by 2050 the Sierra snowpack will be significantly reduced. Much of the lost snow will fall as rain, which flows quickly down the mountains during winter and cannot be stored in our current water system for use during California's hot, dry summers. The climate is also expected to become more variable, bringing more droughts and floods. Water districts will have to adapt to new, more variable conditions.

Potential Climate Change Effects

Within the next 20 years, DWR expects that water supplies, water demand, sea level, and the occurrence and severity of natural disasters will be affected by climate change. Some of these potential changes are presented below.

Water suppliers should consider the following climate change effects, many of which are already documented in California:

- Water Demand — Hotter days and nights, as well as a longer irrigation season, will increase landscaping water needs, and power plants and industrial processes will have increased cooling water needs.
- Water Supply and Quality — Reduced snowpack, shifting spring runoff to earlier in the year (Figure G-1), increased potential for algal bloom, and increased potential for seawater intrusion—each has the potential to impact water supply and water quality.
- Sea Level Rise — It is expected that sea level will continue to rise, resulting in near shore ocean changes such as stronger storm surges, more forceful wave energy, and more extreme tides. This will also affect levee stability in low-lying areas and increase flooding.
- Disaster — Disasters are expected to become more frequent as climate change brings increased climate variability, resulting in more extreme droughts and floods. This will challenge water supplier operations in several ways as wildfires are expected to become larger and hotter, droughts will become deeper and longer, and floods can become larger and more frequent.

A thorough discussion of a water suppliers' potential actions and responses to these changes will be presented in the IRWM climate change handbook currently being prepared. If a water supplier has already begun evaluating potential climate change impacts in its service area, it is encouraged to include a summary or reference in its UWMP or include it as an attachment.

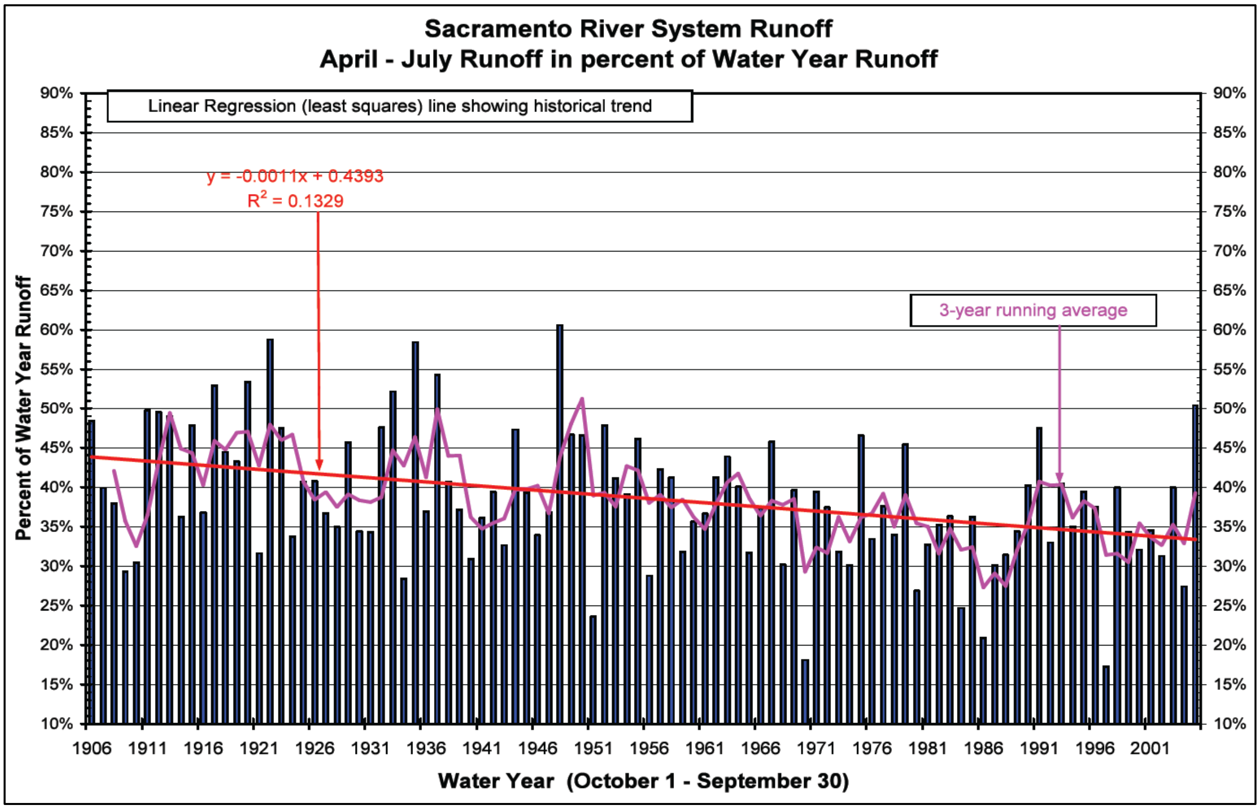

Figure G-1 Change in the timing of seasonal runoff on the Sacramento River

Source: Roos and Anderson 2006.

IRWMP Climate Change Requirements

Climate change is part of the IRWM Grant Program both legislatively and procedurally. SBX2-1, the IRWM Planning Act, was passed in September 2008 and revised CWC §10530 et seq. The planning act describes what IRWM plans must include and what DWR must include in the guidelines for the grant program. CWC §10541(e)(9) and (10) specify that the guidelines must include consideration of GHG emissions of identified programs and projects and evaluation of the adaptability to climate change of the region's water management systems.

CWC §10540(b)(2) specifically mentions UWMPs as a plan that may be coordinated with an IRWM planning effort. As such, any climate change work conducted within the context of a UWMP can help feed into the regional perspective and actions of an IRWMP, and any regional analysis done on climate change effects at the IRWM region level can feed back into the UWMP.

The Final IRWM Grant Program guideline released in August 2010 contains an IRWM plan standard for climate change, as well as climate change components in standards for how IRWMs select projects (project review process) and describe regions. Climate change is one of 16 IRWM plan standards in the guideline. On Page 24 the IRWM Grant Program guideline state:

The IRWM Plan must address both adaptation to the effects of climate change and mitigation of GHG emissions. The IRWM Plan must include the following items:

- *A discussion of the potential effects of climate change on the IRWM region, including an evaluation of the IRWM region's vulnerabilities to the effects of climate change and potential adaptation responses to those vulnerabilities, and*
- *A process that discloses and considers GHG emissions when choosing between project alternatives.*

The IRWM Plan guidelines also mention SB 97[14] requirements, which are discussed further below.

CEQA Climate Change Requirements

As the IRWM grant funds enable construction projects to move forward, those projects may be considered projects under CEQA and subject to CEQA analysis and documentation. With the passage of SB 97, the CEQA guidelines were amended and adopted by the Natural Resources Agency and became effective March 18, 2010. The CEQA amendments require lead agencies to include an evaluation of the GHG emissions from the project in their CEQA documents. The CEQA guideline amendments do not identify a threshold of significance for GHG emissions nor do they prescribe assessment methodologies or specific mitigation measures. The amendments encourage lead agencies to consider many factors in performing a CEQA analysis, but preserve the discretion that CEQA grants lead agencies to make their own determinations based on substantial evidence.

DWRs DIRWM, when providing funding to implement IRWM projects, acts as a CEQA-responsible agency in its discretionary disbursement of funds. As such, DWR must evaluate the CEQA documentation for adequacy and reach its own CEQA findings with respect to any identified significant environmental effects, including the assessment and mitigation of GHG emissions. Although a UWMP does not require a CEQA document, UWMPs are increasingly relied on by other projects for analysis required for CEQA documentation. Providing analysis of climate change and GHG emissions reductions associated with DMMs/BMPs may support future projects and reduce requirements for future analysis.

[14] SB 97, signed by the Governor in 2007, is an act to add Section 21083.05 to, and to add and repeal Section 21097 of, the Public Resources Code, relating to the California Environmental Quality Act. SB 97 (2007) advances a policy to develop CEQA guidelines on how State and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions.

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Section H: Electronic Submittal

DOST is not online as of the date of the release of this Guidebook. This section will be added once DOST is online.

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Section I: Urban Water Management Plan Checklist

This checklist is developed directly from the UWMP Act and the Water Conservation Bill of 2009. It is provided to support water suppliers during preparation of its UWMP. Two versions of the UWMP Checklist are provided: The first one (Table I-1) is organized according to the law and the second checklist (Table I-2) according to subject matter. The two checklists contain duplicate information, and the water supplier should use whichever checklist is more convenient. In the event that information or recommendations in these tables are inconsistent with, or conflict with, or omit the requirements of the UWMP Act or applicable laws, the UWMP Act or other laws prevail.

Part II, Section H, contains instructions for electronic submittal.

Each water supplier submitting a UWMP can also provide DWR with the UWMP location of the required element by completing the last column of either Table I-1 or I-2. This will support DWR in its review of these UWMPs. The completed form can be included as a hard copy with the UWMP or submitted electronically, as described in Section H: Electronic Submittal.

If an item does not pertain to a water supplier, then indicate the UWMP requirement and that it does not apply. For example, if a water supplier does not directly or indirectly have groundwater as a water supply source, the UWMP should include a statement that groundwater is not a water supply source.

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Table I-1 Urban Water Management Plan checklist, organized by legislation number

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)	System Demands		
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	System Demands	Retailer and wholesalers have slightly different requirements	
3	Report progress in meeting urban water use targets using the standardized form.	10608.40	Not applicable	Standardized form not yet available	
4	Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)	Plan Preparation		
5	An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.	10620(f)	Water Supply Reliability . . .		
6	Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.	10621(b)	Plan Preparation		
7	The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).	10621(c)	Plan Preparation		

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
8	Describe the service area of the supplier	10631(a)	System Description		
9	(Describe the service area) climate	10631(a)	System Description		
10	(Describe the service area) current and projected population . . . The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier . . .	10631(a)	System Description	Provide the most recent population data possible. Use the method described in “Baseline Daily Per Capita Water Use.” See Section M.	
11	. . . (population projections) shall be in five-year increments to 20 years or as far as data is available.	10631(a)	System Description	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	
12	Describe . . . other demographic factors affecting the supplier's water management planning	10631(a)	System Description		
13	Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).	10631(b)	System Supplies	The ‘existing’ water sources should be for the same year as the “current population” in line 10. 2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	
14	(Is) groundwater . . . identified as an existing or planned source of water available to the supplier . . .?	10631(b)	System Supplies	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
15	(Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management. Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)	System Supplies		
16	(Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater.	10631(b)(2)	System Supplies		
17	For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board	10631(b)(2)	System Supplies		
18	(Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.	10631(b)(2)	System Supplies		
19	For basins that have not been adjudicated, (provide) information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.	10631(b)(2)	System Supplies		
20	(Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(3)	System Supplies		
21	(Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(4)	System Supplies	Provide projections for 2015, 2020, 2025, and 2030.	

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) An average water year, (B) A single dry water year, (C) Multiple dry water years.	10631(c)(1)	Water Supply Reliability . . .		
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)	Water Supply Reliability . . .		
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)	System Supplies		
25	Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof;(I) Agricultural.	10631(e)(1)	System Demands	Consider “past” to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
26	(Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following: (A) Water survey programs for single-family residential and multifamily residential customers; (B) Residential plumbing retrofit; (C) System water audits, leak detection, and repair; (D) Metering with commodity rates for all new connections and retrofit of existing connections; (E) Large landscape conservation programs and incentives; (F) High-efficiency washing machine rebate programs; (G) Public information programs; (H) School education programs; (I) Conservation programs for commercial, industrial, and institutional accounts; (J) Wholesale agency programs; (K) Conservation pricing; (L) Water conservation coordinator; (M) Water waste prohibition;(N) Residential ultra-low-flush toilet replacement programs.	10631(f)(1)	DMMs	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	
27	A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.	10631(f)(3)	DMMs		
28	An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.	10631(f)(4)	DMMs		

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
29	An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following: (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.	10631(g)	DMMs	See 10631(g) for additional wording.	
30	(Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.	10631(h)	System Supplies		
31	Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.	10631(i)	System Supplies		

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
32	Include the annual reports submitted to meet the Section 6.2 requirement (of the MOU), if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	DMMs	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	
33	Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).	10631(k)	System Demands	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	
34	The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)	System Demands		
35	Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.	10632(a)	Water Supply Reliability . . .		
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)	Water Supply Reliability . . .		
37	(Identify) actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)	Water Supply Reliability . . .		

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
38	(Identify) additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)	Water Supply Reliability . . .		
39	(Specify) consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)	Water Supply Reliability . . .		
40	(Indicated) penalties or charges for excessive use, where applicable.	10632(f)	Water Supply Reliability . . .		
41	An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)	Water Supply Reliability . . .		
42	(Provide) a draft water shortage contingency resolution or ordinance.	10632(h)	Water Supply Reliability . . .		
43	(Indicate) a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)	Water Supply Reliability . . .		
44	Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area	10633	System Supplies		
45	(Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)	System Supplies		
46	(Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)	System Supplies		

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
47	(Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)	System Supplies		
48	(Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)	System Supplies		
49	(Describe) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.	10633(e)	System Supplies		
50	(Describe the) actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)	System Supplies		
51	(Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)	System Supplies		
52	The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.	10634	Water Supply Reliability . . .	For years 2010, 2015, 2020, 2025, and 2030	

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
53	Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)	Water Supply Reliability . . .		
54	The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.	10635(b)	Plan Preparation		
55	Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642	Plan Preparation		
56	Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area.	10642	Plan Preparation		
57	After the hearing, the plan shall be adopted as prepared or as modified after the hearing.	10642	Plan Preparation		
58	An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.	10643	Plan Preparation		

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
59	An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.	10644(a)	Plan Preparation		
60	Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.	10645	Plan Preparation		

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

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

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Table I-2 Urban Water Management Plan checklist, organized by subject

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
4	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)		
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)		
55	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642		
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		
SYSTEM DEMANDS				
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)		
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (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, conjunctive use, and (I) agriculture.	10631(e)(1)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		
SYSTEM SUPPLIES				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided.	
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		
16	Describe the groundwater basin.	10631(b)(2)		
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		
19	For groundwater basins that are not adjudicated, provide information as to whether DWR 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. If the basin is adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	10631(b)(3)		
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)		

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)		
49	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.	10633(e)		
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)		
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING [b]				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)		
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)		
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)		
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634	For years 2010, 2015, 2020, 2025, and 2030	

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing 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. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		
DEMAND MANAGEMENT MEASURES				
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		
28	Provide 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 ability to further reduce demand.	10631(f)(4)		
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	See 10631(g) for additional wording.	
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	

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

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

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Section J: DWR Staff UWMP 2010 Review Sheet

The Review Sheet on the following pages will be used by DWR to assess each legislatively required UWMP component. It is provided here for information only. It is NOT to be completed by the water supplier and included with the UWMP prior to adoption.

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2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

1. Coordination with Appropriate Agencies **(Water Code § 10620 (d)(1)(2))**

☐ Participated in area, regional, watershed or basinwide URBAN WATER MANAGEMENT PLAN ________ Reference & Page Number

Name of plan ________ Lead Agency ________

☐ Described the coordination of the plan preparation and anticipated benefits. ________ Reference & Page Number

Table 1
Public and agency coordination

Coordinating Agencies[1,2]	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft plan	Was sent a notice of intention to adopt	Not involved / No information
Other water suppliers							
Water mgmt agencies							
Relevant public agencies							
General public							
Other							

[1] Indicate the specific name of the agency with which coordination or outreach occurred.
[2] Check at least one box in each row.

DWR Reviewer Comments:	

2. Describe resource maximization / import minimization plan **(Water Code §10620 (f))**

☐ Described how water management tools / options maximize resources & minimize need to import water ________ Reference & Page Number

DWR Reviewer Comments:	

3. Plan Updated in Years Ending in Five and Zero **(Water Code § 10621(a))**

☐ Updated and adopted plan ________ Date adopted ________ Reference & Page Number

DWR Reviewer Comments:	

4. City and County Notification and Participation **(Water Code § 10621(b))**

☐ Provided 60-day notification to any city or county within service area of UWMP review and revision ________ Reference & Page Number

DWR Reviewer Comments:	

5. Service Area Information **Water Code § 10631 (a))**

☐ Included current and projected population in 5-year increments for 20 years. ________ Reference & Page Number

☐ Provided population projections were based on data from state, regional or local agency ________ Reference & Page Number

Table 2
Population - current and projected

	2010	2015	2020	2025	2030	2035 - optional	Data source[2]
Service area population[1]							

[1] Service area population is defined as the population served by the distribution system. See Technical Methodology 2: Service Area Population (2010 UWMP Guidebook, Section M).
[2] Provide the source of the population data provided.

☐ Described climate characteristics that affect water management ________ Reference & Page Number

☐ Described other demographic factors affecting water management ________ Reference & Page Number

DWR Reviewer Comments:	

6. Water Sources **(Water Code § 10631 (b))**

☐ Identified existing and planned water supply sources, to the extent practicable ________ Reference & Page Number

☐ Provided current water supply quantities ________ Reference & Page Number

☐ Provided planned water supply quantities ________ Reference & Page Number

Table 16
Water supplies - current and projected

Water Supply Sources		2010	2015	2020	2025	2030	2035 - optional
Water purchased from[1]:	**Wholesaler supplied volume (yes/no)**						
Wholesaler 1 (enter agency name)							
Wholesaler 2 (enter agency name)							
Wholesaler 3 (enter agency name)							
Supplier-produced groundwater[2]							
Supplier-produced surface water							
Transfers in							
Exchanges In							
Recycled Water							
Desalinated Water							
Other							
Other							
	Total	**0**	**0**	**0**	**0**	**0**	**0**

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Volumes shown here should be what was purchased in 2010 and what is anticipated to be purchased in the future. If these numbers differ from what is contracted, show the contracted quantities in
[2] Volumes shown here should be consistent with Tables 17 and 18.

DWR Reviewer Comments:	

2010 Urban Water Management Plan "Review for Completeness" Form

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7. If Groundwater identified as existing or planned source **(Water Code §10631 (b)(1-4))**

☐ Agency uses or plans to use groundwater ______ Reference & Page Number
OR ☐ Agency does NOT use groundwater and does not have plans to use groundwater (Skip Section) ______ Reference & Page Number

Groundwater Management Plans

☐ No groundwater management plan adopted for applicable groundwater basin(s) ______ Reference & Page Number
☐ Groundwater management plan(s) have been adopted by the supplier ______ Reference & Page Number
☐ Other specific authorization(s) for groundwater management exist ______ Reference & Page Number
☐ If groundwater management plans exists, provided applicable groundwater management plans ______ Reference & Page Number

☐ Described each groundwater basin(s) (b)(2) ______ Reference & Page Number

Basin Adjudication ______ Reference & Page Number

☐ Basin is not adjudicated ______ Reference & Page Number
☐ Basin is adjudicated ______ Reference & Page Number
☐ If adjudicated, attached order or decree (b)(2) ______ Reference & Page Number
☐ If adjudicated, quantified amount of legal pumping right (b)(2) ______ Reference & Page Number

Basin Overdraft

☐ Basin not in overdraft ______ Reference & Page Number
☐ DWR Bulletin 118 Update 2003 identified, or projected to be, in overdraft (b)(2) ______ Reference & Page Number
☐ Included plan to eliminate overdraft (b)(2) ______ Reference & Page Number

☐ Provided analysis of location, amount and sufficiency, of groundwater pumped for the last five years (b)(3) ______ Reference & Page Number
☐ Provided analysis of location and amount of projected groundwater pumping for 20 years (b)(4) **IN TABLE 3** ______ Reference & Page Number

Table 18
Groundwater - volume pumped

Basin name(s)	Metered or Unmetered[1]	2006	2007	2008	2009	2010
Groundwater as a percent of total water supply						

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Indicate whether volume is based on volumeteric meter data or another method

Table 19
Groundwater - volume projected to be pumped

Basin name(s)	2015	2020	2025	2030	2035 - optional
Percent of total water supply					

Units are in acre-feet per year.
Include future planned expansion

DWR Reviewer Comments:	

8. Reliability of Supply **(Water Code §10631 (c) (1-3))**

☐ Described the reliability of the water supply and vulnerability to seasonal or climatic shortage ______ Reference & Page Number

Table 28
Supply reliability - historic conditions

		Multiple Dry Water Years			
Average / Normal Water Year	**Single Dry Water**	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Percent of Average/Normal Year:					

☐ Provided the basis of water year data ______ Reference & Page Number

Table 27
Basis of water year data

Water Year Type	Base Year(s)
Average Water Year	
Single-Dry Water Year	
Multiple-Dry Water Years	

______ Reference & Page Number
______ Reference & Page Number
______ Reference & Page Number

Table 29
Factors resulting in inconsistency of supply

Water supply sources[1]	Specific source name, if any	Limitation quantification	Legal	Environmental	Water quality	Climatic	Additional information

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] From Table 16.

☐ Described plans to supplement or replace inconsistent sources with alternative sources or DMMs ______ Reference & Page Number
☐ No inconsistent sources ______ Reference & Page Number

DWR Reviewer Comments:	

2010 Urban Water Management Plan "Review for Completeness" Form

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9. Transfer or Exchange Opportunities **(Water Code §10631 (d))**

☐ Describe short term and long term exchange or transfer opportunities ______ Reference & Page Number
OR ☐ No transfer or exchange opportunities (Skip Section) ______ Reference & Page Number

☐ Has interties(s) for emergency purposes only ______ Reference & Page Number

Table 20
Transfer and exchange opportunities

Transfer agency	Transfer or exchange	Short term or long term	Proposed Volume
Total			

Units (circle one): acre-feet per year million gallons per year cubic feet per year

DWR Reviewer Comments:	

10. Water Use Provisions **(Water Code §10631 (e)(1)(2))**

☐ Quantified past water use by sector ______ Reference & Page Number
☐ Quantified current water use by sector ______ Reference & Page Number
☐ Projected future water use by sector ______ Reference & Page Number

Table 3
Water deliveries - actual, 2005

	2005				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family					0
Multi-family					0
Commercial					0
Industrial					0
Institutional/governmental					0
Landscape					0
Agriculture					0
Other					0
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 6
Water deliveries - actual, 2010

	2010				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume
Single family					0
Multi-family					0
Commercial					0
Industrial					0
Institutional/governmental					0
Landscape					0
Agriculture					0
Other					0
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 5
Water deliveries - projected, 2015

	2015				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume
Single family					0
Multi-family					0
Commercial					0
Industrial					0
Institutional/governmental					0
Landscape					0
Agriculture					0
Other					0
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 6
Water deliveries - projected, 2020

	2020				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume
Single family					0
Multi-family					0
Commercial					0
Industrial					0
Institutional/governmental					0
Landscape					0
Agriculture					0
Other					0
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

2010 Urban Water Management Plan "Review for Completeness" Form

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Table 7
Water deliveries - projected 2025, 2030, and 2035

	2025		2030		2035 - optional	
	metered		metered		metered	
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY
Single family						
Multi-family						
Commercial						
Industrial						
Institutional/governmental						
Landscape						
Agriculture						
Other						
Total	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

DWR Reviewer Comments:	

☐ Identified and quantified sales to other agencies ______ Reference & Page Number
OR ☐ No sales to other agencies ______ Reference & Page Number

Table 9
Sales to other water agencies

Water distributed	2005	2010	2015	2020	2025	2030	2035 - opt
name of agency			0	0	0	0	0
name of agency							
name of agency							
Total	0	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

☐ Identified and quantified additional water uses ______ Reference & Page Number
OR ☐ No additional water uses ______ Reference & Page Number

Table 10
Additional water uses and losses

Water use[1]	2005	2010	2015	2020	2025	2030	2035 -opt
Saline barriers							
Groundwater recharge							
Conjunctive use							
Raw water							
Recycled water							
System losses							
Other (define)							
Total	0	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Any water accounted for in Tables 3 through 7 are not included in this table.

Table 11
Total water use

Water Use	2005	2010	2015	2020	2025	2030	2035 - opt
Total water deliveries (from Tables 3 to 7)							
Sales to other water agencies (from Table 9)							
Additional water uses and losses (from Table 10)							
Total							

Units (circle one): acre-feet per year million gallons per year cubic feet per year

DWR Reviewer Comments:	

11. Per Capita Water Use and Water Use Targets **(Water Code §10608.20)**

☐ Base daily per capita water use is calculated according to provided methodologies

Table 13
Base period ranges

Base	Parameter	Value	Units
10- to 15-year base period	2008 total water deliveries		*see below*
	2008 total volume of delivered recycled water		*see below*
	2008 recycled water as a percent of total deliveries		percent
	Number of years in base period[1]		years
	Year beginning base period range		
	Year ending base period range[2]		
5-year base period	Number of years in base period	5	years
	Year beginning base period range		
	Year ending base period range[3]		

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first base period is a continuous 10- to 15-year period.
[2] The ending year must be between December 31, 2004 and December 31, 2010.
[2] The ending year must be between December 31, 2007 and December 31, 2010.

2010 Urban Water Management Plan "Review for Completeness" Form

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Table 14
Base daily per capita water use - 10- to 15-year range

Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				
Year 6				
Year 7				
Year 8				
Year 9				
Year 10				
Year 11				
Year 12				
Year 13				
Year 14				
Year 15				
			Base Daily Per Capita Water Use[1]	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Add the values in the column and divid by the number of rows.

Table 15
Base daily per capita water use - 5-year range

Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				
			Base Daily Per Capita Water Use[1]	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Add the values in the column and divid by the number of rows.

Target method used to determine urban water use target
- ☐ Target method 1
- ☐ Target method 2
- ☐ Target method 3
- ☐ Target method 4

☐ Urban water use target is calculated according to provided methodologies

______________________ **gpcd**

☐ Interim urban water use target is calculated according to provided methodologies

______________________ **gpcd**

DWR Reviewer Comments:	

12. Water Use Projections and Low Income Housing **(Water Code §10631.1(a))**

☐ Indicate how much of the water use projections provided in Tables 12 through 16 (above) is for single-family and multi-family residential low income housing. ____________ Reference & Page Number

☐ Agency included deliveries to low-income housing in Tables 3-7 ____________ Reference & Page Number

☐ No anticipated low income single or multifamily residential water demands

Table 8
Low income projected water demands

Low Income Water Demands[1]	2015	2020	2025	2030	2035 - opt
Single-family residential	0	0	0	0	0
Multi-family residential					
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Provide demands either as directly estimated values or as a percent of demand.

DWR Reviewer Comments:	

13. 2010 Urban Water Management Plan "Review of DMMs for Completeness" Form **(Water Code §10631 (f) and (g))**

(Water Code §10631 (f) & (g), the 2005 Urban Water Management Plan "Review of DMMs for Completeness" Form is found on Sheet 2

IMPORTANT NOTE
TO BE ELIGIBLE FOR GRANTS OR LOANS, AB1420 HAS MANDATED IMPLEMENTATION, SCHEDULED IMPLEMENTATION, OR EXEMPTION FOR ALL DMMs.
TO ENSURE YOUR PLAN ADDRESSES THE PROVISIONS OF WATER CODE 10631(f) AND (g), PROVIDE COMPLETE DESCRIPTIONS OR BENEFIT/COST ANALYSES FOR ALL DMMs AS IDENTIFIED ON THE DMMs WORKSHEET.

☐ Each DMM has been addressed

DWR Reviewer Comments:	

2010 Urban Water Management Plan "Review for Completeness" Form

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14. Planned Water Supply Projects and Programs **(Water Code §10631 (h))**

☐ Agency has future water supply projects planned that are not related to DMMs. ____ Reference & Page Number
OR ☐ Agency does NOT have any future water supply projects planned that are not related to DMMs (Skip Section). ____ Reference & Page Number

☐ Provided detailed description of expected future supply projects and programs ____ Reference & Page Number
☐ Provided timeline for each proposed project ____ Reference & Page Number

Table 26
Future Water Supply Projects

Project name[1]	Projected start date	Projected completion date	Potential project constraints[2]	Normal-year supply[3]	Single-dry year supply[3]	Multiple-dry year first year supply[3]	Multiple-dry year second year supply[3]	Multiple-dry year third year supply[3]
				0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Water volumes presented here should be accounted for in Table 16.
2Indicate whether project is likely to happen and what constraints, if any, exist for project implementation.
[3] Provide estimated supply benefits, if available.

DWR Reviewer Comments:

15. Opportunities for development of desalinated water **(Water Code §10631 (i))**

☐ Agency uses or has future plans to use desalinated water. ____ Reference & Page Number
OR ☐ Agency does NOT have any opportunities for future use of desalinated water (Skip Section). ____ Reference & Page Number

Described opportunities for development of desalinated water, including, but not limited to,
☐ Ocean water
☐ Brackish ocean water
☐ Brackish groundwater
☐ Other

DWR Reviewer Comments:

16. District is a CUWCC signatory **(Water Code § 10631 (j))**

☐ Agency is a CUWCC member ____ Reference & Page Number
☐ Attached 2009-2010 biannual update to UWMP ____ Reference & Page Number
☐ Biannual updates is considered complete by CUWCC website ____ Reference & Page Number

DWR Reviewer Comments:

17. If Supplier receives or projects receiving water from a wholesale supplier **(Water Code §10631 (k))**

☐ Agency receives or plans to receive wholesale water ____ Reference & Page Number
OR ☐ Agency neither has nor planto receive future receipt of wholesale water ____ Reference & Page Number

☐ Agency provided written demand projections to wholesaler, 20 years ____ Reference & Page Number

Table 12
Retail agency demand projections provided to wholesale suppliers

Wholesaler	Contracted Volume[3]	2010	2015	2020	2025	2030	2035 -opt

☐ Wholesaler provided written water availability projections, by source, to agency, 20 years ____ Reference & Page Number
(if agency served by more than one wholesaler, duplicate this table and provide the source availability for each wholesaler)

Table 17
Wholesale supplies - existing and planned sources of water

Wholesale sources[1,2]	Contracted Volume[3]	2015	2020	2025	2030	2035 - opt
(source 1)						
(source 2)						
(source 3)						

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Water volumes presented here should be accounted for in Table 16.
[2] If the water supplier is a wholesaler, indicate all customers (excluding individual retail customers) to which water is sold. If the water supplier is a retailer, indicate each wholesale supplier, if more than one.
[3] Indicate the full amount of water

☐ Provided reliability of wholesale supply in writing by wholesale agency ____ Reference & Page Number
(if agency served by more than one wholesaler, duplicate this table and provide the source availability for each wholesaler)

☐ Wholesale supply reliability numbers provided in Table 31. ____ Reference & Page Number

☐ Factors resulting in inconsistency of wholesaler's supply are provided in Table 29. ____ Reference & Page Number

DWR Reviewer Comments:

2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

18. Water Shortage Contingency Plan Section - Stages of Action (Water Code § 10632 (a))

- ☐ Provided stages of action ______ Reference & Page Number
- ☐ Provided the water supply conditions for each stage ______ Reference & Page Number
- ☐ Included plan for 50 percent supply shortage ______ Reference & Page Number

Table 35
Water shortage contingency - rationing stages to address water supply shortages

Stage No.	Water Supply Conditions	% Shortage

[1] One of the stages of action must be designed to address a 50 percent reduction in water supply.

DWR Reviewer Comments:	

19. Water Shortage Contingency Plan Section - Three-Year Minimum Water Supply (Water Code §10632 (b))

- ☐ Identified driest 3-year period ______ Reference & Page Number
- ☐ Determined minimum water supply available by source for the next three years ______ Reference & Page Number

Table 31
Supply reliability - current water sources

Water supply sources[1]	Average / Normal Water Year Supply[2]	Single Dry Water Year Supply[2]	Multiple Dry Water Year Supply[2]			
			Year 1	Year 2	Year 3	Year 4
Percent of normal year:						

Units are in acre-feet per year.
[1] From Table 16.
[2] See Table 27 for basis of water type years.

DWR Reviewer Comments:	

20. Water Shortage Contingency Plan - Preparation for catastrophic water supply interruption (Water Code §10632 (c))

- ☐ Provided catastrophic supply interruption plan ______ Reference & Page Number
  - ☐ Described actions to be taken during power outage ______ Reference & Page Number
  - ☐ Described actions to be taken during earthquake ______ Reference & Page Number
  - ☐ Described actions to be taken during other catastrophic interruptions ______ Reference & Page Number

DWR Reviewer Comments:	

21. Water Shortage Contingency Plan - Prohibitions, Consumption Reduction Methods, and Penalties (Water Code § 10632 (d-f))

- ☐ Listed the mandatory prohibitions against specific water use practices during water shortages ______ Reference & Page Number

Table 36
Water shortage contingency - mandatory prohibitions

Examples of Prohibitions	Stage When
Using potable water for street washing	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	

- ☐ Listed the consumption reduction methods the water supplier will use to reduce water use in the most restrictive stages with up to a 50% reduction. ______ Reference & Page Number

Table 37
Water shortage contingency - consumption reduction methods

Consumption	Stage When	Projected
name method		
name method		
name method		
name method		
name method		
name method		

- ☐ Listed penalties or charges for excessive use ______ Reference & Page Number

Table 38
Water shortage contingency - penalties and charges

Penalties or Charges	Stage When Penalty Takes Effect
Penalty for excess use	
Charge for excess use	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	

DWR Reviewer Comments:	

2010 Urban Water Management Plan "Review for Completeness" Form

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22. Water Shortage Contingency Plan - Revenue and Expenditure Impacts **(Water Code § 10632 (g))**

- [ ] Described how actions and conditions impact revenues ______ Reference & Page Number
  - [ ] Rate adjustments ______ Reference & Page Number
  - [ ] Development of reserves ______ Reference & Page Number
- [ ] Described how actions and conditions impact expenditures ______ Reference & Page Number
- [ ] Described measures to overcome the revenue and expenditure impacts ______ Reference & Page Number

DWR Reviewer Comments:

23. Water Shortage Contingency Plan - Water Shortage Contingency Ordinance/Resolution **(Water Code § 10632 (h))**

- [ ] Attached a copy of the draft water shortage contingency resolution or ordinance. ______ Reference & Page Number

DWR Reviewer Comments:

24. Water Shortage Contingency Plan - Reduction Measuring Mechanism **(Water Code § 10632 (i))**

- [ ] Provided mechanisms for determining actual reductions ______ Reference & Page Number
- [ ] No water shortage contingency resolution or ordinance ______ Reference & Page Number

DWR Reviewer Comments:

25. Wastewater and Recycled Water - System description and disposal **(Water Code § 10633 (a))**

- [ ] Described the wastewater collection and treatment systems for the supplier's service area ______ Reference & Page Number
- [ ] Quantified the volume of wastewater collected and treated ______ Reference & Page Number
- [ ] Described methods of wastewater disposal ______ Reference & Page Number

Table 21
Recycled water - wastewater collection and treatment

Type of Wastewater	2005	2010	2015	2020	2025	2030	2035 - opt
Wastewater collected & treated in service area							
Volume that meets recycled water standard							
Units (circle one): acre-feet per year million gallons per year cubic feet per year							

- [ ] Described methods of wastewater disposal ______ Reference & Page Number

Table 22
Recycled water - non-recycled wastewater disposal

Method of disposal	Treatment Level	2010	2015	2020	2025	2030	2035 - opt
Name of method							
Name of method							
Name of method							
Name of method							
	Total	0	0	0	0	0	0
Units (circle one): acre-feet per year million gallons per year cubic feet per year							

DWR Reviewer Comments:

26. Wastewater and Recycled Water - Uses and Projected Uses **(Water Code § 10633 (b - e))**

- [ ] Agency has access to recycled water. ______ Reference & Page Number

OR
- [ ] Agency does NOT have any access to recycled water (explanation provided) ______ Reference & Page Number

- [ ] The use of recycled water by the Agency is technically or economically feasible. ______ Reference & Page Number

OR
- [ ] The use of recycled water by the Agency is NOT technically or economically feasible (explanation provided) ______ Reference & Page Number

- [ ] No current (2010) use of recycled water ______ Reference & Page Number
- [ ] Described and quantified potential uses of recycled water ______ Reference & Page Number

Table 23
Recycled water - potential future use

User type	Description	Feasibility[1]	2015	2020	2025	2030	2035 - opt
Agricultural irrigation							
Landscape irrigation[2]							
Commercial irrigation[3]							
Golf course irrigation							
Wildlife habitat							
Wetlands							
Industrial reuse							
Groundwater recharge							
Seawater barrier							
Getothermal/Energy							
Indirect potable reuse							
Other (user type)							
Other (user type)							
	Total	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Technical and economic feasibility.
[2] Includes parks, schools, cemeteries, churches, residential, or other public facilities)
[3] Includes commercial building use such as landscaping, toilets, HVAC, etc) and commercial uses (car washes, laundries, nurseries, etc)

DWR Reviewer Comments:

2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

27. Wastewater and Recycled Water - Projected Uses **(Water Code § 10633 (e))**

☐ Compared 2010 projections included in the 2005 UWMP with actual 2010 volumes ______ Reference & Page Number
OR ☐ No recycled water use for 2010 projected in 2005 UWMP

Table 24
Recycled water - 2005 UWMP use projection compared to 2010 actual

Use type	2010 actual use	2005 Projection for 2010[1]
Agricultural irrigation		
Landscape irrigation[2]		
Commercial irrigation[3]		
Golf course irrigation		
Wildlife habitat		
Wetlands		
Industrial reuse		
Groundwater recharge		
Seawater barrier		
Getothermal/Energy		
Indirect potable reuse		
Other (user type)		
Other (user type)		
Total	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] From the 2005 UWMP. There has been some modification of use types. Data from the 2005 UWMP can be left in the existing catagories or modified to the new catagories, at the discretion of the water supplier.

[2] Includes parks, schools, cemeteries, churches, residential, or other public facilities)

[3] Includes commercial building use such as landscaping, toilets, HVAC, etc) and commercial uses (car washes, laundries, nurseries, etc)

DWR Reviewer Comments:

28. Wastewater and Recycled Water - optimize uses **(Water Code § 10633 (f))**

☐ Described actions that might be taken to encourage recycled water uses ______ Reference & Page Number
☐ Described projected results of these actions in terms of acre-feet of recycled water used per year ______ Reference & Page Number

Table 25
Methods to encourage recycled water use

Actions	Projectes Results					
	2010	2015	2020	2025	2030	2035 - opt
Financial incentives						
name of action						
name of action						
Total	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

DWR Reviewer Comments:

29. Wastewater and Recycled Water - Recycling Plan Agency Coordination **(Water Code § 10633(f))**

☐ Provided a recycled water use optimization plan which includes actions to facilitate the use of recycled water (dual distribution systems, promote recirculating uses) ______ Reference & Page Number

☐ Agency does not have recycled water use optimization plan ______ Reference & Page Number

☐ Described the coordination of the recycling plan preparation information to the extent available. ______ Reference & Page Number

DWR Reviewer Comments:

30. Water quality impacts on availability of supply **(Water Code §10634)**

☐ Discussed water quality impacts (by source) upon water management strategies and supply reliability ______ Reference & Page Number
OR ☐ No water quality impacts projected (explanation provided) ______ Reference & Page Number

Table 30
Water quality - current and projected water supply impacts

Water source	Description of condition	2010	2015	2020	2025	2030	2035 - opt

Units are in acre-feet per year.

DWR Reviewer Comments:

31. Supply and Demand Comparison to 20 Years **(Water Code § 10635 (a))**

☐ Compare the projected normal water supply to projected normal water demand over the next 20 years, in 5-year increments. ______ Reference & Page Number

Table 32
Supply and demand comparison - normal year

	2010	2015	2020	2025	2030	2035 - opt
Supply totals (from Table 16)						
Demand totals (From Table 11)						
Difference						
Difference as % of Supply						
Difference as % of Demand						

Units are in acre-feet per year.

DWR Reviewer Comments:

2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

32. Supply and Demand Comparison: Single-dry Year Scenario **(Water Code § 10635 (a))**

☐ Compare the projected single-dry year water supply to projected single-dry year water demand over the next 20 years, in 5-year increments. ________ Reference & Page Number

Table 33 Supply and demand comparison - single dry year	2010	2015	2020	2025	2030 - opt	2030
Supply totals[1,2]						
Demand totals[2,3,4]						
Difference						
Difference as % of Supply						
Difference as % of Demand						

Units are in acre-feet per year.
[1] Consider the same sources as in Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.
[2] Provide in the text of the UWMP text that discusses how single-dry-year water supply volumes were determined.
[3] Consider the same demands as in Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.
[4] The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.

DWR Reviewer Comments:

33. Supply and Demand Comparison: Multiple-dry Year Scenario **(Water Code § 10635 (a))**

☐ Project a multiple-dry year period (as identified in Table 27) occurring between 2011-2015 and compare projected supply and demand during those years ________ Reference & Page Number

☐ Project a multiple-dry year period (as identified in Table 27) occurring between 2016-2020 and compare projected supply and demand during those years ________ Reference & Page Number

☐ Project a multiple-dry year period (as identified in Table 27) occurring between 2021-2025 and compare projected supply and demand during those years ________ Reference & Page Number

☐ Project a multiple-dry year period (as identified in Table 27) occurring between 2026-2030 and compare projected supply and demand during those years ________ Reference & Page Number

Table 34
Supply and demand comparison - multiple dry-year events

		2010	2015	2020	2025	2030	2035 - opt
Multiple-dry year first year supply	**Supply totals**[1,2]						
	Demand totals[2,3,4]						
	Difference						
	Difference as % of Supply						
	Difference as % of Demand						
Multiple-dry year second year supply	**Supply totals**[1,2]						
	Demand totals[2,3,4]						
	Difference						
	Difference as % of Supply						
	Difference as % of Demand						
Multiple-dry year third year supply	**Supply totals**[1,2]						
	Demand totals[2,3,4]						
	Difference						
	Difference as % of Supply						
	Difference as % of Demand						

Units are in acre-feet per year.
[1] Consider the same sources as in Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.
[2] Provide in the text of the UWMP text that discusses how single-dry-year water supply volumes were determined.
[3] Consider the same demands as in Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.
[4] The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.

DWR Reviewer Comments:

34. Provision of Water Service Reliability section to cities/counties within service area **(Water Code § 10635(b))**

☐ Provided Water Service Reliability section of UWMP to cities and counties within which it provides water supplies within 60 days of UWMP submission to DWR ________ Reference & Page Number

DWR Reviewer Comments:

35. Does the Plan Include Public Participation and Plan Adoption **(Water Code § 10642)**

☐ Attach a copy of adoption resolution ________ Reference & Page Number
☐ Encourage involvement of social, cultural & economic community groups ________ Reference & Page Number
☐ Plan available for public inspection ________ Reference & Page Number
☐ Provide proof of public hearing ________ Reference & Page Number
☐ Provided meeting notice to local governments ________ Reference & Page Number

DWR Reviewer Comments:

36. Review of implementation of 2005 UWMP **(Water Code § 10643)**

☐ Reviewed implementation plan and schedule of 2005 UWMP ________ Reference & Page Number
☐ Implemented in accordance with the schedule set forth in plan ________ Reference & Page Number
☐ 2005 UWMP not required ________ Reference & Page Number

DWR Reviewer Comments:

37. Provision of 2010 UWMP to local governments **(Water Code § 10644 (a))**

☐ Provide 2010 UWMP to DWR, and cities and counties within 30 days of adoption ________ Reference & Page Number

DWR Reviewer Comments:

38. Does the plan or correspondence accompanying it show where it is available for public review **(Water Code § 10645)**

☐ Does UWMP or correspondence accompanying it show where it is available for public review ________ Reference & Page Number

DWR Reviewer Comments:

Section K: California Water Code, Division 6, Part 2.6: Urban Water Management Planning

The following sections of California Water Code Division 6, Part 2.6, are available online at http://www.leginfo.ca.gov/calaw.html.

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, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(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 that 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) (1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(A) An average water year.

(B) A single dry water year.

(C) Multiple dry water years.

(2) 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) For purposes of this part, urban water suppliers that are members of the California Urban Water Conservation Council shall be deemed in compliance with the requirements of subdivisions (f) and (g) by complying with all the provisions of the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that memorandum.

(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).

10631.1.

(a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

10631.5.

(a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).

(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the

department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, “not locally cost effective” means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) 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. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit annual reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.

(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

10631.7. The department, in consultation with the California Urban Water Conservation Council, shall convene an independent technical panel to provide information and recommendations to the department and the Legislature on new demand management measures, technologies, and approaches. The panel shall consist of no more than seven members, who shall be selected by the department to reflect a balanced representation of experts. The panel shall have at least one, but no more than two, representatives from each of the following: retail water suppliers, environmental organizations, the business community, wholesale water suppliers, and academia. The panel shall be convened by January 1, 2009, and shall report to the

Legislature no later than January 1, 2010, and every five years thereafter. The department shall review the panel report and include in the final report to the Legislature the department's recommendations and comments regarding the panel process and the panel's recommendations.

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, indirect potable reuse, 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.

Article 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 submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(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 exemplary elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan to 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.

(c) (1) For the purpose of identifying the exemplary elements of the individual plans, the department shall identify in the report those water demand management measures adopted and implemented by specific urban water suppliers, and identified pursuant to Section 10631, that achieve water savings significantly above the levels established by the department to meet the requirements of Section 10631.5.

(2) The department shall distribute to the panel convened pursuant to Section 10631.7 the results achieved by the implementation of those water demand management measures described in paragraph (1).

(3) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

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.

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Section L: California Water Code, Division 6, Part 2.55: Water Conservation

The following sections of California Water Code Division 6, Part 2.55, are available online at http://www.leginfo.ca.gov/calaw.html.

Chapter 1. General Declarations and Policy	§10608-10608.8
Chapter 2. Definitions	§10608.12
Chapter 3. Urban Retail Water Suppliers	§10608.16-10608.44

Legislative Counsel's Digest

Senate Bill No. 7
Chapter 4

An act to amend and repeal Section 10631.5 of, to add Part 2.55 (commencing with Section 10608) to Division 6 of, and to repeal and add Part 2.8 (commencing with Section 10800) of Division 6 of, the Water Code, relating to water.

[Approved by Governor November 10, 2009. Filed with Secretary of State November 10, 2009.]

Legislative Counsel's Digest

SB 7, Steinberg. Water conservation.

(1) Existing law requires the Department of Water Resources to convene an independent technical panel to provide information to the department and the Legislature on new demand management measures, technologies, and approaches. "Demand management measures" 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.

This bill would require the state to achieve a 20% reduction in urban per capita water use in California by December 31, 2020. The state would be required to make incremental progress towards this goal by reducing per capita water use by at least 10% on or before December 31, 2015. The bill would require each urban retail water supplier to develop urban water use targets and an interim urban water use target, in accordance with specified requirements. The bill would require agricultural water suppliers to implement efficient water management practices. The bill would require the department, in consultation with other state agencies, to develop a single standardized water use reporting form. The bill, with certain exceptions, would provide that urban retail water suppliers, on and after July 1, 2016, and agricultural water suppliers, on and after July 1, 2013, are not eligible for state water grants or loans unless they comply with the water conservation requirements established by the bill. The bill would repeal, on July 1, 2016, an existing requirement that conditions eligibility for certain water management grants or loans to an urban water supplier on the implementation of certain water demand management measures.

(2) Existing law, until January 1, 1993, and thereafter only as specified, requires certain agricultural water suppliers to prepare and adopt water management plans.

This bill would revise existing law relating to agricultural water management planning to require agricultural water suppliers to prepare and adopt agricultural water management plans with specified components on or before December 31, 2012, and update those plans on or before December 31, 2015, and on or before December 31 every 5 years thereafter. An agricultural water supplier that becomes an agricultural water supplier after December 31, 2012, would be required to prepare and adopt an agricultural water management plan within one year after becoming an agricultural water supplier. The agricultural water supplier would be required to notify each city or county within which the supplier provides water supplies with regard to the preparation or review of the plan. The bill would require the agricultural water supplier to submit copies of the plan to the department and other specified entities. The bill would provide that an agricultural water supplier is not eligible for state water grants or loans unless the supplier complies with the water management planning requirements established by the bill.

(3) The bill would take effect only if SB 1 and SB 6 of the 2009–10 7th Extraordinary Session of the Legislature are enacted and become effective.

The people of the State of California do enact as follows:

SECTION 1. Part 2.55 (commencing with Section 10608) is added to Division 6 of the Water Code, to read:

Part 2.55. Sustainable Water Use and Demand Reduction

Chapter 1. General Declarations and Policy

10608. The Legislature finds and declares all of the following:

(a) Water is a public resource that the California Constitution protects against waste and unreasonable use.

(b) Growing population, climate change, and the need to protect and grow California's economy while protecting and restoring our fish and wildlife habitats make it essential that the state manage its water resources as efficiently as possible.

(c) Diverse regional water supply portfolios will increase water supply reliability and reduce dependence on the Delta.

(d) Reduced water use through conservation provides significant energy and environmental benefits, and can help protect water quality, improve streamflows, and reduce greenhouse gas emissions.

(e) The success of state and local water conservation programs to increase efficiency of water use is best determined on the basis of measurable outcomes related to water use or efficiency.

(f) Improvements in technology and management practices offer the potential for increasing water efficiency in California over time, providing an essential water management tool to meet the need for water for urban, agricultural, and environmental uses.

(g) The Governor has called for a 20 percent per capita reduction in urban water use statewide by 2020.

(h) The factors used to formulate water use efficiency targets can vary significantly from location to location based on factors including weather, patterns of urban and suburban development, and past efforts to enhance water use efficiency.

(i) Per capita water use is a valid measure of a water provider's efforts to reduce urban water use within its service area. However, per capita water use is less useful for measuring relative water use efficiency between different water providers. Differences in weather, historical patterns of urban and suburban development, and density of housing in a particular location need to be considered when assessing per capita water use as a measure of efficiency.

10608.4. It is the intent of the Legislature, by the enactment of this part, to do all of the following:

(a) Require all water suppliers to increase the efficiency of use of this essential resource.

(b) Establish a framework to meet the state targets for urban water conservation identified in this part and called for by the Governor.

(c) Measure increased efficiency of urban water use on a per capita basis.

(d) Establish a method or methods for urban retail water suppliers to determine targets for achieving increased water use efficiency by the year 2020, in accordance with the Governor's goal of a 20-percent reduction.

(e) Establish consistent water use efficiency planning and implementation standards for urban water suppliers and agricultural water suppliers.

(f) Promote urban water conservation standards that are consistent with the California Urban Water Conservation Council's adopted best management practices and the requirements for demand management in Section 10631.

(g) Establish standards that recognize and provide credit to water suppliers that made substantial capital investments in urban water conservation since the drought of the early 1990s.

(h) Recognize and account for the investment of urban retail water suppliers in providing recycled water for beneficial uses.

(i) Require implementation of specified efficient water management practices for agricultural water suppliers.

(j) Support the economic productivity of California's agricultural, commercial, and industrial sectors.

(k) Advance regional water resources management.

10608.8.

(a) (1) Water use efficiency measures adopted and implemented pursuant to this part or Part 2.8 (commencing with Section 10800) are water conservation measures subject to the protections provided under Section 1011.

(2) Because an urban agency is not required to meet its urban water use target until 2020 pursuant to subdivision (b) of Section 10608.24, an urban retail water supplier's failure to meet those targets shall not establish a violation of law for purposes of any state administrative or judicial proceeding prior to January 1, 2021. Nothing in this paragraph limits the use of data reported to the department or the board in litigation or an administrative proceeding. This paragraph shall become inoperative on January 1, 2021.

(3) To the extent feasible, the department and the board shall provide for the use of water conservation reports required under this part to meet the requirements of Section 1011 for water conservation reporting.

(b) This part does not limit or otherwise affect the application of Chapter 3.5 (commencing with Section 11340), Chapter 4 (commencing with Section 11370), Chapter 4.5 (commencing with Section 11400), and Chapter 5 (commencing with Section 11500) of Part 1 of Division 3 of Title 2 of the Government Code.

(c) This part does not require a reduction in the total water used in the agricultural or urban sectors, because other factors, including, but not limited to, changes in agricultural economics or population growth may have greater effects on water use. This part does not limit the economic productivity of California's agricultural, commercial, or industrial sectors.

(d) The requirements of this part do not apply to an agricultural water supplier that is a party to the Quantification Settlement Agreement, as defined in subdivision (a) of Section 1 of Chapter 617 of the Statutes of 2002, during the period within which the Quantification Settlement Agreement remains in effect. After the expiration of the Quantification Settlement Agreement, to the extent conservation water projects implemented as part of the Quantification Settlement Agreement remain in effect, the conserved water created as part of those projects shall be credited against the obligations of the agricultural water supplier pursuant to this part.

Chapter 2. Definitions

10608.12. Unless the context otherwise requires, the following definitions govern the construction of this part:

(a) “Agricultural water supplier” means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. “Agricultural water supplier” includes a supplier or contractor for water, regardless of the basis of right, that distributes or sells water for ultimate resale to customers. “Agricultural water supplier” does not include the department.

(b) “Base daily per capita water use” means any of the following:

(1) The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(2) For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(3) For the purposes of Section 10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.

(c) "Baseline commercial, industrial, and institutional water use" means an urban retail water supplier's base daily per capita water use for commercial, industrial, and institutional users.

(d) "Commercial water user" means a water user that provides or distributes a product or service.

(e) "Compliance daily per capita water use" means the gross water use during the final year of the reporting period, reported in gallons per capita per day.

(f) "Disadvantaged community" means a community with an annual median household income that is less than 80 percent of the statewide annual median household income.

(g) "Gross water use" means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

(1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.

(2) The net volume of water that the urban retail water supplier places into long-term storage.

(3) The volume of water the urban retail water supplier conveys for use by another urban water supplier.

(4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.

(h) "Industrial water user" means a water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.

(i) "Institutional water user" means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

(j) "Interim urban water use target" means the midpoint between the urban retail water supplier's base daily per capita water use and the urban retail water supplier's urban water use target for 2020.

(k) “Locally cost effective” means that the present value of the local benefits of implementing an agricultural efficiency water management practice is greater than or equal to the present value of the local cost of implementing that measure.

(l) “Process water” means water used for producing a product or product content or water used for research and development, including, but not limited to, continuous manufacturing processes, water used for testing and maintaining equipment used in producing a product or product content, and water used in combined heat and power facilities used in producing a product or product content. Process water does not mean incidental water uses not related to the production of a product or product content, including, but not limited to, water used for restrooms, landscaping, air conditioning, heating, kitchens, and laundry.

(m) “Recycled water” means recycled water, as defined in subdivision (n) of Section 13050, that is used to offset potable demand, including recycled water supplied for direct use and indirect potable reuse, that meets the following requirements, where applicable:

(1) For groundwater recharge, including recharge through spreading basins, water supplies that are all of the following:

(A) Metered.

(B) Developed through planned investment by the urban water supplier or a wastewater treatment agency.

(C) Treated to a minimum tertiary level.

(D) Delivered within the service area of an urban retail water supplier or its urban wholesale water supplier that helps an urban retail water supplier meet its urban water use target.

(2) For reservoir augmentation, water supplies that meet the criteria of paragraph (1) and are conveyed through a distribution system constructed specifically for recycled water.

(n) “Regional water resources management” means sources of supply resulting from watershed-based planning for sustainable local water reliability or any of the following alternative sources of water:

(1) The capture and reuse of stormwater or rainwater.

(2) The use of recycled water.

(3) The desalination of brackish groundwater.

(4) The conjunctive use of surface water and groundwater in a manner that is consistent with the safe yield of the groundwater basin.

(o) "Reporting period" means the years for which an urban retail water supplier reports compliance with the urban water use targets.

(p) "Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

(q) "Urban water use target" means the urban retail water supplier's targeted future daily per capita water use.

(r) "Urban wholesale water supplier," means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

Chapter 3. Urban Retail Water Suppliers

10608.16.

(a) The state shall achieve a 20-percent reduction in urban per capita water use in California on or before December 31, 2020.

(b) The state shall make incremental progress towards the state target specified in subdivision (a) by reducing urban per capita water use by at least 10 percent on or before December 31, 2015.

10608.20.

(a) (1) Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.

(2) It is the intent of the Legislature that the urban water use targets described in subdivision (a) cumulatively result in a 20-percent reduction from the baseline daily per capita water use by December 31, 2020.

(b) An urban retail water supplier shall adopt one of the following methods for determining its urban water use target pursuant to subdivision (a):

(1) Eighty percent of the urban retail water supplier's baseline per capita daily water use.

(2) The per capita daily water use that is estimated using the sum of the following performance standards:

(A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.

(B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.

(C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.

(3) Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). If the service area of an urban water supplier includes more than one hydrologic region, the supplier shall apportion its service area to each region based on population or area.

(4) A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010. The method developed by the department shall identify per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020. In developing urban daily per capita water use targets, the department shall do all of the following:

(A) Consider climatic differences within the state.

(B) Consider population density differences within the state.

(C) Provide flexibility to communities and regions in meeting the targets.

(D) Consider different levels of per capita water use according to plant water needs in different regions.

(E) Consider different levels of commercial, industrial, and institutional water use in different regions of the state.

(F) Avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low.

(c) If the department adopts a regulation pursuant to paragraph (4) of subdivision (b) that results in a requirement that an urban retail water supplier achieve a reduction in daily per capita water use that is greater than 20 percent by December 31, 2020, an urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may limit its urban water use target to a reduction of not more than 20 percent by December 31, 2020, by adopting the method described in paragraph (1) of subdivision (b).

(d) The department shall update the method described in paragraph (4) of subdivision (b) and report to the Legislature by December 31, 2014. An urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may adopt a new urban daily per capita water use target pursuant to this updated method.

(e) An urban retail water supplier shall include in its urban water management plan required pursuant to Part 2.6 (commencing with Section 10610) due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.

(f) When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.

(g) An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).

(h) (1) The department, through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this part, including, but not limited to, both of the following:

(A) Methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use.

(B) Criteria for adjustments pursuant to subdivisions (d) and (e) of Section 10608.24.

(2) The department shall post the methodologies and criteria developed pursuant to this subdivision on its Internet Web site, and make written copies

available, by October 1, 2010. An urban retail water supplier shall use the methods developed by the department in compliance with this part.

(i) (1) The department shall adopt regulations for implementation of the provisions relating to process water in accordance with subdivision (l) of Section 10608.12, subdivision (e) of Section 10608.24, and subdivision (d) of Section 10608.26.

(2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

(j) An urban retail water supplier shall be granted an extension to July 1, 2011, for adoption of an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) due in 2010 to allow use of technical methodologies developed by the department pursuant to paragraph (4) of subdivision (b) and subdivision (h). An urban retail water supplier that adopts an urban water management plan due in 2010 that does not use the methodologies developed by the department pursuant to subdivision (h) shall amend the plan by July 1, 2011, to comply with this part.

10608.22. Notwithstanding the method adopted by an urban retail water supplier pursuant to Section 10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use as defined in paragraph (3) of subdivision (b) of Section 10608.12. This section does not apply to an urban retail water supplier with a base daily per capita water use at or below 100 gallons per capita per day.

10608.24.

(a) Each urban retail water supplier shall meet its interim urban water use target by December 31, 2015.

(b) Each urban retail water supplier shall meet its urban water use target by December 31, 2020.

(c) An urban retail water supplier's compliance daily per capita water use shall be the measure of progress toward achievement of its urban water use target.

(d) (1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:

(A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.

(B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.

(C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.

(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.

(e) When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial percentage of industrial water use in its service area, may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.

(f) (1) An urban retail water supplier that includes agricultural water use in an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) may include the agricultural water use in determining gross water use. An urban retail water supplier that includes agricultural water use in determining gross water use and develops its urban water use target pursuant to paragraph (2) of subdivision (b) of Section 10608.20 shall use a water efficient standard for agricultural irrigation of 100 percent of reference evapotranspiration multiplied by the crop coefficient for irrigated acres.

(2) An urban retail water supplier, that is also an agricultural water supplier, is not subject to the requirements of Chapter 4 (commencing with Section 10608.48), if the agricultural water use is incorporated into its urban water use target pursuant to paragraph (1).

10608.26.

(a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

(1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.

(2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.

(3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.

(b) In complying with this part, an urban retail water supplier may meet its urban water use target through efficiency improvements in any combination among its customer sectors. An urban retail water supplier shall avoid placing a disproportionate burden on any customer sector.

(c) For an urban retail water supplier that supplies water to a United States Department of Defense military installation, the urban retail water supplier's implementation plan for complying with this part shall consider the United States Department of Defense military installation's requirements under federal Executive Order 13423.

(d) (1) Any ordinance or resolution adopted by an urban retail water supplier after the effective date of this section shall not require existing customers as of the effective date of this section, to undertake changes in product formulation, operations, or equipment that would reduce process water use, but may provide technical assistance and financial incentives to those customers to implement efficiency measures for process water. This section shall not limit an ordinance or resolution adopted pursuant to a declaration of drought emergency by an urban retail water supplier.

(2) This part shall not be construed or enforced so as to interfere with the requirements of Chapter 4 (commencing with Section 113980) to Chapter 13 (commencing with Section 114380), inclusive, of Part 7 of Division 104 of the Health and Safety Code, or any requirement or standard for the protection of public health, public safety, or worker safety established by federal, state, or local government or recommended by recognized standard setting organizations or trade associations.

10608.28.

(a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

(1) Through an urban wholesale water supplier.

(2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).

(3) Through a regional water management group as defined in Section 10537.

(4) By an integrated regional water management funding area.

(5) By hydrologic region.

(6) Through other appropriate geographic scales for which computation methods have been developed by the department.

(b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

10608.32. All costs incurred pursuant to this part by a water utility regulated by the Public Utilities Commission may be recoverable in rates subject to review and approval by the Public Utilities Commission, and may be recorded in a memorandum account and reviewed for reasonableness by the Public Utilities Commission.

10608.36. Urban wholesale water suppliers shall include in the urban water management plans required pursuant to Part 2.6 (commencing with Section 10610) an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part.

10608.40. Urban water retail suppliers shall report to the department on their progress in meeting their urban water use targets as part of their urban water management plans submitted pursuant to Section 10631. The data shall be reported using a standardized form developed pursuant to Section 10608.52.

10608.42. The department shall review the 2015 urban water management plans and report to the Legislature by December 31, 2016, on progress towards achieving a 20-percent reduction in urban water use by December 31, 2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets in order to achieve the 20-percent reduction and to reflect updated efficiency information and technology changes.

10608.43. The department, in conjunction with the California Urban Water Conservation Council, by April 1, 2010, shall convene a representative task force consisting of academic experts, urban retail water suppliers, environmental organizations, commercial water users, industrial water users, and institutional water users to develop alternative best management practices for commercial, industrial, and institutional users and an assessment of the potential statewide water use efficiency improvement in the commercial, industrial, and institutional sectors that would result from implementation of these best management practices. The taskforce, in conjunction with the department, shall submit a report to the Legislature by April 1, 2012, that shall include a review of multiple sectors within commercial, industrial, and institutional users and that shall recommend water use efficiency standards for commercial, industrial, and institutional users among various sectors of water use. The report shall include, but not be limited to, the following:

(a) Appropriate metrics for evaluating commercial, industrial, and institutional water use.

(b) Evaluation of water demands for manufacturing processes, goods, and cooling.

(c) Evaluation of public infrastructure necessary for delivery of recycled water to the commercial, industrial, and institutional sectors.

(d) Evaluation of institutional and economic barriers to increased recycled water use within the commercial, industrial, and institutional sectors.

(e) Identification of technical feasibility and cost of the best management practices to achieve more efficient water use statewide in the commercial, industrial, and institutional sectors that is consistent with the public interest and reflects past investments in water use efficiency.

10608.44. Each state agency shall reduce water use on facilities it operates to support urban retail water suppliers in meeting the target identified in Section 10608.16.

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Section M: Water Conservation Bill of 2009 Technical Methodologies

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Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use

(For the Consistent Implementation of the Water Conservation Act of 2009)

February 2011

California Department of Water Resources
Division of Statewide Integrated Water Management
Water Use and Efficiency Branch

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Introduction

In February 2008, Governor Arnold Schwarzenegger introduced a seven-part comprehensive plan for improving the Sacramento-San Joaquin Delta. A key component of his plan was a goal to achieve a 20 percent reduction in per capita water use statewide by the year 2020. The governor's inclusion of water conservation in the Delta plan emphasizes the importance of water conservation in reducing demand on the Delta and in reducing demand on the overall California water supply. In response to Schwarzenegger's call for statewide per capita savings, the Department of Water Resources (DWR) and the State Water Resources Control Board convened the 20x2020 Agency Team on Water Conservation. DWR released a draft 20x2020 Water Conservation Plan in April 2009 and the final 20x2020 Water Conservation Plan in February 2010. The water conservation plan developed estimates of statewide and regional baseline per capita water use and outlined recommendations to the governor on how a statewide per capita water use reduction plan could be implemented.

In November 2009, SBX7-7, The Water Conservation Act of 2009, was signed into law as part of a comprehensive water legislation package. The Water Conservation Act addresses both urban and agricultural water conservation. The urban provisions reflect the approach taken in the 20x2020 Water Conservation Plan. The legislation sets a goal of achieving a 20 percent statewide reduction in urban per capita water use and directs urban retail water suppliers to set 2020 urban water use targets. The Water Conservation Act of 2009 directs DWR to develop technical methodologies and criteria to ensure the consistent implementation of the Act and to provide guidance to urban retail water suppliers in developing baseline and compliance water use. These technical methodologies were developed through a public process with stakeholder input. DWR has held two public listening sessions, five public stakeholder meetings, and two public workshops to receive comment on the technical methodologies. One of the methodologies, the Criteria for Compliance -Year Adjustment will be released in 2011. This methodology is not needed by urban water suppliers to develop 2010 urban water management plans, and additional time is needed to develop the weather normalization model, which will be a major component of the methodology.

Background documents, stakeholder meeting summaries and public comments related to the development of these methodologies are available at the Water Conservation Act of 2009 website: http://www.water.ca.gov/wateruseefficiency/sb7/

Or contact:

SBX7-7 Urban Water Conservation Program Manager
Water Use and Efficiency Branch
Department of Water Resources, 1416 Ninth Street, Sacramento CA 95814

Overview of Methodologies, Water Use Targets, and Reporting

The Water Conservation Act of 2009 was incorporated into Division 6 of the California Water Code, commencing with Section 10608 of Part 2.55. All quotations of the Water Code in this report are from sections added by this legislation, unless otherwise noted.

The methodologies, water use targets, and reporting apply to urban retail water suppliers that meet a threshold of number of end users or annual volume of potable water supplied. Section 10698.12 (p) defines the water suppliers affected:

> *"Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.*

This overview summarizes the process that urban retail water suppliers must follow and the options they have for complying with the legislation.

Methodologies

The legislation specifically calls for developing seven methodologies and a set of criteria for adjusting daily per capita water use at the time compliance is required (the 2015 and 2020 compliance years) under Section 10608.20(h):

> *(1) The department, through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this part, including, but not limited to, both of the following:*
>
> *(A) Methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use.*
>
> *(B) Criteria for adjustments pursuant to subdivisions (d) and (e) of Section 10608.24.*

Sections 10608.20 and 10608.28 of the Water Code allow water suppliers the choice of complying individually or regionally by mutual agreement with other water suppliers or regional agencies. DWR has also developed a methodology for regional compliance.

The following methodologies are included in this report:

- Methodology 1: Gross Water Use
- Methodology 2: Service Area Population
- Methodology 3: Base Daily Per Capita Water Use
- Methodology 4: Compliance Daily Per Capita Water Use

- Methodology 5: Indoor Residential Use
- Methodology 6: Landscaped Area Water Use
- Methodology 7: Baseline Commercial, Industrial, and Institutional (CII) Water Use
- Methodology 8: Criteria for Adjustments to Compliance Daily Per Capita Water Use
- Methodology 9: Regional Compliance

The methodologies provide specific guidance to water suppliers on how to calculate baseline, target, and compliance-year water use. Each methodology defines how its calculations are to be used, with direct reference to the applicable section of the Water Code.

Each methodology describes the calculations, data needed, and, where applicable, optional steps and alternative approaches that water suppliers may use depending on their specific circumstances.

The methodologies for indoor residential water use; landscaped area water use; and baseline CII water use (Methodologies 5, 6, and 7) apply only to urban retail water suppliers who use Method 2 (see Water Use Targets below) to set water use targets.

Baseline Water Use

Water suppliers must define a 10- or 15-year base (or baseline) period for water use that will be used to develop their target levels of per capita water use. Water suppliers must also calculate water use for a 5-year baseline period, and use that value to determine a minimum required reduction in water use by 2020. The longer baseline period applies to a water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water. Methodology 3: Base Daily Per Capita Water Use describes the calculations.

Water Use Targets

An urban retail water supplier, as defined above, must set a 2020 water use target and a 2015 interim target using one of four methods. Three of these are defined in Section 10608.20(a)(1), with the fourth developed by DWR by the end of 2010. The 2020 water use target will be calculated using one of the following four methods:

- Method 1: Eighty percent of the water supplier’s baseline per capita water use
- Method 2: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and CII uses
- Method 3: Ninety-five percent of the applicable state hydrologic region target as stated in the State’s April 30, 2009, draft 20x2020 Water Conservation Plan
- Method 4: An approach developed by DWR and reported to the Legislature by December 2010 (a description of this target method will be included as Appendix C)

The target may need to be adjusted further to achieve a minimum reduction in water use regardless of the target method (this is explained in Methodology 3). The Water Code directs that water suppliers must compare their actual water use in 2020 with their calculated targets to assess compliance. In addition, water suppliers will report interim compliance in 2015 as compared to an interim target (generally halfway between the baseline water use and the 2020 target level). The years 2015 and 2020 are referred to in the methodologies as compliance years. All baseline, target, and compliance-year water use estimates must be calculated and reported in gallons per capita per day (GPCD).

Water suppliers have some flexibility in setting and revising water use targets:

- A water supplier may set its water use target and comply individually, or as part of a regional alliance (see Methodology 9: Regional Compliance).
- A water supplier may revise its water use target in its 2015 or 2020 urban water management plan or in an amended plan.
- A water supplier may change the method it uses to set its water use target and report it in a 2010 amended plan or in its 2015 urban water management plan. Urban water suppliers are not permitted to change target methods after they have submitted their 2015 UWMP.

Data Reporting

DWR will collect data pertaining to urban water use targets through three documents: (1) through the individual supplier urban water management plans; (2) through the regional urban water management plans; and (3) through regional alliance reports.

Water suppliers that comply individually must report the following data in their urban water management plans (applicable urban water management plan dates are included in parentheses).

- Baseline Gross Water Use and Service Area Population (2010, 2015, 2020)
- Individual 2020 Urban Water Use Target (2010, 2015, 2020) and Interim 2015 Urban Water Use Target (2010)
- Compliance Year Gross Water Use (2015 and 2020) and Service Area Population (2010, 2015, 2020)
- Adjustments to Gross Water Use in the compliance year (2015, 2020)
- Water suppliers who choose Target Method 2 also must provide Landscaped Area Water Use and Baseline CII Water Use data (2010, 2015, and 2020).
- Water Suppliers who choose Target Method 4 must provide the components of calculation as required by Target Method 4. Appendix C describes Target Method 4 and the regional compliance reporting that applies to that method (2010, 2015, and 2020).

Water suppliers that comply regionally must fulfill additional reporting requirements. These are described in greater detail in Methodology 9: Regional Compliance.

Consequences if Water Supplier Does Not Meet Water Use Targets

Each urban retail water supplier, as defined above, must comply by establishing 2015 and 2020 water use targets, demonstrating that its water use is in compliance with its targets, and reporting water use baselines, targets, compliance year water use, and supporting data in its urban water management plan. Section 10608.56 (a) states that a water supplier not in compliance will not be eligible for water grants or loans that may be administered by DWR or other state agencies:

> *On and after July 1, 2016, an urban retail water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.*

Two exceptions to this are allowed. Section 10608.56 (c) states that a water supplier shall be eligible for a water loan or grant if it "has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for achieving the per capita reductions."

Section 10608.56 (e) states that a water supplier can also be eligible for a water loan or grant if it "has submitted to the department for approval documentation demonstrating that its entire service area qualifies as a disadvantaged community."

Methodology 1: Gross Water Use

Definition of Gross Water Use

Section 10608.12(g) of the Water Code defines "Gross Water Use" as:

> *the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:*
>
> *(1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier*
>
> *(2) The net volume of water that the urban retail water supplier places into long term storage*
>
> *(3) The volume of water the urban retail water supplier conveys for use by another urban water supplier*
>
> *(4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24*

Calculation of Gross Water Use

Gross Water Use is a measure of water supplied to the distribution system over 12 months and adjusted for changes in distribution system storage and deliveries to other water suppliers that pass through the distribution system. Recycled water deliveries are to be excluded from the calculation of Gross Water Use. Water delivered through the distribution system for agricultural use may be deducted from the calculation of Gross Water Use. Under certain conditions, industrial process water use also may be deducted from Gross Water Use.

The methodology for calculating Gross Water Use broadly follows American Water Works Association (AWWA) Manual M36 guidance for calculating Distribution System Input Volume.[1] Calculating Gross Water Use entails 12 basic steps, two of which are optional.[2]

Step 1: Define the 12-month Calculation Period

Gross Water Use shall be calculated over a continuous 12-month period. This period can be based on the calendar year or the utility's fiscal year.[3] The same 12-month period must be used in calculations of Gross Water Use for determining Base Daily Per Capita Water Use and Compliance Daily Per Capita Water Use.

[1]American Water Works Association, Manual of Water Supply Practices – M36: Water Audits and Loss Control Programs, 3rd Edition, 2009. M36 defines Distribution System Input Volume as the volume of water entering the distribution system to provide service to customers. It is equal to the water volume derived from the water utility's own source waters, plus water imported or purchased, plus or minus the net change in water storage (if applicable and significant).

[2]AWWA Manual M36 contains several forms and worksheets that retail urban water suppliers can use to compile and organize data required to calculate Gross Water Use.

[3]As stipulated in paragraph (1) of subdivision (a) of Section 10608.20 of SBX7-7.

Step 2: Delineate Distribution System Boundary

Water supply systems can be broadly subdivided between the transmission systems that convey large amounts of water to local storage reservoirs or treatment plants, and the distribution systems that supply water to residential, commercial, industrial, and public uses such as fire safety. Water distribution systems generally comprise large networks of pipes with complex branched and loop topologies with multiple flow paths to many delivery points.[4] In some systems, some retail customers receive water for municipal and industrial (M&I) uses directly from transmission canals and pipes, in which case the retail water supplier may treat the sections of the transmission canals and pipes delivering water to the retail M&I customers as part of its distribution system. However, transmission canals and pipelines not used for delivering water directly to retail customers should not be included as part of the distribution system.

Wherever possible, distribution system boundary limits should be defined by points of metering or measurement[5] of the water supply. Typical measurement locations for distribution include exit points for treatment plants, treated water reservoirs, wells feeding directly into the distribution system, and imported water entering directly into the distribution system. A schematic of a typical urban retail water supply system is shown in Figure 1; actual distribution systems may vary greatly in configuration. Therefore, each urban retail water supplier must define and delineate its distribution system for purposes of calculating Gross Water Use. The rules for defining and delineating the distribution system boundary must be applied consistently in the base period and compliance years.[6]

Step 3: Compile Water Volume from Own Sources

The water supplier's own sources of supply entering the distribution system shall be identified and tallied. For systems that provide only treated water, this may consist mostly or entirely of water entering the distribution system from treatment plants (as in Figure 1). It may also include water from wells or other sources controlled by the water supplier that directly supply the distribution system (as in Figure 1).

Recycled water, as defined in subdivision (m) of Section 10608.12, directly entering the distribution system shall be excluded from the tally of own sources. Step 8 addresses how to account for recycled water indirectly entering the distribution system through potable reuse.

Measurement records for each source shall be compiled into annual volumes. AWWA's M36 manual or other appropriate references should be consulted in situations where water sources are unmetered or the water meters have not been routinely calibrated. Volumes for each source shall be reviewed and corrected for known errors that may exist in the raw

[4] http://censam.mit.edu/news/posters/whittle/1.pdf

[5] Measurements of unmetered agricultural and raw water deliveries must, at a minimum, meet an accuracy standard of +/- 6% by volume, as defined in the U.S. Bureau of Reclamation, Mid-Pacific Region's "2008 Conservation and Efficiency Criteria". Metered deliveries of M&I water must meet the measurement accuracy and calibration standards described in American Water Works Association Manual M6.

[6] For guidance on situations in which the distribution system boundary changed during the base period, see Methodology 3: Base Daily Per Capita Water Use. For situations in which the distribution system boundary changed during the compliance period, see Methodology 4: Compliance Daily Per Capita Water Use.

measurement data. Uncorrected metered volumes shall be adjusted based on the registration accuracy of the meter, as follows:[7]

$$\text{metered volume correction} = \frac{\text{uncorrected metered volume}}{\text{registration accuracy expressed as a decimal}} - \text{uncorrected meter volume}$$

Step 4: Compile Imported Water Volume

Outside sources of finished water imported directly into the distribution system shall be identified and tabulated, excluding the following:

- Recycled water, as defined in subdivision (m) of Section 10608.12, imported from another water supplier
- Imported raw water passing through the urban retail water supplier's treatment plants, if that water has already been counted under Step 3 (as in Figure 1)

The raw measurement data shall be corrected for known errors in the same manner as for own source water.[8]

Step 5: Compile Exported Water Volume

Any water volumes sent through the distribution system to another water utility or jurisdiction shall be identified and tabulated. Recycled water, as defined in subdivision (m) of Section 10608.12, exiting the distribution system shall be excluded from the tabulation.[9]

Bulk water exports that do not pass through the distribution system also shall not be counted. The raw metering data shall be corrected for known errors in the same manner as for own source and imported water.

Step 6: Calculate Net Change in Distribution System Storage

If distribution system storage is greater at the end of the year than at the beginning, it indicates that water has entered the distribution system but has not been delivered to customers. This water would have been counted in Steps 3 and 4, but because it has not been delivered to customers, it must be deducted from the calculation of Gross Water Use.

Conversely, a decrease in end-of-year distribution system storage indicates that water has been drawn from storage to meet customer demands. This water would not have been counted in Steps 1 and 2, and therefore must be added to the calculation of Gross Water Use. Note that these calculations apply only to storage in the distribution system. Do not include changes in storage outside the distribution system. If the change in distribution system storage is expected to be insignificant, or if data needed to calculate the change in distribution system storage are not available, the water supplier may forgo this step.

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[7]AWWA Manual M36 should be consulted if additional guidance on correcting raw meter data for meter registration inaccuracy is needed. Meters with errors exceeding AWWA standards should be recalibrated, repaired, or replaced.

[8]Generally, bulk water sale meters are routinely monitored for accuracy because they provide the basis for payment between the wholesaler and retailer.

[9]It is necessary to subtract recycled water exiting the system only if it was included in the tabulations of water entering the distribution system performed in Steps 3 and 4. However, the easiest way to handle recycled water directly entering the distribution system in the calculation of Gross Water Use is to exclude it entirely from each calculation step.

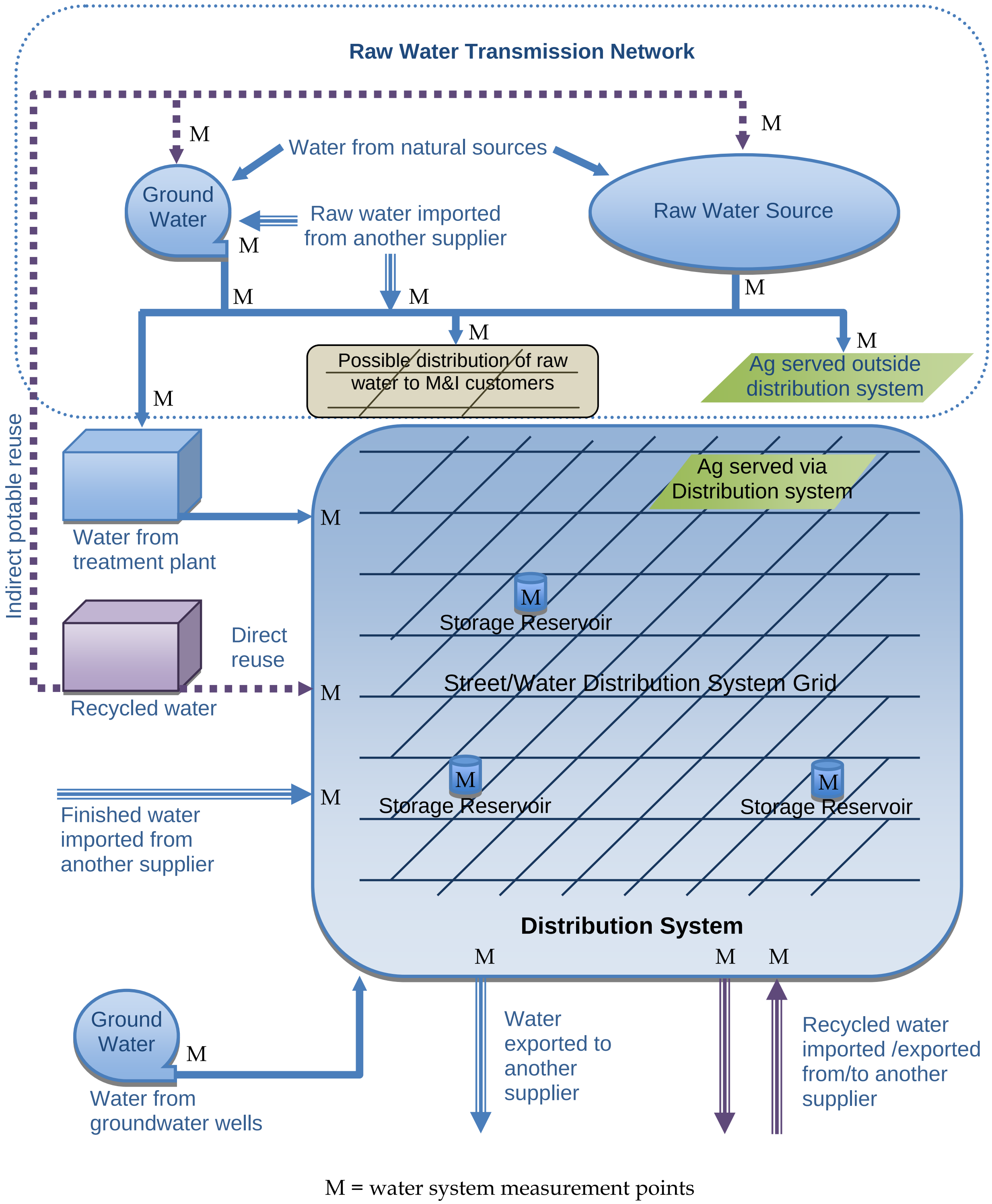

FIGURE 1
URBAN RETAIL WATER SUPPLIER SYSTEM SCHEMATIC[10]

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[10]Figure 1 provides a general depiction of all of the elements that may affect the calculation of Gross Water Use. Not all of these elements may be present in a particular water system, nor is it expected that Figure 1 will accurately characterize a particular system configuration.

Step 7: Calculate Gross Water Use before Indirect Recycled Water Use Deductions

Gross Water Use before Indirect Recycled Water Use Deductions equals the volume of water from own sources entering the distribution system determined in Step 3, plus the volume of water from imported water sources entering the distribution system determined in Step 4, less the volume of water delivered via the distribution system to other utilities determined in Step 5, less the net change in distribution system storage determined in Step 6.[11] Table 1 provides an example calculation.

Step 8: Deduct Recycled Water Used for Indirect Potable Reuse from Gross Water Use

This step is necessary only if the urban retail water supplier uses recycled water (as defined in Subdivision (m) of Section 10608.12) to supplement raw surface or groundwater for indirect potable reuse. The Step 8 deduction requires the urban retail water supplier to estimate the amount of recycled water indirectly entering the distribution system through a surface or groundwater source (as in Figure 1).[12] This calculation requires three steps: (1) estimate the amount of recycled water used to supplement a surface reservoir source of supply, (2) estimate the amount of recycled water in extracted groundwater sources of supply, and (3) adjust these volumes for losses during transmission and treatment before the water enters the distribution system.

1. **Estimate recycled water used for surface reservoir augmentation.** The allowable deduction depends on the recycled water blend percentage in the surface reservoir water entering the potable water treatment plant. For example, if the raw surface water source is 95 percent fresh water and 5 percent recycled water, no more than 5 percent of the volume from this water source can be deducted from Gross Water Use calculated in Step 7. If the blend percentage of a surface water source is unknown, it shall be estimated based on the measured or estimated volumes of recycled water, local runoff, and imported water that entered the reservoir for the three years before the year for which Gross Water Use is being calculated. For example, if Gross Water Use is being calculated for 2005, the blend percentage is estimated by dividing the volume of recycled water that entered the reservoir by the total volume of water that entered the reservoir from 2002 through 2004.

2. **Estimate recycled water used for groundwater recharge.** Three approaches are allowed to estimate the amount of recycled water extracted from groundwater and introduced into a distribution system. Because year-to-year variations can occur in the amount of recycled water applied in a groundwater recharge operation, long-term running averages are required.

[11] If the net change is negative, Gross Water Use will increase. If it is positive, Gross Water Use will decrease.

[12] Recycled water used for indirect potable use should only be subtracted at the time it enters the potable distribution system. It cannot be subtracted when placed into storage and again when extracted for potable use.

a. **Monitoring data at extraction wells.** If monitoring data are available to enable determination of the percent of extracted water at each extraction well that originated as recycled water (for example, using geochemical analysis), then such data can be used to estimate the amount of recycled water entering a distribution system. To account for year-to-year variations, the credit or recycled water is a five year running monthly average percentage for each well for the preceding 60 months. For recharge projects in operation less than 60 months, a period of 60 months can be created using a combination of actual monitoring data since initiation of recharge operations and projected data. The projected data can be based on an acceptable groundwater model as described in paragraph b below or a projected average of extraction using the procedure described in paragraph c below.

b. **Groundwater model for extraction wells.** If a groundwater model is available that has the capability of tracking the movement of recycled water from recharge operations to extraction wells and estimating the percent of extracted groundwater that originated as recycled water at each well operated by the water supplier based on actual historic data of recycled water applied at groundwater recharge operations, then such data can be used to determine the amount of recycled water entering a distribution system. The groundwater model must be calibrated and approved as part of an adjudication or other regulatory process, such as the groundwater permitting process by the California Department of Public Health or a California Regional Water Quality Control Board. To account for year-to-year variations, the credit for recycled water is a five-year running monthly average percentage at each well for the preceding 60 months. For recharge projects in operation less than 60 months, the monthly running average may be derived from the model using all months of actual recycled water applied in a recharge operation and projected recycled water amounts planned to be applied for a future period to reach a combined total of 60 months of operation.

c. **Recharge data less in-basin losses.** Where actual extraction well monitoring data or estimated data obtained from an accepted groundwater model, as described in paragraph b above, are unavailable, an estimate can be made of extracted recycled water based on amounts of recycled water applied in recharge operations adjusted for an in-basin loss factor. The allowable deduction depends on the product of three factors:

    i. The average annual volume of recycled water recharged into the groundwater basin for the purpose of indirect potable reuse over the 5 years before the year for which Gross Water Use is being calculated. For recharge projects in operation less than 60 months, data from all months of actual recharge operations may be combined with projected volumes of recycled water recharge to reach a combined total of 60 months of operation to calculate the average annual volume of recycled water recharged.

    ii. A loss factor to account for water losses during recharge and extraction. If a loss factor has been developed as part of a groundwater management plan, a basin adjudication process, or some similar regulatory process, the water supplier shall use that loss factor and provide reference to the appropriate documentation. If a loss factor has not been developed as part of a local regulatory process, the water supplier shall use a default loss factor of 10 percent.[13] The default loss factor of 10percent is not applicable to groundwater recharge operations intended as seawater intrusion barriers. For seawater intrusion barriers, the loss factor will be determined on a case-by-case basis.

iii. The volume of water pumped from the basin by the urban retail water supplier expressed as a percentage of the total volume of water pumped by all water users extracting water from the basin in the year for which Gross Water Use is being calculated.

For example, if the average annual recharge of recycled water for the five years before the year for which Gross Water Use is being calculated is 500 acre-feet (AF), the recharge loss factor is 10 percent, and the urban retail water supplier accounted for 25 percent of the volume of water pumped from the basin in the year for which Gross Water Use is being calculated, then no more than 113AF =(500 x (1.0-0.10) x 0.25) from this supply source can be deducted from Gross Water Use calculated in Step 7.

3. **Adjust for losses.** Only deduct the volume of recycled water used for indirect potable reuse that enters the distribution system from Gross Water Use calculated in Step 7.

Loss factors for transmission and treatment based on recent system audit data (or other reliable sources for estimating transmission and treatment losses) shall be applied to the estimated volumes of recycled water. For example, if the volume of recycled water before transmission and treatment is estimated to be 1,000 AF, and combined losses from transmission and treatment are estimated to be 3 percent, only 970 AF shall be deducted from Gross Water Use calculated in Step 7.

Table 2 shows an example calculation of the volume of recycled water used for indirect potable reuse based on approach 2.c above.

[13]The default value of 10 percent is based on the loss factors applied to groundwater storage in the Arvin-Edison and Semitropic Water Storage Districts. It also is consistent with the range of 0 to 15 percent loss factors applied to California water storage projects identified in the Groundwater Banking Programs Survey-Results and Summary Report prepared for the Sacramento Groundwater Authority by Kennedy/Jenks Consultants (2008). The projects they surveyed primarily used modeling and observation to determine the specific loss factor for each project.

Step 9: Calculate Gross Water Use after Deducting Indirect Recycled Water Use

This equals the volume of water determined in Step 7 less the volume of water determined in Step 8. Table 1 shows an example calculation of Gross Water Use after indirect recycled water use deductions.

Step 10 (Optional): Deduct from Gross Water Use the Volume of Water Delivered for Agricultural Use

This step is necessary only if the urban retail water supplier has chosen to exclude from the calculation of Gross Water Use water delivered for agriculture per Section 10608.12 (g) (4).

Consideration of agricultural water use must be the same for calculations of Gross Water Use for determining Base Daily Per Capita Water Use and Compliance Daily Per Capita Water Use.

Identify and tabulate the volume of water delivered through the distribution system for agricultural water uses. Do not include deliveries that bypass the distribution system (see Figure 1 for examples of agricultural deliveries inside and outside the distribution system).

Delivery volumes shall be based on account records and meter data for connections in the distribution system used to supply water for the commercial production of agricultural crops or livestock.[14]

Step 11 (Optional): Deduct Volume of Water Delivered for Process Water Use

This step is necessary only if the urban retail water supplier has elected to exclude process water from the calculation of Gross Water Use and the supplier is eligible to do so. An urban retail water supplier is eligible to exclude process water from the calculation of Gross Water Use only if its industrial water use comprises a substantial percentage of total water use.

[NOTE: See Appendix D for guidance on whether to include or exclude process water.]

Step 12: Calculate Gross Water Use after Optional Deductions

This equals the volume of water determined in Step 9 less the volume of water determined in Steps 10 and 11. Table 1 provides an example calculation of Gross Water Use after optional deductions.

[14] The standard used to identify distribution system connections supplying agricultural water uses is based on subdivision (b) of Section 535 of the California Water Code. Commercial agricultural production is defined by the U.S. Department of Agriculture and the Census Bureau as any place from which $1,000 or more of agricultural products (crops and livestock) were sold or normally would have been sold during the year. For the purposes of calculating Gross Water Use, retail nursery water use is not considered to be an agricultural water use.

TABLE 1

EXAMPLE URBAN RETAIL WATER SUPPLIER GROSS WATER USE CALCULATION

Utility Name:		**12-month period:**	**1-Jan to 31-Dec**				**Volume Units:**	**Million Gallons**			
	Calculation	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
	Volume from Own Sources (raw data)	3,480.8									
	Meter error adjustment (+/-)	136.9									
1	*Subtotal: Corrected Volume from Own Sources*	3,617.7									
	Volume from Imported Sources (raw data)	1,005.0									
	Meter error adjustment (+/-)	39.5									
2	*Subtotal: Corrected Volume from Imported Sources*	1,044.5									
3	***Total Volume Into Dist. System = Line 1 + Line 2***	***4,662.2***									
	Volume Exported to Other Utilities (raw data)	432.0									
	Meter error adjustment (+/-)	17.3									
4	*Subtotal: Corrected Volume Exported to Other Utilities*	449.3									
5	Change in Dist. System Storage (+/-)	-8.6									
6	***Gross Water Use Before Indirect Recycled Water Use Deductions = Line 3 - Line 4 - Line 5***	***4,221.5***									
7	Indirect Recycled Water Use Deduction	304.3									
8	***Gross Water Use After Indirect Recycled Water Use Deductions = Line 6 - Line 7***	***3,917.2***									
9	*Water Delivered for Ag. Use (optional deduction)*	0.0									
10	*Process Water Use (optional deduction)*	278.8									
11	**Gross Water Use After Optional Deductions = Line 8 - Line 9 - Line 10**	**3,638.4**									

TABLE 2

EXAMPLE CALCULATION OF ANNUAL DEDUCTABLE VOLUME OF INDIRECT RECYCLED WATER ENTERING DISTRIBUTION SYSTEM

Surface Reservoir Augmentation			Volume Discharged from Reservoir for Distribution System Delivery (MG)	Recycled Water Blend	Recycled Water Delivered to Treatment Plant (MG)	Transmission/Treatment Loss	Transmission/Treatment Losses (MG)	Volume Entering Distribution System (MG)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					(4) x (5)		(6) x (7)	(6) – (8)
Source 1			1,000	5%	50	3%	1.5	48.5
Source 2			500	10%	50	3%	1.5	48.5
						Subtotal Reservoir Augmentation:		*97*

Groundwater Recharge	5-Year Annual Average Recharge (MG)	Recharge Recovery Factor	Recycled Water Pumped from Basin (MG)	Utility Pumping as % of Basin Total	Recycled Water Pumped by Utility (MG)	Transmission/Treatment Loss	Transmission/ Treatment Losses (MG)	Volume Entering Distribution System (MG)
			(4)	(5)	(6)	(7)	(8)	(9)
(1)	(2)	(3)	(2) x (3)		(4) x (5)		(6) x (7)	(6) – (8)
Basin 1	500	90%	450	25%	113	3%	3.4	109.1
Basin 2	750	90%	675	15%	101	3%	3	
						Subtotal Groundwater Recharge:		*207.3*
					Deductable Volume of Indirect Recycled Water Entering Distribution System:			**304.3**

MG = million gallons

Methodology 2: Service Area Population

Definition of the Service Area Population

Section 10608.20(f) states:

> *When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.*

The legislation directs DWR to develop consistent methodologies and criteria for determining Service Area Population.

To obtain an accurate estimate of GPCD, water suppliers must estimate population of the areas that they actually serve, which may or may not coincide with either their jurisdictional boundaries or with the boundaries of cities. Customers may be in the distribution area with a wholly private supply during the baseline and compliance years, and new areas may be annexed into a water supplier's distribution system over time. The area used for calculating Service Area Population shall be the same as the distribution system area used in Methodology 1, Gross Water Use.

Figure 2 illustrates the many different situations that may arise, with the background grid indicating the census blocks that overlap with the water supplier's service area boundary.

Examples include the following:

- The actual distribution area may cover only a portion of the jurisdictional boundary.
- Large water users that depend wholly or partially on a private groundwater supply (e.g., college campus, a military installation, a correctional facility) may exist in the distribution area. If such a user is wholly dependent on private supply, its residents should be excluded. If the user is partially dependent (for example, it uses a municipal source for indoor use and private groundwater wells for irrigation only), its residents served by the municipal source should be included. Estimation of compliance GPCD for customers that switch their irrigation to a municipal source between the baseline and compliance years is addressed in Methodology 4: Compliance Daily Per Capita Water Use.
- New customers outside the present distribution area may connect to the water supplier's distribution system in the future for various reasons.
- The water supplier's distribution system can geographically expand over time as a result of economic and population growth.

Although a water supplier may consult any or all federal, State, and local data sources to estimate population, these estimates must account for the above-mentioned complexities.

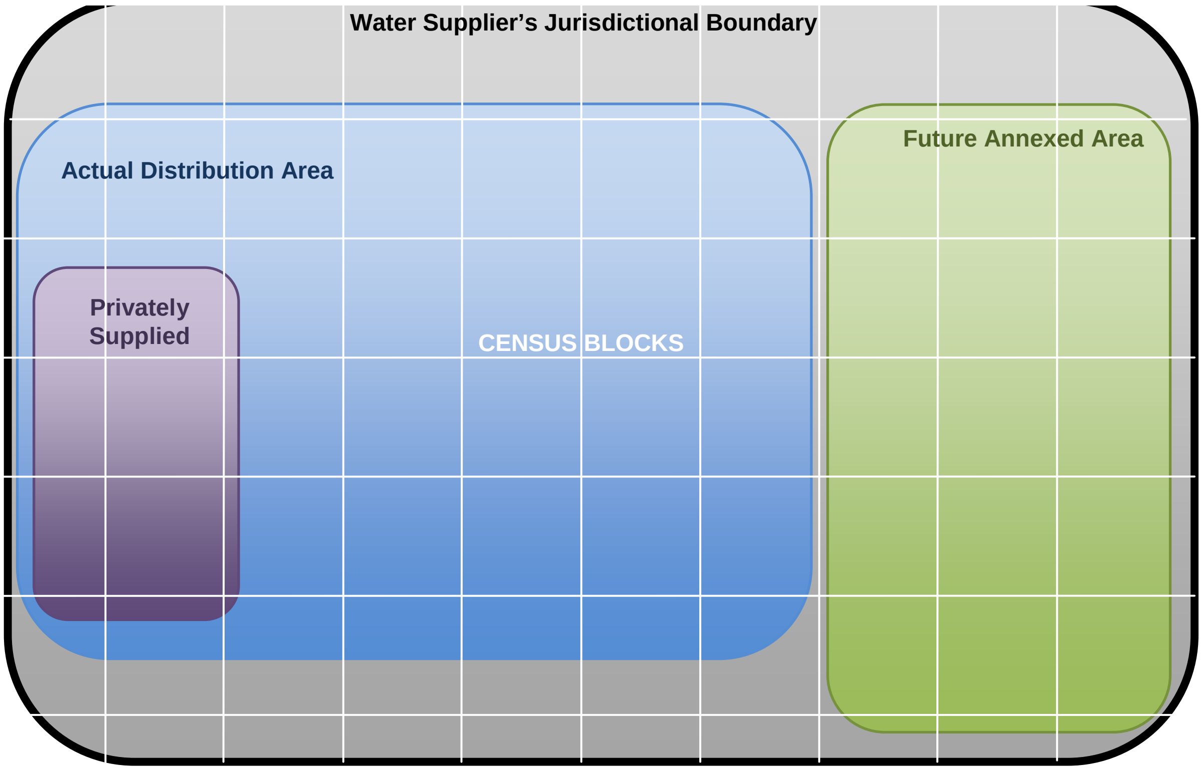

FIGURE 2
DEFINING AREA FOR POPULATION CALCULATION

Estimating the Service Area Population

Data published by the California Department of Finance (DOF) or the U.S. Census Bureau must serve as the foundational building block for population estimates. In some instances, data published by these two sources may be directly applicable. In other instances, additional refinements may be necessary. For example, to account for distribution areas that do not match city boundaries, customers with private sources of supply, or other unique local circumstances, water suppliers may have to supplement the above sources of data with additional local data sources such as county assessor data, building permits data, and traffic analysis zone data. These refinements are acceptable as long as they are consistently applied over time, and as long as they build upon population data resources of the DOF or the U.S.

Census Bureau. Suppliers in any category listed below may use the persons per-connection or person per housing unit population calculation method described in Appendix A.

Retail water suppliers will generally fall into one of the following three categories:

- Category 1: Water suppliers whose actual distribution area overlaps substantially (≥95%) with city boundaries (may be a single city or a group of cities) during baseline and compliance years
- Category 2: Water suppliers not falling in Category 1 but having an electronic geographic information system (GIS) map of their distribution area

- Category 3: Water suppliers not falling in Category 1 and lacking an electronic GIS map of their distribution area.

Category 1 Water Suppliers

These water suppliers are encouraged to use population data published by the DOF's demography unit. However, population data may also be available through a water wholesaler, a local government agency, or an association of local governments. A list of associations of local governments is available through the California Association of Councils of Government (CALCOG: www.calcog.org). Many of these associations serve as census data repositories and also have GIS capabilities.

Category 1 water suppliers may use population estimates from any of these federal, state, or local agencies, as long as they clearly cite their data source, use the same source for both the baseline and compliance years, and correct these estimates for privately supplied large customers that may exist in their actual distribution area (for development of these corrections, see Appendix A).

Category 2 Water Suppliers

These water suppliers have two options:

- Water suppliers that are members of an association of local governments (or a water wholesaler) that develop population estimates for its members using GIS maps of actual distribution areas and population data from the DOF or Census Bureau should use these data for the baseline and compliance years. These suppliers are not required to use the per-connection or per-housing unit methodology described in Appendix A. The water suppliers should coordinate with the local government association or wholesaler to complete the task of identifying and removing large institutions with wholly private systems in their distribution area.
- Water suppliers without such membership must develop population estimates using either a per-connection or per-housing unit methodology described in Appendix A or another equivalent method that uses data either from the DOF or the U.S. Census Bureau as its basis.

Category 3 Water Suppliers

These water suppliers have the same two options as Category 2 water suppliers. The only difference is that to access the U.S. Census Bureau's population data resources, they first must identify which census blocks fall in their distribution area. This exercise can be performed manually (see Appendix A), or the distribution area map boundary can be digitized. Category 3 water suppliers may be able to access these digitization capabilities and census-based population estimation capabilities through their local association of governments. Alternatively, they can develop population estimates using either the per-connection or per-housing unit methodology described in Appendix A or another equivalent method that uses data from either the DOF or the U.S. Census Bureau as its basis.

Determining Adequacy of Current Population Estimate Methodology

Figure 3 provides a flow chart to help water suppliers determine whether their existing population estimation methodology is adequate or must be refined. If refinement is needed, it should be coordinated with the water wholesaler or the local association of governments that currently provides population estimates. Water suppliers that currently lack access to reliable population estimates that reflect characteristics of their actual distribution areas can use the per-connection methodology described in Appendix A.

Adjusting Population Estimates

Population increases in existing developed areas or high-density infill redevelopments are estimated annually by DOF for incorporated cities and unincorporated portions of counties. These and other sources of local data may be used to estimate population for the non-census years. For water suppliers using the methodology described in Appendix A, population changes largely will be captured through the persons-per-connection ratios applied to changes in counts of active connections over time.

Water suppliers may revise population estimates for baseline years between 2000 and 2010 when 2010 census information becomes available. DWR will examine discrepancy between the actual 2010 population estimate and the DOF's projections for 2010. If significant discrepancies are discovered, DWR may require some or all suppliers to update their baseline population estimates.

Service area boundaries may also contract or expand during the baseline period. The latter could occur because of annexation of previously developed areas that may have been dependent upon private groundwater wells in the past but have subsequently become part of an urban retail water supplier's system. The following list provides guidance under various annexation scenarios. Additional adjustments may be required to population estimates for events that occur between the baseline and compliance years. These issues are discussed in Methodology 4: Compliance Daily Per Capita Use.

- If a portion of the distribution area is removed during one of the baseline years, water suppliers must compute their baseline after eliminating this removed portion from all their baseline years.
- If an area was annexed before the first baseline year, or the annexation involves merger with another urban retail water supplier, no data issues arise. In the latter case, population and connections data would be available for each water supplier separately. If not, appropriate estimates should be developed and documented.
- If the area was annexed before 2000, population estimates should be developed for the annexed area using the census block and person-per-connection method outlined in Appendix A, or an equivalent method.
- If the area was annexed after 2000, the water supplier will know the connection count only in the year of the annexation, not in 2000 and corresponding to the population estimate. Water suppliers may apply person-per-connection ratios developed for their pre-annexation distribution area to estimate population in the annexed area, or use other defensible techniques. For example, they could obtain county assessor data to back-cast what connection counts would have been in the annexed area in 2000 to permit scaling of census population estimates for the annexed areas to the post-annexation years. These can be further improved after 2012 once data from the 2010 census become available.

Water suppliers in other unique situations, such as those experiencing a significant change in their seasonal workforce or seasonal resident population between the baseline and compliance years, may adjust their population estimates using other techniques. The water supplier must provide documentation that the technique is based on or consistent with DOF or U.S. Census Bureau population data.

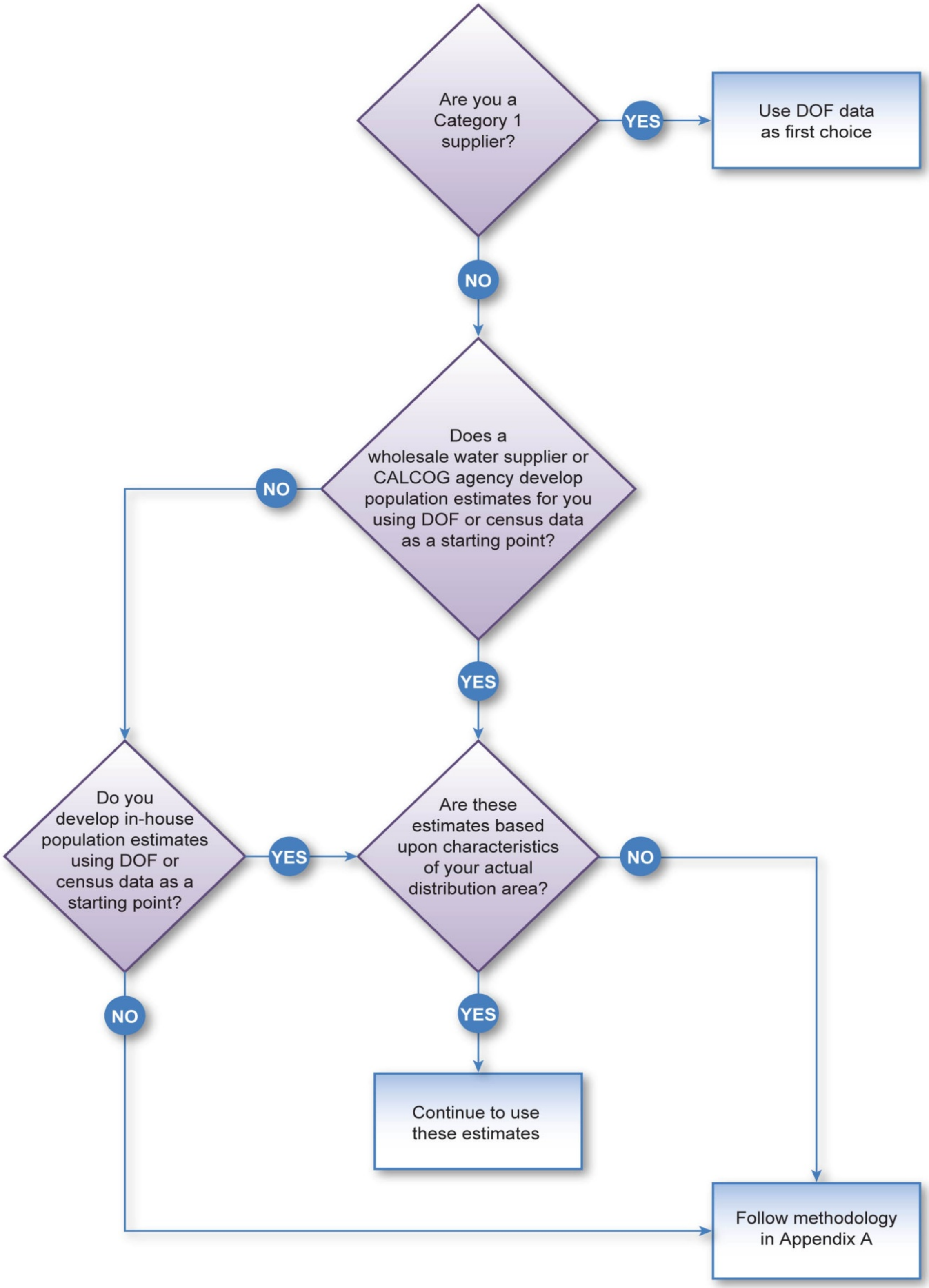

FIGURE 3
SUGGESTED PROCESS FOR DETERMINING ADEQUACY OF SERVICE AREA POPULATION ESTIMATE METHODOLOGY

Methodology 3: Base Daily Per Capita Water Use

Definition of Base Daily Per Capita Water Use

Base Daily Per Capita Water Use is defined as average gross water use, expressed in GPCD, for a continuous, multiyear base period. The Water Code specifies two different base periods for calculating Base Daily Per Capita Water Use under Section 10608.20 and Section 10608.22:

- The first base period is a 10- to 15-year continuous period, and is used to calculate baseline per capita water use per Section 10608.20.
- The second base period is a continuous five-year period, and is used to determine whether the 2020 per capita water use target meets the legislation's minimum water use reduction requirement per Section 10608.22.

Unless the urban retail water supplier's five year Base Daily Per Capita Water Use per Section 10608.12 (b) (3) is 100 GPCD or less, Base Daily Per Capita Water Use must be calculated for both baseline periods.

Calculation of Base Daily Per Capita Water Use

Calculating Base Daily Per Capita Water Use entails four steps:

1. Estimate Service Area Population for each year in the base period using Methodology 2.
2. Calculate Gross Water Use for each year in the base period using Methodology 1. Express Gross Water Use in gallons per day (gpd).[15]
3. Calculate daily per capita water use for each year in the base period. Divide Gross Water Use (determined in Step 2) by Service Area Population (determined in Step 1).
4. Calculate Base Daily Per Capita Water Use. Calculate average per capita water use by summing the values calculated in Step 3 and dividing by the number of years in the base period. The result is Base Daily Per Capita Water Use for the selected base period.

[15] If Gross Water Use is expressed in million gallons per year, multiply by 1,000,000 and then divide the result by 365. If Gross Water Use is expressed in acre-feet, multiply by 325,851 and then divide the result by 365.

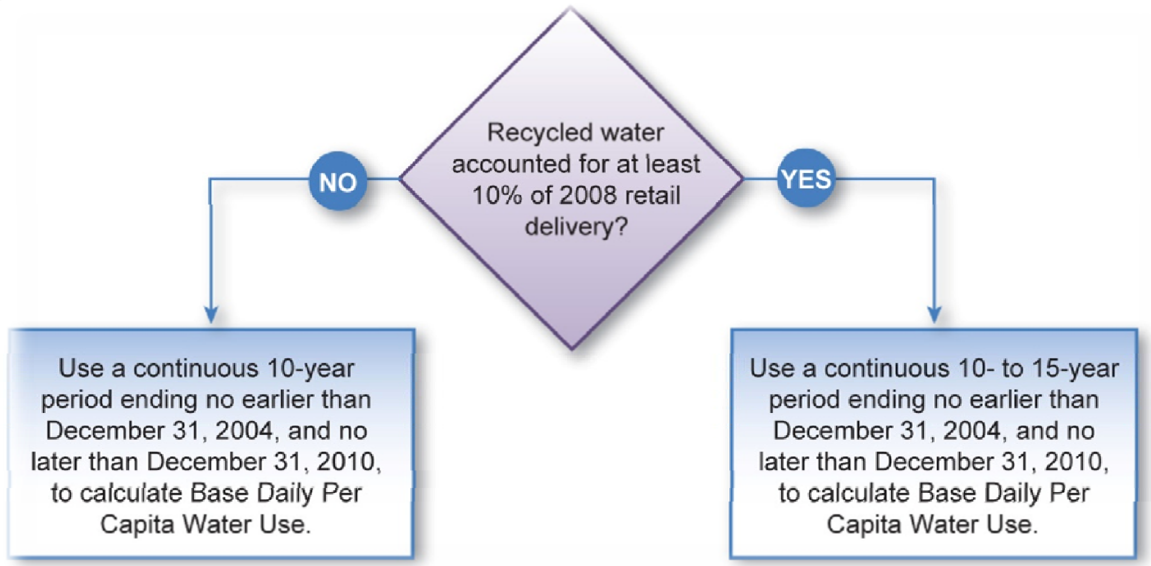

FIGURE 4
10 TO 15 YEAR BASE DAILY PER CAPITA WATER USE CALCULATIONS

Calculating Base Daily Per Capita Water Use per Section 10608.20

Calculate Base Daily Per Capita Water Use using one of the following base periods:

• If recycled water made up less than 10 percent of 2008 retail water delivery, use a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

• If recycled water made up 10 percent or more of 2008 retail water delivery, use a continuous 10- to 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

Figure 4 illustrates the procedure. If Gross Water Use and/or population are not available for the full base period, the water supplier shall calculate base daily per capita water use for the maximum number of years for which data are available. When selecting between base periods, the water supplier shall select the base period for which the most data are available.

For example, if gross water use and/or population data are not available before 1997, the water supplier shall select a base period starting in 1997.

Distribution Area Expansion Caused by Mergers

If two or more water suppliers merged wholly, or one water supplier acquired a portion of another’s service area, during a year that falls in the baseline period of the merged entity, they should derive their baseline GPCD as if they were a single entity for the entire baseline period to stay consistent with the targets and compliance GPCDs that would represent the merged entity.

Distribution Area Contraction

If during the baseline period a previously served portion of the distribution system is removed from a water supplier's service area, the baseline GPCD shall be corrected to reflect only that portion of the service area that remained consistently supplied during the baseline and compliance years.

Distribution Area Expansion by Annexation of Already Developed Areas[16]

For areas annexed during the baseline years, water suppliers can select one of two choices:

- Include these areas for baseline GPCD estimation and test compliance for the combined entity.
- Track baseline and compliance GPCDs for the annexed areas separately.

Determining the Minimum Water Use Reduction Requirement per Section 10608.22

The following calculation is required only if the five-year baseline per capita water use per Section 10608.12 (b) (3) is greater than 100 gpcd. The calculation is used to determine whether the water supplier's 2015 and 2020 per capita water use targets meet the legislation's minimum water use reduction requirement per Section 10608.22. The calculation entails three steps:

1. Calculate Base Daily Per Capita Water Use using a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.[17]
2. Multiply the result from Step 1 by 0.95. The 2020 per capita water use target cannot exceed this value (unless the water supplier's five year baseline per capita water use is 100 gpcd or less). If the 2020 target is greater than this value, reduce the target to this value.
3. Set the 2015 target to the mid-point between the 10- or 15-year baseline per capita water use and the 2020 target determined in Step 2.

As an example, suppose a water supplier has a 10-year baseline per capita water use (per Section 10608.20) of 170 GPCD, and a 5-year baseline per capita water use (per Section 10608.22) of 168 GPCD.

- The maximum allowable GPCD target in 2020 (per Section 10608.22) is 0.95 x 168 GPCD = 160 GPCD.
- The 2020 target under Method 1 is 0.8 x 170 GPCD = 136 GPCD.

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[16] Annexation here refers to already developed and inhabited areas that may have relied upon groundwater until this point in time, or on other sources of water for which data are not available, and that were not previously connected to a municipal source. This is not to be confused with annexation of previously undeveloped land. No adjustment is required for the latter type of annexation, whose impact on GPCD is naturally accounted for by the estimation of base period Gross Water Use and Service Area Population.

[17] If 5 years of continuous data are not available, use the maximum number of years for which data are available.

Because the Method 1 target is less than 160 GPCD, no further adjustment to the 2020 target is required if Method 1 is used.

Suppose the water supplier's 2020 target under Method 3 is 167 GPCD. Because this is greater than 160 GPCD, the target would need to be reduced to 160 GPCD if Method 3 is used.

Similarly, if a target calculated using Method 2 or 4 exceeded 160 GPCD, it would need to be reduced to 160 GPCD in order to satisfy the legislation's minimum water use reduction requirement. Figure 5 shows how the two baseline per capita water use amounts are used to determine whether the 2020 target meets the legislation's minimum water use reduction requirement.

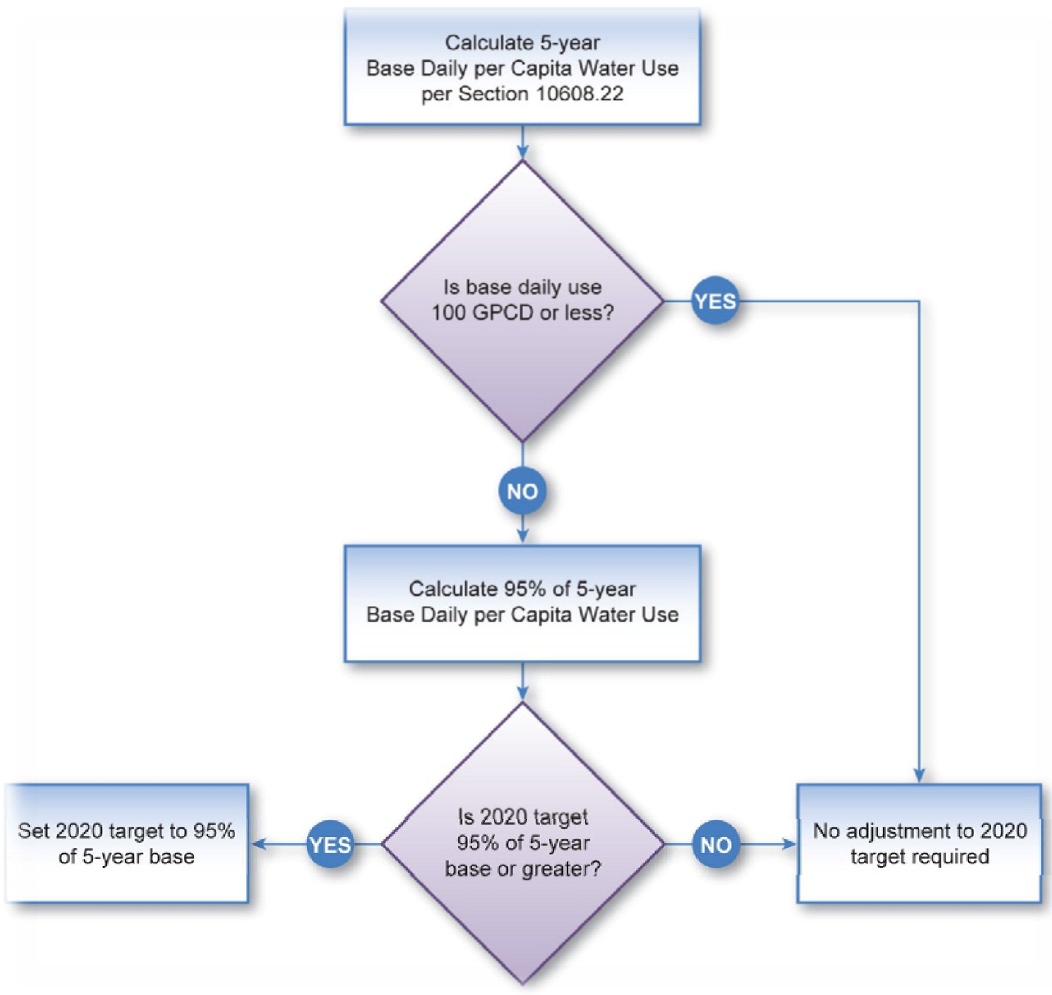

FIGURE 5
DETERMINATION OF MAXIMUM ALLOWABLE 2020 GPCD TARGET

Tables 3 and 4 may be used to organize the information needed to calculate Base Daily Per Capita Water Use under Sections 10608.20 and 10608.22.

TABLE 3

BASE DAILY PER CAPITA WATER USE CALCULATION FOR SECTION 10608.22

Utility Name: ____

12-month Period: ____________________ to ____________________

(1) Base Years*	(2) Service Area Population	(3) Gross Water Use (gal. per day)	(4) Daily Per Capita Water Use (3) ÷ (2)
Year 1			
Year 2			
Year 3			
Year 4			
Year 5			
		Total of Column (4):	
		Divide Total by 5:	

*Most recent year in base period must end no earlier than December 31, 2007, and no later than December 31, 2010.

TABLE 4

BASE DAILY PER CAPITA WATER USE CALCULATION FOR SECTION 10608.20

Utility Name: ____

12-month Period: ____________________ to ____________________

(1) Base Years*	(2) Service Area Population	(3) Gross Water Use (gal. per day)	(4) Daily Per Capita Water Use (3) ÷ (2)
Year 1			
Year 2			
Year 3			
Year 4			
Year 5			
Year 6			
Year 7			
Year 8			
Year 9			
Year 10			
Year 11			
Year 12			
Year 13			
Year 14			
Year 15			
		Total of Column (4):	
		Divide Total by Number of Base Years:	

* Enter the actual year of the data in this column. The most recent year in base period must end no earlier than December 31, 2004, and no later than December 31, 2010. *The base period cannot exceed 10 years unless at least 10 percent of 2008 retail deliveries were met with recycled water.*

Revisions to Base Daily Per Capita Water Use or Targets

A water supplier may revise its calculated Base Daily Per Capita Water Use after submitting its 2010 urban water management plan if better information becomes available. The revisions may be included in the water supplier's 2015 and subsequent plans or may be submitted as an amended plan, provided it follows the process required for amendments to such plans. If the revisions to the Base Daily Per Capita Water Use changes the water use target, the water use target must be revised as well.

In addition, a water supplier may change the method it uses to set its water use target, and report the method change and target revision in a 2010 amended plan or in its 2015 urban water management plan. Target method changes are not permitted in the 2020 plan or amended 2015 plans.

Methodology 4: Compliance Daily Per Capita Water Use

The following methodology addresses estimation of compliance daily per capita water use (in GPCD) in the years 2015 and 2020.

Definition of Compliance Daily Per Capita Use

Section 10608.12(e) states:

> *"Compliance daily per-capita use" means the gross water use during the final year of the reporting period, reported in gallons per capita per day.*

Estimation of Compliance-Year GPCD

Methodology 1: Gross Water Use and Methodology 2: Service Area Population shall be used to develop the two basic components for estimating compliance-year GPCD. This section discusses adjustments to compliance-year GPCD because of changes in distribution area caused by mergers, annexation, and other scenarios that occur between the baseline and compliance years.

Adjustments are allowed in calculating compliance-year GPCD for factors described in Section 10608.24. These adjustments are discussed in Methodology 8: Criteria for Compliance-Year Adjustment.

Distribution Area Expansion Caused by Mergers

If water suppliers merge, or one water supplier acquires a portion of another's service area, between the baseline period and the compliance year, they have two choices:

- Test compliance separately for each service area.
- Calculate a (compliance year) population weighted average of each system's target and determine compliance as a single entity using this weighted average.

Distribution Area Contraction

If a previously supplied portion included in the baseline is removed from the distribution area before the compliance years, water suppliers shall re-compute their baseline GPCD after eliminating the removed portion for all baseline years.

Distribution Area Expansion by Annexation of Already Developed Areas[18]

For areas annexed between the baseline and compliance years, a water supplier must determine Base Daily Per Capita Water Use, target water use, and compliance water use.

- Base Daily Per Capita Water Use for the annexed area shall be determined using the same baseline period as the water supplier's original service area (before the annexation). If such data are not available, the water supplier shall use a baseline period starting with the earliest year available for the annexed area and including ten years, if available. If no data exist for years before annexation, the water supplier shall use data from the year of annexation.
- Annexed areas shall be assigned a prorated target based upon the number of years between annexation and the end of 2020. For example, if a water supplier's target is based on a 20 percent reduction by 2020, and it annexes an area in 2017, this annexed area should show a 6 percent reduction in GPCD by 2020 relative to its 2017 GPCD.
- Compliance may be determined for the separate service areas (annexed and original), or for the combined service area using a (compliance year) population weighted average.

If compliance is determined separately for separate service areas, both areas must be in compliance for supplier to be in compliance.

Distribution Area Expansion by Annexation of Undeveloped Areas

No special adjustment calculation is needed for areas that were undeveloped during the baseline period but which were annexed and developed between the baseline period and compliance year. The impact on GPCD is accounted for by the estimation of compliance year Gross Water Use and compliance-year population.

Existing Large Partial Customers Become Whole Customers

Large customers that pump groundwater or take surface water for landscape irrigation or other uses (depending on their municipal source solely for indoor use) may switch and use only the municipal source. This change will disrupt the baseline and compliance year comparison. Two adjustments are provided below:

- If the switch occurs during the baseline years, the landscape irrigation or other use should be included in the compliance-year gross water calculation.
- If the switch occurs between the baseline and compliance years, the water associated with irrigation use switches, properly documented and subjected to the requirements of the Model Water Efficient Landscape Ordinance adopted by DWR in 2009, may be excluded from the calculation of compliance-year Gross Water Use. Otherwise, the irrigation or other use must be included in both the baseline and compliance year gross water use calculations.

[18]Annexation here refers to already developed and inhabited areas that may have relied upon groundwater until this point in time and were not previously connected to a municipal source.

Water Supplier Subject to Urban Water Management Plan Reporting Requirements between 2010 and 2020

Water suppliers that become subject to urban water management plan reporting requirements after 2010 also become subject to the new requirements of Section 10608 of the Water Code from the same year onward. These water suppliers are required to estimate their baseline GPCD and establish their 2020 GPCD targets using the same methodological guidelines that apply to other water suppliers. However, for testing compliance, such water suppliers may prorate these targets depending on the year the water supplier became subject to the new requirements.

For example, if a water supplier chooses a 2020 target that is 20 percent below its baseline GPCD, but it became subject to the new requirements only in 2017, it shall test compliance against a target that is 6 percent below its baseline GPCD.

Methodology 5: Indoor Residential Use

Definition of Indoor Residential Use

Section 10608.20(b)(2)(A) states:

> *For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.*

Section 10608.42 states:

> *The department shall review the 2015 urban water management plans and report to the Legislature by December 31, 2016, on progress towards achieving a 20-percent reduction in urban water use by December 31, 2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets in order to achieve the 20-percent reduction and to reflect updated efficiency information and technology changes.*

Section 10608.20(b)(2)(A) sets a provisional standard for efficient indoor use (55 GPCD) that urban retail water suppliers using target Method 2 must use to set their 2020 target.

However, they are not required to demonstrate that this indoor residential target has actually been met—only that the overall target, which includes additional components for landscaped area water use and CII water use, has been met.

Section 10608.42 requires DWR to submit a report to the Legislature in 2016 that will include recommendations on changes to water use efficiency standards to reflect updated efficiency information and technological changes. DWR will conduct a study to assess whether the provisional indoor residential standard of 55 GPCD should be adjusted.

Based on the report DWR submits in 2016, the Legislature may change the indoor residential standard. The indoor residential standard is used only to set the target under Method 2; calculation of indoor usage by water supplier is not required for determining compliance with Method 2.

Methodology 6: Landscaped Area Water Use

The calculation of Landscaped Area Water Use requires a measurement (or estimate) of landscaped area and of the landscape water use per unit area (based on reference evapotranspiration [ET]). As with other urban water use measures under Section 10608, Landscaped Area Water Use is defined as a daily per capita rate of water use; consequently, Methodology 2: Service Area Population is used in calculating Landscaped Area Water Use.

Definition of Landscaped Area Water Use

For the Landscaped Area Water Use component of target Method 2, Section 10608.20 (b) (2) (B) states:

> *For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.*

All landscape irrigated by dedicated or residential meters must be included, including multifamily residential parcels. Definitions and calculations contained in the Model Water Efficient Landscape Ordinance (MWELO) are provided in Appendix B. These calculations give the Landscaped Area Water Use as a function of landscaped area and reference ET. The MWELO defines landscaped area as planting areas, turf areas, and water features. Landscaped area excludes footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (such as open spaces and existing native vegetation). Section 10608.20 (b)(2)(B) restricts the landscaped area to include only landscape irrigated through dedicated or residential meters or connections.

Landscaped area for the purposes of calculating the Method 2 target shall mean the water supplier's estimate or measurement of 2020 landscaped areas. Water suppliers shall develop a preliminary estimate (forecast) of 2020 landscaped areas for purposes of setting urban water use targets and interim urban water use targets under Subdivision 10608.20 (a) (1).

For final compliance-year calculations, water suppliers shall update the estimate of 2020 landscaped areas using one of the techniques described in the following sections.

Approach to Calculating Landscaped Area Water Use

Water suppliers shall follow five steps to calculate Landscaped Area Water Use:

1. Identify applicable MWELO (1992 or 2010) for each parcel.
2. Estimate irrigated landscaped area for each parcel.

3. Determine reference evapotranspiration for each parcel.
4. Use the Maximum Applied Water Allowance (MAWA) equation from the applicable MWELO to calculate annual volume of landscaped area water use.
5. Convert annual volume to GPCD.

Identify Applicable MWELO for Each Parcel

Before computing landscaped area, water suppliers must determine how MWELO ordinances apply to specific parcels in their service areas. Two versions of MWELO apply according to the date when landscaping was installed in a given parcel:

- For landscaped areas installed on or after January 1, 2010, the MAWA equation and all applicable criteria from the 2009 version of the ordinance or its equivalent shall be used.
- For landscaped areas installed before January 1, 2010, the MAWA equation and all applicable criteria from the 1992 version of the ordinance or its equivalent shall be used.

For the purposes of this methodology, two important differences between the two ordinances are the ET adjustment factor and the inclusion of a special landscaped area for calculating a water allowance in the 2010 ordinance. The applicable definitions and calculations in these ordinances are provided in Appendix B.

Landscaped Area Water Use shall be calculated for each parcel (or groups of parcels with the same reference ET and applicable MWELO) using Maximum Applied Water Allowance (MAWA) computations from the applicable MWELO.

Water suppliers should use the best available information to determine which MWELO applies to each parcel. This may include date of submittal for MWELO design review, date of service establishment, and remote sensing information.

The calculations provided in Appendix B will yield water use estimates in gallons per year.

The total Landscaped Area Water Use for the water supplier will equal the total Landscaped Area Water Use of all parcels in the water supplier's service area. Because Landscaped Area Water Use is defined in units of GPCD, the result of the calculation above must be divided by Service Area Population and then converted from annual to daily use.

Measure Landscaped Area

The water supplier shall select a technique for measuring landscaped area that satisfies the following criteria:

- The landscaped area must be measured or estimated for all parcels served by a residential or dedicated landscape water meter or connection in the water supplier's service area.
- Only irrigated landscaped area served by residential or dedicated landscape water meter or connection shall be included in the calculation of Landscaped Area Water Use. Landscape served by CII connections and non-irrigated landscape shall be excluded. (All references to landscaped area below shall mean irrigated landscaped area served by a residential or dedicated landscape meter or connection.)

Measurement Techniques

The following sections describe techniques that may be used to measure landscaped area. Water suppliers may use one or a combination of these techniques.

Field-Based Measurement. Field-based measurement of parcels' landscaped area may be accomplished by physical measurement using devices such as a total station, measuring wheel and compass, global positioning system (GPS), or other measuring devices having accuracy similar to these devices. Field-based measurement also may be obtained from landscape designs submitted to the water supplier for compliance with the MWELO or for other planning and billing purposes.

Measuring with Remote Sensing. The landscaped area may be measured by using remote sensing (aerial or satellite imaging) to identify the landscaped areas in conjunction with a GIS representation of the parcels in the water supplier's service area. A variety of remote sensing techniques are available, and additional techniques may become available between now and 2020. DWR will allow the water supplier to select the remote-sensing technique that it prefers. However, the following conditions shall be met:

- The remote-sensing information must be overlaid onto a GIS representation of each parcel boundaries to estimate the irrigated landscaped area in each parcel.
- The remote-sensing imagery must have a resolution of 1 meter or less per pixel.
- The remote-sensing technique must be verified for accuracy by comparing its results to the results of field-based measurement for a subset of parcels selected using random sampling. The water supplier shall report the resulting percent error between the estimates of landscaped area produced by the remote-sensing technique and those produced by field-based measurements for the sampled parcels.
- DWR has not set its own standards for remote-sensing verification and sampling design. The water supplier shall provide a description of its remote-sensing technique (including imagery, data processing, and verification) when it reports its landscaped area for purposes of complying with provisions of the Water Code. Congalton and Green (1999)[19] and Stein et al. (2002)[20] are two references that describe professional standards for remote sensing.

Using Sampling to Estimate Landscaped Area on Small Parcels. The landscaped area for smaller-sized parcels may be calculated by measuring the percentage of total parcel area that is landscaped in a sample of similar parcels and applying that percentage to the remaining parcels. This technique may be used only for parcels with a total land area of 24,000 square feet or less. The parcels for which this technique is used shall be divided into groups, or strata, based on parcel size increments of 4,000 square feet or less. (For example, parcels up to 4,000 square feet would form one group, parcels between 4,001 and 8,000 square feet would form another group, and so forth.) Field-based measurement or remote sensing must be used to calculate the landscaped area for a subset of parcels sampled at random in each parcel size group. The percentage of landscaped area to total

[19] Congalton, R. G., and K. Green, 1999. Assessing the Accuracy of Remotely Sensed Data: Principles and Practices. CRC Press, Boca Raton, FL.

[20] Stein, A., F. van der Meer, and B. Gorte, eds. 2002. Spatial Statistics for Remote Sensing. Kluwer Academic Publishers, Netherlands.

land area for the sampled parcels in each group can then be used to calculate the landscaped area for all other parcels in the group. Parcels greater than 24,000 square feet shall be measured directly.

Statistical sampling is a means to provide adequate information at reasonable cost. If implemented carefully, sampling allows the water supplier to develop accurate estimates of landscaped area for all relevant parcels from a subset of parcels. However, sampling shall not be used to estimate landscaped area for parcels larger than 24,000 square feet. Stratified sampling (random sampling in identified subgroups of parcels) should be used to estimate the landscaped area in different parcel size groups, as described earlier. Other characteristics of parcels may be used as a basis for selecting the strata in addition to parcel size.

DWR has not developed specific standards for sampling design. Urban water suppliers should follow standards of professional practice sufficient to demonstrate unbiased estimates of landscaped area. For example, Cochrane (1977)[21] and Lohr (2010)[22] provide guidance for sound sampling design.

Other Measurement Techniques. The water supplier may use another technique to measure landscaped area for each parcel other than the ones described previously if one becomes available in the future. However, the technique must meet similar conditions to those described above for remote sensing:

- The landscaped area information must be gathered or reported on a parcel basis, or it must be overlaid onto a GIS representation of each parcel's boundaries to calculate the landscaped area in each parcel.
- The technique must be tested for accuracy by comparing its results to the results of field-based measurement for a subset of parcels. Field-based measurement should be performed for a subset of parcels selected at random from those for which the technique has been used. The water supplier should report the percent error between the calculations of landscaped area produced by the selected technique and those produced by field-based measurements for the sampled parcels.

Estimate Reference Evapotranspiration

Calculations under the MWELO require determination of reference ET. Each parcels served by a residential or dedicated landscape water meter or connection in the water supplier's service area shall be assigned a reference ET based on one of the following methods:

- Appendix A of the 2009 ordinance contains tables of reference ET. In some cases, the water supplier may choose a single reference ET value most appropriate for all parcels in its service area. For parcels in geographic areas not covered in the Appendix A table, the ordinance provides the following direction for selecting the appropriate reference value: "For geographic areas not covered in Appendix A, use data from other cities located nearby in the same reference evapotranspiration zone, as found in the CIMIS Reference Evapotranspiration Zones Map, Department of Water Resources, 1999."

[21]Cochrane, William G. 1977. Sampling Techniques. 3rd edition. Wiley; NY, NY.
[22]Lohr, Sharon. 2010. Sampling: Design and Analysis. Brooks/Cole Cengage, Boston, MA. 2nd edition.

- DWR has developed a spatial program (Spatial CIMIS) that provides interpolated ET data between weather stations.[23] The program can provide estimates of reference ET for any part of California with a resolution of 2 kilometer (km) by 2 km. Water suppliers may use this tool to assign reference ET to parcels. Any other CIMIS enhancements or additional stations formally adopted by DWR between 2010 and 2020 also may be used.
- Water suppliers may use local reference ET estimates that are not formally part of CIMIS or that make adjustments to CIMIS station estimates, provided that such estimates or adjustments are scientifically derived and of comparable reliability to CIMIS estimates.

The water supplier shall explain why neither the CIMIS nor other approved DWR reference ET information is adequate, and shall provide the data and calculations used to develop the local reference ET estimate.

Apply MAWA Equation to Calculate Annual Volume

Appendix B provides the MAWA equations that apply to parcels. These equations, or their equivalents, will yield water use estimates in gallons per year. The total Landscaped Area Water Use for the water supplier will equal the total Landscaped Area Water Use of all parcels in the supplier's service area.

Convert Annual Volume to GPCD

After the MAWA for all parcels has been summed to determine the total Landscaped Area Water Use portion of the Method 2 target, the total must be divided by Service Area Population and then by 365 to calculate the Landscaped Area Water Use in GPCD. Refer to Methodology 2: Service Area Population to complete this step. Because Landscaped Area Water Use is defined in units of GPCD, the result must be converted from annual to daily use.

Summary of Steps to Calculate Landscaped Area Water Use

Calculating Landscaped Area Water Use requires the following process:

1. Assign applicable MWELO (1992 or 2009) to each parcel.
2. Estimate landscaped area for each parcel.
   a. Select measurement technique(s) for landscaped area (for example, field based, remote sensing, or sampling).
   b. Apply technique(s) to calculate total landscaped area for each parcel. (This applies only to parcels for which landscaped area has not yet been measured.)
   c. Measure special landscape area (SLA) where applicable.
3. Determine the reference ET for each parcel.
4. Use the MAWA from the applicable MWELO to calculate Landscaped Area Water Use for all parcels.

[23]California Irrigation Management Information System. The spatial model is available at http://www.cimis.water.ca.gov/cimis/cimiSatSpatialCimis.jsp.

   a. Use the equations, or their equivalents, to calculate the MAWA for each parcel or group of parcels (grouped according to applicable MWELO, reference ET, and presence of SLA).
   b. Sum the MAWA over all parcels to calculate the total annual Landscaped Area Water Use portion of the Method 2 target.

5. Divide the total from Step 4 by Service Area Population and then by 365 to calculate the Landscaped Area Water Use in GPCD.

Methodology 7: Baseline Commercial, Industrial, and Institutional Water Use

Baseline Commercial Industrial and Institutional (CII) Water Use is needed for urban water use target Method 2 (along with the indoor residential and landscape uses). It also affects the adjustment factors that agencies may consider at the time of testing compliance in 2015 and 2020 by allowing them to make adjustments based on "substantial changes" in CII relative to Baseline CII Water Use per Section 10608.24 (d)(1)(B). The definition of "substantial change" and adjustments are discussed in Methodology 8: Criteria for Adjustments to Compliance Daily Per Capita Water Use.

Definition of Baseline CII Water Use

Section 10608.12 defines Baseline CII Water Use and related concepts as follows:

(c) "Baseline commercial, industrial, and institutional water use" means an urban retail water supplier's base daily per capita water use for commercial, industrial, and institutional users.

(d) "Commercial water user" means a water user that provides or distributes a product or service.

(h) "Industrial water user" means a water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.

(i) "Institutional water user" means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

Use of Baseline CII Water Use

Urban retail water suppliers are given several methods for calculating water use targets. Method 2 allows them to calculate a target by using three components: Indoor Residential Use, Landscaped Area Water Use, and Baseline CII Water Use. Section 10608.20 (b)(2)(C) specifies that the CII portion of the target is to be calculated as follows:

For CII uses, a 10 percent reduction in water use from the baseline CII water use by 2020.

Calculation of Baseline CII Water Use

Baseline periods that a retail water supplier may use to determine Baseline CII Water Use shall follow the same direction required for Base Daily Per Capita Water Use under Section 10608.12.(b):

"Base daily per capita water use" means any of the following:

(1) The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(2) For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

A retail water supplier must have CII data for the entire baseline period used in the water supplier's calculation of Base Daily Per Capita Water Use. If the CII data do not exist, the retail water supplier should use another water use target method.

For each year in the baseline period, the volume of Baseline CII Water Use shall be divided by the Service Area Population (see Methodology 2), and the average of those calculations, converted to a daily rate, is the Baseline CII Water Use for the purpose of calculating the Method 2 target as defined in Section 10608.20(b)(2). The procedure for averaging the annual per capita CII use is the same as for calculating Base Daily Per Capita Water Use (refer to Methodology 3: Base Daily Per Capita Water Use).

The CII component of the 2020 target for Method 2 shall be the Baseline CII Water Use (in GPCD) multiplied by 0.9.

Process Water Exclusion

A retail water supplier may elect to exclude process water from its calculation, consistent with Section 10608.24(e):

> *When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial percentage of industrial water use in its service area, may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.*

If a water supplier elects to exclude process water, it must do so for baseline and compliance year per capita water use and for baseline CII water use. DWR regulations that define when and how process water can be excluded from Gross Water Use and Baseline CII Water Use calculations are provided in Appendix D.

Adjustments for Multifamily Residential Connections

A retail water supplier whose baseline CII data includes some multifamily residential uses must demonstrate that it can accurately adjust the data to remove those uses.

In cases where the retail water supplier can estimate the population in multifamily residences included in the CII data, the supplier must do both of the following:

1. Use the adjustment procedure described below in Adjustments for Residential Uses in CII Connections to remove indoor residential uses from the CII data.
2. Assure that landscaped area in the CII data is excluded from the calculations of Landscaped Area Water Use.

In situations where the supplier cannot estimate the population in multifamily residences included in the CII data, Method 2 cannot be used to set the water supplier's water use target.

Adjustments for Residential Uses in CII Connections

Some CII connections also may serve group quarters or other residential uses. Examples could include campus dormitories, military base housing, and apartments that are served by a CII connection. Water use target Method 2 already provides an indoor use allowance of 55 GPCD for such residents. To ensure that this indoor use is not double-counted, the following steps must be used to adjust the CII component of the target water use under Method 2:

1. Estimate the average population served by CII connections during the baseline period and whose residents use is included in the water supplier's unadjusted Baseline CII Water Use.
2. Calculate the average daily volume of target Indoor Residential Use associated with this population by multiplying the result of Step 1 by the 55-GPCD target indoor use specified for Method 2.
3. Convert the unadjusted CII GPCD target (the Baseline CII Water Use times 0.9) to an average daily volume by multiplying by Service Area Population.
4. Subtract the average daily volume calculated in Step 2 from the unadjusted CII daily volume calculated in Step 3.
5. Divide the result from Step 4 by Service Area Population to give the adjusted Baseline CII Water Use in GPCD for use in calculating the water use target for Method 2.

Methodology 8: Criteria for Adjustments to Compliance Daily Per Capita Water Use

Definition of Adjustments to Compliance Daily Per Capita Water Use

Section 10608.24(d) states:

> *(1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:*
>
> > *(a) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.*
> >
> > *(b) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.*
> >
> > *(c) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.*
>
> *(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.*

Calculation of Adjustments to Compliance GPCD

To be developed.

[Application of these adjustments will not occur until a compliance year. This methodology requires further development including completion of weather normalization modeling. Expected completion date is early 2011.]

Methodology 9: Regional Compliance

According to Sections 10608.20(a)(1) and 10608.28, urban retail water suppliers may plan, comply, and report on a regional basis, an individual basis or both. Each group of water suppliers agreeing among themselves to plan, comply, and report as a region is referred to in this methodology as a "regional alliance."

Legislative Guidance for Regional Compliance

Section 10608.20(a)(1) states:

> *Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.*

Section 10608.28 states:

(a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

- *(1) Through an urban wholesale water supplier.*
- *(2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).*
- *(3) Through a regional water management group as defined in Section 10537.*
- *(4) By an integrated regional water management funding area.*
- *(5) By hydrologic region.*
- *(6) Through other appropriate geographic scales for which computation methods have been developed by the department.*

(b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

Criteria for Water Suppliers that May Report and Comply as a Region

To form a regional alliance, water suppliers must meet at least one of the following criteria:

- Water suppliers are recipients of water from a common wholesale water supplier. For this purpose, the State Water Project and the Central Valley Project are not considered wholesale water suppliers. Wholesale water suppliers are not required to establish and meet targets for daily per capita water use. Wholesale water suppliers serving in the role of a regional alliance are representing the urban retail water suppliers that are members of the alliance and compliance with a regional target is on behalf of the member suppliers and not the wholesaler supplier itself.
- Water suppliers are partners with a common regional agency authorized to plan and implement water conservation.
- Water suppliers are part of a regional water management group as defined in Water Code section 10537.
- Water suppliers are part of an integrated regional water management funding area, which for this purpose is interpreted to mean an Integrated Regional Water Management (IRWM) planning area.
- Water suppliers are located in the same hydrologic region, which for this purpose refers to the 10 hydrologic regions as shown in the California Water Plan. For situations where water suppliers may serve areas in more than one hydrologic region, the majority of each water supplier’s Service Area Population must be in the hydrologic region being identified as a regional alliance.
- Water suppliers join through appropriate geographic scales for which these methodologies can be applied. For this provision, water suppliers’ service area boundaries must be contiguous.

Tiered Regional Alliances

In general, urban retail water suppliers can belong to only one regional alliance for the purpose of establishing and complying with urban water use targets. An exception is when regional alliances are tiered so that the members of the smallest alliance are all members of the larger alliance or alliances.

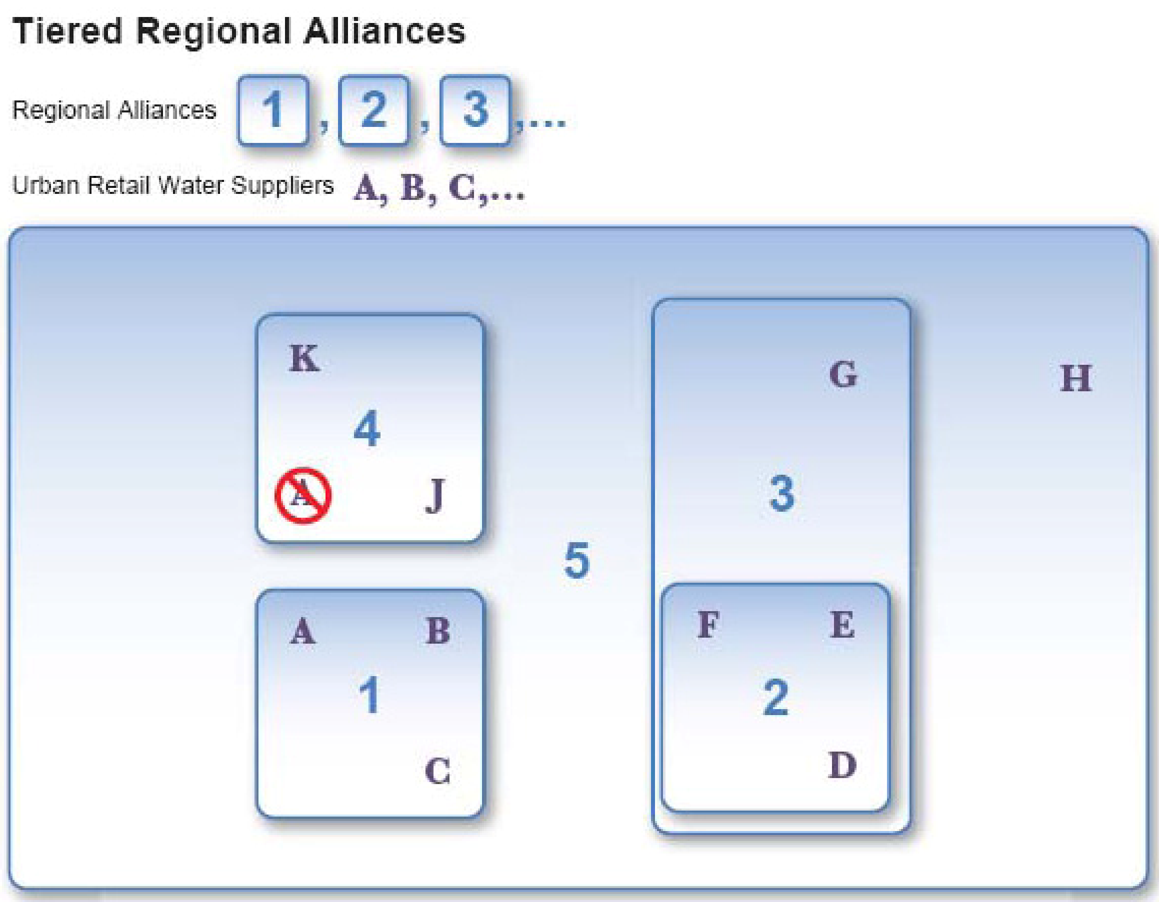

FIGURE 6:
EXAMPLE OF TIERED ALLIANCES

Figure 6 illustrates tiered alliances. For example, supplier A forms an alliance with suppliers B and C (Alliance 1). Supplier A cannot also form an alliance with suppliers J and K unless the A,J,K alliance were to include B and C as well. Water suppliers D, E, and F could comply as regional Alliance 2, or include supplier G and comply as regional Alliance 3. Alternatively, all suppliers in Figure 6 could comply as Alliance 5. The tiered alliance requirements are only for compliance with urban water use targets and do not apply to other regional water management activities or partnerships.

Calculation of Targets and Compliance GPCD

Calculation of Regional Targets

Water suppliers wishing to test compliance regionally are permitted to do so. Water suppliers in a regional alliance have three options for calculating their regional targets.

Under the first option, which preserves maximum flexibility at the supplier level, each supplier in a regional alliance would first calculate its individual target as if it were complying individually. These individual targets should then be weighted by each supplier's population and averaged over all members in the alliance to obtain the regional target.[24] For the 2011 urban water management plans, suppliers may use their current population data for generating the regional targets. However, for testing compliance in 2015 and 2020, the population weighting of the individual targets must be based upon the compliance-year population data. A retail water supplier may update its target in 2015 (see Water Code section 10608.20(g) and any such modifications made to individual targets after 2011 must be incorporated into updated regional targets and reported in the compliance year 2015. For those urban retailers or alliances that choose method 2 for developing a target (see Water Code section 10608.20(b)(2)), the target must be revised and reported in 2020. A modification in any individual target or a change in membership in a regional alliance will require a recalculation of the regional target.

A second approach for an alliance to calculate a regional target is to sum up the individual supplier's gross water use and service area populations to develop regional gross water use and population. The alliance would then calculate regional base daily per capita use and choose one target method to calculate a regional target. Alliances must have all their members use the same baseline period.

A third approach is to calculate regional gross water use or population directly for the entire regional alliance area. Regional base daily per capita use and a regional water use target would then be derived. Like the second approach, members of alliances using this approach must use the same baseline period and the same target method. A regional alliance must meet the requirements of Section 10608.22. The regional target may not exceed 95 percent of the region's 5-year Base Daily Per Capita Water Use. Methodology 3: Base Daily Per Capita Water Use describes in detail the interpretation and calculations required under Section 10608.22.

Calculation of Regional Compliance Daily Per Capita Water Use

Gross Water Use and Service Area Population must be reported for each supplier during the compliance year. If applicable, adjustments for evapotranspiration and rainfall, fire suppression, and changes in distribution area should be made for each individual water supplier. Adjustments to Gross Water Use for extraordinary economic growth can be

[24]Assume there are (N) suppliers in an alliance, with individual targets (T_1, T_2, … , T_N) and population (P_1, P_2, … , P_N), where the subscript on the individual targets and population denote the identity of each supplier. Then, total population in a regional alliance (RP) becomes:

$RP = P_1 + P_2 + \ldots + P_N$

The regional target (RT) can be derived as a weighted average of the individual supplier targets as follows:

$RT = (P_1 * T_1 + P_2 * T_2 + \ldots + P_N * T_N)/RP$

applied either to the individual supplier's data or to the aggregate regional alliance data (but not both), depending upon availability of suitable data and methods. Regional compliance daily per capita water use shall be calculated as the aggregate regional Gross Water Use divided by the aggregate Service Area Population.

Data Reporting for a Regional Alliance

A regional alliance must send DWR a letter stating that an alliance has been formed and provide a list of the water supplier members. This letter should be sent by July 1, 2011, for alliances formed before submitting 2010 urban water management plans, or in ninety days after an alliance has been formed after July 1, 2011. In the case of tiered alliances, a retail water supplier cannot be cited as a member of a regional alliance unless it acknowledges its membership in that alliance in its urban water management plan.

DWR will collect data pertaining to regional alliances through three documents: (1) through the individual supplier urban water management plans; (2) through the regional urban water management plans; and (3) through the regional alliance reports.

Individual Supplier Urban Water Management Plans

All members of a regional alliance must include the following data in their individual urban water management plans unless they are participating in a regional urban water management plan (applicable urban water management plan dates are shown in parentheses):

- A list of all of its regional alliances. If a supplier is a member of tiered alliances, it must name all the alliances it is a member of
- Baseline Gross Water Use and Service Area Population (2010, 2015, 2020)
- Individual 2020 Urban Water Use Target (2010, 2015, 2020) and Interim 2015 Urban Water Use Target (2010)
- Compliance Year Gross Water Use (2015 and 2020) and Service Area Population (2010, 2015, 2020)
- Adjustments to Gross Water Use in the compliance year (2015, 2020)
- Water suppliers who choose Target Method 2 also must provide Landscaped Area Water Use and Baseline CII Water Use data (2010, 2015, 2020)
- Water Suppliers who choose Target Method 4 must provide the components of calculation as required by Target Method 4. Appendix C describes Target Method 4 and the regional compliance reporting that applies to that method (2010, 2015, 2020)

Regional Urban Water Management Plans

Members of regional alliance can forgo submitting individual urban water management plans and instead submit a regional urban water management plan. These regional urban water management plans are different from the regional alliance reports in that they must meet all the urban water management plan reporting requirements. The water use target data can be reported in the regional plan in either of two ways:

- The regional plan can report all the data elements that are now required to be included in the individual urban water management plans pertaining to this program (see section above titled Individual Supplier Urban Water Management Plans), for each supplier in the alliance. It would also report the same data elements aggregated over all members in the alliance.
- The regional plan may report some data elements only in aggregate for the alliance as a whole (not for each individual member). For example, the plan may report Service Area Population only for the regional alliance if the regional population data are more accurate or available. If the Service Area Population is only reported on a regional basis, then Base Daily per Capita Use, Compliance Daily per Capita Use, and Urban Water Use Targets would be calculated and reported only on a regional basis. Water suppliers that are part of a regional alliance that only reports a regional population can only develop a regional Urban Water Use Target and comply with this target regionally. Developing individual targets and testing compliance at the individual level is not possible unless an individual Service Area Population is calculated.

Regional Alliance Report

For regional alliances that do not submit a regional urban water management plan, DWR will require a regional alliance report. This report shall include all the water use target data elements that are now required to be included in the individual urban water management plans (see section above titled Individual Supplier Urban Water Management Plans) for each supplier in the alliance, and also shall include the alliance-level aggregates.

Memoranda of Understanding or Agreements for Regional Alliances

DWR will not review or approve the terms of memoranda of understanding (MOUs) or legal agreements that water suppliers use to create and manage regional alliances. However, terms of the agreements shall be consistent with all applicable sections of the Water Code. DWR will presume that water suppliers understand the consequences if partner suppliers withdraw from a regional alliance.

Compliance Assessment for Water Suppliers Belonging to a Regional Alliance

Compliance will be assessed based upon how an individual retail water supplier performs relative to its individual target or how the retail water supplier’s regional alliance performs as a whole relative to its regional target. Wholesale suppliers are not themselves subject to compliance assessment. The following guidelines will be used to assess compliance:

- If a regional alliance meets its regional target, all suppliers in the alliance will be deemed compliant. For tiered alliances, if a smaller alliance does not meet its water use target, the member agencies can still be in compliance if a larger alliance is in compliance. Conversely, members of a smaller alliance can be in compliance if the smaller alliance complies while the larger alliance fails. If a regional alliance fails to meet its regional target, water suppliers in the alliance that meet their individual targets will be deemed compliant.

- Water suppliers in alliances that meet neither their individual targets nor their regional targets will be deemed noncompliant. These suppliers can still apply for grant funds if their application is accompanied by a plan that demonstrates how the funds being sought will bring them into compliance with their targets (Section 10608.56).

Withdrawal from a Regional Alliance before 2020

If a water supplier withdraws from a regional alliance, the withdrawing water supplier must then comply individually. The water suppliers remaining in the regional alliance must revise regional baseline and target data and alliance membership in the subsequent UWMP plan. The memorandum of understanding or other legal agreements governing the alliance may define additional consequences or remedies.

Dissolution of a Regional Alliance before 2020

If a regional alliance dissolves before 2020, each affected water supplier must then comply individually or form or join another alliance. An affected water supplier that had not previously submitted an individual urban water management plan (for example, if it had participated in a regional urban water management plan for a regional alliance that has dissolved) has to submit an urban water management plan or a regional water management plan. The memorandum of understanding or other legal agreements governing the alliance may define additional consequences or remedies.

APPENDIX A

Alternative Methodology for Service Area Population

Water suppliers without access to detailed population data should develop population estimates by anchoring their year 2000 residential connections to the year 2000 census population estimate, and then scaling this estimate backward and forward using data for active residential connections. The procedure for calculating population from connections first requires a water supplier to identify the census blocks that lie in its (year 2000) distribution area. The availability of a GIS distribution area map for the year 2000 makes this first step relatively easy.

If no GIS boundary map of the distribution area is available, a water supplier will have to perform this exercise manually. The U. S. Census Bureau's county/tract/block maps should serve as the primary tool for this matching exercise.[1] First select the appropriate county. Next, the first file labeled "CBC06xxx_000.pdf" provides the detailed map numbering scheme for the entire county. The relevant maps from this list can then be used online or printed to locate the appropriate census blocks.

It is also relatively easy to scan a paper map of the distribution area (in 2000), digitize and geo-reference the boundary (and internal areas that need to be excluded), and overlay it electronically on a census map to identify which census blocks lie in the 2000 distribution area. Category 3 water suppliers may be able to access these capabilities through their local association of governments.

Step 1: Finalize Census Blocks in the 2000 Distribution Area

Some census blocks may straddle the water supplier's year 2000 distribution area boundary line. In such cases, if half or more of the block's area appears to lie within the boundary, the water supplier should include it; otherwise, it should exclude the block.

Census blocks are grouped into block groups. Blocks that identify places such as college campuses, military installations, or correctional institutions are organized into a

What Is a Census Block?

A census block is the smallest geographical unit used by the Census Bureau. Census blocks are areas bounded on all sides by visible features, such as streets, roads, streams, and railroad tracks, and by invisible boundaries, such as city, town, township, and county limits, property lines, and short, imaginary extensions of streets and roads. Generally, census blocks are small in area; for example, a block may be bounded by city streets. However, census blocks in sparsely settled areas may contain many square miles of territory.

[1] These maps can be accessed at http://www2.census.gov/geo/maps/blk2000/st06_California/County/.

single block group that, taken together, corresponds exactly with the boundary of such a place. Census blocks associated with such institutions in the distribution area, but with wholly private sources of supply, can thus be cleanly removed from the population estimate.

Census block groups aggregate up to the next level of geography that is called a census tract. Blocks have a unique identification number only in a tract, not across tracts. When identifying blocks that lie in the distribution area, both block and tract identification numbers are needed to correctly link the selected blocks with their corresponding population data.

What Is a Census Block Group?

A block group (BG) is a cluster of census blocks having the same first digit of their four-digit identifying numbers in a census tract. For example, block group 3 (BG 3) in a census tract includes all blocks numbered from 3000 to 3999. BGs generally contain between 600 and 3,000 people, with an average size of 1,500 people. BGs on American Indian reservations, off reservation trust lands, and special places must contain a minimum of 300 people. (Special places include correctional institutions, military installations, college campuses, worker's dormitories, hospitals, nursing homes, and group homes.)

Step 2: Scale Population Information from Census Blocks to Distribution Area

Once the census blocks lying in the year 2000 distribution area are identified, each block's total and group-quarter population in 2000 can be obtained from the Census Bureau's website. This requires the following steps:[2]

Place of Residence

Each person included in the census is counted at his or her usual place of residence, which is the place where he or she lives and sleeps most of the time. If a person has no usual residence, the person is counted where he or she was staying on Census Day (April 1). People temporarily away from their usual residence, such as on a vacation or business trip, are counted at their usual place of residence. People who moved around Census Day are counted at the place they consider to be their usual residence. A person's usual place of residence is not necessarily the same as legal residence or voting residence. A detailed set of enumeration rules guides how the Census Bureau counts individuals. An attempt is made to count all individuals, whether they reside in housing units or in group quarters.

1. Go to www.census.gov
2. Click on "American FactFinder" tab in left navigation column.
3. Select the legacy American FactFinder link (factfinder.census.gov). If and when this legacy website is terminated, the following download instructions may require modification.
4. Click on "Download Center" in the left navigation column.
5. In the table that appears, click on the "Census 2000 Summary File 1 (SF-1) 100-Percent Data" link.
6. Under geographic summary level, select "All Blocks in a County (101)."
7. Follow the prompts to select state and county.
8. Under Select a Download Method, choose "Selected Detailed Tables."
9. Click on "Go."

[2] Note that these steps apply as of February 2011. Link names and other elements of the Census Bureau's website may change in future. The same caution applies to other website directions in this appendix.

10. When prompted with table choices, select at a minimum "P1. Total Population" and P37. Group Quarters Population by Group Quarter Type." You can select multiple tables at once by holding down the Ctrl key as you select them.
11. Click "Add" to add them to the Current Table Selections box.
12. Select "Next"
13. Select "Start Download"

A zipped file containing three files will be created for the user. One of these will include the data in a delimited text format (the character " | " will be the delimiter which the user will need to specify while importing the text file into Excel for further manipulation) containing total population and any additional information the user selects by block. From this list, select the blocks identified as falling in the water supplier's year 2000 actual distribution area in Step 1 and obtain the aggregate population for the water supplier's service area.

> **P1. Total Population**
>
> The "Total Population" selection includes population residing in housing units as well as in group quarters. Housing units include structures such as single-family homes, multifamily homes, mobile homes, boats, RVs, and vans. Group quarters include institutions such as correctional facilities, nursing homes, hospital wards and hospices, psychiatric hospitals, juvenile institutions, college dormitories, military quarters, agriculture worker's dormitories, logging camps, and other institutions. The full list of what is included in group quarters is long and is intended to capture a variety of residency scenarios to make the population count as complete as possible. This list can be obtained from the Census Bureau's website.

In most cases, additional editing or manipulation of total year 2000 population should not be required. Census blocks associated with privately supplied customers would already have been removed from the distribution area definition. However, if some census blocks include both utility supplied residents and privately supplied group-quarter residents, the latter may be removed by subtracting the group-quarter population from the total population, wherever applicable, before aggregating population up to the distribution area level.

> **P37. Group Quarters Population by Group Quarter Type**
>
> This selection provides a breakdown of the group quarter population into the following categories: correctional institutions; nursing homes; other institutionalized populations; college dormitories including college quarters off campus; military quarters; other non-institutional group quarters.

Step 3: Obtain Population by Structure Type

To estimate population per connection, agencies are advised to develop at least two separate ratios: one for population per single-family connection, and one for population per multifamily connection, which includes apartment complexes and other types of group quarters. This information can also be obtained from the Census Bureau website. For this purpose, the Census 2000 Summary File 3 (SF-3) should be used as the source since these data are not available from Summary File 1. Data in Summary File 3, however, are presented at the block group level. The first letter in a block's identifier indicates the block group it belongs to.

> **H33. Total Population in Occupied Housing Units by Tenure by Units in Structure**
>
> This selection provides a breakdown of population by the following types of structures:
> Owner occupied, 1 detached unit in structure
> Owner occupied, 1 attached unit in structure
> Owner occupied, 2 units in structure
> Owner occupied, 3-4 units in structure
> Owner occupied, 5-9 units in structure
> Owner occupied, 10-19 units in structure
> Owner occupied, 20-49 units in structure
> Owner occupied, 50 or more units in structure
> Owner occupied, mobile home
> Owner occupied, boat, RV, van, etc.
> (Repeated for renters)

1. Go to www.census.gov
2. Click on "American FactFinder" tab in left navigation column.
3. Select the legacy American FactFinder link (factfinder.census.gov). If and when this legacy website is terminated, the following download instructions may require modification.
4. Click on "Download Center" in the left navigation column.
5. Select the "Census 2000 Summary File 3 (SF-3) Sample Data" link.
6. Under geographic summary level, select "All Block Groups in a County (150)."
7. Follow the prompts to select state and county
8. Under Select Download Method, select "Select Detailed Tables."
9. Click on "Go."
10. When prompted with table choices, select at a minimum "P1. Total Population" and "H33. Total Population in Occupied Housing Units by Tenure by Units in Structure."
11. Click on "Next."
12. Click on "Start Download."

A zipped file containing three files will be created for the user. One of these will include the data in a delimited text format (the character " | " will be the delimiter which the user will need to specify while importing the text file into Excel for further manipulation) containing total population split across many categories.

It is necessary to download both total population and population in occupied housing units by tenure and units in structure.

Why is it necessary to download total population at the block group level? First, total population in a block group obtained from Summary File 3 may not exactly match block group population were it to be estimated from Summary File 1 for the purpose of comparison. This is because the former is created from a sample, the latter from the full data. Sample weights ensure that the two estimates of total population converge for higher levels of aggregation, such as a county, but they may not exactly match at the block-group level.

Second, the definition of housing units excludes group quarters. Therefore, if total population were estimated by aggregating population residing in the various categories of data series H33, group-quarter population would not be captured.

Step 4: Obtain Active Connections Data

Water suppliers differ in their metering of certain structure types. For example, some water suppliers may typically use individual metering of single-family attached structures, while other water suppliers may use master-metering. Water suppliers must first decide, based upon local knowledge and level of detail available in the billing system, how different structure types will be allocated to either the single-family or multifamily category.

For each baseline year (and the census year 2000 if it is not included in the baseline period), tabulate total single-family and total multifamily connections. Remove from the tabulation any connections that were inactive during the entire year.

For each block group, aggregate population for the single-family structure category, including both renters and owners. Subtract this estimate from total block group population obtained from Summary File 3. The difference is an estimate of population residing in multifamily structures, including group quarters.

Develop a ratio for each block group indicating how its total population is split between the single-family and multifamily structures. Then, for each block in the distribution area, apply its corresponding block-group ratio to split the block-level total population (from Summary File 1) into the single-family and multifamily categories. Aggregate these block-specific splits to obtain total population residing in single-family and multifamily structures in the entire distribution area.

Step 5: Develop Population Estimates for Non-Census Years

For the census year 2000, obtain persons per single-family connection and per multifamily connection. Apply these ratios to active connections data for the non-census years to estimate non-census-year population. Figure A-1 provides a pictorial description of the approach outlined above.

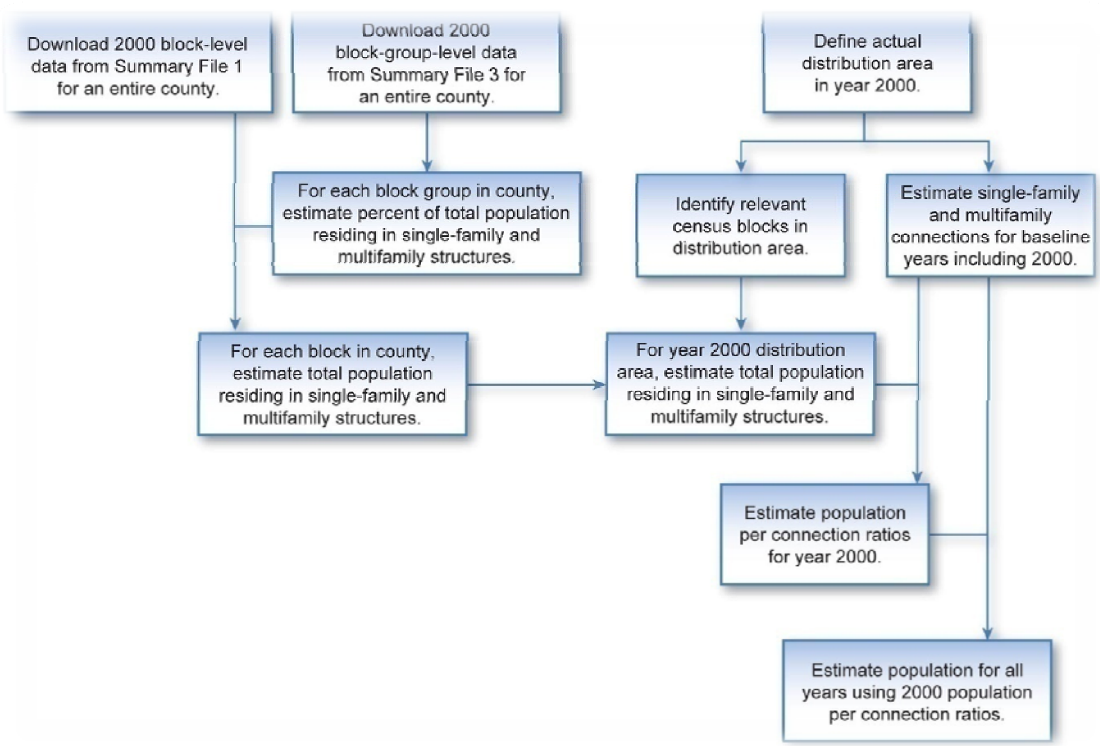

FIGURE A-1
POPULATION PER RESIDENTIAL CONNECTION METHOD

Two exceptions to this procedure are possible:

- Water suppliers are permitted to split their multifamily accounts into additional categories. For example, water suppliers may divide the multifamily sector into categories based upon units in the structure, assuming such information is reliably recorded in their billing system. The water supplier can calculate persons-per-connection for each of these categories, as long as they use the same methodology for all base period and compliance years. Water suppliers may substitute a person-per-unit ratio in place of a person-per-connection ratio to scale multifamily population if their billing systems include reliable data about total units in each multifamily structure. In such a case, population in group quarters would need to be scaled separately using a persons-per-connection ratio specific to group quarters.
- Water suppliers that cannot identify multifamily connections at present should use a single ratio (total population per single-family connection) to obtain population for the non-census years. DWR recommends that these water suppliers begin improving their data systems so that population estimates for the 2015 and 2020 compliance years are more accurate. DWR also encourages water suppliers to identify multifamily accounts separately from CII accounts.

Step 6: Further Improvements to Estimates

Water suppliers that calculate population using the per-connection method described here are encouraged to improve these estimates by including auxiliary information from other sources such as the California Department of Finance, Current Population Survey, the American Housing Survey, building permits data, and similar sources. If they use such information they should maintain consistency between the baseline and compliance years, document the methodology, and provide details about the magnitude of the adjustments made to the population estimated using Steps 1 through 5.

APPENDIX B

Model Water Efficient Landscape Ordinance Definitions and Calculations

The Model Water Efficient Landscape Ordinance (MWELO) was originally added to the California Code of Regulations (Title 23, Division 2, Chapter 2.7) in 1992 and was revised in 2009. Paragraph 492.4 defines the calculation of Maximum Applied Water Allowance (MAWA).

For landscaped areas that are installed on or after January 1, 2010, the MAWA equation and all applicable definitions of terms from the revised ordinance are as follows:

> *Maximum Applied Water Allowance (MAWA) = (ETo) (0.62) [(0.7 x LA) + (0.3 x SLA)]*
>
> *Maximum Applied Water Allowance (MAWA) is in gallons per year*
>
> *ETo = Reference Evapotranspiration (inches per year). Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowance so that regional differences in climate can be accommodated." Reference Evapotranspiration values for each location can be found in Appendix A of the 2010 Model Water Efficient Landscape Ordinance.*
>
> *0.62 = Conversion Factor (from inches/year to gallons/sq ft/year)*
>
> *0.7 = ET Adjustment Factor (ETAF). When applied to reference evapotranspiration, the ETAF "adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape."*
>
> *LA = Landscaped Area including SLA (square feet), which includes "all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation)."*
>
> *0.3 = Additional Water Allowance for Special Landscape Area (SLA), resulting in an effective ETAF for SLA of 1.0.*
>
> *SLA = Special Landscaped Area (square feet), which is defined as "an area of the landscape dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface."*

For landscaped areas that are installed before January 1, 2010, the MAWA equation and all applicable definition of terms from the original 1992 version of the ordinance are as follows:

Maximum Applied Water Allowance (MAWA) = (ETo) (0.62) (0.8 x LA)

Maximum Applied Water Allowance (MAWA) is in gallons per year

ETo = Reference Evapotranspiration (inches per year). Reference Evapotranspiration values for each location can be found on page 38.10 of the Model Water Efficient Landscape Ordinance.

0.62 = Conversion Factor (from inches/year to gallons/sq ft/year)

0.8 = ET Adjustment Factor (ETAF). When applied to reference evapotranspiration, the ETAF "adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape."

LA = Landscaped area includes the entire parcel less the building footprint, driveways, non-irrigated portions of parking lots, landscapes such as decks and patio, and other non-porous areas. Water features are included in the calculation of the landscaped area. Areas dedicated to edible plants, such as orchards or vegetable gardens are not included.

APPENDIX C

PROVISIONAL METHOD 4 FOR DETERMINING WATER USE TARGETS

DWR developed Provisional Target Method 4 in accordance with Water Code Section 10608.20(b)(4). Urban retail water suppliers that adopt Target Method 4 to determine their 2020 urban water use target must use the provisional procedures described in this document. This target method has been developed with the assistance of the California Urban Water Conservation Council, the California State Water Resources Control Board, and the Urban Stakeholder Committee, composed of technical experts and representatives of water suppliers and environmental and other organizations.

Water Code Section 10608.20(d) provides that DWR will update Target Method 4 by December 31, 2014. It is anticipated that improvements will be made to the target method based on new data and analytical techniques in the update. Provisional Target Method 4 described here will be in effect until the update by 2014.

A Target Method 4 Calculator (Calculator) using an Excel spreadsheet has been developed for use with Provisional Target Method 4. The Calculator will be required to accomplish some of the procedures for this method. Other procedures may be accomplished without use of the Calculator but have been incorporated into the Calculator to automate the calculation of the 2020 target.

Overview

The overall framework for Provisional Target Method 4 is described in this section. Details are presented in the Detailed Procedures section. For this target method, savings are assumed between the baseline period and 2020 due to metering of unmetered water connections and achieving water conservation measures in three water use sectors.

The 2020 water use target for individual urban water suppliers is determined by Equation 1 in units of gallons per capita per day (GPCD).

Equation 1

$$\text{Urban Water Use Target} = \text{Base Daily per Capita Water Use} - \text{Total Savings}$$

The base daily per capita water use is separated into three sectors for the purpose of Target Method 4:

1. Residential indoor
2. Commercial, Industrial, and Institutional (CII)
3. Landscape water use, water loss, and other unaccounted-for water

Because accurate methods are not generally available to estimate the water use in these three sectors, a standard of 70 GPCD is assumed for residential indoor water use. For the purpose of Target Method 4, CII water use does not include landscape irrigation use served by dedicated landscape irrigation meters. Dedicated landscape meters often serve large commercial or institutional irrigation sites such as golf courses, parks, or school grounds. CII water use includes irrigation water use served by mixed use water meters. Landscape irrigation water use in item 3 above is composed of residential irrigation and irrigation served by dedicated landscape irrigation meters or connections. Unaccounted for water is water that is lost in water distribution systems. Other unaccounted for water may include unmetered uses such as construction water or discrepancies in water meter accuracy. For simplification, water loss and other unaccounted for water are referred to as "water loss" in this document.

For the purpose of Target Method 4 it is necessary to calculate landscape water use and loss using Equation 2. The units for Equation 2 are GPCD.

Equation 2

Landscape and Water Loss per Capita Use	=	Base Daily per Capita Water Use	-	Standard Indoor Residential 70 gpcd	-	CII Water Use

Potential water savings are estimated for each of these water use sectors and for reduced water use due to installation of meters on unmetered connections, as shown in Equation 3. The units for Equation 3 are GPCD.

Equation 3

Total Savings	=	Metering Savings	+	Indoor Residential Savings	+	CII Savings	+	Landscape and Water Loss Savings

Detailed Procedures

Step 1: Baseline Water Use and Midpoint Year

The Base Daily Per Capita Water Use is an average calculated for the base period selected by the urban retail water supplier, as described in Methodology 3 in *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (Methodologies Report).

The data required for some of the following steps of Target Method 4 must be provided for the midpoint year for the base period. For a base period with an even number of years, the midpoint year will be the 12 months preceding the midpoint date.

The Calculator has been designed for calendar years. For water suppliers that choose to use a fiscal year reporting basis, the Calculator can be adapted by entering the fiscal year period representing the year designated in the Calculator.

Step 2: Metering Savings

For service areas with water service connections without water meters, a water supplier must estimate the total amount of water delivered to unmetered connections during the midpoint year of the baseline period. The metering savings is calculated using Equation 4.

Equation 4

$$\text{Metering Savings, GPCD} = \frac{\text{Water Deliveries to Unmetered Connections in Midpoint Baseline Year, gallons} \times 0.20}{\text{Service Area Population in Midpoint Baseline Year} \times \text{365 days}}$$

Step 3: Indoor Residential Savings

Indoor residential water savings are estimated based upon anticipated increases in the installation of more efficient toilets, residential clothes washers, and showerheads. The savings estimates are based on a comparison of saturation levels of fixtures, at certain water use efficiencies, during the midpoint year of the baseline period and with saturation goals in 2020. Separating toilets in single-family and multi-family dwellings, the 2020 saturation goals for the four plumbing fixtures categories are listed in Table 1.

Table 1. Saturation Goals for Indoor Residential Fixtures

Fixture Type	2020 Saturation Goals
Single-family Toilets	85% 1.28 gal/flush toilets 15% average flush volume at midpoint baseline year
Multi-family Toilets	85% 1.28 gal toilets 15% average flush volume at midpoint baseline year
Residential Washers	85% Water Factor (WF) of 6 15% average WF at midpoint baseline year
Residential Showerheads	95% low flow showerheads 5% non-low flow showerheads

There are two alternatives for calculating indoor residential water savings, one using the Target Method 4 Calculator based on historic data for a water supplier and the other using a default savings of 15 GPCD.

Alternative 1:

To calculate indoor residential savings using the historic data of an individual water supplier the following types of data may be required to enter into the Calculator:

- Persons per household
- Toilets per household
- Showers per household
- Numbers of single- and multi-family dwelling units for years 1991 through the midpoint of baseline period
- Population residing in group quarters in the midpoint year of baseline period
- Either (1) numbers of efficient toilets, showerheads, and clothes washers either distributed, installed, or credited through incentives, such as rebates for years 1991 through the midpoint of baseline period or (2) saturation levels of fixtures at various efficiencies at the midpoint year of the baseline period

After entry of the required data, the Calculator will determine the indoor residential savings in terms of GPCD.

Alternative 2:

If a water supplier does not have historic data for the midpoint baseline and prior years, the supplier can use a default indoor residential water savings of 15 GPCD. While the Calculator allows Alternative 2 for the convenience of calculating the target, if this alternative is chosen, the Calculator is unnecessary.

Determining whether to use the default value, the following information may be helpful. In developing the Provisional Target Method 4, a random sample of 52 water suppliers were selected to test the Calculator. The sample represented a variety of climatic and demographic characteristics. An analysis of this random sample developed a statewide average savings from the four indoor residential elements was 14.1 GPCD, with a range of

7.9 to 16.8 GPCD. Sixty percent of the suppliers fell within the range of 13.1 to 15.1 GPCD and 15 percent exceeded 15.1 GPCD.

Step 4: CII Savings

CII water savings is assumed to be 10 percent of baseline CII water use, which is an average for the baseline period calculated following procedures in Methodology 7 in the Methodologies Report. For the purpose of Target Method 4, CII water use does not include landscape irrigation served by dedicated landscape irrigation meters. CII savings is calculated using Equation 5.

Equation 5

$$\text{CII Savings, GPCD} = \text{Average baseline CII Water Use, GPCD} \times 0.10$$

Step 5: Landscape Irrigation and Water Loss Savings

Landscape water use and water loss savings are based on a 21.6 percent reduction in that sector for all suppliers. The 21.6 percent reduction was derived from an analysis of 52 sample water suppliers and was calculated so that the average water use target for the 52 sample suppliers would meet the overall goal of a cumulative 20% percent savings. Landscape water use and water loss use is calculated using Equation 2 and represents irrigation water use, water loss and other unaccounted-for water uses. The savings is calculated using
Equation 6.

Equation 6

$$\text{Landscape water use and Water Loss Savings, GPCD} = \text{Landscape Irrigation and Water Loss Sector Use per Eq. 2, GPCD} \times 0.216$$

Step 6: Total Savings

The total savings required using Target Method 4 is calculated using Equation 3, entering results from Steps 2 through 5.

Step 7: 2020 Urban Water Use Target

The 2020 urban water use target in GPCD is calculated using Equation 1.

Example

To illustrate the procedures for the Provisional Target Method 4, calculations for the fictional Whispering Glen Water District are shown below.

Step 1. Baseline Water Use and Midpoint Year

Whispering Glen Water District selected a 10-year baseline period of 1996-2005. The average base daily per capita water use for this period was calculated to be 228 GPCD. The savings are calculated based on water deliveries in the midpoint year of the baseline period, which is 2000.

Step 2. Metering Savings (Equation 4)

$$\text{Metering Savings, GPCD} = \frac{\underset{2,541,637,800}{\text{Water Deliveries to Unmetered Connections in Midpoint Baseline Year, gallons}} \times 0.20}{\underset{168,118}{\text{Service Area Population in Midpoint Baseline Year}} \times 365 \text{ days}} = 8.3 \text{ GPCD}$$

Step 3. Indoor Residential Savings

Alternative 1, Target Method 4 Calculator:

$$\text{Total Indoor Residential Savings, GPCD} = \underset{7.6}{\text{Single-family Toilets Savings, GPCD}} + \underset{1.6}{\text{Multi-family Toilets Savings, GPCD}} + \underset{6.0}{\text{Residential Washers Savings, GPCD}} + \underset{1.3}{\text{Residential Showers Savings, GPCD}} = 16.5 \text{ GPCD}$$

Alternative 2, Default:

Total Indoor Residential Savings, GPCD	=	15.0 GPCD

Step 4. CII Savings (Equation 5)

CII Savings, GPCD	=	Average baseline CII Water Use, GPCD	X	0.10	=	6.9 GPCD
		69.0				

Step 5. Landscape Irrigation and Water Loss Savings (Equations 2 and 6)

Landscape Irrigation and Water Loss Sector Use, GPCD	=	2000 Base Daily per Capita Water Use	–	Standard Indoor Residential Use, GPCD	–	CII Water Deliveries in Midpoint Baseline Year, GPCD	=	89.0 GPCD
		227.7		70.0		68.7		

Landscape Irrigation and Water Loss Savings, GPCD	=	Landscape Irrigation and Water Loss Sector Use, GPCD	X	0.216	=	19.2 GPCD
		89.0				

Step 6. Total Savings

Because there are two alternative methods to calculate indoor residential savings, there are two alternatives for total savings, calculated using Equation 3.

Alternative 1 (based on Target Method 4 Calculator for Indoor Residential Savings):

Total Savings, GPCD	=	Metering Savings, GPCD	+	Indoor Residential Savings, GPCD	+	CII Savings, GPCD	+	Landscape Irrigation and Water Loss Savings, GPCD	=	50.9 GPCD
		8.3		16.5		6.9		19.2		

Alternative 2 (based on default for Indoor Residential Savings):

Total Savings, GPCD	=	Metering Savings, GPCD	+	Indoor Residential Savings, GPCD	+	CII Savings, GPCD	+	Landscape Irrigation and Water Loss Savings, GPCD	=	49.4 GPCD
		8.3		15.0		6.9		19.2		

Step 7. 2020 Urban Water Use Target (Equation 1)

Alternative 1 (based on Target Method 4 Calculator for Indoor Residential Savings):

Urban Water Use Target, GPCD	=	Base Daily per Capita Water Use, GPCD	–	Total Savings, GPCD	=	176.8 GPCD
		227.7		50.9		

Alternative 2 (based on default for Indoor Residential Savings):

Urban Water Use Target, GPCD	=	Base Daily per Capita Water Use, GPCD	–	Total Savings, GPCD	=	178.3 GPCD
		227.7		49.4		

APPENDIX D

Regulations for Implementing Process Water Provision

California Code of Regulations
Title 23. Waters
Division 2. Department of Water Resources
Chapter 5.1. Water Conservation Act of 2009
Article 1. Industrial Process Water Exclusion in the Calculation of Gross Water Use

§596. Process Water

(a) An urban retail water supplier that has a substantial percentage of industrial water use in its service area is eligible to exclude the process water use of existing industrial water customers from the calculation of its gross water use to avoid a disproportionate burden on another customer sector.

(b) The Department of Water Resources will review and assess the implementation of this article and may amend its provisions upon considering the recommendations of the Commercial, Industrial and Institutional task force convened pursuant to section 10608.43 of the Water Code.

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.20(e), 10608.24(e), and 10608.43 Water Code.

§596.1. Applicability and Definitions

(a) Sections 596.2 through 596.5 describe criteria and methods whereby an urban retail water supplier may deduct process water use when calculating their gross water use in developing their urban water use targets.

(b) The terms used in this article are defined in this subdivision.

(1) “commercial water user” means a water user that provides or distributes a product or service. Examples include commercial businesses and retail stores, office buildings, restaurants, hotels and motels, laundries, food stores, and car washes.

(2) “disadvantaged community” means a community with an annual median household income that is less than 80 percent of the statewide annual median household income.

(3) “distribution system” means a water conveyance system that delivers water to a residential, commercial, or industrial customer and for public uses such as fire safety where the source of water is either raw or potable water.

(4) “drought emergency” means a water shortage emergency condition that exists when there would be insufficient water for human consumption, sanitation and fire protection, as set forth in California Water Code Section 350-359 and Government Code Section 8550-8551.

(5) "gross water use" means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

(A) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier

(B) The net volume of water that the urban retail water supplier places into long-term storage

(C) The volume of water the urban retail water supplier conveys for use by another urban water supplier

(D) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24 of the Water Code.

(6) "incidental water use" means water that is used by industry for purposes not related to producing a product or product content or research and development. This includes incidental cooling, air conditioning, heating, landscape irrigation, sanitation, bathrooms, cleaning, food preparation, kitchens, or other water uses not related to the manufacturing of a product or research and development.

(7) "industrial water user" means a manufacturer or processor of materials as defined by the North American Industry Classification System (NAICS) code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development. An industrial water user is primarily involved in product manufacturing and processing activities and research and development of products, such as those related to chemicals, food, beverage bottling, paper and allied products, steel, electronics and computers, metal finishing, petroleum refining, and transportation equipment. Data centers dedicated to research and development are considered an industrial water user.

(8) "institutional water user" means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

(9) "local agency" means any municipality, such as a city or county government or public water agency.

(10) "non-industrial water use" means gross water use minus industrial water use.

(11) "process water" means water used by industrial water users for producing a product or product content, or water used for research and development. Process water includes, but is not limited to; the continuous manufacturing processes, water used for testing, cleaning and maintaining equipment. Water used to cool machinery or buildings used in the manufacturing process **or necessary to maintain product quality or chemical characteristics for product manufacturing or control rooms, data centers, laboratories, clean rooms and other industrial facility units that are integral to the manufacturing** or research and development process shall be considered process water. Water used in the manufacturing process that is necessary for complying with local, State and federal health and safety laws, and is not incidental water, shall be considered process water. Process water does not include incidental, commercial or institutional water uses.

(12) "recycled water" means water that is used to offset potable demand, including recycled water supplied for direct use and indirect potable reuse that meets the following requirements, where applicable:

(A) For groundwater recharge, including recharge through spreading basins, water supplies that are all of the following:

(i) Metered.

(ii) Developed through planned investment by the urban water supplier or a wastewater treatment agency.

(iii) Treated to a minimum tertiary level.

(iv) Delivered within the service area of an urban retail water supplier or its urban wholesale water supplier that helps an urban retail water supplier meet its urban water use target.

(B) For reservoir augmentation, water supplies that meet the criteria of subdivision (A) and are conveyed through a distribution system constructed specifically for recycled water.

(13) "urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

(14) "Urban Water Management Plan" means a plan prepared pursuant to California Water Code Division 6 Part 2.6. 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.

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.12, 10608.20, and 10631Water Code.

§596.2 Criteria for Excluding Industrial Process Water Use from Gross Water Use Calculation

When calculating its gross water use, an urban retail water supplier may elect to exclude up to 100 percent of process water use from its gross water use if any one of the following criteria is met in its service area:

(a) Total industrial water use is equal to or greater than 12 percent of gross water use, or

(b) Total industrial water use is equal to or greater than 15 gallons per capita per day, or

(c) Non-industrial water use is equal to or less than 120 gallons per capita per day if the water supplier has self-certified the sufficiency of its water conservation program with the Department of Water Resources under the provisions of section 10631.5 of the Water Code, or

(d) The population within the supplier's service area meets the criteria for a disadvantaged community.

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.20 and 10608.24 Water Code.

§596.3. Quantification and Verification of Total Industrial Process and Industrial Incidental Water.

The volumes of water uses in Section 596.3 shall be for the same period as urban water suppliers calculate their baseline daily per capita water use and reported in their Urban Water Management Plans.

(a) The volume of process water use shall be verified and separated from incidental water use.

(1) To establish a baseline for determining process water use, urban retail water suppliers shall calculate the process water use over a continuous ten year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(2) Verification of process water can be accomplished by metering, sub-metering or other means determined suitable and verifiable by the urban retail water supplier and reported in their Urban Water Management Plans and reviewed by the Department of Water Resources.

(b) In cases where the urban retail water supplier provides only a portion of an industrial water user's water supply, the urban retail water supplier shall prorate the volume of process water use excluded from gross water use by considering the average share of the industrial water use that it supplied over a continuous ten year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

The verification of the proportion of industrial water use supplied shall be accomplished through metering, sub-metering, or other means determined suitable and verifiable by the urban water supplier such as audits, historic manufacturing output or suppliers' billing records and as reported in their Urban Water Management Plans.

Example. If an urban water supplier delivered only 60 percent of the average annual water used by an industrial water user, the urban supplier can only use that 60 percent of industrial water in determining if it is eligible to exclude process water from its gross water use; and if it is eligible, it can exclude only 60 percent of the volume of process water used by such industrial water user.

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.20 and 10608.24 Water Code.

§596.4. Existing Industrial Customers

When implementing this article, urban retail water suppliers shall meet the following provisions:

(a) Any ordinance or resolution adopted by an urban retail water supplier after November 10, 2009 shall not require industrial water customers existing as of November 10, 2009 to undertake changes in product formulation, operations, or equipment that would reduce process water use.

(b) An urban retail water supplier may encourage existing industrial customers to utilize water efficiency technologies, methodologies, or practices through the use of financial and technical assistance.

(c) This section shall not limit an ordinance or resolution adopted pursuant to a declaration of drought emergency by an urban retail water supplier.

Note: Authority cited: Section 10608.20, Water Code. Reference: Section 10608.26 Water Code.

§596.5 New and Retrofitted Industries

Local agencies and water suppliers shall encourage newly-established and retrofitted industries to adopt industry-specific water conservation practices and technologies where such technologies exist.

Note: Authority cited: Section 10608.20, Water Code. Reference: Section 10608.20 Water Code.

Section N: Recommended UWMP Data Tables

DWR has developed a series of tables to support inclusion of required data in a UWMP. Use of these tables help confirm that the necessary data are included in the UWMP, provide a mechanism for clear data reporting, and facilitate DWR review of submitted UWMPs. Word files containing blank tables are posted on the UWMP website for water suppliers preparing UWMPs. Blank versions of these tables are also included in this section for reference. Additional discussion of how the tables can be included in a UWMP is included in Part I. Although use of these tables is encouraged, it is not required nor are the tables necessarily sufficient to meet requirements of the UWMP Act. A water supplier can access these tables using DOST or in Word and Excel format at the UWMP website (http://www.owue.water.ca.gov/urbanplan/assist/assist.cfm).

Part II, Section H, contains instructions for electronic submittal.

With the 2010 UWMPs, data may be supplied to DWR in tables within a UWMP, and data may also be electronically transmitted by using the DWR online submittal tool (DOST). DOST is discussed further in Section H: Electronic Submittal.

These tables provide a clear and concise way for an urban water supplier to present UWMP data. If a water supplier prefers an alternate approach to data presentation, the alternate may be used as long as the required information is presented in a clear manner.

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Table 1 Coordination with appropriate agencies							
Coordinating Agencies[1,2]	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft plan	Was sent a notice of intention to adopt	Not involved / No information
Other water suppliers							
Water mgmt agencies							
Relevant public agencies							
General public							
Other							

[1] *Indicate the specific name of the agency with which coordination or outreach occurred.*
[2] *Check at least one box in each row.*

Table 2 Population — current and projected							
	2010	2015	2020	2025	2030	2035 - optional	Data source[2]
Service area population[1]							

[1] *Service area population is defined as the population served by the distribution system. See Technical Methodology 2: Service Area Population (2010 UWMP Guidebook, Section M).*
[2] *Provide the source of the population data provided.*

Table 3 Water deliveries — actual, 2005					
	2005				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family					
Multi-family					
Commercial					
Industrial					
Institutional/governmental					
Landscape					
Agriculture					
Other					
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 4 Water deliveries — actual, 2010					
	2010				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume
Single family					
Multi-family					
Commercial					
Industrial					
Institutional/governmental					
Landscape					
Agriculture					
Other					
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 5 Water deliveries — projected, 2015					
	2015				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume
Single family					
Multi-family					
Commercial					
Industrial					
Institutional/governmental					
Landscape					
Agriculture					
Other					
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 6 Water deliveries — projected, 2020					
	2020				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume
Single family					
Multi-family					
Commercial					
Industrial					
Institutional/governmental					
Landscape					
Agriculture					
Other					
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 7
Water deliveries — projected 2025, 2030, and 2035

	2025		2030		2035 - optional	
	metered		metered		metered	
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY
Single family						
Multi-family						
Commercial						
Industrial						
Institutional/governmental						
Landscape						
Agriculture						
Other						
Total	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 8
Low-income projected water demands

Low Income Water Demands[1]	**2015**	**2020**	**2025**	**2030**	**2035 - opt**
Single-family residential					
Multi-family residential					
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] Provide demands either as directly estimated values or as a percent of demand.

Table 9
Sales to other water agencies

Water distributed	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 - opt**
Name of agency							
Name of agency							
Name of agency							
Total	0	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 10
Additional water uses and losses

Water use[1]	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 -opt**
Saline barriers							
Groundwater recharge							
Conjunctive use							
Raw water							
Recycled water							
System losses							
Other (define)							
Total	0	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] Any water accounted for in Tables 3 through 7 are not included in this table.

Table 11
Total water use

Water Use	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 - opt**
Total water deliveries (from Tables 3 to 7)							
Sales to other water agencies (from Table 9)							
Additional water uses and losses (from Table 10)							
Total	0	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 12
Retail agency demand projections provided to wholesale suppliers

Wholesaler	**Contracted Volume**[3]	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 -opt**

Table 13
Base period ranges

Base	**Parameter**	**Value**	**Units**
10- to 15-year base period	2008 total water deliveries		*see below*
	2008 total volume of delivered recycled water		*see below*
	2008 recycled water as a percent of total deliveries		percent
	Number of years in base period[1]		years
	Year beginning base period range		
	Year ending base period range[2]		
5-year base period	Number of years in base period	5	years
	Year beginning base period range		
	Year ending base period range[3]		

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first base period is a continuous 10- to 15-year period.

[2] The ending year must be between December 31, 2004 and December 31, 2010.

[2] The ending year must be between December 31, 2007 and December 31, 2010.

Table 14
Base daily per capita water use — 10- to 15-year range

Base period year: Sequence Year	Base period year: Calendar Year	Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				
Year 6				
Year 7				
Year 8				
Year 9				
Year 10				
Year 11				
Year 12				
Year 13				
Year 14				
Year 15				
			Base Daily Per Capita Water Use[1]	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Add the values in the column and divid by the number of rows.

Table 15
Base daily per capita water use — 5-year range

Base period year: Sequence Year	Base period year: Calendar Year	Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				
			Base Daily Per Capita Water Use[1]	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Add the values in the column and divid by the number of rows.

Table 16
Water supplies — current and projected

Water Supply Sources		2010	2015	2020	2025	2030	2035 - opt
Water purchased from[1]:	Wholesaler supplied volume (yes/no)						
Wholesaler 1 (enter agency name)							
Wholesaler 2 (enter agency name)							
Wholesaler 3 (enter agency name)							
Supplier-produced groundwater[2]							
Supplier-produced surface water							
Transfers in							
Exchanges In							
Recycled Water							
Desalinated Water							
Other							
Other							
Total		0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Volumes shown here should be what was purchased in 2010 and what is anticipated to be purchased in the future. If these numbers differ from what is contracted, show the contracted quantities in Table 17.
[2] Volumes shown here should be consistent with Tables 17 and 18.

Table 17
Wholesale supplies — existing and planned sources of water

Wholesale sources[1,2]	Contracted Volume[3]	2015	2020	2025	2030	2035 - opt
(Source 1)						
(Source 2)						
(Source 3)						

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Water volumes presented here should be accounted for in Table 16.
[2] If the water supplier is a wholesaler, indicate all customers (excluding individual retail customers) to which water is sold. If the water supplier is a retailer, indicate each wholesale sup
[3] Indicate the full amount of water

Table 18
Groundwater — volume pumped

Basin name(s)	Metered or Unmetered[1]	2006	2007	2008	2009	2010
Groundwater as a percent of total water supply						

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Indicate whether volume is based on volumeteric meter data or another method

Table 19
Groundwater — volume projected to be pumped

Basin name(s)	2015	2020	2025	2030	2035 - optional
Percent of total water supply					

Units are in acre-feet per year.
Include future planned expansion

Table 20
Transfer and exchange opportunities

Transfer agency	Transfer or exchange	Short term or long term	Proposed Volume
Total			

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 21
Recycled water — wastewater collection and treatment

Type of Wastewater	2005	2010	2015	2020	2025	2030	2035 - opt
Wastewater collected & treated in service area							
Volume that meets recycled water standard							

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 22
Recycled water — non-recycled wastewater disposal

Method of disposal	Treatment Level	2010	2015	2020	2025	2030	2035 - opt
Name of method							
Name of method							
Name of method							
Name of method							
	Total	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 23
Recycled water — potential future use

User type	Description	Feasibility[1]	2015	2020	2025	2030	2035 - opt
Agricultural irrigation							
Landscape irrigation[2]							
Commercial irrigation[3]							
Golf course irrigation							
Wildlife habitat							
Wetlands							
Industrial reuse							
Groundwater recharge							
Seawater barrier							
Getothermal/Energy							
Indirect potable reuse							
Other (user type)							
Other (user type)							
	Total	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Technical and economic feasibility.
[2] Includes parks, schools, cemeteries, churches, residential, or other public facilities)
[3] Includes commercial building use such as landscaping, toilets, HVAC, etc) and commercial uses (car washes, laundries, nurseries, etc)

Table 24
Recycled water — 2005 UWMP use projection compared to 2010 actual

Use type	2010 actual use	2005 Projection for 2010[1]
Agricultural irrigation		
Landscape irrigation[2]		
Commercial irrigation[3]		
Golf course irrigation		
Wildlife habitat		
Wetlands		
Industrial reuse		
Groundwater recharge		
Seawater barrier		
Getothermal/Energy		
Indirect potable reuse		
Other (user type)		
Other (user type)		
Total	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] From the 2005 UWMP. There has been some modification of use types. Data from the 2005 UWMP can be left in the existing catagories or modified to the new catagories, at the discretion of the water supplier.
[2] Includes parks, schools, cemeteries, churches, residential, or other public facilities)
[3] Includes commercial building use such as landscaping, toilets, HVAC, etc) and commercial uses (car washes, laundries, nurseries, etc)

Table 25
Methods to encourage recycled water use

Actions	Projectes Results					
	2010	2015	2020	2025	2030	2035 - opt
Financial incentives						
Name of action						
Name of action						
Total	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 26
Future water supply projects

Project name[1]	Projected start date	Projected completion date	Potential project constraints[2]	Normal-year supply[3]	Single-dry year supply[3]	Multiple-dry year first year supply[3]	Multiple-dry year second year supply[3]	Multiple-dry year third year supply[3]
				0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Water volumes presented here should be accounted for in Table 16.
[2] Indicate whether project is likely to happen and what constraints, if any, exist for project implementation.
[3] Provide estimated supply benefits, if available.

Table 27
Basis of water year data

Water Year Type	Base Year(s)
Average Water Year	
Single-Dry Water Year	
Multiple-Dry Water Years	

Table 28
Supply reliability — historic conditions

		Multiple Dry Water Years			
Average / Normal Water Year	Single Dry Water	Year 1	Year 2	Year 3	Year 4
Percent of Average/Normal Year:					

Table 29
Factors resulting in inconsistency of supply

Water supply sources[1]	Specific source name, if any	Limitation quantification	Legal	Environmental	Water quality	Climatic	Additional information

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] From Table 16.

Table 30
Water quality — current and projected water supply impacts

Water source	Description of condition	2010	2015	2020	2025	2030	2035 - opt

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 31
Supply reliability — current water sources

Water supply sources[1]	Average / Normal Water Year Supply[2]	Multiple Dry Water Year Supply[2]		
		Year 2011	Year 2012	Year 2013
Percent of normal year:				

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] From Table 16.
[2] See Table 27 for basis of water type years.

Table 32
Supply and demand comparison — normal year

	2015	2020	2025	2030	2035 - opt
Supply totals (from Table 16)					
Demand totals (From Table 11)					
Difference					
Difference as % of Supply					
Difference as % of Demand					

Units are in acre-feet per year.

Table 33
Supply and demand comparison — single dry year

	2015	2020	2025	2030 - opt	2030
Supply totals[1,2]					
Demand totals[2,3,4]					
Difference					
Difference as % of Supply					
Difference as % of Demand					

Units are in acre-feet per year.
[1] Consider the same sources as in Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of
[2] Provide in the text of the UWMP text that discusses how single-dry-year water supply volumes were determined.
[3] Consider the same demands as in Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of
[4] The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.

Table 34 Supply and demand comparison — multiple dry-year events						
		2015	2020	2025	2030	2035 - opt
Multiple-dry year first year supply	Supply totals[1,2]					
	Demand totals[2,3,4]					
	Difference					
	Difference as % of Supply					
	Difference as % of Demand					
Multiple-dry year second year supply	Supply totals[1,2]					
	Demand totals[2,3,4]					
	Difference					
	Difference as % of Supply					
	Difference as % of Demand					
Multiple-dry year third year supply	Supply totals[1,2]					
	Demand totals[2,3,4]					
	Difference					
	Difference as % of Supply					
	Difference as % of Demand					

Units are in acre-feet per year.

[1] Consider the same sources as in Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.

[2] Provide in the text of the UWMP text that discusses how single-dry-year water supply volumes were determined.

[3] Consider the same demands as in Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.

[4] The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.

Table 35 Water shortage contingency — rationing stages to address water supply shortages		
Stage No.	Water Supply Conditions	% Shortage

[1] One of the stages of action must be designed to address a 50 percent reduction in water supply.

Table 36 Water shortage contingency — mandatory prohibitions	
Examples of Prohibitions	Stage When
Using potable water for street washing	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	

Table 37 Water shortage contingency — consumption reduction methods		
Consumption	Stage When	Projected
Name method		
Name method		
Name method		
Name method		
Name method		
Name method		

Table 38 Water shortage contingency — penalties and charges	
Penalties or Charges	Stage When Penalty Takes Effect
Penalty for excess use	
Charge for excess use	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	

Section O: References

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Section P: Glossary

This glossary is included to support the new terms that have been introduced by the Legislature for the 2010 UWMPs. Although most of these definitions are included in either the Urban Water Management Planning (CWC §10611 through 10617) or Water Conservation (CWC §10608.12) Acts, the collection of these definitions into a single location, and the inclusion of additional definitions, is provided to support water suppliers as UWMPs are prepared. Sources for each definition are included in parentheses at the end of the definition.

Agency

City or county governments and public and private water suppliers that provide water for municipal purposes to 3,000 or more customers or provide more than 3,000 acre feet of water per year. (UWMP 2005 Guidebook)

Base daily per capita water use (baseline)

Any of the following:

- The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.
- For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.
- For the purposes of Section 10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010 (CWC §10608.12(b)).

Base period

Any of the following:

- A 10- to 15- year continuous period used to calculate baseline daily per capita water use per Section 10608.20.
- A continuous 5-year period used to determine whether the 2020 urban water use target meets the legislation's minimum water use reduction requirement per Section 10608.22 (modified from DWR 2010a).

Baseline commercial, industrial, and institutional water use

An urban retail water supplier's base daily per capita water use for commercial, industrial, and institutional users. (CWC §10608.12(c))

Best management practice (BMP)

A best management practice (BMP) means a policy, program, practice, rule, regulation or ordinance or the use of devices, equipment or facilities which meets either of the following criteria:

An established and generally accepted practice among water suppliers that results in more efficient use or conservation of water;

A practice for which sufficient data are available from existing water conservation projects to indicate that significant conservation or conservation related benefits can be achieved; that the practice is technically and economically reasonable and not environmentally or socially unacceptable; and that the practice is not otherwise unreasonable for most water suppliers to carry out. (CUWCC website - http://www.cuwcc.org/mou/terms-section-1-definitions.aspx)

Climate change

Any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from: natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun; natural processes within the climate system (e.g. changes in ocean circulation); human activities that change the atmosphere's composition (e.g. through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification) (EPA website - http://www.epa.gov/climatechange/basicinfo.html)

Commercial water user

A water user that provides or distributes a product or service. (CWC §10608.12(d))

Compliance daily per capita water use

The gross water use during the final year of the reporting period, reported in gallons per capita per day. (CWC §10608.12(e))

Customer

A purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses. (CWC §10612)

Demand management

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. (CWC §10611.5)

Demand management measures (DMM)

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. (CWC §10611.5)

Demand management measures include, but are not limited to (CWC §10631 (f)(1)):

(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.

Disadvantaged community

A community with an annual median household income that is less than 80 percent of the statewide annual median household income. (CWC §10608.12(f))

Distribution System

Any combination of pipes, tanks, pumps, etc., which deliver drinking water from a source or treatment facility to the consumer and includes:

a) Disinfection facilities for which no Giardia or virus reduction is required pursuant to §64654(a).
b) The composite of all distribution systems of a public water system. (CWC §63750.50)

Distribution System Boundary

The edge of the network of pipes that conveys water to residential, commercial, industrial, and public user defined by points of metering or measurement of the water supply. Typical measurement locations for distribution include exit points for treatment plants, treated water reservoirs, wells feeding directly into the distribution system, and imported water entering directly into the distribution system. (modified from DWR 2010a)

Efficient use

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. (CWC §10613)

Gross water

The total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.
2) The net volume of water that the urban retail water supplier places into long-term storage.
3) The volume of water the urban retail water supplier conveys for use by another urban water supplier.
4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24. (CWC §10608.12(g))

Industrial water user

A water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development. (CWC §10608.12(h))

Institutional water user

A water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions. (CWC §10608.12(i))

Interim urban water use target

The midpoint between the urban retail water supplier's base daily per capita water use and the urban retail water supplier's urban water use target for 2020. (CWC §10608.12(j))

Integrated Regional Water Management (IRWM)

A collaborative effort to manage all aspects of water resources in a region. IRWM crosses jurisdictional, watershed, and political boundaries; involves multiple agencies, stakeholders, Individuals, and groups; and attempts to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions. .(www.water.ca.gov/irwm/index.cfm)

Locally cost effective

The present value of the local benefits of implementing an agricultural efficiency water management practice is greater than or equal to the present value of the local cost of implementing that measure. (CWC §10608.12(k))

Lower Income

(a) "Lower income households" means persons and families whose income does not exceed the qualifying limits for lower income families as established and amended from time to time pursuant to Section 8 of the United States Housing Act of 1937. The limits shall be published by the department in the California Code of Regulations as soon as possible after adoption by the Secretary of Housing and Urban Development. In the event the federal standards are discontinued, the department shall, by regulation, establish income limits for lower income households for all geographic areas of the state at 80 percent of area median income, adjusted for family size and revised annually.

(b) "Lower income households" includes very low income households, as defined in Section 50105, and extremely low income households, as defined in Section 50106. The addition of this subdivision does not constitute a change in, but is declaratory of, existing law.

(c) As used in this section, "area median income" means the median family income of a geographic area of the state. (Health and Safety Code §50079.5)

Multiple-dry year period

A year in the historical sequence generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903. For example, 1928-1934 and 1987-1992 were the two multi-year periods of lowest average runoff during the 20th century in the Central Valley basin. Suppliers should determine this for each watershed from which they receive supplies. (2010 Guidebook)

Normal Year

A year in the historical sequence that most closely represents median runoff levels and patterns. It is defined as the median runoff over the previous 30 years or more. This median is recalculated every ten years. (2010 Guidebook)

Not locally cost effective

The present value of the local benefits of implementing a BMP is less than the present value of the local costs of implementing that BMP. (CWC §10631.5(a)(4)(B))

Person

Any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.
(CWC §10614)

Plan

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. (CWC §10615)

Process water

Water used for producing a product or product content or water used for research and development, including, but not limited to, continuous manufacturing processes, water used for testing and maintaining equipment used in producing a product or product content, and water used in combined heat and power facilities used in producing a product or product content. Process water does not mean incidental water uses not related to the production of a product or product content, including, but not limited to, water used for restrooms, landscaping, air conditioning, heating, kitchens, and laundry. (CWC §10608.12(l))

Public agency

Any board, commission, county, city and county, city, regional agency, district, or other public entity. (CWC §10616)

Recycled water

The reclamation and reuse of wastewater for beneficial use that is used to offset potable demand, including recycled water supplied for direct use and indirect potable reuse, that meets the following requirements, where applicable:

For groundwater recharge, including recharge through spreading basins, water supplies that are all of the following:

1. Metered.
2. Developed through planned investment by the urban water supplier or a wastewater treatment agency.
3. Treated to a minimum tertiary level.
4. Delivered within the service area of an urban retail water supplier or its urban wholesale water supplier that helps an urban retail water supplier meet its urban water use target.

For reservoir augmentation, water supplies that meet the criteria of paragraph (1) and are conveyed through a distribution system constructed specifically for recycled water. (CWC §10608.12(m))

Regional Alliance

Each group of water suppliers agreeing among themselves to plan, comply, and report as a region. (DWR 2010a, pg 50)

Regional water resources management

Sources of supply resulting from watershed-based planning for sustainable local water reliability or any of the following alternative sources of water:

- The capture and reuse of stormwater or rainwater.
- The use of recycled water.
- The desalination of brackish groundwater.
- The conjunctive use of surface water and groundwater in a manner that is consistent with the safe yield of the groundwater basin. (CWC §10608.12(n))

Reporting period

The years for which an urban retail water supplier reports compliance with the urban water use targets. (CWC §10608.12(o))

Single-dry year

A year in the historical sequence generally considered to be the lowest annual runoff for a watershed since the water-year beginning in 1903. Suppliers should determine this for each watershed from which they receive supplies. (2010 Guidebook)

Target Method

One of the four series of calculations an urban retail water supplier are to use to determine its urban water use target pursuant to CWC §10608.20(a). The four target methods are:

- Method 1 — 80 percent
- Method 2 — Performance standards
- Method 3 — 95 percent of hydrologic region target
- Method 4 — Water savings

Technical Methodology

The nine approaches developed by DWR to provide guidance to water suppliers on how to calculate baseline, target, and compliance year water use. They provide specific direction on how to calculate the required values and guidance on how different information is to be obtained. The technical methodologies are described in Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (For the Consistent Implementation of the Water Conservation Bill of 2009) (DWR 2010a). (2010 Guidebook)

Urban (retail) water supplier

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. (CWC §10617)

Urban water use target

The urban retail water supplier’s targeted future daily per capita water use. (CWC §10608.12(q))

Urban wholesale water supplier

A water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes. (CWC §10608.12(r))

APPENDIX C GROUNDWATER MANAGEMENT PLAN

March 2005

Elsinore Valley Municipal Water District

Elsinore Basin Groundwater Management Plan

Final Report

Elsinore Valley Municipal Water District

MWH

ELSINORE VALLEY MUNICIPAL WATER DISTRICT

Elsinore Basin Groundwater Management Plan

March 2005

MWH

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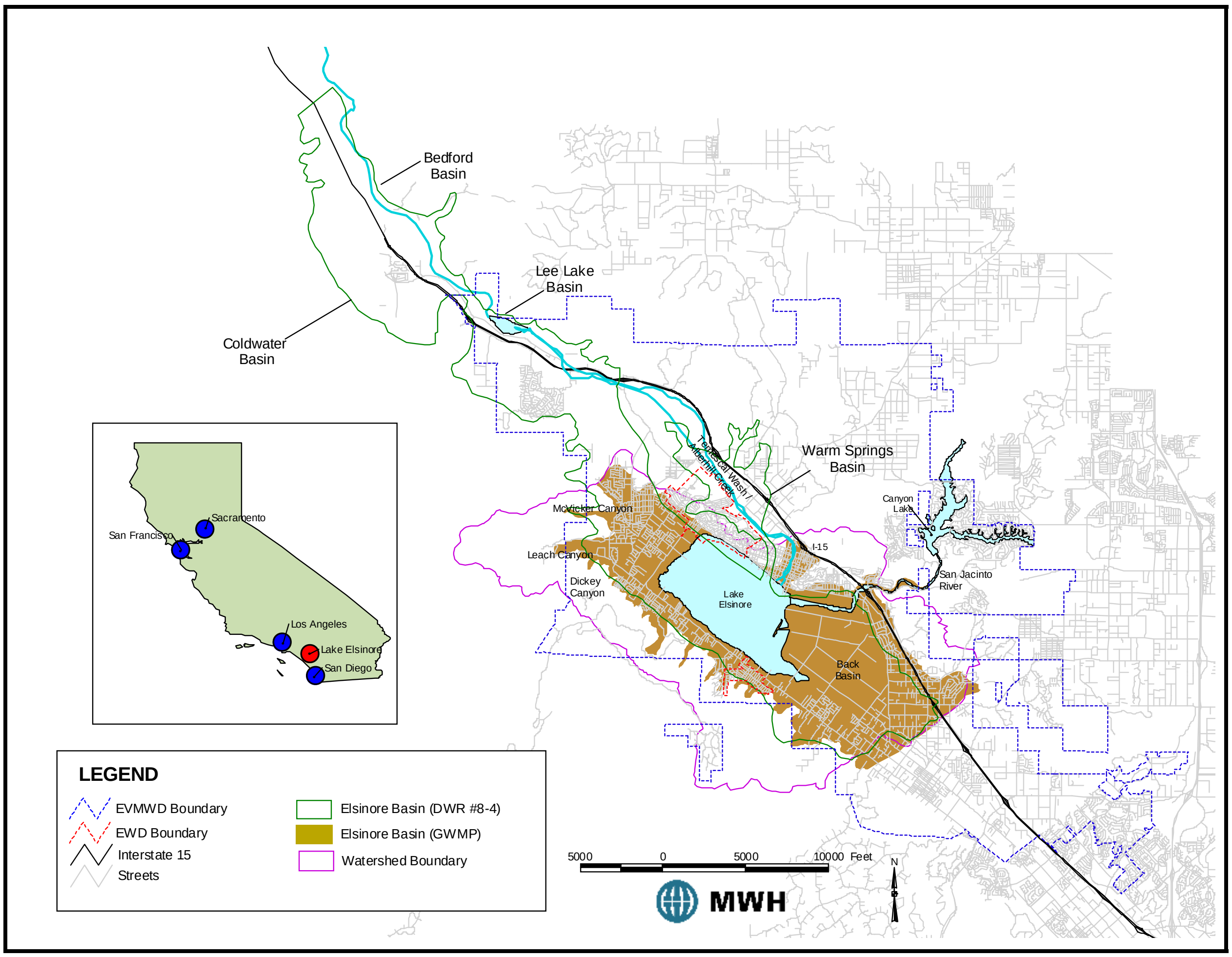
Executive Summary

The objective of this Groundwater Management Plan (GWMP) is to provide an evaluation of the groundwater basin and develop a reliable groundwater supply to meet drought and dry season demands through the year 2020. This plan addresses the hydrogeologic understanding of the basin, the evaluation of baseline conditions, identification of management issues and strategies, and the definition and evaluation of four alternatives. This document concludes with an implementation plan of the recommended plan. This GWMP was adopted by the Elsinore Valley Municipal Water District Board of Directors on March 24, 2005 under the authority of the Groundwater Management Planning Act (California Water Code Part 2.75, §10753) as amended.

STUDY AREA

The study area is the Elsinore Basin (**Figure ES-1)**. The surface drainage area shown on this figure consists of approximately 42 square miles, of which about 25 square miles are located

Figure ES-1
Study Area

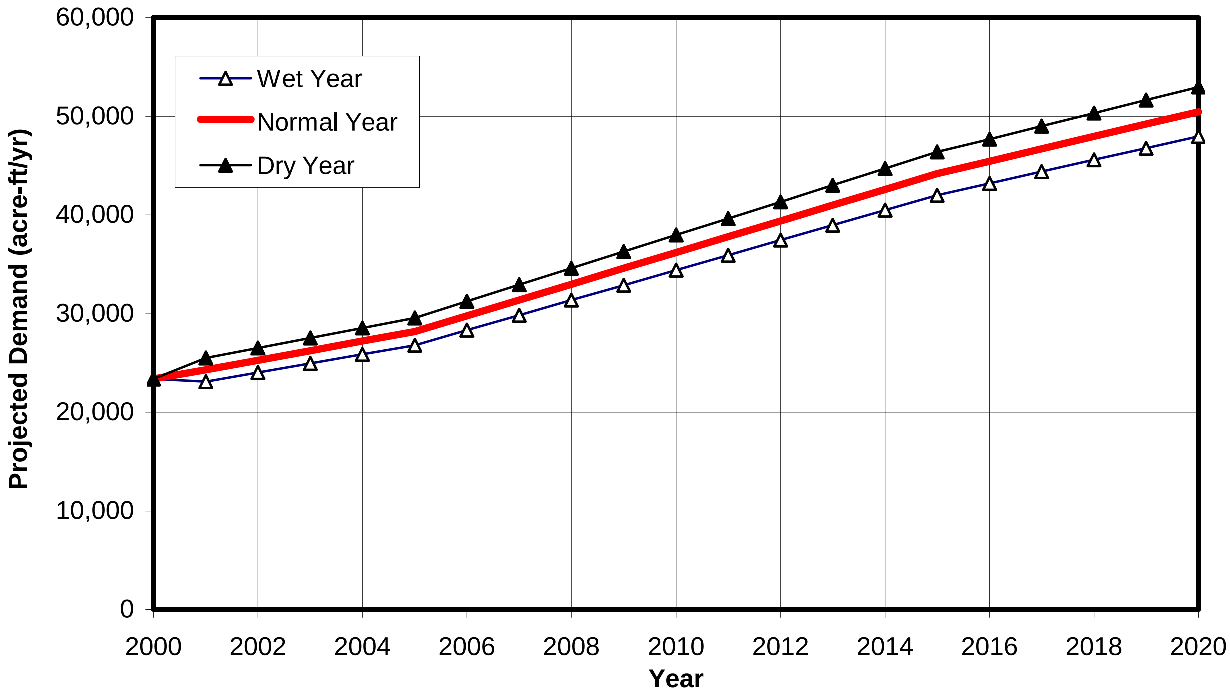


within the basin floor including Lake Elsinore (5 square miles). The remaining portions of the Elsinore Basin include the surrounding highlands and associated streams and canyons. A portion of the area southeast of the lake, referred to as the Back Basin, is part of the flood plain for Lake Elsinore and the San Jacinto River.

NEED FOR GROUNDWATER MANAGEMENT PLAN

The work completed as part of this GWMP illustrates that the Elsinore Basin may be in a state of overdraft (about 4,400 acre-ft/yr). A continuation of the current conditions to year 2020 will result in an increased overdraft (about 6,500 acre-ft/yr) and a significant decline in water levels. Water quality degradation and increased risk of land subsidence are two of the related adverse impacts of declining water levels. In addition to these effects, the demand for groundwater will increase in the future due to 1) the need for lake replenishment and 2) additional potable supplies to meet demands over the next 20 years (**Figure ES-2)**. The adverse effects of declining water levels combined with increased demands make the development of this GWMP critical. The intent of this plan is to provide a guideline that will resolve the overdraft problem and protect the groundwater supply for use by future generations.

Figure ES-2
Projected Water Demands of EVMWD and EWD



The need and goal statement for this GWMP has been developed through the stakeholder process with local agencies, water purveyors and residents involved in the stakeholder process:

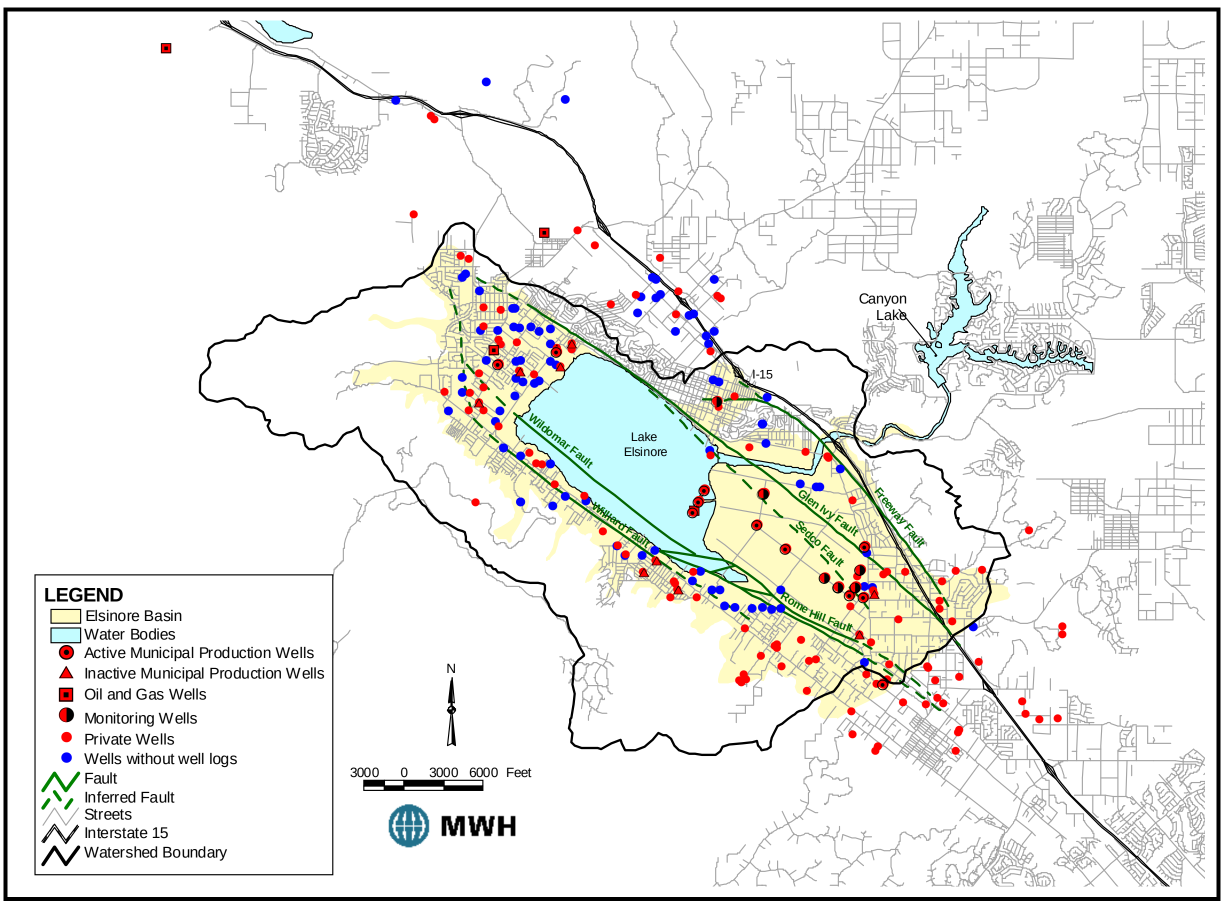
"Because water demand is projected to double in the next 20 years, cooperative groundwater management is required to achieve a sustainable water balance in the Elsinore Basin, the goal of this Groundwater Management Plan is to ensure a reliable, high quality, cost-efficient groundwater supply for the users of the Elsinore Basin in an environmentally responsible manner."

HYDROGEOLOGIC UNDERSTANDING OF THE ELSINORE BASIN

The Elsinore Basin is a major source of water supply for Elsinore Valley Municipal Water District (EVMWD), Elsinore Water District (EWD) and other local groundwater producers. The development of a conceptual understanding of the groundwater basin is an important step in the development of the GWMP and includes the understanding of the geology, fault locations, groundwater flows, groundwater quality and a groundwater budget of the Elsinore Basin.

Figure ES-3 presents the location of the Elsinore Basin, the 239 documented wells, and the location of faults within the Elsinore Basin. There are 151 wells that have well logs, which provide the most comprehensive descriptions of the lithology in the basin.

Figure ES-3
Location of Wells and Faults in the Elsinore Basin



Fault System

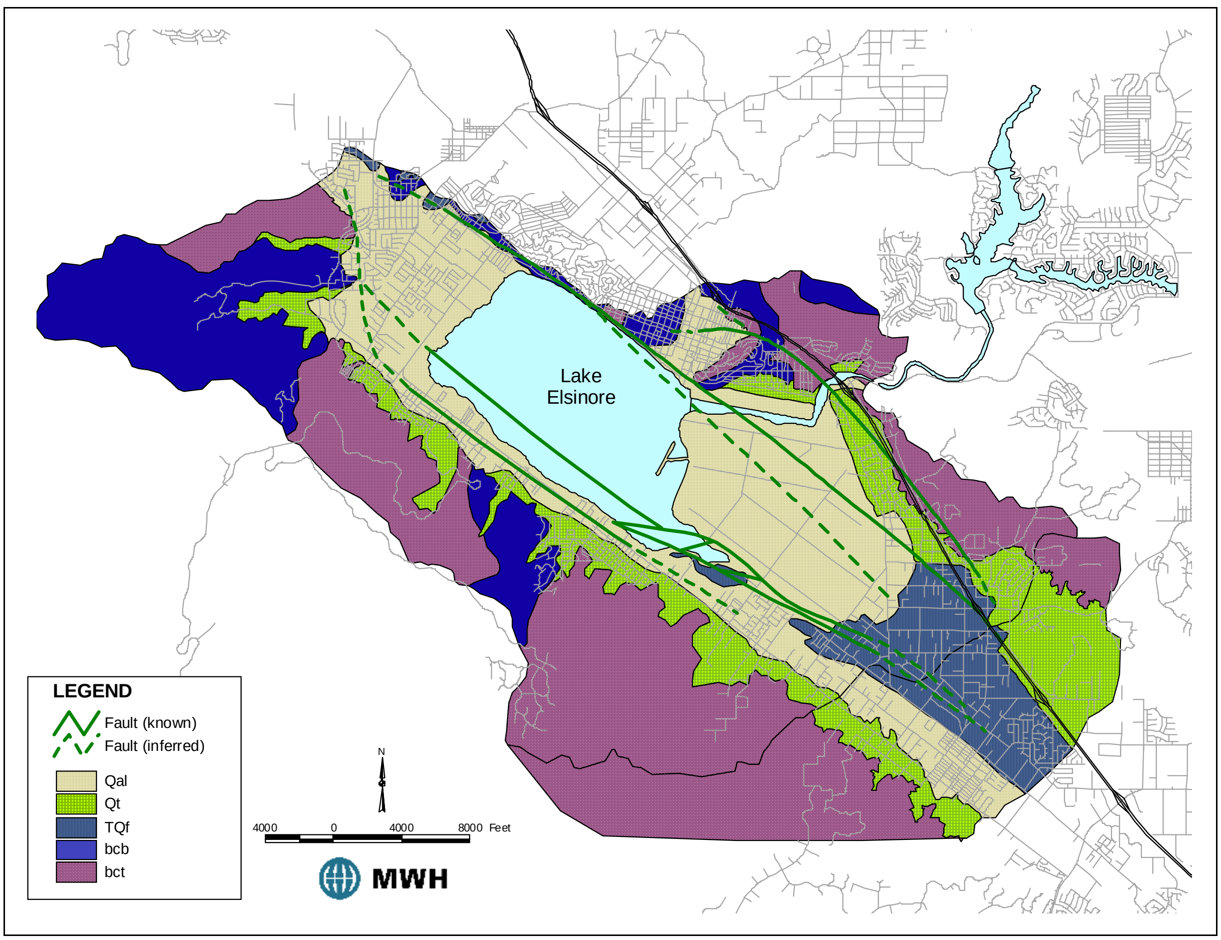
The Elsinore Basin is dominated by two major fault zones, the Glen Ivy Fault Zone which includes the Glen Ivy fault, the Freeway fault and the Sedco fault, and the Wildomar Fault Zone, which includes the Wildomar fault, the Rome Hill fault, and the Willard fault. Of these the Glen Ivy and Rome Hill faults appear to be at least partial barriers to groundwater flow. The Willard and the Wildomar faults do not appear to be barriers to groundwater flow.

Geology

Figure ES-4 shows the geology of the Elsinore Basin, which can be divided into five classifications, also referred to as the hydrostratigraphy of the Basin. These classifications are:

- The Recent alluvium (Qal)
- The Older alluvium (Qt)
- The Fernando Group (TQf)
- The Bedford Canyon Formation (bcb)
- The basement rocks (bct)

Figure ES-4
Geology of the Elsinore Basin



Cross sections are presented in the report that show the relationship between these geologic units. According to the conceptual model developed for this GWMP, the Elsinore Basin is a closed groundwater basin bounded by either bedrock or faults. Inflows to the basin a predominantly from the canyons to the northwest (Leach and McVicker) and the San Jacinto on the northeast. The general groundwater flow direction is from the northwest to the southeast, largely a result of groundwater extraction in the Back Basin.

Groundwater Balance

The groundwater balance prepared for this GWMP covers the period 1990-2001 and consists of the quantification and reconciliation of the following inflow and outflow components:

Inflows

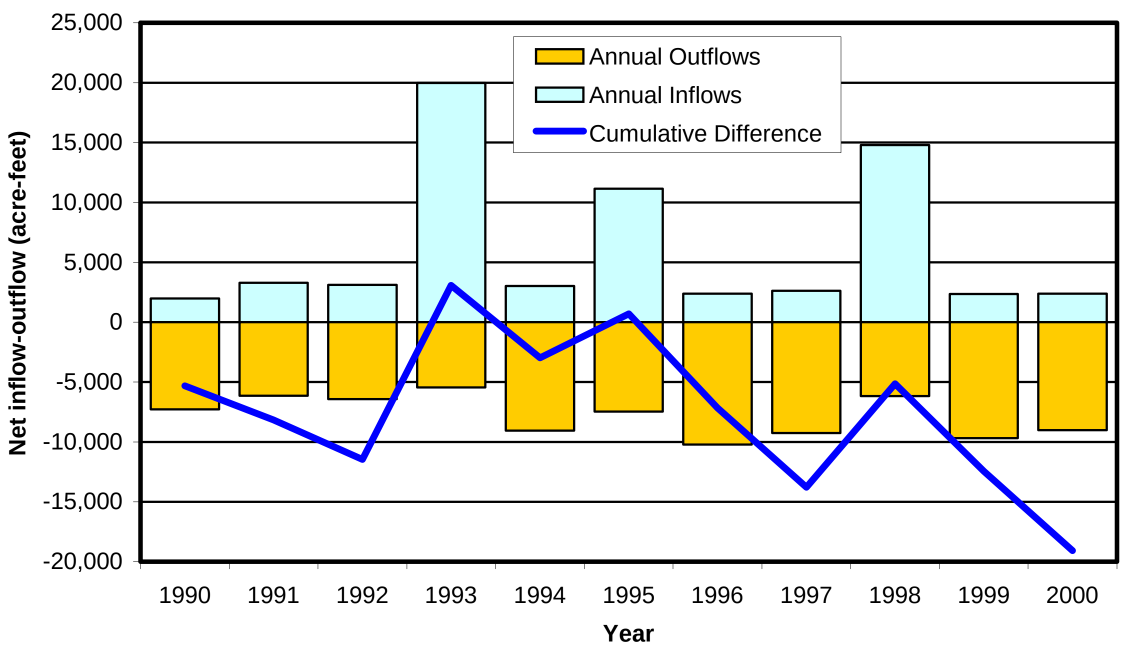
- Infiltration from direct precipitation
- Surface water infiltration
- Infiltration from deep percolation of applied water
- Infiltration from septic tanks
- Underflow into basin

Outflows

- Groundwater pumping
- Flow to surface water
- Underflow out of basin

Based upon this period, the difference between inflows and outflows suggests an average annual groundwater deficit of approximately 1,800 acre-ft/yr over the 11-year period. The estimated cumulative groundwater deficit over the same period was approximately 19,000 acre-ft. **Figure ES-5** shows the estimated annual inflows and outflows over the period, indicating that the Elsinore Basin experienced a groundwater deficit in eight of the 11 years reviewed.

Figure ES-5
Elsinore Basin Groundwater Budget 1990-2001



Water Quality

The water quality of the basin is evaluated based on available data. Although the data shows lateral and vertical variations in water quality, the following general observations can be made:

- Total dissolved solids (TDS) concentrations are generally higher in the area north of Lake Elsinore and along basin margins than in the Back Basin area.
- Highest concentrations of TDS, sulfate and nitrate are found at the Lincoln Street Well.
- Lowest concentrations of TDS and sulfate are found in the Olive Street Well.
- Highest concentrations of nitrate are found in the Palomar Well and these concentrations appear to be increasing.

BASELINE CONDITIONS

The review of historical water conditions indicates that outflows from the Elsinore Basin exceed the inflows. If this condition were to continue in the future, the basin may become overdrafted. To compare the long-term impact of the existing basin operation and the anticipated future operation of the basin, two baseline scenarios (Baselines A and B) are developed. The definition of both baselines is summarized in **Table ES-1**. Baseline B also provides the basis for comparison of the four alternatives developed for this GWMP.

Table ES-1
Summary of Baselines A and B

Baseline A	Baseline B
Year 2000 Demand (average = 25,000 acre-ft/yr)	Year 2020 Demand (average = 50,000 acre-ft/yr)
Year 2000 Land use	Year 2020 Land use
All existing production wells (8)	All existing production wells plus Joy St Well (9)
Canyon Lake WTP at 9 mgd	Canyon Lake WTP at 9 mgd
AVP connection at 24.2 mgd	AVP connection at 24.2 mgd
TVP connection at 12.7 mgd	TVP connection with new PS at 26.5 mgd
No septic tanks conversions	3,000 septic tanks converted to sewer
No Lake make-up	Lake make-up with Island Wells and Recycled Water (7.5 mgd)
No additional new source of supply	Additional new source of supply

Baseline A simulates the current (year 2000) groundwater pumping patterns in the basin, while Baseline B simulates expected pumping conditions in the basin in year 2020 without the implementation of any new groundwater management activities. To evaluate the potential range in groundwater conditions in the basin, the hydrologic conditions for the period October 1960 through September 2001 are used. This 41-year period represents a period of average precipitation and includes a wide range of wet, normal and dry years.

The baseline conditions and the difference in groundwater storage predicted with the groundwater model over the 41-year period are presented in **Figure ES-6** and **Figure ES-7**. As shown in **Figure ES-6**, the basin would experience a storage deficit of about 180,000 acre-ft and 270,000 acre-ft over the 41-year simulation period for Baseline A and Baseline B, respectively.

This corresponds to an average deficit of 4,400 acre-ft/yr for Baseline A and 6,500 acre-ft/yr for Baseline B.

Figure ES-6
Projected Cumulative Groundwater Balance for Baselines A and B

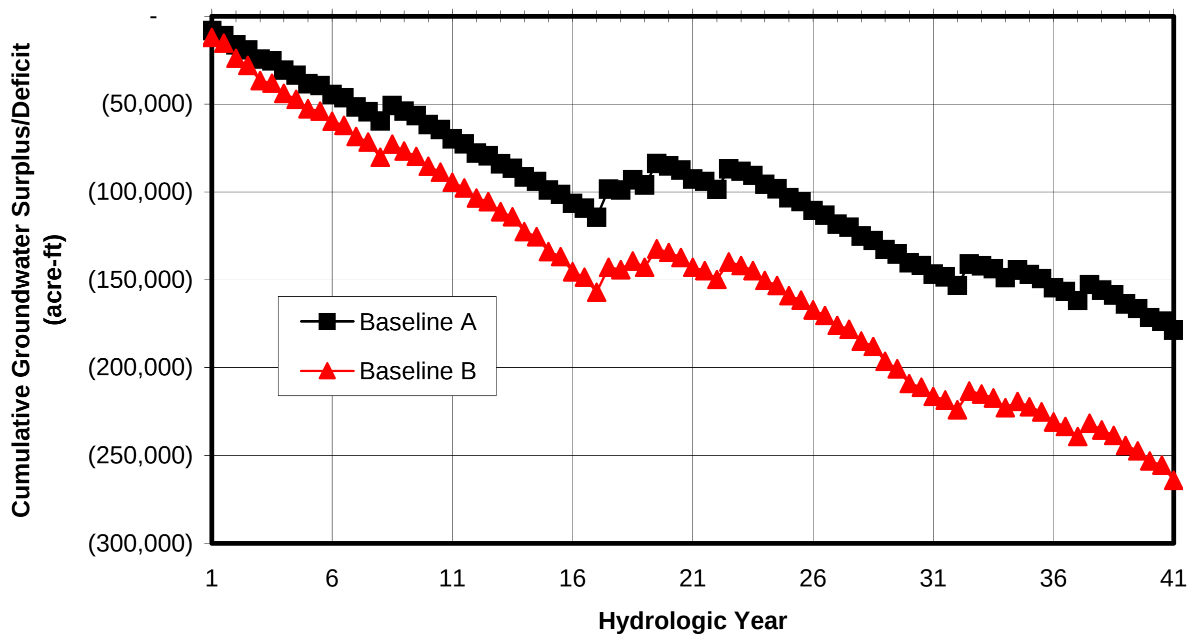
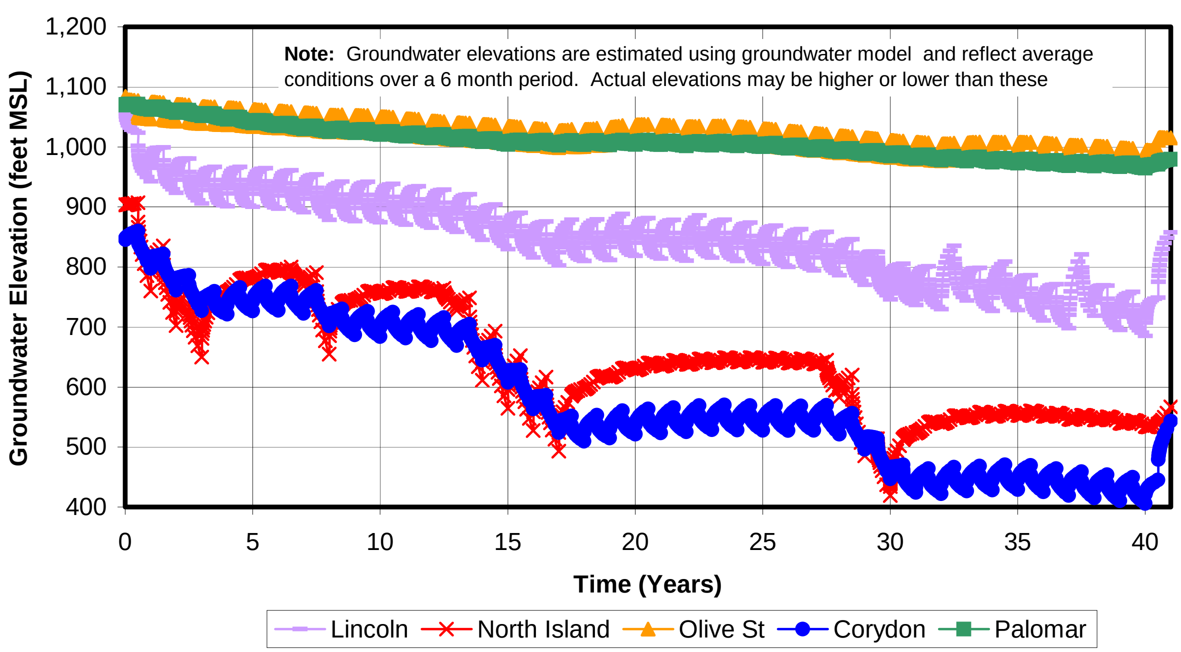


Figure ES-7
Projected Groundwater Levels for Baseline B



As shown in **Figure ES-7**, the water levels are expected to decline throughout the basin. The decrease in water levels is greater under Baseline B conditions than under Baseline A conditions. Under Baseline B conditions, the water levels in the Lincoln Street and Corydon Street wells are projected to drop more than 200 feet and 400 feet over the 41-yr simulation period, respectively. Declining water levels can lead to other detrimental effects such as land subsidence, increased pumping costs, loss of production capacity and water quality degradation.

GROUNDWATER MANAGEMENT ISSUES

This GWMP is prepared in compliance with the Groundwater Management Act, also known as AB3030, which is recently amended by SB1938, which identify twelve specific components and management issues that may be included in a groundwater management plan. These twelve components and five additional potential issues are discussed in detail in **Section 5** and are summarized in **Appendix F**. The following nine main issues pertain to the Elsinore Basin:

- Well head protection
- Groundwater contamination
- Well construction, destruction, and abandonment policies
- Compliance with drinking water regulations and Basin Plan objectives
- Doubling of water demands
- Use of groundwater for Lake Elsinore replenishment needs
- Declining groundwater levels and storage deficit
- Basin monitoring
- Potential of subsidence

GROUNDWATER MANAGEMENT STRATEGIES

A groundwater management strategy is a general approach that addresses one or more of the management issues. The strategies identified in this GWMP are:

- Store imported water by using dual purpose wells
- Increase local supplies by using spreading basins
- Store imported water by using spreading basins
- Store groundwater for dry years by using in-lieu recharge
- Develop new sources of supply
- Reduce supply needs through water conservation
- Measure progress through basin monitoring
- Stakeholder involvement
- Protect groundwater quality by developing programs and policies

These strategies are included in different combinations in the four alternatives that are developed for this GWMP and are compared with Baseline B in the alternative evaluation. Details on these management strategies are presented in **Section 5**.

DESCRIPTION OF ALTERNATIVES

Four alternatives are identified to meet the current and future demands of EVWMD, while achieving a sustainable water balance in the Elsinore Basin. A detailed summary of the components included in the two baselines and the four alternatives is presented in **Table ES-2**. The four alternatives are:

- Alternative 1 – Dual Purpose Wells
- Alternative 2 – Surface Spreading
- Alternative 3 – In-lieu Recharge and Water Conservation
- Alternative 4 – Combination

The average groundwater balance for all four alternatives and the two baselines of the 41-year hydrologic period from 1961 to 2001 is presented in detail in **Section 6** along the water supply balances, and the Lake Elsinore balances. All alternatives are able to meet the year 2020 demands and maintain the Lake level at 1,240 ft MSL by replenishing the Lake with groundwater and recycled water. However, only alternatives 1, 3, and 4 show maintain a balanced groundwater basin (net storage equals zero), while Baseline A, Baseline B and Alternative 2 have an average annual groundwater storage deficit of 4,400 acre-ft, 6,500 acre-ft and 3,800 acre-ft, respectively.

Alternative 1

The purpose of Alternative 1 is to achieve a balanced groundwater basin through a conjunctive use program using the 14 dual-purpose injection-extraction wells. Treated water would be injected during periods when replenishment water is available. The new dual-purpose wells would be used to extract stored groundwater when additional supplies are required to meet the year 2020 demands. The 14 dual-purpose wells are:

- Four conversions of existing deep wells in the Back Basin
- Two new deep dual-purpose wells in the Back Basin
- Five new shallow dual-purpose wells in the Back Basin
- Three new deep dual-purpose wells in the area north of Lake Elsinore.

Injection would take place in 33 of the 41 years and over the 41-year period, an average of 6,700 acre-ft/yr would be injected. Extraction would take place during 22 out of the 41 years. In addition, four peaking wells are required to meet the year 2020 Maximum Day Demands (MDD).

Alternative 2

The purpose of Alternative 2 is to achieve a balanced groundwater basin using spreading basins in Leach and McVicker Canyons to maximize the capture of local runoff water and infiltrate treated imported water. Five new extraction wells would be required in the area north of Lake Elsinore to extract water that is recharged in the spreading basins. Surface recharge would take place every year, ranging from 540 to 6,540 acre-ft in six months.

Extraction would take place during 22 years of the 41-year period and ranges from 0 to 1,930 acre-ft in six months. In addition, 11 extra wells are required to provide peaking capacity to meet the year 2020 MDD.

Alternative 3

The purpose of Alternative 3 is to achieve a balanced groundwater basin using a combination of in-lieu recharge and water conservation. With in-lieu recharge, the amount of imported water used would be maximized to reduce groundwater pumping, hence increasing the basin storage as natural inflows continue. Construction of new facilities is not required for in-lieu recharge, with the exception of the eight new peaking wells that are needed to meet the year 2020 MDD.

Alternative 4

The purpose of Alternative 4 is to achieve a balanced groundwater basin using a combination of dual-purpose wells, in-lieu recharge, and water conservation. The following 14 dual-purpose wells would be installed for this alternative:

- Four conversions of existing deep wells in the Back Basin
- Two new deep dual-purpose wells in the Back Basin
- Five new shallow dual-purpose wells in the Back Basin
- Equipping Joy Street Well as dual-purpose
- Two new deep dual-purpose wells in the area north of Lake Elsinore

During the 41-year hydrologic cycle, about 240,000 acre-ft of imported water would be injected. Lake replenishment from groundwater is insignificant, because more recycled water is used under this alternative (up to 17.7 mgd versus 7.5 mgd in alternatives 1 through 3). In addition, four peaking wells are required to meet the year 2020 MDD.

EVALUATION OF ALTERNATIVES

The process of evaluating the effectiveness of each alternative in meeting the GWMP's goal involves technical analyses coupled with professional judgment and experience. Each management alternative is evaluated using the following eleven criteria:

- Ability to reduce overdraft
- Expected cost
- Environmental impacts
- Risk
- Legal and regulatory implementation
- Public acceptability
- Funding
- Reliability
- Water Quality
- Flexibility
- Ease of implementation

The evaluation and ranking of Baseline B and Alternatives 1 through 4 is presented in **Table ES-3**. Alternatives are rated on a scale of 1 to 5, with 5 being excellent and 1 being a very poor score. In addition, each criterion has a weighting factor ranging from 1 to 3, with 3 used for the

Table ES-2
Summary of Alternatives

Item	Baseline A	Baseline B	Alternative 1 Dual Purpose Wells	Alternative 2 Surface Spreading	Alternative 3 In-Lieu Recharge and Water Conservation	Alternative 4 Combination
Water Demand	Year 2000	Year 2020	Same as Baseline B	Same as Baseline B	Year 2020 with 10% water conservation	Same as Baseline B with 5% water conservation
Water Supplies	Current Supplies: • 8 Existing EVMWD Wells • 4 Existing EWD Wells • Canyon Lake WTP • AVP Connection • TVP Connection	• Same as in Baseline A • Joy Street Well • 11 wells for peaking	• Same as in Baseline A • Joy Street Well • Conversion of 4 existing wells to dual purpose wells • 10 new dual purpose wells • 4 wells for peaking	• Same as in Baseline A • Joy Street Well • 5 new extraction wells • 11 wells for peaking	• Same as in Baseline A • Joy Street Well • 8 wells for peaking	• Same as in Baseline A • Equipping Joy Street Well as dual purpose • Conversion of 6 existing wells to dual purpose wells • 7 new dual purpose wells • 4 wells for peaking
Land Use	Year 2000	Year 2020	Same as Baseline B	Same as Baseline B	Same as Baseline B	Same as Baseline B
Lake Replenishment	None	• 7.5 mgd of Recycled Water • 3 Island Wells	Same as Baseline B	Same as Baseline B	Same as Baseline B	• 17.7 mgd of Recycled Water • 1 Island Wells
Septic Tanks	Existing Septic Tanks	Existing Septic Tanks	Conversion of all Septic Tanks in the High-Risk Zone	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Special Projects (in addition to the peaking wells)	None	• 17.9 miles of 36-inch to 12-inch diameter pipeline to bring in new source water[2] from the Woodcrest Turnout to Lake St. Tank.	Dual Purpose Wells with imported water: • 3 deep wells north of the lake • 6 deep wells south of the lake[1] • 5 shallow wells south of the lake Other Facilities: • 30-inch diameter pipeline (4,000 ft) • 800 HP pumping station between Cal Oaks and the Back Basin	Surface Spreading with imported water: • 25-acre spreading basin in Leach Canyon • 15-acre spreading basin in McVicker Canyon • 5 extraction wells north of Lake • Pipelines and PS to convey add'l water source to spreading basins	• 8 peaking wells	Dual Purpose Wells with imported water: • 3 deep wells n/o the lake[3] • 6 deep wells s/o of the lake[1] • 5 shallow wells south of the lake Other Facilities: • 30-inch diam. pipeline (4,000 ft) • 800 HP pumping station betw. Cal Oaks and the Back Basin
Basin Monitoring	• Water Quality • Groundwater levels • Groundwater production • Lake levels • Surface flow rates • Rainfall	Same as Baseline A	• Expanded monitoring network for parameters of Baseline A and B • Subsidence	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Stakeholder Involvement	None	None	• Formation of a basin advisory committee	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Wellhead Protection	Existing EVMWD Wells	Same as Baseline A	• Expansion to all active wells in the basin	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Well Construction and Abandonment Program	None	None	• Identification of location/status of wells through a well canvass • Development of a Well Construction and Abandonment Program that includes the coordinates of these activities with Riverside County Department of Environmental Health. • Implementation of policies and regulations	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Land Development Plans	None	None	• Coordination with local and regional planning agencies	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1

Table ES-3
Summary of Alternatives Evaluation

Evaluation Criteria	Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Ability to Reduce Overdraft	1 • Groundwater balance is not achieved. • Zero artificial recharge. • Declining water levels to 400 ft. • Storage Deficit = 6,500 acre-ft/yr.	4 • Groundwater balance is achieved. • 6,700 acre-ft/yr injected. • 600 acre-ft/yr in-lieu recharge. • Stable water levels. • Storage Deficit = 0 acre-ft/yr.	2 • Groundwater balance is not achieved. • 4,800 acre-ft/yr surface spreading. • Declining water levels to 400 ft. • Storage Deficit = 3,800 acre-ft/yr.	3 • Groundwater balance is achieved. • 7,200 acre-ft/yr in-lieu recharge. • Stable water levels. • Storage Deficit = 200 acre-ft/yr.	5 • Groundwater balance is achieved. • 5,900 acre-ft/yr injected. • 600 acre-ft/yr in-lieu recharge. • Slightly increasing water levels. • Storage Deficit = 0 acre-ft/yr.
Expected Costs	4 • $428/acre-ft • $365/acre-ft (without common cost)	3 • $446/acre-ft • $438/acre-ft (without common cost)	3 • $457/acre-ft • $480/acre-ft (without common cost)	5 • $409/acre-ft • $288/acre-ft (without common cost)	4 • $425/acre-ft • $353/acre-ft (without common cost)
Environmental Impacts	1 • Steep declining water levels cause subsidence, which can not be mitigated. • Increase energy usage due to increased pumping lift.	4 • No significant environmental impact other than the construction of wells, pipelines and a PS. • Elimination of overdraft conditions is an environmental benefit.	2 • Use of canyons for spreading basins (30 acres) is likely to cause habitat losses, which may need mitigation. • Overdraft conditions remain, this can not be mitigated.	4 • No negative environmental impact as facilities other than the constructing of peaking wells. • Elimination of overdraft conditions is an environmental benefit. • Water Conservation	5 • No significant environmental impact other than the constructing of wells, pipelines and a PS. • Elimination of overdraft conditions is an environmental benefit. • Water Conservation • Better use of water resources by eliminating groundwater use for lake replenishment
Risk	2 • High risk that wells production will decrease due to declining water levels (resulting in higher cost for additional supplies and decreased reliability). • Moderate risk that additional imported supplies may not be available.	4 • Low risk with injection/extraction technology. • Low risk that the injection capacities are lower than estimated at the time of this GWMP. • Moderate risk that additional imported supplies may not be available.	1 • High risk that surface spreading is not feasible to the extend included in this alternative due to limitations in infiltration (depth to bedrock). • Pilot testing required to determine infiltration rates. • Moderate risk that additional imported supplies may not be available.	3 • Moderate risk that 10 percent water conservation is not achieved. • Moderate risk that additional imported supplies may not be available.	4 • Low risk with injection/extraction technology. • Low risk that the injection capacities are lower than estimated at the time of this GWMP. • Moderate risk that additional imported supplies may not be available.
Legal and Regulatory Issues	2 • Declining water levels are a potential for litigation and may require adjudication of the Elsinore Basin. This causes complex legal and regulatory issues.	3 • Construction permits. • Compliance with 40 CFR Part 144, only water that meets drinking water standards can used for injection. • Development/implementation of septic tank conversion policies required. • NPDES permit required for discharge of 7.5 mgd of recycled water in Lake Elsinore. • Meet Basin Plan objectives.	3 • Construction permits. • Development/implementation of septic tank conversion policies required. • NPDES permit required for discharge of 7.5 mgd of recycled water in Lake Elsinore. • Meet Basin Plan objectives. • Use of recycled water for spreading, is limited to 50 % of the total spreading amount or RO treatment is required.	4 • Construction permits. • Development/implementation of septic tank conversion policies required. • NPDES permit required for discharge of 7.5 mgd of recycled water in Lake Elsinore.	2 • Construction permits. • Compliance with 40 CFR Part 144, only water that meets drinking water standards can used for injection. • Development/implementation of septic tank conversion policies required. • NPDES permit required for discharge of 17.7 mgd of recycled water in Lake Elsinore. • Meet Basin Plan objectives.
Public Acceptability	1 • Public is expected to vigorously oppose to unacceptable subsidence.	5 • Public is expected to support most components.	2 • The public is expected to oppose to some degree of subsidence. • The public may oppose to the construction of spreading basins in the canyons. • Public may oppose to use of recycled water for surface spreading.	3 • Public is expected to support most components of the alternative, however, 10 percent water conservation places a burden on public participation. • The alternative requires minimal construction.	4 • Public is expected to support most components.

Table ES-3 (Continued)
Summary of Alternatives Evaluation

Evaluation Criteria	Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Funding	1 • Capital Cost $56 million. • Fair distribution of investments.	3 • Capital Cost $30 million. • Uneven distribution of investments.	1 • Capital Cost $57 million. • Fair distribution of investments.	4 • Capital Cost $16 million. • Even distribution of investments.	4 • Capital Cost $24 million. • Fair distribution of investments.
Reliability	3 • 73% of water supply from MWD in consecutive drought years.	3 • 70% of water supply from MWDSC in consecutive drought years.	3 • 70% of water supply from MWDSC in consecutive drought years.	2 • 84% of water supply from MWDSC in consecutive drought years.	4 • 67% of water supply from MWDSC in consecutive drought years.
Water Quality	1 • Upper aquifer: significant increase in TDS concentration • Lower aquifer: increase in TDS concentration	3 • Upper aquifer: no change in TDS concentration • Lower aquifer: increase in TDS concentration	2 • Upper aquifer: significant increase in TDS concentration • Lower aquifer: no change in TDS concentration	3 • Upper aquifer: slight increase in TDS concentration • Lower aquifer: slight increase in TDS concentration	3 • Upper aquifer: no change in TDS concentration • Lower aquifer: increase in TDS concentration
Flexibility	2 • Projects can be implemented in the future if well production declines or subsidence occurs. However, flexibility to adjust to unforeseen circumstances is low as the need for additional supplies increases the longer projects are postponed.	5 • Dual purpose wells provide flexibility to inject/extract more water depending on demands/availability of MWDSC water. • Flexible to use multiple sources, water from Mills WTP, Skinner WTP, and Canyon Lake WTP. • Not flexible to use multiple water sources as injected water needs to comply with Title 22.	3 • Flexible to use multiple water sources for spreading; local runoff, treated imported water, untreated imported water, Canyon Lake WTP water, recycled water from the regional WWTP or EMWD. • Limited capacity of spreading basins to maximize use of replenishment water.	3 • Flexible to adjust to higher demands (lower water conservation) than anticipated with GW pumping. • Poor flexibility to implement new projects, as the need for additional supplies increases the longer projects are postponed. • Moderate flexibility to use replenishment water for in-lieu recharge as this amount is limited by (winter) water demands.	5 • Dual purpose wells provide flexibility to inject/extract more water depending on the availability of MWDSC water. • Flexible to use multiple sources, water from Mills WTP, Skinner WTP, and Canyon Lake WTP. • Not flexible to use multiple water sources as injected water needs to comply with Title 22.
Ease of Implementation	3 • Construction required of 11 wells • Substantial re-equipment of wells • Construction of new pipeline for additional source.	4 • Construction required of 13 wells, 1 pipeline and 1 pumping station.	2 • Construction of spreading basins required in canyons, which is expected to be difficult due to rocks, and difficult accessibility of the upper part of leach canyon. • Construction of 17 wells, pipelines and a booster station. • Substantial re-equipment of wells.	3 • No construction required other than 8 wells. • Implementation of water conservation measures that contribute to 10 percent conservation may be difficult.	4 • Construction required of 11 new wells • Conversion of 6 existing wells to dual purpose. • Construction of 1 pipeline and 1 PS • Implementing water conservation. measured that contribute to 5 percent conservation.
Total Rating **Weighted Rating**	**21** **42**	**41** **81**	**25** **50**	**37** **77**	**45 (highest score)** **92 (highest score)**

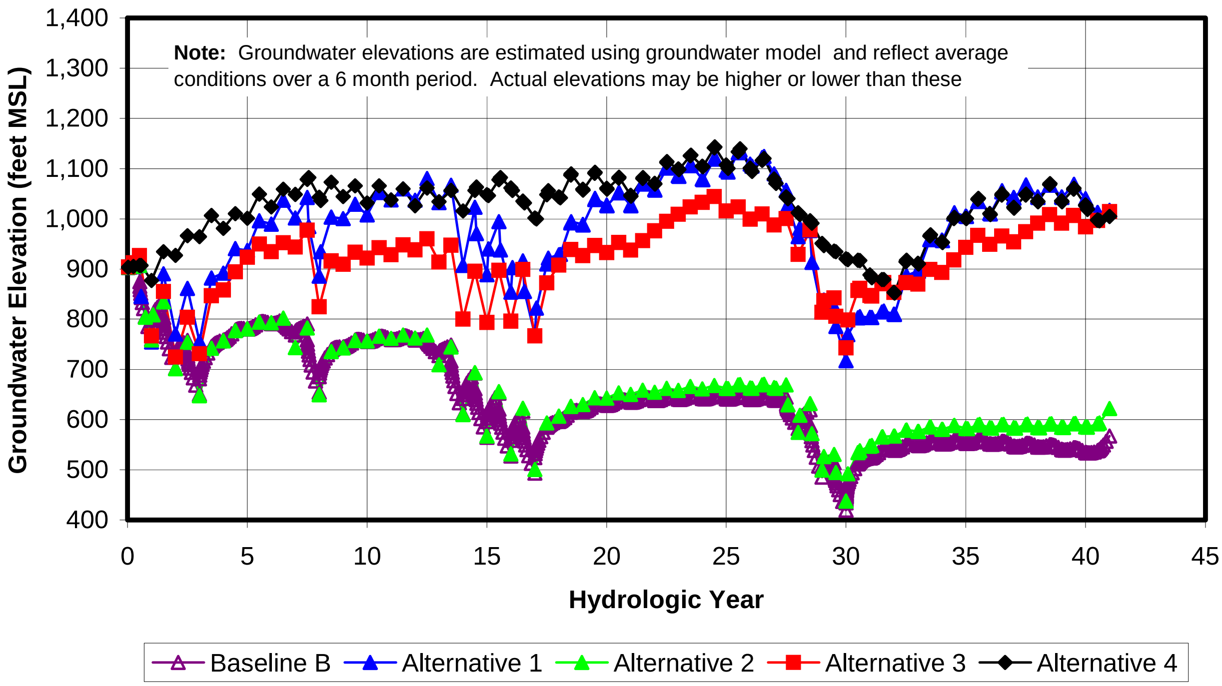
most important criteria and 1 for the least important criteria. A detailed explanation of each criterion and its ranking is provided in **Section 7**.

Ability to Reduce Overdraft

The ability to reduce overdraft is evaluated using the groundwater model. The groundwater levels in Baseline B drop between 100 and 400 feet over the 41-year simulation period depending on the location in the Elsinore Basin. In general, groundwater levels decline more in the Back Basin than in the area north of Lake Elsinore. A comparison graph of the North Island Well, which is located in the center of the Elsinore Basin, is presented in **Figure ES-8**.

As shown in this graph, the water levels in Alternative 2 are only slightly higher than the water levels in Baseline B, with declining water levels of about 300 to 350 feet. The declining water levels in indicate that surface spreading alone is not sufficient to achieve a sustainable groundwater balance and make Alternative 2 the worst alternative. Alternatives 1, 3, and 4 are fairly similar with respect to water levels, although Alternatives 1 and 4 show slightly higher water levels than Alternative 3. This is difference indicates the positive effect of the dual-purpose wells in the Back Basin and shows that in-lieu recharge is not as effective in the south part of the basin as in the north part of the basin due to the lack of natural recharge.

Figure ES-8
Comparison Chart for the North Island Well



Estimated Cost

The estimated capital cost, annual operation and maintenance (O&M) cost, and the annual cost to purchase treated imported water are summarized per alternative in **Table ES-4**. Detailed cost information is presented in **Section 7** and **Appendix H**.

Table ES-4
Cost Summary per Alternative

Item	Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Capital Cost	$ 49,970,000	$ 30,020,000	$ 57,380,000	$ 15,760,000	$ 24,310,000
Total Annual Cost (excl. common cost)[1]	$ 4,595,700	$ 5,518,000	$ 6,050,000	$ 3,629,000	$ 4,445,000
Water Supply (acre-ft/yr) (excl. common supplies)[2]	12,600	12,600	12,600	12,600	12,600
Unit Cost ($/acre-ft)	$365	$438	$480	$288	$353

1 – Excludes cost of Canyon Lake WTP, Imported water at Tier 1 rate, and Imported water Tier 2 rate as in Baseline B.
2 – Excludes supplies from Canyon Lake WTP (3,000 acre-ft/yr), Tier 1 (13,320 acre-ft/yr), and Tier 2 as in Baseline B (21,580 acre-ft/yr)

As shown in this table, the capital cost range significantly from $16 million to $57 million, and the unit costs range from $288 to $480 per acre-ft. The unit costs presented exclude the cost and supply amounts that are common in all alternatives to emphasize the differences. Common cost and supplies that are excluded from the unit cost calculations are:

- The cost of Canyon Lake WTP water (same amount for all alternatives and Baseline B)
- The cost of imported water at Tier 1 rate (same amount for all alternatives and Baseline B)
- The cost of imported water at Tier 2 rate as required for Baseline B.

As the actual amount of Tier 2 water varies between the alternatives, the incremental cost difference compared to Baseline B is included in the cost estimates. Alternative 3 is the least expensive followed by Alternative 4 and Alternative 1. Although the unit costs of Baseline B and Alternative 2 are fairly similar to the cost of Alternatives 1, 3 and 4, the effect on the groundwater basin is significantly different, as these alternatives do not achieve a sustainable groundwater balance.

Conclusion of Alternative Evaluation

As shown in **Table ES-3**, Alternative 4 scores the highest with and without the weighted ranking. The second best alternative is Alternative 1. Although Alternative 3 has the lowest unit cost, it is ranked third with based on all evaluation criteria. Alternative 2 does not score much higher than Baseline B. Alternative 4 is selected as the preferred alternative because the unit cost are lower than Alternative 1, and because it includes water conservation and maximizes increase use of recycled water for lake replenishment, which are both in-line with the environmental responsibility stated in the District's mission statement.

IMPLEMENTATION PLAN

The preferred alternative, further referred to as the recommended plan, includes water conservation, dual-purpose wells for basin recharge, the use of recycled water as the primary source for lake replenishment, and a basin monitoring program. In addition, the plan contains recommendations for stakeholder involvement through an advisory committee, wellhead protection, well construction and abandonment procedures, the development of septic tank policies, and agency coordination. Each of these components is discussed more detail in **Section 8**. A map depicting the location of the structural components required for the implementation of the recommended plan is presented in **Figure ES-9.**

Conjunctive Use with Dual-Purpose Wells

The recommended plan contains the installation of 14 dual-purpose wells to recharge the groundwater basin during wet periods and provide storage for dry periods. Seven new dual purpose-wells are will be installed in the Back Basin area (2 deep and 5 shallow), while six existing wells (Lincoln, Machado, Cereal 1, Cereal 3, Cereal 4, and Corydon wells) will be converted to dual-purpose wells. Joy Street Well will also be equipped as dual-purpose well.

In general, injection would take place between October and March in years when replenishment (Long Term Storage; or, LTS) water is available, which depends on the hydrologic conditions of the sources that contribute to MWDSC's overall supply. Injection may be possible year around during wet years if excess replenishment water is available. The dual-purpose wells would be used for extraction in the summer months of dry years when the demands increase and the available imported supply from MWDSC decreases. The operation of the basin under average rainfall year conditions is presented in **Figure ES-10**. The injection amount presented in purple is slightly higher in wet years and zero in dry years.

In addition to dual-purpose wells, in-lieu recharge at about 1,100 acre-ft/yr of is used recharge the groundwater basin to maintain a sustainable groundwater balance. In-lieu recharge can start immediately, as it does not require any construction, providing that LTS water is available.

Lake Replenishment with Recycled Water

Maintenance of water levels in Lake Elsinore would be accomplished with recycled water and groundwater when the lake level drops below 1,240 feet MSL. Recycled water would be used as the primary source of replenishment water up to 17.7 mgd. This is the projected capacity of the Regional Plant in year 2020 minus 0.5 mgd reserved for discharge to Temescal Wash. One of the three Island Wells would be used as the secondary source when the recycled water supply is not adequate to maintain the lake level, while all three wells are required to maintain lake levels before year 2020 when less recycled water is available. EVMWD should continue to pursue Regional Board approval for discharge of Regional Plant effluent into Lake Elsinore when needed to maintain the elevation. This will require a combination of phosphorus removal at the plant and nitrogen offsets to comply with the Lake Elsinore TMDL. EVMWD should gradually reduce the use of Island Well water until the recycled water is sufficient to meet the total lake replenishment need.

Figure ES-9
Components of the Recommended Plan

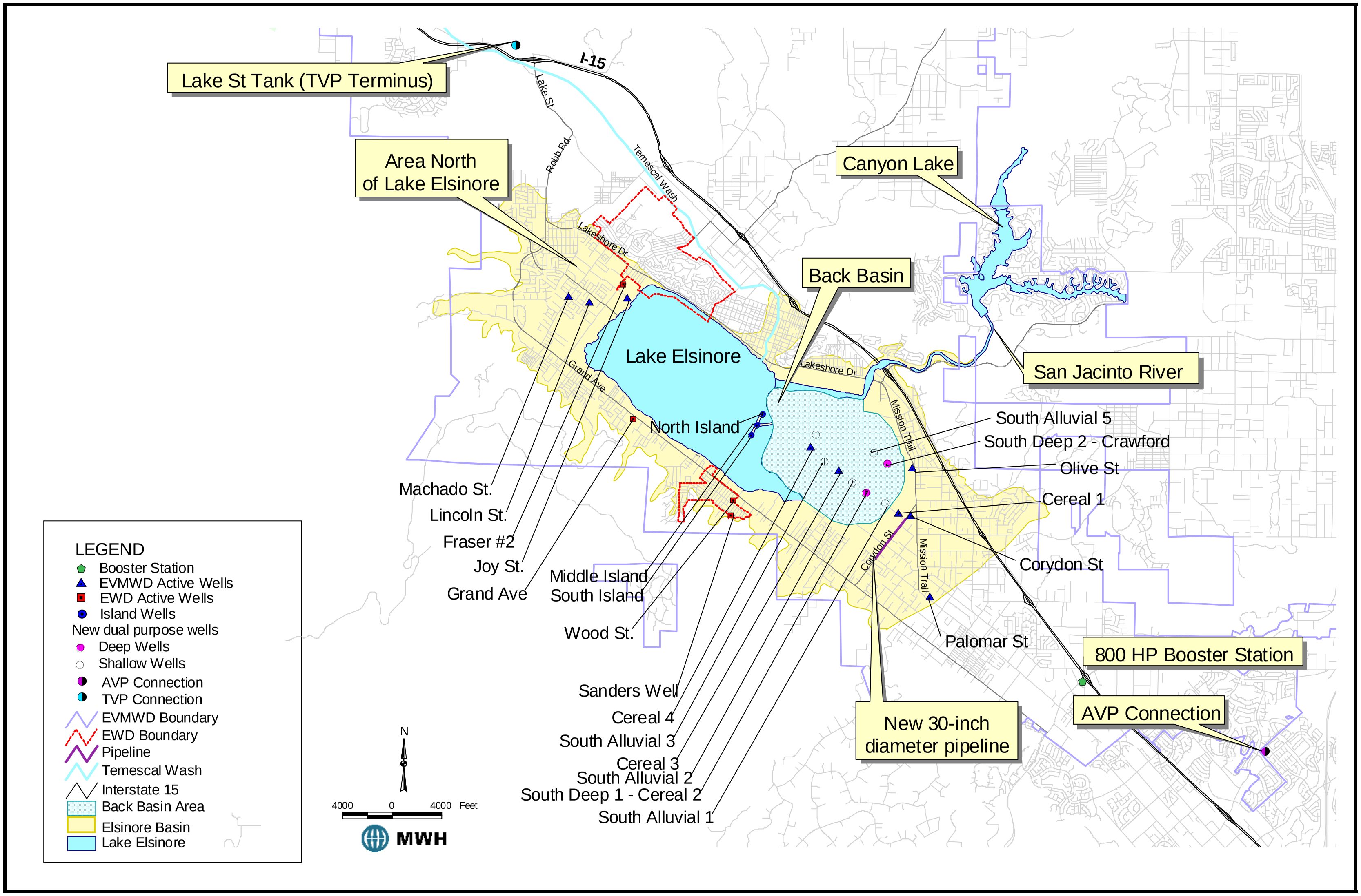
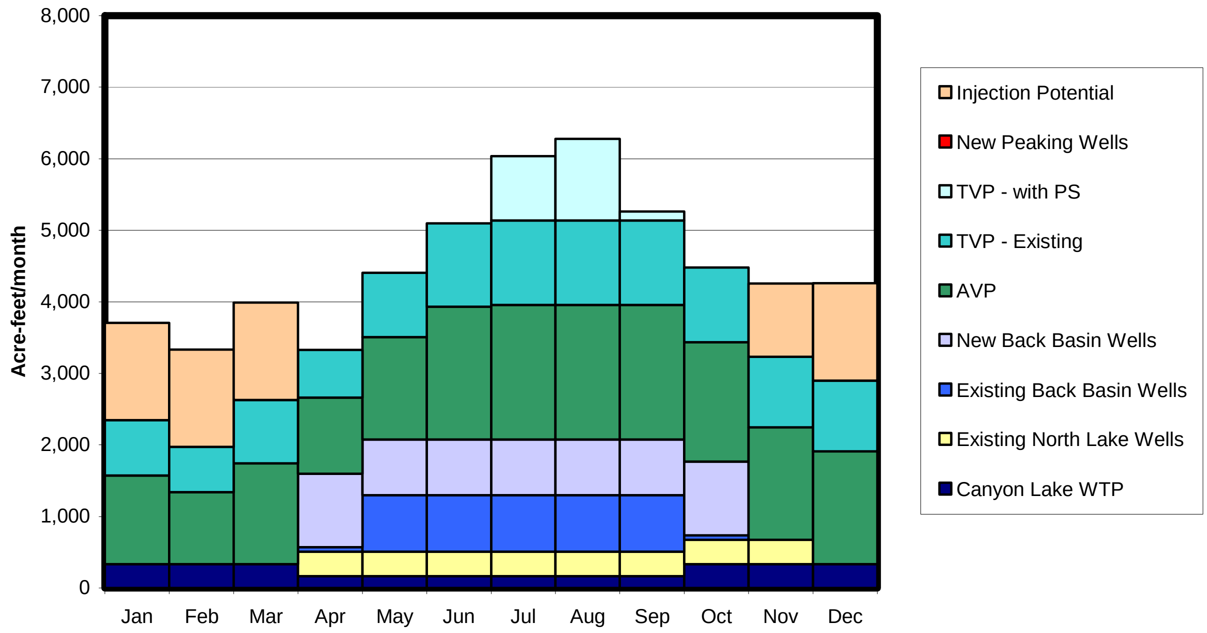


Figure ES-10
Water Supply Mix during an Average Rainfall Year



Basin Monitoring Plan

As part of the GWMP a separate Monitoring Plan is prepared to better understand the groundwater basin and to measure the effects of the activities that are implemented. This monitoring program incorporates the Joint Groundwater Monitoring Program that was established by the May 2000 agreement between EVMWD and EWD. The key components of the monitoring plan are:

- Construction of five new monitoring wells
- Monitor of water levels on a monthly basis.
- Monitor water quality data on an annual basis
- Monitor surface water flows
- Monitor land subsidence
- Conduct a well canvas.
- Conduct spinner logging testing, water quality zone testing, and aquifer testing.

The information collected through this monitoring program will lead to more efficient implementation of management activities, as it would provide guidance for adjusting management parameters according to the results over time.

Advisory Committee

The GWMP recommends that EVMWD's Board of Directors appoint five members to form an Advisory Committee that represents the users of the Elsinore Basin. The Advisory Committee could be involved with the following programs and activities and provide their comments on these activities to the EVMWD Board of Directors:

- Implementation of the Groundwater Management Plan
- Final development and coordination of the Monitoring Program
- Development of Well Construction, Destruction, and Abandonment Policies.

Septic Tank Conversion Policies

The recommended plan presumes that, at a minimum all septic tanks in the high-risk zone, as shown in **Figure 5-2**, should be connected to the sewer system by year 2020. Approximately 2,900 septic tanks, which is about 80 percent of all the septic tanks in the basin, are located in this high-risk zone and should be connected to the sewer system, while no additional septic tanks be added within the high-risk zone. The District is currently developing the policies to accomplish the conversion of septic tanks. An economic analysis that quantifies the cost and benefits of septic tank conversions should be considered as part of the policy development.

Cost of Recommended Plan

A detailed cost breakdown of the capital and annual costs for the recommended alternative are presented in **Table ES-5** The total capital cost is $24.3 million, while the total annual cost is about $21.5 million. With a projected water demand of 50,500 acre-ft/yr in year 2020, these total annual costs correspond to a unit cost of $425 per acre-foot. This unit cost includes all the cost that are common to all alternatives for Canyon Lake WTP, Tier 1 water, and Tier 2 water. When these common costs are excluded, the unit cost of the recommended plan is $353 per acre-foot. As explained in the phasing in **Section 8**, the majority of the capital investments are required between the years 2003 and 2010.

Stakeholder Involvement

Collaboration with area stakeholders was an integral part of developing this GWMP. Key elements of EVMWD's Stakeholder Collaboration Plan included informative mailing describing the GWMP, initial public hearing, a public scoping meeting, informational reports posted on the District's web site and updates at EVMWD Board meetings. Details on stakeholder involvement are described in more detail in **Section 1** and **Appendix C**.

GMWP Adoption

The Groundwater Management Planning Act (California Water Code Part 2.75, §10753), originally enacted as Assembly Bill (AB) 3030 (1992) and amended by Senate Bill (SB) 1938 (2002) specifies the requirements for adoption of groundwater management plans. The EVMWD Board of Directors conducted a public hearing on June 10, 2004 and subsequently adopted a resolution of intent to prepare a groundwater management plan. Following additional

Table ES-5
Summary of Estimated Cost of the Recommended Plan

Cost Type	Project Description		Capital Cost	Annual Cost
Capital Cost	4 Peaking Wells		$ 7,480,000	$ 194,000
	Conversion of 6 Existing Wells to Dual Purpose Wells		$ 600,000	$ 37,000
	Equipping Joy Street as a Dual Purpose Well		$ 100,000	$ 7,000
	7 New Dual Purpose Wells		$ 13,090,000	$ 339,000
	30-inch diameter pipeline on Corydon Street (4,000 LF)		$ 1,360,000	$ 50,000
	800 HP in-line PS (near Clinton Keith Rd./I-15)		$ 1,680,000	$ 103,000
	Subtotal		**$ 24,310,000**	**$ 730,000**
O&M Cost	**Quantity (acre-feet/yr)**	**Cost Item**		**Annual Cost**
	8,188	Groundwater Pumping in Back Basin Area		$ 691,000
	2,132	Groundwater Pumping N/O Lake		$ 166,000
	380	Groundwater Pumping EWD		$ 31,000
	0	Groundwater Pumping for Lake Replenishment		$ -
	3,400	Recycled water for Lake Replenishment		$ 510,000
	3,000	Canyon Lake WTP		$ 690,000
	13,320	Purchase of MWD Water (Tier 1)		$ 5,568,000
	19,880	Purchase of MWD Water (Tier 2)		$ 9,921,000
	5,900	Purchase of MWD Water for Injection		$ 1,770,000
	1,100	Purchase of MWD Water for In-Lieu recharge		$ 330,000
	12,000	Pumping Cost in-line PS (near Clinton Keith Rd./I-15)		$ 232,000
	2,500	Water Conservation		$ 650,000
	Subtotal			**$ 20,559,000**
Total				**$ 21,472,000**

public review and preparation of a mitigated negative declaration pursuant to the California Environmental Quality Act, the EVMWD Board of Directors conducted a second public hearing on March 10, 2005 to receive landowner protests to the adoption of the GWMP. On March 24, 2005, the EVMWD Board of Directors formally adopted the GWMP. Copies of the hearing notices and resolutions are included in **Appendix C.**

CONCLUSIONS

This GWMP has determined that the Elsinore Basin is currently in a state of overdraft, with a cumulative deficit of 19,000 acre-ft/yr over the past 11 years, or approximately 1,800 acre-ft/yr. A detailed evaluation of the baseline conditions for the year 2000 conditions (Baseline A) and the projected year 2020 conditions (Baseline B) predict that this overdraft will increase to an average of 4,300 acre-ft/yr to 6,400 acre-ft/yr, respectively. Based on groundwater model simulations, this GWMP predicts that this storage deficit will result in declining water levels of 200 to 400 feet. These declining water levels may result in significant water quality degradation, land subsidence, or reduced groundwater pumping capacity of existing wells.

This document contains recommendations for activities to better manage the groundwater resources of the Elsinore Basin. The requirements stated in AB3030 and amended by SB1938 have been used for the identification of groundwater management issues and to be in compliance with the Groundwater Management Act. The recommendations are to provide solutions to the basin management challenges. Some key issues are:

- An increase need for groundwater due to lake replenishment needs and a doubling of water demand between 2000 and 2020.
- Significant existing and projected groundwater level declines imposing the risk of water quality degradation and land subsidence
- An increasing trend in nitrate concentrations in areas with septic tanks and a projected increase of TDS concentrations.
- Potential for water quality contamination through the over 200 wells in the basin with an unidentified well status.

Some of the key recommendations presented in this GWMP are:

- Development of an Advisory Committee to continue the Stakeholder involvement process and to help the EVMWD Board of Directors effectively manage the basin.
- Implementation of conjunctive use projects to achieve a sustainable groundwater balance and ensure a reliable water supply.
- Implement a water conservation program to reduce potable water demands by five percent.
- Minimize the use of groundwater for lake replenishment and save the high quality groundwater to serve potable demands
- Expand the monitoring program to enhance the understanding of the groundwater basin and to help manage future conjunctive use operations.
- Develop septic tanks conversion policies and well construction and abandonment policies to protect the basins water quality.

The basin management presented in this GWMP will initiate a proactive approach to groundwater management in the Elsinore Basin and allow the Elsinore Valley to grow and double its demands over the next 20 years, while maintaining a reliable, affordable, and sustainable water supply. The EVMWD Board of Directors adopted this GWMP on March 24, 2005.

Section 1
Introduction

The Groundwater Management Act (California Water Code Part 2.75, §10753), originally enacted as Assembly Bill (AB) 3030 (1992) and amended by Senate Bill (SB) 1938 (2002), provides the authority to prepare groundwater management plans. The intent of AB3030 is to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions. The Elsinore Basin Groundwater Management Plan (GWMP) is jointly funded under a Local Groundwater Management Assistance Act of 2000 (AB303) grant by the California Department of Water Resources (DWR) and the Elsinore Valley Municipal Water District (EVMWD) in accordance with Contract Number 4600001817 dated June 25, 2001. This GWMP provides the framework for the management of groundwater resources in the Elsinore Basin and is the guidance document for future groundwater development activities.

The lead agency for this plan is EVMWD. This plan has been prepared in coordination with local agencies, water purveyors and interested residents through a stakeholder involvement process facilitated by DWR. The GWMP is intended to provide a better understanding of the Elsinore Basin and to recommend various management strategies that result in a reliable water supply for all users of the Elsinore Basin while meeting the increasing water demands.

The following section introduces the GWMP. It includes a description of the study area, the current state of the groundwater supply in the basin, project objectives and a summary of the remainder of the report.

SCOPE OF WORK

This GWMP is prepared with the assistance of Montgomery Watson Harza (MWH) and funded by a grant from the State of California administered by DWR under AB303. The scope of work funded by the State includes the following six technical tasks.

- Data assessment
- Stakeholder involvement
- Preparation of a groundwater monitoring program
- Update of conceptual hydrogeologic model
- Preparation of numerical groundwater model
- Preparation of the GWMP

The work conducted for these tasks is presented in the remainder of this report. References used in the preparation of this report are listed in **Appendix A**. A list of abbreviations is provided in **Appendix B**.

GROUNDWATER MANAGEMENT PLAN REQUIREMENTS

This section summarizes the mandatory, recommended and voluntary components of a GWMP. The requirements for a GWMP are defined in the California Water Code §10753 *et seq*. The mandatory requirements are specified in §10753.7 and summarized in **Table 1-1**. In addition to these required components, there are several components that DWR recommends be included in a groundwater management plan as presented in Appendix C of DWR's Bulletin 118 (2003) *California's Groundwater*. Section 10753.8 includes several voluntary components that a groundwater management plan may include. These recommended and voluntary requirements are also presented in **Table 1-1**. **Table 1-1** presents the location of these requirements in this report.

Table 1-1
Location of Elsinore Basin GWMP Components

Description		Section(s)
A.	**CWC § 10750 *et seq.*, Required Components**[1]	
1.	Documentation of public involvement statement. §10753.4 (b)	1, App. C
2.	Basin Management Objectives (BMOs). §10753.7(a)(1)	1
3.	Monitoring and management of groundwater elevations, groundwater quality, inelastic land surface subsidence, and changes in surface water flows and quality that directly affect groundwater levels or quality or are caused by pumping. §10753.7(a)(1)	8, App. K
4.	Plan to involve other agencies located within groundwater basin. §10753.7(a)(2)	1 and 8
5.	Map of groundwater basin showing area of agency subject to GWMP, other local agency boundaries, and groundwater basin boundary as defined in DWR Bulletin 118. §10753.7(a)(3)	1, Fig 1-1
6.	Adoption of monitoring protocols to generate information that promotes efficient and effective groundwater management. §10753.7(a)(4)	8, App. K
7.	For agencies not overlying groundwater basins, prepare GWMP using appropriate geologic and hydrogeologic principles. §10753.7(a)(5)	Not Applicable
B.	**DWR's Recommended Components**[2]	
1.	Establish a basin advisory committee.	8
2.	Describe area to be managed under GWMP.	2
3.	Create link between BMOs and goals and actions of GWMP.	5, 8
4.	Describe GWMP monitoring program.	8, App. K
5.	Describe integrated water management planning efforts.	1, 5, 8
6.	Periodic report on implementation of GWMP.	8
7.	Re-evaluate GWMP periodically.	8

Table 1-1 (Continued)
Location of Elsinore Basin GWMP Components

Description		Section(s)
C.	**CWC § 10753.8, Voluntary Components[3]**	
1.	Control of saline water intrusion.	5
2.	Identification and management of wellhead protection areas and recharge areas.	5
3.	Regulation of the migration of contaminated groundwater.	5
4.	Administration of well abandonment and well destruction program.	5
5.	Mitigation of conditions of overdraft.	5
6.	Replenishment of groundwater extracted by water producers.	5
7.	Monitoring of groundwater levels and storage.	5
8.	Facilitating conjunctive use operations.	5
9.	Identification of well construction policies.	5
10.	Construction and operation by local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects.	5
11.	Development of relationships with state and federal regulatory agencies.	5
12.	Review of land use plans and coordination with land use planning agencies to assess activities that create reasonable risk of groundwater contamination.	5

1. CWC § 10750 *et seq.* (seven required components). Amendments to the CWC § 10750 *et seq.* require GWMPs to include several components to be eligible for the award of funds administered by DWR for the construction of groundwater projects or groundwater quality projects. These amendments to the CWC were included in Senate Bill 1938, effective January 1, 2003.
2. DWR Bulletin 118 (2003) Appendix C components (seven recommended components).
3. CWC § 10750 *et seq.* (12 voluntary components). CWC § 10750 *et seq.* includes 12 specific technical issues that could be addressed in GWMPs to manage the basin optimally and protect against adverse conditions.

STUDY AREA

The study area for this plan is the Elsinore Basin as shown in **Figure 1-1**. The surface drainage area shown on this figure consists of approximately 42 square miles, of which about 25 square miles are located within the basin floor including Lake Elsinore. The remaining portions of the Elsinore Basin include the surrounding highlands and associated streams and canyons. In general, the surface water in the study area drains toward Lake Elsinore. Principal surface water streams and rivers include McVicker Canyon, Leach Canyon and Dickey Canyon along the western margin of Lake Elsinore and the San Jacinto River from the east. During periods of high

Figure 1-1
Study Area

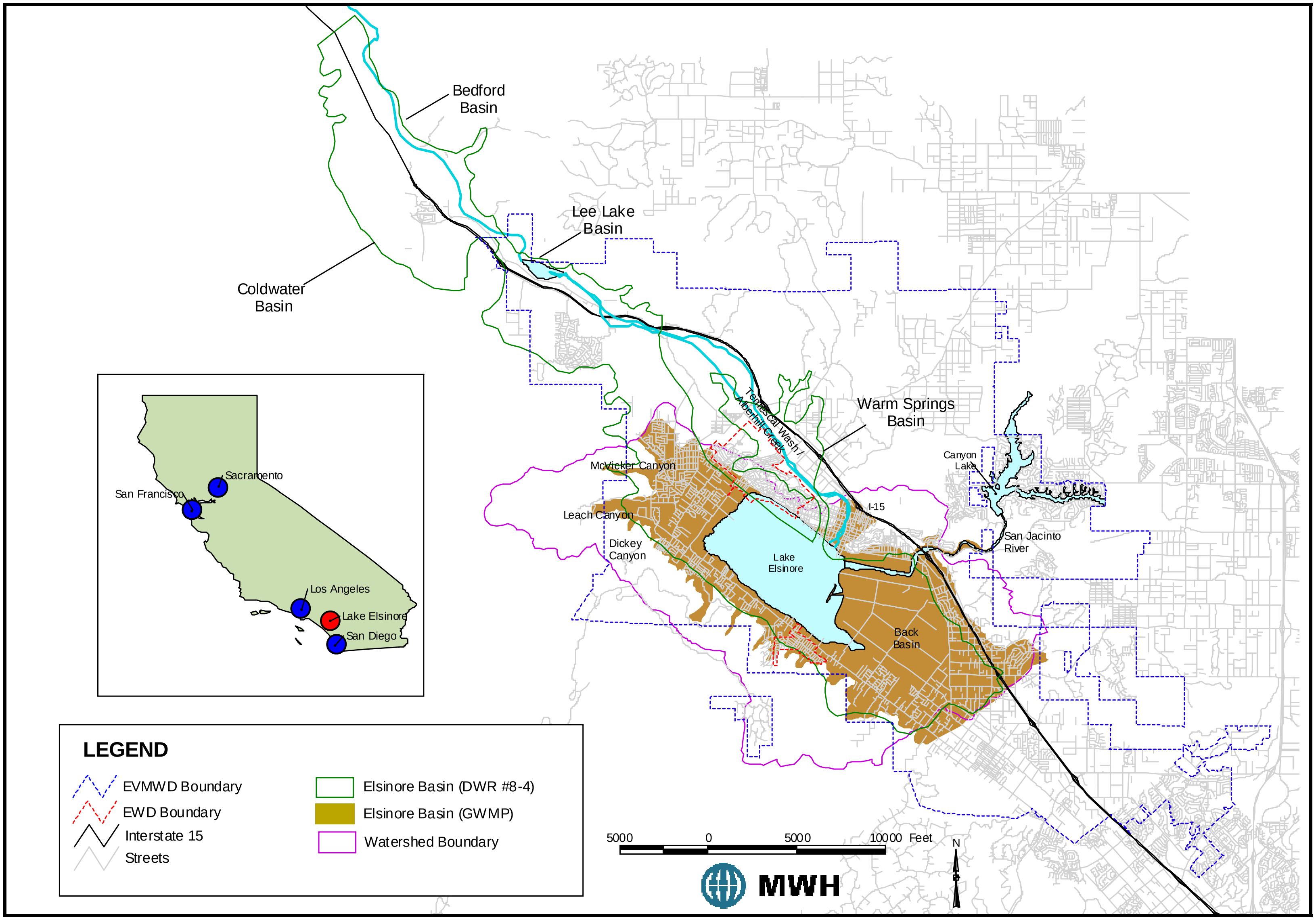
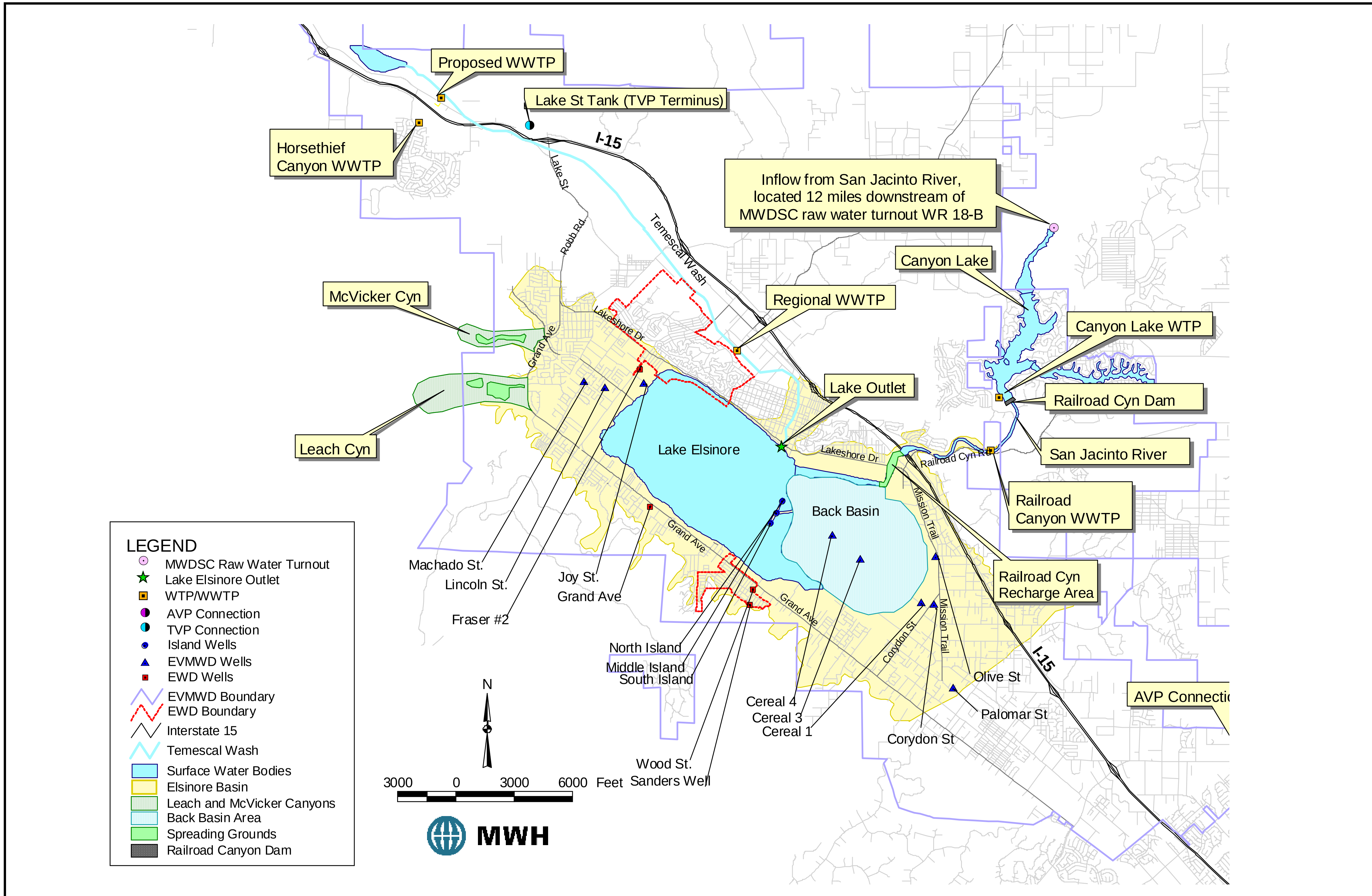


Figure 1-2
Locations of Key Facilities in the Elsinore Basin



lake levels, water in Lake Elsinore flows into the lake outlet channel, which discharges to Temescal Wash, a tributary of the Santa Ana River. The area southeast of the lake, referred to as the Back Basin, is part of the flood plain for Lake Elsinore and the San Jacinto River. The boundary of the groundwater basin is approximately coincident with the surface drainage boundary shown on **Figure 1-1**. **Figure 1-1** also shows the service area boundaries of the EVMWD and the Elsinore Water District (EWD), which provide domestic water service within the basin and are the primary groundwater pumpers in the basin.

As shown on **Figure 1-1,** DWR's Bulletin 118 (2003) indicates the boundary of the Elsinore Basin as encompassing the adjacent Warm Springs, Lee Lake, Coldwater and Bedford groundwater basins. These basins were not included in this groundwater management plan because they are hydrogeologically separated from the Elsinore Basin by the Glen Ivy and Freeway Faults as described in **Section 2**.

PROJECT BACKGROUND

The EVMWD provides water service to a 96 square mile area in western Riverside County. In the Elsinore Basin, the EVMWD currently obtains its water supply from eight groundwater wells, the Canyon Lake Water Treatment Plant (WTP) and the Metropolitan Water District of Southern California (MWDSC) (through Western Municipal Water District) to meet the water demands of its customers. The EVMWD's service area and the location of the water supplies are presented in **Figure 1-2**. EVMWD is the primary groundwater producer in the Elsinore Basin. EVMWD currently pumps approximately 94 percent of the groundwater produced in the Elsinore Basin. Elsinore Water District (EWD), whose service area includes portions north of Lake Elsinore and Lakeland Village south of Lake Elsinore, pumps approximately 5 percent of the groundwater supply. Local pumpers with private wells account for about 1 percent of the pumping in the basin.

Based upon previous studies prepared by the EVMWD, including the Urban Water Management Plan (MWH, 2000), the Water Resources Development Plan (MWH, 1997) and the Distribution System Master Plan (MWH, 2002), rapid growth in the Elsinore area is expected over the next 10 to 20 years. Demands within the Elsinore Basin (including EVMWD's service area and EWD's service area) are projected to more than double by 2020 (from about 23,400 acre-ft/yr in 2000 to as much as 53,100 acre-ft/yr in 2020). EWD's demand is not projected to increase during this time period, as its service area is largely built-out. In the Water Resources Development Plan (MWH, 1997), 26 water supply alternatives were evaluated with various supply sources. This report identified water supplied by the State Water Project (SWP) as the preferred water source. In the Distribution System Master Plan (2002), a supply deficit was projected but future sources were not identified. Because the Distribution System Master Plan contains the most recent water demand projections, these data are used to project supply needs for EVMWD in this GWMP.

To meet the current and future water demands, EVMWD will be increasingly dependent on imported water supplies. For example, in 2000, the groundwater wells accounted for 34 percent of the annual water demand with an additional 10 percent supplied from the Canyon Lake WTP. The remaining 56 percent was imported water supplied by MWDSC through the Auld Valley Pipeline (AVP) connection. Based upon the Distribution System Master Plan, by 2020, imported water from either the Temescal Valley Pipeline (TVP) or the AVP is projected to supply as much as 80 percent of the demand. Because groundwater is an important part of the future water supply picture, prudent management of the Elsinore Basin is critical.

PLANNING OBJECTIVES

The goal of the GWMP is based upon the assessment of the management issues for the Elsinore Basin and the mission statement of EVMWD. The mission statement of EVMWD is:

> *"To manage the District's natural resources to provide reliable, cost efficient, high quality water and wastewater services for the communities we serve, while promoting conservation, environmental responsibility, education, community interaction, ethical behavior, and recognizing employees as highly valuable assets."*

Based upon discussion with local agencies, water purveyors and residents involved in the stakeholder process, the following statement defines the need and goal for the GWMP:

> *"Because water demand is projected to double in the next 20 years, cooperative groundwater management is required to achieve a sustainable water balance in the Elsinore Basin. The goal of this Groundwater Management Plan is to ensure a reliable, high quality, cost-efficient groundwater supply for the users of the Elsinore Basin in an environmentally responsible manner."*

The purpose of the GWMP is to serve as the guidance document for implementation of groundwater projects required to meet the plan objectives. The following four plan objectives are defined to achieve this goal:

- Enhance water supply reliability
- Manage the basin yield
- Maintain suitable water quality
- Improve understanding of basin hydrogeology

The primary objective of the GWMP is to enhance the water supply reliability through conjunctive use activities in the Elsinore Basin. Conjunctive use is the process of storing water in the groundwater basin during periods in which additional water supplies are available, while extracting the water in periods of reduced imported water supplies typically occurring during droughts. Water can be stored through direct injection, surface spreading or in-lieu storage activities.

The second objective of the GWMP is to manage the basin yield. The GWMP includes a compilation of data needed to estimate the basin yield and define measures required for a sustainable operation of the Elsinore Basin.

The third objective is to maintain suitable water quality in the Elsinore Basin. The quality of water in the Elsinore Basin is generally good. However, there are groundwater quality concerns in various locations throughout the basin. For example, contamination from septic tanks, the risk of increased concentrations of organic compounds as development progresses in the Elsinore area, and elevated arsenic concentrations are known water quality issues that need to be considered in the recommended management strategies. This GWMP includes water quality management recommendations. These management activities address the current basin conditions as well as the future conditions after implementation of the plan. The water quality evaluation guidelines defined under the AB3030 process will be followed where applicable to the Elsinore Basin.

The fourth objective is to improve the current understanding of the basin hydrogeologic characteristics. A thorough understanding of the basin is critical to the development of future groundwater management projects in the basin. Previous studies have developed a significant understanding of the basin but more work is needed to best manage this important resource.

REGIONAL SETTING OF ELSINORE BASIN

Because many management issues are related to the complex interaction between water bodies and demands within the Elsinore Basin, an understanding of these interactions is important to developing a groundwater management plan that reflects the integrated nature of water resources in the basin. The principal water bodies, demands and discharges are:

- The Elsinore Basin watershed and groundwater basin
- Surface water bodies (Lake Elsinore, Canyon Lake, Temescal Wash, and the San Jacinto River)
- Water supply sources (groundwater, Canyon Lake WTP, imported water, recycled water local runoff)
- Demands (potable, non-potable, evapotranspiration)
- Water disposal (wastewater, outflows to surface water bodies)

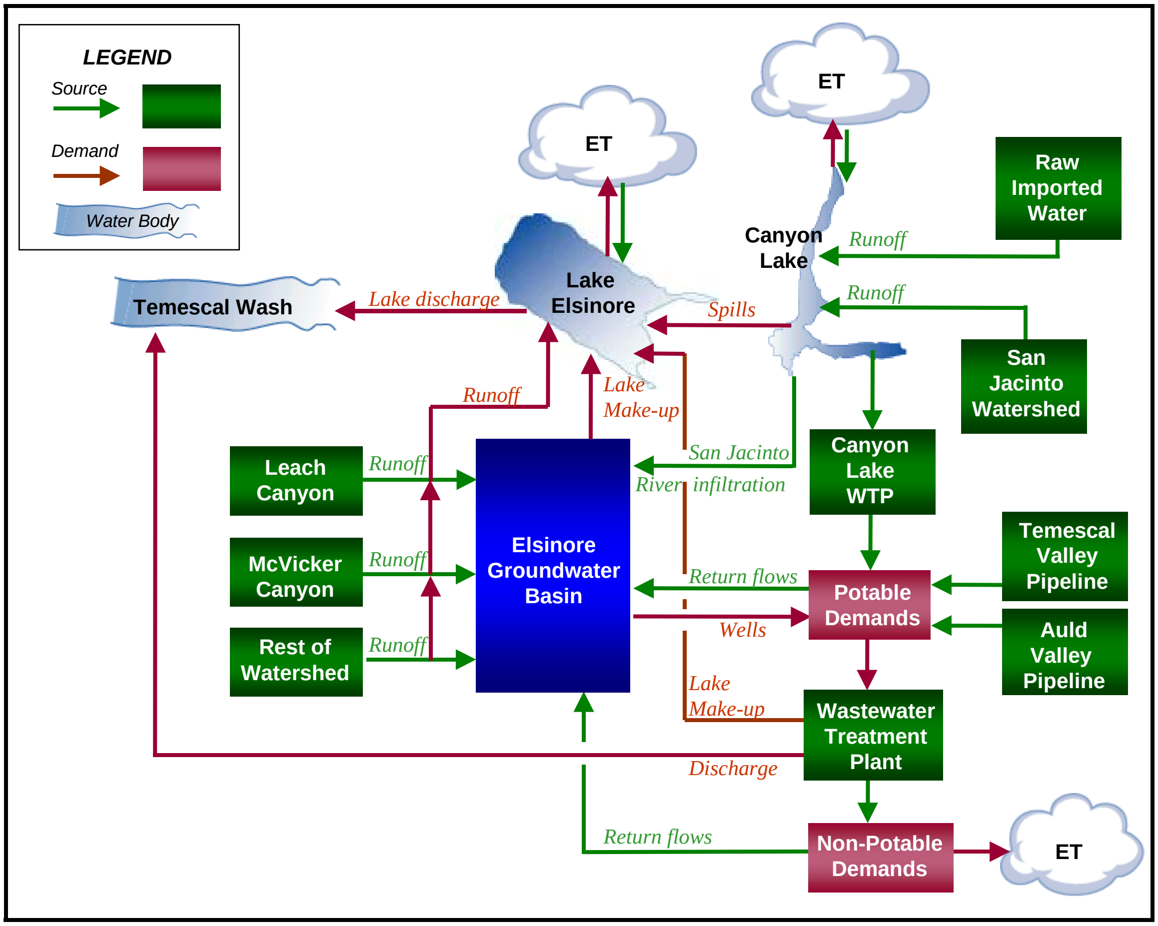
The locations of these features are provided in **Figure 1-2**. The relationships between the water bodies and water users are shown in **Figure 1-3**.

To define management alternatives that achieve a sustainable water balance, the interactions of all the water bodies shown in Figure 1-3 need to be evaluated. Each component is discussed in detail below.

Elsinore Groundwater Basin

The principal source of inflow to the Elsinore groundwater basin is infiltration of local precipitation and runoff from the surrounding watershed (an average of nearly 40 percent of the total inflows). Other inflows to the groundwater basin are water that infiltrates from the San Jacinto River prior to reaching Lake Elsinore and return flows from either irrigation or domestic use. Currently, the only significant outflow from the groundwater basin is the groundwater pumping to meet potable water demand. To maintain the water level in Lake Elsinore above the desired operating level of 1,240 feet above mean sea level (MSL), EVMWD is equipping the three Island wells to pump groundwater into the Lake when the Lake levels are low. In addition, the Elsinore Basin is essentially closed to subsurface inflows and outflows from adjacent

Figure 1-3
Water Flows in the Elsinore Basin



groundwater basins as well as Lake Elsinore. The only exception to this is future pumping of groundwater to maintain lake levels, as discussed below.

Lake Elsinore

Lake Elsinore is a natural lake that, under historical conditions, has varied in size from 6,000 acres in very wet years to a dry playa in drought years. To moderate these swings in lake surface area and to reduce evaporation, a levee was constructed across the lake in 1995, which reduced its surface area from approximately 6,000 to about 3,300 acres. Operational details for Lake Elsinore are provided in **Inflows to** Lake Elsinore include local runoff from the surrounding watershed, precipitation directly onto Lake Elsinore, flows from the San Jacinto River, recycled water from wastewater treatment plants and, in the near future, groundwater from the Island wells. Outflows include overflows to Temescal Wash, which occur when the lake level exceeds 1,255 feet MSL and evaporation. Less than 15 percent of the total runoff from the watershed flows into the lake on an annual average basis. The local runoff that reaches the lake accounts for only about eight percent of the annual lake inflow. This amount varies from year to year, ranging from about 1,500 acre-ft/yr in dry years to more than 5,600 acre-ft/yr during wet years.

Approximately 20 percent of the inflow to Lake Elsinore comes from precipitation directly onto the lake. The remaining 72 percent of the inflows to the lake come from the San Jacinto River.

Table 1-2.

Inflows to Lake Elsinore include local runoff from the surrounding watershed, precipitation directly onto Lake Elsinore, flows from the San Jacinto River, recycled water from wastewater treatment plants and, in the near future, groundwater from the Island wells. Outflows include overflows to Temescal Wash, which occur when the lake level exceeds 1,255 feet MSL and evaporation. Less than 15 percent of the total runoff from the watershed flows into the lake on an annual average basis. The local runoff that reaches the lake accounts for only about eight percent of the annual lake inflow. This amount varies from year to year, ranging from about 1,500 acre-ft/yr in dry years to more than 5,600 acre-ft/yr during wet years. Approximately 20 percent of the inflow to Lake Elsinore comes from precipitation directly onto the lake. The remaining 72 percent of the inflows to the lake come from the San Jacinto River.

Table 1-2
Operational Data for Lake Elsinore

Location	Level
Target lake elevation	1,240 feet MSL
Normal Lake operating range	1,240 – 1,247 feet MSL
Elevation of sill in the outlet channel	1,255 feet MSL
Elevation of emergency outlet to the Back Basin	1,262 feet MSL
Elevation of 100-year floodplain	1,263.3 feet MSL

In addition to the existing inflows from the San Jacinto River and local runoff, Lake Elsinore will soon be replenished with groundwater from the Island wells to maintain a minimum lake level of 1,240 feet MSL. Likewise, as much as 2 mgd of recycled water from the Regional Wastewater Treatment Plant (WWTP) is currently discharged to the lake under a two-year pilot study.

The major water loss from the lake is evaporation that ranges between 13,000 and 15,000 acre-ft/year depending on the lake level and climate conditions. When the lake level exceeds the sill elevation in the outflow channel of 1,255 feet, water is discharged to the Temescal Wash. During major storm events, when the lake level reaches an elevation of 1,262, water will spill to the area south of the dike, also referred to as the Back Basin. Most of the water that is spilled to the Back Basin is lost to evapotranspiration; only a minimal portion will infiltrate into the groundwater basin because of the presence of substantial clay layers near the surface.

Canyon Lake

Canyon Lake receives water from the San Jacinto River watershed and, occasionally, untreated imported water from a connection to MWDSC's Colorado River Aqueduct. Canyon Lake is maintained between 1,372 and 1,382 feet MSL and spills into Railroad Canyon at an elevation above 1,382 feet MSL. Approximately ninety percent of these spills reach the Lake. When water is available, Canyon Lake water is treated in the Canyon Lake WTP. This plant typically operates between April and October to provide additional water for summer demands. Additional untreated Colorado River water can be purchased from the WR-18B turnout to supplement Canyon Lake flowing down the San Jacinto River.

Imported Water Supplies

EVMWD can purchase imported water at three locations, the TVP connection, the AVP connection and Colorado River Aqueduct turnout WR-18b. Water obtained through the TVP is SWP water that originates from MWDSC's Mills Filtration Plant. Water from this plant is conveyed through the Woodcrest Pipeline up to the Woodcrest Turnout (near I-15) where the TVP connects, which conveys water to the northwestern part of the District's distribution system. Water obtained through the AVP connection is a blend of SWP and Colorado River Aqueduct water that is treated at MWDSC's Skinner Filtration Plant. EVMWD can also obtain untreated imported water from the MWDSC's WR-18B connection to the Colorado River Aqueduct, which discharges into the San Jacinto River 12 miles north of Canyon Lake. The untreated imported water flows down the San Jacinto River until it reaches Canyon Lake.

Wastewater and Recycled Water

In the areas served by sewers, wastewater is collected and treated at one of the three wastewater treatment plants (Regional WWTP, Railroad Canyon WWTP, or Horsethief Canyon WWTP). Wastewater effluent from the Regional WWTP is discharged into the Temescal Wash and is used for lake replenishment as part of a pilot test program. Effluent from the Railroad Canyon and Horsethief Canyon WWTPs is used for local golf course and landscape irrigation.

Potable Demands

Potable water demands are met from four supply sources: imported water from the AVP and the TVP, groundwater, and surface water from the Canyon Lake WTP. After use, a portion of the water is returned to the groundwater basin as irrigation returns, septic tank effluent or wastewater flowing to the Regional WWTP.

Non-Potable Demands

Non-potable demands include lake replenishment for Lake Elsinore. As discussed above, additional water is required to maintain the level of Lake Elsinore above 1240 feet MSL. Current non-potable supplies include up to 7.5 mgd of recycled water from the Regional WWTP (8 mgd capacity less 0.5 mgd for Temescal Wash) and up to 5.2 mgd from the Island wells.

Summary

This conceptual understanding of the Elsinore Basin will be used to develop the groundwater model and the alternatives and to provide the framework for implementation of the GWMP. EVMWD is committed to developing a GWMP that takes into consideration the complex water supply interactions within the Elsinore Basin. The remainder of this report provides documentation of the development process and action items for implementation of the GWMP.

STAKEHOLDER INVOLVEMENT

Collaboration with area stakeholders was an integral part of developing this GWMP. EVMWD, with assistance from DWR and the Center for Collaborative Policy a joint program of California State University Sacramento and the McGeorge School of Law, University of the Pacific, develop a Stakeholder Collaboration Plan that consisted of the following:

- Use of EVMWD web site to present public documents on the groundwater management plan.
- Public information meetings, which allowed more detailed discussion of the Groundwater Management Plan and public input on alternatives development. Public meetings were held on October 3, 2002, February 5, 2003 and August 10, 2004. The first and second public meetings were widely advertised and held in a workshop format to maximize stakeholder participation. The third meeting was focused on private well owners in the basin. Information was presented on the project goals and expectations, alternatives and the preferred plan. All public meetings for the project were held at EVMWD's headquarters in Lake Elsinore.
- A technical review committee consisting of water resources experts from California Department of Water Resources, Eastern Municipal Water District, Orange County Water District, and MWH met three times over the course of plan development to review the technical and scientific aspects of the plan.
- A presentation on the draft plan was made to the staff of the Elsinore Water District on May 11, 2004.
- Presentations on the Groundwater Management Plan were made at four EVMWD Board meetings during the course of plan development: Board Study Session on August 20, 2003. Board meetings on March 3, 2004; June 10, 2004; and March 24, 2005.
- The first public hearing required under the Groundwater Management Planning Act was held on June 10, 2004, which served as a public forum to determine if a Groundwater Management Plan should be prepared.
- A second public hearing was held on March 10, 2005 to receive additional comments on the draft plan and to consider protests by landowners overlying the Elsinore Basin.

Stakeholders include: Regional Water Quality Control Board (Cindy Li), City of Lake Elsinore (Dick Watenpaugh and Pat Kilroy), Santa Ana Watershed Project Authority (Mark Norton), California Department of Health Services (Edward Hitti), Western MWD (Norm Thomas), Elsinore Water District (Sharon Sweesy), City of Canyon Lake (Habib Motlagh), Eastern Municipal Water District (Behrooz Mortazavi), Attorney at Law Master of Dispute Resolution (Dale Schafer), Whitney Drinking Water (Herman Dejone), Farm Mutual Water Company (Robert Wilders), California Department of Water Resources (Carl Hauge), County of Riverside (Wendy Kolk), and MWDSC (Edgar Fandialan). Further information on the stakeholders is presented in **Appendix C**.

Meeting minutes for the stakeholder meetings is presented in **Appendix C**.

GWMP ADOPTION

The procedures for adoption of the Elsinore Basin Groundwater Management Plan (GWMP) are consistent with the provisions of §10753 *et seq.* of the California Water Code. The adoption of the GWMP required that the District perform the following:

- Conduct an initial public hearing on whether to prepare a groundwater management plan. A copy of the notice of public hearing is presented in **Appendix C.** The initial public hearing was held on June 10, 2004.
- Publish the adopted Resolution of Intention. A copy of the resolution of intent and the public notices are presented in **Appendix C**.
- Revise the GWMP based on comments received during the public hearings and any written comments.
- Conduct a second public hearing on whether to adopt the GWMP and to consider protests to the adoption of the plan. The public notice for the second public hearing is presented in **Appendix C**. The second public hearing was held on March 10, 2005. No protests to the adoption of the GWMP were filed at the second public hearing.

The adoption of the GWMP also requires the preparation of the following environmental documents pursuant to the California Environmental Quality Act (CEQA):

- Prepare Initial Environmental Study (IES).
- Perform biological and cultural resources surveys.
- Prepare Mitigated Negative Declaration (MND) and Notices.
- Distribute the MND and Notices. Notices include: Notice of Availability/Notice of Intent (NOA/NOI) to Adopt a Negative Declaration.
- Prepare Mitigation Monitoring and Reporting Plan (MMRP).
- Prepare and filing of a Notice of Determination (NOD).

The CEQA documents and the GWMP were adopted at the March 24, 2005 EVMWD Board meeting. A copy of the resolution of adoption is presented in **Appendix C**.

RECENT PLANNING CHANGES

The technical work performed for this GWMP was conducted in 2002 and in 2003. Since that time, several water-related activities have occurred. Although these activities have some effects on groundwater management, the effects are not significant enough to warrant major revisions to this GWMP. Such revisions will be incorporated in future updates to the GWMP.

The Regional Water Quality Control Board adopted Total Maximum Daily Loads (TMDLs) for nutrients in Canyon Lake and Lake Elsinore in December 2004. The TMDLs specify maximum loading of nitrogen and phosphorus. EVMWD was issued a revised National Pollution Discharge Elimination System (NPDES) permit for discharge to Temescal Wash and Lake

Elsinore in March 2005. This revised permit incorporates the nutrient TMDL requirements. To comply with the TMDLs and the new permit, EVMWD plans to install phosphorus treatment at the Regional Plant and may need to offset excess nitrogen loading of recycled water used for lake replenishment. With the adoption of the TMDLs, the use of Eastern MWD effluent for lake replenishment is not expected to be cost effective due to its cost and high nutrient concentrations. The adoption of the TMDLs was anticipated during the development of this GWMP.

The Lake Elsinore-San Jacinto Watershed Authority (LESJWA) issued a draft program environmental impact report (EIR) for the Lake Elsinore Stabilization and Enhancement Project in March 2005. This EIR included an updated analysis of lake replenishment needs using the 1928-2001 hydrologic period. The results of this analysis differ from those presented in this GWMP due to the different hydrologic periods and criteria for replenishing the lake. For this project, lake replenishment would take place when the lake elevation dropped below 1,247 ft MSL. Although, the results of the LESJWA investigation differs from those of the GWMP, the effect of pumping on the groundwater basin is similar to that evaluated in the GWMP.

EVMWD has installed pumping equipment in two of the three Island Wells. The third well will not be equipped, but instead will be used as a monitoring well. These wells were operated from March 2004 until February 2005 when heavy rainfall raised Lake Elsinore to an elevation of nearly 1,255 feet. Lake replenishment is expected to resume when the lake drops below elevation 1,247 ft. Use of Island well water was anticipated in this plan for lake replenishment.

Revised Basin Plan Objectives for the Elsinore Groundwater Basin were adopted by the Regional Board on January 22, 2004. These revised objectives increased the TDS from 450 to 480 mg/L and decreased the nitrate objective from 4 to 1 mg/L as nitrogen. Specific objectives for hardness, sodium, chloride and sulfate were eliminated. Adoption of these objectives were anticipated in the GWMP but are indicated as proposed in the report.

Wastewater flow projections for EVMWD's Regional WWTP were revised in early 2005 which indicate flows will be about 7.5 mgd in 2020 instead of 18.2 mgd as indicated in the EVMWD Wastewater Master Plan (Kennedy/Jenks Consultants, 2003). This lower projection may prolong the need to use Island Well water for lake replenishment unless an additional source of supplemental water is obtained for the lake.

Construction has been completed for several facilities including a new connection to MWDSC's Lakeview Pipeline and the Eastern MWD's effluent disposal pipeline from Rancho California. The new MWDSC connection (WR-31) allows EVMWD to deliver SWP to Canyon Lake providing a higher quality supply and improved reliability. The Eastern MWD pipeline conveys recycled water from treatment plants in the Rancho California area to Wasson Sill and could provide recycled water for use in the EVMWD service area. Both of these facilities improve water supply reliability and could assist in groundwater management.

REPORT OVERVIEW

The Elsinore Basin GWMP is divided into the following eight sections:

- **Section 1** is the introduction of the GWMP
- **Section 2** includes a description of the hydrogeologic setting of the Elsinore Basin and a description of the conceptual model.
- **Section 3** describes the development of a numerical groundwater model for the Elsinore Basin.
- **Section 4** describes existing and future baseline conditions.
- **Section 5** includes a discussion of management issues.
- **Section 6** describes the management alternatives.
- **Section 7** evaluates each management alternative and recommends the preferred alternative.
- **Section 8** provides an implementation plan for the recommended alternative.

Section 2
Hydrogeologic Setting

The Elsinore Basin is a major source of water supply for EVMWD, EWD and other local groundwater producers. The development of a detailed understanding of the groundwater basin is an important step in the development of the GWMP. The following section discusses the development of the hydrogeologic conceptual model for the Elsinore Basin. This section includes a summary of the following:

- previous work and data collection efforts
- geology and structure
- groundwater flow
- groundwater quality and
- a preliminary groundwater budget

BACKGROUND

Previous Work

In 1994, Geoscience Support Services Inc. (Geoscience) under contract with EVMWD provided a comprehensive review of the hydrogeology of the Elsinore Basin. The Geoscience report compiled historical information from previous reports including: State Water Resources Control Board (1953 and 1959), Harding-Lawson Associates (1978 and 1980) and DWR (DWR, 1981). The purpose of the report was to define the Elsinore Basin in sufficient detail to evaluate the feasibility of surface recharge and injection facilities to augment groundwater supplies. Geoscience prepared a hydrogeologic conceptual model based upon available data at that time, evaluated geophysical data, prepared a numerical groundwater model and evaluated the economic feasibility of recharge in the Elsinore Basin. MWH updated the information compiled in the Geoscience report based upon subsequent efforts and recent information gathered as part of this project.

Neblett and Associates (1998 and 1999) performed a detailed geologic study to evaluate the feasibility of the Liberty Development, a proposed 878-acre residential and golf course development in the Back Basin area. This effort included a fault study and geotechnical study including an extensive field program. The field program included: 21,000 lineal feet of seismic refraction lines, sixty-five cone penetrometer soundings, sixty-one hollow stem auger borings, and forty-six groundwater piezometers to depths of 110 feet. In addition, this report provided an aerial photographic lineament analysis to identify the location of the Glen Ivy fault, a seismic analysis and a liquefaction study to evaluate the feasibility of residential development in this area. The study also defined the surface trace of the Glen Ivy fault. According the Neblett and Associates (1998), the fault zone is “complex and a single main trace was not discernable” and ranges from approximately 100 feet to 500 feet wide.

Data Collection

A variety of additional data has been collected as part of the GWMP effort. A thorough review of the available hydrogeologic data is a prerequisite for the development of the conceptual model. In addition, the data collected under this task served as the input data for the numerical groundwater flow model developed for this groundwater management plan. As part of the GWMP development data has been compiled to evaluate the characteristics of the Elsinore Basin, define the watershed, calculate the water budget and identify potential surface recharge locations. The information types can be categorized as follows:

- Reference reports
- Base maps
- Boundary maps
- Well information
- Water levels
- Production records
- Surface water flows
- Precipitation data
- Water quality data
- Geophysical data

Data Organization

The collected data are organized in a Geographic Information System (GIS) format. A GIS is a combination of a database program and a graphical interface that displays the information on geographic maps. A GIS gives the user the ability to organize and analyze information geographically. By compiling the information in a groundwater GIS, information can be accessed more easily and information can be combined and presented spatially to obtain a better understanding of the groundwater basin. The groundwater GIS for the GWMP is developed using *ArcView 3.2* a product of the Environmental Systems Research Institute (ESRI). The GIS is used for the following purposes in the Elsinore Basin:

- Data collection and organization
- Geographic mapping
- Information analyses
- Calculations
- Provide input data for the numerical model

The groundwater GIS is created in the NAD83, Zone V, California coordinate system. All information added in the future should be in this coordinate system to obtain the same geographic projection of information.

Data Sources

The sources of the information collected are presented by data type in **Table 2-1** along with the file format. The shapefile format is the generic file format for the GIS. Other file formats that are compatible with ArcView include images (tiff and pdf), AutoCAD drawings (dwg and dxf) and database tables (dbf and xls).

Table 2-1
Data Sources

Data Type	Data Description	Data Source	Data Format
Base maps	Parcels Streets and Freeways Aerial Photography Water Bodies Ground Elevation Contours	EVMWD EVMWD EVMWD EVMWD USGS[1]	Shapefile Shapefile Shapefile Shapefile Shapefile
Boundary maps	EWD – EVMWD Service Areas Groundwater Basins San Jacinto Watershed Townships, Ranges & Sections Elsinore Basin Watershed	EVMWD EVMWD EVMWD EVMWD MWH[1]	Shapefile Shapefile Shapefile Shapefile Shapefile
Well information	Various	Various	Shapefile
Groundwater levels	Monthly Data 1919-2001[3]	EVMWD	Spreadsheet
Production records	Monthly Data 1947-2000[3]	EVMWD, SAWPA, SWRCB[4]	Spreadsheet
Stream gauge data	Daily Data 1916-2001	USGS	Spreadsheet
Precipitation data	Monthly Data 1897-2001	RCFCWCD [5]	Spreadsheet
Water quality data	Monthly Data 1985-2001[3]	Monitoring Wells[2], DHS[6]	Spreadsheet
Geophysical data	Geologic Formations Faults Seismic Lines	MWH[7,] CDMG (1969) [8] MWH[7,] CDMG (1969) [8] GeoScience (1994), Neblett &Associates (1999	Shapefile Shapefile Shapefile

1 – Drawn and digitized from United States Geological Survey (USGS) contour data
2 – Newly drilled monitoring wells added by MWH
3 – Sporadic data
4 – State Water Resources Control Board
5 – Riverside County Flood Control and Water Conservation District
6 – Department of Health Services
7 – Interpretation of various reports in combination with Back Basin pilot testing results
8 – California Division of Mines and Geology

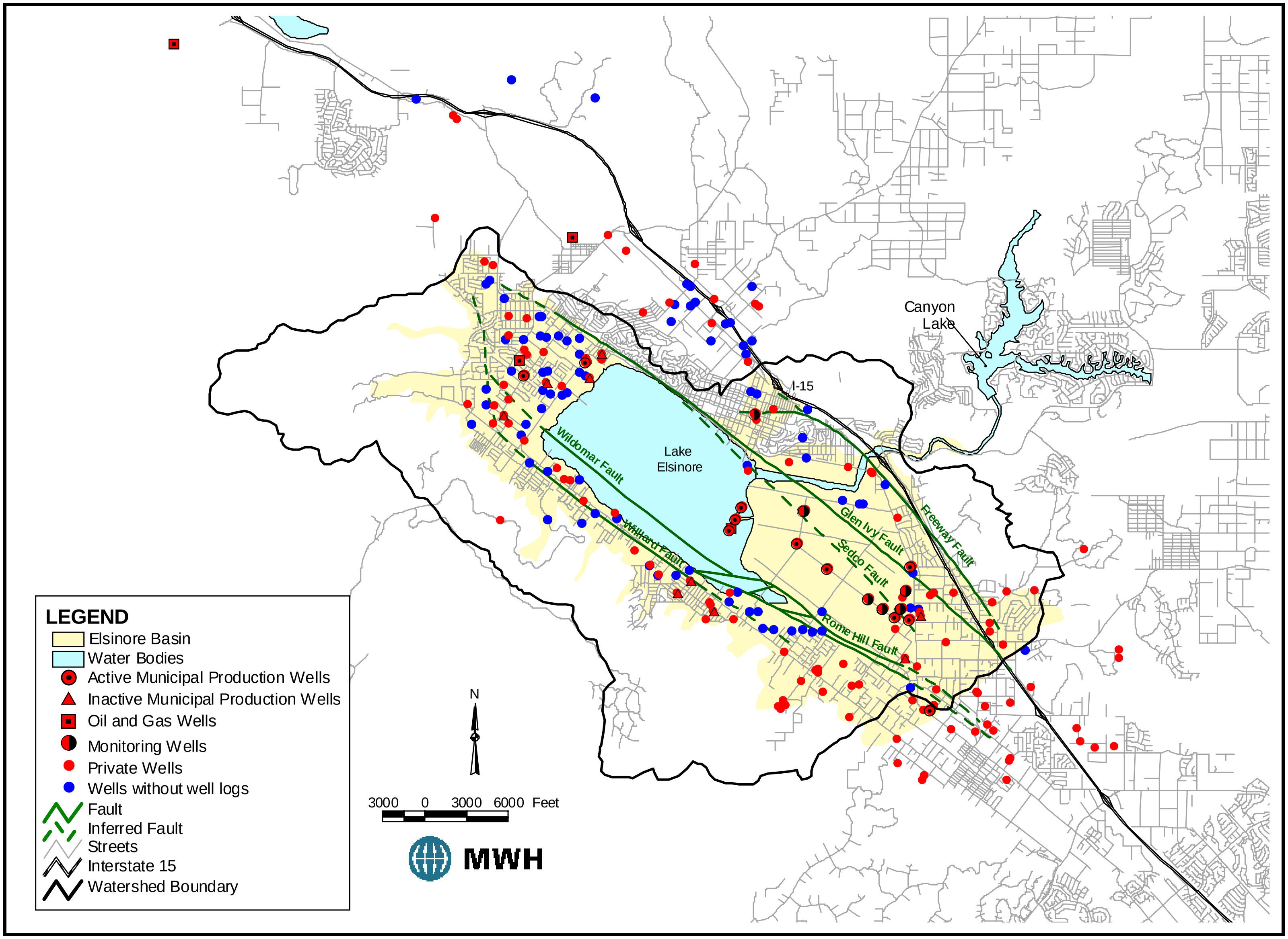
Spreadsheet data including historical water levels, production records and water quality data are not included in the GIS because this format is more flexible for many types of analyses.

Well Information

Lithologic data from wells are critical to the development of the conceptual hydrogeologic model for the Elsinore Basin. **Figure 2-1** presents the location of 239 documented wells within the Elsinore Basin. The location of faults, seismic lines, precipitation stations and stream gauges are also included for reference. The wells are color-coded based on the availability of well logs.

There are 151 wells with well logs (colored red**)**, which provide the most comprehensive descriptions of the lithology in the basin. Well logs are not available for the remaining 88 wells (colored blue). The level of information per well log varies greatly – 23 well logs

Figure 2-1
Wells in the Elsinore Basin



provided limited information and are not used in the subsequent analysis. A total of 124 well logs are scanned and are saved electronically in .pdf format. Based upon the well log data, tops and bottoms of the principal aquifer units are documented and compiled. These data are used to define the structure of the basin as discussed later in this section.

Data Assessment

Based upon a review of the well information and other data, EVMWD has elected not to perform a seismic study to evaluate the geologic structure in the basin as initially envisioned for this project. The seismic studies previously conducted throughout the basin (i.e. Harding Lawson, 1978 and 1980; Neblett & Associates, 1998) provide sufficient seismic data to define the overall structure of the basin. Therefore, EVMWD plans to install additional monitoring wells in lieu of the seismic investigation. The additional monitoring wells provide actual lithologic data that can be used to confirm the conclusions drawn by the seismic work.

GEOLOGY AND STRUCTURE

The geology and structure of the Elsinore Basin are important to the understanding of the basin hydrogeology.

Geologic Setting

Figure 2-2 presents a map of the faults within the Elsinore Basin. The Elsinore Basin was formed within the Elsinore graben, a down-dropped block between the Glen Ivy and Wildomar faults (see **Figure 2-2**), which are associated with the right-lateral strike-slip-dominated Elsinore Fault Zone (EFZ). The EFZ extends approximately 120 miles from Baja California north to the Corona area, where it divides into the Whittier and Chino faults. As the Elsinore Basin was formed by faulting throughout geologic time, it would have likely been occupied by various streams, rivers and lakes similar to the San Jacinto River and Lake Elsinore of today. For example, the San Jacinto River, which currently flows through Railroad Canyon, has probably taken more than one course and may have been in various different locations in its history. As a result, the geology and structure of the Elsinore Basin is complex.

The basement rocks within the Elsinore area generally consist of granodiorite, tonalite and diorite rocks of Jurassic to Cretaceous age (Neblett and Associates, 1998). Metasedimentary rocks (slates and sandstones) of Jurassic age are also encountered. Overlying the basement rocks within the basin, are medium to coarse-grained non-marine sandstones, siltstones and clay of the Pauba Formation (DWR, 1981). The Pauba Formation is overlain by flood plain deposits of late Pleistocene to Holocene age consisting of interfingering sands, silts and clays. Overlying these deposits are relatively unconsolidated Holocene lacustrine sands, silts and clays associated with the ancient San Jacinto River and Lake Elsinore.

Hydrostratigraphy

Figure 2-3 shows the general hydrostratigraphy of the Elsinore Basin. The following descriptions of the hydrostratigraphy are presented from shallowest to deepest. **Figure 2-4** presents a geologic map of the Elsinore Basin**.** The hydrostratigraphic units depicted on

Figure 2-2
Faults of the Elsinore Basin

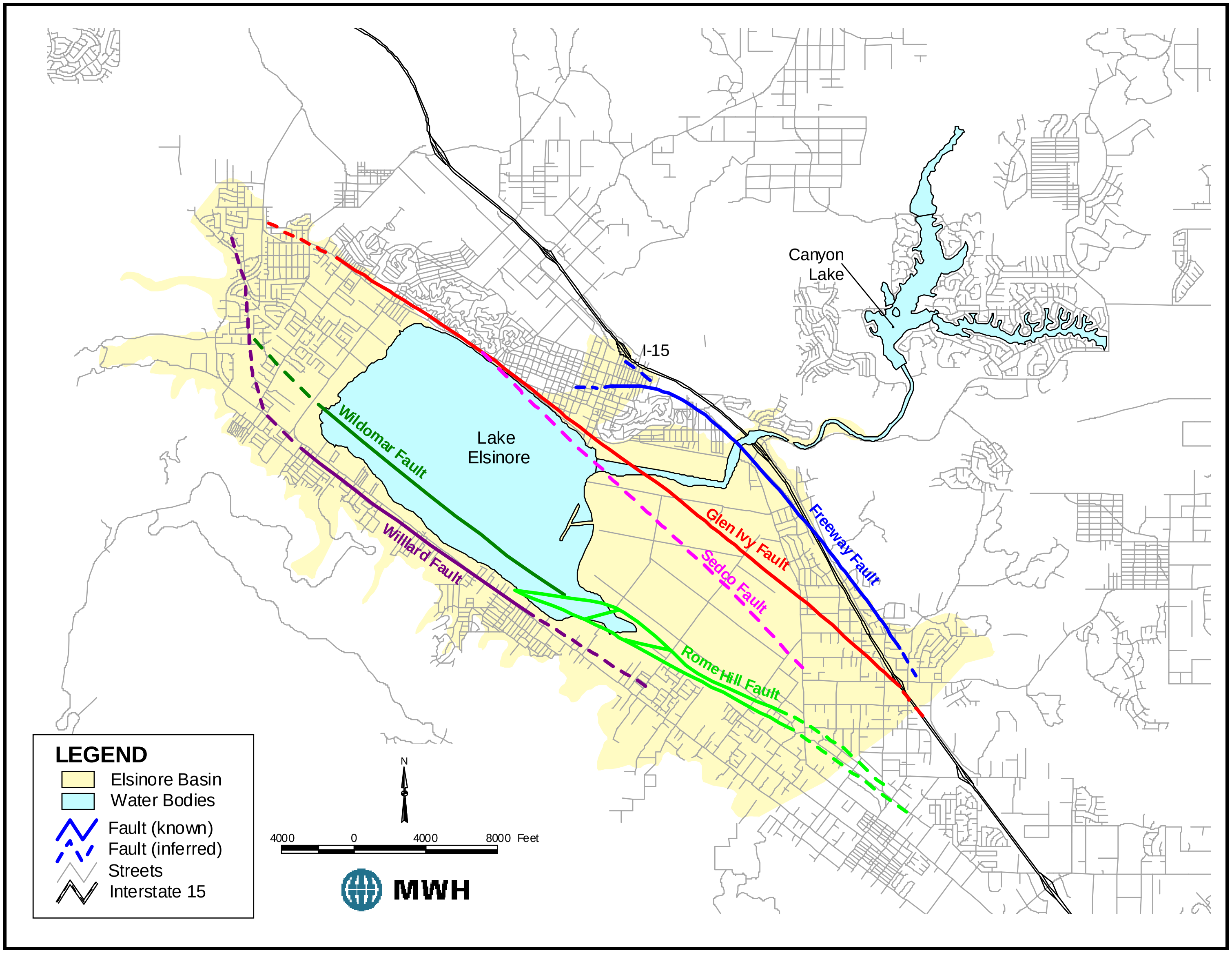


Figure 2-4 include: the Recent alluvium (Qal), the Older alluvium (Qt), the Fernando Group (TQf), the Bedford Canyon Formation (bcb) and undifferentiated basement rocks (bct). Descriptions of these units are described below.

Figure 2-3
Hydrostratigraphy in the Elsinore Basin

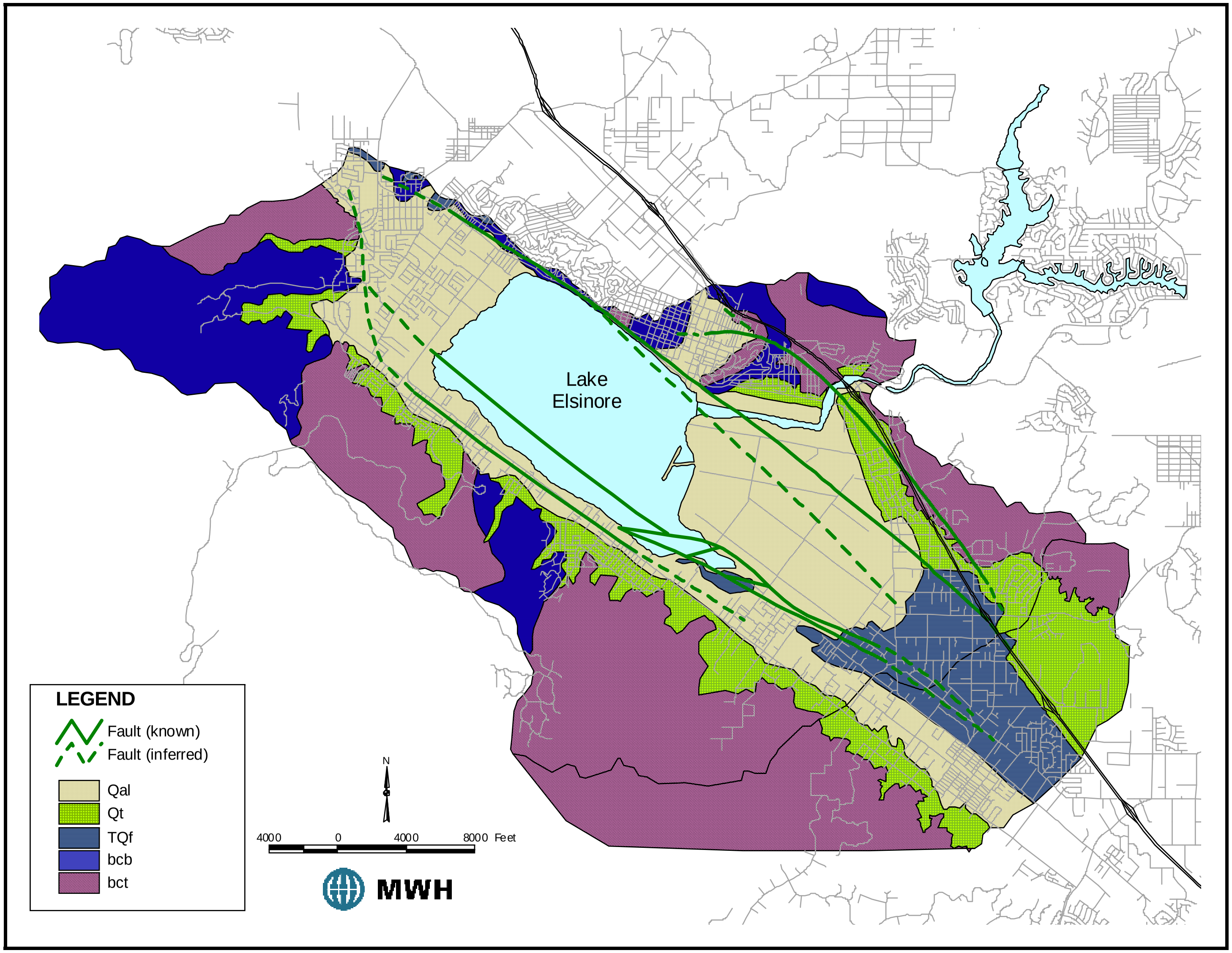
Formation	Symbol	Graphic	Description
Recent Alluvium	Qal		Interfingering sands and clays
			Perched groundwater conditions present
Older Alluvium	Qt		Interfingering sands and clays
			Slightly more consolidated than above
Fernando Group	TQf		Poorly sorted, subangular granitic sands, cobbles, and boulders
			Most produced groundwater comes from this zone
Bedford Canyon Formation	bcb		Blue to black slate and sandstone
			Relatively low groundwater production rates in this zone
Undifferentiated Basement	bct		Granitic basement rocks
			Limited groundwater production except in fractures

Recent Alluvium

The Recent alluvium (Qal) is the youngest of the water-bearing formations in the Elsinore Basin (Geoscience, 1994). It consists of interfingering gravels, sands, silts and clays resulting from streams originating in the surrounding highland areas. Most of these interfingering lenses are laterally discontinuous and do not correlate well across long distances. The Recent alluvium is more than 300 feet thick in some portions of the basin, particularly in the center of the basin.

In many locations, perched groundwater conditions exist within the Recent Alluvium. Perched groundwater can be found within the upper 25 feet, particularly in the Back Basin where as much as 100 feet of impermeable clay occurs at or near the surface, impeding percolation of water to the deeper aquifers.

Figure 2-4
Geology of the Elsinore Basin



Source: Geoscience, 1994 and CDMG, 1969.

Older Alluvium

The Older alluvium (Qt) is similar to the Recent alluvium, consisting of interfingering gravels, sands, silts and clays of stream origin (Geoscience, 1994). The Older alluvium, like the Recent alluvium, is up to 300 feet thick. Because of their similar depositional environments, there does not appear to be a clear and definitive lithologic marker unit between the Recent and Older alluvium that could be determined from well log information. However, the Older alluvium is generally more consolidated and contains more clay than does the Recent alluvium (Geoscience, 1994). Therefore, for the purposes of this report, the Recent and Older alluvium will be referred to simply as alluvium (Qa).

Fernando Group

The Fernando Group (TQf) is characterized by poorly sorted, subangular granitic sands and gravels with laterally discontinuous lenses of silts and clays correlative with the early Pleistocene Pauba Formation, located to the southeast in the Murietta area (Geoscience, 1994). The boundary between the alluvial aquifers and the Fernando Group is marked by a relatively continuous clay aquitard that extends throughout most of the central portion of the basin beneath Lake Elsinore. The Fernando Group is thin or absent along the margins of the basin and is as much as 1,200 feet thick in the center of the basin.

Bedford Canyon Formation

The Bedford Canyon Formation (bcb) is characterized by blue to black slate alternating with layers of fine-grained sandstones of Jurassic age that underlies the Fernando Group throughout the basin (Geoscience, 1994). Lithology identified as Bedford Canyon includes the more consolidated sedimentary section beneath the Fernando Group between the Wildomar fault and the Glen Ivy fault in the deepest part of the basin. Groundwater in the Bedford Canyon formation is limited to the weathered zones at shallow depths and fractures at depth and generally does not produce significant groundwater supplies. The Bedford Canyon Formation is also found in the highland areas of the northern portion of the basin – these areas do not produce significant groundwater supplies (Geoscience, 1994).

Undifferentiated Basement Complex

The basement rocks (bct) in the Elsinore Basin are characterized by igneous granites, tonalites, gabbros and minor basalt of Jurassic to Cretaceous age (Geoscience, 1994). These rocks are found at the surface in the highlands surrounding the basin and generally do not produce significant groundwater except in fractures. In the basin area itself, the depth to bedrock ranges from about 200 feet to as much as 2,800 feet in the Back Basin area.

Structure

As discussed previously, the Elsinore Basin is dominated by the Elsinore graben, a down-dropped block between the Glen Ivy Fault Zone and the Wildomar Fault Zone located to the north and south of Lake Elsinore, respectively. The following section provides a brief discussion of the structure in the Elsinore Basin as it relates to groundwater flow in the basin.

Faults

The Elsinore Basin is dominated by two major fault zones. These are the Glen Ivy Fault Zone, which includes the Glen Ivy fault, the Freeway fault and the Sedco fault, and the Wildomar Fault Zone, which includes the Wildomar fault, the Rome Hill fault and the Willard fault. These faults are shown on **Figure 2-2**. These faults are steeply dipping (nearly vertical) with predominant dip-slip and minor right-lateral strike-slip motion.

Other faults identified by DWR (1981), which subdivided the Elsinore Basin into additional hydrogeologic compartments, appear to be limited to the basement rocks and do not appear to provide barriers to or restrict groundwater flow.

The Freeway fault, which also offsets basement rocks, is located along the I-15 freeway in the northern portion of the basin. This fault does not appear to restrict subsurface flow from the surrounding highlands either.

The Sedco fault, which is located in the Back Basin area, has been extensively studied as part of the Back Basin Pilot Injection Program (BBPIP). Based upon data collected during a pilot injection test, the Sedco fault does not appear to restrict groundwater flow in the Back Basin area. Based upon water level differences and analysis of the sources of groundwater recharge across the fault, the Glen Ivy fault appears to be at least a partial barrier to groundwater flow.

The Rome Hill Fault Zone, which is part of the Wildomar Fault Zone, results in the local surface high called Rome Hill. Because of the extensive faulting and differences in water levels across the fault, this appears to be a barrier to groundwater flow. Therefore, subsurface flow from the surrounding highlands south of the fault, do not appear to provide recharge to the central portion of the basin.

The Willard fault, which extends along Grand Avenue along the southeast and eastern side of the basin, offsets basement rocks in the area and does not appear to be a barrier to flow. Similarly, the parallel Wildomar fault does not appear to be a barrier to groundwater flow.

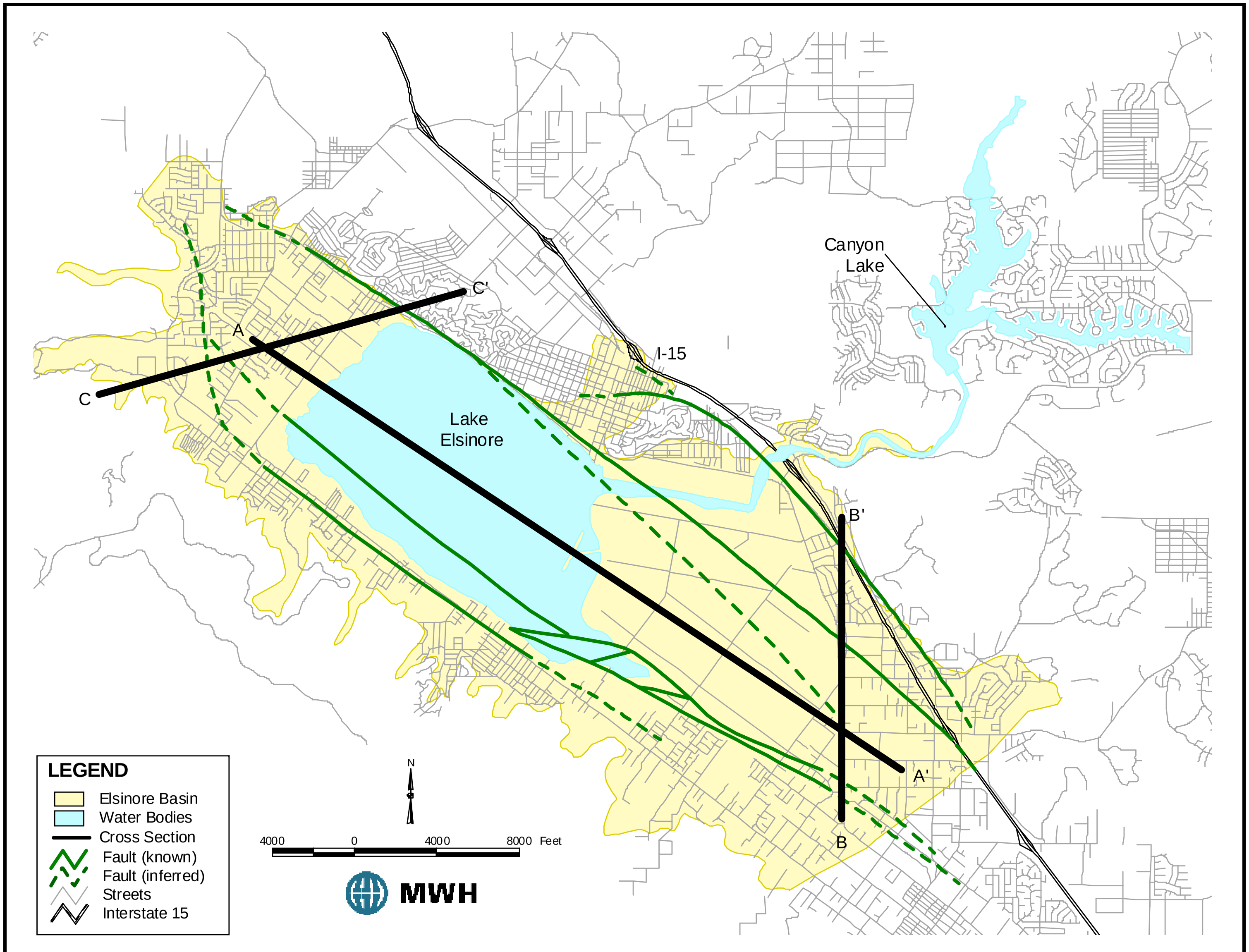
Conceptual Hydrogeologic Sections

To provide a description of the conceptual hydrogeology and overall structure of the Elsinore Basin, three hydrostratigraphic cross sections have been constructed in various locations in the basin. The locations of the cross sections are presented on **Figure 2-5**. The cross sections are presented on **Figure 2-6** through **Figure 2-8.** Information presented on the cross sections is developed from data compiled from driller's logs, geophysical logs, water level data, seismic studies and interpretation developed during the course of this investigation. Structural contour maps depicting the tops and bottoms of key aquifer units are also presented in **Appendix D**.

Cross Section A-A'

This cross section extends approximately 7.5 miles longitudinally across the basin parallel to the long axis of the basin from approximately Grand Avenue on the northwest to Mission Trail on the southeast. The alluvium (shown as Qa on the section) ranges in thickness from about 200 feet in the northwest to more than 450 feet in the southeast part of the section.

Figure 2-5
Location of Cross Sections



The Sedco fault appears to offset the alluvium by about 20 to 40 feet in the Back Basin area based upon geophysical logs from several wells (i.e. Cereal-1, Corydon, MW-1 and MW-2) in the Back Basin area. The clay aquitard, which appears to be relatively continuous throughout the basin, separates the alluvium from the underlying Fernando Group.

The Fernando Group (shown as TQf on the section) is also present throughout the basin underlying the alluvium. In the southeast part of the section, the alluvium is not present and the Fernando Group is actually uplifted to the surface. The Fernando Group extends to a depth of approximately 700 feet overlying the Bedford Canyon Formation in the area north of the lake. In the Back Basin area, the Fernando Group extends to a depth of as much as 1,800 feet below ground surface (fbgs) in the vicinity of the Island wells and is underlain by a more consolidated, less permeable Bedford Canyon Formation. The Fernando Group appears to be offset by as much as 150 feet by the Sedco fault between the Cereal-1 and Corydon Street wells. In the Wildomar area southeast of the Corydon well, the bedrock surface is uplifted to about 900 feet above MSL, creating a barrier to groundwater flow toward the Murietta Basin. This appears to limit the volume of the basin between the Sedco fault and the Glen Ivy fault.

As shown in the section, water levels in wells that are screened in the alluvium are generally higher than water levels in wells that are screened solely within the Fernando Group or the underlying Bedford Canyon Formation, which suggests that there is limited hydrogeologic connection between the alluvium and the Fernando Group. The general groundwater flow direction is from the northwest to the southeast, largely a result of groundwater extraction in the Back Basin. The difference in groundwater levels between the Cereal-1 well, which is screened in both the alluvium and the Fernando Group, and the Corydon Street well, which is screened only in the Fernando Group, appears to be a result of being screened in separate zones.

Cross Section B-B'

Cross Section B-B' extends about 4 miles from south to north through the Back Basin. This section shows the various faults through the Back Basin (from south to north the Wildomar Fault Zone, the Sedco fault, the Glen Ivy fault and the Freeway fault). Depth to bedrock and the resultant alluvial thickness is largely controlled by bedrock faulting in the area. For example, the Fernando Group and the Bedford Canyon Formation generally thicken toward the center of the basin and are not found along the boundaries of the basin (north of Freeway fault and south of Wildomar fault) in this area. This is likely a result of erosional processes caused by downdropping of the bedrock. The thicknesses of these units are also variable across faults. The vertical offset in the bedrock along the Wildomar Fault Zone (which includes the extension of the Wildomar fault and the Rome Hill fault) appears to be as much as 400 feet. Between the Wildomar Fault Zone and the Sedco fault, the bedrock surface undulates from faulting in the bedrock. The vertical offset in the bedrock along the Sedco fault appears to be more than 200 feet. The vertical offset along the Glen Ivy fault is more than 500 feet. The Freeway fault contact is inferred and the offset shown is estimated based upon surface geology.

Cross Section C-C'

Cross Section C-C' extends about 3 miles east-northeast from Leach Canyon past Lakeshore Drive along the northern side of Lake Elsinore. Like the Back Basin area, the basin geometry is

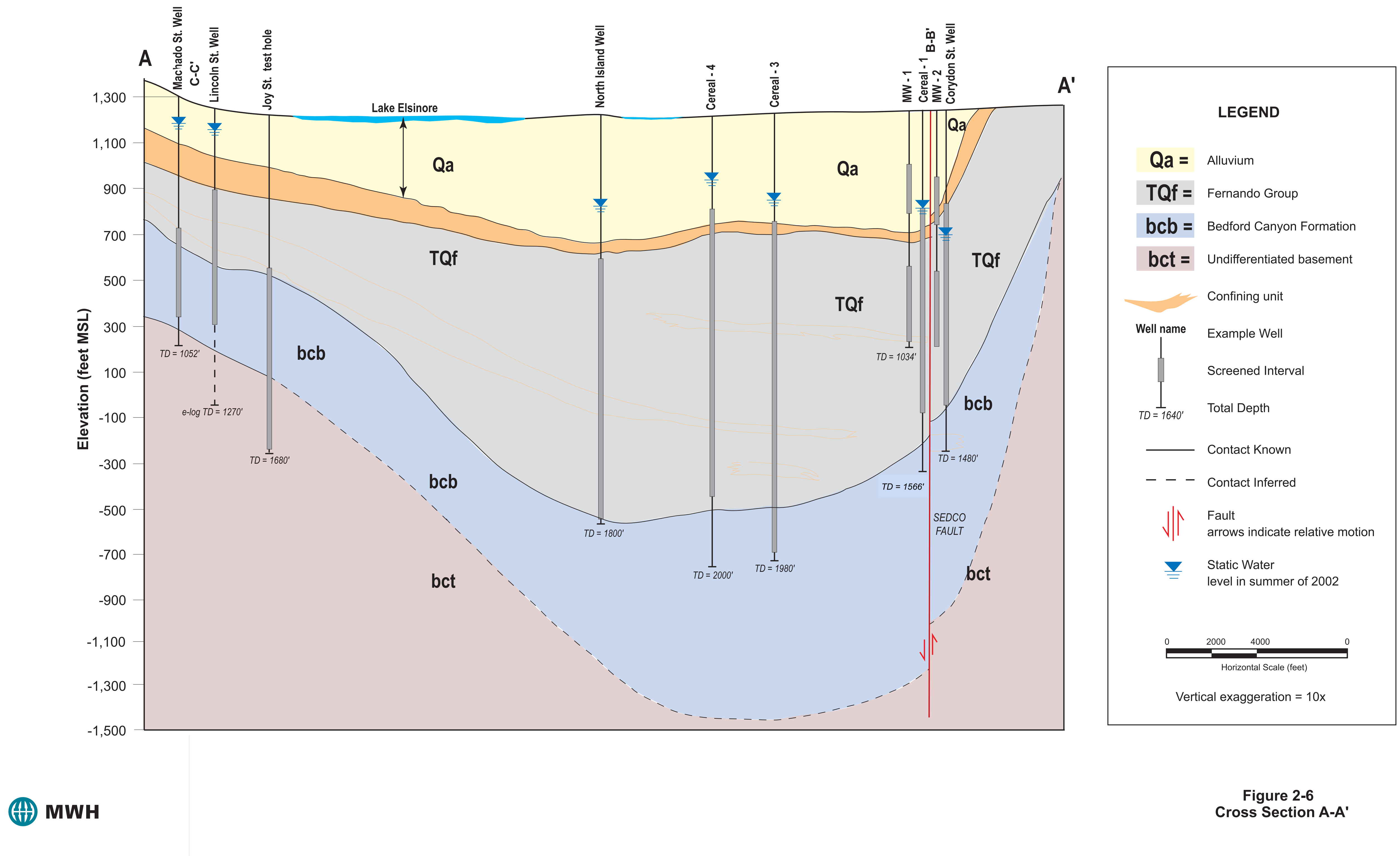
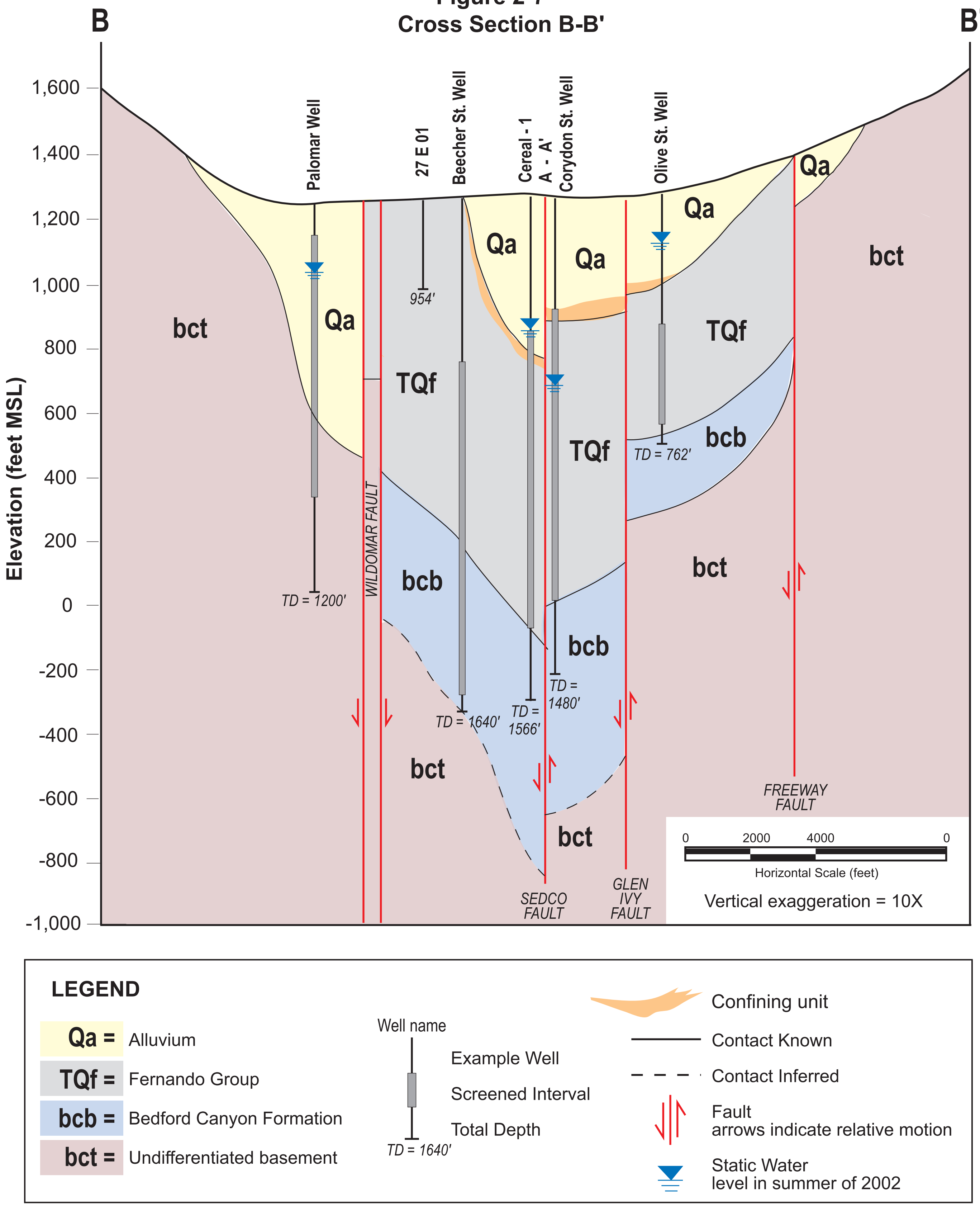


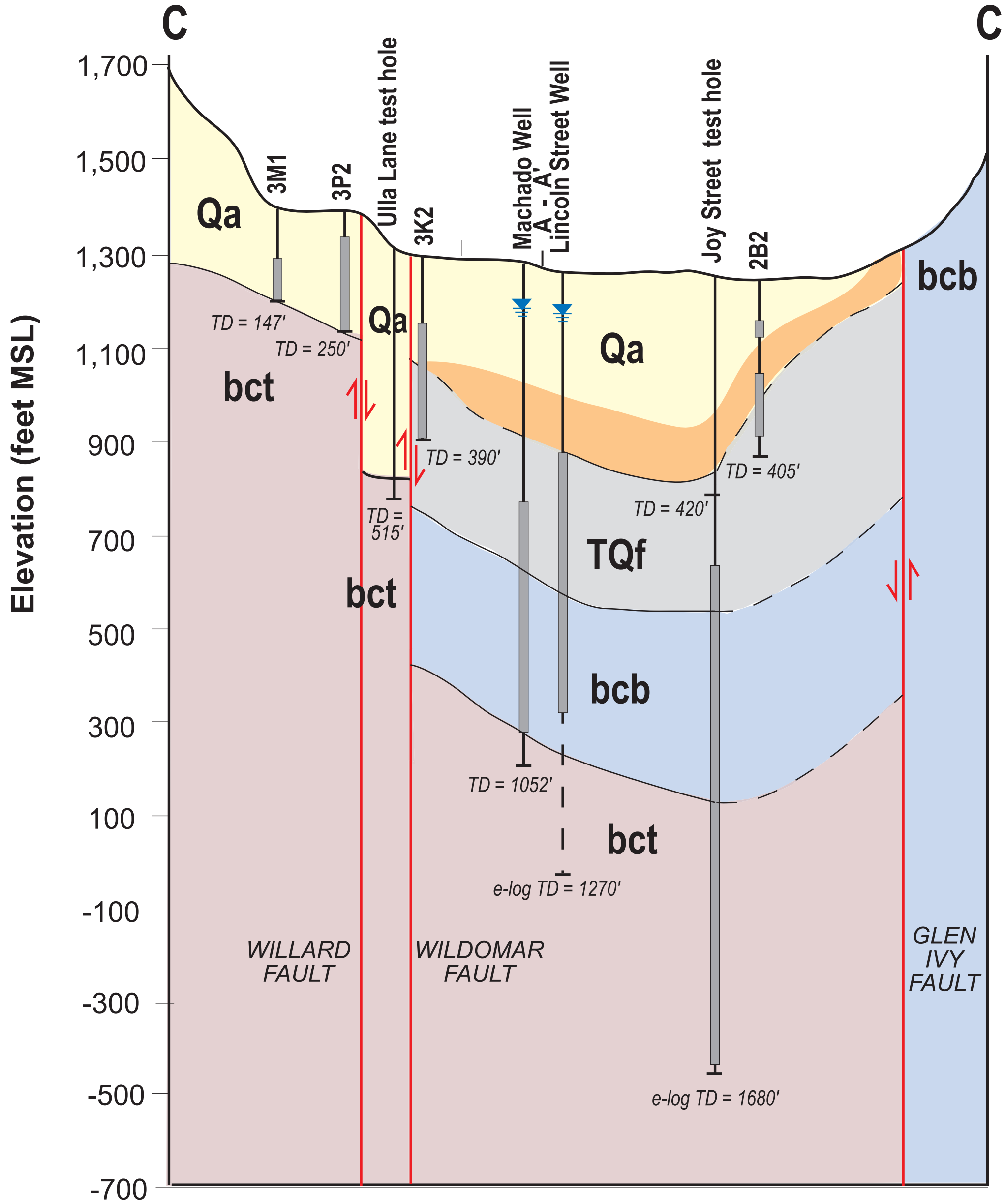
Figure 2-6
Cross Section A-A'

Figure 2-7
Cross Section B-B'



MWH

Figure 2-8
Cross Section C-C'



LEGEND

Qa =	Alluvium
TQf =	Fernando Group
bcb =	Bedford Canyon Formation
bct =	Undifferentiated basement

Well name — Example Well; Screened Interval; Total Depth (TD = 1640')

Confining unit

Contact Known

Contact Inferred

Fault
arrows indicate relative motion

Static Water
level in summer of 2002

MWH

largely controlled by faulting. This section identifies the locations of the Wildomar, Willard and Glen Ivy faults.

The alluvium in this part of the basin is generally thinner than in the Back Basin area. The depth to bedrock in the area of Leach Canyon ranges from 200 to 250 fbgs near the mouth of the canyon. Depth to bedrock in the center of the basin ranges from 1,000 to 1,200 fbgs. The thickness of the alluvium is about 200 feet in the central portion of the section. In the western portion of the basin, the alluvium is underlain directly by the granite basement complex because the Fernando Group and Bedford Canyon Formation are not present, likely a result of erosional processes. East from the Wildomar fault, the alluvium is underlain by the Fernando Group and the Bedford Canyon Formation. The Fernando Group is approximately 200 feet thick throughout this area.

The Fernando Group is underlain by the Bedford Canyon formation in this part of the basin. As discussed above, the Bedford Canyon Formation is characterized by metamorphosed sedimentary rocks (slates and sandstones) and has limited groundwater production capability. Many of EVMWD's wells including Lincoln Street and Machado Street appear to be screened at least partially within the Bedford Canyon Formation, which may explain their relatively low production rates compared to the wells of the Back Basin.

Aquifer Characteristics

The primary source of data on aquifer characteristics is from pump tests. **Table 2-2** summarizes the aquifer characteristics based upon data compiled from DWR well logs and pumping tests performed throughout the basin.

Based upon aquifer tests performed in the Corydon Street well and the North, Middle and South Island wells, transmissivity values for the Fernando Group in the Back Basin range from about 103,000 to 154,000 gpd/ft, which is consistent with a sand lithology. Aquifer tests for the Cereal-3 and Cereal-4 wells, which are screened in both the Fernando Group and a small portion of the overlying alluvium, suggested transmissivity values ranging from 130,000 to 150,000 gpd/ft (Fox, 1991a and 1991b). The average transmissivity of these screened sections are slightly higher than those screened exclusively in the Fernando Group, which suggests that the alluvium has a higher hydraulic conductivity than the underlying Fernando Group.

Often, direct field measurements of transmissivity and horizontal hydraulic conductivity are not available. To establish a range of transmissivity values for the principal water-bearing units, all available specific capacity data, a related parameter, are compiled. The transmissivity of a confined aquifer can be approximated by multiplying the specific capacity by a constant of approximately 2,000 (Logan, 1964). Sources of specific capacity data included well driller's logs, purveyor's records and published data. Although specific capacity is a relative measure of the transmissivity of the aquifer, each specific capacity measurement is evaluated with caution because specific capacity is often affected by partial penetration of the aquifer, well losses, hydrogeologic boundaries and pumping time. Few of these wells are screened in only one water-bearing zone; therefore, aquifer-specific transmissivity estimates are not available. Furthermore, many wells are also screened across less permeable units, which would result in lower specific capacity values for the aquifer portions of the screened section. Therefore, aquifer-specific transmissivities that are calculated from specific capacity data should be considered a lower limit.

Table 2-2
Summary of Aquifer Characteristics

Well Name	Aquifer	Saturated Screen Length (b) (ft)	Transmissivity (T) (gpd/ft)	Storativity (s)	Source
North Well	TQf	1,200	138,000 [1]	0.00037	Geoscience, 1990
Middle Well	TQf	1,167	159,000 [1]	0.00660	Geoscience, 1990
South Well	TQf	1,200	104,000 [1]	0.00550	Geoscience, 1990
Cereal-1	Qa and TQf	990	112,000 [1]	0.0035	This study
Cereal-3	Qa and TQf	1,330	130,000-140,000 [1]	NA	Fox, 1991b
Cereal-4	Qa and TQf	1,180	140,000-154,000 [1]	NA	Fox, 1991a
Corydon Street	TQf	920	103,000-123,000 [1]	NA	Fox, 1985
Olive Street	TQf	300	38,000 [2]	NA	Geoscience, 1994
Lincoln Street No. 1	Qa, TQf and bcb	817	16,000 [2]	NA	Geoscience, 1994
Lincoln Street No. 2	TQf and bcb	580	34,000 [2]	NA	Geoscience, 1994
San Jacinto	Qa	300	17,000 [2]	NA	Geoscience, 1994
Beecher Street	TQf and bcb	780	116,000 [2]	NA	Geoscience, 1994
Fraser No. 1	Qa and TQf	220	24,000 [2]	NA	Geoscience, 1994
Machado Street	TQf and bcb	390	19,000 [2]	NA	DWR well log

Notes:
1 Calculated from aquifer test data
2 Calculated from specific capacity data assuming T = specific capacity x 2,000/well efficiency (rounded to nearest 1,000)

No in-situ measurements of horizontal hydraulic conductivity are available so hydraulic conductivity estimates are made from transmissivity. Hydraulic conductivity is defined by the following equation:

$$T/b = k$$

where:
T = transmissivity
b = saturated aquifer thickness and
k = hydraulic conductivity

Based upon the transmissivity estimates provided in **Table 2-2**, horizontal hydraulic conductivity ranges from about 3 ft/day in the area north of the Lake to about 19 ft/day in the Back Basin area. This range in hydraulic conductivity is consistent with a silty to medium sand lithology, which is present throughout the Elsinore Basin.

No direct measurements of vertical hydraulic conductivity are available for of any of the various hydrogeologic units. In most cases, the vertical hydraulic conductivity is expected to be much less (in some cases orders of magnitude) than the horizontal hydraulic conductivity. Even within relatively homogenous sand and gravel aquifers, horizontal hydraulic conductivity will generally exceed vertical hydraulic conductivity by 2 to 20 times (Todd, 1980). If silts and clays are present, this contrast will be even greater. Thin lenses of sediments with low bulk hydraulic conductivity (such as clays common in the study area) typically have an insignificant effect on horizontal conductivity, but they have a significant effect on vertical conductivity.

Storage coefficients derived from aquifer tests range from 0.00037 to 0.0060, consistent with confined or semi-confined aquifers. Based upon preliminary data evaluated as part of the BBPIP, calculated values of transmissivity in the alluvium range from about 80,000 gpd/ft to nearly 312,000 gpd/ft. Calculated values for the storage coefficient in the alluvium range from 1.1×10^{-2} to 8.7×10^{-3}. These coefficients are consistent with an unconfined or semi-confined aquifer system.

GROUNDWATER LEVELS

The following section describes the historical groundwater flow conditions for the Elsinore Basin. A summary of recent groundwater elevations is provided in **Table 2-3**.

General Groundwater Flow

As shown in Cross Section A-A', groundwater currently flows from the northwest to the southeast beneath Lake Elsinore (see **Figure 2-6** and **Figure 2-9**). Based upon the limited groundwater level data available, the average groundwater gradient in the Fernando Group appears to be approximately 0.016 in the central part of the basin. This gradient is very steep and appears to reflect the extensive pumping in the Back Basin area. The groundwater surface elevation within the Fernando Group in the central portion of the basin during the summer of 2002 ranged from 1,196 feet MSL (MSL) in the Machado Street well to 698 feet MSL in the Corydon Street well. Based upon water levels within the Fernando Group from the new monitoring wells MW-1 and MW-2, the gradient appears to steepen toward the Corydon Street well. The groundwater elevation in the Olive Street well, which is on the upthrown side of the Glen Ivy fault (see **Figure 2-7**), is 1,156 feet MSL, more than 400 feet higher than water levels in the Corydon Street well about a mile away. This suggests that the Glen Ivy fault provides at least a partial barrier to groundwater flow. However, observed vertical offsets in the bedrock associated with Glen Ivy fault may also cause fluctuations in water level.

Table 2-3
Summary of Groundwater Elevations – Summer 2002

Well Name	Aquifer	Groundwater Elevation (ft MSL)
Cereal-1	Qa and TQf	843
Cereal-3	Qa and TQf	879
Cereal-4	Qa and TQf	953
Corydon Street	TQf	698
Lincoln Street	TQf and bcb	1168
Machado Street	TQf and bcb	1196
MW-1 Deep	TQf	859
MW-1 Shallow	Qa	1032
MW-2 Deep	TQf	845
MW-2 Shallow	Qa and TQf	955
North Island Well	TQf	877
Olive Street	TQf	1156
Palomar Street	Qa	1074
South Island Well	TQf	900

The groundwater elevations for wells partially or entirely screened within the alluvium are shown on **Figure 2-10**. Because no production wells for which water level data are available are screened entirely in the alluvium, it is not possible to create a contour map for wells within the alluvium. However, the average gradient between the wells Cereal-4 and Cereal-1, which are all screened in both the alluvium and the Fernando Group appears to be approximately 0.012, similar to the gradient within the Fernando Group. Water levels in monitoring wells MW-1 and MW-2, which have piezometers screened exclusively in the alluvium, are about 100 to 150 feet higher than wells that are also screened in the Fernando Group. The Palomar well, located on the south side of the Wildomar Fault Zone, has a water elevation of 1,074 feet MSL. Because no other water level data are available for the area near the Palomar well during 2002, it is not possible to contour water levels in this area for this time period.

Historical Groundwater Levels

An evaluation of historical groundwater levels is important to understanding the behavior of the groundwater basin. Historical groundwater levels in the Elsinore Basin are described below.

Figure 2-9
Groundwater Contour Map
Fernando Group – Summer 2002

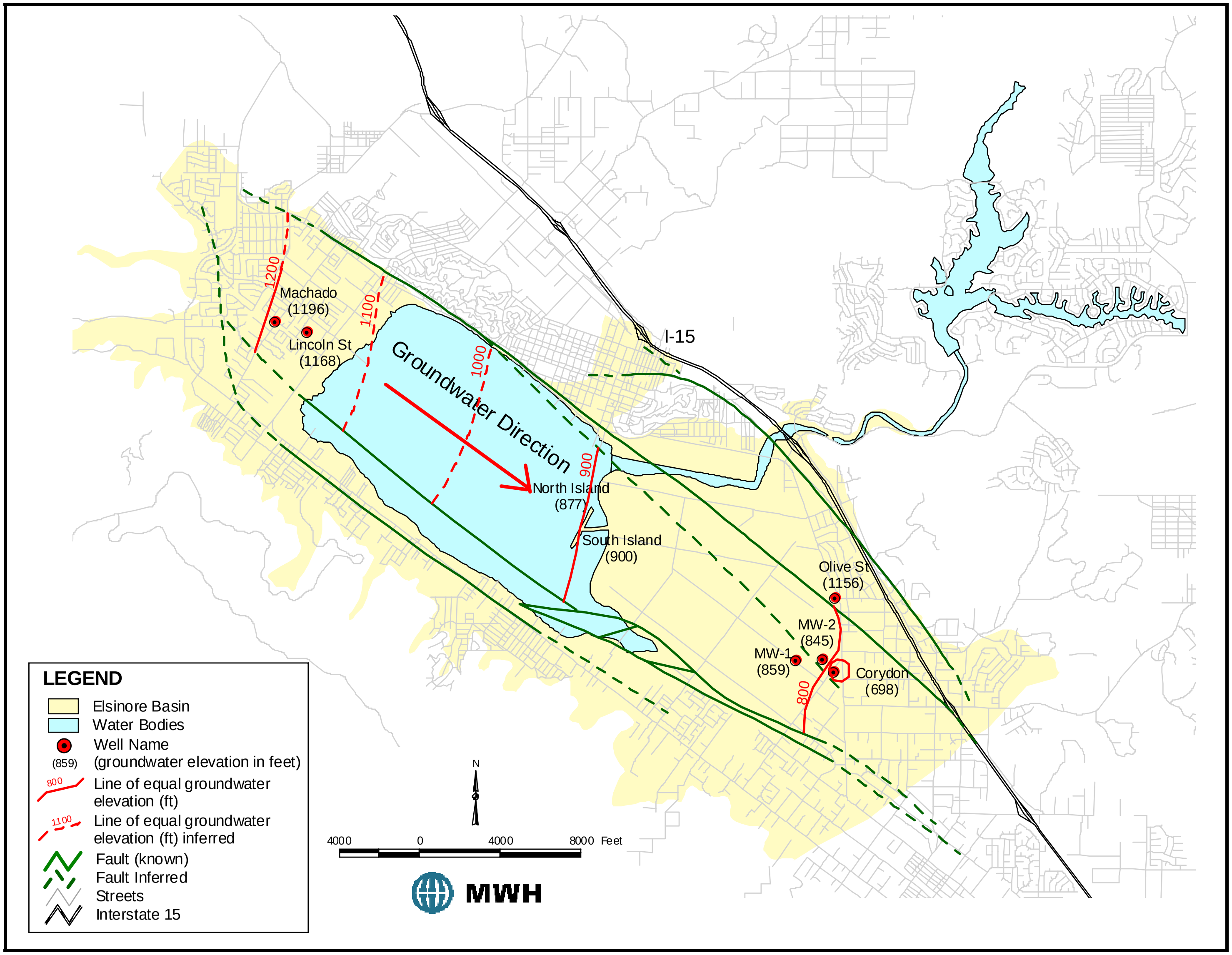
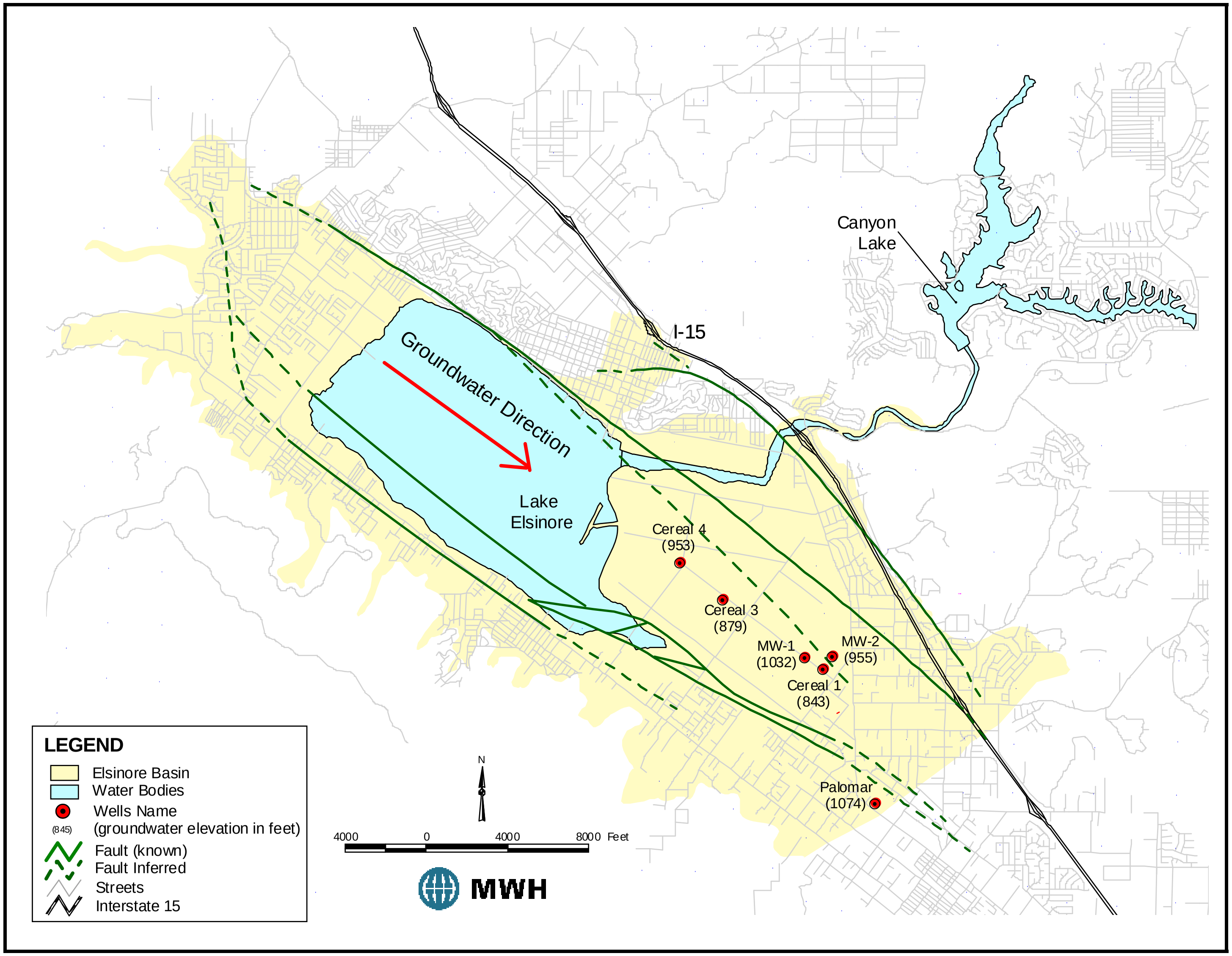


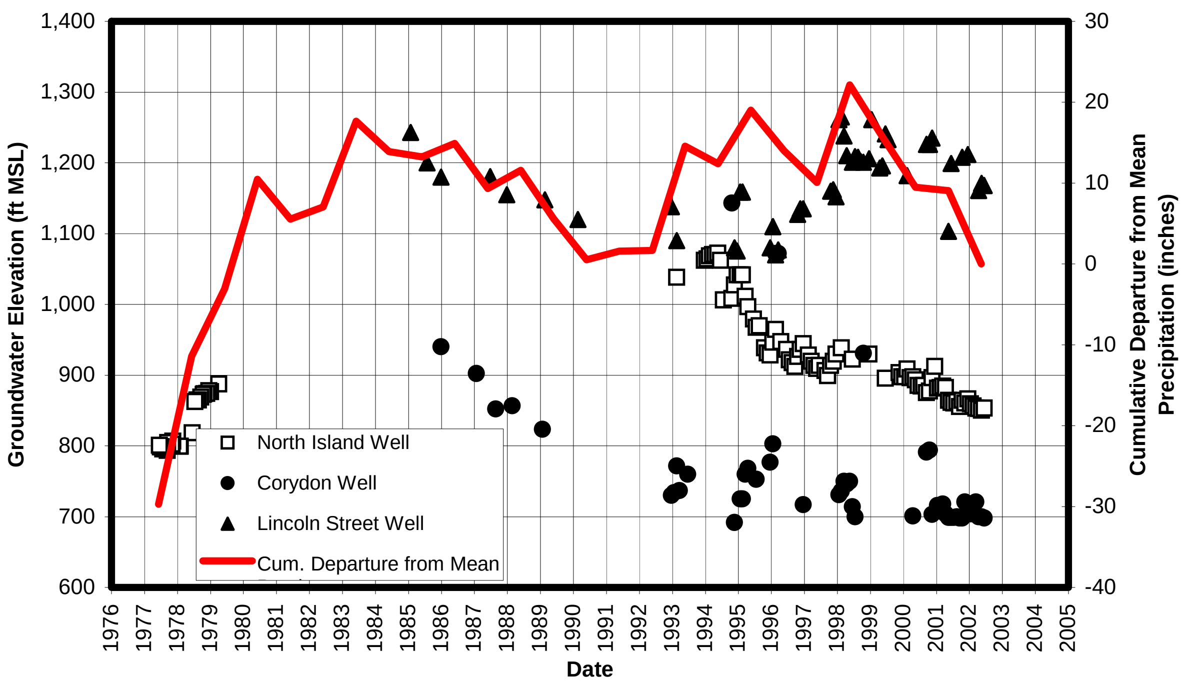
Figure 2-10
Groundwater Level Map
Alluvium and Fernando Group– Summer 2002



Fernando Group

Figure 2-11 shows historical water levels for select wells that are screened within the Fernando Group, but not in the alluvium. The water levels in the Lincoln Street Well, which is located in the area north of the lake, generally follow historical trends in precipitation as indicated by the cumulative departure from mean precipitation curve. The water levels in the Corydon Street and North Island wells are decreasing steadily and have decreased more than 200 feet since the early 1990s. This appears to be consistent with the basin geometry, which suggests that the Back Basin area has limited natural recharge to the Fernando Group and that most of the pumping occurs in this portion of the basin. The area north of the lake appears to have a source of natural recharge to the Fernando Group from surface drainages such as Leach and McVicker Canyons that infiltrate directly through the shallow alluvium into the underlying aquifers.

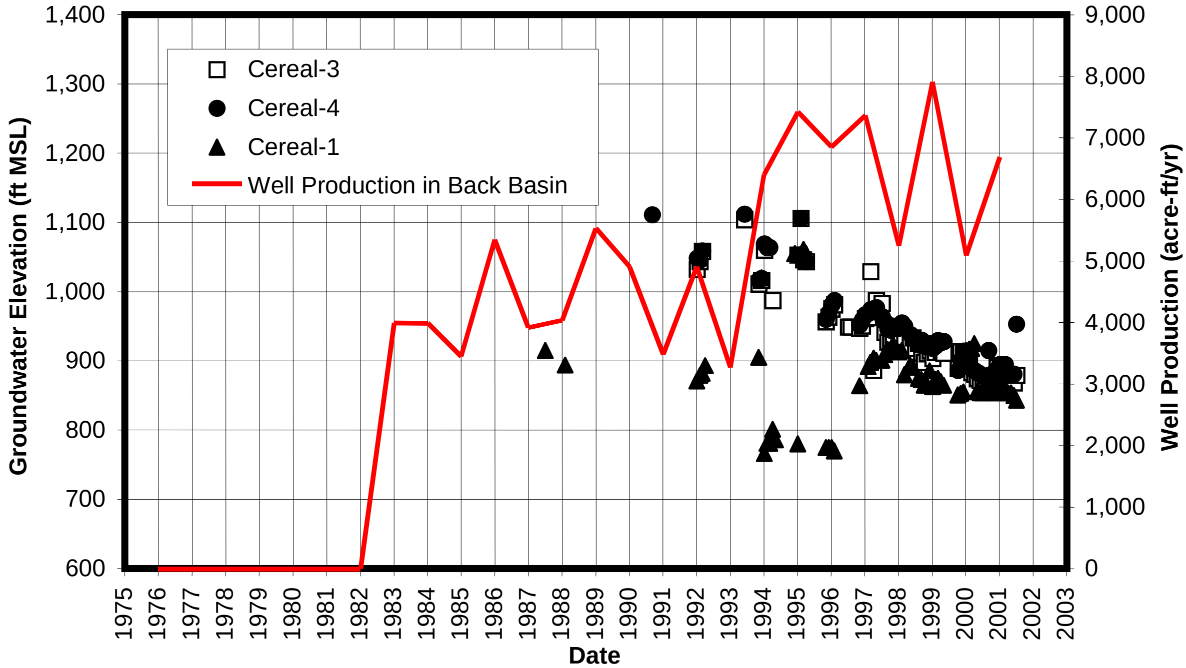
Figure 2-11
Historical Water Levels in the Fernando Group



Alluvium and Fernando Group

Figure 2-12 presents historical water levels in select wells screened across both the alluvium (containing both the Upper and Lower alluvium defined previously) and the Fernando Group. In the Back Basin, the water levels in the alluvium are as much as 150 feet higher than in the Fernando Group. Water levels in the Cereal-3 and Cereal-4 wells have declined more than 150 feet since their construction. Water levels in the Cereal-1 well have fluctuated significantly since the well was constructed. The water levels fluctuations appear to be a function of regional pumping patterns in nearby wells (as shown on **Figure 2-12**). During the 1994 to 1996 period, the Cereal-1 well has similar water levels to the Corydon well. This would appear to suggest that the Sedco fault, which separates the Cereal-1 well and the Corydon Street well is not a barrier to groundwater flow.

Figure 2-12
Historical Water Levels in the Alluvium and the Fernando Group



GROUNDWATER BUDGET

A groundwater budget analysis is the quantification and reconciliation of the inflow and outflow components of the groundwater regime in the study area. The purpose of this analysis is to characterize the major contributions to groundwater flow and evaluate the relative importance of each inflow and outflow component in the hydrologic behavior of the basin. Historical variations in the various components of flow, as well as potential variations of groundwater in storage, can be used to evaluate a representative range of flow conditions in the basin.
Typical components of groundwater inflows and outflows for a groundwater budget analysis are listed below:

Inflows
- Infiltration from direct precipitation
- Surface water infiltration
- Infiltration from deep percolation of applied water
- Infiltration from septic tanks
- Underflow into basin

Outflows
- Groundwater pumping
- Flow to surface water
- Underflow out of basin

Each of these potential components of inflow and outflow as they pertain to the Elsinore Basin are discussed in more detail below.

Inflows

The following are the major inflow components to the Elsinore Groundwater Basin:

- Recharge from precipitation – rainfall directly to the basin
- Surface water infiltration – recharge from infiltration of surface waters such as streams. The San Jacinto River is the major surface water inflow. Inflow from Lake Elsinore is considered negligible.
- Infiltration from land use – direct surface recharge from application of water for irrigation
- Infiltration from septic tanks – infiltration in areas serviced by septic systems in the basin

Precipitation Recharge

Recharge from precipitation is a significant inflow to the Elsinore Basin. The following section quantifies the historical annual average precipitation volume and the amount of this precipitation that infiltrates into the groundwater basin. The following equation calculates the amount of precipitation recharge:

Precipitation Recharge = Total Precipitation –Runoff – Evapotranspiration

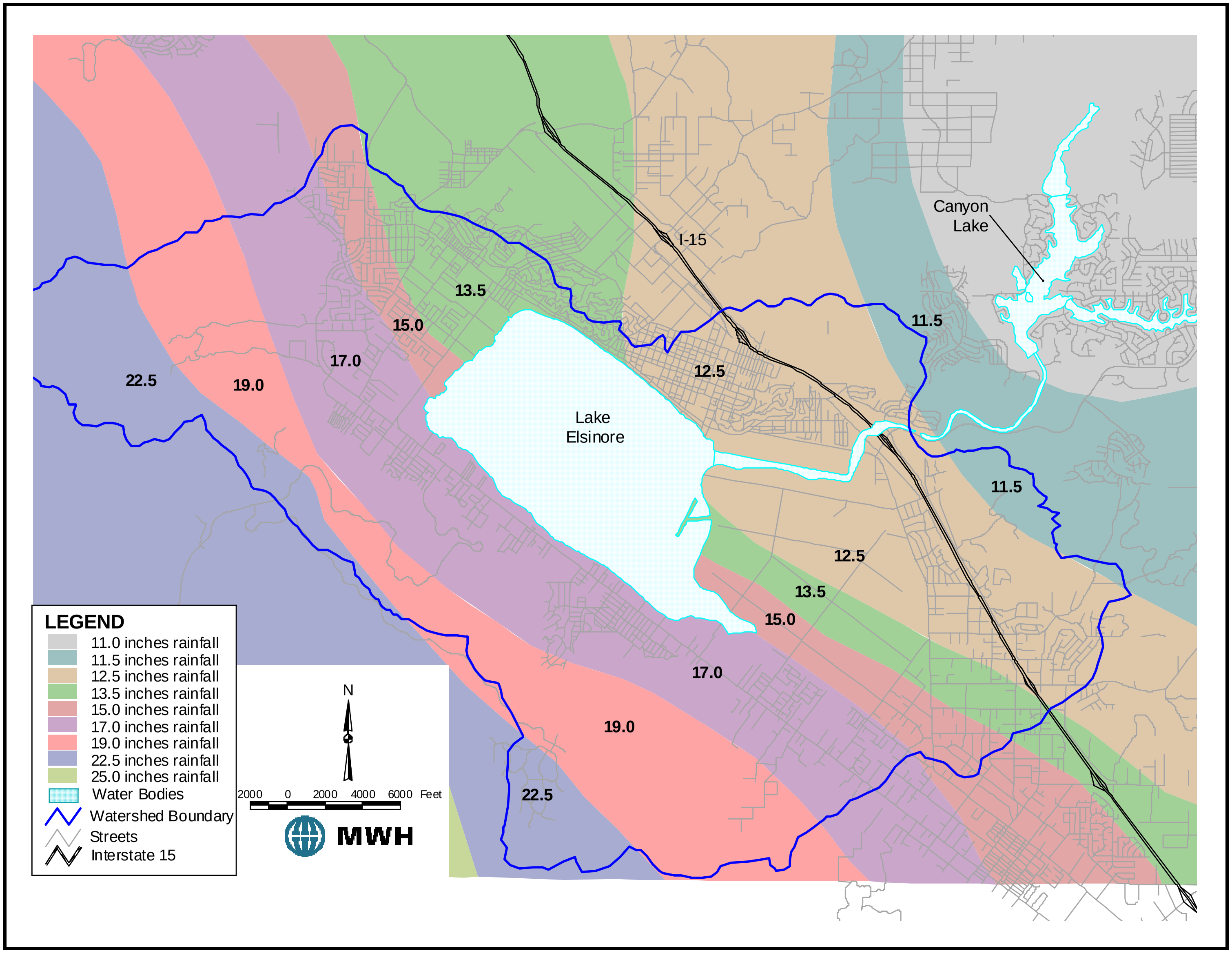
As shown on **Figure 2-13**, precipitation is highly variable across the watershed, ranging from approximately 11.5 inches per year in the northeastern portion of the watershed to as much as 25 inches per year in the southern portion of the watershed.

In the preparation of a groundwater budget, a representative time period over which inflows and outflows are approximately equal that approximates current conditions must be selected. When pumping data and groundwater usage are not stable, precipitation is often used to select the representative time period. **Figure 2-14** shows the annual precipitation and cumulative departure from mean precipitation at Station 67 located north of Lake Elsinore. Average annual precipitation at this rain gauge since 1897 is approximately 12.3 inches.

The cumulative departure from mean precipitation, which represents the cumulative difference between the annual precipitation and the historical average precipitation, is also shown on this figure. The cumulative departure curve shows a general increasing trend in precipitation from 1897 to the early 1940s (i.e. precipitation is generally above average) and a decreasing trend from the early 1940s to the late 1970s (i.e. precipitation is generally below average). Between the late 1970s and the early 1990s and the early 1990s to the present, precipitation patterns exhibit two complete cycles of above-average and below-average precipitation.

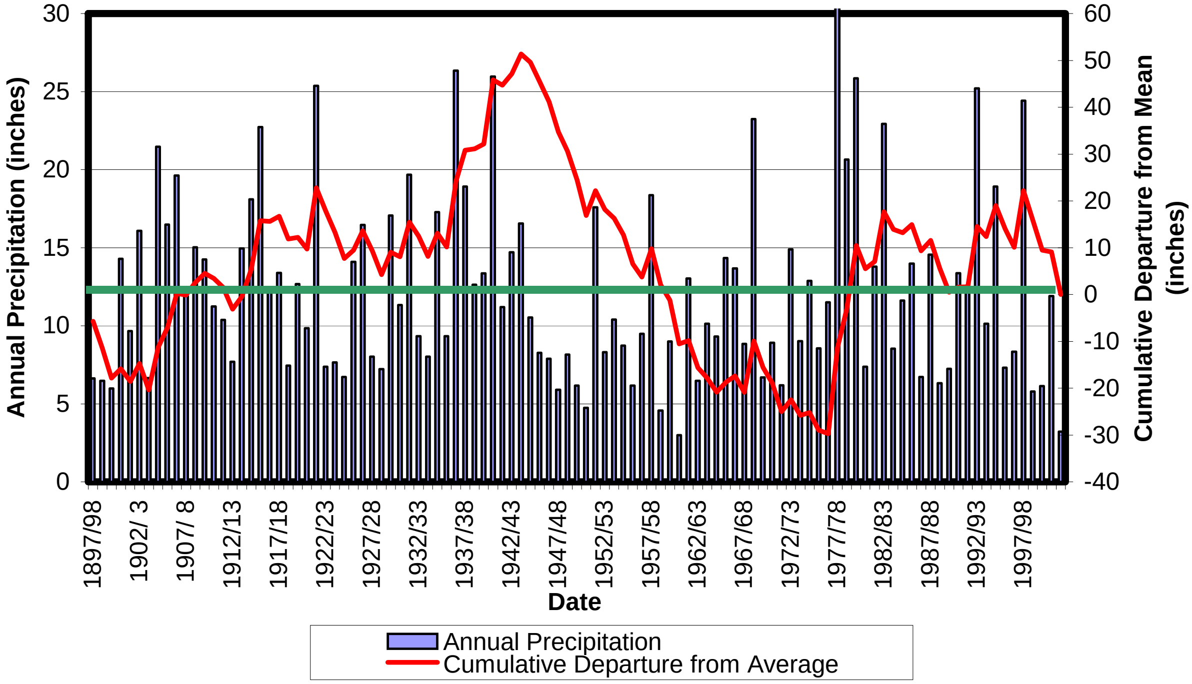
Based upon the data presented on **Figure 2-14**, the base period for the groundwater budget selected for this study is from 1990 to 2000. This 11-year period includes both wet and dry periods and has an average precipitation of approximately 13 inches per year, slightly higher than that for the historical period. Cumulative departure from mean precipitation is

Figure 2-13
Isohyetal Map of Elsinore Watershed



Source: Riverside County Flood Control and Water Conservation District, Isohyetal Map of Average Annual Precipitation.

Figure 2-14
Historical Annual Precipitation
Riverside County Flood Control District – Station 67



approximately equal at each end of this time period, which suggests similar hydrologic conditions at the beginning and the end of the time period.

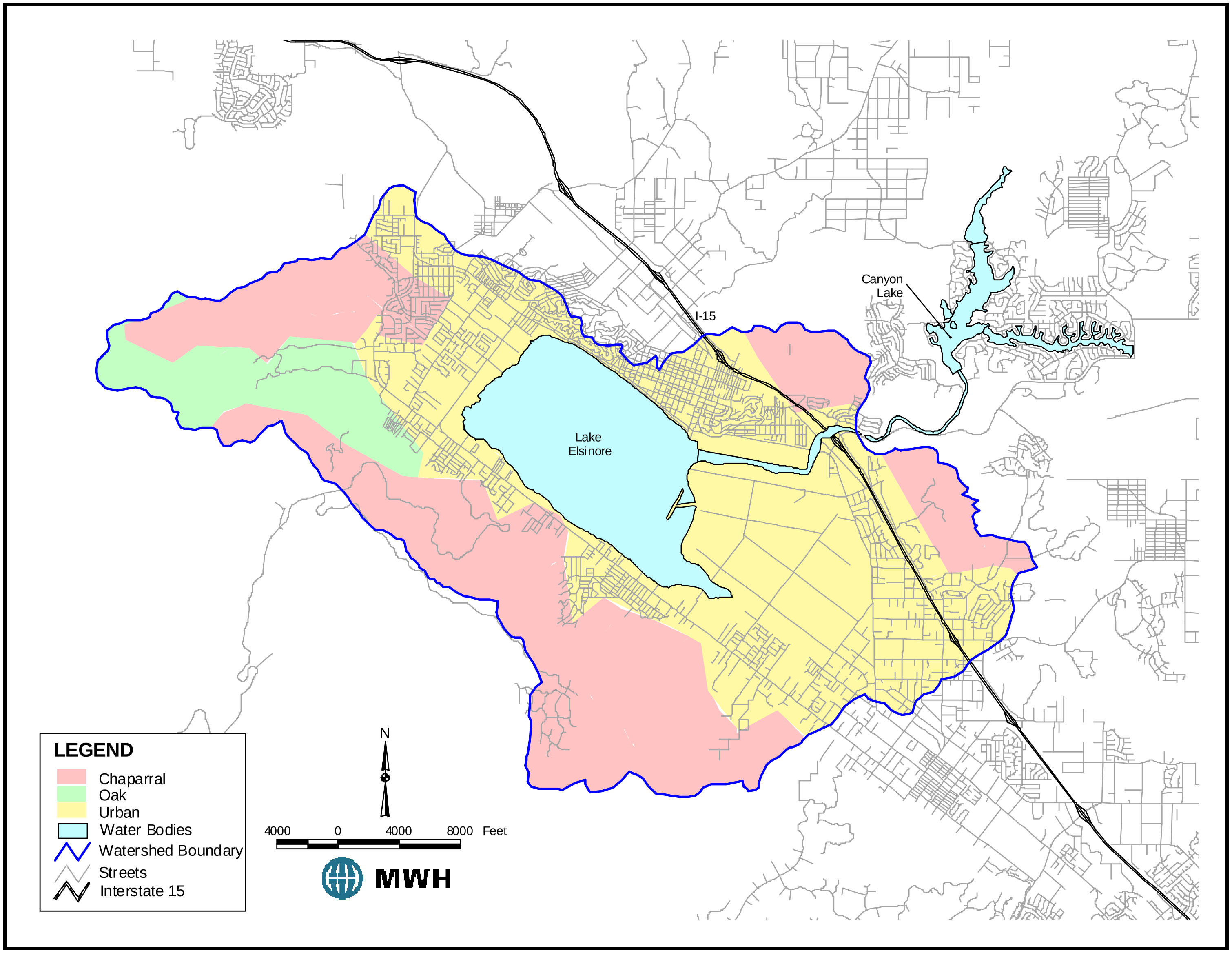
Because the methods for determining the runoff coefficients and associated infiltration rates in the open space areas and the urban areas are different, each component will be discussed separately. Runoff and evapotranspiration estimates for each category are described below.

Recharge from Precipitation in Open Areas

Runoff coefficients based upon various vegetation types, soil types and rainfall intensity are estimated using the methodology described in the Riverside County Flood Control District Hydrology Manual (Riverside County Flood Control District, 1978). As shown on **Figure 2-15**, the vegetation cover in the tributary open areas to the Elsinore Basin is characterized by chaparral and canyon live oak. Chaparral is present throughout most of the watershed area with minor areas of canyon live oak in the northwest portion of the watershed near Leach and Dickey canyons.

Soils are classified by RCFCWCD according to their ability to infiltrate water, ranging from Type A (higher infiltration) to Type D (very low infiltration). Most of the open areas in the watershed have B soil types characterized by moderate infiltration rates (RCFCWCD, 1978). In the northwest portion of the watershed, there are some areas of soil type A characterized by high infiltration rates. Runoff coefficients are estimated for each subwatershed based on the soil types

Figure 2-15
Vegetation Distribution in the Elsinore Basin



Source: Information Center for the Environment, UC Davis and vegetative cover. An antecedent moisture condition (AMC) value of I is used to determine the runoff coefficients because most storms occur under dry ambient conditions. Runoff coefficients used for this analysis ranged from 0.3 to 0.5.

In general, precipitation that does not become runoff is utilized for soil moisture replenishment before infiltrating through the soil into groundwater. The evapotranspiration within the open space is estimated according to the method described by the DWR (2000). These estimates are provided in **Table 2-4**. With this method, the evapotranspiration is estimated by multiplying the reference evapotranspiration for the area by a landscape coefficient (K_L) for the specific plant community. According to the Riverside County Water Budget Formula (2001), the reference annual evapotranspiration value for Elsinore is 55 inches.

Table 2-4
Evapotranspiration Constants for Elsinore Basin

Plant	Water Needs Category	K_L	Landscape Evapotranspiration (inches)
Chamise Chaparral	Very Low	0.2	11
Canyon Live Oak	Low	0.3	17

During the base period (1990-2000), approximately 2,000 acre-ft/yr entered the groundwater basin in the open areas.

Recharge from Precipitation in Urban Areas

The fate of precipitation on the urban areas in the Elsinore Basin is estimated by creating runoff coefficients for each of the subwatersheds in the basin. Land use data (see **Figure 2-16**) have been used to calculate a weighted average percent imperviousness for each subwatershed. A runoff coefficient is calculated from percent imperviousness. Runoff is calculated by multiplying the precipitation over the subwatershed by the runoff coefficient. Evapotranspiration from the pervious areas of the watershed is subtracted from the non-runoff water and the remainder, if any, is infiltration to groundwater. It is assumed that plants in the urban areas would be irrigated. Therefore, only a portion of the plant evapotranspiration needs are fulfilled through precipitation.

Figure 2-17 presents estimated annual infiltration due to precipitation from 1990 to 2000. The average inflow during this time period is approximately 2,800 acre-ft/yr. It is important to note that significant recharge occurs in the wetter years. During drier periods, there is no significant amount of groundwater recharge from precipitation.

Surface Water Recharge

The principal surface water bodies in the Elsinore Basin are the San Jacinto River and Lake Elsinore. Recharge from these water bodies is derived from infiltration.

Figure 2-16
Land Use in Elsinore Watershed

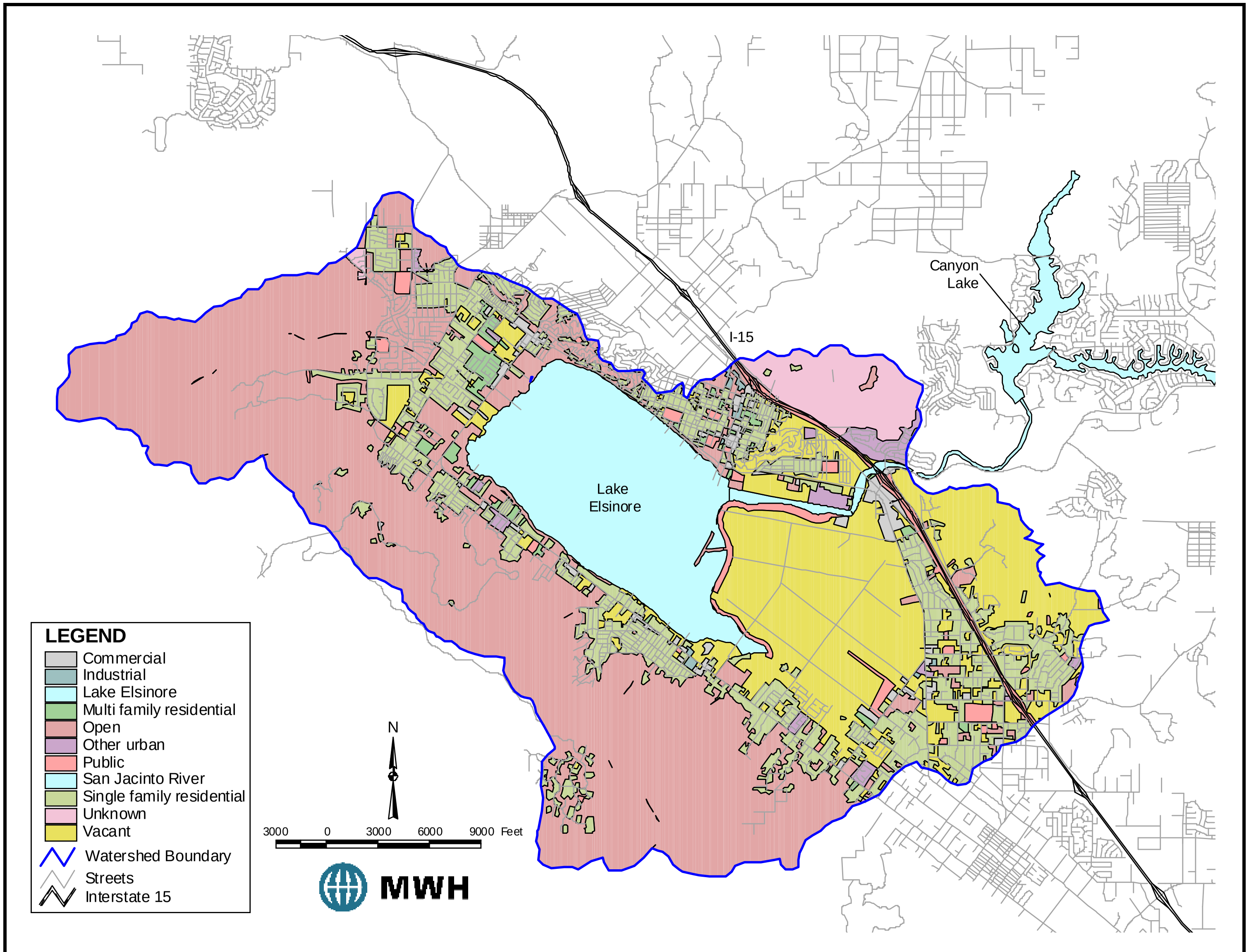
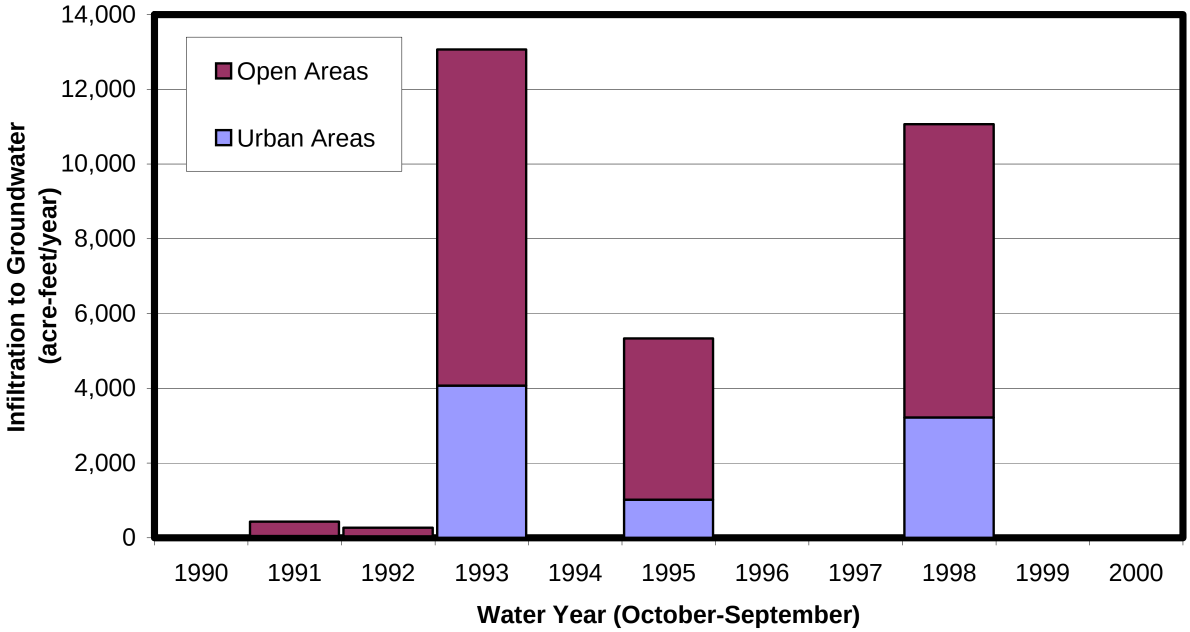


Figure 2-17
Annual Estimated Groundwater Recharge from Precipitation (1990-2000)



San Jacinto River

The San Jacinto River is the primary source of surface water inflow to the Elsinore Basin. **Figure 2-18** presents historical San Jacinto River stream flows since 1916 in stream gauge 1107050, located north of I-15. Since 1916, the average annual flow at the USGS stream gauge was approximately 19 cfs (13,700 acre-ft/yr). However, since Railroad Canyon Dam was constructed in 1927, substantial flow in this portion of the San Jacinto River only occurs when there are releases or spills from Canyon Lake. The San Jacinto riverbed is characterized by fine to medium sand and encompasses an area of approximately 51 acres (downstream of gauge 1107050). Assuming an infiltration rate of approximately 0.6 feet/day, the average annual inflow to the basin since 1916 has been approximately 1,240 acre-ft/yr or approximately 8 percent of the total flow in the river downstream of Canyon Lake. Based upon field observations and the location of the stream gauge, it is assumed that there is no underflow beneath the stream gauge.

Estimated annual stream recharge to groundwater for the base period (1990 to 2000) is shown on **Figure 2-19**. The average groundwater recharge from the San Jacinto River during this time period is approximately 1,700 acre-ft/yr. As with precipitation, most of the recharge to the basin occurs during wet years.

Figure 2-18
Historical Annual Streamflow at San Jacinto River (1916-2000)

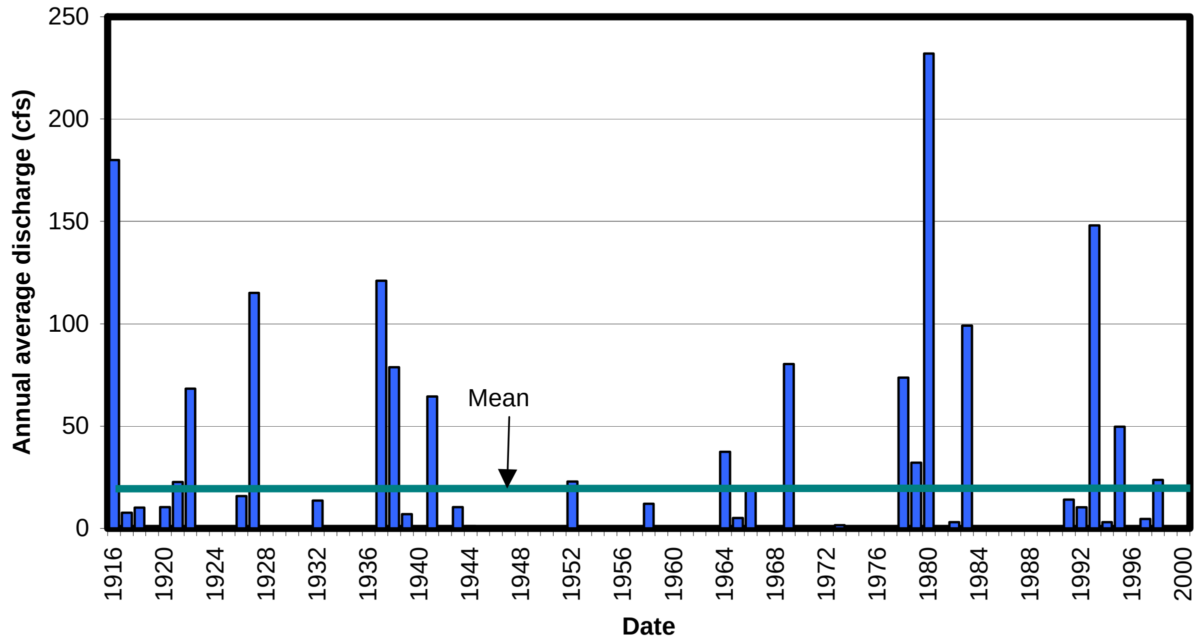
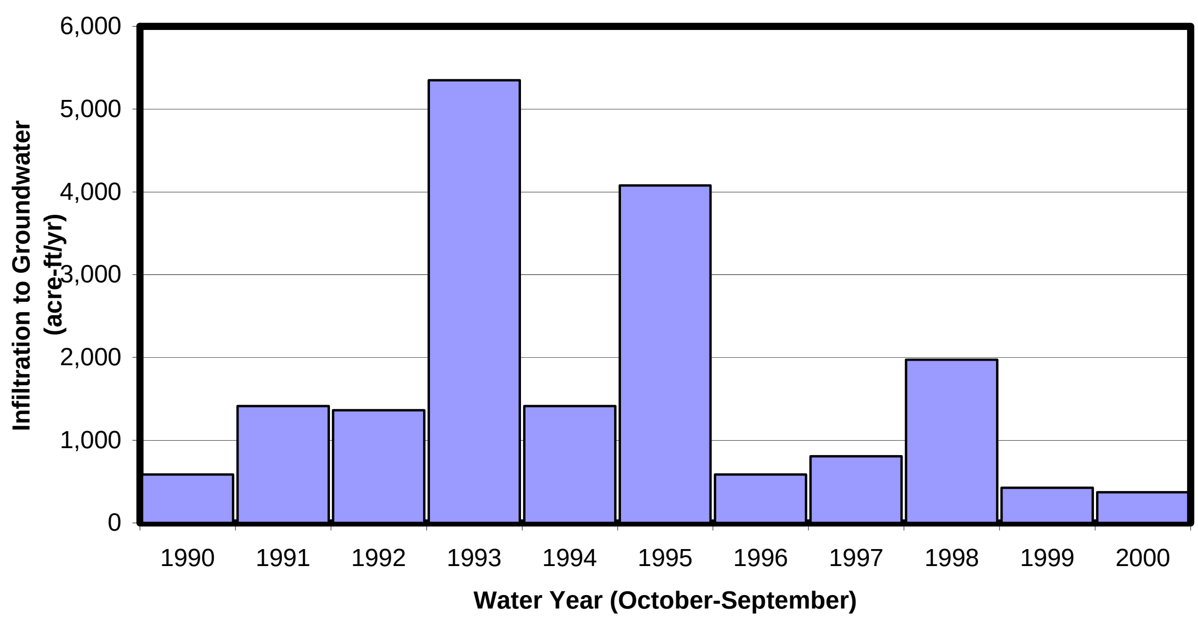


Figure 2-19
Estimated Groundwater Recharge from the San Jacinto River (1990-2000)



Lake Elsinore

Because of the predominance of clay beneath Lake Elsinore, it is assumed that Lake Elsinore itself does not contribute significant recharge to the groundwater basin and the net inflow from the lake is zero.

Recharge through Water Use

Groundwater recharge also occurs from applied water for landscape irrigation and infiltration from septic system leach fields. Each of these components is estimated below.

Applied Water

According to water production and usage data within the Elsinore Basin, approximately 39 percent of the water demand (2,500 acre-ft) in the area is used for outdoor needs, which generally consist of landscaping and irrigation (MWH, 2000). Because of the relatively dry climate and high water demands of most landscaping, the evapotranspiration requirement for landscaping within the Elsinore Basin exceeds 10,000 acre-ft/yr. Therefore, it is assumed that most of the applied water (in addition to most infiltration from direct precipitation) will be utilized by plants as evapotranspiration. Assuming a typical irrigation efficiency of 75 percent, an average of approximately 600 acre-ft/yr enters the groundwater basin from applied water. **Figure 2-20** shows the annual infiltration to groundwater through water use. This figure shows that infiltration of irrigation returns has generally increased since 1990 because of the increase in demands throughout the basin. During wet years (e.g. 1998), less water was used for landscape irrigation so infiltration to the groundwater basin was also lower.

Septic Systems

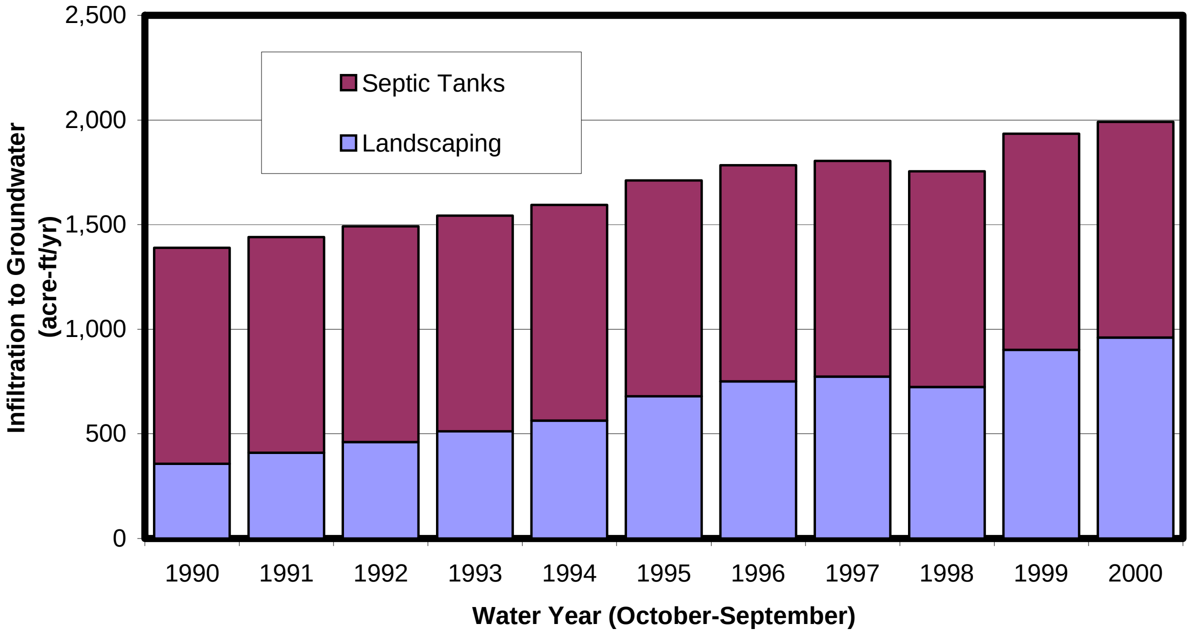
EVMWD GIS data indicate that there are currently approximately 3,900 parcels within the Elsinore Basin that are connected to septic systems. Based upon an annual rate of approximately 0.25 acre-ft per tank, approximately 1,000 acre-ft/yr are added to the groundwater basin from septic systems. This inflow is expected to be relatively constant over the past decade because it is assumed that most new developments obtain connections to the sewer system and do not use septic systems.

In addition, some septic users have converted to the sewer system and some new septic users have been added in areas not serviced by the sewer system. Therefore, during this time period, it is assumed that the number of septic users has remained constant.

Subsurface Inflow

The Elsinore Basin is currently closed to underflow from outside the basin. Therefore, there is no subsurface inflow except as described above.

Figure 2-20
Estimated Groundwater Recharge through Water Use (1990-2000)



Outflows

The following are the major outflow components to the Elsinore Groundwater Basin:

- Evapotranspiration – the loss of groundwater from soil and open water bodies (e.g. Lake Elsinore) and transpiration by plants
- Groundwater pumping – groundwater extraction by wells in the basin
- Flow to surface water – flow from the groundwater basin to surface water bodies such as Lake Elsinore and/or Temescal Wash (i.e. rising groundwater)
- Underflow – subsurface outflow from the basin along the southeastern margin to Murietta

Evapotranspiration by Phreatophytes

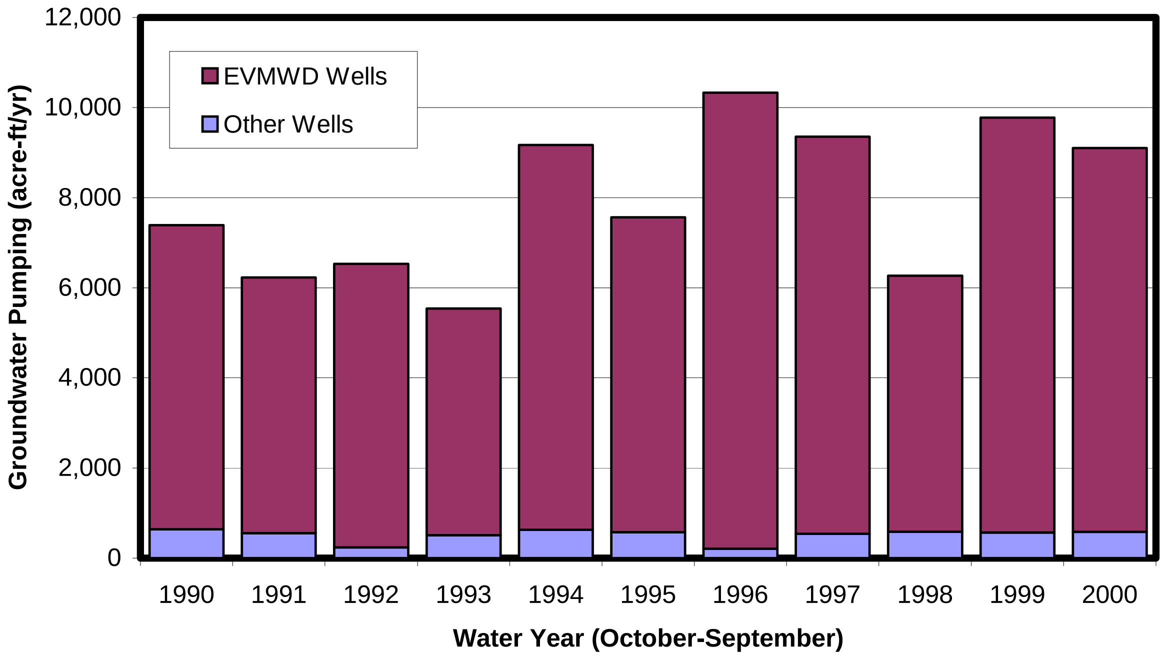
Phreatophytes are plants whose roots extend to the water table and use groundwater directly for their water needs. Because groundwater levels are generally substantially below ground surface, it is unlikely that groundwater is currently lost to plant evapotranspiration. Therefore, this outflow is zero. Evapotranspiration is considered when the infiltration from precipitation on urban and open areas is calculated.

Groundwater Pumping

Historical pumping data are summarized on **Figure 2-21**. These data do not include unmetered pumping from private well owners in the basin, thereby underestimating the actual pumping.

Private pumpers are believed to pump approximately 100 acre-ft/yr (assuming that each well pumps less than 1 acre-ft/yr).

Figure 2-21
Historical Groundwater Pumping in the Elsinore Basin



Surface Outflows

Because static groundwater levels are more than 100 feet below the level of Lake Elsinore, it is unlikely that significant groundwater is lost to the Lake. However, in some locations in the Back Basin, there is perched groundwater at levels as high 10 feet below ground surface. It is possible that this water could migrate toward Lake Elsinore. However, this water is limited in extent and would not produce significant outflows.

Subsurface Outflows

As discussed previously, the general groundwater flow direction is from the northwest to the southeast within the Elsinore Basin. Therefore, there is a potential for flow from the Elsinore Basin into the Murietta groundwater basin toward the southeast. As discussed previously, the bedrock surface rises up in the southeast to an elevation above current water levels, thereby preventing groundwater from leaving the basin. It is possible for water to be exchanged between the two basins if the water table rises to above an elevation of approximately 1,100 feet. However, if this situation were to occur, the potential flow is estimated to be less than 100 acre-ft/yr and is considered negligible.

Water Budget Summary

Table 2-5 presents the average groundwater budget for the base period from 1990 to 2000.

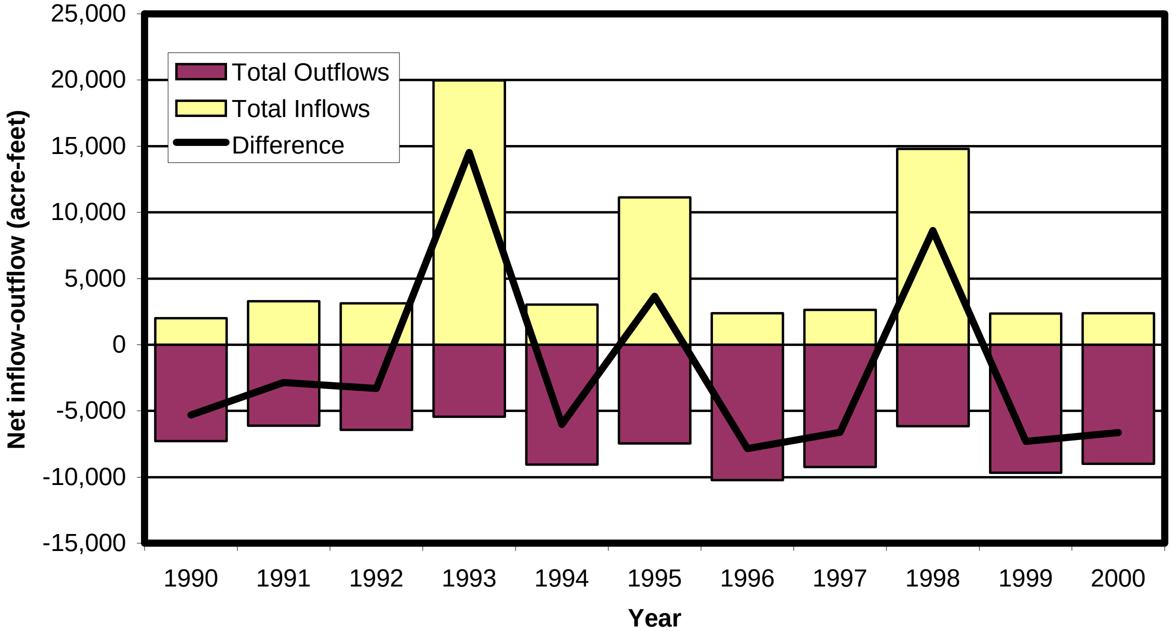
Table 2-5
Summary of Estimated Groundwater Basin Budget for 1990-2000

Component	Average (1990-2000)
Inflows	
Infiltration of Precipitation	
Rural Areas	2,000
Urban Areas	800
Recharge from Surface Water	
Recharge from San Jacinto River	1,700
Recharge from Lake Elsinore	0
Return Flows	
Applied Water	600
Septic Systems	1,000
Subsurface Inflow	0
Total Inflows	**6,100**
Outflows	
Groundwater Pumping	7,900
Surface Outflow	0
Subsurface Outflow	0
Total Outflows	**7,900**
NET SURPLUS/DEFICIT	**-1,800**

Based upon this period, the difference between inflows and outflows suggests an average annual groundwater deficit of approximately 1,800 acre-ft/yr over the 11-year period of review. **Figure 2-22** shows estimated annual inflows and outflows over the period. It is important to note that, during the period 1990 to 2000, the Elsinore Basin experienced a groundwater deficit in eight of the 11 years reviewed. The three years of positive balance were 1992-3, 1994-5 and 1997-8, which were very wet years. The estimated cumulative groundwater deficit in the Elsinore Basin between 1990 and 2000 was approximately 19,000 acre-ft.

These data are used to calibrate a groundwater flow model for the Elsinore Basin. Details on the model creation and calibration are provided in Section 3.

Figure 2-22
Total Estimated Inflows and Outflows to Groundwater Basin



GROUNDWATER QUALITY

The following section provides a description of the groundwater quality within the basin as it relates to the hydrogeologic conceptual model.

Piper diagrams are often used to observe differences in general water quality from various sources. A Piper diagram plots various cation and anion concentrations on the same graph as a relative percentage, which allows for identification of water quality similarities and differences among various water sources that may not be detected simply by comparing bulk concentrations. A Piper diagram for the Elsinore Basin is provided on **Figure 2-23**. These data suggest various water quality signatures throughout the basin. For example, the Cereal-1 well, which is screened across the alluvium and the Fernando Group, has an intermediate quality between the Corydon Well (which is screened only in the Fernando Group) and the monitoring wells that are screened in the alluvium. Similarly, the Lincoln Street Well and the Machado Well, which are screened in the Fernando Group and the Bedford Canyon Formation, appear to have similar water quality.

Time-series plots for total dissolved solids (TDS), nitrate and sulfate in select wells are presented on **Figure 2-24** through **Figure 2-26**. These constituents are often used to identify changes in water quality. General observations made from these data include:

- TDS (caused by higher nitrate and sulfate) is generally higher in the area north of the lake and along basin margins than in the Back Basin

- Highest concentrations of TDS, sulfate and nitrate are found at the Lincoln Street Well
- Lowest concentrations of TDS and sulfate are found in the Olive Street Well
- Nitrate (as nitrate) concentrations in the Palomar Well appear to be increasing
- Concentrations of arsenic are below the current standard of 50 μg/L, however, they have exceeded the new (effective 2006) maximum contaminant level of 10 μg/L in the Back Basin wells (Cereal-1, Cereal-3, Cereal-4 and Corydon Street)
- Highest concentrations of arsenic are found in deeper wells such as Cereal-1, Cereal-3 and Cereal-4

Figure 2-23
Piper Diagram in the Elsinore Basin

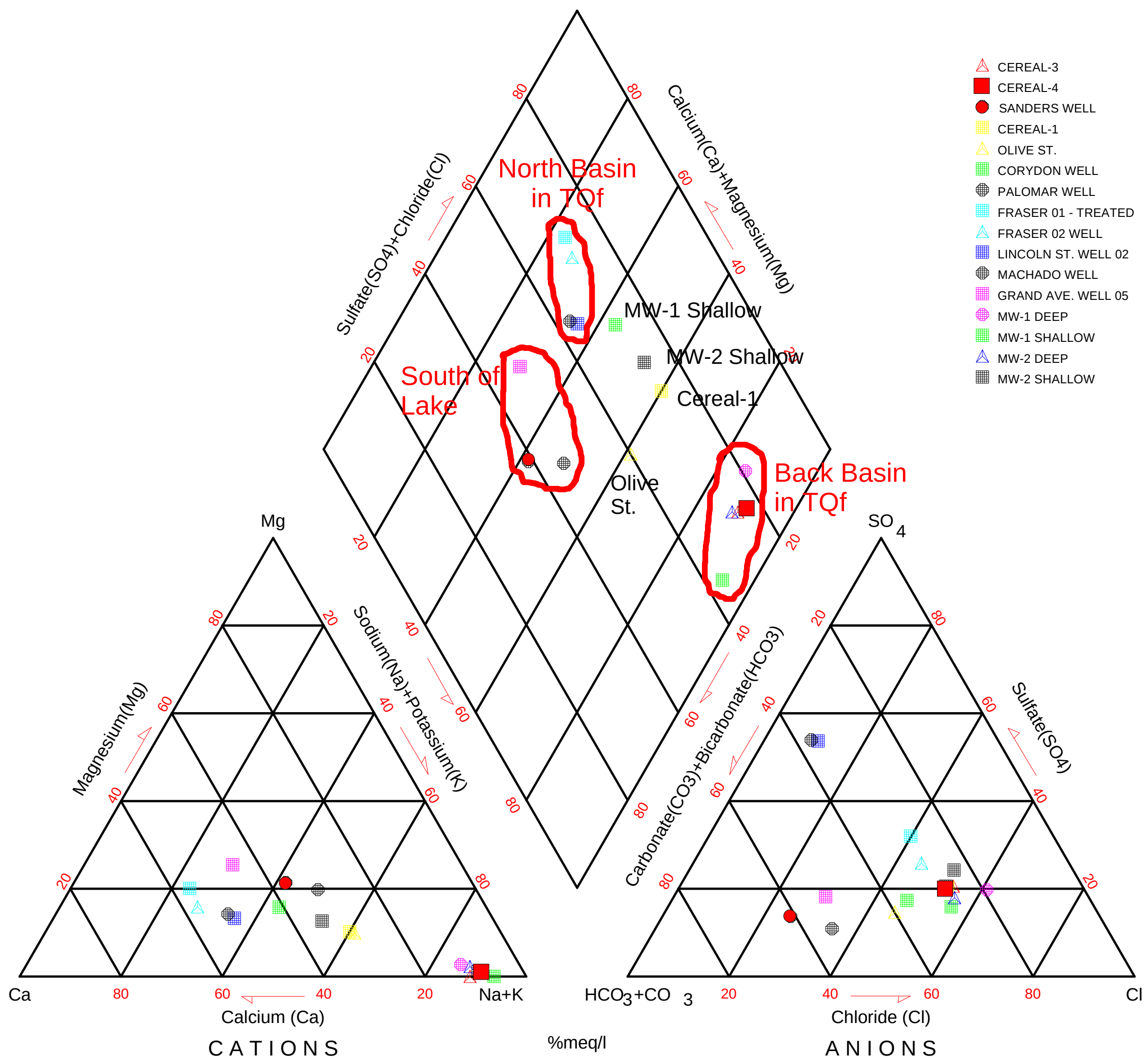


Figure 2-24
Historical Total Dissolved Solids Concentrations in Elsinore Basin Wells

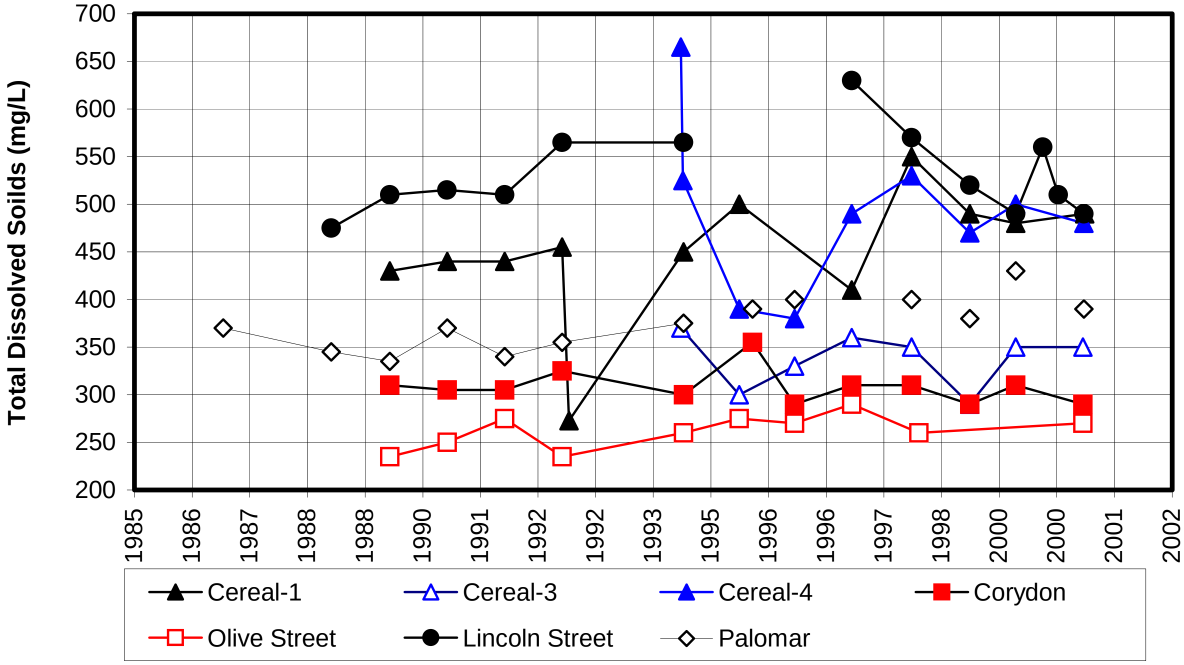


Figure 2-25
Historical Sulfate Concentrations in Wells in the Elsinore Basin

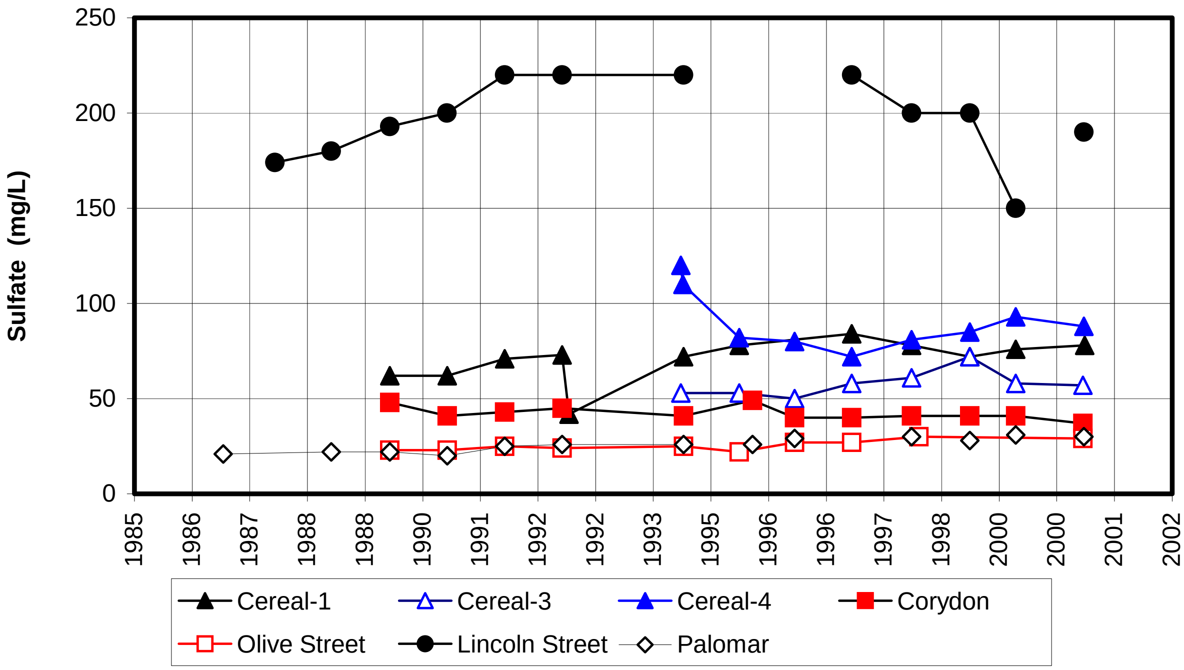


Figure 2-26
Historical Nitrate Concentrations in Wells in the Elsinore Basin

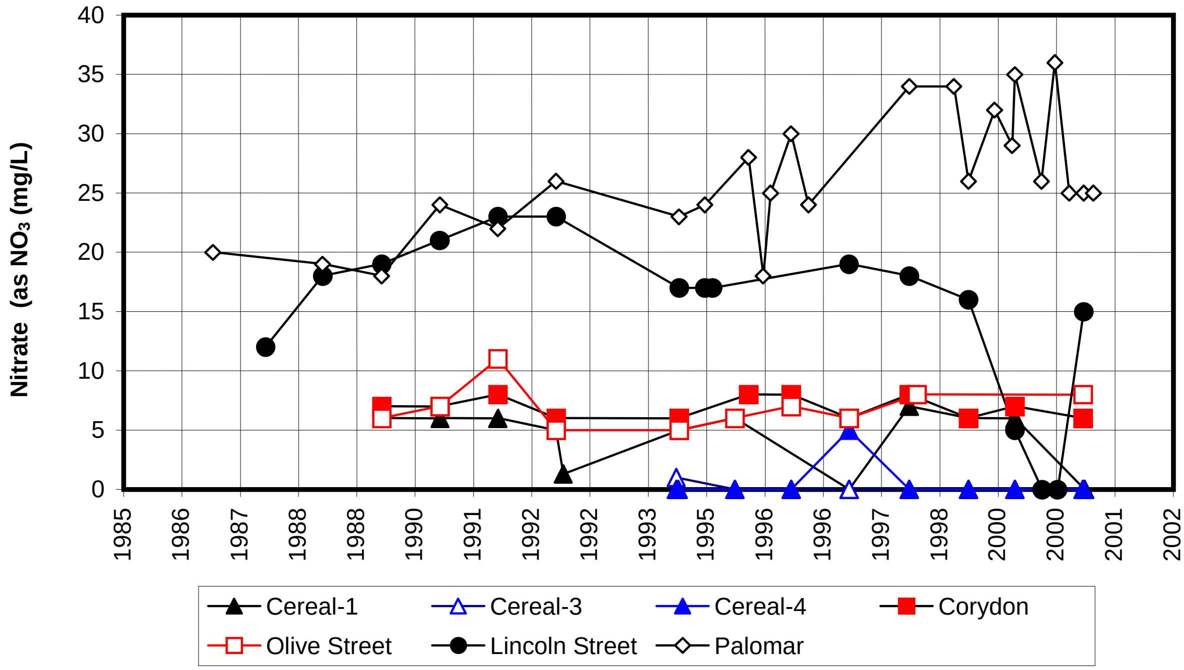
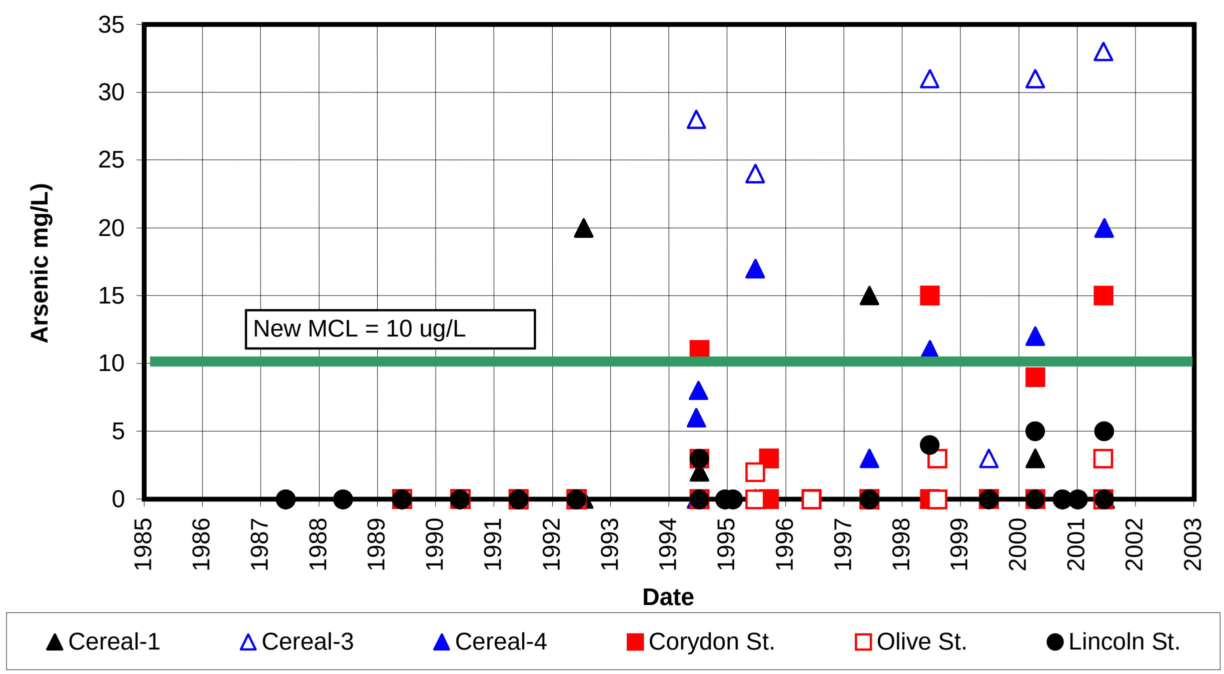


Figure 2-27
Historical Arsenic Concentrations in Elsinore Basin Wells



The higher concentrations of various constituents in the area north of the lake could be a result of historical land use practices in this area. Much of the area north of the lake historically has been an agricultural area. In addition, much of this area was on septic systems, which can result in higher nitrate concentrations in the groundwater. Wells such as Lincoln Street and Machado Street have higher nitrate and sulfate concentrations, which may be related to the prior land use in this area. Shallow wells in the area have also had historically higher sulfate and nitrate concentrations.

SUMMARY

Based upon the data compiled as part of this study, the conceptual understanding of the Elsinore Basin structure has been developed. The alluvium appears to be separated from the Fernando Group by a confining to semi-confining aquitard throughout much of the basin, which restricts downward migration of groundwater into the Fernando Group. Recharge to the alluvium occurs along the margins of the basin through Leach, McVicker and Dickey Canyons and the San Jacinto River. Surface recharge to the Fernando Group is generally limited to the north end of the basin. Faults within the basin, except for the Glen Ivy fault and the Rome Hill fault do not appear to restrict groundwater flow, which allows recharge to occur within the basin.

Based upon vertical and lateral variations in water level throughout the basin, the following observations are made:

- Water levels are generally declining in the Back Basin in both the alluvium and the Fernando Group
- Water levels are generally stable in the area north of the lake
- Water levels in the alluvium are generally higher than in the Fernando Group, which suggests the presence of a confining or semi-confining unit between the Fernando Group and the overlying alluvium.
- Groundwater flow is generally from the area north of the lake to the Back Basin

Lateral and vertical variations in water quality are also observed. General observations made from these data include:

- TDS (caused by higher nitrate and sulfate) is generally higher in the area north of the lake and along basin margins than in the Back Basin
- Highest concentrations of TDS, sulfate and nitrate are found at the Lincoln Street Well
- Lowest concentrations of TDS and sulfate are found in the Olive Street Well
- Highest concentrations of nitrate are found in the Palomar Well and these concentrations appear to be increasing.

The average groundwater deficit between 1990 and 2000 was approximately 1,800 acre-ft/yr. This estimate is generally consistent with the observed decline in groundwater levels during this time period in the Back Basin area.

These data are used as inputs to the numerical groundwater model, which is discussed in **Section 3**.

Section 3
Groundwater Model

This section describes the development of the groundwater model for the Elsinore Basin. This report includes:

- Model layer definition, including thickness and horizontal extent
- Geologic fault definition
- Aquifer parameters, including vertical and horizontal conductivity and storativity
- Results of model calibration.

The purpose of the groundwater model is for use as a groundwater resource planning tool. The model is able to quantitatively evaluate aquifer responses to induced stresses and proposed groundwater use scenarios.

MODEL CONSTRUCTION

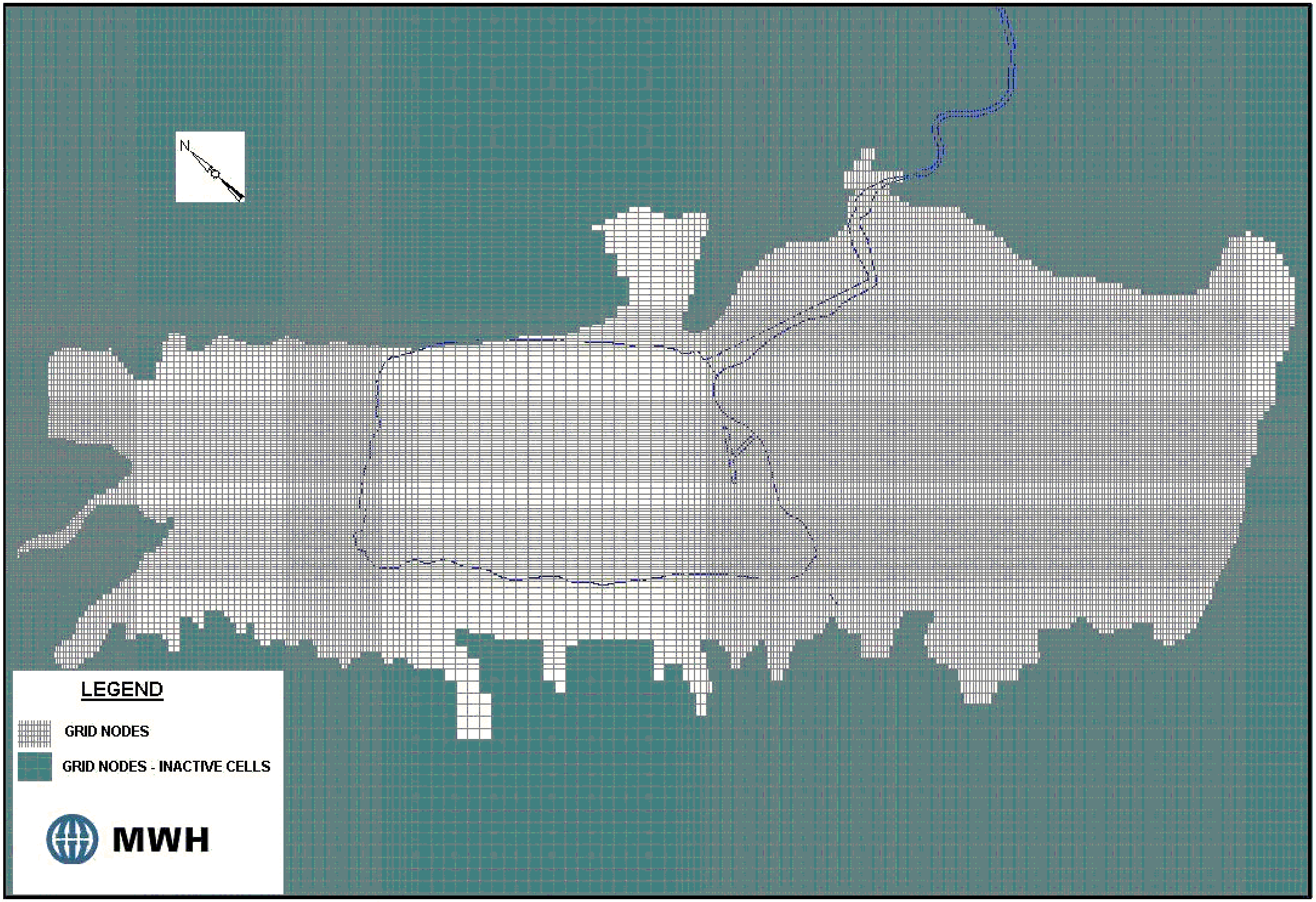
In general, a numerical model approximates groundwater flow conditions for a groundwater system based upon conceptual model aquifer parameters, groundwater flow conditions and proximal groundwater quality. Flow model construction and calibration simulations are undertaken using Visual MODFLOW Pro 3.0 (Waterloo Hydrogeologic, 2002), a graphical interface to MODFLOW. Visual MODFLOW Pro is a commercially available, three-dimensional, block-centered, finite difference simulator of groundwater flow and contaminant transport. MODFLOW is an industry standard, numerical groundwater model developed by the United States Geological Survey (USGS). The model created for use in the Elsinore Basin does not include a water quality assessment. However, future updates of the model may include water quality assessments. This section describes the model domain, model layer discretization, aquifer parameters, boundary conditions and hydrologic stresses.

Model Domain

The model domain, shown on **Figure 3-1**, is an area of approximately 80 square miles, of which approximately 25 square miles (white area) centered on Lake Elsinore are comprised of active cells located within the groundwater basin. Cells in the remaining area lie outside the groundwater basin boundary, and these are assigned inactive status during creation of the model.

The horizontal model domain is comprised of a grid of rectangular computational cells oriented with its principal axes coincident to the predominant direction of groundwater flow (northwest to southeast) within the basin. The dimensions of the domain are 36,880 feet perpendicular to the predominant groundwater flow and 60,340 feet parallel to the predominant groundwater flow direction. As mentioned previously, appropriate computational cells within the model domain are made inactive in areas outside the active groundwater flow system.

Figure 3-1
Model Domain and Grid Discretization



The active model domain is 26,320 feet perpendicular to predominant groundwater flow and 51,740 feet parallel to the predominant groundwater flow direction. The rectangular grid spacing varies, with areas of enhanced numerical interest (near pumping wells, faults, etc.) having grid dimensions of approximately 115 by 120 feet. Coarser grid spacing is present away from those regions, with maximum grid spacing approximately 480 by 460 feet. Overall, the active model grid is comprised of 98 rows and 311 columns.

The model is discretized vertically into four layers. However, all five hydrostratigraphic units present in the basin are represented in the model, as explained below.

Model Layer Discretization

Vertical discretization of the model layers reflects the conceptual model of the basin, which is discussed in detail in **Section 2**. The flow model of the groundwater basin is comprised of four model layers (see **Figure 3-2**), with hydraulic characteristics generally as follows:

- Layer 1 - shallow aquifer composed of alluvium (Qal) and Older Alluvium (Qt)
- Layer 2 – localized clay aquitard underlying the shallow aquifer (Aqt)
- Layer 3 – Fernando Group (TQf)
- Layer 4 – Bedford Canyon Formation (bcb)

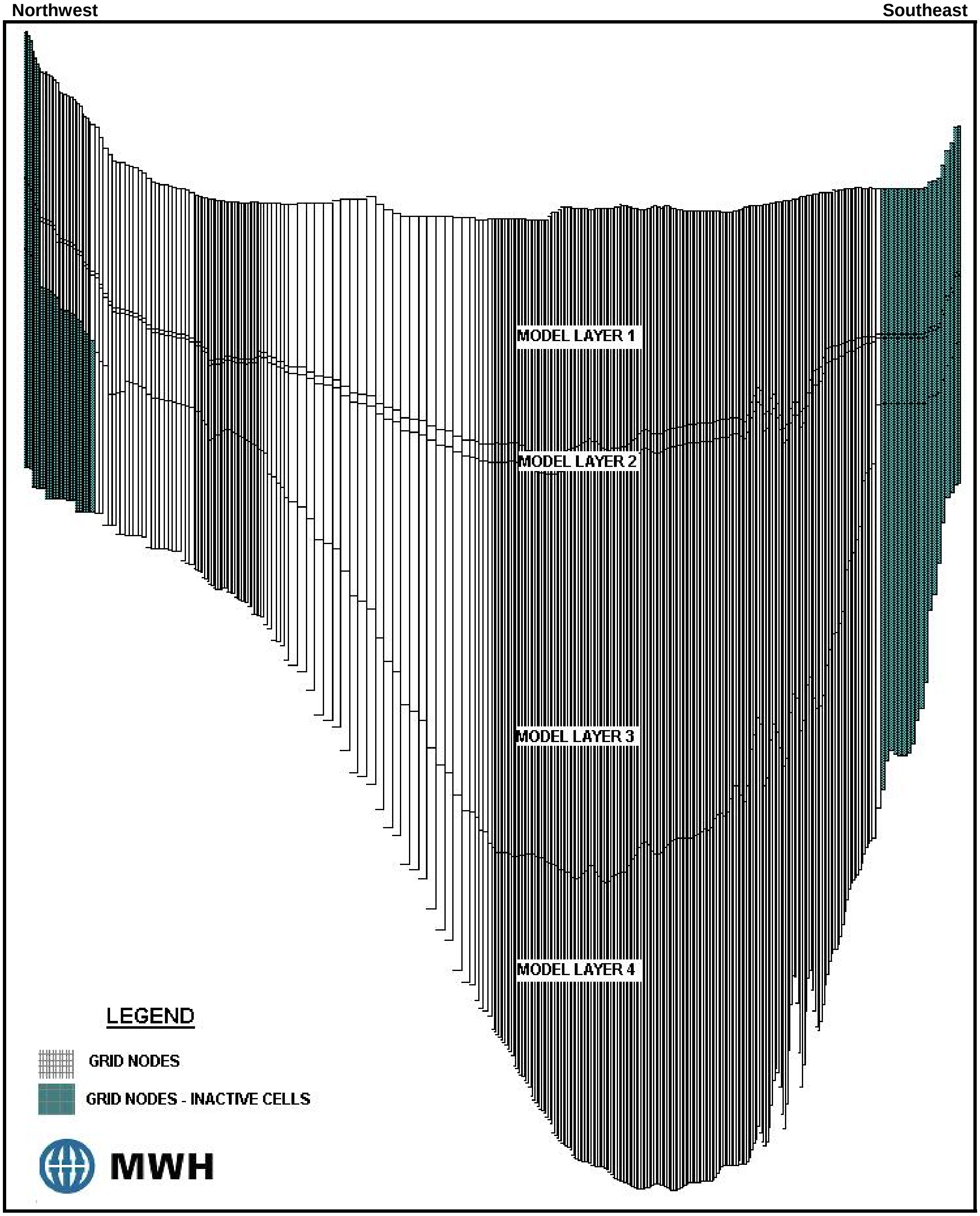
Figure 3-2 shows a longitudinal cross section through the model domain to illustrate the model layers. Model Layer 1, the shallow alluvial aquifer, is generally laterally continuous in the active model domain, except in the Back Basin area where the Fernando Group is exposed at the ground surface due to faulting. With similar hydraulic properties, the Qal and Qt map units (**Section 2**) are combined into undifferentiated alluvium (Qa) for modeling purposes. Comprised of interfingering sands and clays, the alluvium is second to the Fernando Group in importance as a source of groundwater supply in the basin. The thickness of this unit exceeds 300 feet in parts of the basin.

Model Layer 2, the clay aquitard, appears to be laterally continuous in the graben area defined by the Glen Ivy and Wildomar faults. However, outside the graben, the aquitard is typically not present. The aquitard thickness approaches 100 feet or more in the western part of the basin. Where the Fernando Group is found at the ground surface, the aquitard is locally absent. Water level data suggest that the aquitard, where present, is a confining unit to the underlying Fernando Group.

Model Layer 3, the Fernando Group (TQf), is composed of poorly sorted granitic sands, cobbles and boulders. With a saturated thickness approaching 1,200 feet in places, the Fernando Group is the most important source of groundwater in the basin. Due to the complex geologic structure and depositional history of the basin, including numerous faults and periods of erosion and/or non-deposition, the Fernando Group is not laterally continuous in the basin. In general, the lateral extent, as ascertained from borehole data, is defined by the graben area between the Glen Ivy and Wildomar faults referred to previously.

Figure 3-2
Longitudinal Cross Section Through Flow Model

(vertical exaggeration 25X)



Consequently, where the Fernando Group is present at the ground surface (due to faulting in the Back Basin area for example), its hydraulic properties are assigned to Layer 1 in that area even though Layer 1 is assigned hydraulic properties of the undifferentiated alluvium elsewhere. Likewise, in areas of the basin where the aquitard is thin or not present, such that alluvium directly overlies the Fernando Group, Layer 2 is assigned hydraulic properties pertaining to the Fernando Group even though in the remainder of the model Layer 2 is assigned hydraulic properties of the aquitard. This technique is also used as necessary to assign hydraulic properties of the undifferentiated granitic basement rocks to Layers 2, 3 and 4 outside the graben area.

Model Layer 4, the Bedford Canyon Formation (bcb), is described as interbedded slate and sandstone. It does not yield significant quantities of groundwater to wells. Like the Fernando Group, its presence appears to be largely fault-controlled. Therefore, in the model, the Bedford Canyon Formation is predominately found within the graben area between the two major fault systems (Rome Hill and Wildomar), except in the structurally complex Back Basin area (e.g. Rome Hill fault area). The base of the flow model is the base of Layer 4. Depending on the location within the model, Layer 4 is assigned hydraulic characteristics of either the Bedford Canyon or the undifferentiated basement rocks described below.

The base of the flow model in the area generally between the Wildomar and Glen Ivy faults is considered to be the top of the undifferentiated granitic basement rocks. Elsewhere the zone of hydraulic conductivity representing the basement rocks may be present in Model Layers 2, 3 or 4 where faulting or nondeposition of overlying units has juxtaposed alluvium with underlying basement rocks. While the hydraulic conductivity of the basement rocks is considered to be several orders of magnitude less than that of the overlying formations, the unit does yield small amounts of groundwater to wells where fractures or weathered zones are present.

The elevations of the bottom of model layers are based on cross sections A-A’, B-B’, and C-C’ found in **Section 2** (**Figures 2-6 through 2-8**), as well as borehole data compiled by MWH. In addition, structure contour maps showing approximate elevations of the base of the four hydrostratigraphic units are generated using available borehole data (**Appendix D**).

Naturally, fault-induced displacements of up to hundreds of feet can create challenges for any contouring algorithm that is used to generate layer bottom elevations as input to a model. For that reason, layer bottom elevations in the model should only be considered as rough approximations in areas where the geologic structure is complex, i.e. near the faults.

Based on Cross Section A-A’ in **Section 2** (**Figure 2-6**), the Fernando Group and Bedford Canyon Formation exhibit the greatest saturated thickness in the Back Basin area, specifically in the vicinity of the Cereal-3 and Cereal-4 wells. A representative longitudinal cross section showing the four layers of the model is shown in **Figure 3-2**. A four-layer model allows stresses to be simulated in a specific layer, as appropriate, given the completion depths of the extraction wells within the model domain.

Aquifer Parameters

Aquifer parameters are based upon data compiled as part of this investigation as described in **Section 2**. **Figure 3-3** shows the lateral distribution of hydraulic conductivity assigned to Model

Layer 1 (top of figure) and Model Layer 3 (bottom of figure), which are the primary waterbearing formations in the basin. The color-coded zones correspond to different values of hydraulic conductivity (K) and storativity.

The white and green zones represent regions consisting predominately of alluvium; green, purple, and blue represent the Fernando Group; red indicates the Bedford Canyon Formation; and teal represents the undifferentiated basement rocks. Because the colors indicate similar hydrogeologic properties, colors in different zones may be the same. The spatial distribution in all layers, as well as the model input values, reflect data gathered from borehole logs, aquifer pumping tests, well specific capacity information, and values estimated from the literature.

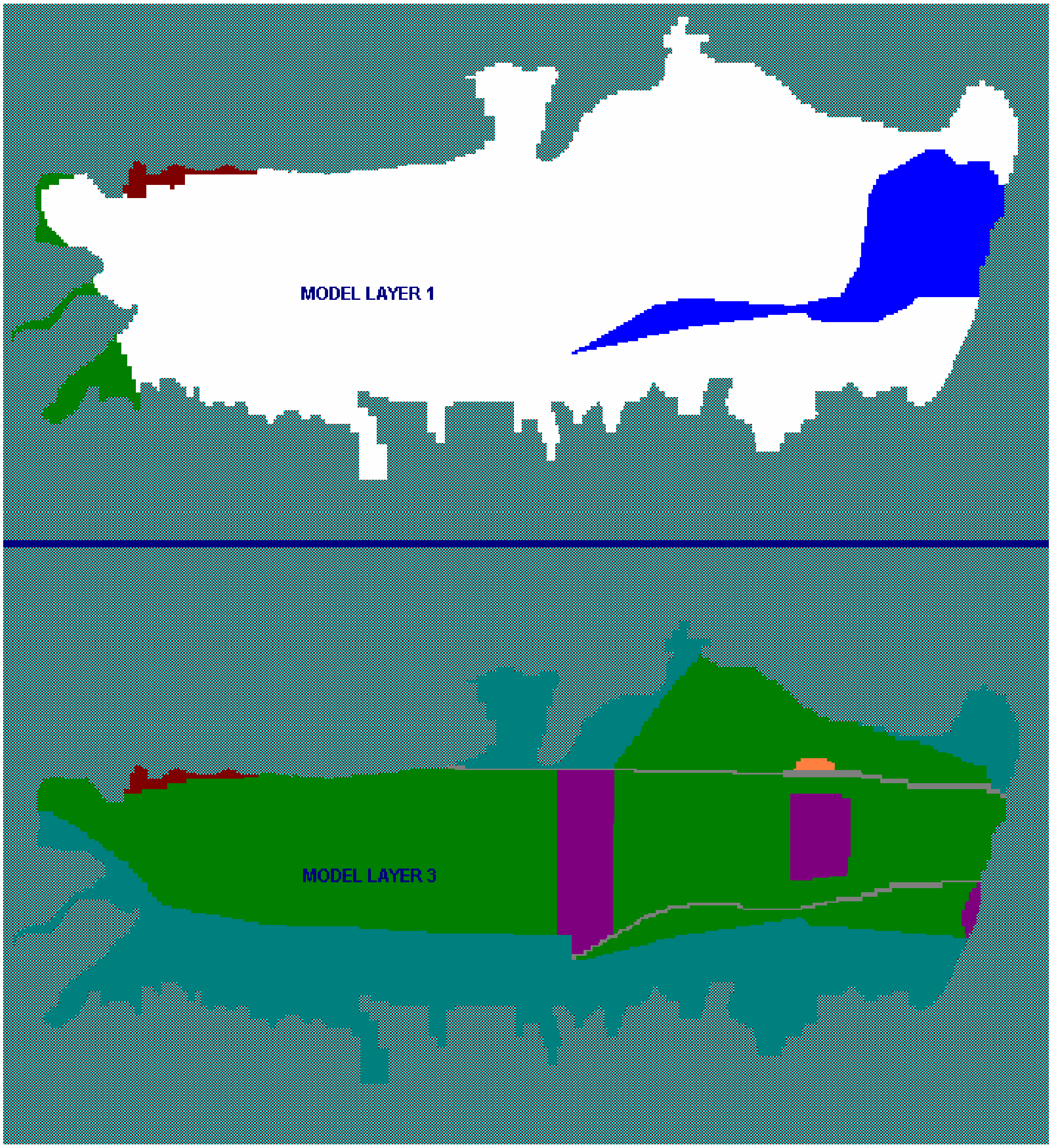
Other hydraulic characteristics that are assigned to the color-coded zones are explained below and are summarized in **Table 3-1.**

- Model Layer 1 is assigned a horizontal to vertical hydraulic conductivity (K_H:K_V) anisotropy ratio varying from 3:1 to 100:1. Isotropic horizontal hydraulic conductivity values are assumed.
- A horizontal to vertical hydraulic conductivity anisotropy ratio of 100:1 is used for Model Layer 2, reflecting the higher proportion of clays in the aquitard. Isotropic horizontal hydraulic conductivity is also assumed for this model layer.
- A horizontal to vertical hydraulic conductivity anisotropy ratio varying from 3:1 to 100:1 is used for Model Layer 3.
- Specific storage values ranging from 10^{-6} to 10^{-3} ft^{-1} are assigned to the various zones. For specific yield, values ranging from 0.05 to 0.20 are used, depending on the layer and formation represented.

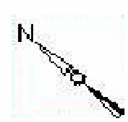
Table 3-1
Aquifer Property Model Input Parameters

Hydrostratigraphic Unit	Model Hydraulic Conductivity			Model Specific Storage (1/ft)	Model Specific Yield	Model Effective Porosity
	Kx (ft/day)	Ky (ft/day)	Kz (ft/day)			
Alluvium	20 3.0	20 3.0	2.0 1.0	10^{-5} 10^{-5}	0.15 0.15	0.20 0.20
Clay aquitard	0.01 0.01	0.01 0.01	0.001 10^{-5}	10^{-6} 10^{-6}	0.05 0.05	0.05 0.05
Fernando Group	3.0 3.0 5.0	3.0 3.0 5.0	1.0 0.03 1.0	10^{-4} 10^{-3} 10^{-5}	0.1 0.1 0.2	0.10 0.10 0.2
Bedford Canyon Formation	0.5	0.5	0.1	10^{-6}	0.10	0.10
Undifferentiated Basement	0.001	0.001	10^{-5}	10^{-6}	0.10	0.10
Rome Hill and Willard Faults	0.001	0.001	10^{-4}	10^{-6}	0.10	0.10

Figure 3-3
Hydraulic Conductivity Distribution, Model Layers 1 and 3



Hydraulic Conductivity (feet/day)				
Color	Horizontal	Vertical	Geologic Formation Model Layer 1	Geologic Formation Model Layer 3
	20	2	Alluvium	N/A
	3	0.03	Fernado Group	N/A
	3	1	Alluvium	Fernando Group
	0.5	0.1	Bedford Canyon	Bedford Canyon
	0.5	0.1	N/A	Fernando Group
	5	1	N/A	Fernando Group
	0.001	0.00001	N/A	Basement
	0.001	0.0001	N/A	Faults
	N/A	N/A	N/A	Inactive Zone



MWH

Historical water level data suggest that the aquitard forms an effective hydraulic barrier between the alluvium and underlying Fernando Group. Hydraulic heads are typically higher in the alluvium. Many of the wells in the basin are completed into more than one aquifer, which masks the actual formation-specific head elevation at those locations.

Boundary Conditions

As summarized in the water budget discussion in **Section 2**, subsurface inflows and outflows of groundwater to/from the basin are insignificant due to physical boundaries present at the basin perimeter. As a result of the geologic structure, the basin is surrounded and underlain by essentially impermeable rocks. Therefore, except for occasional inflows from the San Jacinto River, the Elsinore Basin can be considered a closed groundwater basin. In the model, inactive cells are placed in the domain outside the groundwater basin boundary to simulate the physical barriers to groundwater flow. The basin boundary, therefore, is considered a no-flow boundary. In addition, a no-flow boundary is present at the bottom of Model Layer 4. No constant-head boundaries are used in the model.

Basin recharge (net of evapotranspiration) in the form of infiltration from precipitation, irrigation return flows, and septic system effluent are applied at variable rates in sixteen discrete zones over the entire active domain of the model (as described in **Section 2**). Each polygon is assigned its own set of monthly net recharge values. These sources of recharge are applied according to rates obtained from groundwater balance over a period of approximately 11 years (water year 1990 through water year 2000 as defined in **Section 2**). Inflows to the basin from the San Jacinto River are applied over the same time period in a discrete area of the riverbed within the model domain. San Jacinto River inflow is modeled using the recharge boundary condition within Visual MODFLOW. Lake Elsinore is not considered a significant source of recharge to the groundwater system.

Hydrologic Stresses

Groundwater is pumped primarily from the alluvium and Fernando Group at several locations within the groundwater basin. Groundwater extraction occurs primarily from municipal wells operated by the EVMWD and EWD, as indicated in **Table 3-2** and on **Figure 3-4.** Total extraction volumes average approximately 7,900 acre-ft/yr between 1990 and 2000. Historical monthly extraction rates from the EVMWD wells are highly variable. Pumping rates in the Back Basin have slowly declined during 1990 to 2000 due to a decline in the potentiometric surface in the Back Basin. Regional groundwater flow inside the basin is toward the southeast (toward the Back Basin area) where several water district wells are clustered.

Table 3-2
Summary of Wells in Flow Model

Well Identification	Water Bearing Formation	Type of Well	Used in Calibration?
Cereal 1	Alluvium and Fernando Group	Pumping	Yes
Cereal 3	Alluvium and Fernando Group	Pumping	Yes
Cereal 4	Alluvium and Fernando Group	Pumping	Yes
Corydon	Fernando Group	Pumping	Yes
Lincoln #2	Fernando Group and Bedford Canyon	Pumping	Yes
Olive St	Fernando Group, Bedford Canyon and Basement rocks	Pumping	Yes
Palomar	Fernando Group	Pumping	Yes
Fraser #2	Fernando Group	Pumping	No
Grand Well	Not available	Pumping	No
Sanders Well	Basement rocks	Pumping	No
Showboat	Alluvium	Pumping	No
Wood Street #2	Alluvium and Basement rocks	Pumping	No
Wood Well	Alluvium and Basement rocks	Pumping	No
North Island	Fernando Group	Non-pumping	Yes
South Island	Fernando Group	Non-pumping	Yes

MODEL CALIBRATION

Within Visual MODFLOW, the user has a choice of five mathematical solvers that can be used to calculate the series of equations developed during solution of the groundwater model flow simulation. For groundwater flow simulations performed during model calibration, the Waterloo Hydrogeologic Software (WHS) numerical solver is used to calculate simulation results. The WHS Solver is an iterative, bi-conjugate gradient routine that solves the large system of equations using both inner and outer iteration levels. Overall, the WHS solver is found to be stable and accurate in its solution of the sets of equations to be solved by the problem posed.

Because of the complexity of the basin and interactions of the faults and uncertainty in the data, the model is considered calibrated if calculated heads are within 100 feet of the actual heads for key wells and matched the overall water level trends over the calibration period.

Figure 3-4
Calibration and Pumping Well Location Map

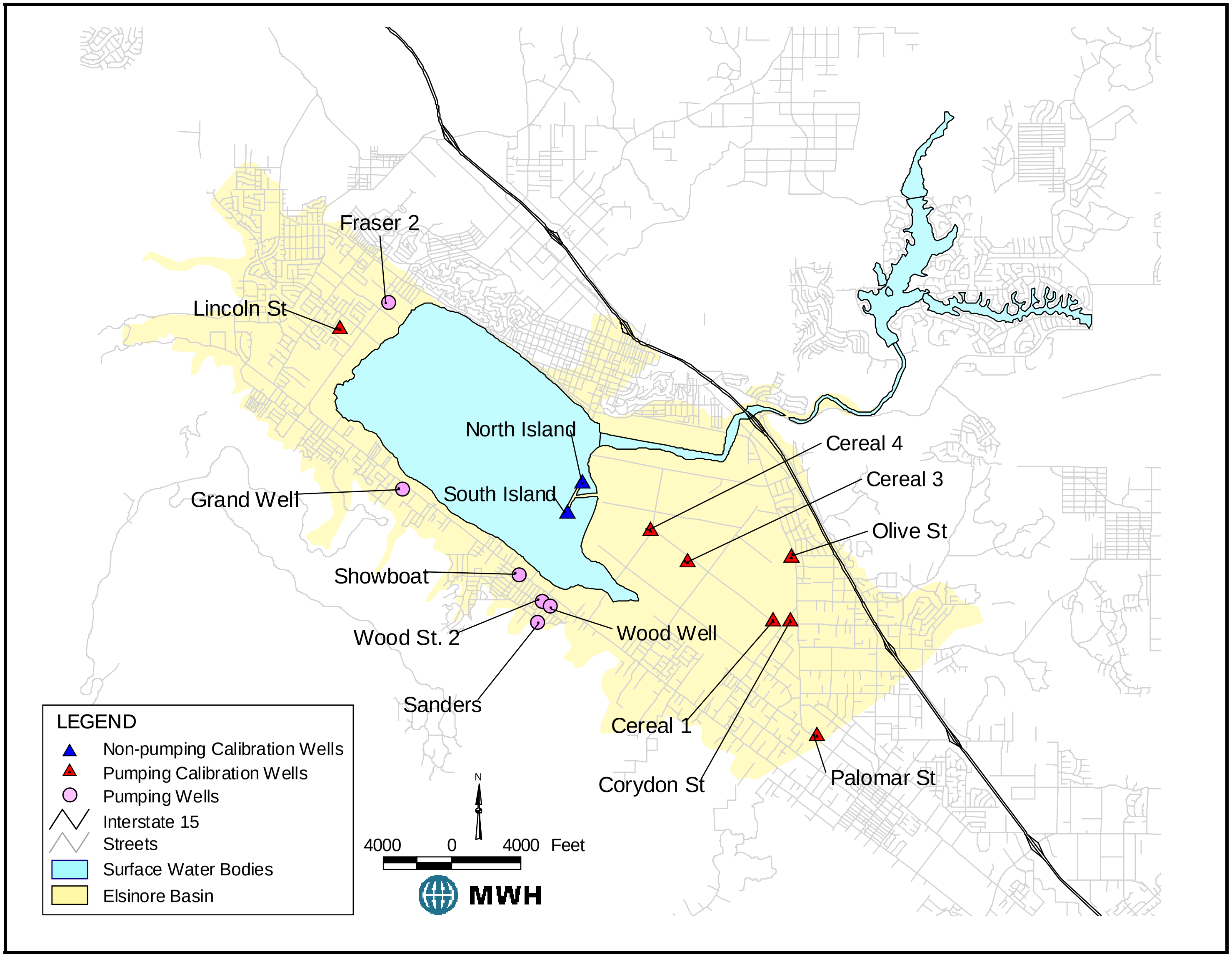
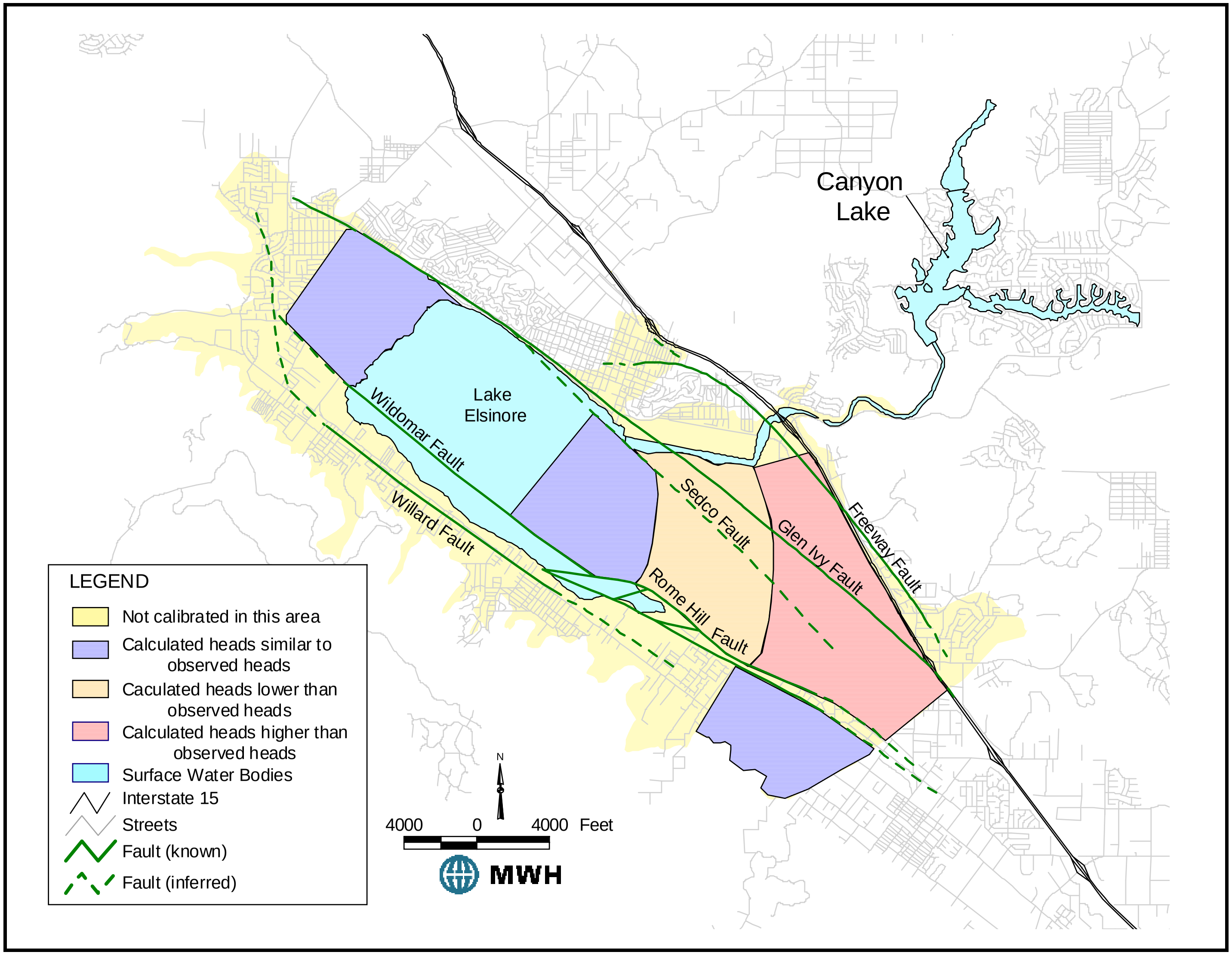


Figure 3-5
Relative Goodness of Fit for Groundwater Model



Calibration Wells

The seven EVMWD municipal wells listed in **Table 3-2** are used as calibration wells in the model. Measured water levels under pumping and static conditions comprised the calibration target values. In addition, the North Island and South Island wells are used as calibration wells in the model. The locations of wells utilized for model calibration as well as other pumping wells in the basin are shown on **Figure 3-4**.

Results

Calibration results for the calibration wells in Layer 3 are provided in **Appendix E**. The use of pumping wells for calibration purposes complicates calibration evaluation because of error induced by numerical limitations. In Visual MODFLOW, the extracted volume of groundwater is spread over the entire horizontal computational cell, thereby damping the numerical response of the model to changes in pumping rates. For example, measured pumping heads may decrease faster than calculated heads when increasing the extraction rate of a well. Conversely, measured pumping heads may increase faster than calculated heads when decreasing the extraction rate of a well. During model simulations, extraction rates are varied instantaneously on a monthly basis. Because of these numerical limitations, calibration plots at the non-pumping North and South Island wells are closely monitored as the best approximation of model calibration.

Appendix E also presents model calibration plots of calculated versus observed head (static and pumping) data for 1990 through 2000 and for individual years 1991 through 2000. The figures show that calibration improves with the later years, likely corresponding with an improvement in observed data quality. To verify that the groundwater model is predicting the same groundwater deficit as is presented in the conceptual model, a mass balance is calculated and evaluated for the entire model domain. The overall mass balance for the calibration period is shown in **Appendix E**. Overall, the water mass balance calculated by the model closely matches with the water budget presented in the conceptual model (**Section 2**).

Calibration plots are presented for wells going from northwest to southeast. A brief summary of calibration results for each well follows.

Lincoln Street Well

Calculated head levels are shown to change with variation in pumping rate and recharge. However, because the actual static levels increase with time and the pumping levels decrease with time, it is difficult to ascertain the actual trend in this area of the basin based upon the trend of Lincoln Street. In addition, reliable data are not available for this well prior to 1992. Based upon data from other wells near the Lincoln Street well (e.g. Machado Street well, Fraser 2 and Wisconsin well), the water levels appear to be relatively stable in this area. Therefore, the trend in water levels predicted for the Lincoln Street Well appears to be consistent with observed data.

North Island Well

Calculated head levels closely match observed static head data. The North Island well is a non-pumping well and provides more reliable calibration data for the basin. Data are not available for this well from early 1990 through 1992. Calculated heads for this well do not match observed trends particularly well during the El Niño event of 1992-93. This may be due to a variety of factors including: construction of the lake levee in 1995 that changed the hydrology of the basin or underestimating the amount of groundwater recharge based on averaging the El Niño rainfall event over the six month stress periods in 1993/94. However, the calculated data match well with the observed data post-1995. Therefore, the model appears to be well calibrated in this area of the basin.

South Island Well

Calculated head levels closely match observed static head data. The South Island well is a non-pumping well and, like the North Island well provides reliable calibration data for the basin. Data are not available for this well from early 1990 through 1992. Like the North Island well, calculated heads for this well do not match observed trends particularly well during the El Niño event of 1992-93. The calculated data match well with the observed data post-1995, however. Therefore, the model appears to be well calibrated in this area of the basin.

Cereal 4 Well

The trend of the calculated heads closely matches the trend of the observed data. Calculated head values generally deviate less than 20 feet from observed pumping head data. This well was constructed in 1991 so limited data are available prior to 1992. Since 1995, calculated trends track well with observed trends.

Cereal 3 Well

The trend of the calculated heads closely matches the trend of the observed data. Calculated head values generally deviate less than 30 feet from observed pumping head data. This well was constructed in 1991, so limited data are available prior to 1992. Since 1995, calculated trends track well with observed trends, although calculated water levels are generally lower than the observed water levels.

Cereal 1 Well

Calculated heads match the observed trend and are generally lower than static levels and higher than pumping head levels. The trend in this well is difficult to match because this well is used as a standby well and does not operate continuously during the month. For modeling purposes, an average monthly pumping rate is assumed, which results in higher head levels than observed. However, the trend is matched more closely after 1997 when this well was used more frequently and the average monthly pumping is more representative of the pumping from this well. Therefore, although the calculated heads do not match exactly with the observed heads, it appears to match well with the overall trend in the basin.

Corydon Well

The calculated heads for the Corydon well are generally higher than the observed heads by more than the 100-foot criterion. Repeated attempts to match data at the Corydon well have been unsuccessful. It is unclear if this is because of unknown geologic heterogeneity or if the measured data are suspect. Because the Corydon well is close to a fault boundary (Sedco fault) and the southern edge of the groundwater basin, it is difficult to determine if there may boundary effects that may impact the ability to calibrate to this well. In addition, the difference between observed static and pumping levels is relatively low and is not consistent with pump test data for this area. This suggests that the well may not be completely recovered when static water levels are taken and that the water levels recorded are largely dependent upon when the water levels are taken. This uncertainty makes calibration in this area difficult.

Olive Street Well

The measured pumping and static head data for the Olive Street well vary considerably, often by 200 feet or more during singular gauging events. Calculated variations between pumping and static data match this trend. Because the Olive Street well has been off-line for bacterial problems, it is used on an infrequent basis, which results in the large variations in water levels. Because of this, it is difficult to calibrate to absolute water levels for this well. Rather, trends in the data and fluctuations between on and off cycles are used to determine suitability of fit. Overall, the calculated head values generally match this fluctuation. However, like the Corydon Street well, this calculated heads are generally higher than the actual pumping heads.

Palomar Well

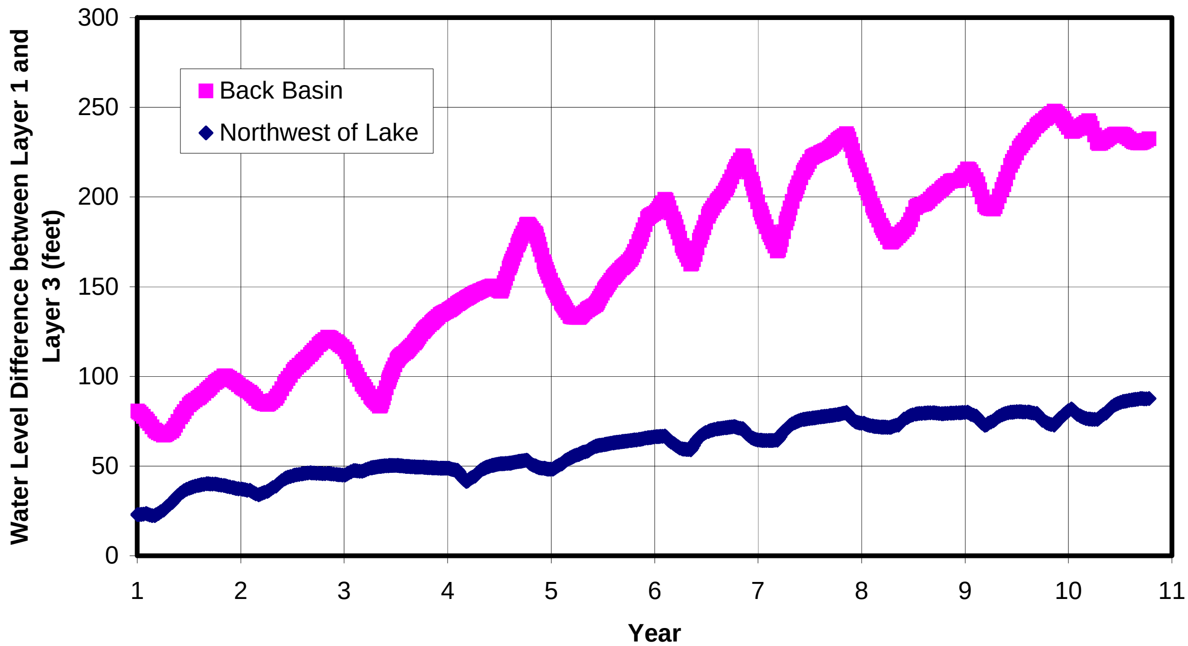
Calculated heads generally match the decreasing trend and values of the observed data. This area is generally well calibrated.

Calibration Analysis

A summary of the goodness of fit for the model area is provided on **Figure 3-5**. This figure shows the relative calibration error in qualitative terms. Where limited calibration data are available such as the margins of the basin, south of and beneath Lake Elsinore (areas shown in yellow), caution should be exercised in interpreting modeling results. In general, the model performs relatively well in the northwest portion of the basin, near the Island wells, and in the southeast portion of the basin near the Palomar well and differences in the calculated heads and the observed heads are generally much less than the 100-foot criterion. In the area between Cereal-4 and Cereal-3 in the Back Basin, calculated heads are generally lower than the observed heads. On the other hands, calculated heads are higher in the area east of Cereal-1. This area will need to be evaluated further.

Because of a lack of data available in the alluvium (Layer 1) for comparison over the calibration period, it is difficult to discern the accuracy of the groundwater flow model in the alluvium. As discussed in **Section 2**, the difference in head between the alluvium (Layer 1) and the Fernando Group (Layer 3) is on the order of 200 feet in the Back Basin area. In the northwest part of the basin, this difference is less. As shown in the contour map provided in **Appendix E** and the head summary shown on **Figure 3-6**, the calculated head in Layer 1 is generally consistent with these observations.

Figure 3-6
Modeled Difference in Water Level Between Layer 1 and Layer 3



Additional monitoring well data in the alluvium will be needed to calibrate the head changes in Layer 1.

Sensitivity Analysis

During model calibration, the sensitivity of the model results to variations in key parameters (e.g. definition of faults, aquifer parameters, pumping rate, and recharge rates) is evaluated.

In the Back Basin area, the model is very sensitive to whether the Glen Ivy and Rome Hill faults are simulated to restrict groundwater flow. At one extreme, simulating these faults as not restricting flow results in inaccurate calculated head levels at the following wells: Olive Street, Corydon, and Cereal 1. Calculated heads at Corydon Street and Cereal 1 are on the order of 100 to 200 feet higher if the faults are not modeled as barriers than if they are modeled as barriers to flow.

Water levels in the Back Basin area are less sensitive to other parameters such as hydraulic conductivity or storativity. Calibration simulations in other portions of the basin show that the model is moderately sensitive to the magnitude of storage parameter specified. As is the case with many transient models, storage parameters are obtained from the literature for each specific soil/rock type and are adjusted during calibration runs.

Because most of the available calibration data is obtained from pumping wells, model calibration is extremely sensitive to assigned extraction or injection rates. During model calibration, pumping rates are averaged and assigned as monthly values. This averaging introduces error into calculated head values because the instantaneous pumping rate is not used. Due to the use of the pumping wells as calibration points, any deviation in modeled pumping rate from the actual instantaneous rate would result in a difference in calculated head and measured head data. Even for a properly calibrated model with minimal geologic uncertainty, the use of pumping wells to evaluate model calibration is fraught with difficulties.

Except along the margins of the basin, the model is minimally sensitive to net recharge. Recharge input is "averaged" both temporally and spatially over a 6-month period, which attenuates peaks and valleys in net recharge that enters the groundwater flow domain. Spatial averaging occurs by the use of rainfall, runoff and septic data on a subregional basis. The overall effect is that net recharge input is "smoothed." Therefore, peaks in data would not be captured but the overall trend would be observed. In this regard, the model would only be minimally affected. Future data input that includes recharge specification on a more refined temporal and spatial basis would likely result in improved model response.

Summary

Overall, model calibration is strongly impacted by sparse hydraulic head data of questionable quality and the use of pumping wells as calibration points. Because of the aforementioned limitations, this model should be considered a qualitative predictive tool, useful in the evaluation of aquifer trends in response to aquifer stresses. In order to use the model as a quantitative predictor of absolute aquifer head values, more site hydraulic head data should be collected and used to perform a post-audit of model accuracy.

MODEL LIMITATIONS

The availability and accuracy of site physical data limit computer models. Some limitations of the model are presented as follows:

- The model strives to simulate discontinuous water-bearing formations with widely varying hydrogeologic properties. Due to the complex geology and extensive faulting present in the basin, it is impractical for the model to capture all geologic heterogeneity. Limited site data available during model development does not allow for incorporation of all such possible features.

- With the exception of the Fernando Group, sparse aquifer pumping test data (for determination of hydraulic properties) are available for the hydrostratigraphic units. Consequently, model input hydraulic characteristics for the alluvium, aquitard, Bedford Canyon Formation and basement rocks are estimated using appropriate values, which are then adjusted during model calibration.

- The limited number of calibration wells (nine) within the 25 square mile groundwater basin limits the evaluation of model calibration. Sufficient data over the calibration period is not available for the alluvium formations.

- Some wells have screens across multiple water-bearing formations. This complicates model calibration because it is difficult to determine how much of the flow comes from each formation prior to calibration.

Although the groundwater flow model has inherent limitations, it can be effectively used to predict general trends in aquifer reaction to pumping stresses. Site data is limited; however, data is sufficient in number and accuracy to calibrate the model for use as a predictive tool of aquifer general trends for basin-wide alternatives analysis. Among other uses, the model can be expected to be a good predictive tool to evaluate general trends for proposed groundwater recharge scenarios. However, it should not be used to evaluate site-specific water level variations or be used to evaluate absolute water levels.

The model can be used effectively to evaluate different groundwater recharge scenarios in fulfillment of development of this GWMP. The groundwater model presented herein is a good predictive tool for analysis of aquifer response to induced stresses in the groundwater basin and proposed groundwater use scenarios.

Future updates may be necessary based upon information collected through implementation of the GWMP. In particular, additional groundwater information that is gathered from monitoring wells in the alluvium and the Fernando Group should be included to verify model calibration. The model should be reviewed periodically to verify that it still provides valid information.

SUMMARY AND RECOMMENDATIONS

This section details the composition of a four-layer, finite-difference groundwater flow model. Software utilized for modeling is Visual MODFLOW Pro 3.0. Overall, calculated head values at observation points match observed trends. The model water mass balance sufficiently matches the water budget presented in the conceptual model in **Section 2**. Also, calculated groundwater flow directions match those presented in **Section 2**.

Data and numerical limitations enact restrictions on the evaluation of model. Data are spatially sparse which limits the extent of the model calibration. Numerically, the use of pumping wells for calibration purposes complicates calibration evaluation because of error induced by numerical limitations and potential errors during the collection of the pumping data (i.e. well was not completely recovered). In Visual MODFLOW, the extracted volume of groundwater is virtually spread over the entire horizontal computational cell, thereby damping the numerical response of the model to changes in pumping rates in that cell. Even with these complications, the groundwater model is useful as a groundwater resource planning tool. The model is able to quantitatively evaluate aquifer responses to induced stresses and proposed groundwater use scenarios. However, caution should be exercised is using the groundwater model to evaluate site-specific or absolute water levels. Rather, it provides a measure of relative performance of various groundwater management options.

Section 4
Baseline Conditions

The review of historical water conditions in **Section 2** indicates that the Elsinore Basin in a state of groundwater deficit today. However, to determine whether these problems will continue, a reasonable estimate of future water conditions is necessary. These conditions include future water demands and the supplies required to meet those demands. They also provide a baseline for developing and comparing the effectiveness of the alternative management plans that are developed in **Section 5**. This section presents a discussion of future supplies and demands anticipated for the Elsinore Basin, the projected water balance and the expected impacts if no management plan were implemented. The section concludes with a discussion of the need for a management plan.

INTRODUCTION

As discussed in **Section 1**, potable water demands are projected to more than double by 2020. **Table 4-1** presents an accounting of the supplies and demands for the Elsinore Basin for existing conditions. Year 2000 data are used throughout this report to reflect current conditions to remain consistent with the estimates provided in the Water Distribution System Master Plan (MWH, 2002). The data presented herein include groundwater pumping from EVMWD, EWD and private pumpers. Total pumping in the Elsinore Basin during 2000 was approximately 8,200 acre-ft. Total water demands were approximately 23,400 acre-ft.

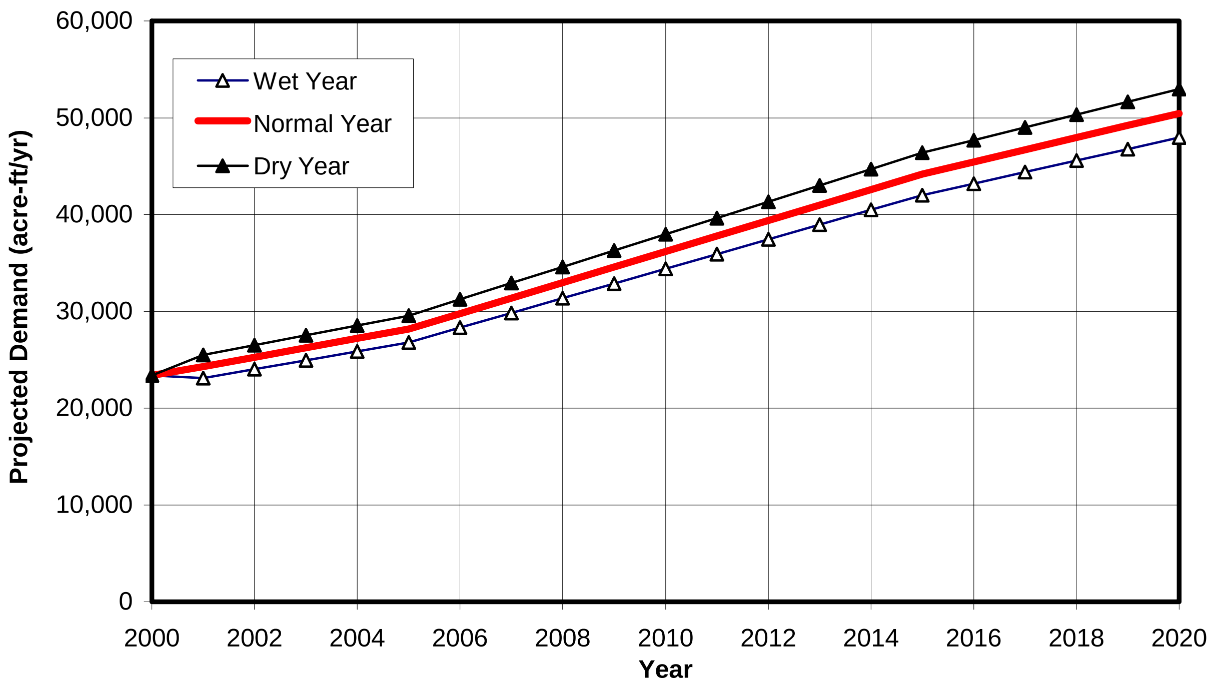
Table 4-1
Potable Water Demands in the Elsinore Basin – Year 2000

Description		Year 2000
Demand	Average Day Demand	23,400
Supplies	Existing Wells [1]	8,200
	Canyon Lake WTP	2,300
	Imported water from MWDSC (Auld Valley)	12,900
	Imported water from MWDSC (Temescal Valley)	0
	Total	23,400
Supply Shortfall		0

1 – Includes EVMWD, EWD and private wells.

Figure 4-1 presents a summary of the projected water demands for the Elsinore Basin through 2020. These projections are based upon the monthly potable demand projections presented in the Distribution System Master Plan (MWH, 2002). The potable demand projections are based upon SCAG population projections through 2025 and the amount of projected development through 2080 as described in the Distribution System Master Plan (MWH, 2002). Based upon discussions with EWD, it is assumed that EWD's demand will remain fixed in the future because its service area is essentially built-out. In addition, the demand for private pumpers is projected to remain constant, as new developments will likely be supplied by EVMWD. This figure shows a range in demand assuming the average annual demand increases approximately 5 percent in dry years and decreases approximately 5 percent in wet years. As such, the potable demand is projected to range from 48,000 acre-ft/yr to 53,100 acre-ft/yr by 2020.

Figure 4-1
Summary of Projected Potable Water Demands through 2020



These projections do not include water demands for non-potable supplies such as recycled water or groundwater not suitable for potable use. As discussed in **Section 1**, recycled water is currently being used in to replenish Lake Elsinore on a pilot basis. Because the feasibility of a basin-wide recycled water system has not been determined at this time, additional studies may be necessary. Based upon a review of the local hydrology, for purposes of this report, wet years occur about 3 out of 10 years, dry years every 2 out of 10 and 5 out of 10 are considered normal years.

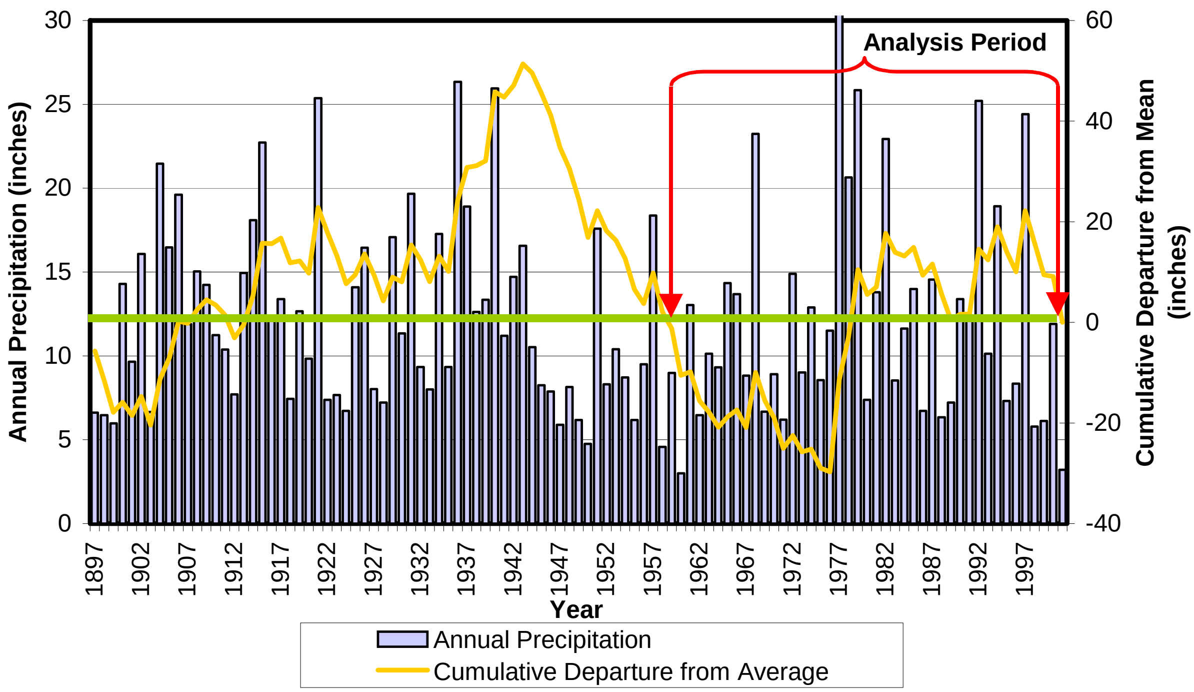
The remainder of this section discusses the future baseline conditions in the basin.

BASELINE CONDITIONS

Projections of future conditions are by their nature approximations and, as such, are frequently based on historical trends or on estimates made by others. In the development of future water demands and supplies, a number of assumptions have been made, as described below. The planning period for the GWMP is the year 2020. However, because the water balance analysis presented in **Section 2** for the historical period 1990 to 2000 suggests that inflows to the basin are currently less than the outflows, it is important to evaluate the groundwater impacts of this situation continuing in the future. Therefore, two future baseline conditions have been developed for this GWMP.

Baseline A simulates current (year 2000) groundwater pumping patterns in the basin. Baseline B simulates expected pumping conditions in the basin in year 2020 without the implementation of any groundwater management activities. To evaluate the potential range in groundwater conditions in the basin, the hydrologic conditions for the period October 1960 through September 2001 are used. This 41-year period represents a period of precipitation that closely approximates the long-term average rainfall and includes a wide range of wet, normal and dry years as shown on **Figure 4-2**. The baseline conditions and the groundwater levels predicted with the groundwater model are described below.

Figure 4-2
Annual Precipitation at Lake Elsinore



This approach of modeling the basin is used to evaluate the baseline conditions and the alternatives because it provides the ability to define the potential range of conditions based upon hydrology given a fixed set of groundwater pumping conditions.

Baseline A – Current Basin Conditions

Baseline A is based on year 2000 conditions for water demands, operating groundwater wells, and the degree of urbanization of the basin area. The purpose of Baseline A is to compare the current pumping conditions with the basin conditions in year 2020 due to increased water demands, increased urbanization (reduced infiltration) and increased groundwater production from additional planned groundwater wells.

Planning Assumptions

The following is a description of the planning assumptions for Baseline A. According to MWDSC, their imported water supply is sufficient to meet projected demands for the next 20 years (MWDSC, 2003). Therefore, supply projections are made assuming that the TVP and the AVP can be used to full capacity when necessary.

Water Demands

The water demands used in Baseline A are the combined year 2000 demands of EVMWD, EWD and the private pumpers. As discussed above, the demand in 2000 was 23,400 acre-ft. If these demands are projected into the future, taking into consideration wet and dry year cycles, current demands would range from 22,300 acre-ft/yr in wet years to 24,600 acre-ft/yr in dry years as shown in **Table 4-2**.

Table 4-2
Potable Water Demands in the Elsinore Basin – Baseline A

Description		Actual 2000 (acre-ft/yr)	Normal Year 2000 (acre-ft/yr)	Dry Year 2000 (acre-ft/yr)	Wet Year 2000 (acre-ft/yr)
Demand	Average Annual Demand	23,400	23,400	24,600	22,300
Supplies	Existing Wells	8,200	9,900	9,900	9,900
	Canyon Lake WTP	2,300	3,000	700	6,600
	MWDSC (AVP)	12,900	6,600	6,600	4,500
	MWDSC (TVP)	0	3,900	7,400	1,300
	Total	23,400	23,400	24,600	22,300
Supply Deficit		0	0	0	0

Water Supplies

To meet the potable demand, the water supplies included in Baseline A are:

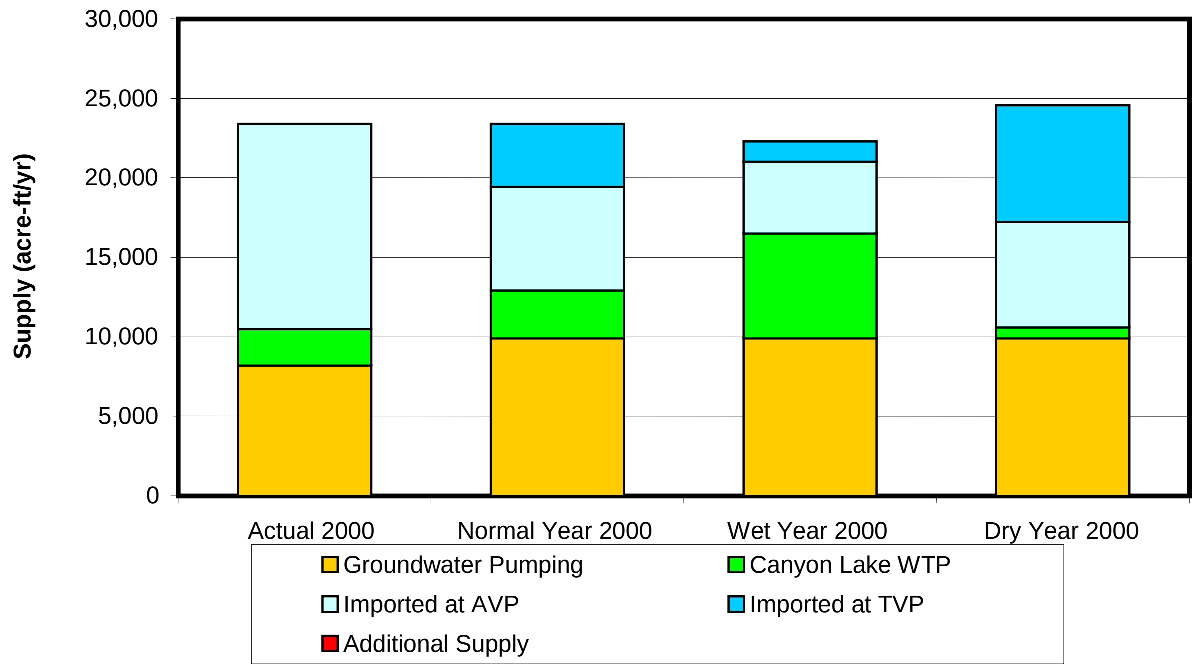
- Eight existing groundwater wells of EVMWD with a total capacity of 11,600 gallons per minute (gpm).
- Four existing groundwater wells of EWD with a total capacity of 3,400 gpm.
- Unknown number and capacity of private wells.
- Imported water from AVP with a capacity of 14,000 gpm (22,600 acre-ft/yr).

- Imported water from TVP with a capacity of 15,300 gpm (24,700 acre-ft/yr).
- Canyon Lake WTP with a capacity of 6,250 gpm with annual flows ranging from 700 to 6,600 acre-ft/yr when operating.

Groundwater production estimates are made based upon actual production data from 1997 to 2001 and reflect the average production from each well in the basin over this 5-year period and includes the new EVMWD Machado Street well because it was on-line during 2001. Therefore, the estimated production for Baseline A conditions (9,900 acre-ft/yr) is slightly higher than the actual conditions in 2000. In addition, the groundwater pumping is kept constant during wet and dry years to evaluate the affects of varying hydrology on the groundwater basin. The proposed EVMWD Joy Street and Terra Cotta wells are not included in Baseline A because these wells were not online in 2000 or 2001.

Similarly, imported water from the TVP was not available to EVMWD in 2000. Projections for Baseline A include the use of imported water from the TVP. Neither the TVP nor the AVP reach capacity under Baseline A. A summary of the projected supplies to meet the demands is provided on **Figure 4-3**. No additional supplies are required to meet current demands under this scenario. However, the ability of the groundwater basin to sustain this level of pumping through a wide range of hydrologic conditions must be evaluated.

Figure 4-3
Summary of Supplies to Meet Projected Demands – Baseline A



Note: The amount of groundwater pumping presented on this figure does not allow sustainable basin conditions.

Land Use

In Baseline A, the land use for year 2000 is used to calculate the amount of infiltration from precipitation in the local watershed and the amount of return flows from irrigation.

Septic Tanks

It is estimated that approximately 3,900 septic tanks are located within the groundwater basin. These septic tanks contribute to about 1,000 acre-ft of infiltration per year. Baseline A assumes that none of these septic tanks will be connected to the sewer system.

Lake Replenishment

No lake replenishment using groundwater or reclaimed water is included in Baseline A because lake replenishment was not performed prior to 2002.

Groundwater Balance

The estimated groundwater balance based upon 1961 to 2001 hydrology for Baseline A is summarized in **Table 4-3**. Note that this groundwater balance reflects projected future conditions with historical inflows and is therefore, not directly related to the actual conditions presented in **Section 2**. If groundwater pumping conditions for 2000 continued for a repeat of the 41-year hydrologic analysis period, an average deficit of approximately 4,400 acre-ft/yr would occur. The annual basin balance is projected to range from a deficit of 8,200 acre-ft/yr in dry years similar to water year 1960-61 to a surplus of as much as 10,800 acre-ft/yr in wet years similar to water year 1980-81.

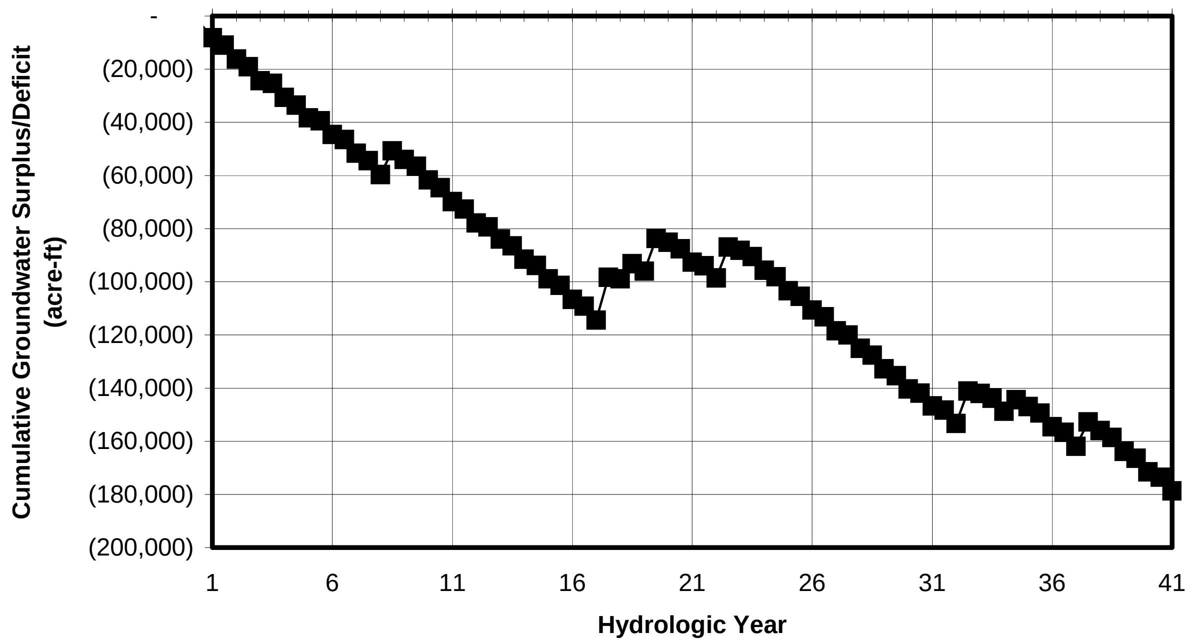
Table 4-3
Summary of Groundwater Balance – Baseline A

Parameter	Average (acre-ft/yr)	Wet Year (acre-ft/yr)	Dry Year (acre-ft/yr)
INFLOWS			
Infiltration of Precipitation			
Rural Areas	1,700	9,500	0
Urban Areas	900	5,500	0
Recharge from Surface Water			
San Jacinto River	1,200	4,000	0
Lake Elsinore	0	0	0
Return Flows			
Septic Systems	1,000	1,000	1,000
Applied Water	700	700	700
Subsurface Inflows		-	-
Total Inflows	**5,500**	**20,700**	**1,700**
OUTFLOWS			
Groundwater Pumpage	(9,900)	(9,900)	(9,900)
Surface Outflow	0	0	0
Subsurface Outflow	0	0	0
Total Outflows	**(9,900)**	**(9,900)**	**(9,900)**
Net Surplus/(Deficit)	**(4,400)**	**10,800**	**(8,200)**

Base period = 1961 to 2001

Figure 4-4 presents the projected cumulative groundwater balance for the Elsinore Basin under Baseline A for the 41-year simulation. This figure shows that the basin would lose approximately 176,000 acre-ft of storage (about 12 percent of the basin storage) after 41 years if pumping were kept constant at the Baseline A rate. Because the natural inflows and outflows are approximately equal during this period, a deficit would indicate that the basin is not currently in balance and the existing condition is not sustainable.

Figure 4-4
Projected Cumulative Groundwater Balance - Baseline A

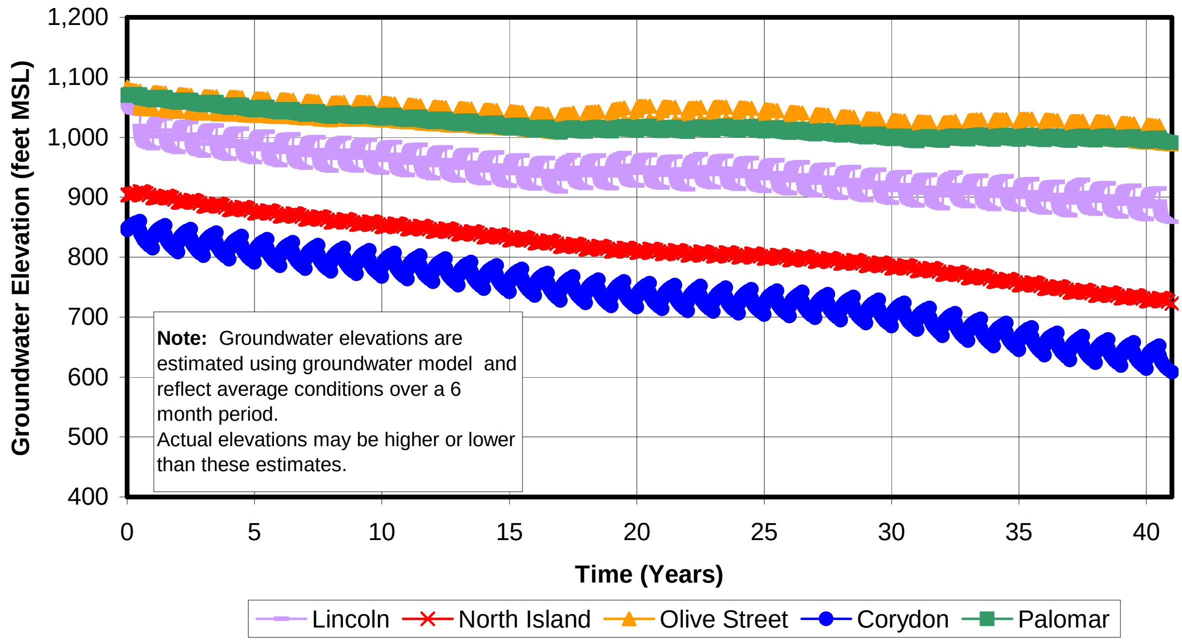


Water Levels

The predicted water levels in the Elsinore Basin for Baseline A conditions are presented on **Figure 4-5**. This figure shows that the water levels are declining throughout the groundwater basin. Water levels in the Corydon well, for example, are projected to decline as much as 250 feet over 41 years. Water levels in wells near the edge of the basin (e.g. Olive Street and Palomar) are projected to decline on the order of 80 to 90 feet. Other wells are projected to decline as much 200 feet. As discussed above, this condition is not sustainable. Impacts of this condition include:

- Water quality degradation as poor quality water migrates from other portions of the basin
- Increased risk of land subsidence that may result in damage to infrastructure
- Aquifer subsidence that may result in permanently reduced yield and storage capacities
- Reduced well pumping capacities due to shorter wetted screen intervals
- Mitigation costs to private users relying on this groundwater basin
- Reduced supply reliability in prolonged drought periods or emergencies such as earthquakes.
- Loss of habitat in wetlands and reduction of recreation industry if water for lake replenishment is not available.

Figure 4-5
Projected Water Levels of Baseline A – Existing Conditions



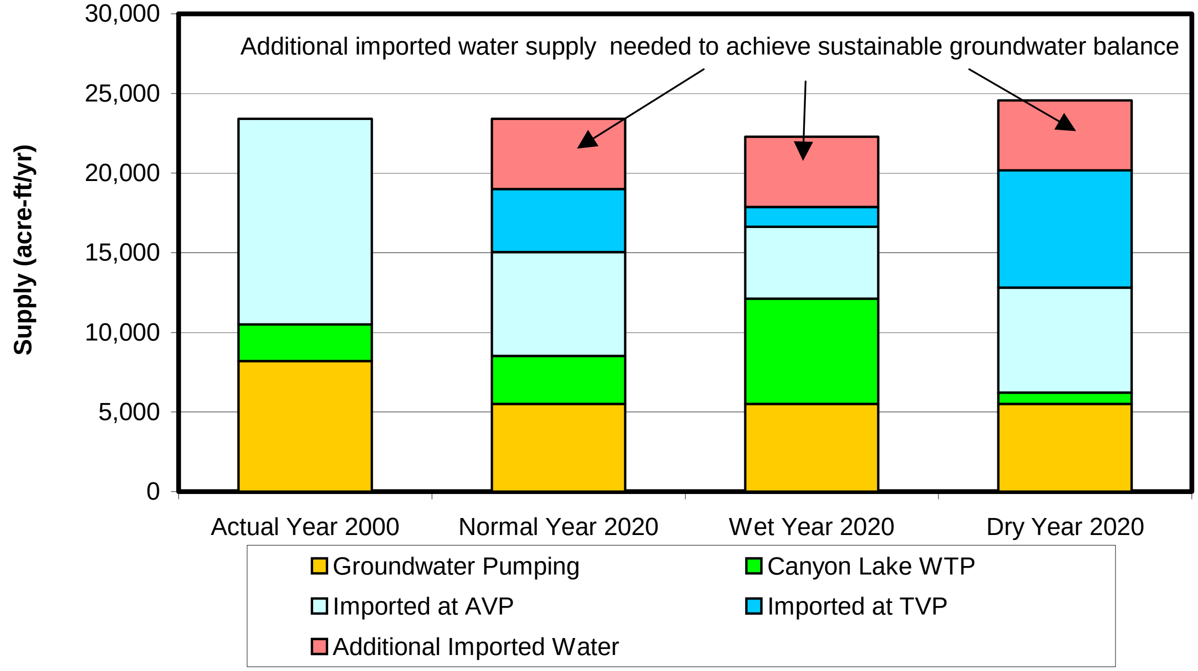
Under current pumping conditions, the average long-term groundwater deficit is about 4,400 acre-ft/yr. Therefore, without a groundwater management strategy, 9,900 acre-ft/yr could not be pumped from the basin over the long-term without significant detrimental impacts, which results in additional supply deficit. To obtain a sustainable balance in the basin, an additional 4,400 acre-ft/yr of imported water supplies would need to be purchased to reduce groundwater pumping to the current sustainable yield (5,500 acre-ft/yr) as shown on **Figure 4-6**. The supply picture presented here is significantly different from the data presented on **Figure 4-3** and may not be feasible for future demands. Therefore, Baseline B addresses future conditions in the Elsinore Basin.

Baseline B – Year 2020 Basin Conditions

Baseline B is based on the anticipated future conditions in year 2020 with respect to water demands, operating groundwater wells and the degree of urbanization of the basin area. Baseline B has a dual purpose:

- Baseline B is used to compare the basin conditions in year 2020 with the current (year 2000) basin conditions to quantify the effects of increased pumping and decreased infiltration due to projected development.
- Baseline B provides a basis for evaluation of management alternatives, which represent the year 2020 conditions as well.

Figure 4-6
Supply Mix to Meet the Projected Year 2020 Demands with Sustainable Groundwater Balance– Baseline A



Planning Assumptions

The following discusses the planning assumptions for Baseline B.

Water Demands

The water demands of EVMWD are projected to increase to 50,000 acre-ft in year 2020 (MWH, May 2002), while the water demands of EWD and private pumpers are assumed to remain constant at 500 acre-ft/yr. Under normal hydrologic conditions, the total demand is 50,500 acre-ft/yr. In a dry year, the demand is assumed to increase by five percent to 53,100 acre-ft/yr. In a wet year, the demand is assumed to decrease by five percent to 48,000 acre-ft/yr. A summary of the potable demands and supplies is presented in **Table 4-4**.

Water Supplies to Meet Demands

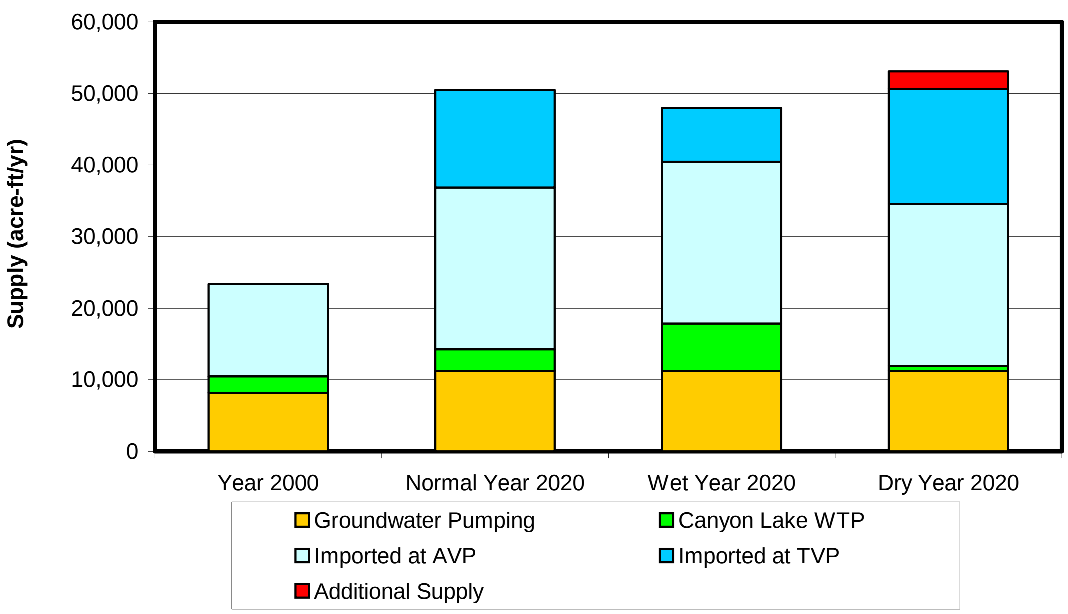
The water supplies included in Baseline B are the same as Baseline A plus the Joy Street Well, which is drilled, and ready to be equipped. The Joy Street Well has an estimated capacity of 1,000 gpm, which increases the groundwater production to 11,300 acre-ft/yr. To meet the maximum day demands (MDD) in year 2020, 14 additional wells are required to provide peaking capacity, assuming each well has a capacity of 1,000 gpm, or another peaking source is needed. According to MWDSC, their imported water supply is sufficient to meet projected demands for the next 20 years (MWDSC, 2003). Therefore, supply projections are made assuming the TVP and the AVP can be used at capacity if necessary. The groundwater supplies accounted for here include only those supplies used to meet potable demands. The use of recycled water and non-potable groundwater supplies for lake replenishment is discussed later.

Table 4-4
Potable Water Demands in the Elsinore Basin – Baseline B

Description		Year 2000 (acre-ft/yr)	Normal Year 2020 (acre-ft/yr)	Dry Year 2020 (acre-ft/yr)	Wet Year 2020 (acre-f/yr)
Demand	Average Annual Demand	23,400	50,500	53,100	48,000
Supplies	Existing Wells	8,200	11,300	11,300	11,300
Supplies	Canyon Lake WTP	2,300	3,000	700	6,600
	MWDSC (AVP)	12,900	22,600	22,600	21,600
	MWDSC (TVP)	0	13,600	16,100	8,500
	Total	23,400	50,500	50,700	48,000
Supply Shortfall		0	0	2,400	0

Figure 4-7 presents a graph of the projected supplies and demands under Baseline B. This figure implies that there are sufficient supplies in existing facilities to meet the potable demand in normal and wet years, while only dry years have a supply shortfall of approximately 2,400 acre-ft/yr. However, Baseline B results in groundwater pumping in excess of the perennial yield. Therefore, a supply deficit actually occurs in all years.

Figure 4-7
Supply Mix to Meet the Projected Year 2020 Demands – Baseline B



Note: The amount of groundwater pumping presented on this figure does not allow sustainable basin conditions.

Land Use

In Baseline B, the projected land use from the General Plans of the City of Lake Elsinore (City of Lake Elsinore, 1990) and Riverside County (Riverside County, 1994) for year 2020 is used to calculate the amount of runoff and the amount of return flows from irrigation.

Septic Tanks

The amount of infiltration from septic tanks in Baseline B is approximately 1,000 acre-ft per year, which is the same as in Baseline A. This is based on the assumption that septic tanks installed for new developments in the basin, will offset the number of existing septic tanks that are connected to the EVMWD sewer system by year 2020.

Lake Replenishment

Lake Elsinore replenishment is assumed to be accomplished with a combination of recycled water and groundwater when the lake level drops below elevation 1,240 ft MSL. Recycled water from the Regional WWTP would be used as the primary source of replenishment water up to 7.5 mgd (the current capacity of the plant less 0.5 mgd to Temescal Wash). The three Island wells would be used as the secondary source when the reclaimed water supply is not adequate to maintain the lake level at elevation 1,240 ft MSL. A summary of the lake replenishment requirements for Lake Elsinore is provided on **Figure 4-8** and in **Table 4-5**.

Figure 4-8
Summary of Lake Replenishment Requirements for Baseline B

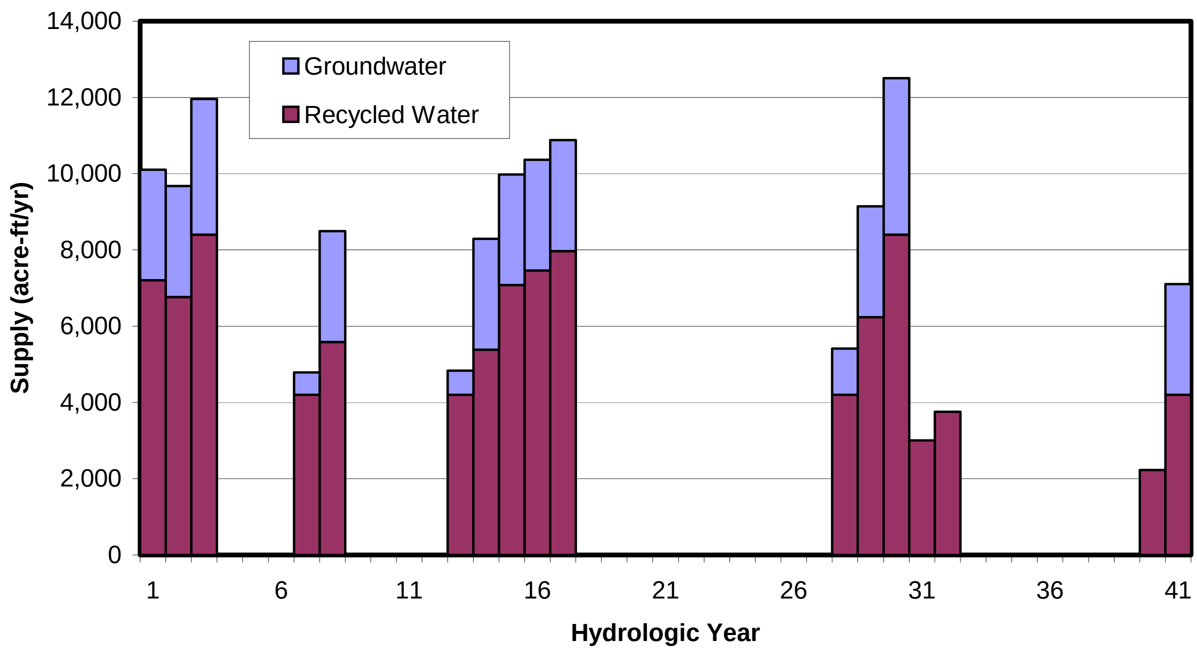


Table 4-5
Range of Lake Replenishment Requirements – Baseline B

Parameter	Year 2000 (acre-ft/yr)	Normal Year 2020 (acre-ft/yr)	Wet Year 2020 (acre-ft/yr)	Dry Year 2020 (acre-ft/yr)
Recycled Water from Regional WWTP				
Capacity (8 mgd)	9,000	9,000	9,000	9,000
Used for Lake Makeup	0	2,300	0	8,400
Groundwater	0	900 [1]	0 [2]	4,100 [3]
Total Used for Lake Makeup	0	3,200	0	12,500

1 – Normal year based upon average over 41 years
2 – Wet year based upon hydrologic year 1981
3 – Dry year based upon hydrologic year 1990, which had the highest lake demand.

As shown in **Table 4-5**, an average of about 3,200 acre-ft/yr is necessary to maintain Lake Elsinore at an elevation of 1240 feet MSL. As shown on **Figure 4-8**, lake makeup water is needed about 40 percent of the time. When required, about 70 percent of the makeup water is projected to come from recycled water from the Regional WWTP. No lake makeup water is necessary during wet years as local runoff is sufficient to maintain the lake level. Up to 12,500 acre-ft/yr of lake makeup would be required if conditions during water year 1990 were repeated. Because the highest lake demand (water year 1990) presented in **Table 4-5** is not coincident with the driest single year in the Elsinore Basin (water year 1961) presented in **Table 4-6**, the groundwater pumping in these tables differs.

A similar study performed by the LESJWA using the 1928 to 2000 hydrological period, with two years of very high runoff into the lake, estimated the make-up water needed to maintain the lake elevation at 1,240 ft was 13,800 acre-ft/yr (equal to evaporation at a 1,247 ft lake level less 1,400 acre-ft/yr of local runoff) in dry years. The study assumed that up to 7.5 mgd of recycled water from the Regional Plant and 5,000 acre-ft/yr of groundwater from the Island Wells were available for lake make-up on a long-term basis, with the remainder coming from Eastern MWD. This evaluation computed an average make-up water need of 6,911 acre-ft/yr and then adjusted that average to 8,000 acre-ft/yr, presumably based on the findings of the 1997 MWH study. Further discussion on these reports is presented in **Appendix F**.

Groundwater Balance

A summary of the groundwater balance under Baseline B is provided in **Table 4-6**. If groundwater conditions of Baseline B continued for the next 41 years, an average deficit of approximately 6,500 acre-ft/yr would occur. The annual basin balance is projected to range from a deficit of more than 12,100 acre-ft/yr in dry years similar to 1960-1 (which was the driest single year over the 41-year simulation) to a surplus of as much as 8,300 acre-ft/yr in wet years similar to 1980-1.

Table 4-6
Summary of Groundwater Balance – Baseline B

Parameter	Average (acre-ft/yr)	Wet Year [1] (acre-ft/yr)	Dry Year [1] (acre-ft/yr)
INFLOWS			
Infiltration of Precipitation			
Rural Areas	1,700	9,500	0
Urban Areas	700	4,000	0
Recharge from Surface Water			
San Jacinto River	1,200	4,000	0
Lake Elsinore	0	0	0
Return Flows			
Septic Systems	1,000	1,000	1,000
Applied Water	1,100	1,100	1,100
Subsurface Inflows	0	0	0
Total Inflows	**5,700**	**19,600**	**2,100**
OUTFLOWS			
Groundwater Pumpage	(11,300)	(11,300)	(11,300)
Pumping for Lake Replenishment	(900)	0 [1]	(2,900) [2]
Subsurface Outflow	0	0	0
Total Outflows	**(12,200)**	**(11,300)**	**(14,200)**
Net Surplus/(Deficit)	**(6,500)**	**8,300**	**(12,100)**

1 – Wet year is based upon hydrologic year 1981
2 – Dry year based upon hydrologic year 1961. This year differs from hydrologic period shown in Table 4-5. Therefore, data presented are different. See text for further discussion.

Figure 4-9 presents the projected cumulative groundwater balance for the Elsinore Basin under Baseline B for the 41-year simulation. This figure shows that the basin is projected to lose approximately 264,000 acre-ft of storage after 41 years (nearly 20 percent of the basin storage). Because inflows during this period are approximately equal to the long-term average for the basin, a deficit would indicate that the basin is not currently in balance and the projected 2020 conditions are not sustainable.

Water Levels

The predicted water levels in the Elsinore Basin for the conditions of Baseline B are presented on **Figure 4-10**. This figure shows that the water levels are declining throughout the basin. The decrease in water levels under Baseline B conditions is also greater than the decrease in water levels under Baseline A conditions. For example, water levels in the Corydon Street well are projected to drop more than 400 feet over the simulation period. Water levels in the north end of the lake near Lincoln Street well are projected to drop more than 200 feet. Declining water levels can lead to other detrimental effects such as land subsidence, increased pumping costs, loss of production capacity and water quality degradation.

Figure 4-9
Projected Cumulative Groundwater Balance - Baselines A and B

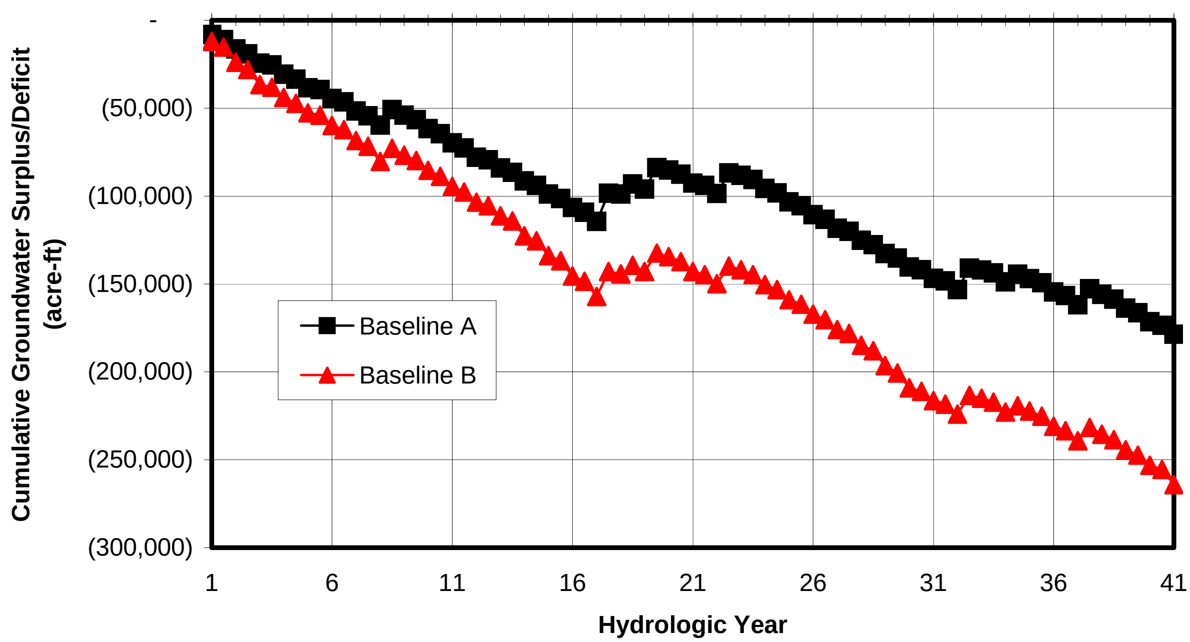
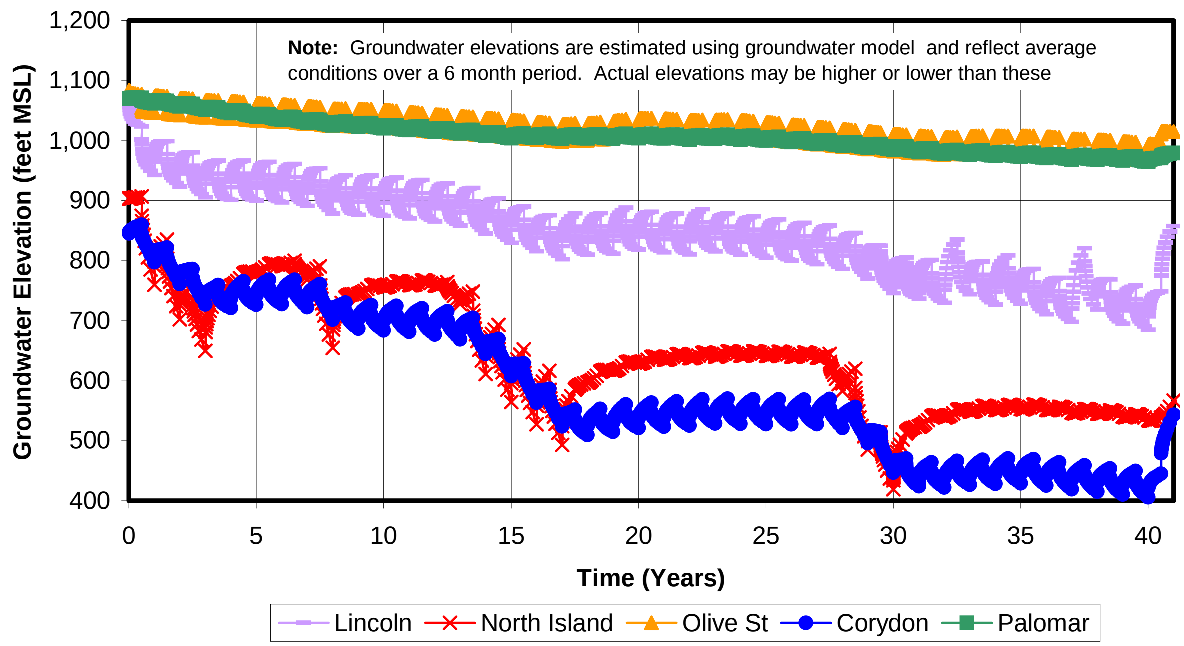


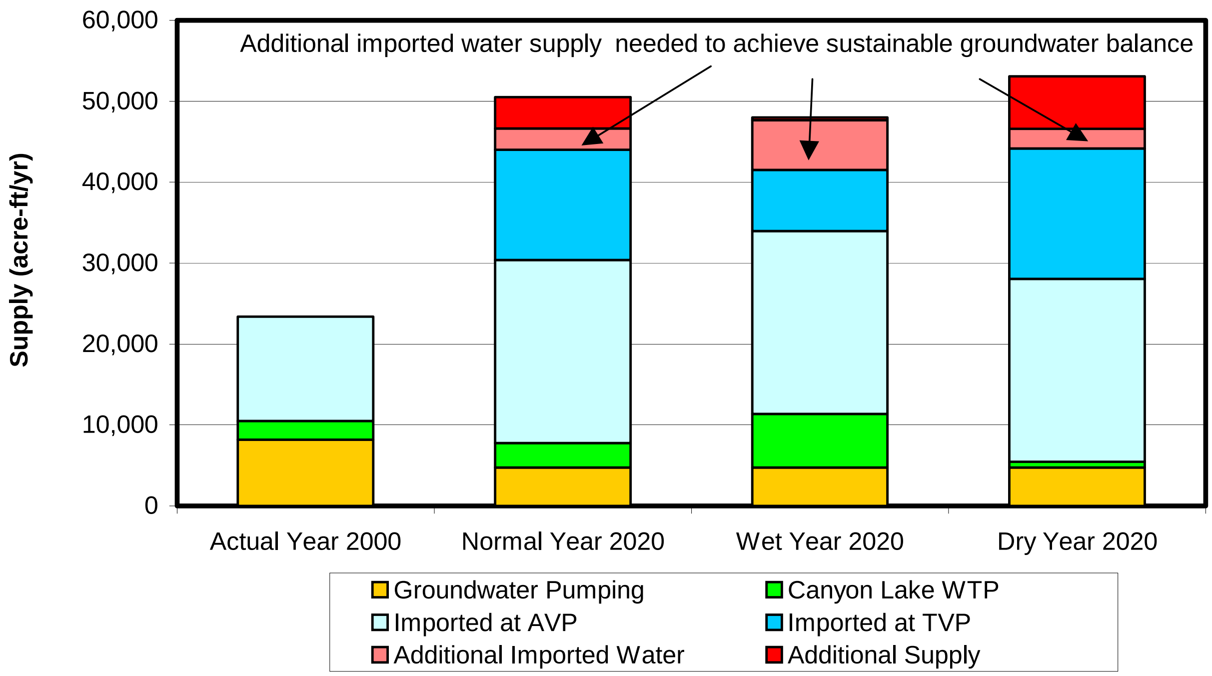
Figure 4-10
Projected Water Levels of Baseline B – Future Conditions



As discussed above, the projected average long-term deficit in the basin is approximately 6,500 acre-ft/yr, assuming the groundwater pumping continues at the current rate as well as the planned addition of Joy Street Well. The future sustainable yield of the basin is projected to be about 5,700 acre-ft/yr (slightly higher than under current conditions because of increased applied water returns). To maintain a sustainable yield, groundwater pumping needs to be reduced by 6,500 acre-ft/yr, which would need to be replaced with additional imported water or other water supply.

This situation is presented graphically on **Figure 4-11**. This figure shows that to maintain a sustainable balance, additional supplies will be needed in the summer months in all years to maintain a sustainable yield assuming that groundwater pumping is reduced evenly throughout the year by 42 percent. This figure shows that from 300 acre-ft/yr to 6,500 acre-ft/yr of new supply (shown in red) would be required to meet the projected year 2020 demands.

Figure 4-11
Supply Mix to Meet Year 2020 Demands
with Sustainable Groundwater Balance– Baseline B



NEED FOR MANAGEMENT PLAN

As illustrated with the water balance in **Section 2** and the projected water levels of Baseline A, the conditions of the Elsinore Basin indicate that the groundwater basin may be in a state of overdraft. A continuation of the current conditions to year 2020 will result in an increased overdraft as illustrated with the decreasing water levels in Baseline B. Water quality degradation and increased risk of land subsidence are two of the related adverse impacts of these declining water levels. Estimates of total volume of water in storage range from 1.45 million acre-ft (Fox,

1999) to 1.8 million acre-ft (DWR, 1981). Without the project in 2020 (Baseline B), the basin would lose nearly 20 percent of its storage on a long-term basis. The impacts of this lost storage include:

- Water quality degradation as poor quality water migrates downward throughout the basin
- Increased risk of land subsidence that may result in damage of infrastructure
- Aquifer subsidence that may result in permanent reduced yield and storage capacities
- Reduced well pumping capacities due to shorter wetted screen intervals
- Increased cost of potable water for EVMWD's customers
- Reduced supply reliability in prolonged drought periods or emergencies such as earthquakes.
- Loss of habitat in wetlands and reduction of recreation industry if water for lake replenishment is not available.

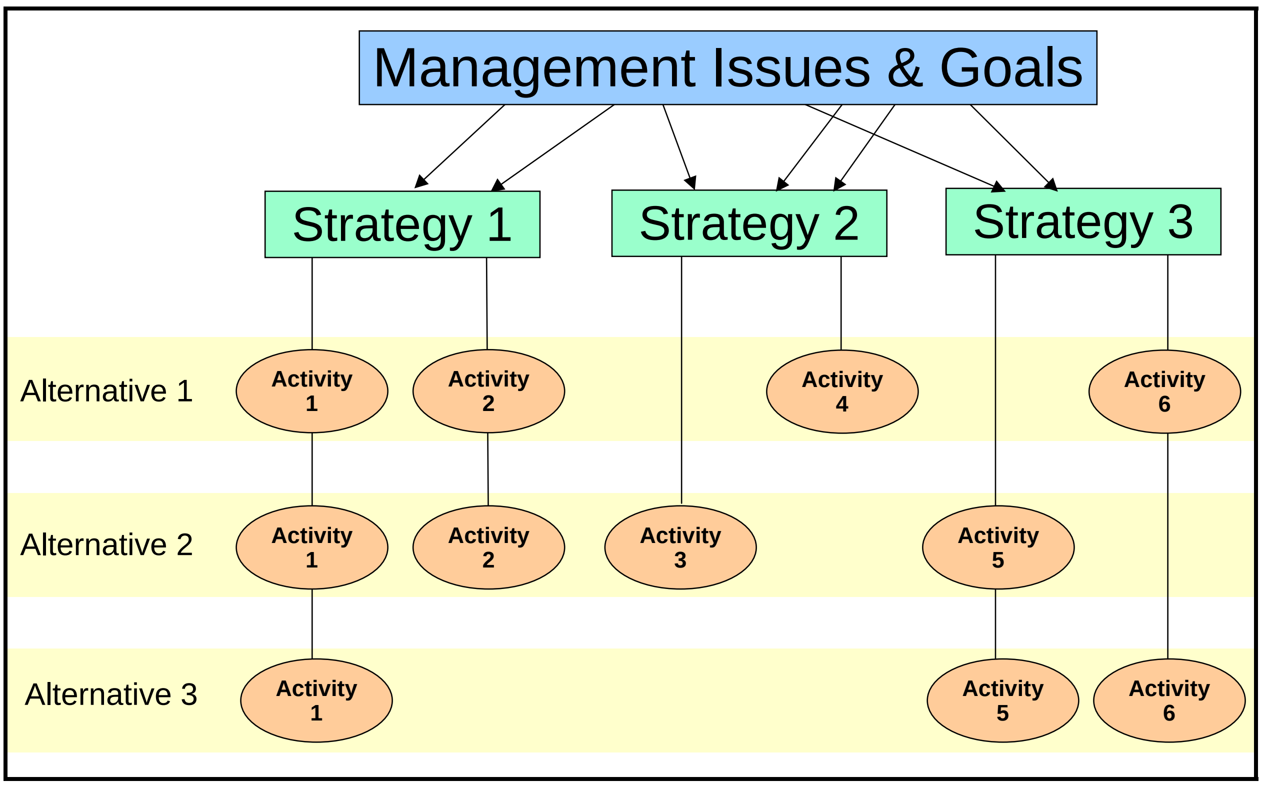
As a result, it is imperative that the District develop a GWMP that will resolve the overdraft problem and protect the groundwater supply for use by future generations. To develop a comprehensive groundwater management plan that incorporates all the management issues of the Elsinore Basin, a complete inventory of management issues is needed. The inventory of management issues is discussed in the following section.

Section 5
Management Issues and Strategies

INTRODUCTION

This section describes the development of groundwater management alternatives that will be evaluated in the GWMP. To define the management alternatives, a three-step process is followed as presented on **Figure 5-1**.

Figure 5-1
Process to Define Management Alternatives



First, an inventory of the groundwater basin management issues is prepared, which are then translated into management goals. To address these management issues, various general management strategies are defined (e.g. surface spreading or water conservation). For each management strategy, one or more specific activities are defined that can be implemented in the Elsinore Basin. For example, for the strategy "Surface Spreading," activities may include spreading basins in Leach Canyon or McVicker Canyon. Finally, a total of four management alternatives are defined by creating unique combinations of multiple activities. The description of these alternatives is presented in Section 6.

GROUNDWATER MANAGEMENT ISSUES

The Groundwater Management Act (California Water Code, Part 2.75, §10753), also known as AB 3030 (1992) and amended by SB 1938 (2002), provides the authority to prepare groundwater management plans. Section 10753.8 identifies twelve specific components or issues that may be included in a groundwater management plan. Groundwater management plans developed with these components permit local agencies to adopt programs to manage groundwater and serve as guidelines for this groundwater management plan.

An AB 3030 groundwater management plan may include the following:

- Control of saline water intrusion
- Identification and management of wellhead protection areas and recharge areas
- Regulation of the migration of contaminated groundwater
- Identification of well construction policies
- Administration of a well abandonment and well destruction program
- Construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects
- Review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination
- Mitigation of conditions of overdraft
- Replenishment of groundwater extracted by water producers
- Monitoring of groundwater levels and storage
- Facilitating conjunctive use operations
- Development of relationships with state and federal regulatory agencies

In addition to the twelve components defined under AB 3030, the conditions of the Elsinore Basin and EVMWD's water supply are evaluated to identify other specific management issues for both existing and anticipated future conditions. Additional management issues that are related to the existing basin conditions include:

- Meeting current and future drinking water quality regulations for EVMWD's potable wells
- The increased dependence on imported water supplies due to the doubling of water demands in the next 20 years
- The increased use of groundwater for groundwater and Lake replenishment requirements
- The potential impact of groundwater management activities on hot spring wells
- Risk of liquefaction and subsidence

A detailed description and the assessment of the issues listed in the AB 3030 requirements, and the existing and future potential issues (17 in total) are given below. A summary table is also provided in **Appendix G**.

AB 3030 Issues and Components

The following section describes the issues and components identified under §10753.8 of the Water Code that may be included in a groundwater management plan. The format for this discussion follows the potential management issues described in **Table 5-1**.

1. Saline Water Intrusion

One of the components identified by AB 3030 is the control of saline water intrusion. Saline water intrusion includes the following:

- Increase in salt content dissolved from earth materials
- Lateral or upward migration of saline water
- Downward seepage of sewage, agricultural, or industrial waste
- Downward seepage of mineralized surface water
- Interzonal or inter-aquifer migration of saline water
- Sea water intrusion

Although Lake Elsinore water has a higher salt concentration than the underlying groundwater, the lake is not considered as a potential source of downward seepage of saline water because the lake bottom sediments and underlying clay layers prevent migration of the lake water into the groundwater system. Three wells (known as the Island wells) were installed in the 1960s in the southern region of the lake to pump groundwater to the lake to maintain the water levels in the lake during times of low natural inflow. The Middle Island well has a leak in the well casing, which may have allowed higher TDS water to migrate from the alluvium into the underlying Fernando Group. EVMWD is currently repairing this well to prevent future contamination.

The Elsinore Basin is located more than 50 miles from the ocean. Therefore, seawater intrusion is not considered a threat. Based upon recent groundwater quality data, the remainder of the basin is not characterized by saline water and therefore, saline water intrusion is not a significant issue for the Elsinore Basin. Other water quality issues are discussed below.

2. Wellhead Protection

The identification and management of wellhead protection areas and recharge areas is another component that is recommended to be evaluated under the AB 3030 requirements. On behalf of EVMWD, Kennedy/Jenks Consultants prepared a Drinking Water Source Assessment and Protection Plan in March 2002. The plan included an evaluation of EVMWD's eight groundwater wells and possible contamination activities located within 2-, 5-, and 10-year fixed radii from these wells. For example, a 10-year radius is the distance from a well that groundwater travels in a 10-year period.

Table 5-1
List of Potential Management Issues

Issue Number	AB 3030 & SB 1938	Description	Applicability to Elsinore Basin
AB 3030/SB 1938 Issues			
1	Yes	Control of saline water intrusion	Not Significant
2	Yes	Identification and management of wellhead protection areas and recharge areas	Existing
3	Yes	Regulation of the migration of contaminated groundwater	Existing
4	Yes	Identification of well construction policies	Existing
5	Yes	The administration of a well abandonment and well destruction program	Existing
6	Yes	Construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects	Existing
7	Yes	Review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination	Existing
8	Yes	Mitigation of conditions of overdraft (water balance, water levels, and land subsidence)	Existing
9	Yes	Replenishment of groundwater extracted by water producers	Existing
10	Yes	Monitoring of groundwater production, levels, storage and water quality	Existing
11	Yes	Facilitating conjunctive use operations	Existing

Table 5-1 (continued)
List of Potential Management Issues

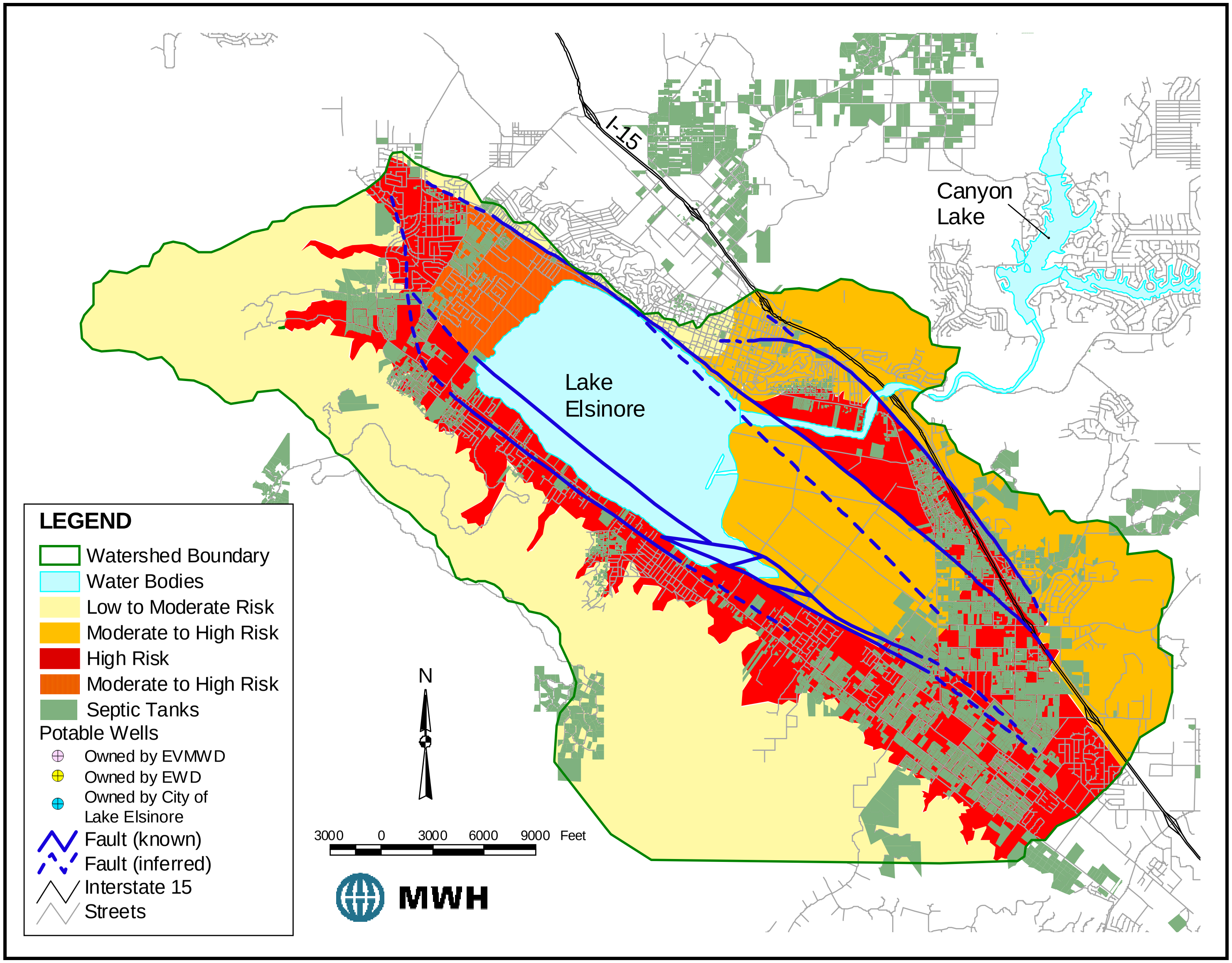
Issue Number	AB 3030 & SB 1938	Description	Applicability to Elsinore Basin
12	Yes	Development of relationships with state and federal regulatory agencies	Existing
Other Management Issues			
1	No	Compliance with drinking water quality regulations and Basin Plan Objectives	Existing
2	No	The increased dependence on imported water supplies due to the doubling of water demands in the next 20 years	Existing
3	No	The increased need for groundwater due to lake replenishment requirements	Existing
4	No	The potential impact of groundwater management activities on hot spring wells	Not Significant
5	No	Risk of liquefaction	Future

3. Migration of Contaminated Groundwater

The downward seepage of sewage, agricultural, or industrial waste is a potential source of groundwater contamination. The EVMWD service area includes residential and industrial land uses. Agricultural land use has greatly diminished in the last ten years and is currently limited to residential parcels. However, in some areas (e.g. the north end of the lake) where historical agricultural land use was present, there is a potential for downward migration of high TDS and sulfate groundwater. In areas with close proximity to septic tanks, downward migration of nitrate occurs.

In addition, approximately 3,900 parcels in the City of Lake Elsinore and surrounding areas have septic systems that are still in use (see **Figure 5-2).** Risk zones associated with septic tank locations relative to groundwater supply are presented below.

Figure 5-2
Septic Tank Risk Zones



Generally, the level of risk is related to existing or potential future groundwater supply development and recharge potential. The categories and the basis for their selection are as follows:

- **Areas of Low to Moderate Risk:** These areas generally consist of bedrock. There is little or no potential for the development of groundwater supply projects in these areas.
- **Areas of Moderate to High Risk:** These are areas where there are existing groundwater supply facilities or the potential for the development of future groundwater supply. However, the clay content is higher in the shallow sediments, which provides limited separation between septic tank effluent and the deeper water supply aquifers.
- **Areas of High Risk:** These are areas where there are existing groundwater supply facilities or the potential for future groundwater supply development. Based on the location relative to the basin boundaries, and the lack of fine-grained sediments in the shallow sediments, these areas are where most of the aquifer recharge occurs and are the most vulnerable to contamination.

One of the eight EVMWD wells (Palomar) and two of EWD's wells (Wood and Sanders) are currently located in high risk zones. As discussed in Section 2, the Palomar well has experienced an increase in nitrate concentrations (an indicator parameter for contamination from septic tanks or previous agricultural use) over the past 15 years. If nitrate concentrations in this well continue to increase, it is possible that it could exceed the MCL of 45 mg/L in the near future. Sufficient data are not available to evaluate the nitrate concentrations in the Wood and Sanders wells. Although concentrations are currently below the nitrate MCL of 45 mg/L in these wells, nitrate presents an issue for groundwater quality in portions of the basin.

An additional concern for contamination is from leaky underground storage tanks (LUSTs) discharging petroleum products, solvents or other organic constituents. In particular, the gasoline oxygenate MTBE (methyl tertiary-butyl ether) has become a major problem throughout California. Thirty-five cases of LUSTs have been reported to the RWQCB (RWQCB, 2003). Cleanups are currently underway or completed for these locations. According to the RWQCB, MTBE has been detected in the groundwater as a result of LUSTs in four locations throughout the Elsinore Basin since 1998. Based upon recent groundwater production well quality data, no District or EWD well has had detections of MTBE or other organic compounds attributed to these LUSTs.

4. Well Construction Policies

Because improperly constructed wells can impact water quality, proactive policies to ensure proper construction are an important aspect of the GWMP. Well construction policies are addressed later in this document under Groundwater Management Strategies and Activities.

5. Well Abandonment and Destruction

Improperly abandoned or uncapped wells can provide a vertical conduit for surface contaminants into the groundwater. Therefore, proactive involvement by EVMWD is necessary to help promote groundwater protection practices. Well abandonment policies are addressed later in this document under Groundwater Management Strategies and Activities.

6. Construction of Groundwater Projects

One of the AB 3030 requirements is to evaluate the impact of the construction and operation of various projects on the groundwater basin water quality and quantity. Projects mentioned include:

- Groundwater contamination cleanup projects (discussed above)
- Groundwater storage projects
- Groundwater recharge projects
- Groundwater extraction projects
- Water conservation projects
- Water recycling projects

Groundwater Storage Projects

One of the main objectives of the GWMP is to evaluate the possibilities of groundwater storage to provide additional water supplies in dry periods and thereby improving water supply reliability. Groundwater storage and recovery may result in greater fluctuations of water levels and a potential change in water quality in the aquifers used for storage. Water level changes may lead to a risk of subsidence or liquefaction.

Groundwater Recharge and Extraction Projects

For groundwater recharge, surface recharge, direct injection and in-lieu recharge are considered and evaluated in this GWMP. To identify potential surface recharge locations, EVMWD is conducted a study to evaluate the feasibility of surface recharge in the Elsinore Basin. In addition, EVMWD completed the BBIPP to assess the benefits of injecting imported water in the underlying aquifers in the Back Basin area. Both projects provided EVMWD with additional information on potential technical and management issues with regards to these activities.

Water Conservation Projects

Water conservation is an approach to reduce potable water demands, and thereby providing part of the solution for the projected water supply deficit. Many water conservation methods such as low flow toilets, water saving clothes washers and low flow showerheads, do not significantly impact the groundwater basin because water conservation will reduce the demand for imported water, while pumping will remain essentially constant. However, conservation focused on a reduction of irrigation water use may result in reduced infiltration that replenishes the groundwater basin. Therefore, a portion of the conserved water may not return to the basin and must be considered when evaluating water conservation programs.

Water Recycling Projects

EVMWD conducted a pilot study that evaluates the effect of discharging recycled water to Lake Elsinore on water quality with the ultimate intent of obtaining a National Pollutant Discharge Elimination System (NPDES) permit. This pilot study was completed in February 2004. The use of recycled water to maintain the lake level was approved by the Regional Board in March

2005. Increased recycled water use will reduce the amount of groundwater that will need to be pumped from the groundwater basin into the lake. The amount of wastewater effluent available for lake augmentation depends on the waste discharge requirements, the required minimum discharge to Temescal Wash, future demand for non-potable water and availability of recycled water from EMWD. In addition, recycled water may also be used for landscape irrigation, which may increase the salt concentration within the groundwater basin. The current regional treatment capacity is 8 mgd, which is planned to be expanded 20 mgd by year 2020.

7. Impact of Land Use Plans on Groundwater Contamination

Land use plans were obtained during the preparation stages of the Distribution System Master Plan (MWH, 2002). EVMWD will continue to interact with planning agencies, including the City of Lake Elsinore and Riverside County to obtain land use plans, track future developments and identify potential water quality impacts on the groundwater basin, as well as determine future utility service needs.

8. Mitigation of Overdraft Conditions

The contemporary definition of *overdraft* incorporates an evaluation of the consequences of extracting more groundwater from a basin than is returned. The *perennial yield* of a groundwater basin defines the rate at which water can be withdrawn perennially under specific operating conditions without producing an undesired result (e.g., water quality degradation, land subsidence, or declining water levels). Any production in excess of perennial yield is regarded as overdraft. The existence of overdraft implies that continuation of current water management practices will result in significant adverse impacts on environmental, social or economic conditions (Todd, 1980; American Society of Civil Engineers, 1987).

Groundwater Balance and Water Levels

A groundwater balance, which accounts for the inflows and outflows in the basin, illustrates the extent of groundwater overdraft. From 1990 through 2000, the average annual groundwater storage decreased by about 1,800 acre-ft/yr (as discussed in Section 2). It should be noted that this period was wetter than the historical average and, as such, may underestimate the actual deficit in the basin. In addition, water levels in some wells in the south portion of the basin declined more than 200 feet from 1990 to 2000. Groundwater levels remained fairly constant in the northern part of the basin where most of the recharge occurs.

As discussed in Section 4, the projected future groundwater balance indicates continued decline in water levels and continued overdraft conditions in the basin if current groundwater activities are continued. The average groundwater deficit is projected to be about 4,400 acre-ft/yr if existing conditions (Baseline A) continue and more than 6,500 acre-ft/yr with projected increases in groundwater use (Baseline B). Because of the negative groundwater balance and declining water levels, the sustainability of this condition is a significant issue for this GWMP.

Risk for Land Subsidence

Land subsidence is the lowering of the ground surface due to groundwater withdrawal or seismic activity. Seismic-induced movements may cause subsidence on the depressed side of a fault, or relatively small-scale subsidence can also occur when dry soils are saturated with water due to seismic activity. Groundwater withdrawal is the most likely mechanism or cause for land subsidence in the Elsinore Basin. Groundwater withdrawal causes the sediments of the aquifer to consolidate. The amount of consolidation depends upon the thickness and hydrogeologic character of the aquifer, as well as the rate and amount of decrease in the water level. Fine-grained sediments (clays), such as those composing the aquitard that separates the alluvium and the Fernando Group, are more susceptible to consolidation and subsidence than coarse-grained sediments (sands and gravels) when groundwater is removed from them. However, the low permeability and high specific storage of fine-grained sediments cause consolidation to occur slowly, over a period of several years, rather than as an instantaneous response to water level decline. Therefore, a short-term impact might be difficult to detect and subsidence may occur years after the water level had declined. However, once the consolidation occurs, consolidation of fine-grained sediments is permanent, due to a permanent rearrangement of soil particles. This results in a permanent loss of groundwater storage capacity and causes permanent land subsidence.

Uneven depression of the land surface is the major indication of vertical consolidation due to surface subsidence. Land subsidence due to vertical consolidation usually is not uniform, possibly due to differences in the underlying sediments. The resulting damage can include:

- Visible cracks, fissures, or surface depressions
- Damage to structures, such as canals, utilities, roads, and buildings
- Damage and loss in effectiveness of the subsurface agricultural drainage system
- Disruption of surface drainage and irrigation systems
- Loss of vertical elevation

In addition to vertical consolidation, regional and local horizontal ground movements can occur due to large amounts of localized groundwater extraction. The horizontal movements can ultimately result in inelastic failures at the ground surface that appear as surface fissures. Surface fissures can damage structures, interrupt irrigation of agriculture, capture runoff and can become direct conduits for poor quality water to enter the aquifer. The risk of subsidence is a potential issue for EVMWD as water levels have been decreasing over the past ten years and the use of groundwater is projected to increase in the future.

9. Replenishment of Extracted Groundwater

As discussed in the water budget of Section 4, average annual inflow to the Elsinore Basin totals approximately 5,700 acre-ft/yr based upon a repeat of the 1961-2001 hydrology under 2020 demand conditions. In the northwest portion of the basin, the inflow over the past ten years has been in approximate balance with the outflows. However, the water levels in the southern part of the basin have been declining, which suggests that the replenishment has been lower than the groundwater extraction. Maintaining water levels within an acceptable range is an objective of the GWMP and is incorporated in the groundwater management strategies.

Infiltrating precipitation in open and urban areas contributes approximately 2,400 acre-ft/yr, which is about 40 percent of the total inflow to the basin. Urbanization results in a loss permeable land surface, which leads to more runoff and less infiltration. It is estimated that the increased urbanization around the lake will diminish groundwater recharge due to infiltration of runoff from 900 to 700 acre-ft/yr between the present and year 2020. Due to this relatively small amount, the effect of reduced recharge is not considered a significant issue for the GWMP.

10. Monitoring of Groundwater Production, Levels, Storage, and Water Quality

EVMWD and EWD currently record the production and water levels from their existing wells monthly. In addition, water quality samples are collected on an annual basis. The basin contains more than 200 wells, most of which are operated by private well owners. Groundwater pumpers extracting more than 25 acre-ft on an annual basis are required to file their production with the SWRCB per California Water Code §4999 *et seq*. However, this reporting is not comprehensive and, for most producers, occurs on an irregular basis. Additional information is necessary to better identify areas of potential concern. Data currently available are discussed in more detail in Section 2.

An understanding of the water quality throughout the basin is also an important aspect of groundwater management. Water quality information is required to evaluate the existing basin conditions and the compatibility with imported water supplies, as well as to monitor the changes in water quality as a result of the proposed groundwater management activities such as surface infiltration and direct injection of imported water. The Groundwater Monitoring Plan (MWH, 2003) has specified the recommended parameters, locations and frequency for water quality and water level monitoring.

11. Facilitating Conjunctive Use Operations

Conjunctive use is the practice of storing surface water in a groundwater basin in wet periods and withdrawing it from the basin in dry periods. The goal of conjunctive use is to improve water supply reliability. Conjunctive use will be part of all management strategies, and is discussed in more detail in Section 6.

12. Develop Relationships with Regulatory Agencies

Early participation of agencies and stakeholders will provide the opportunity to include their concerns in the GWMP and is important to avoid any unanticipated issues and ease the implementation process. Stakeholders and regulatory agencies have been invited to participate in the GWMP development process via the formal stakeholder meetings. Continued involvement will be necessary.

Other Management Issues

In addition to those issues addressed in AB 3030, there are other groundwater management issues or components that are considered in this GWMP.

1. Compliance with Drinking Water Quality Regulations and Basin Plan Objectives

Existing areas of concern relative to drinking water quality regulations and the Basin Plan Objectives in the Elsinore Basin include:

- Concentrations of TDS have exceeded the DHS-recommended secondary standard of 500 mg/L in the Lincoln Street Well and Cereal 4 Well.
- Concentrations of nitrate and sulfate, although higher in some locations, have not exceeded applicable standards in any EVMWD well.
- Concentrations of arsenic are below the current MCL of 50 μg/L, however, they have exceeded the new (effective 2006) arsenic MCL of 10 μg/L in the Back Basin wells (Cereal 1, Cereal 3, Cereal 4 and Corydon Street).
- Highest concentrations of arsenic are found in deeper wells such as Cereal 1, Cereal 3 and Cereal 4.

According to EVMWD staff, the Olive Street well is not currently in production because of elevated bacterial levels. These elevated levels may be caused by a variety of environmental conditions including the influence of septic tanks and surface water and/or operating conditions such as vegetable oil leakage within the pump. Because the elevated bacteria levels are not associated with a corresponding increase in nitrate concentrations or other nutrients, it is unlikely to be caused by septic tanks alone. Further investigation will be required to address this issue.

Future use of EVMWD wells will depend upon the active management of water quality with respect to TDS, nitrate, arsenic and bacteria. Blending options may need to be addressed. As discussed previously, the future risk of contamination from septic tanks and LUSTs should also be considered.

Table 5-2 summarizes the specific water quality objectives set for the Elsinore Basin by the RWQCB (1995). The water quality objectives of the Basin Plan are more stringent that the Title 22 drinking water regulations. It should be noted that Regional Board recently revised the Basin Plan objectives. The revised limits the Basin Plan objectives to two parameters, TDS and nitrate (as N) with maximum concentration of 480 mg/L and 1 mg/L, respectively. These revisions were adopted in December 2004. Future groundwater management activities will need to be consistent with these revised objectives and regulations. With current TDS concentrations of about 550 mg/L in the upper aquifer, this parameter is a groundwater management concern, as TDS concentrations tend to increase over time due to continuous addition of salt through natural recharge, septic tank infiltration, injection of imported water, or surface spreading of imported water.

Table 5-2
Specific Water Quality Objectives for Elsinore Basin

Constituent	Units	Basin Objective	Drinking Water Standards
Elsinore Basin			
Total Dissolved Solids	mg/L	450[1], 480[2]	500[3]
Hardness	mg/L	260[1]	NS
Sodium	mg/L	50[1]	NS
Chloride	mg/L	60[1]	250[3]
Sulfate	mg/L	60[1]	250[3]
Nitrate (as N)	mg/L	4[1],1[2]	10
San Jacinto River – Reach 1			
Total Dissolved Solids	mg/L	450	500[3]
Hardness	mg/L	260	NS
Sodium	mg/L	50	NS
Chloride	mg/L	65	250[3]
Sulfate	mg/L	60	250[3]
Total Inorganic Nitrogen	mg/L	3	NS
COD	mg/L	15	NS
Lake Elsinore			
Total Dissolved Solids	mg/L	2,000	500[3]
Total Inorganic Nitrogen	mg/L	1.5	NS
Canyon Lake			
Total Dissolved Solids	mg/L	700	500[3]
Hardness	mg/L	325	NS
Sodium	mg/L	100	NS
Chloride	mg/L	90	250[3]
Total Inorganic Nitrogen	mg/L	8	NS
Sulfate	mg/L	290	250[3]

Source: Regional Board, 1995 and 2004
1 – Previous Basin Plan Objective for Elsinore Basin (RWQCB, 1995) revised or eliminated in 2004.
2 – Revised Basin Plan Objective for Elsinore Basin (RWQCB, 2004)
3 – Recommended Secondary Maximum Contaminant Level (MCL) of California
NS = No standard

2. Doubling of Water Demand in the Next 20 Years

As discussed in Section 1, water demands in the Elsinore Basin are projected to more than double by 2020. The increasing water demands in EVMWD's water service area result in the need for additional water supplies by 2020. This issue is one of the driving forces behind the GWMP.

With the potable water demands doubling over the next 20 years and limited groundwater resources, the reliance on imported water will increase. Based on the water source allocation of the Distribution System Master Plan (MWH, 2002), imported water will be 80 percent of the water supply in year 2020. As the need for imported water increases throughout Southern California, the reliability of this source is critical for EVMWD's water supply.

3. Lake Replenishment Requirements

As discussed previously, the target minimum level for Lake Elsinore is 1,240 feet MSL. To maintain this level, the volume of additional water required from either groundwater or required for lake augmentation varies from zero to more than 12,500 acre-ft/yr in dry years. A more detailed analysis is included in **Appendix F**.

Replenishment water can be obtained from groundwater, recycled water or untreated imported water. EVMWD conducted a pilot study to evaluate the effect of discharging recycled water on the lake's water quality. Untreated imported water is costly, but may be more economical than groundwater. When groundwater is used for lake augmentation, groundwater overdraft increases. To prevent the overdraft impacts, additional imported water is necessary for groundwater replenishment or to meet demands. Therefore, the use of groundwater for lake replenishment results in the purchase of more treated imported water to meet potable water demands and may be less cost-effective than using other sources of water for lake replenishment.

4. Impact of Future Basin Operations on Hot Springs

Through discussions with stakeholders in the basin, the impact of the GWMP on local hot springs is identified as a potential issue in the basin. Within the EVMWD service area, wells with hot water are located along the outflow channel from Lake Elsinore to Silver Street. The heated water associated with the faulting in the area rises to shallow depths near downtown Lake Elsinore north of the Glen Ivy fault. Because the Glen Ivy fault appears to be a barrier to flow at this location, activities in the Elsinore Basin are not anticipated to influence the hot spring operations.

5. Risk of Liquefaction

Liquefaction is a process by which sediments below the water table temporarily lose strength and behave as a liquid rather than a solid. In the liquefied condition, soil may deform enough to cause damage to buildings and other structures. Seismic shaking is the most common cause of liquefaction. Liquefaction occurs in sands and silts in areas with high groundwater levels. Liquefaction has been most abundant in areas where groundwater occurs within 30 feet of the ground surface; few instances of liquefaction have occurred in areas with groundwater deeper than 60 feet (EERI, 1999). Dense soils, including well-compacted fills, have low susceptibility to liquefaction (EERI, 1999).

The risk for liquefaction in the Elsinore Basin is the highest in areas where groundwater levels in the alluvium are shallow. This primarily occurs in the Back Basin area but may also occur in other locations if water levels were to rise to within 30 feet of the ground surface. Storing groundwater in the basin that results in higher groundwater levels may increase the risk of liquefaction. The GWMP needs to establish the maximum water levels to minimize the risk of liquefaction.

GROUNDWATER MANAGEMENT STRATEGIES AND ACTIVITIES

A groundwater management strategy is a general approach that addresses one or more of the management issues. The strategies identified are:

- Store imported water by using dual purpose wells
- Increase local supplies by using spreading basins
- Store imported water by using spreading basins
- Save groundwater for dry years by using in-lieu recharge
- Develop new sources of supply
- Reduce supply needs through water conservation
- Measure progress through basin monitoring
- Stakeholder involvement
- Protect groundwater quality by developing programs and policies

The management activities are presented per strategy in **Table 5-3**, which also includes the source(s) of water considered for each activity. These strategies and corresponding activities are explained below.

Dual Purpose Wells

Dual purpose wells are wells that can both inject water into and extract water from the aquifer. Depending on the difference between the distribution system and the aquifer pressures, water can either flow by gravity into the aquifer or needs to be pumped during injection cycles. Wells can be used to inject water in periods when imported water may be available in large amounts or at lower cost. During dry periods, when less imported water may be available or the cost of imported water is high, the wells can be used to extract the stored water from the aquifer.

The design of injection wells is similar to that of a water supply well. Because water is injected directly into the aquifer, this method bypasses the unsaturated zone and any intervening low permeability layers and eliminates evaporation losses. Therefore, injection wells are advantageous in regions where shallow clay layers are present that prevent good infiltration. However, because water is injected directly into a drinking water aquifer, water used for injection needs to meet drinking water regulations prior to injection as specified under CFR 144.12a (EPA, 1999). Therefore, the only water sources available for injection are treated imported water from MWDSC and water from the Canyon Lake WTP.

Possible Locations

Locations considered for dual purpose wells, which are provided on **Figure 5-3,** include:

- North of the lake between Lakeshore Drive and Grand Avenue and
- South of the lake within the Back Basin

Table 5-3
Management Activities and Water Sources Considered

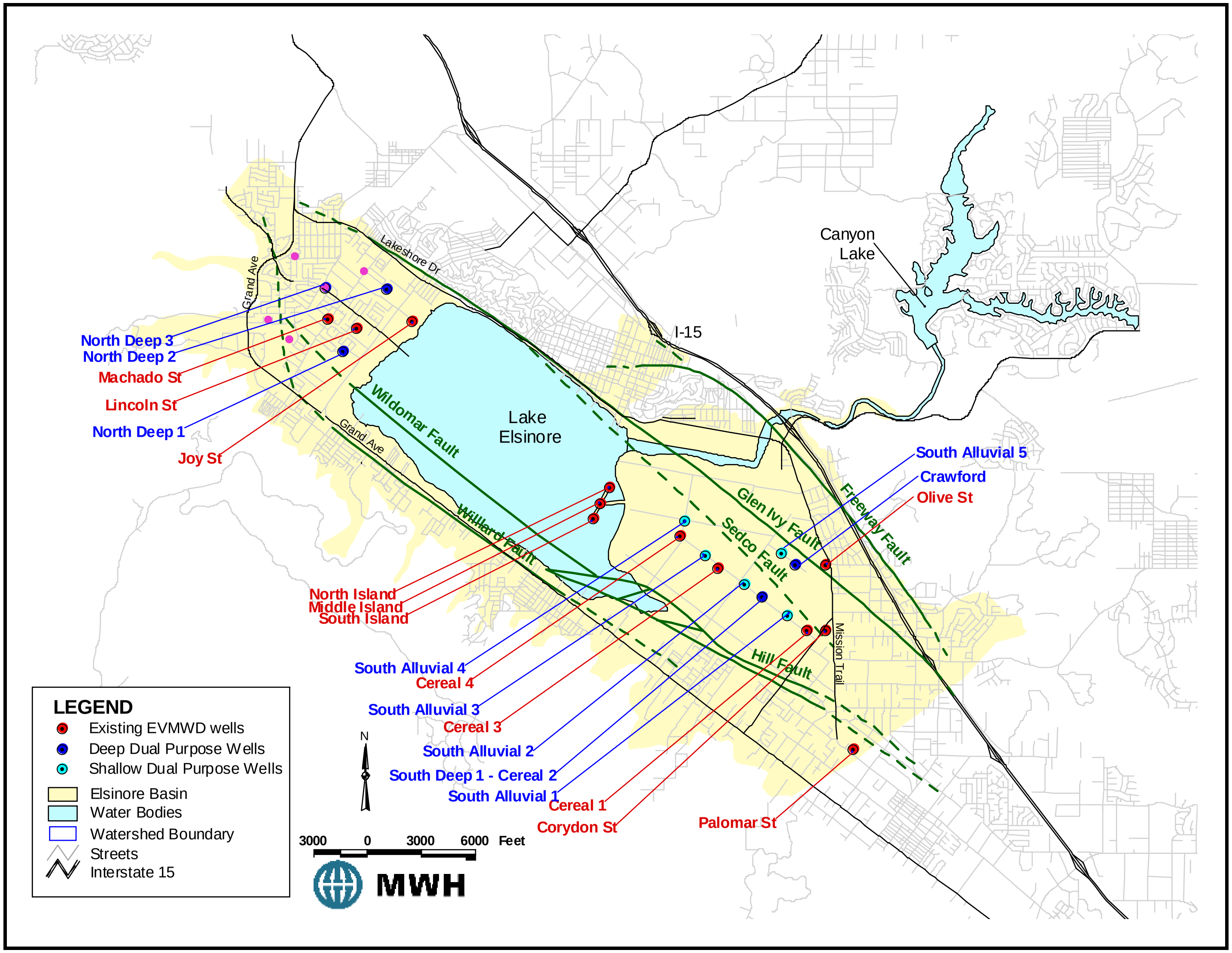
Strategy	Activity	Existing Sources			New Sources		
		Imported Water from TVP[1]	Imported Water from AVP[2]	Canyon Lake WTP[3]	Recycled water from RWWTP[4] or EMWD[5]	Imported Water from SJRT[6]	Sewering of Septic Tanks
Store imported water by using dual purpose wells	Dual purpose wells north of the Lake	X	X	X	-	-	-
	Dual purpose wells south of the Lake	X	X	X	-	-	-
Increase local supplies and store imported water by using surface spreading basins	Spreading basins in McVicker Canyon	X	X	-	X	X	X
	Spreading basins in Leach Canyon	X	X	-	X	X	X
	Surface recharge in Railroad Canyon	-	-	-	-	X	-
Save groundwater for dry years by using in-lieu recharge	In-lieu recharge with imported water	X	X	-	-	-	-
	In-lieu recharge with Canyon Lake WTP water	-	-	X	-	-	-

Other Strategies

- Develop new sources of supply
- Reduce supply needs through water conservation
- Measure progress through basin monitoring
- Stakeholder involvement
- Protect groundwater quality by developing programs and policies

1 - Temescal Valley Pipeline, 2 - Auld Valley Pipeline, 3 - Water Treatment Plant, 4 - Regional Wastewater Treatment Plant, 5 - Eastern Municipal Water District, 6 - San Jacinto Untreated Water Turnout, "X" means considered and "-" means not considered.

Figure 5-3
Location of Dual Purpose Wells



Recharge Potential

Three dual-purpose wells are considered in the area north of the lake. Details are as follows:

- Three deep dual-purpose wells (up to 1,000 feet)
- Extraction capacity of deep wells would be 1,000 gpm per well
- Injection capacity of deep wells would be 750 gpm per well

Eleven dual-purpose wells are being considered within the Back Basin area. Details are as follows:

- Six deep (up to 1,000 feet) and five shallow (less than 500 feet) dual purpose wells.
- Four existing deep wells (Cereal 1, Cereal 3, Cereal 4 and Corydon) would be converted to dual purposed wells. The remaining two deep wells would be new wells.
- Extraction capacity of deep wells would range from 1,000 gpm to 1,750 gpm
- Injection capacity of deep wells would range from 750 gpm to 1,400 gpm per well
- Extraction capacity of shallow wells would be 700 gpm per well
- Injection capacity of shallow wells would be 350 gpm per well

These capacities are based upon preliminary results of the BBIPP. Details of these wells are summarized in **Table 5-4**. When available, up to about 11,750 acre-ft/year of imported water could be injected using dual-purpose wells. These wells could extract up to about 13,100 acre-ft/yr.

Table 5-4
Summary of Recharge Potential with Dual Purpose Wells

Area	Number of Wells	Maximum Injection Capacity (gpm)	Maximum Extraction Capacity (gpm)	Annual Injection Potential[1] (acre-ft/yr)	Annual Extraction Potential[1] (acre-ft/yr)
North of Lake					
Deep Wells	3	750	1,000	600 per well	810 per well
Back Basin					
Shallow Wells	5	350	700	280 per well	560 per well
Deep Wells	5	1,400	1,750	1,130 per well	1,410 per well
Deep Wells	1	750	1,000	600 per well	810 per well
Total	**14**	**11,750**	**16,250**	**11,750**	**13,100**

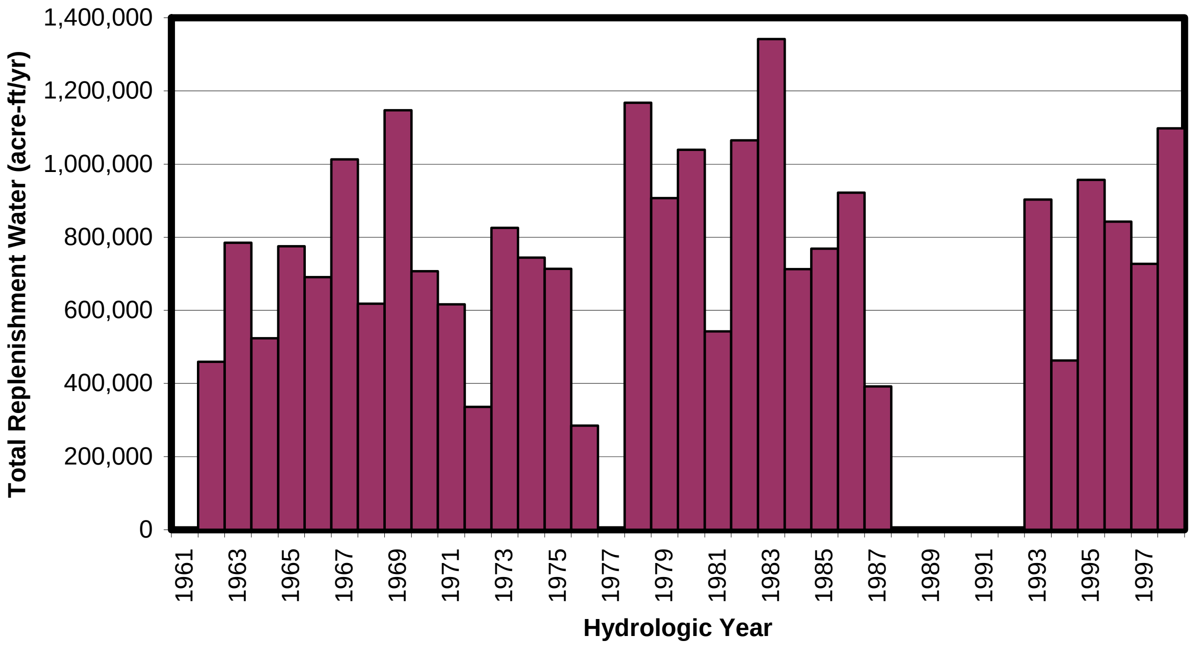
1 – Calculations assume continuous extraction/injection during six months per year.

Operation

Dual-purpose wells are operated in cycles of injection and extraction. Water that could be used for injection is treated water from Canyon Lake WTP and treated imported water from MWDSC. Because the connection with the TVP is closer to the area north of the lake than the AVP connection, the injected water would primarily originate from the TVP for wells north of the Lake. For wells in the Back Basin, injected water may come from either the TVP or the AVP. Injection would take place in low demand periods (typically October through March) when lower cost replenishment water is available and the water distribution system can accommodate the extra water demand for the injection wells without resulting in low system pressures.

Based on information provided by MWDSC, replenishment water is expected to be available for injection in approximately eight out of ten years. **Figure 5-4** shows the projected amount of replenishment water available in year 2020 based on hydrologic conditions from 1961 through 1998.

Figure 5-4
Total Replenishment Supplies Available from MWDSC (1961-1998)



Injection is assumed to take place during six months from October through March. It should be noted that injection may be possible year around during wet years if excess replenishment water is available. The extraction periods depend on the need for stored groundwater. In years that the summer demand can be met with the existing groundwater wells and imported water, the dual-purpose wells would not extract any long term stored water. However, in dry years when existing supplies cannot meet the summer demand peak, the dual-purpose wells would be used to extract stored water from the groundwater basin. To exercise all the wells regularly, cycling the use of dual-purpose wells for extraction along with the regular production wells is recommended.

The operation of dual-purpose wells south of the lake would be the same as the dual purpose wells in the north part of the basin. Injection in the area south of the lake is would be with water from the AVP connection due to the closer proximity.

Implementation

Implementation of dual-purpose wells north of the lake would include the design and construction of three wells. Environmental documents have been prepared and permits (such as waste discharge requirements or waivers) would need to be prepared prior to construction. One well with injection capabilities should be constructed and tested before designing, constructing or converting a second well.

The implementation of dual-purpose wells south of the lake would require the design and construction of seven wells. Environmental documents and permits would need to be prepared prior to construction.

Surface Spreading

Surface spreading is the process of infiltrating water into the groundwater aquifer using ponds or ditches. These spreading facilities are open areas with highly permeable soil to allow rapid infiltration by gravity. Infiltration rates vary based on the soil type and the depth of the water in the spreading basin, but typically range from less than one to six feet per day in areas suitable for surface recharge. Surface spreading can be used for surface runoff, recycled water, or other sources such as imported water.

Many different types and sizes of spreading facilities exist. The size is dependent upon the available land and the amount of water that needs to be captured. A spreading facility is typically divided into multiple ponds or basins that are separated with earthen berms. The ponds are often interconnected and are terraced to allow water to flow from one basin to the next. The number of available basins further limits the effective spreading area because regular maintenance is required to sustain high infiltration rates. The water level in the spreading basins should not exceed more than five feet because the weight of the water compacts the soil, which limits the infiltration rate. Low water levels at the other hand result in lower infiltration rates due to lower water pressures.

Spreading basins are the most common method of groundwater recharge because they are relatively inexpensive if adequate land is available. However, this method is not suitable in areas where surface clay is present because these clays limit downward infiltration. In the Elsinore Basin, surface spreading is most suitable along the margins of the Elsinore Basin where substantial clay is absent. In addition, the San Jacinto River, where the groundwater aquifer is naturally recharged, is also a suitable location for surface recharge. At these locations, the infiltration of local runoff can be maximized, reducing the amount of imported water required for recharge.

McVicker Canyon

One site for proposed surface spreading is located within City of Lake Elsinore, near the intersection of Grand Avenue and Lincoln Street. The site encompasses the eastern portion of the McVicker Canyon bottom, and includes a portion of the existing flood control basin and drainage facilities maintained by Riverside County Flood Control and Water Conservation District (RCFCWCD). The flood control basin includes an earthen dam situated across the upper mouth of the McVicker Canyon. Along the southwestern margin of the site, an apparently natural seep flows in and drains into the basin area. The McVicker Canyon site and the Leach Canyon site are shown on **Figure 5-5**.

Recharge Potential

The recharge potential for McVicker Canyon is summarized in **Table 5-5.**

Based upon available land area near McVicker Canyon, as much as 800 acre-ft/yr could be infiltrated (assuming an infiltration rate of approximately 1 foot per day) with minor modification of the existing debris basins in an area of approximately 9 acres. If additional recharge were required, the basins could be expanded to infiltrate as much as 2,000 acre-ft/yr.

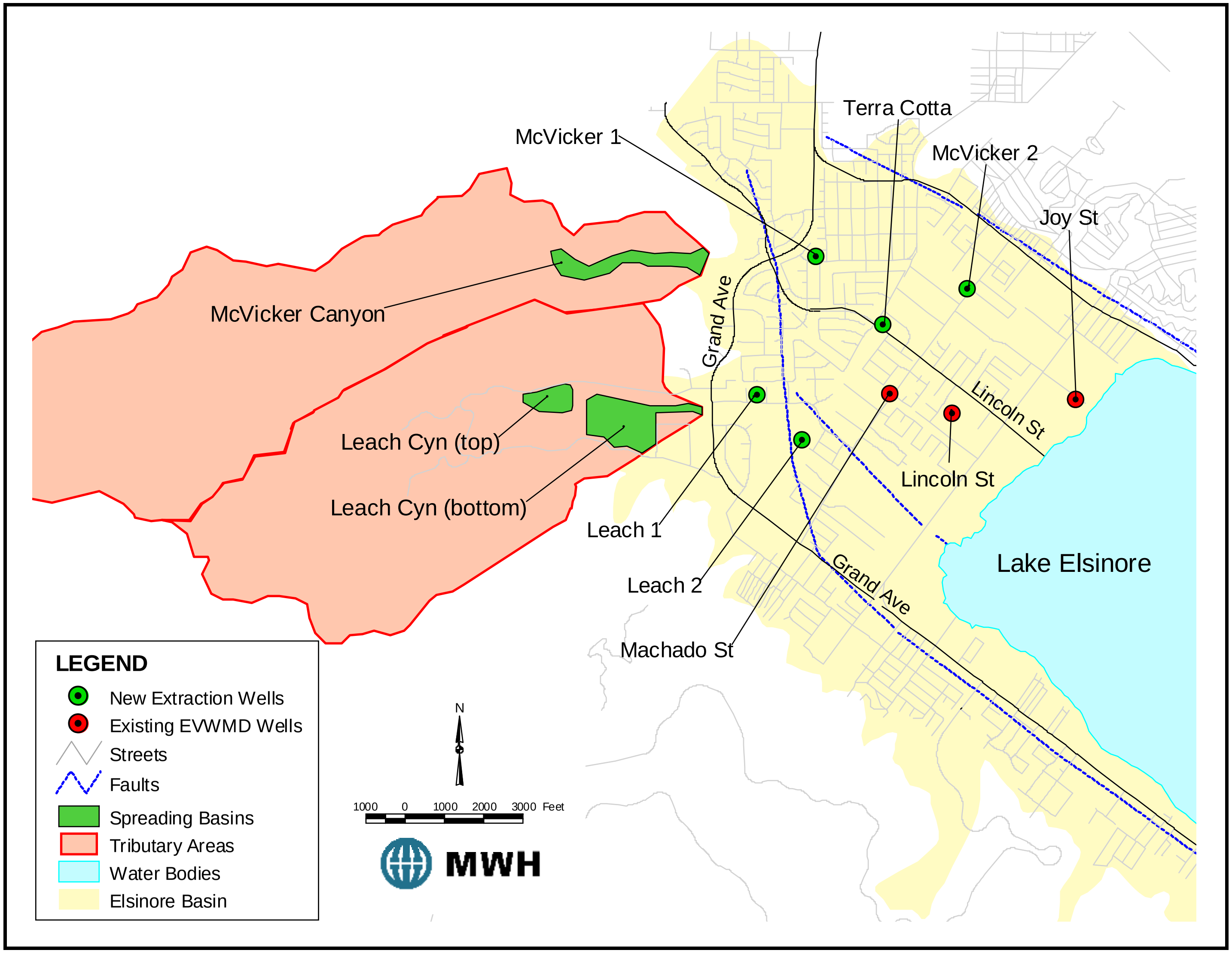
Table 5-5
McVicker Canyon Surface Spreading Potential

Parameter	Minimum Size	Expanded Size
Total Site Area (acres)	9	22
Wetted Area (acres)	6	15
Annual Infiltration from Runoff (acre-ft/yr)	200	400
Infiltration from Imported Source (acre-ft/6 months)	600	1,600
Total Annual Infiltration Volume (acre-ft)	800	2,000
Availability of Imported Water	6 months; October through March 67 percent use factor	6 months; October through March 67 percent use factor

Implementation

Implementing surface spreading at McVicker Canyon would require grading of the entire site to provide infiltration surfaces and berms to separate the individual ponds. Pipelines from either the intersection of Broadway Avenue and Grand Avenue or Railroad Canyon Dam would need to be constructed as well as a booster station if water from Canyon Lake is used for surface spreading. Specific details of the spreading operations and actual amounts infiltrated under each alternative will be discussed later in the description of each alternative.

Figure 5-5
Potential Recharge Locations



For the design of the spreading facilities, it is important to have a good understanding of the recharge characteristics of the soils. Although a good understanding of the Elsinore Basin geology has been obtained, more understanding is on the following topics is desired before spreading facilities can be designed:

- The infiltration rate and basin geometry along the San Jacinto River between Canyon Lake and Lake Elsinore
- The infiltration rate and transport characteristics and depth to bedrock in the vicinity of Leach and McVicker Canyons

More data should be collected from pilot tests of surface spreading for the canyon(s) selected as part of the preferred management alternative to obtain information required for a detailed design.

Leach Canyon

Leach Canyon is located within the unincorporated part of Riverside County within the City of Lake Elsinore's sphere of influence. The site consists of two portions. The top portion includes the lower part of the flood control basin located within Leach Canyon, and is bordered to the east by the debris dam at the mouth of the canyon. The location of this site is depicted on **Figure 5-5**. The north boundary of the site is Leach Canyon Road, which becomes Amorose Street at the intersection point with the dam. The bottom portion consists of a narrow strip of land south of single-family residential properties along Amorose Street, abutting Grand Avenue to the east and the dam to the west. This portion contains an earthen channel that drains from the flood control basin behind the debris dam to Grand Avenue, where it joins another drainage channel.

Recharge Potential

The recharge potential for Leach Canyon is summarized in **Table 5-6**. Based upon available land area near Leach Canyon, as much as 1,800 acre-ft/yr could be infiltrated (assuming an infiltration rate of approximately 1 foot per day) with minor modification of the existing debris basins. If additional recharge were required, the basins could be expanded to recharge as much as 3,300 acre-ft/yr. Specific details of the spreading operations and actual amounts infiltrated under each alternative will be discussed later in the description of each alternative.

Table 5-6
Leach Canyon Surface Spreading Potential

Parameter	Minimum Size	Expanded Size
Total Site Area (acres)	21	38
Wetted Area (acres)	14	25
Annual Infiltration from Runoff (acre-ft/yr)	300	500
Infiltration from Imported Source (acre-ft/6 months)	1,500	2,800
Total Annual Infiltration Volume (acre-ft)	1,800	3,300
Availability of Imported Water	6 months; October through March 67 percent use factor	6 months; October through March 67 percent use factor

Three sources of water may be used for surface spreading: treated imported water from the TVP, untreated imported water or recycled water from the Regional WWTP. Specific details on the required transmission pipelines and pumping stations to deliver water from these sources to the spreading basins is discussed under Alternative 2.

Operation

Imported water would be available six months per year for supplementing rainfall to provide groundwater recharge. Water could be imported from the TVP, the San Jacinto River or potentially the Regional WWTP. The ponds would be available for infiltration of imported water approximately 67 percent of dry weather days to allow for wetting and drying cycles. Volume would be reserved to provide detention of runoff in the event of a storm. During rain events, they would be fully functional. The ponds would be available for maintenance during periods of inactivity. Based on preliminary calculations, it appears that the anticipated annual infiltration volumes of water at Leach Canyon would not cause excessive groundwater mounding. Pilot testing is needed to verify this assumption.

Implementation

Implementing surface spreading at Leach Canyon would require grading of the entire site to provide level infiltration surfaces and berms to separate the individual ponds. The pipelines from either the intersection of Broadway Avenue and Grand Avenue or Railroad Canyon Dam would need to be constructed as well as a booster station if water from Canyon Lake is used for surface spreading. Prior to implementation, pilot tests should be performed to determine the long-term infiltration rates of the soils in the Canyon. The objectives of the pilot test are mentioned under the implementation of McVicker Canyon.

Railroad Canyon

The site for proposed surface recharge in Railroad Canyon is located within the City of Lake Elsinore, near the intersection of Interstate 15 (I-15) and Railroad Canyon Road. The site resides within the San Jacinto River channel along Railroad Canyon road, and includes the riparian/flood plain area, and is approximately bounded by Railroad Canyon Road to the south, I-15 to the west, and Newport Road to the north. The river passes beneath the Summerhill Road bridge at the junction of the two portions.

Recharge Potential

The infiltration site consists of 51 acres of existing riverbed, located just downstream of USGS stream gauge 11070500. Modification of the existing riverbed to create a spreading facility has environmental constraints that would need to be mitigated when constructed. Without modification, a maximum of 30 acre-ft per day could be infiltrated, assuming an infiltration rate of 0.6 feet per day. Due to the finer grained soils present, the infiltration rate here is believed to be lower than in the canyon sites.

Operation

The proposed infiltration site is the existing riverbed. Preliminary calculations indicate that river flows less than ten acre-ft per day (5 cfs) delivered to the spreading site will not reach Lake Elsinore; thus up to this amount could be infiltrated for groundwater recharge. Once the infiltration capacity of the riverbed is reached, water flows into Lake Elsinore. The source of water for spreading would be Canyon Lake, which feeds the San Jacinto River below Canyon Lake in wet weather, when water is released from the Railroad Canyon Dam or when the lake spills. The lake level could be maintained at the spillway elevation to achieve continuous recharge by purchasing untreated imported water. It should be noted that some losses of water will occur while the water flows through the 12-mile stretch of the San Jacinto River north of Canyon Lake. These losses are estimated to range between 6 and 16 percent (MWH, 1997). Other losses would be the increased evaporation from Canyon Lake due to an increase lake surface area when the lake is full.

Implementation

The existing riverbed would not require modification to implement the surface recharge concept.

In-Lieu Recharge

The concept of in-lieu recharge involves the replacement of groundwater pumping with imported water supplies. With an in-lieu operation, water users that currently pump groundwater would maximize the use of imported water during wet periods (either seasonally or annually) when more imported water may be available. Groundwater pumping would be limited during these periods. During dry periods, the users would pump groundwater using existing facilities. Groundwater recharge occurs during the wet periods as groundwater accumulates instead of being pumped out of the basin. The amount of in-lieu recharge that can be implemented in the Elsinore Basin is dependent upon the demand and the capacity of existing facilities.

EVMWD is the principal groundwater producer in the Elsinore Basin, EVMWD is responsible for approximately 95 percent of the total groundwater pumping in the basin. Implementation of in-lieu recharge by EVMWD would not require any major facilities as the water distribution system has two imported water connections. However, some groundwater pumping will be required to provide peaking capacity. If individual pumpers or the Elsinore Water District (EWD) are included in in-lieu operations, imported water can be supplied to these users through the EVMWD distribution system.

New Sources of Supply

The strategy of developing new supply sources involves expanding the mix of available water to make EVMWD’s water supply more flexible and reliable. The following new supply sources were identified in discussions with District Staff and the stakeholders:

- Untreated imported water from MWDSC’s San Jacinto Raw Water Turnout (WR-18B)
- Runoff from the local watershed
- Recycled water from the Regional WWTP

- Recycled water from Eastern Municipal Water District (EMWD)
- Recycled water produced by connecting existing septic users to sewer

San Jacinto Raw Water Turnout

The San Jacinto Raw Water Turnout (SJRWT) is located north of Avenue B and 10th Street in the City of Lakeview near Lake Perris. This 50-cfs MWDSC connection (WR-18B) can deliver untreated Colorado River water into the San Jacinto River. From the turnout point, water travels approximately 12 miles downstream to Canyon Lake. Before the AVP was built, this connection was used to deliver water into Canyon Lake that fed the Canyon Lake WTP. Because EVMWD can purchase treated imported water at the AVP connection, this connection has not been used regularly to feed the Canyon Lake WTP. Currently, the Canyon Lake WTP only treats natural runoff from the San Jacinto River watershed. Untreated imported water from the SJRWT can be used as a supply source for surface spreading or for lake replenishment. A new imported water connection (WR-31) provides access to untreated SWP water.

Surface Spreading

Untreated imported water from the SJRWT can be used for either surface recharge in the San Jacinto River or surface spreading in local canyons. As discussed previously, McVicker and Leach Canyons have the best recharge potential. However, spreading imported water at these locations would require construction of an untreated water pipeline from the dam to the spreading basins. Another option is a pipeline from the outlet of the San Jacinto River into Lake Elsinore

Lake Replenishment or Augmentation

Untreated water from the SJRWT can also be used for lake replenishment reducing the amount of groundwater that needs to be utilized for lake augmentation. Although the cost of untreated imported water is higher than the cost of groundwater, the use of untreated water for lake replenishment may be more cost effective than the use of groundwater when the total costs of water supply are considered. When high quality groundwater is pumped into the lake, this water is no longer available for potable water supply. To keep the basin in balance, potable groundwater pumping would need to be reduced, resulting in the need for more treated water from MWDSC at a higher cost than the untreated imported water. The use of groundwater for lake augmentation will eventually be paid for as treated water. A secondary advantage of using untreated water for lake augmentation is the increased natural recharge in the San Jacinto riverbed. The most cost-effective source for lake augmentation is likely to be recycled water, assuming that no additional treatment is required beyond existing processes.

Local Runoff

The capture of local runoff can be increased by the construction of surface spreading basins in the canyons and by enhanced infiltration in the San Jacinto River.

Regional WWTP

Based upon current construction and the Sewer Master Plan (Kennedy/Jenks, 2003), the Regional WWTP has a current capacity of 8 mgd and which is planned to be expanded to 20 mgd by the year 2020. This projection does not include conversion of all septic tanks to sewer system connections within the basin, hence the total available wastewater flow from the Regional WTP may be higher than anticipated. The GWMP recommends that policies be developed to regulate the installation of septic tanks for new developments as well as the conversion of existing septic tanks that are in close proximity of sewer trunk mains and sewer transmission pipes. Reducing the amount of septic tanks is the basin is beneficial for groundwater quality, possibly lake water quality, and provides additional recycled water. Recycled water can be used for irrigation, lake augmentation and possibly surface spreading.

Wastewater from EMWD

At this time, the availability of recycled water from EMWD for EVMWD's use is unknown. EMWD delivers recycled water primarily for irrigation within their service area. However, during periods of low recycled water demand, EMWD stores recycled water in reservoirs and may discharge excess recycled water through a pipeline to Temescal Wash. This excess recycled water could potentially be used for irrigation, surface spreading or lake augmentation. Additional recycled water from EMWD's Temecula plant may also be available for EVMWD use in the future. EMWD recently constructed a pipeline to convey effluent from its Temecula Valley Plant to Temescal Wash. The availability of this source of supply and the cost of this water should be further investigated. EVMWD is currently evaluating the use of this supply as part of the Wildomar Recycled Water Master Plan.

Water Conservation

The water demand projections used in this GWMP are based on the Water Distribution Master Plan (MWH, 2002), which does not include any water conservation measures. Water conservation could be used to reduce water consumption and decrease the need for new water supplies. Specific strategies for water conservation included in this management plan are:

- Low water use landscaping
- Increased awareness and financial incentives

These strategies are currently in place in many communities throughout California, the Pacific Northwest and the southwestern states. They have been very successful. Agencies such as the U.S. Bureau of Reclamation and MWDSC also offer funding opportunities and other resources to agencies that want to implement water conservation programs in their communities. In December 2002, EVMWD became a signatory to the Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California defining best management practices (BMP) for demand management.

Low Water Use Landscaping

Low water use landscaping utilizes plants that have lower water needs relative to traditional turf. Low water use landscaping has been found to use approximately 42 percent less water than traditional turf (East Bay Municipal Utility District, 1992) and provide significant financial savings on labor, energy usage, fertilizer and herbicides. It should be noted that a reduction in irrigation in the groundwater basin also would lead to reduced return flows that contribute to groundwater recharge. However, the net effect is lower water supply needs. Therefore, it would be beneficial to EVMWD if low water use landscaping is implemented throughout EVMWD service area to decrease potable water needs. Key principles of low water use landscaping can be found in **Appendix H**.

Water Savings Potential

Table 5-7 shows the projected irrigation demands for EVMWD's service area, inside and outside the groundwater basin in year 2020 and the potential water savings that could be generated from implementation of a low water use landscaping program. These calculations assume:

- 39 percent of total demand is for outdoor use, or irrigation (Urban Water Management Plan, 2000).
- Low water use landscaping is implemented in 20 percent of the parcels that are projected to be developed by year 2020.
- The water reduction achieved with low water use landscaping is 42 percent (East Bay MUD, 1992).

These policies could reduce the water demand by as much as 1,630 acre-ft/yr within EVMWD's service area, which is about three percent of the total project water demand in year 2020.

Table 5-7
Estimated Irrigation Savings with Low Water Use Landscaping

Description	Inside the GW Basin (acre-ft/yr)	Outside the GW Basin (acre-ft/yr)	Total Service Area (acre-ft/yr)
Water Demand Year 2020[1]	18,560	31,390	49,950
Irrigation Demand without low water use landscaping[2]	7,240	12,240	19,480
Irrigation Demand with low water use landscaping[3]	6,630	11,220	17,850
Projected Water Savings[3]	610	1,020	1,630

1 – Based on demand projections (MWH, 2002)
2 – Based on 39 percent outdoor use
3 – Based on a participate rate of 20 percent and 42 percent water savings for participating parcels

Implementation

The conversion of traditional landscaping to low water use landscaping needs to be implemented over time and would be easiest accomplished for new developments. The use of low water use landscaping could be encouraged through public outreach, education and financial incentives. EVMWD could play an important role in stimulating low water use landscaping practices by providing water rate discounts. EVMWD should evaluate what other agencies have accomplished with applications of this principle.

Increase Awareness and Financial Incentives

Water conservation may be implemented at residences as well as businesses. Because all new developments (which contribute up to 50 percent of the future water demand) will have water saving devices installed, most conservation in EVMWD will be from retrofits of existing toilets, showerheads, washing machines and other equipment in residential and commercial areas.

Water Savings Potential

The estimated water conservation potential is based on the following assumptions:

- Low flow toilets in residential properties resulting in a ten percent water reduction.
- Water savings due to low flow toilets in non-residential properties is ten percent.
- Low flow showerheads and plumbing in residential properties resulting in a five percent water reduction.
- High efficiency clothes washers in residential properties result in a ten percent water reduction.
- Sensitive sprinkler systems in residential properties resulting in a five percent water reduction.
- Water savings in non-residential properties is ten percent.
- 20 percent of existing customers will install low flow toilets, water saving showerheads, adjust plumbing, use high-efficiency clothes washers, and install sensitive irrigation systems by year 2020.
- 100 percent of the future customers will have low flow toilets and water saving showerheads.
- 80 percent of future customers will use high-efficiency clothes washers and install sensitive irrigation systems by year 2020.
- The overall water savings for residential customers is assumed to be 20 percent in addition to irrigation savings, taking into consideration that customers may not implement all possible water savings devices.
- The overall water saving for non-residential customers is assumed to be 10 percent.

The assumptions used are based on water conservation studies conducted throughout the United States (Ayres, 1993-1995; EBMUD, 2002; GDS, 2000). As shown in **Table 5-8**, the estimated water savings potential is approximately 5,000 acre-ft per year or about ten percent of the projected water demands for year 2020. These saving do not include the three percent saving due to low water use landscaping as discussed previously.

Water conservation achieved through the increasing public awareness will primarily offset the need for additional imported water supplies.

Implementation

Education and financial incentives are the main strategies to achieve water conservation in residential and business environments. In addition, changes in building codes effect water conservation by requiring devices such as low flow toilets. Education of customers can be accomplished though brochures at public parks and libraries, websites, school programs, community activities and television and radio commercials. Financial incentives are an effective strategy to increase water conservation because it provides benefits for people to change their behavior, rather than requesting an effort without rewards.

Table 5-8
Estimated Water Savings with Awareness and Financial Incentives

Water Demand		Residential[1] (acre-ft/yr)	Non-Residential[2] (acre-ft/yr)	Total (acre-ft/yr)
Without Conservation	Existing Customers	20,545	2,283	22,828
	Future Customers	24,414	2,713	27,127
	Total	**44,960**	**4,996**	**49,955**
With Conservation	Existing Customers	19,723 [3,5]	2,237 [3,6]	21,961
	Future Customers	20,508 [4,5]	2,496 [4,6]	23,004
	Total	**40,231**	**4,733**	**44,964**
Water Savings	Existing Customers	822	46	867
	Future Customers	3,906	217	4,123
	Total	**4,728**	**263**	**4,991**

1 – Residential demands is 90 % of the total demand
2 – Non-residential demand is 10% of the total demand
3 – Based on 20 % participation
4 – Based on 80 % participation
5 – Based 20% water savings for participating customers
6 – Based 10% water savings for participating customers

Financial incentives could be formulated in many ways, the most common are:

- Providing discounts for customers who reduce their water consumption by a predetermined percentage.
- Providing partial rebates for customers who purchase and install water conservation technologies, such as water efficient washing machines, toilets and showerheads.
- Tiered water rate structures.

EVMWD has already implemented a rebate program for ultra low-flow toilets and for water conserving washing machines. Rebates of up to $60 are given to customers who replace a toilet that uses 3.5 to 5 gallons per flush with one that uses 1.6 gallons per flush. These toilets result in approximate water saving of ten percent for residential customers. Through June 30, 2003, EVMWD is offering a $35 rebate to customers who replace older, high volume washers with more efficient models. These washers save approximately 20 gallons of water per load, which is approximately ten percent of residential water use. In addition, these washers reduce energy use by up to 60 percent. These incentives could be expanded to increase the participation rates in these programs. Examples of other rebate programs and implementation details are included in **Appendix H**.

Basin Monitoring

A basin monitoring program is important to better understand the groundwater basin and to measure the effects of the strategies that are implemented. In addition, basin monitoring provides a basis for effective adaptive management. Basin parameters that should be monitored can be divided into the following categories:

- Water quality (groundwater and surface water)
- Groundwater levels
- Groundwater production
- Surface water levels
- Surface flows
- Precipitation

A preliminary monitoring program is presented in the Groundwater Monitoring Plan (MWH, 2003), and includes the monitoring of the parameters listed above. The monitoring program also includes the installation of new monitoring wells, aquifer testing and land subsidence monitoring.

The information collected will ultimately lead to more efficient implementation of management strategies, as it would provide guidance for adjusting management parameters according to the results over time. The collection of background data will also provide a baseline that can be used to evaluate the success of future programs.

Stakeholder Involvement

Stakeholder involvement is an important component of a successful management plan. The management of the Elsinore Basin involves many regulatory and institutional agencies as well as the general public. Involvement of the community and local agencies early in the process is important to establish a sense of ownership of the program. Examples of agency involvement that can be part of the basin management are:

- Registration of well status and production records with the SWRCB
- Coordination and enforcement of well construction and abandonment with Riverside County and DWR
- Implementation of the basin monitoring program (described above) with EWD and the City of Lake Elsinore

- Definition and implementation of septic tank policies with the City of Lake Elsinore, Riverside County and the RWQCB
- Coordination with RCFCD to maintain dual purpose flood control-surface recharge facilities in local canyons
- Formation of a basin advisory committee that will provide oversight on basin management

Groundwater Quality Protection Programs and Policies

The following is a list of activities that should be implemented as part of each GWMP alternative to protect the groundwater quality in the Elsinore Basin:

- Develop a wellhead protection program
- Develop a well construction and abandonment program
- Develop septic tank conversion policies
- Collect and evaluate land development plans

Wellhead Protection Program

The GWMP recommends that EVMWD implement a protection plan to monitor and protect existing water sources. The recharge areas to the groundwater basin have been formed naturally and are generally located around the periphery of the basin in the undeveloped regions of the basin. These areas tend to be less visited by the public, but are not protected from public access.

This GWMP recommends that EVMWD contact the RWQCB regularly to verify that no new contaminants have been accidentally released into the groundwater basin. If a leak or spill is identified, effective control and clean-up of contaminated groundwater would be conducted by the appropriate parties. This would include a coordinated effort between the appropriate regulatory agencies involved, source control, understanding of the hydrogeology, and delineation of the contamination. The regulatory agencies may include any combination of the following: RWQCB, Department of Toxic Substances Control, U.S. Environmental Protection Agency (EPA), and EVMWD. The degree to which they participate depends on the nature and magnitude of the problem.

Well Construction and Abandonment Program

Improperly constructed wells can result in poor yields and contaminated groundwater by establishing a pathway for pollutants to enter a well from the surface, allowing communication between aquifers of varying quality or the unauthorized disposal of waste into the well. In cooperation with Riverside County (Environmental Health Department), EVMWD should ensure that all wells drilled in the groundwater basin follow the California Water Code §13700 through §13806. The well drilling contractors shall be in possession of an active C-57 Contractor’s license and shall obtain a County permit for the drilling, deepening, modification, or repair of any well in accordance with Riverside County Ordinance 682.3. Minimum standards for the construction of wells are specified in DWR Bulletins 74-81 and 74-90.

The GWMP recommends that EVMWD implement a well abandonment program in cooperation with Riverside County (Environmental Health Department). The program would include the identification of abandoned or improperly destroyed wells within the Elsinore Basin and a well abandonment or capping procedure. A well canvass is recommended for the identification and registration of these wells. Wells would be evaluated and destroyed as necessary. This program would include the property owners and appropriate regulatory agencies. The property owners are responsible to assure that the wells are properly destroyed, if no future use is anticipated, or capped and maintained, if future use is anticipated as outlined in Riverside County Ordinance 682.3. Proper destruction procedures are also specified in the DWR Bulletins 74-81 and 74-90.

Septic Tank Conversion Policies

The GWMP recommends that policies be developed to regulate the installation of septic tanks for new developments as well as the conversion of existing septic tanks that are in close proximity of sewer trunk mains and sewer transmission pipes. Reducing the amount of septic tanks in the basin is beneficial for groundwater quality, possibly lake water quality, and provides a new water source.

Land Development Plans

The GWMP recommends that EVMWD implement a program to regularly collect land development plans that include areas within the groundwater basin, for example every six months. EVMWD can request that the planning agencies contact EVMWD when any permit is applied for to construct the following types of facilities: unsewered residential properties, industrial buildings, production wells, and commercial structures. The use of shallow drainage wells to dispose run-off water should not be approved for construction within the groundwater basin because of the potential for surface contaminants entering the groundwater from these types of facilities.

Activities Not Considered

One activity identified during the stakeholder involvement process that is not considered in this GWMP is to increase the Lake Elsinore's spillway elevation. This activity is excluded from further discussions because of the increased risk for flooding. As discussed previously, Lake Elsinore can discharge to Temescal Wash. The flow rate can be substantial in periods of heavy rain when the runoff from the local and San Jacinto watersheds raises the lake level above the sill elevation in the outflow channel (1,255 feet MSL). This outflow could be reduced if the sill elevation is raised. A higher sill elevation would create more storage capacity in the lake. However, in a severe storm, less water would be discharged to Temescal Wash, hence increasing the 100-year flood elevation. The 100-year flood elevation has been set at 1263.3 feet MSL. It is not possible to increase the flood elevation due to developments around the lake, and therefore an increase of the spillway elevation would reduce the size of storm that could be captured in the existing flood plain. Because the 100-year flood elevation is fixed, the increase of the spillway is not considered as a valid activity for this management plan.

Section 6
Description of Alternatives

This section describes the groundwater management alternatives developed to meet the goals of the GWMP. The alternatives evaluate water management from different conceptual viewpoints, each with the intent of achieving the goals of the GWMP in a timely, cost-effective, and environmentally responsible manner.

Four alternatives are identified to meet the current and future demands of EVMWD, while achieving a sustainable water balance in the Elsinore Basin. Due to the programmatic nature of the GWMP, the alternatives and their associated facilities and programs are conceptual and, other than those programs identified as ongoing projects, may differ in their ultimate configuration. The four different alternatives are:

- Alternative 1 – Dual Purpose Wells
- Alternative 2 – Surface Spreading
- Alternative 3 – In-lieu Recharge and Water Conservation
- Alternative 4 – Combination

The purpose of Alternatives 1, 2 and 3 is to attempt to manage the basin using different strategies to identify those strategies that perform better. Alternative 4 is developed based upon evaluation of the first three alternatives and includes a combination of the best strategies. Each alternative is compared with the baselines discussed in Section 4. For the comparison of alternatives and to evaluate the impact of the different activities on the groundwater levels in the basin, a numerical groundwater model is used to simulate the groundwater response to a repeat of the hydrologic conditions for the period 1961 through 2001. This allows evaluation of basin response over a wide range of wet, normal and dry years. The projected water demands for 2020 are met with Alternatives 1, 3, and 4 using different sources of supply. There is a 3,800 acre-ft/yr deficit under Alternative 2. A detailed summary of the components included in the two baselines and the four alternatives is presented in **Table 6-1.**

MODELING ASSUMPTIONS

Assumptions used in the groundwater modeling and hydraulic modeling of the alternatives are discussed below. The evaluation of the alternatives and the results are discussed in detail in **Section 7**.

Groundwater Model

For each alternative, separate model input files are prepared to represent the conditions of each alternative. Numerical groundwater model input consist of the following:

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Table 6-1
Summary of Alternatives

Item	Baseline A	Baseline B	Alternative 1 Dual Purpose Wells	Alternative 2 Surface Spreading	Alternative 3 In-Lieu Recharge and Water Conservation	Alternative 4 Combination
Water Demand	Year 2000	Year 2020	Same as Baseline B	Same as Baseline B	Year 2020 with 10% water conservation	Same as Baseline B with 5% water conservation
Water Supplies	Current Supplies: • 8 Existing EVMWD Wells • 4 Existing EWD Wells • Canyon Lake WTP • AVP Connection • TVP Connection	• Same as in Baseline A • Joy Street Well • 11 wells for peaking	• Same as in Baseline A • Joy Street Well • Conversion of 4 existing wells to dual purpose wells • 10 new dual purpose wells • 4 wells for peaking	• Same as in Baseline A • Joy Street Well • 5 new extraction wells • 11 wells for peaking	• Same as in Baseline A • Joy Street Well • 8 wells for peaking	• Same as in Baseline A • Equipping Joy Street Well as dual purpose • Conversion of 6 existing wells to dual purpose wells • 7 new dual purpose wells • 4 wells for peaking
Land Use	Year 2000	Year 2020	Same as Baseline B	Same as Baseline B	Same as Baseline B	Same as Baseline B
Lake Replenishment	None	• 7.5 mgd of Recycled Water • 3 Island Wells	Same as Baseline B	Same as Baseline B	Same as Baseline B	• 17.7 mgd of Recycled Water • 1 Island Wells
Septic Tanks	Existing Septic Tanks	Existing Septic Tanks	Conversion of all Septic Tanks in at least the High-Risk Zone	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Special Projects (in addition to the peaking wells)	None	• 17.9 miles of 36-inch to 12-inch diameter pipeline to bring in new source water[2] from the Woodcrest Turnout to Lake St. Tank.	Dual Purpose Wells with imported water: • 3 deep wells north of the lake • 6 deep wells south of the lake[1] • 5 shallow wells south of the lake Other Facilities: • 30-inch diameter pipeline (4,000 ft) • 800 HP pumping station between Cal Oaks and the Back Basin	Surface Spreading with imported water: • 25-acre spreading basin in Leach Canyon • 15-acre spreading basin in McVicker Canyon • 5 extraction wells north of Lake • Pipelines and PS to convey add'l water source to spreading basins	• 8 peaking wells	Dual Purpose Wells with imported water: • 3 deep wells n/o the lake[3] • 6 deep wells s/o of the lake[1] • 5 shallow wells south of the lake Other Facilities: • 30-inch diam. pipeline (4,000 ft) • 800 HP pumping station betw. Cal Oaks and the Back Basin
Basin Monitoring	• Water Quality • Groundwater levels • Groundwater production • Lake levels • Surface flow rates • Rainfall	Same as Baseline A	• Expanded monitoring network for parameters of Baseline A and B • Subsidence	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Stakeholder Involvement	None	None	• Formation of a basin advisory committee	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Wellhead Protection	Existing EVMWD Wells	Same as Baseline A	• Expansion to all active wells in the basin	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Well Construction and Abandonment Program	None	None	• Identification of location/status of wells through a well canvass • Development of a Well Construction and Abandonment Program that includes the coordinates of these activities with Riverside County Department of Environmental Health. • Implementation of policies and regulations	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Land Development Plans	None	None	• Coordination with local and regional planning agencies	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1

1 – Four are existing wells (Cereal 1, Cereal 3, Cereal 4, and Corydon), 2 – New source water could also come from a different location, this project was chosen allocate cost for the supply shortfall, 3 – This includes Joy Street Well.

- recharge due to infiltrating precipitation.
- recharge due to infiltration from the San Jacinto River, irrigation water and septic tanks effluent.
- groundwater pumping of potable wells for potable water demand.
- groundwater pumping of Island wells for lake maintenance.
- direct injection recharge (Alternatives 1 and 4)
- surface spreading recharge (Alternative 2 only)

The amounts are calculated for the hydrologic period from 1961 to 2001 with six-month stress periods. The calculations are based on providing sufficient water supply to meet the year 2020 water demands, balancing the groundwater basin when possible and maintaining the water level of Lake Elsinore at 1,240 feet MSL. A summary of the model input and resulting groundwater balance is presented in **Table 6-2.**

Table 6-2
Summary of Average Groundwater Balance for 2020

	Baseline A	Baseline B	ALT1	ALT2	ALT3	ALT4
Parameter	**acre-ft/yr**	**acre-ft/yr**	**acre-ft/yr**	**acre-ft/yr**	**acre-ft/yr**	**acre-ft/yr**
INFLOWS						
Infiltration of Precipitation						
Rural Areas	1,700	1,700	1,700	1,700	1,700	1,700
Urban Areas	900	700	700	700	700	700
Recharge from Surface Water						
San Jacinto River	1,200	1,200	1,200	1,200	1,200	1,200
Lake Elsinore	0	0	0	0	0	0
Return Flows						
Septic Systems	1,000	1,000	200	200	200	200
Applied Water	700	1,100	1,100	1,100	1,100	1,100
Subsurface Inflows	0	0	0	0	0	0
Groundwater Recharge						
Injection	0	0	6,700	0	0	5,900
Spreading	0	0	0	4,800	0	0
Total Inflows	**5,500**	**5,700**	**11,600**	**9,700**	**4,900**	**10,800**
OUTFLOWS						
Groundwater Pumpage						
Potable Use	(9,900)	(11,300)	(9,400)	(11,300)	(4,100)	(7,900)
Lake Replenishment	0	(900)	(900)	(900)	(900)	0
Dual Purpose Wells	0	0	(1,300)	0	0	(2,800)
Wells for Surface Spreading	0	0	0	(1,300)	0	0
Subsurface Outflow	0	0	0	0	0	0
Total Outflows	**(9,900)**	**(12,200)**	**(11,600)**	**(13,500)**	**(5,000)**	**(10,700)**
Net Surplus/(Deficit)	**(4,400)**	**(6,500)**	**0**	**(3,800)**	**(100)**	**100**

Note: Values shown are averages over the anticipated range of demands and hydrology.

Hydraulic Model

The hydraulic model developed for the Distribution System Master Plan (MWH, 2002) is used to size pipelines and booster stations and to evaluate system pressures and reservoir response in each of the four alternatives. The maximum injection and extraction capacities as summarized in **Table 6-3.**

Table 6-3
Maximum Injection and Extraction Capacities

Well Name	Extraction Rate (gpm)	Injection Rate (gpm)
Cereal Wells 1, 3, and 4	1,750	1,400
Corydon Well	1,000	750
Olive Street Well	350	None
Palomar Well	300	None
Lincoln Well	935	750
Machado Well	1,250	750
Joy Street Well	1,000	750
Proposed deep dual purpose wells in the Back Basin (Cereal 2 and Crawford)	1,750	1,400
Proposed shallow dual purpose wells in the Back Basin	700	350
Proposed deep dual purpose wells north of Lake Elsinore	1,000	750
Proposed wells north of Lake Elsinore for Extraction of Surface Spreading in Canyons (McVicker 1 and 2, Leach 1 and 2, Terra Cotta)	600	None

For the hydraulic simulations, the following assumptions are made:

- The demands in the hydraulic model include the water demands of EVMWD only. Demands of private pumpers and EWD are not taken into consideration as they are not served from the EVMWD system.
- For the simulation of injection scenarios, the ADD of year 2020 is used, as injection will only occur during winter months.

- For the simulation of extraction scenarios, the MDD of year 2020 is used. Because extraction occurs during summer months, including the maximum day. MDD corresponds with a peaking factor of 2.0. Some scenarios are modeled at lower demands without the additional proposed peaking wells.
- Injection and extraction do not occur at the same time.
- Injection and extraction do not necessarily occur at maximum rates.
- The maximum capacity of Canyon Lake WTP is 9.0 mgd (6,250 gpm).
- The maximum connection capacity of the AVP is 24.2 mgd (16,805 gpm). The existing pumps are capable of pumping more than the rated connection, but flows are limited to the capacity of the connection.
- The maximum capacity of the TVP is 26.5 mgd (18,403 gpm), with the proposed pump station.
- The Island wells are not included in hydraulic model runs.

A comparison of the supplies and demands for each alternative is provided in **Table 6-4**. Details of supplies and demands presented in this table are discussed under each alternative. **Table 6-5** presents a Lake Elsinore balance for each alternative.

ALTERNATIVE 1 – DUAL PURPOSE WELLS

The purpose of Alternative 1 is to achieve a balanced groundwater basin through a conjunctive use program using dual-purpose injection-extraction wells. Treated water would be injected during periods when replenishment water is available. The new dual-purpose wells would be used to extract stored groundwater when additional supplies are required to meet the year 2020 demands.

Water Demands

Alternative 1 includes the same water demands and land use as Baseline B.

Water Supplies

Alternative 1 requires the equipping of 14 dual-purpose wells. These dual-purpose wells would increase the groundwater extraction capacity for potable use from 13,350 gpm (Baseline B) to 21,300 gpm. The 14 dual-purpose wells include:

- Four existing wells (Corydon, Cereal 1, Cereal 3, and Cereal 4) would be converted to dual purpose wells
- Two new deep dual purpose wells in the Back Basin area (Cereal 2 and Crawford-5)
- Five new shallow dual purpose wells in the Back Basin area (South Alluvial 1 through 5)
- Three deep dual purpose wells in the area north of Lake Elsinore (North Deep 1 through 3)

Injection would take place between October and March in years when replenishment water is available, which depends on the hydrologic conditions of the sources that contribute to MWDSC's overall supply. The dual-purpose wells would be used for extraction in the summer months of dry years when the demands increase and the available imported supply from MWDSC is reduced.

To meet the MDD in year 2020, three additional wells are required to provide peaking capacity, assuming that each well has a capacity of 1,000 gpm.

Table 6-4
Projected Average Supplies and Demands for 2020

	Baseline A acre-ft/yr	Baseline B acre-ft/yr	ALT1 acre-ft/yr	ALT2 acre-ft/yr	ALT3 acre-ft/yr	ALT4 acre-ft/yr
Demands						
Potable Demands	23,400	50,500	50,500	50,500	45,500	48,000
Water Conservation	0	0	0	0	5,000	2,500
Total Demands	**23,400**	**50,500**	**50,500**	**50,500**	**50,500**	**50,500**
Supplies to Meet Demand						
Groundwater						
Existing or Planned Wells	9,900	11,300	9,400	11,300	4,100	7,900
Additional Wells	0	0	1,300	1,300	0	2,800
Imported Water						
AVP	6,600	22,600	22,600	22,300	22,600	18,100
TVP	3,900	13,600	14,200	12,600	15,800	16,200
Canyon Lake WTP	3,000	3,000	3,000	3,000	3,000	3,000
Total Supplies	**23,400**	**50,500**	**50,500**	**50,500**	**45,500**	**48,000**
Lake Replenishment						
Groundwater	0	900	900	900	900	0
Recycled Water	0	2,300	2,300	2,400	2,300	3,400
Total Lake Replenishment	**0**	**3,200**	**3,200**	**3,300**	**3,200**	**3,400**
Groundwater Recharge						
Injection Wells	0	0	6,700	0	0	5,900
Surface Spreading	0	0	0	3,800	0	0
Capture of Add'l Runoff	0	0	0	1,000	0	0
Net In-Lieu Recharge	0	0	600	0	7,200	600
Total GW Recharge	**0**	**0**	**7,300**	**4,800**	**7,200**	**6,500**
Imported Supplies						
Direct Use						
Normal Deliveries	10,500	36,200	35,900	34,900	34,500	33,700
In-lieu Deliveries [1]	0	0	900	0	3,900	1,100
Injection Wells	0	0	6,700	0	0	5,900
Surface Spreading	0	0	0	3,800	0	0
Total Imported Supplies	**10,500**	**36,200**	**43,500**	**38,700**	**38,400**	**40,200**

Note: Values shown are averages over the anticipated range of demands and hydrology.
1 In-lieu deliveries are the volume of water delivered to offset groundwater pumping remaining in storage for at least one year.

Table 6-5
Summary of Projected Lake Elsinore Balance for 2020

Item	Baseline A	Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
INFLOWS						
Groundwater Pumping	0	900	900	900	900	0
Precipitation on Lake	3,800	3,800	3,800	3,800	3,800	3,800
Local Runoff	1,500	1,500	1,500	1,300	1,500	1,500
San Jacinto River	13,800	13,800	13,800	13,800	13,800	13,800
Recycled Water	0	2,300	2,300	2,400	2,300	3,400
Total Inflow	**19,000**	**22,300**	**22,300**	**22,200**	**22,300**	**22,500**
OUTFLOWS						
Evaporation Losses	15,600	15,600	15,600	15,600	15,600	15,600
Spills	6,000	6,700	6,700	6,600	6,700	6,700
Total Outflow	**21,600**	**22,300**	**22,300**	**22,200**	**22,300**	**22,500**
Lake Balance	**(2,600)**	**0**	**0**	**0**	**0**	**0**

Note: Values shown are averages over the anticipated range of demands and hydrology.

The injection and extraction cycles of Alternative 1 as a function of the hydrologic conditions of 1960 through 2001 are shown on **Figure 6-1**. During the 41-year hydrologic cycle, about 274,000 acre-ft of imported water would be injected, and 54,000 acre-ft of additional water would be extracted. With these operations, the groundwater basin remains in a long-term balance.

Figure 6-1 shows that injection would take place in 33 of the 41 years. Over the 41-year period, an average of 6,700 acre-ft/yr would be injected. Extraction would take place during 22 out of the 41 years. Dual-purpose wells would be used in combination with existing wells to meet demands during these periods when surplus water is not available. In addition, because dual-purpose wells would not be pumping at the same time as injection, imported water would be purchased for in-lieu recharge. With Alternative 1, pumping in the winter months is reduced an average of 1,900 acre-ft and increased an average of 1,300 acre-ft during the summer months. The net long-term in-lieu recharge is approximately 600 acre-ft/yr over the 41-year period of record. However, because an average of 900 acre-ft/yr of the in-lieu water stored remains in storage for more than one year, this amount can be purchased at the long-term storage rate. Details of the long-term storage rate program are provided in Section 7.

The water supply distribution for 2020 demands in average, wet and dry years is shown in **Figure 6-2**. As shown in this figure, extraction from dual purpose wells is only required in dry years, while the increased water production at Canyon Lake WTP plant is available to meet the

Figure 6-1
Injection and Extraction Cycles of Alternative 1

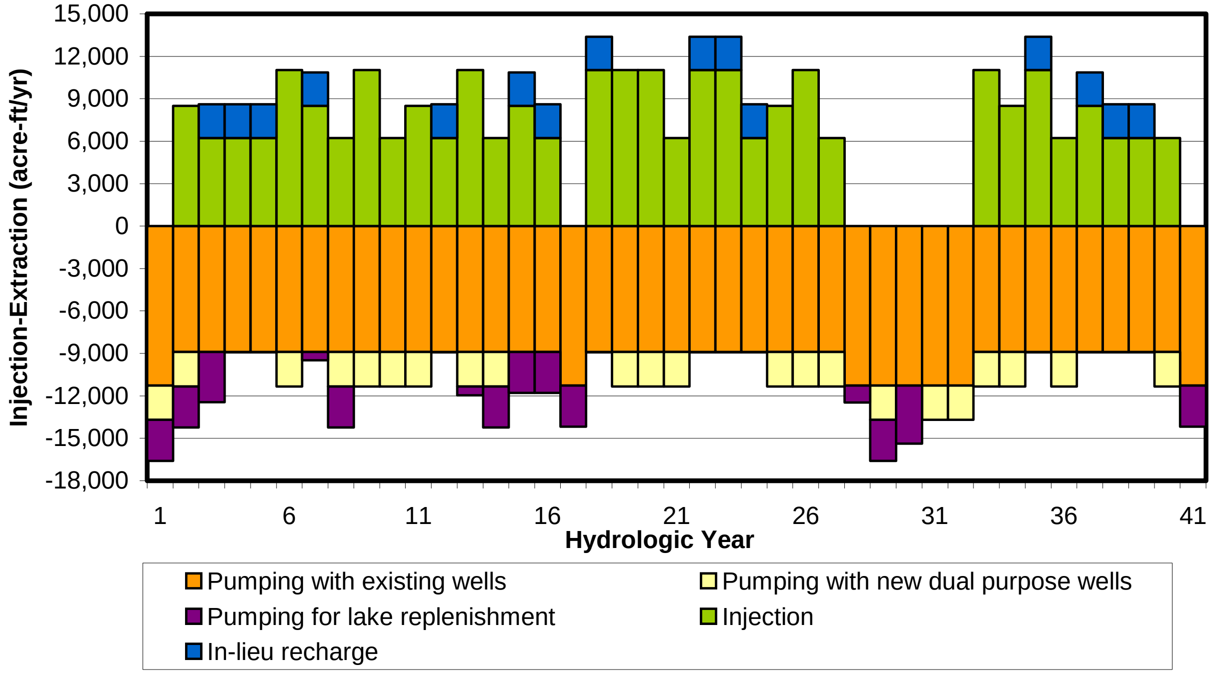
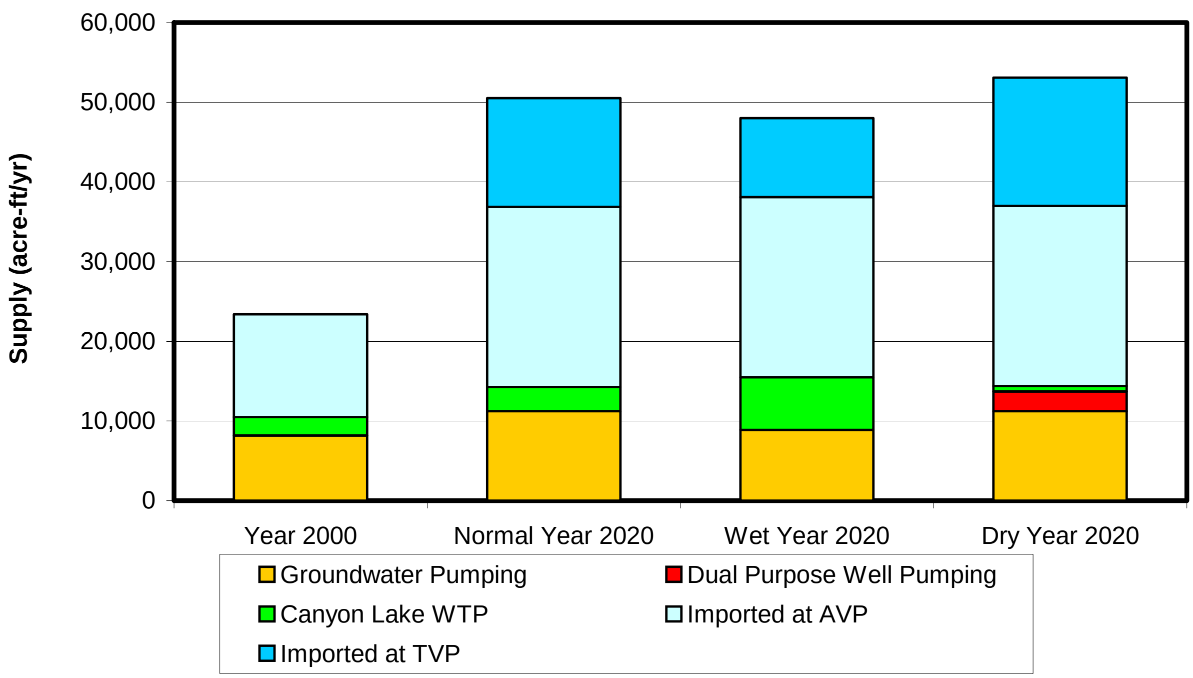


Figure 6-2
Year 2020 Potable Supplies with Alternative 1



water demands in average and wet years. On an average annual basis, about 73 percent of the demand are supplied from imported water, 21 percent from groundwater pumping and 6 percent from Canyon Lake WTP. It should be noted that these supply distributions are based on six-month average demands, and that dual purpose wells and peaking wells would need to be available to provide peaking capacity.

Analyses with a hydraulic distribution system model are performed to size any additional facilities to maintain sufficient system pressures during extraction and injection cycles. For extraction, a 30-inch diameter pipeline of about 4,000 lineal feet is required along Corydon Street from Palomar Street to Cereal Street. For injection, it is most cost-effective to build an 800 HP inline booster station near the I-15 and Clinton Keith Rd to lift the water imported from the AVP connection. For water imported through the TVP connection, it is assumed that the inline booster station at Grand Avenue can be used (reserving the direction) to lift water flowing from TVP to the Back Basin.

Septic Tanks

Alternative 1 assumes that all septic tanks in at least the high-risk zone (see Section 5) would be connected to the sewer system by 2020. Approximately 2,900 septic tanks, or 80 percent of all the septic tanks in the basin, are located within the high-risk zone of the basin. The conversion of these septic tanks to the sewer system reduces the amount of infiltration from approximately 1,000 acre-ft/yr to about 200 acre-ft/yr. Although not included in this GWMP, it is recommended that all septic tanks within the Elsinore groundwater basin be converted to sewer.

Lake Replenishment

Lake replenishment activities would be the same as Baseline B.

ALTERNATIVE 2 – SURFACE SPREADING

The purpose of Alternative 2 is to achieve a long-term groundwater balance using spreading basins in the Leach and McVicker Canyons to maximize the capture of local runoff water and other available water sources. Imported water from MWDSC or recycled water from the Regional WWTP would be infiltrated in the spreading basins to supplement local runoff, in order to permit conjunctive use operation of the basin. New wells would be required in the area north of the lake to extract water that is recharged in the spreading basins. By spreading more water than is extracted, a more sustainable water balance is anticipated. For this alternative, the maximum amount of recharge at Leach and McVicker Canyon is applied assuming that the maximum size recharge facility described in **Section 5** could be constructed. Based upon recent investigations, recharge in these areas may not feasible and may limit the ability of this alternative to achieve a sustainable yield. In addition, the San Jacinto River recharge project described in Section 5 is not included because the groundwater impacts of recharge at this location are unknown given current understanding of the basin.

Water Demands

Alternative 2 includes the same water demands, land use, and lake replenishment assumptions as Baseline B, and the same septic tank assumptions as described under Alternative 1.

Water Supplies

In addition to the supplies listed in Baseline B, Alternative 2 contains five additional extraction wells to extract water that is recharged in the spreading basins. These five wells have a combined capacity of 3.5 mgd (2,400 gpm). In addition, 11 extra wells with a combined capacity of 16.5 mgd (12,000 gpm) are required to provide peaking capacity to meet the MDD in year 2020, assuming that these peaking wells have an capacity of 1,000 gpm each.

The two surface spreading grounds and the extraction wells are sized as follows:

- One surface spreading facility would be located in McVicker Canyon with 15 wetted acres and an infiltration capacity of about 1,900 acre-ft in six months.
- One surface spreading facility would be located in Leach Canyon with 25 wetted acres. This spreading basin is divided into two areas, the upper area (6 acres) and the lower area (19 acres).
- Five new extraction wells would be located north of the lake with a total extraction capacity of 2,400 gpm.

More details on the sizing of the spreading facilities are presented in **Section 5**. The ponds would be available for infiltration of imported water approximately 67 percent of dry weather days in the six-month operation period to allow for wetting and drying cycles. Volume would be reserved to provide retention of runoff. During rain events, the basins would be fully functional. The pond maintenance would occur during periods of inactivity. The spreading of local runoff can be supplemented with four different supply sources: treated imported water, untreated imported water and recycled water from the Regional WWTP or recycled water from EMWD. The required facilities are determined using the hydraulic distribution system model and are described below. The most cost-effective source will be determined in the alternative evaluation. For calculations in this report, the use of treated imported water is assumed.

Option 1 – Treated Imported Water

To deliver 11.8 mgd of treated imported water from the TVP, a 36-inch diameter pipeline of approximately 6,000 lineal feet would need to be constructed from the intersection of Lake Street and Mountain Street to the inlet locations of Leach Canyon and McVicker Park. A 30-inch diameter pipeline of approximately 7,400 lineal feet would need to be constructed from McVicker Park to the inlet location of Leach Canyon and a 24-inch diameter pipeline of approximately 5,000 lineal feet would need to be constructed from McVicker Park to the inlet location of McVicker Canyon. These inlet locations will be at the upper part of the spreading basins, where water can flow into the spreading facility by gravity. This recommendation also uses the existing 21-inch pipeline in the 1601 pressure zone along Lake Street and assumes that the Alberhill pump station as recommended in the Distribution System Master Plan is implemented (210 HP pump station from the 1434 pressure zone to the 1601 pressure zone). To pump the water from the 1601 pressure zone to the top of the spreading basins (1820 feet MSL), an 800 HP pumping station expansion at Rice Canyon Pump Station needs to be constructed. The assumptions used for the availability of treated imported water are the same as in Alternative 1.

Option 2 – Untreated Imported Water

To deliver 11.8 mgd of untreated imported water, a 36-inch diameter pipeline of approximately 48,000 lineal feet needs to be constructed from the Canyon Lake outlet at the Railroad Canyon Dam to McVicker Park. A 30-inch diameter pipeline of approximately 7,400 lineal feet would need to be constructed from McVicker Park to the inlet location of Leach Canyon and a 24-inch diameter pipeline of approximately 5,000 lineal feet would need to be constructed from McVicker Park to the inlet location of McVicker Canyon. In addition, a 2,000 HP booster station would be required to pump the water to the spreading basins, as the water level in Canyon Lake level varies between 1,372 and 1,382 feet MSL and the inlet point at both canyons is at about 1,820 feet MSL.

Option 3 – Recycled Water from the Regional WWTP

To deliver 5.9 mgd of recycled water from the Regional WWTP, a 24-inch diameter pipeline of approximately 22,000 lineal feet needs to be constructed to convey water to McVicker Park. A 20-inch diameter pipeline of approximately 7,400 lineal feet would need to be constructed from McVicker Park to the inlet location of Leach Canyon and a 16-inch diameter pipeline of approximately 5,000 lineal feet would need to be constructed from McVicker Park to the inlet location of McVicker Canyon. In addition, a 1,200 HP pumping station would need to be constructed from the plant to the inlet locations of the spreading basins, as the discharge outlet of the Regional WWTP is approximately 1,253 ft MSL and the inlet point at both canyons is about 1,820 ft MSL. It is assumed that not more than 50 percent of water infiltrated in the spreading basins can consist of recycled water in accordance with DHS regulations for recharge with recycled water. Therefore, recycled water can only be used in combination with local runoff and imported water. It should be noted that this source is only available when recycled water is not used for lake replenishment.

Option 4 – Recycled Water from EMWD

In periods when EMWD pumps recycled water to Temescal Wash for discharge, this water can be captured and pumped to the spreading basins. Assuming that up to 5.9 mgd of recycled water would be available from EMWD (likely only in wet years), a 36-inch diameter pipeline of approximately 25,000 lineal feet needs to be constructed to convey water to McVicker Park from the EMWD outlet point. A 30-inch diameter pipeline of approximately 7,400 lineal feet would need to be constructed from McVicker Park to the inlet location of Leach Canyon and a 24-inch diameter pipeline of approximately 5,000 lineal feet would need to be constructed from McVicker Park to the inlet location of McVicker Canyon. In addition, a 2,400 HP booster station would be required to pump the water to the spreading basins, as the elevation at the EMWD outlet point is 1,255 ft MSL and the inlet point at both canyons is about 1,820 feet MSL.

Cost Comparison of Various Sources

The cost of using recycled water for surface spreading versus treated and untreated imported water is estimated to determine which source is the most cost-effective. The results of this comparison are shown in **Table 6-6**, while details on the items included in each option are presented in **Appendix I**.

Table 6-6
Cost Comparison Surface Spreading Water Sources

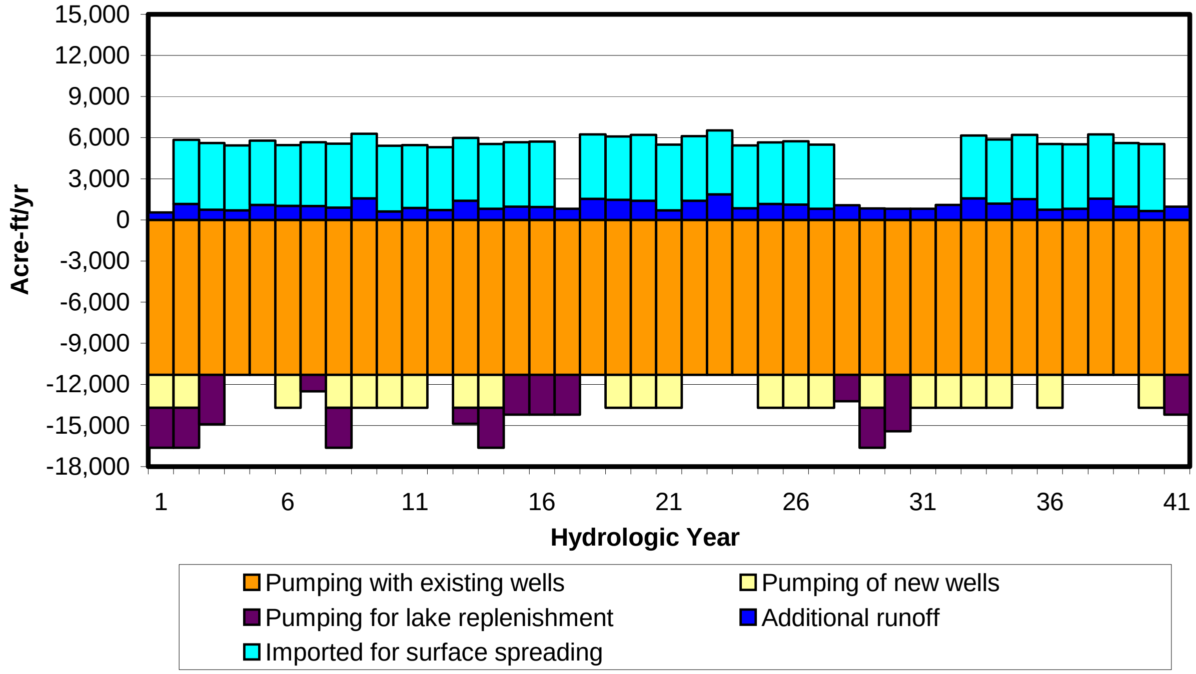
Item	Option 1 Treated, Imported Water	Option 2 Untreated Imported Water	Option 3 Recycled Water from Reg. WWTP	Option 4 Recycled Water from EMWD
Capital Cost	$ 8,400,000	$ 28,400,000	$ 15,200,000	$ 16,400,000
Annual Capital Cost	337,000	1,053,000	605,000	641,000
Annual Power Cost	232,000	580,000	464,000	638,000
Annual Supply Cost	1,260,000	978,600	630,000	976,000
Total Annual Cost	$ 1,829,000	$ 2,611,600	$ 1,699,000	$ 2,255,500
Total Supply (acre-ft/6 months)	**4,200**	**4,200**	**2,100**	**2,100**
Unit Cost per acre-ft	**$435**	**$622**	**$809**	**$1,074**

Based on the cost estimates of the four options, it can be concluded that the use of treated imported water is the least expensive, and the other three sources are about 1.5 to 2.0 times more expensive. The higher costs for the options with recycled water are caused by the draft DHS regulation that not more than 50 percent of the water spread can be recycled water. This requirement result in double infrastructure improvements to convey and pump both treated imported water and recycled water to the spreading basins. It should be noted that the cost per acre-foot is likely to be lower, when the same recycled water pipeline is used to serve irrigation demands along the route of the pipeline including McVicker Park. Although the investigation of the extend of this potential recycled water demand is beyond the scope of this project, it is not expected that this will reduce the cost of Option 3 and 4 below $435 per acre-foot. As shown in **Table 6-6**, the capital cost increases with distance. As the untreated MWDSC water is the furthest away from the spreading basin locations, high capital investments are required for a pipeline and pumping station from Canyon Lake to the spreading basin. The Regional WWTP is closer to the basins than the connection with EMWD near the sill in the Lake outlet channel, which results in slightly lower capital cost. The cost of using treated imported water is the lowest because of a combination of 1) the shorter distance to the spreading basins, 2) lower pumping cost, and 3) because the existing distribution system can partially be used to convey treated imported water. A detailed cost summary is included in **Appendix I**.

The amounts of surface spreading with local runoff and imported water/recycled supplies, and the associated extraction with the four new extraction wells to meet the year 2020 demands are shown on **Figure 6-3** as a function of the hydrologic conditions from October 1960 through September 2001. As shown in this figure, the amount of water spread would always be greater than zero, even in years that imported or recycled replenishment water is not available, as local runoff will contribute some amount of recharge.

During the 41-year hydrologic cycle, about 197,000 acre-ft of water is recharged in the spreading basins, 22 percent from local runoff and 78 percent from imported or other source water. During the 41-year period, about 42,000 acre-ft would be extracted. Replenishment would take place

Figure 6-3
Surface Spreading and Extraction Cycles Alternative 2



every year, ranging from 540 to 6,540 acre-ft in six months. Extraction would take place during 22 years of the 41-year period and ranges from 0 to 1,930 acre-ft in six months. With these operations, the groundwater basin has an average deficit of 3,800 acre-ft/yr compared to 6,400 acre-ft/yr in Baseline B. Availability of suitable land limits the surface spreading capacity, hence a sustainable groundwater balance is not achieved in this alternative. No in-lieu recharge would occur with Alternative 2 because wells would not be turned off during the recharge operations.

The water supply distribution for the year 2020 demands in average, wet and dry years is shown on **Figure 6-4**. As shown in this figure, groundwater pumping with the four new wells that extract the water recharged in the canyons is only required in dry years. It should be noted that this supply distribution does result in a groundwater deficit of approximately 3,800 acre-ft/yr as presented in **Table 6-2**. When this amount is subtracted from the groundwater pumping amounts and replaced by additional imported water supplies, a sustainable groundwater balance is achieved. This situation is presented graphically on **Figure 6-5**. It should be noted that these supply distributions are based on six-month average demands, and that peaking wells would need to be available to provide peaking capacity.

Figure 6-4
Year 2020 Potable Supplies for Alternative 2

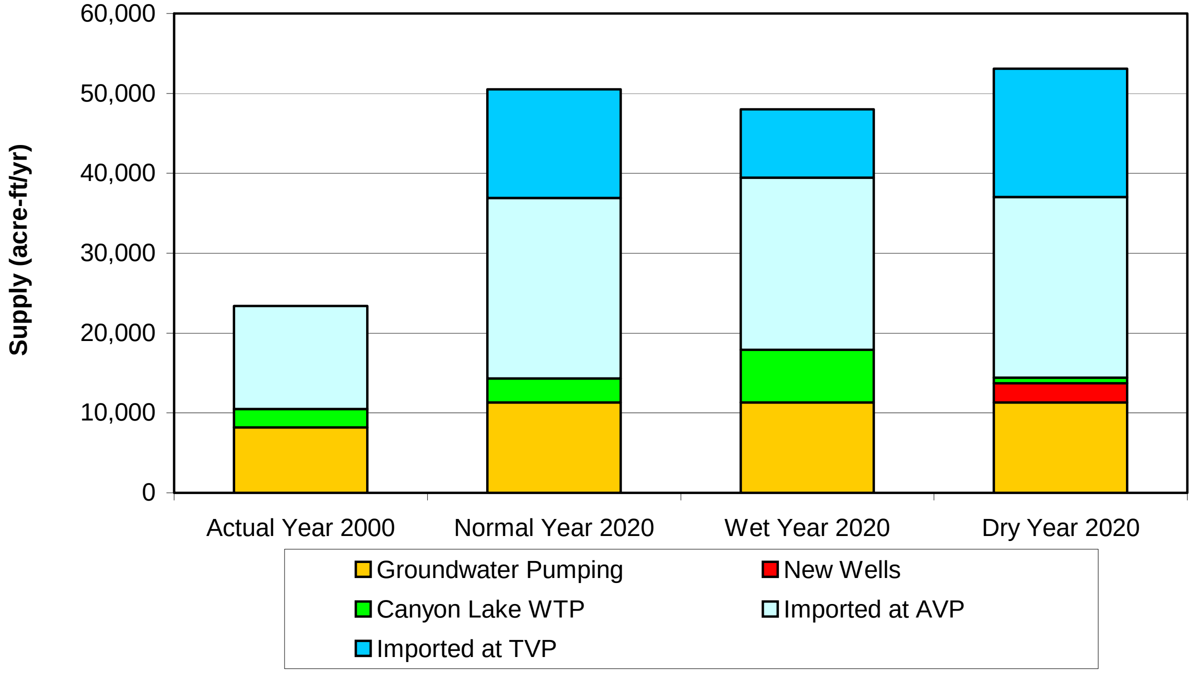
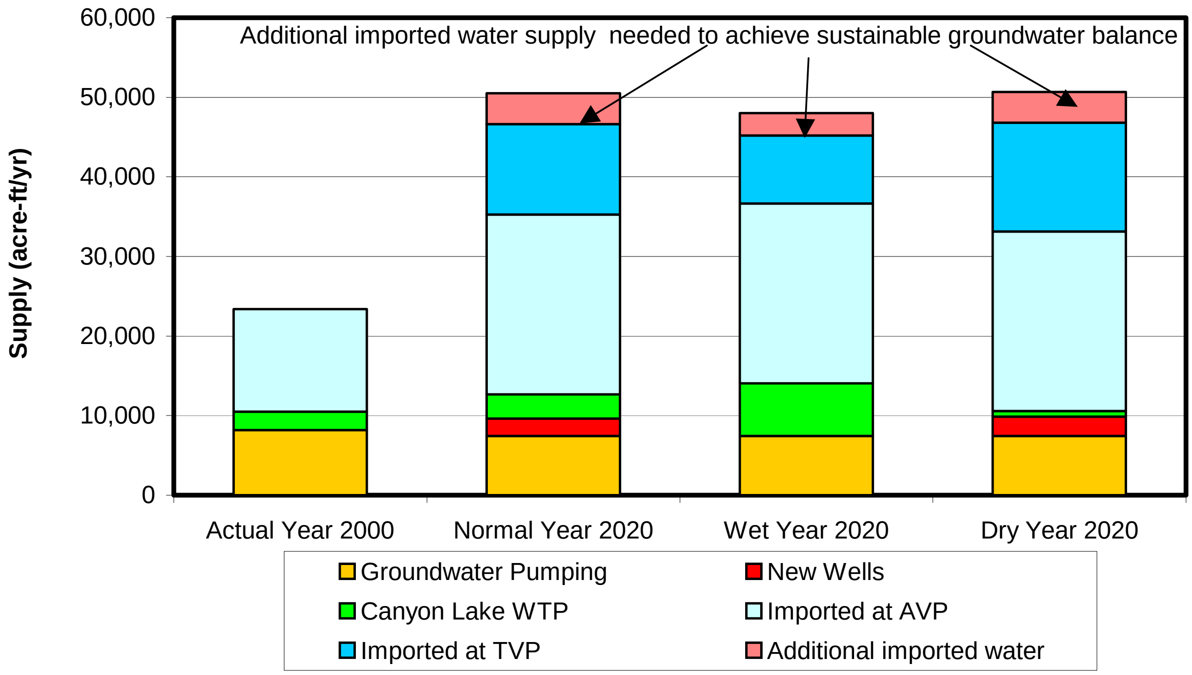


Figure 6-5
Supply Mix to Meet Year 2020 Demands
with Sustainable Groundwater Balance– Alternative 2



ALTERNATIVE 3 – IN-LIEU RECHARGE

The purpose of Alternative 3 is to achieve a long-term groundwater balance using a combination of in-lieu recharge and water conservation. With in-lieu recharge, the amount of imported water used would be maximized to reduce groundwater pumping, hence increasing the basin storage as natural inflows continue. For in-lieu recharge, construction of new facilities is not required, with the exception of the eight new wells are needed to provide peaking capacity to meet MDD in year 2020 assuming that these peaking wells have a capacity of 1,000 gpm each.

Alternative 3 includes the same water supply, land use and lake replenishment assumptions as Baseline B and the same septic tank assumptions as described under Alternative 1. Differentiating components and activities are described below.

Water Demands

The water demands in Alternative 3 would be reduced as discussed in the water conservation portion of Section 5. The average annual water demand in normal demand years is assumed to decrease from 50,500 acre-ft/yr to 45,500 acre-ft/yr, a reduction of ten percent. Annual water demands are assumed to vary plus or minus five percent between hot, dry years and cool, wet years compared to normal year conditions.

Water Supply

The amounts of groundwater pumping, imported water for in-lieu recharge as a function of the hydrologic conditions from October 1960 through September 2001 are shown on **Figure 6-6**. About 50 percent of the groundwater pumping of Baseline B is replaced with imported water in Alternative 3. With this alternative, pumping is reduced approximately 3,900 acre-ft during the winter months and 3,300 acre-ft during the summer months. This pumping is replaced with imported water creating in-lieu recharge. The winter recharge could be purchased at long-term storage rates.

The water supply distribution for the year 2020 demands in average, wet and dry years is shown on **Figure 6-7**. As shown in this figure, the groundwater pumping in wet years is almost zero and primarily offset by the increased production of Canyon Lake WTP. The reduced water demands due to conservation measures can be met with imported water when in-lieu replenishment takes place. These assumptions are based on calculations that balance the groundwater basin over the 41-year period while meeting year 2020 demands. Alternative 3 achieves a balanced groundwater basin, meaning that the amount extracted is equal to the amount replenished over the 41-year period. In this alternative, 85 percent of the average water demands are supplied from imported water, nine percent from groundwater and six percent from the Canyon Lake WTP.

It should be noted that these supply distributions are based on a six-month average demands, and that peaking wells would need to be available to provide peaking capacity.

Figure 6-6
Groundwater Pumping and In-Lieu Recharge – Alternative 3

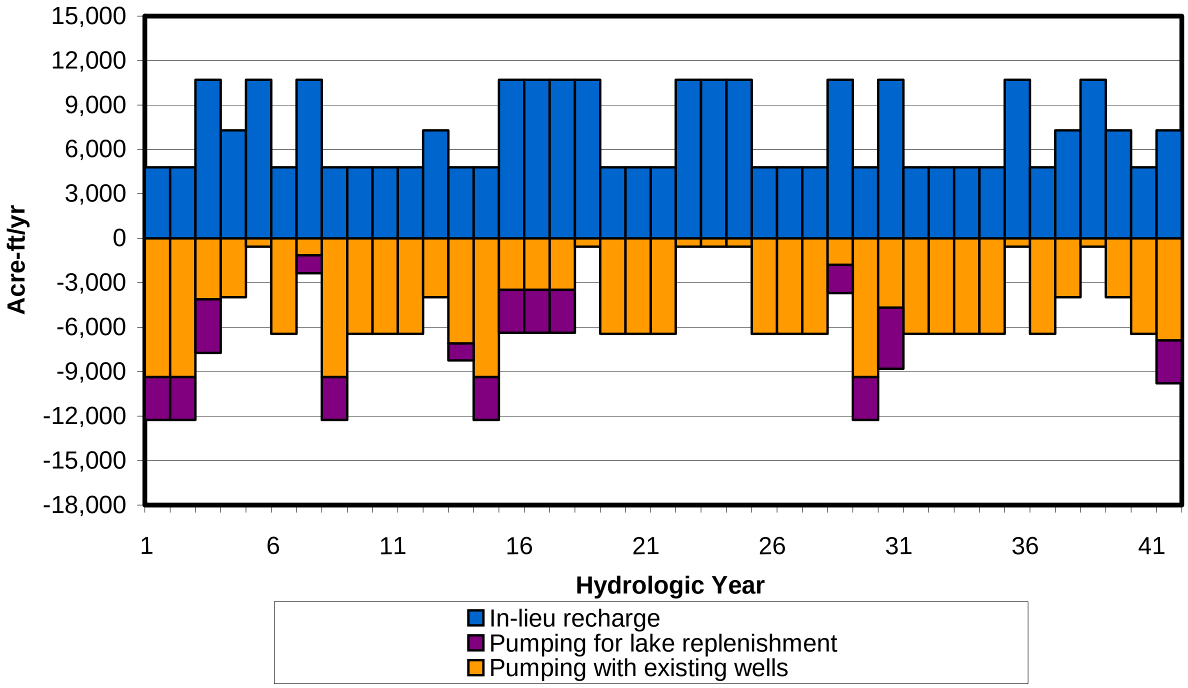
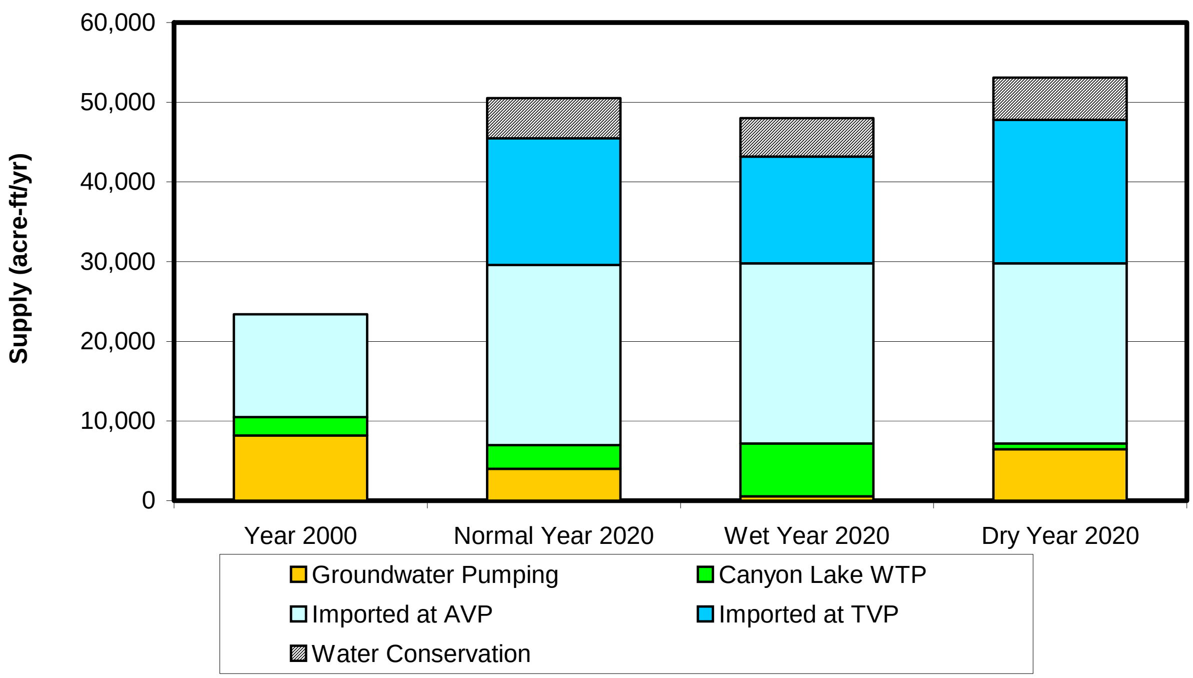


Figure 6-7
Year 2020 Potable Supplies for Alternative 3



ALTERNATIVE 4 – COMBINATION ALTERNATIVE

The purpose of Alternative 4 is to achieve a long-term groundwater balance using a combination of dual-purpose wells, in-lieu recharge, and water conservation. Dual-purpose wells would be installed in the Back Basin area as well as in the area north of Lake Elsinore. Similar to Alternatives 1 through 3, injection of treated imported water is only possible in periods when MWDSC makes replenishment water available.

As discussed above, spreading basins in McVicker Canyon and the upper portion of Leach Canyon may not be feasible. In addition, as is discussed in more detail in Section 7, Alternative 1 performed better than Alternative 2 in the northwest portion of the basin in terms of water level response and cost. Due to the high cost of pipelines and booster stations to convey the relatively small amount of supplemental water and the small amount of local runoff captured from these facilities, surface spreading is not included in Alternative 4.

For this alternative, construction of new dual-purpose wells, pipelines and booster stations is required. Alternative 4 includes the same land use assumptions as Baseline B and the same septic tank assumptions as described under Alternative 1. Differentiating components and activities are described below.

Water Demands

The water demands in Alternative 4 would be reduced with five percent compared to ten percent in Alternative 3. It is anticipated that this degree of water conservation is feasible without many financial incentives, as the projected demands of the Distribution Master Plan did not include any water conservation while current building codes require the installation of water saving devices. The average annual water demand in a normal year would decrease from 50,500 acre-ft/yr to 48,000 acre-ft/yr. Annual water demands are assumed to increase five percent in dry years and decrease five percent in wet years compared to normal year conditions.

Water Supplies

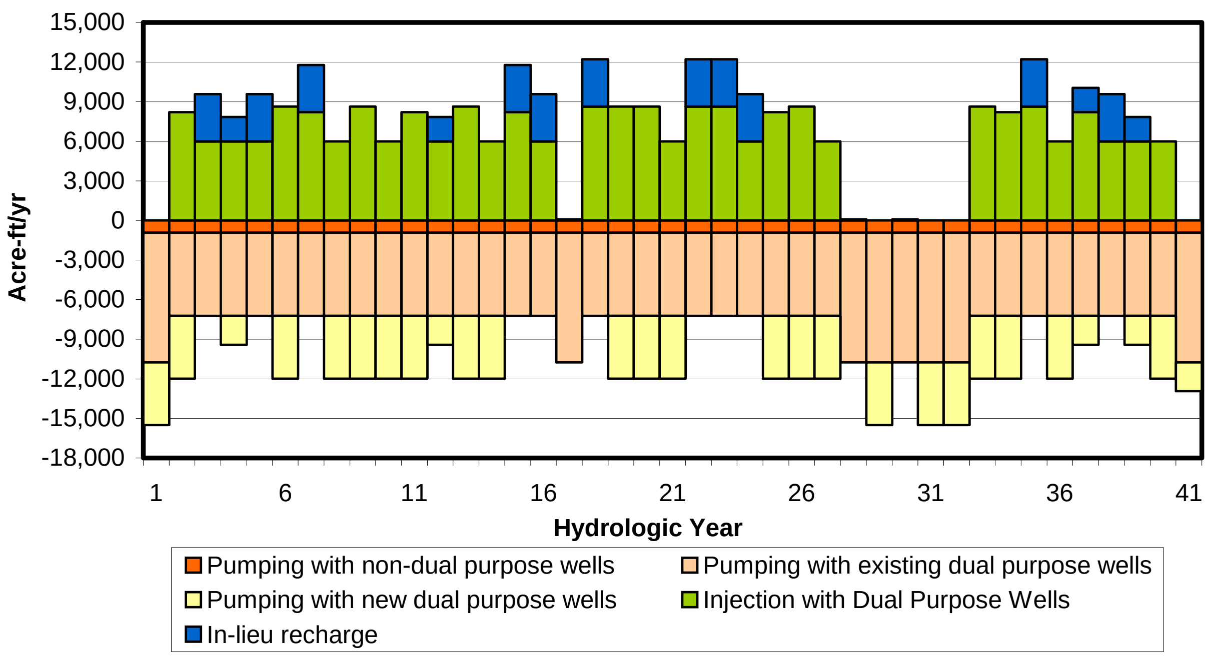
In addition to the supplies listed in Baseline B, Alternative 4 has 14 dual-purpose wells. Injection would take place between October and March in years when replenishment water is available, which depends on the hydrologic conditions of the sources that contribute to MWDSC's overall supply. The dual-purpose wells would be used for extraction in the summer months of dry years when the demands increase and the available imported supply from MWDSC is reduced. These dual-purpose wells are:

- Existing wells in the Back Basin area (Corydon, Cereal 1, Cereal 3, and Cereal 4) would be converted to dual purpose wells
- Two new deep dual purpose wells in the Back Basin area (Crawford-5 and Cereal 2)
- Five new shallow dual purpose wells in the Back Basin Area (South Alluvial 1 through 5)
- Joy Street well would be equipped as a dual purpose well
- Two new deep dual purpose wells in the area north of Lake Elsinore

In addition, four additional wells with a capacity of 1,000 gpm each are needed to provide peaking capacity to meet MDD.

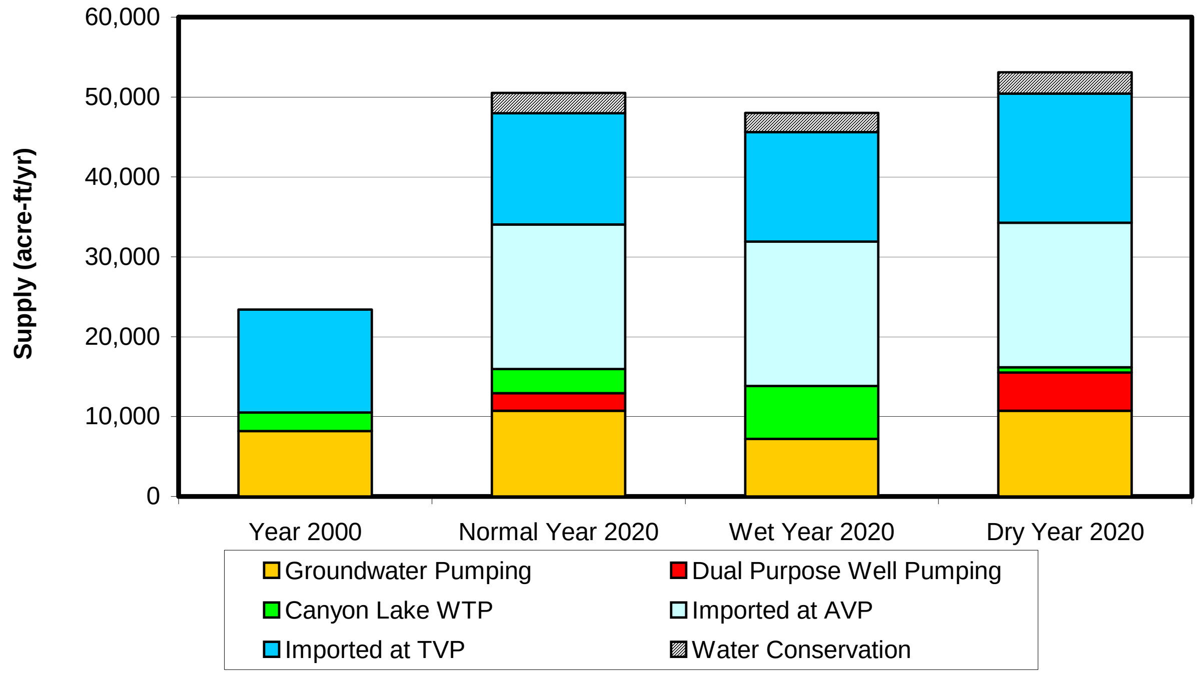
Figure 6-8 shows the injection and extraction cycles of Alternative 4 as a function of the hydrologic conditions of 1960 through 2001. During the 41-year hydrologic cycle, about 240,000 acre-ft of imported water would be injected. With these operations, the groundwater basin remains in a long-term balance, meaning that the amount extracted is equal to the amount replenished over the 41-year period. As shown in this figure, lake replenishment from groundwater (because lake replenishment is provided by recycled water as discussed below) is insignificant, hence, less injection of imported water is required to maintain a sustainable groundwater balance. As a result, potable groundwater pumping is reduced by an average of 3,100 acre-ft during the winter. Pumping is increased by about 2,500 acre-ft during the summer, which results in a net in-lieu recharge of about 600 acre-ft/yr. However, approximately 1,100 acre-ft of the in-lieu water stored during the winter months remains in storage for more than one year, which allows EVMWD to take advantage of long-term storage water rates. More details on this issue are provided in **Section 7**.

Figure 6-8
Groundwater Pumping and Injection – Alternative 4



The water supply distribution for the year 2020 demands in average, wet and dry years is shown on **Figure 6-9**. As shown in this figure, the dual purpose well are only required in dry years, when demands increase and the production of Canyon Lake WTP is almost zero. Alternative 4 achieves a balanced groundwater basin, In this alternative, 71 percent of the average potable water demands are supplied from imported water (not including water used for replenishment), 23 percent from groundwater and six percent from the Canyon Lake WTP. It should be noted that these supply distributions are based on a six-month average demands, and that dual purpose wells and peaking wells would need to be available to provide peaking capacity.

Figure 6-9
Supply of Year 2020 Demand with Alternative 4



Lake Replenishment

Lake replenishment is assumed to be accomplished with recycled water and groundwater when the lake level drops below elevation 1,240 feet MSL. Recycled water would be used as the primary source of replenishment water up to 17.7 mgd. This is the projected capacity of the Regional WWTP in year 2020 minus 0.5 mgd for environmental discharge to Temescal Wash. One of the three Island wells would be used as the secondary source when the recycled water supply is not adequate to maintain the Lake level at elevation 1,240 MSL. Based on lake balance calculations, replenishment with groundwater occurred twice in 41 years. In addition, recycled water from EMWD could be used if necessary.

Note that since the technical analyses in this report were completed, The Lake Elsinore-San Jacinto Watershed Authority (LESJWA) issued a draft program environmental impact report (EIR) for the Lake Elsinore Stabilization and Enhancement Project in March 2005. This EIR included an updated analysis of lake replenishment needs using the 1928-2001 hydrologic period. The results of this analysis differ from those presented in this GWMP due to the different hydrologic periods and criteria for replenishing the lake. For this project, lake replenishment would take place when the lake elevation dropped below 1,247 ft MSL. Although, the results of the LESJWA investigation differs from those of the GWMP, the effect of pumping on the groundwater basin is similar to that evaluated in the GWMP.

In addition, The Regional Water Quality Control Board adopted Total Maximum Daily Loads (TMDLs) for nutrients in Canyon Lake and Lake Elsinore in December 2004. With the adoption of the TMDLs, the use of Eastern MWD effluent for lake replenishment is not expected to be cost-effective due to its cost and high nutrient concentrations.

The remaining sections of this report will evaluate the alternatives presented herein and recommend an implementation strategy for the preferred alternative.

Section 7
Evaluation of Alternatives

INTRODUCTION

The selection of a preferred alternative involves evaluating each alternative against a set of evaluation criteria and the conditions of Baseline B as discussed in **Section 4**. The alternative which best meets the evaluation criteria is selected as the preferred alternative. This section described the assumptions used in groundwater modeling, hydraulic modeling and cost calculations, followed by a discussion of the evaluation criteria, the evaluation results, and the selection of the preferred alternative.

EVALUATION CRITERIA

The process of evaluating the effectiveness of each alternative in meeting the GWMP's goal involves technical analyses coupled with professional judgment and experience. Each management alternative is evaluated using the following set of criteria:

- Ability to reduce overdraft
- Expected cost
- Environmental impacts
- Risk
- Legal and regulatory implementation
- Public acceptability
- Funding
- Reliability
- Water Quality
- Flexibility
- Ease of implementation

Alternatives are rated on a scale of 1 to 5, with 5 being excellent and 1 being a very poor score. In addition, each criterion has a weighting factor ranging from 1 to 3, with 3 used for the most important criteria and 1 for the least important criteria. The total ranking of the alternatives compared to Baseline B is presented with and without the weighting to illustrate the impact of the assigned weighting to the final ranking of alternatives. Where possible, quantifiable measures are defined to rate the alternatives for each of the criteria, however the majority of criteria are rated based on qualitative considerations. The basis for the numerical rating of the alternatives for each criterion is presented in **Table 7-1**. The definitions of the criteria are described in more detail below.

Table 7-1
Evaluation Criteria

Evaluation Criteria	Very Poor Score (1)	Poor Score (2)	Fair Score (3)	Good Score (4)	Excellent Score (5)
Ability to Reduce Overdraft	Steep declining water levels, Storage deficit > 4,000 AF/yr.	Declining water levels, Storage deficit 1,000-4,000 AF/yr.	Some declining water levels, Storage deficit < 1,000 AF/yr.	Stable water levels, Storage surplus 0-1,000 AF/yr.	Increasing water levels, Storage surplus > 1,000 AF/yr.
Expected Costs	>$600/AF	$501-600/AF	$401-500/AF	$300-400/AF	<$300/AF
Environmental Impacts	Significant negative environmental impact and controversy.	Negative impact that can only be partially mitigated.	Some negative impact, but can be satisfactorily mitigated.	Min. negative impact, some beneficial environmental impact.	No negative impact, beneficial environmental impact.
Risk	Not technically feasible based on current information.	High risk due to use of new technologies or technically difficult components.	Moderate risk.	Low risk due to the use of demonstrated technologies at some locations.	No risk due to use of proven technologies.
Legal and Regulatory Issues	Very significant.	Significant.	Moderate.	Minimal.	None.
Public Acceptability	Public is expected to vigorously oppose.	Public is expected to oppose to some components.	Public is not expected to oppose the alternative.	Public is expected to support most components	Public is expected to support the whole alternative
Funding	Capital cost >$40 M, uneven distribution of investment.	Capital cost $31-40 M, uneven distribution of investments.	Capital cost $21-30 M, fairly even distribution of investments.	Capital cost $10-20 M and even distribution of investments.	Capital cost < $10 M and even distribution of investments.
Reliability	Reliance on imported supply in consecutive drought years >90%	Reliance on imported supply in consecutive drought years 80-89%	Reliance on imported supply in consecutive drought years 70-79 %	Reliance on imported supply in consecutive drought years 60-69%	Reliance on imported supply in consecutive drought years <60 %
Water Quality	Significant increase in TDS concentration (over 100 percent)	Moderate increase in TDS concentration (over 50 percent(	Minor increase in TDS concentration (over 20 percent)	No increase in TDS concentration (plus or minus 10 percent)	Decrease in TDS concentration (more than 10 percent decrease)
Flexibility	Not flexible.	Some degree of flexibility.	Fairly Flexible.	Very Flexible.	Extremely Flexible.
Ease of Implementation	Very high degree of technical difficulty.	High degree of technical difficulty.	Some technical difficulties anticipated.	Minimal technical difficulties anticipated.	No technical difficulties anticipated.

Ability to Reduce Overdraft

The ability to maintain a sustainable water balance over long-term hydrologic conditions is one of the primary goals of the GWMP; hence, the weighting factor of this criterion is 3. Overdraft can be quantified with the two indicators: 1) the reduction in groundwater storage when outflows exceed the inflows over a long-term period and 2) by the adverse impact associated with overdraft such as declining water levels, land subsidence and water quality degradation. An increase in groundwater storage must occur to eliminate overdraft and the associated adverse impacts. Increasing groundwater inflows, reducing groundwater outflows or a combination of both can achieve a reduction of overdraft.

As described in the **Section 5**, the storage deficit under Baseline B conditions is approximately 6,500 acre-ft/yr. This deficit results in declining water levels up to 400 feet. To achieve a balanced groundwater basin, the additional recharge and/or reduction of groundwater pumping needs to be 6,500 acre-ft/yr on a long-term average basis. Alternatives that achieve this are rated as 5, while alternatives with an average storage deficit of greater than 4,000 acre-ft/yr are rated as 1. Intermediate ratings are listed in **Table 7-1**.

Expected Cost

Alternatives are compared based on the unit cost of water per acre-ft, which is calculated by dividing the total annual cost by the total water supply, which is the average water demand plus water conservation amount when applicable. Because one of the GWMP goals is to provide a cost-effective water supply, the maximum weighting factor of 3 is assigned to this criterion.

The following capital costs are converted to annual cost in current dollars per alternative:

- Capital cost of new peaking wells.
- Capital cost of well rehabilitation and electrical upgrades
- Capital cost of new dual purpose wells
- Capital cost of conversions of existing wells to dual purpose.
- Capital cost of spreading basins
- Capital cost of pipelines and booster stations to convey treated imported water to dual purpose wells or spreading basins

The total annual costs used to calculate the unit cost per acre-ft include:

- Annual capital cost
- O&M cost for groundwater pumping of potable wells and island wells
- O&M cost for operating Canyon Lake WTP
- O&M of spreading ponds
- Annual cost of purchasing imported water at Tier 1, Tier 2 or replenishment rate.
- Energy cost of new booster stations included in an alternative
- Annual cost of water conservation

Alternatives with a unit cost between $401 and $500 per acre-ft are rated as fair (3) because the cost of Tier 1 and Tier 2 water is within this range. Alternatives with unit cost below $300 per acre-ft are rated as excellent, while alternatives with a unit cost of greater than $600 per acre-ft are rated as very poor. The ranges for each rating category are presented in **Table 7-1**. The assumptions used for the development of cost estimates are discussed below.

Cost Assumptions

Capital cost assumptions are developed based on data obtained from industry manufacturers, MWH's experience on similar planning projects and data provided by the District. Pipeline costs have been calculated using recent cost data for work completed by MWH. All estimates have been adjusted to an Engineering News Record (ENR) Construction Cost Index (CCI) of 7,572 (Los Angeles, March, 2003) and are consistent with the American Association of Cost Engineers guidelines for developing reconnaissance-level estimates which should range between 50 percent above and 30 percent below actual capital expenditures. A 30 percent contingency is included in the cost estimates. The engineering, administration, and legal costs are estimated to be 25 percent of construction costs. The engineering, administration, and legal costs also include typical services such as inspection, materials testing and construction management. All costs are presented in current dollars.

The alternatives are compared based upon the total annual cost, which includes the annual capital cost and the operational and maintenance (O&M) cost. For the conversion of capital cost to annual cost a discount rate (interest minus inflation) of four percent is used based on direction from the District. Pipelines are depreciated over 40 years, electrical and mechanical equipment and pump stations over 20 years, wells over 75 years, and spreading basins over 20 years.

The energy cost of groundwater pumping is calculated per well using the modeled flow rates, the water levels calculated with the groundwater model, and a unit energy cost of $0.12 per kWh. The average pumping cost over the 41-year simulation period are determined for four categories, wells in the Back Basin area, wells in the area north of the Lake, the EWD wells, and the Island Wells. As the water levels vary between alternatives, different pumping rates are calculated for each alternative. For the total groundwater pumping cost, a surcharge of $25 per acre-ft is added to the energy cost to account for treatment and well maintenance costs. This amount was assumed based upon the difference in total pumping cost provided by the district and the calculated energy cost based on model results. The total groundwater pumping cost and the unit cost per supply source that are used in the cost calculations are summarized in **Table 7-2**. This table includes $150 per acre-foot of recycled water that is used for lake replenishment to account for the potential lost profit. This amount is a rough estimate and is used in the cost calculations to indicate that (a portion) of the lake make-up amount can be sold to future recycled water customers if a recycled water system is developed within the District's service area.

The cost of water conservation is based on estimates prepared in the Urban Water Management Plan (MWH, 2000). This plan estimated to achieve three percent water conservation by implementing a two-phase program. The annual cost of phase 1 (years 0-3) was estimated to be $108,000 and phase two (years 7-10) was estimated to cost $127,000 per year in 2003 dollars. This equals to about $122,000 per year on an annual basis. The cost includes water surveys, residential plumbing retrofits, large scale landscaping conservation and incentives, high-efficiency appliances promotion, public information, development of a water waste prohibition program, and ultra-flow toilet rebates.

Table 7-2
Summary of Water Supply Cost

Water Supply Source	Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Groundwater Wells north of Lake Elsinore	$ 124	$ 99	$ 106	$ 83	$ 78
Groundwater Wells in the Back Basin Area	$ 139	$ 86	$ 136	$ 95	$ 84
Groundwater Wells EWD	$ 95	$ 91	$ 105	$ 83	$ 81
Island Wells	$ 154	$ 109	$ 150	$ 114	$ 93
Canyon Lake WTP	$ 230				
Treated Imported Water Tier 1	$ 418				
Treated Imported Water Tier 2	$ 499				
Replenishment Water	$ 300				
Additional Source Water	$ 499				
Untreated Imported Water[1]	$ 233				
Recycled water from EMWD	$ 165				
Lost revenue from recycled water used for Lake replenishment	$ 150				

1 – Untreated water obtained through turnout WR-18B

The cost of water conservation is based on the cost estimates prepared for the conservation program presented in the UWMP. These estimates include costs for EVMWD only, and do not include the costs assigned to the naturally occurring conservation as a result of plumbing codes, cost incurred by the public, or MWDSC rebates. For the purpose of this GWMP, a unit water conservation cost of $260 per acre-foot is used.

The cost of spreading basins is estimated based on the amount of earthwork using a unit cost of $12 per cubic yard. This includes cutting, spreading to create berms, and hauling. The earthwork amounts are based on three-dimensional modeling of the sites. These amounts and the estimated capital costs are summarized in **Appendix I**.

The cost of septic tank conversions is not included in the cost estimates presented in this report. The development of the septic tank conversion policies is on going. As part of this effort and economic analysis will be conducted that evaluates the cost of septic tank conversion and the benefits of the avoided cost of well treatment and septic tank replacement cost.

The cost of converting an existing well to dual-purpose use is estimated to cost $100,000 per well which includes a small building to place equipment. This estimate is not location specific and is used for all well conversions.

Environmental Impacts

The environmental impacts included in the alternative evaluation include changes in groundwater storage, land subsidence, use of land with biological resources, and impacts on habitat, water quality degradation, and public health and safety. In addition, the best use of water resources and the level of environmental responsibility are evaluated. Because one of the GWMP goals is to provide a water supply in an environmentally responsible manner, the maximum weighting factor of 3 is assigned to this criterion. Alternatives with some adverse environmental impact, that can be satisfactorily mitigated, are rated as fair score (3). Alternatives with no adverse environmental impacts and/or beneficial environmental impacts are rated as excellent (5), while alternatives with significant adverse environmental impacts that may cause controversy are rated as very poor (1). The definitions for each rating category are presented in **Table 7-1**.

Risk

Risk is defined as the chance that specific investments will not produce the desired results due to use of new technologies or other risks. Other risks may include a reduction in pumping capacity of wells due to declining water levels, the availability of new water supply sources, or unknown basin characteristics. As some degree of risk is expected in new planning strategies, alternatives with a moderate risk are rated as fair (3). Alternatives that contain components that are not technically feasible based on current information are rated as very poor (1), while alternatives without any risks due to the use of proven technologies only are rated excellent (5). The definitions for each rating category are presented in **Table 7-1**. Because risk is not part of the GWMP goal, but does relate to the potential for losses if investments do not produce the desired results, this criterion is assigned a weighting factor of 2.

Legal and Regulatory Issues

For the rating of the alternative, the legal and regulatory issues criterion is defined as the degree of difficulty for achieving compliance with existing regulations or to obtain legal approvals to implement the alternative. Legal and regulatory constraints may include, but are not limited to, the settlement agreement with EWD (monitoring mitigation plan), agreement with the City of Lake Elsinore regarding the lake levels, NPDES permit for discharge of recycled water in Lake Elsinore, and compliance with the Basin Plan objectives.

As the implementation of new project is likely to result in some legal and/or regulatory constraints, alternatives with moderate issues are rated as fair (3). Alternatives that contain components that have very significant legal and regulatory constraints are rated as very poor (1), while alternatives without any constraints are rated excellent (5). The definitions for each rating category are presented in **Table 7-1**. Although legal and regulatory constraints are not part of the GWMP goal, these issues can result in fatal flaw situations. Hence, this criterion is assigned a weighting factor of 2.

Public Acceptability

The public acceptability criterion is defined as the anticipated degree of public approval or opposition to the alternative. A stakeholder process is used in the development of this GWMP to gather information from the public on their concerns about the management of the Elsinore Basin and to incorporate ideas in the management alternatives. Public acceptability is a function of the negative or positive impact that the implementation of an alternative has on the public including, but is not limited to, the financial impact, environmental impact, temporary inconveniences due to construction work, and the degree of participation in water conservation programs. If the public is not expected to oppose or support to an alternative, this alternative is rated as fair (3). Alternatives that contain components that are expected be vigorously opposed by the public are rated as very poor (1), while alternatives that are expected to be supported completely are rated excellent (5). The definitions for each rating category are presented in **Table 7-1**. Public acceptability is not part of GWMP goal, however, the support of the public is important for the implementation of the alternatives; hence, this criterion is assigned a weighting factor of 2.

Funding

One of the components of implementation is the acquisition of funds to construct the required wells, pipelines, pumping stations, and/or spreading basins. Not only the amount of required funds, but also the distribution of required investments over time plays a role in the feasibility of an alternative. Large investments at once are less desirable than projects than can be phased and funded over a period of time. Hence, this criterion is defined as the ability to acquire the required funds and the distribution of investments over the required time frame. Funding is focused on long-term capital investments rather than annual O&M cost which are evaluated with the expected cost criterion.

Alternatives with capital cost between $21 million and $30 million that primarily allow an even distribution of investments are rated as fair (3). Alternatives with capital cost greater than $40 million and/or uneven distribution of investment are rated as very poor (1), while alternatives with capital cost below $10 million are rated excellent (5). The definitions for each rating category are presented in **Table 7-1**. Although funding is not part of the GWMP goal, funding needs are directly related to cost, which is one of the primary evaluation criteria. Therefore, this criterion is assigned a weighting factor of 2.

Reliability

Because water demands are projected to double over the next twenty years, and the net groundwater pumping needs to decrease to achieve a sustainable groundwater balance, the reliance on imported water supplies will increase from 56 percent in year 2000 to about 70 to 80 percent in year 2020. Although the total amount of imported water required to meet future demand does not change between alternatives, with the exception of the amount of water conserved in alternatives 3 and 4, the reliability on imported supplies in consecutive drought years varies between alternatives. The alternatives are different in their conjunctive use operations as the capacities to recharge the groundwater basin with imported supplies vary.

For the purpose of alternative evaluation, reliability is defined as the ability to meet water demands in consecutive drought years when replenishment water is not available. One way to measure the reliability of imported supplies in drought years is to calculate the average percentage of imported water used to meet the water demands in the hydrologic drought period of 1988 through 1992 when replenishment water is not available. Alternatives that use between 70 and 79 percent imported water during these four years are rated as fair (3). Alternatives that use more than 90 percent imported water in this period are rated as very poor (1), and alternatives that use less than 60 percent imported water in this period rated excellent (5). The definitions for each rating category are presented in **Table 7-1**. Reliability is part of the GWMP goal and, therefore, is assigned a weighting factor of 2.

Water Quality

Water quality is defined as the degree in which the salt concentration, expressed in TDS (mg/L), increases under an alternative. The current average TDS concentration of the Elsinore Basin is 550 mg/L in the upper aquifer and 390 mg/L in the lower aquifer, and the proposed Basin Plan Objective is 480 mg/L. The changes in TDS concentration are evaluated over the same hydrologic 41-year period as used for the other analysis, using the average inflows and outflows as presented in **Table 6-2**. Alternatives that result in decreased TDS concentrations (of at least 10 percent less) are rated as excellent (5), while alternatives that show a significant increase (over 100 percent) are rates as very poor (1). The definitions for each rating category are presented in **Table 7-1**. Water Quality is part of the GWMP goal and, therefore, is assigned a weighting factor of 2.

Flexibility

Flexibility is defined as the ease with which plans can be changed to address unforeseen circumstances including the ability to alter the plan to account for changes in planning assumptions regarding future demand patterns, projected resources or other uncertainties. In general, alternatives that contain a combination of strategies are more flexible than alternatives that focus on solely one approach. However, some strategies are flexible by themselves, such as the ability of spreading basins to recharge multiple water sources versus injection wells that are limited to the use of water that meets drinking water standards. Alternatives that do not contain many structural components seem more flexible to adjust to unforeseen circumstances, such as higher water demands than projected, because money is not invested yet and can be used for any project to address the unforeseen condition. However, project delays reduce the flexibility to find the best solution or to deal with unforeseen problems with project implementation. As time is more limited, the longer projects are postponed. Alternatives that are considered fairly flexible are rated as fair (3), alternatives that do not have any flexibility are rated as very poor (1), and that are extremely flexible are rated excellent (5). The definitions for each rating category are presented in **Table 7-1**. Flexibility is not part of or directly related to any components of the GWMP goal; therefore, flexibility is assigned a weighting factor of 1.

Ease of Implementation

The ease of implementation is evaluated per alternative based on the ease of technical implementation of the various alternative components. Ease of implementation includes the technical difficulties to construct facilities such as the spreading basins, as well as operational difficulties, technical limitations of water conservation devices, and the ease to achieve the desired degree of public participation in water conservation programs. Alternatives with some degree of technical difficulties are rated as fair (3), alternatives with a very high degree of technical difficulty as very poor (1), and alternatives with a no technical difficulty as excellent (5). The definitions for each rating category are presented in **Table 7-1**. Ease of implementation is not part of or directly related to any components of the GWMP goal and, therefore is assigned a weighting factor of 1.

EVALUATION OF ALTERNATIVES

Baseline B and the four alternatives are evaluated using the evaluation criteria and rating structure described previously. The evaluation and ratings are summarized in **Table 7-3**, while a more detailed discussion per each of the evaluation criteria is provided below.

Ability to Reduce Overdraft

The ability to reduce overdraft is evaluated using the groundwater model results. As presented in **Section 4**, the groundwater levels in Baseline B drop between 100 and 400 feet over the 41-year simulation period depending on the location in the Elsinore Basin. In general, groundwater levels decline more in the Back Basin, with Corydon Well showing the greatest water level decline, than in the area north of Lake Elsinore. The water levels predicted with the groundwater model per alternative are presented in **Appendix J**. Comparison graphs of Lincoln Street, North Island, and Corydon Well are used for the evaluation of the alternatives. These comparison graphs are presented on **Figure 7-1**, **Figure 7-2**, and **Figure 7-3**.

As shown in these graphs, the water levels in Alternative 2 are only slightly higher than the water levels in Baseline B, especially in the Back Basin area represented by Corydon Well where both scenarios drop from about 400 feet. In the area north or Lake Elsinore, represented by Lincoln Street Well, the effect of surface recharge in Alternative 2 is visible as water levels decline from 350 feet, while Baseline B about declines 450 feet. In the middle of the basin, represented by the North Island Well, the effect of surface recharge of Alternative 2 is almost diminished, as the predicted water levels are very similar, declining about 300 to 350 feet. The water levels in Alternative 2 are clearly the worst of all four alternatives. This indicates that surface spreading alone is not sufficient to achieve a sustainable groundwater balance. If more water could be recharged in Leach and McVicker Canyons, the water levels in the area north of Lake Elsinore are likely to increase, while the levels in the Back Basin area are likely to continue to decline, due to the uneven distribution of recharge and extraction.

Alternatives 1, 3, and 4 are fairly similar with respect to water levels. The water levels of Alternatives 1 and 4 are slightly higher than the water levels in Alternative 3 in the middle and south part of the basin (indicated by the North Island Well and Corydon Well). This is caused by the positive effect of the dual purpose wells in the Back Basin area on the water levels, and it demonstrates that in-lieu recharge is not as effective in the south part of the basin as in the north part of the basin due to the lack of natural recharge. The water levels in Lincoln Street Well indicate that in-lieu recharge in the north part of the basin is more effective, because the water levels of Alternative 3 are between the water levels of Alternatives 1 (lower than Alternative 3)

Figure 7-1
Water Level Comparison – Lincoln Street Well

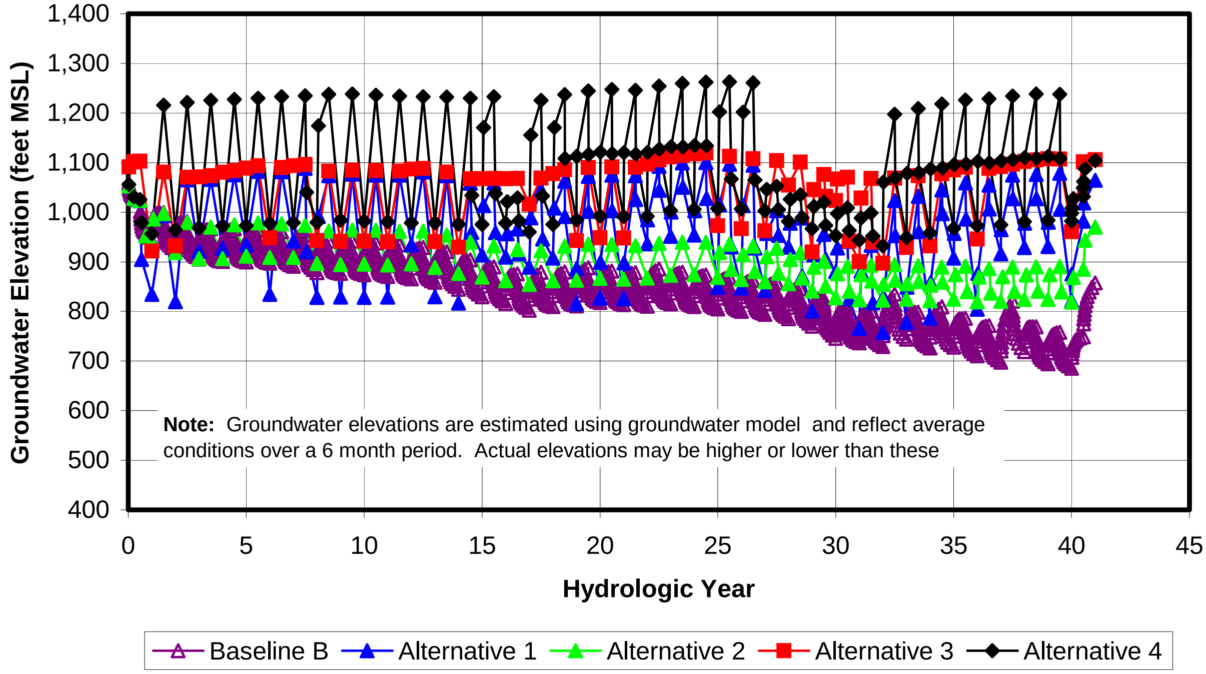


Figure 7-2
Water Level Comparison – North Island Well

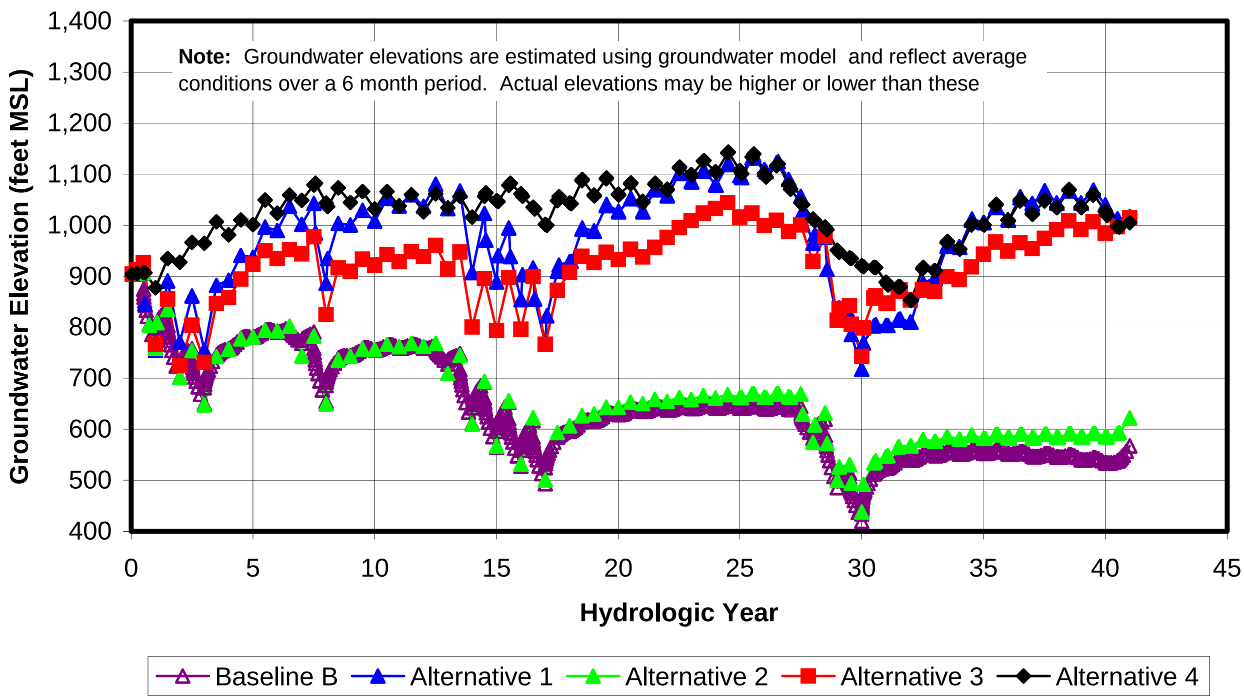


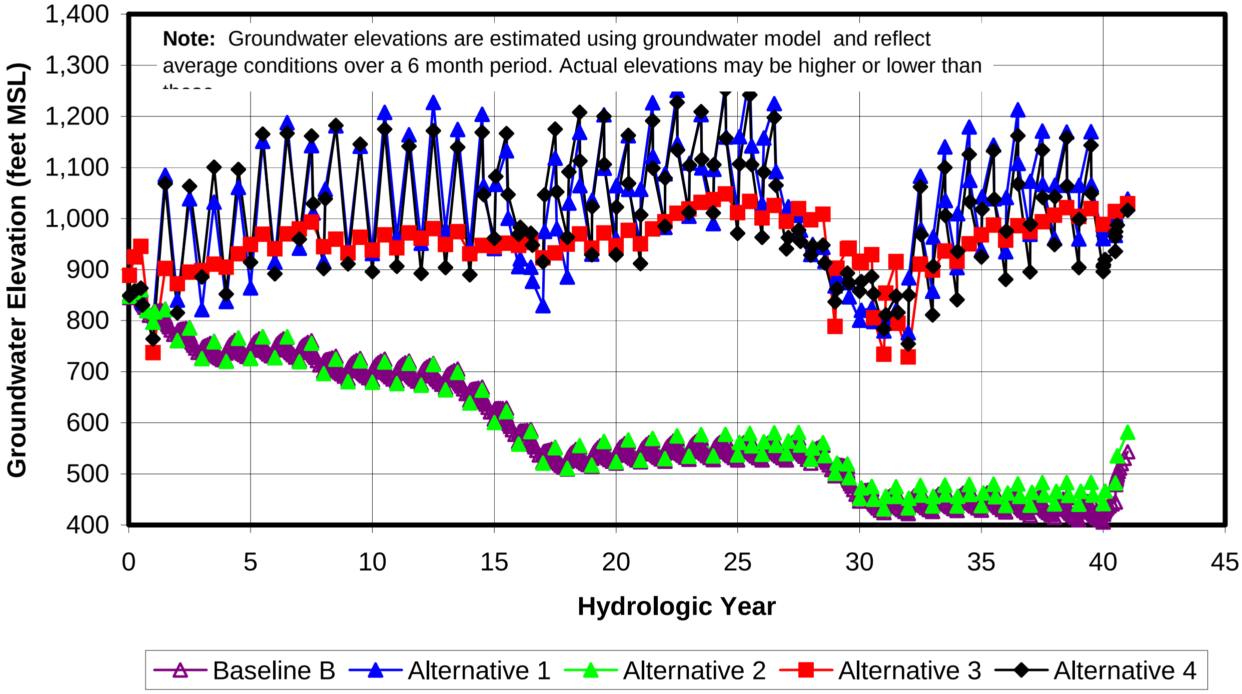
Table 7-3
Summary of Alternative Evaluation

Evaluation Criteria	Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Ability to Reduce Overdraft	1 • Groundwater balance is not achieved. • Zero artificial recharge. • Declining water levels to 400 ft. • Storage Deficit = 6,500 acre-ft/yr.	4 • Groundwater balance is achieved. • 6,700 acre-ft/yr injected. • 600 acre-ft/yr in-lieu recharge. • Stable water levels. • Storage Deficit = 0 acre-ft/yr.	2 • Groundwater balance is not achieved. • 4,800 acre-ft/yr surface spreading. • Declining water levels to 400 ft. • Storage Deficit = 3,800 acre-ft/yr.	3 • Groundwater balance is achieved. • 7,200 acre-ft/yr in-lieu recharge. • Stable water levels. • Storage Deficit = 200 acre-ft/yr.	5 • Groundwater balance is achieved. • 5,900 acre-ft/yr injected. • 600 acre-ft/yr in-lieu recharge. • Slightly increasing water levels. • Storage Deficit = 0 acre-ft/yr.
Expected Costs	4 • $428/acre-ft • $365/acre-ft (without common cost)	3 • $446/acre-ft • $438/acre-ft (without common cost)	3 • $457/acre-ft • $480/acre-ft (without common cost)	5 • $409/acre-ft • $288/acre-ft (without common cost)	4 • $425/acre-ft • $353/acre-ft (without common cost)
Environmental Impacts	1 • Steep declining water levels cause subsidence, which can not be mitigated. • Increase energy usage due to increased pumping lift.	4 • No significant environmental impact other than the construction of wells, pipelines and a PS. • Elimination of overdraft conditions is an environmental benefit.	2 • Use of canyons for spreading basins (30 acres) is likely to cause habitat losses, which may need mitigation. • Overdraft conditions remain, this can not be mitigated.	4 • No negative environmental impact as facilities other than the constructing of peaking wells. • Elimination of overdraft conditions is an environmental benefit. • Water Conservation	5 • No significant environmental impact other than the constructing of wells, pipelines and a PS. • Elimination of overdraft conditions is an environmental benefit. • Water Conservation • Better use of water resources by eliminating groundwater use for lake replenishment
Risk	2 • High risk that wells production will decrease due to declining water levels (resulting in higher cost for additional supplies and decreased reliability). • Moderate risk that additional imported supplies may not be available.	4 • Low risk with injection/extraction technology. • Low risk that the injection capacities are lower than estimated at the time of this GWMP. • Moderate risk that additional imported supplies may not be available.	1 • High risk that surface spreading is not feasible to the extend included in this alternative due to limitations in infiltration (depth to bedrock). • Pilot testing required to determine infiltration rates. • Moderate risk that additional imported supplies may not be available.	3 • Moderate risk that 10 percent water conservation is not achieved. • Moderate risk that additional imported supplies may not be available.	4 • Low risk with injection/extraction technology. • Low risk that the injection capacities are lower than estimated at the time of this GWMP. • Moderate risk that additional imported supplies may not be available.
Legal and Regulatory Issues	2 • Declining water levels are a potential for litigation and may require adjudication of the Elsinore Basin. This causes complex legal and regulatory issues.	3 • Construction permits. • Compliance with 40 CFR Part 144, only water that meets drinking water standards can used for injection. • Development/implementation of septic tank conversion policies required. • NPDES permit required for discharge of 7.5 mgd of recycled water in Lake Elsinore. • Meet Basin Plan objectives.	3 • Construction permits. • Development/implementation of septic tank conversion policies required. • NPDES permit required for discharge of 7.5 mgd of recycled water in Lake Elsinore. • Meet Basin Plan objectives. • Use of recycled water for spreading, is limited to 50 % of the total spreading amount or RO treatment is required.	4 • Construction permits. • Development/implementation of septic tank conversion policies required. • NPDES permit required for discharge of 7.5 mgd of recycled water in Lake Elsinore.	2 • Construction permits. • Compliance with 40 CFR Part 144, only water that meets drinking water standards can used for injection. • Development/implementation of septic tank conversion policies required. • NPDES permit required for discharge of 17.7 mgd of recycled water in Lake Elsinore. • Meet Basin Plan objectives.
Public Acceptability	1 • Public is expected to vigorously oppose to unacceptable subsidence.	5 • Public is expected to support most components.	2 • The public is expected to oppose to some degree of subsidence. • The public may oppose to the construction of spreading basins in the canyons. • Public may oppose to use of recycled water for surface spreading.	3 • Public is expected to support most components of the alternative, however, 10 percent water conservation places a burden on public participation. • The alternative requires minimal construction.	4 • Public is expected to support most components.

Table 7-3 (Continued)
Summary of Alternative Evaluation

Evaluation Criteria	Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Funding	1 • Capital Cost $56 million. • Fair distribution of investments.	3 • Capital Cost $30 million. • Uneven distribution of investments.	1 • Capital Cost $57 million. • Fair distribution of investments.	4 • Capital Cost $16 million. • Even distribution of investments.	4 • Capital Cost $24 million. • Fair distribution of investments.
Reliability	3 • 73% of water supply from MWD in consecutive drought years.	3 • 70% of water supply from MWDSC in consecutive drought years.	3 • 70% of water supply from MWDSC in consecutive drought years.	2 • 84% of water supply from MWDSC in consecutive drought years.	4 • 67% of water supply from MWDSC in consecutive drought years.
Water Quality	1 A significant increase in TDS concentration due to continue increase in salt from septic tanks and decreased basin storage volume	5 Decreasing TDS concentrations due to a reduction in salt from septic tanks and injection of lower TDS water, while maintaining the same storage volume	5 Decreasing TDS concentrations due to a reduction in salt from septic tanks and infiltration of lower TDS water, while maintaining the same storage volume	5 Decreasing TDS concentrations due to a reduction in salt from septic tanks, while maintaining the same storage volume	5 Decreasing TDS concentrations due to a reduction in salt from septic tanks and injection of lower TDS water, while maintaining the same storage volume
Flexibility	2 • Projects can be implemented in the future if well production declines or subsidence occurs. However, flexibility to adjust to unforeseen circumstances is low as the need for additional supplies increases the longer projects are postponed.	5 • Dual-purpose wells provide flexibility to inject/extract more water depending on demands/availability of MWDSC water. • Flexible to use multiple sources, water from Mills WTP, Skinner WTP, and Canyon Lake WTP. • Not flexible to use multiple water sources as injected water needs to comply with Title 22.	4 • Flexible to use multiple water sources for spreading; local runoff, treated imported water, untreated imported water, Canyon Lake WTP water, recycled water from the regional WWTP or EMWD. • Limited capacity of spreading basins to maximize use of replenishment water.	3 • Flexible to adjust to higher demands (lower water conservation) than anticipated with GW pumping. • Poor flexibility to implement new projects, as the need for additional supplies increases the longer projects are postponed. • Moderate flexibility to use replenishment water for in-lieu recharge as this amount is limited by (winter) water demands.	5 • Dual-purpose wells provide flexibility to inject/extract more water depending on the availability of MWDSC water. • Flexible to use multiple sources, water from Mills WTP, Skinner WTP, and Canyon Lake WTP. • Not flexible to use multiple water sources as injected water needs to comply with Title 22.
Ease of Implementation	3 • Construction required of 11 wells • Substantial re-equipment of wells • Construction of new pipeline for additional source.	4 • Construction required of 13 wells, 1 pipeline and 1 pumping station.	2 • Construction of spreading basins required in canyons, which is expected to be difficult due to rocks, and difficult accessibility of the upper part of leach canyon. • Construction of 17 wells, pipelines and a booster station. • Substantial re-equipment of wells.	3 • No construction required other than 8 wells. • Implementation of water conservation measures that contribute to 10 percent conservation may be difficult.	4 • Construction required of 11 new wells • Conversion of 6 existing wells to dual purpose. • Construction of 1 pipeline and 1 PS • Implementing water conservation. measured that contribute to 5 percent conservation.
Total Rating	**21**	**43**	**28**	**39**	**47**

Figure 7-3
Water Level Comparison – Corydon Well



and Alternative 4 (higher than Alternative 3). As indicated in the three graphs, the water levels in Alternative 3 do not show the same degree of fluctuation as the alternatives with injection and extraction cycles (Alternatives 1 and 4). For Alternative 3, water levels fluctuate about 200 to 300 feet in the north and south part of the basin respectively. Alternatives 1 and 4 show a wider range of 350-400 to 500 feet in the north and south part of the basin respectively. This indicates that the alternatives with dual-purpose wells exercise the basin storage more, which is a desired situation for conjunctive use operations.

In addition to water levels, the net groundwater storage is used as a measure for the ability to reduce overdraft. As shown in **Table 7-3**, Baseline B has an average storage deficit of 6,500 acre-ft. The storage deficit of alternative 2 is reduced to 3,900 acre-ft/yr. The groundwater basin is not balanced in this alternative due to the limited infiltration capacity of the surface spreading basins, which cannot be expanded in size due to site constraints. The storage deficit in Alternative 3 is reduced to 200 acre-ft/yr, while Alternatives 1 and 4 are both balanced.

Based on the storage deficits and the degree of declining water levels, Baseline B is rated as very poor, Alternative 2 as poor, Alternative 3 with a fair and Alternative 1 as good, and Alternative 4 as excellent (increasing storage).

Expected Cost

The total capital cost and the cost per acre-ft of water are calculated per alternative with the assumptions discussed earlier in this section. A detailed cost estimate per alternative is provided in **Appendix I**, which is summarized in **Table 7-4**.

Table 7-4
Cost Summary per Alternative

Item	Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Capital Cost	$ 49,970,000	$ 30,020,000	$ 57,380,000	$ 15,760,000	$ 24,310,000
Annual Capital Cost	1,992,000	1,108,000	2,616,000	558,000	913,000
Annual O&M Cost	2,645,000	2,321,000	2,984,000	2,791,000	2,970,000
Annual Imported Water Cost	16,985,700	19,116,000	17,477,000	17,307,000	17,589,000
Total Annual Cost	$ 21,622,700	$ 22,545,000	$ 23,077,000	$ 20,656,000	$ 21,472,000
Supply (acre-ft/yr)	50,500	50,500	50,500	50,500	50,500
Unit Cost per acre-ft (at 3% discount rate)	**$428**	**$446**	**$457**	**$409**	**$425**
Unit Cost per acre-ft (at 2% discount rate)	$421	$442	$449	$407	$422
Unit Cost per acre-ft (at 4% discount rate)	$436	$451	$466	$412	$429

As shown in this table, the capital cost range significantly from $16 million to $57 million, while, the unit costs only show relatively small differences ranging from $409 to $457 per acre-ft at a three percent discount rate and including the cost and amount of imported water. The unit costs do not seem very sensitive to the discount rate used. These relatively small differences in unit cost are caused by the high contribution of purchased imported water costs, which are very similar between alternatives, ranging from $17 million to $19 million. Because the annual cost of alternative specific components is relatively small, the unit costs do not vary greatly. Although the unit costs are very similar, the effect on the groundwater basin is significant. By spending the same amount of money to meet the year 2020 water demands, more value is obtained with the alternatives that achieve a sustainable groundwater balance.

The capital cost of Baseline B is $50.0 million and includes 21 electrical well upgrades, re-equipping of 14 well due to declining water levels, construction of 11 peaking wells and the cost of bringing an additional supply source to the Districts service area. The additional supply is assumed to come from Mills WTP by constructing new pipelines ranging from 12-inch to 26-inch in diameter parallel to the TVP with a combined length of 18 miles. The total capital cost of this additional source is about $24.5 million. The annual cost of Baseline B is $21.6 million and includes the annual capital cost, energy cost of groundwater pumping of all wells, operating Canyon Lake WTP and purchase of imported water at Tier 1 and Tier 2 rates. The additional source water is assumed to cost the same as Tier 2 water. The unit cost of Baseline B is $428 per acre-ft.

The capital cost of Alternative 1 is $30.0 million and includes four well electrical upgrades, four peaking wells, four conversions of existing wells to dual purpose wells, ten new dual purpose wells, a 30-inch diameter pipeline on Corydon Street, and a 800 HP pumping station. The annual cost of Alternative 1 is $22.5 million and includes the annual capital cost, energy cost of groundwater pumping of all wells and the new 800 HP pumping station, operating Canyon Lake WTP and purchase of imported water at Tier 1, Tier 2, and replenishment rates. The unit cost of Alternative 1 is $ 446 per acre-ft.

The capital cost of Alternative 2 is $57.4 million and includes 17 well electrical upgrades, 11 re-equipping of wells due to declining water levels, 11 peaking wells, five new extraction wells near the canyons, 30-acres of spreading ponds in Leach and McVicker Canyon, pipelines ranging from 12-inch to 36-inch in diameter and a combined length of about 4.5 miles to convey TVP water to the spreading ponds, and a 800 HP pumping station. The sizing of facilities is based on the peak capacity required, rather than the average infiltration amounts. The annual cost of Alternative 2 is $23.1 million and includes the annual capital cost, energy cost of groundwater pumping of all wells and the new 800 HP pumping station, operating Canyon Lake WTP and purchase of imported water at Tier 1, Tier 2, and replenishment rates. The unit cost of Alternative 2 is $ 457 per acre-ft. These cost estimates are based on the use of treated imported water (from TVP) as the only source for supplementing the local runoff in the spreading basins, which is determined the least expensive source based on a cost comparison of various sources discussion in **Section 6**.

The capital cost of Alternative 3 is $15.8 million and includes eight well electrical upgrades and eight peaking wells. The annual cost of Alternative 3 is $20.7 million and includes the annual capital cost, energy cost of groundwater pumping of all wells, water conservation programs, operating Canyon Lake WTP and purchase of imported water at Tier 1, Tier 2, and replenishment rates. The unit cost of Alternative 3 is $ 409 per acre-ft.

The capital cost of Alternative 4 is $24.3 million and includes four peaking wells, seven conversions of existing wells to dual purpose wells, seven new dual purpose wells, a 30-inch diameter pipeline on Corydon Street, and a 800 HP pumping station. The annual cost of Alternative 4 is $21.5 million and includes the annual capital cost, energy cost of groundwater pumping of all wells and the new 800 HP pumping station, water conservation programs, operating Canyon Lake WTP and purchase of imported water at Tier 1, Tier 2, and replenishment rates. The unit cost of Alternative 4 is $ 425 per acre-ft.

Because the cost including the purchase of water from MWDSC and the operation of Canyon Lake WTP do not show much variation between the alternatives, the cost of each alternative is also expressed without the common cost components. The amount and cost of both Tier 1 water and Canyon Lake WTP water is the same for all alternatives and Baseline B. The amounts and costs are subtracted from the unit cost presented in **Table 7-5**. In addition, the amount of Tier 2 water purchased in Baseline B and the associated cost are subtracted as well. By presenting the cost without these common cost components and water supply amounts, the cost differences associated with the project are magnified. As shown in **Table 7-5**, the unit cost of the project related water supply varies from $288 to $438 per acre-foot. The supply amounts used for these unit costs, include groundwater pumping, in-lieu water, incremental Tier 2 purchases in comparison to Baseline B and water conservation. Alternative 3 has the lowest unit cost as it includes two cheap water supplies, in-lieu recharge and water conservation. Alternative 4 is the second cheapest with water conservation and more in-lieu recharge than Alternative 1. Alternative 2 is the most expensive alternative in both comparisons, as it does not have any cheap water sources. The alternatives are rated on the results presented in **Table 7-5** as **Table 7-4** does not show any variation due to the effect of common supply cost. Based on the criteria presented in **Table 7-1**, Alternatives 1 and 2 have a fair score (3), Baseline B and Alternative 4 a good score (4), and Alternative 3 an excellent score (5).

Table 7-5
Cost Summary per Alternative per acre-foot of overdraft reduction

Item	Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Total Annual Cost [1]	$21,622,700	$22,545,000	$23,077,000	$20,656,000	$21,472,000
Common Cost – Canyon Lake WTP	$690,000	$690,000	$690,000	$690,000	$690,000
Common Cost - MWDSC at Tier 1	$5,568,000	$5,568,000	$5,568,000	$5,568,000	$5,568,000
Common Cost - MWDSC at Tier 2	$10,769,000	$10,769,000	$10,769,000	$10,769,000	$10,769,000
Total Common Cost	$17,027,000	$17,027,000	$17,027,000	$17,027,000	$17,027,000
Total Annual Cost without Common Cost	**$4,595,700**	**$5,518,000**	**$6,050,000**	**$3,629,000**	**$4,445,000**
Total Water Supply (acre-ft/yr)	50,500	50,500	50,500	50,500	50,500
Common Water Supply[2] (acre-ft/yr)	37,900	37,900	37,900	37,900	37,900
Project Water Supply [3] (acre-ft/yr)	**12,600**	**12,600**	**12,600**	**12,600**	**12,600**
Unit Cost ($/acre-ft)	**$365**	**$438**	**$480**	**$288**	**$353**

1 – See Table 7-4.
2 – Canyon Lake WTP (3,000 acre-ft/yr), Tier 1 (13,320 acre-ft/yr), and Tier 2 of Baseline B (21,580 acre-ft/yr)
3 – Total Water Supply minus Common Water Supply

Environmental Impacts

The evaluation of the environmental impacts include biological, cultural, land use, water quality, air quality, public health and safety, and other considerations. For the alternatives, the primary environmental impacts are changes in groundwater storage, potential of land subsidence, use of land that may have biological resources, impacts on habitat, water quality degradation, construction nuisances, and public health and safety. In addition, the best use of water resources and the level of environmental responsibility are evaluated.

The primary environmental impacts of Baseline B are increased energy usage due to the increased groundwater pumping lifts and the potential of subsidence both caused by declining water levels. Geotechnical surveys need to be conducted to estimate the magnitude of subsidence. However, when 1-3 foot of subsidence per 100 feet of drawdown is used to estimate the subsidence potential for soils with interbedded clays, a 400 feet water level decline may result in subsidence ranging from 4-12 feet. Mitigation of subsidence is not possible, hence Baseline B is rated as very poor.

Alternative 1 does not have any significant environmental impact other than the construction of the groundwater wells, 3,000 lineal feet of pipeline and a pumping station. As construction nuisances are temporary and can be mitigated, these are considered as minimal negative impact. The elimination of overdraft conditions is an environmental benefit. The overall rating of Alternative 1 is good.

Alternative 2 includes the construction of 30 acres of spreading basins in McVicker and Leach Canyon as well as pipelines and a booster station to supplement runoff water with imported water. Based on the survey conducted for the Elsinore Basin Recharge Feasibility Study (MWH, 2003), no environmental impacts are identified for McVicker Canyon other than the pipeline construction. The west side of Leach Canyon is identified as a potential habitat for California gnatcatcher and Belding's orange-throated whiptail. In addition, a potentially historic farmhouse is identified as a cultural resource. The construction of spreading basins in Leach Canyon would also cause nuisance for the residents on the eastside of the lower spreading basins. The main environmental impact is the remaining overdraft conditions of the groundwater basin that may result in subsidence, which cannot be mitigated. The overall rating of Alternative 2 is poor.

Alternative 3 does not have any significant environmental impact other than the construction of the groundwater wells. As construction nuisances are temporary and can be mitigated, these are not considered as minimal negative impact. The elimination of overdraft conditions is an environmental benefit and ten percent water conservation is in-line with the District's mission statement to promote environmental responsibility. The overall rating of Alternative 4 is good.

Alternative 4 does not have any significant environmental impact other than the construction of the groundwater wells, 3,000 lineal feet of pipeline and a pumping station. As construction nuisances are temporary and can be mitigated, these are considered as minimal negative impact. The elimination of overdraft conditions is an environmental benefit. This Alternative has two environmental benefits. Similar to Alternative 3 this Alternative includes water conservation, which is in-line with the District's mission statement to promote environmental responsibility. Secondly, the use of recycled water for lake replenishment is environmentally preferable as it preserves more groundwater for a higher form of use, serving potable water demands. The overall rating of Alternative 1 is excellent.

Risk

Risk is defined as the chance that specific investments will not produce the desired results due to use of new technologies or other risks, such as the reduction in pumping capacity of wells due to declining water levels, the availability of new water supply sources, or unknown basin characteristics.

Baseline B has a high risk that the production capacity of groundwater wells will decrease due to declining water levels. In the water balances, the reduced in production is not included, hence the amount of water required from an additional source may be higher than calculated. Without a reduction in production capacity, the maximum amount of additional supply required is

2,440 acre-ft per six months or 4.4 mgd. Groundwater wells should provide the peaking capacity for days when the demand exceeds the average summer demand (1.25 times ADD). Decreasing groundwater production would not only increase the amount of additional supplies, but also increase the cost, and increase the reliance on imported supplies. Capital cost will increase as a larger diameter pipeline from the Woodcrest turnout or other location would be required. O&M cost may increase as well if a booster station is required to provide sufficient head for conveyance. Due to the high risk of reduced groundwater production and its undesirable consequences (higher cost and increase reliability on imported supplies), the overall rating of Baseline B is poor.

Alternative 1 includes the use of dual-purpose wells from groundwater recharge. Due to the extensive experience of this technology in the United States, the use of dual-purpose wells is considered a low risk. However, the injection capacities may be lower than estimated in the model simulations and balance calculation of this GWMP. If the injection capacities are found to be lower than assumed in this study, some of the proposed peaking wells could be equipped as dual-purpose wells achieve the same recharge capacity. If the concept of dual purpose is incorporated in the design of new wells, no additional costs are expected. Therefore, the risk of lower injection capacities on achieving the desired injection amount is low. Based on this, the overall rating of Alternative 1 is good.

Alternative 2 has a high risk of not achieving the desired results, as a more detailed analysis of the spreading basin sites has indicated two constraints of the proposed expanded basin size options as used in Alternative 2 (see **Table 5-6** and **Table 5-7**). The first constraint is that the site slopes in McVicker Canyon limits the feasible spreading basin size to about 6 acres compared with 15 acres in the maximum basin option. The same constraint applies to Leach Canyon which spreading basin sizes are limited to 6 and 8 acres compared to 14 and 11 acres for the lower and upper part of Leach Canyon respectively. The second constraint is the limited infiltration capacity due to soil characteristics. The depth to bedrock seems to be shallower than the initial estimate, which will limit the infiltration capacity. In addition, a spillway construction is identified in McVicker Canyon, which may daylight recharge water and prevent infiltration. Additional geologic survey and pilot testing are required to determine the depth to bedrock and infiltration rates. Due to the significant reduction in potential spreading basin size (20 acres versus 30 acres), this alternative has a high risk of realizing less groundwater recharge than anticipated. The overall rating of Alternative 2 is very poor.

Alternative 3 does not contain any construction other than the construction of the peaking wells. In periods that less replenishment water is available than anticipated, sufficient groundwater pumping capacity will exist to meet the water demand from groundwater. The main risk of not achieving the proposed results is cause by the proposed water conservation rate of ten percent. This is three times higher than the amount of water conservation projected in the Urban Water Management Plan (MWH, 2000). This relatively ambitious conservation goal is considered as a moderate risk, because previous studies have not indicated a ten percent water conservation potential. Therefore, Alternative 3 is rated as fair.

Alternative 4 includes the use of dual-purpose wells for groundwater recharge and five percent water conservation. The risk of dual-purpose wells is discussed under Alternative 1. Five percent water conservation is considered achievable with existing technologies and increasing public awareness, thus and the risk of not achieving the desired degree of conservation is low. The overall rating of Alternative 4 is good.

Legal and Regulatory Issues

The degree of difficulty for compliance with existing regulations or obtaining legal approvals is evaluated for each alternative below. However, some existing regulations and plans apply to Baseline B and all four alternatives. These are:

- The agreement between the District and the City of Lake Elsinore to maintain the lake levels in Lake Elsinore and in the 350-acre wetland in the Back Basin area at 1,240 feet MSL.
- The NPDES permit issued in January 2002 by the RWQCB for a pilot project to release recycled water into Lake Elsinore up to 4,480 acre-ft/yr. This permit requires that the District adhere to strict monitoring of the nutrient levels of the lake. [Note, the Regional Board issued a revised NPDES permit to EVMWD for discharge to Temescal Wash and Lake Elsinore in March 2005.]
- The Basin Plan's water quality objectives of Lake Elsinore. These include:
  - TDS concentration not to exceed 2,000 mg/L
  - Inorganic nitrogen concentration not to exceed 1.5 mg/L
  - Dissolved oxygen concentration of 5 mg/L or above
  - Chlorine residual not to exceed 0.1 mg/L
  - Detailed regulations on fecal coliform bacteria, un-ionized ammonia and others.
- The Basin Plan's water quality objectives of the groundwater basin (see **Table 5-2**).
- Primary and secondary drinking water standards specified in the California Code or Regulations, Title 22 (see **Table 5-2**)
- The agreement between the District and EWD to participate in a Joint Groundwater Monitoring Program that specifies the monitoring requirements. The agreement established specific groundwater trigger points for Wisconsin well at 1,106 feet MSL and for Stewart well at 1,057 feet MSL to monitor groundwater level changes in the basin.
- A new NPDES permit needs to be obtained that allows discharge of 7.5 mgd of recycled water into Lake Elsinore for Baseline B and Alternatives 1, 2, and 3. Alternative 4 requires a NPDES permit with a capacity of 17.7 mgd.

Baseline B does not require compliance with any additional existing regulations or agreements, other than the permits required for the construction of the 11 new peaking wells and a new pipeline to convey additional source water to the District's service area. However, declining water levels may cause substantial subsidence, which can result in property damage and is a potential for litigation. Declining water levels results in adjudication of the Elsinore Basin, which causes complex legal and regulatory issues. In addition, the continuation of recharge from septic tanks at the existing levels potentially endangers the water quality of both the groundwater basin and Lake Elsinore. These issues are considered very significant; hence, the overall rating of Baseline B is very poor.

Alternative 1 requires permits for the construction of new dual-purpose wells, peaking wells, a pipeline and a booster station are required. For the conversion of septic tanks to sewer in the high-risk zones of the basin, regulations need to be developed and implemented. The use of treated imported water for direct injection does meet the current federal requirements (40 CFR Part 144) that prohibit any injection activity that may endanger underground sources of drinking water (EPA, 1999). Dual-purpose wells are regulated under EPA's Underground Injection Control program as Class V wells. To prevent degradation of ambient ground water quality and protect the aquifer from clogging, it is recommended that water injected into aquifer recharge meet primary and secondary drinking water standards. As treated MWDSC water meets these drinking water standards, compliance with this regulation is not a legal issue. However, injection of imported water may not be in compliance with the Basin Plan objectives for TDS (currently 450 mg/L and expected to be 480 mg/L after the pending update) depending on the variation of the TDS concentration in MWDSC water. Compliance for nitrogen is not an issue, as MWDSC water does not exceed the proposed Basin Plan objective of 1 mg/L as N. Compliance is expected to be based on a 12-month running average. The overall rating of Alternative 1 is fair.

Alternative 2 requires permits for the construction of the spreading basins, new extraction wells, pipelines and a booster station. The construction of the spreading basins needs to be coordinated with RCFCWCD. During the construction of the spreading basins, dust emission need to be in compliance with current regulations, or dust control measures need to be taken. The groundwater quality is potentially impacted due to higher TDS concentrations in treated MWDSC water compared to groundwater. For the conversion of septic tanks to sewer in the high-risk zones of the basin, regulations need to be developed and implemented.

If recycled water would be used for surface spreading, compliance with DHS and the RWQCB is required. The RWQCB has a policy, Reclamation Policy – Resolution 77-1, that supports reclamation projects to assist in the increased need of water in California, primarily to support growth. The RWQCB and DHS set recycled water regulations. DHS' draft requirements for groundwater recharge by surface spreading, as of August 2002, defines the following:

- The maximum amount of recycled water that can be withdrawn at any domestic well is 50 percent
- The minimum underground retention time is six months
- The minimum horizontal distance to nearest well is 500 feet
- The minimum treatment requirements (turbidity equal or less than 2 NTUs; 5-log virus inactivation; 2.2. total coliform per 100 mL, maximum total nitrogen of 3 mg/L, TOC equal or less than 16 mg/L). In general, this is tertiary wastewater treatment and disinfection. Additional treatment for removal of organics by reverse osmosis and advanced oxidation is required when projects exceed 50 percent recycled water. (Tsuchihashi et al., 2002).

As shown in **Table 6-6**, the cost of spreading recycled water is much higher than the cost of spreading treated imported water. Therefore, these legal constraints would only apply if recycled water would be used. This would also increase the cost of Alternative 2, as all cost estimates are based on the use of treated imported water for surface spreading. The overall rating of legal and regulatory issues of Alternative 2 is poor when recycled water is used and fair if treated water is used.

Alternative 3 requires permits for the construction of new peaking wells, and the development and implementation of policies that regulate the conversion of septic tanks to sewer in the high-risk zone of the basin. As the legal and regulatory issues are minimal, Alternative 3 is rated as good.

Alternative 4 requires permits for the construction of new dual-purpose wells, peaking wells, a pipeline and a booster station. For the conversion of septic tanks to sewer in the high-risk zones of the basin, regulations need to be developed and implemented. To be in compliance with the current federal requirements (40 CFR Part 144) as discussed under Alternative 1, only treated imported water can be injected. The primary legal issue is compliance with the Basin Plan objectives for TDS. The overall rating of Alternative 4 is fair.

Public Acceptability

Public acceptability is rated by the anticipated degree of public approval or opposition to the components of an alternative, including financial impact, environmental impact, temporary inconveniences due to construction work, burden on the public for the participation in water conservation programs.

It is expected that Baseline B be vigorously opposed by the residents in the areas that have a high potential for subsidence due to declining water levels. The construction of peaking wells and pipelines are not expected to cause any public concern other than construction nuisances that are addressed under the environmental impacts. However, when water levels are declining, the owners of public wells are expected to vigorously oppose, as this would result in reduced pumping capacity and/or increase energy cost for pumping. In addition, Baseline B is not the most cost-effective management option as discussed under expected cost, which is also expected to cause resistance from the public, as the goal of the GWMP is to ensure a cost-efficient water supply. With the high potential of subsidence and property damage, Baseline B is rated as very poor.

Alternative 1 is not expected to cause any public concern other than the temporary construction nuisances. It is expected that the public will fully support this alternative as it achieves a balanced groundwater basin at reasonable cost. Alternative 1 is rated as excellent.

As the risk of subsidence and property damage remains in Alternative 2, although not to the same extent as in Baseline B, it is expected that the public would oppose this alternative. Similar to Baseline B, there are no cost savings to offset this concern. On the contrary, the cost of Alternative 2 is higher than Alternatives 1, 3, and 4. In addition, the public may oppose the construction of spreading basins in the canyons as this replaces some natural habitat. If recycled water is used for surface spreading, which is not assumed in this GWMP but a possibility for future use, public opposition would be expected based on experience in other groundwater basins. The overall rating of Alternative 2 is slightly better than Baseline B due to the lower degree of subsidence, thus is rated as poor.

Most components of Alternative 3 are expected to be supported by the public. However, ten percent water conservation places an increased burden on public participation, which could be opposed by a portion of the residents and businesses. This alternative does not require much construction and is the most cost-effective. The overall rating of Alternative 3 is fair.

Alternative 4 is not expected to cause many public concerns other than the temporary construction nuisances. The water conservation goal of five percent is considered feasible without placing a significant burden on the public as Alternative 3. The first five percent of water conservation is achieved with less effort than the second five percent, as all “easy” water reductions are implemented first. With increased water awareness, it is expected that the public would support the idea of water conservation as long as investments and effort required from the public are considered reasonable. Based on this, it is expected that the public will fully support this alternative as it achieves a balanced groundwater basin at reasonable cost. Alternative 4 is rated as good.

Funding

As presented under the estimated cost, the total capital cost per alternative varies from $16 million to $57 million. The ability to acquire larger amounts for funding is generally more difficult than smaller amounts, however certain investments can be funded with grants, while others would be fully funded through loans. This does impact both the total costs for the District as well as the ease of acquiring funds. In addition, the distribution of acquiring funds in included in the evaluation.

Baseline B has the second highest capital cost of $50 million. These high cost are primarily due to the cost of bringing a new source to the District’s service area and the cost of peaking wells that do not serve any other purpose as in Alternative 1 and 4. Although the cost of peaking wells can be spread over time depending on the demands, the cost of the pipelines for the additional source, which contributes to 45 percent of the capital cost, is an instantaneous investment. Baseline B does not qualify for any conjunctive use grant funding or MWDSC subsidies, funding opportunities are more limited compared to Alternatives 1 through 4. Due to the high capital cost, limited funding options, and limited opportunity to spread the investment over time, the funding of Baseline B is rated as poor.

Alternative 1 has a capital cost of $30 million which is close to half the capital cost of Baseline B. About 75 percent of these cost are the dual purpose wells and the associated pipeline and booster station. This is an instantaneous investment, while the remaining 25 percent of for peaking wells, which can easily be distributed over time when demands increase. Conjunctive use projects with dual-purpose wells are likely to qualify for future grants, such as AB303 and Proposition 13. Based on the moderate capital cost, the funding opportunities and uneven distribution of investments, the overall rating of Alternative 1 is fair.

Alternative 2 has a capital cost of $57.4 million, which is highest of all alternatives. About 60 percent of this is for the construction of the spreading basins and the associated pipelines, booster station, and extraction wells. The remaining 40 percent are for the construction of peaking wells, which can be distributed over time when demands increase. Conjunctive use projects with dual-purpose wells are likely to qualify for future grants, such as AB303 and Proposition 13. Based on the evaluation criteria as presented in **Table 7-1**, Alternative 2 is rated as poor.

Alternative 3 has a capital cost of $15.8 million, which is least expensive of all alternatives. As the entire cost capital cost are for new peaking wells or adjustment to existing wells, the investment is easily distributed over time. Conjunctive use projects with in-lieu recharge are likely to qualify for future grants, such as AB303 and Proposition 13. Based on the evaluation criteria as presented in **Table 7-1**, Alternative 1 is rated as good.

Alternative 4 has a capital cost of $24.3 million which is less than half the capital cost of Baseline B. About 70 percent of these cost are the dual-purpose wells and the associated pipeline and booster station. This is an instantaneous investment, while the remaining 30 percent of for peaking wells, which can easily be distributed over time when demands increase. Conjunctive use projects with dual-purpose wells are likely to qualify for future grants, such as AB303 and Proposition 13. Based on the relatively low capital cost, the funding opportunities and the fair distribution of investments, the overall rating of Alternative 4 is good.

Reliability

Reliability is evaluated as the ability to meet water demands in consecutive drought years when replenishment water is not available. The measure used to determine the reliability is the dependence of imported supplies during drought years. Based on the water balance calculations for the hydrologic conditions of the drought period 1988 through 1992, the amount of imported water used to meet the demands are calculated. **Table 7-6** presents these results and the rating as defined in **Table 7-1**.

Table 7-6
Reliability of Alternatives

Supply Source	Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Groundwater Pumping	22%	25%	25%	9%	28%
Canyon Lake WTP	5%	5%	5%	6%	6%
Total Imported	73%	70%	70%	85%	67%
Total Supply / Demand	100%	100%	100%	100%	100%
Rating	**fair**	**fair**	**fair**	**poor**	**good**

Water Quality

The impact of the conditions of Baseline B and the four alternatives on the TDS concentration in the upper and lower aquifer are estimated with a preliminary mass balance calculation over the 41-year hydrologic period. It should be noted that the numbers presented below are only to provide an indication of TDS contents after 41-years of operating the basin under each of the alternatives. Collection of water quality samples and water quality modeling of the groundwater basin is required to obtain better information. However, the mass balance results presented in **Table 7-7** can be used to obtain an indication of general trends in TDS concentration.

As shown in **Table 7-7**, the TDS content increases significantly under Baseline B conditions, while the salt concentrations decrease under Alternatives 1 through 4. The decrease is a result of pumping high TDS water while the aquifers are recharges with lower TDS water partially as a result of septic tank conversions. The possible effect of salt release from the bedrock sediments is not included in the mass balance, and it should be noted that the results of Baseline B and Alternative 2 are sensitive to the allocation of volume reduction between the upper and lower aquifers. More detailed calculations are provided in **Appendix J**. Based on these preliminary results, Baseline B is rated as very poor (1), while all four alternatives are rated as excellent (5) as the results indicate that the Basin Plan objective (480 mg/L) can be met with all four alternatives.

Table 7-7
Estimated TDS Concentration (mg/L)

Supply Source	Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Upper Aquifer					
Current Conditions	550	550	550	550	550
Estimated End Balance	2,052	506	507	543	494
Lower Aquifer					
Current Conditions	390	390	390	390	390
Estimated End Balance	320	382	344	369	379
Rating	**very poor**	**excellent**	**excellent**	**excellent**	**excellent**

Flexibility

Baseline B offers the flexibility to implement projects in the future if well production declines or subsidence occurs. As these projects are not part of Baseline B, the overall cost of this option would increase. Flexibility to adjust to unforeseen circumstances is low as the need for additional supplies increases the longer projects are postponed. If projects do not achieve the desired results, there is less time to test and implement new projects or make adjustments compared to alternatives that implement groundwater management projects early on. In addition, the cost of deferring groundwater management projects can be significant for the following reasons:

- The investment in an additional imported water source could be deferred, which translates into cost savings, if groundwater management projects are implemented to address the declining water levels.
- The cost of groundwater management projects will increase the longer projects are postponed as the groundwater deficit increases and larger capacity recharge facilities are required.
- Declining water levels will steadily increase groundwater pumping costs

In addition, to the limited time make adjustments and the increased cost of deferring groundwater management projects, Baseline B is not flexible manage the groundwater basin. Recharge other than in-lieu is not possible under Baseline B, thus the flexibility to recover the basin after unforeseen additional groundwater pumping, such as higher demands or lower availability of imported supplies, is very limited. Overall, the flexibility of Baseline B is poor.

Alternative 1 offers the flexibility to adjust to higher demands with additional groundwater pumping while managing the basin, as the dual purpose wells have the ability to inject more water depending on the availability of replenishment water. The use of dual-purpose wells for recharge limits the number of sources that can be used, as injection water needs to meet drinking water regulations. However, the District has access to three sources of imported water that can be used for injection, water from Mills WTP, Skinner WTP, and Canyon Lake WTP when untreated water is purchased through the WR-18B turnout. It should be noted that the use of untreated MWDSC water may not comply with the Basin Plan objectives. The basin balance calculations demonstrate that Alternative 1 is capable of recovering groundwater levels after a drought period. Thus, it is flexible to adjust to various hydrologic conditions. The flexibility of Alternative 1 is rated as excellent.

Alternative 2 has the flexibility to use multiple water sources for surface spreading; local runoff, treated imported water from TVP and AVP, untreated imported water, Canyon Lake WTP water, and recycled water from Regional WWTP or EMWD. However, the recharge capacity of the spreading basin is limited and not sufficient manage the basin without other measures. Due to the limited recharge capacity, Alternative 2 does not have the flexibility to maximize the use of replenishment water when available. The flexibility of Alternative 2 is rated as fair.

Alternative 3 is flexible to adjust to higher demands with additional groundwater pumping or purchasing more imported water if ten percent water conservation is not achieved. However, as the need for additional supplies increases over time, there is less time to test and implement new projects to meet demands. This alternative has moderate flexibility to use replenishment water for in-lieu recharge as this amount is limited by the water demands in winter period. Overall, the flexibility of Alternative 3 is rated as fair.

Alternative 4 has the same flexibility characteristics as Alternative 1 with regards to dual-purpose wells and in-lieu recharge. It uses more recycled water for lake replenishment, which make the basin more available to store water during droughts. The flexibility of Alternative 4 is rated as excellent.

Ease of Implementation

The last evaluation criterion is the ease of implementation, which is defined as the degree of technical difficulty of the construction phase as well as operational constraints.

Baseline B does not require the use of any new technologies, and the construction of 11 peaking wells and pipeline for new source water is considered fairly easy to implement. Due to declining water levels of up to 400 feet, substantial re-equipment of wells is required to lower the pumps and add additional pump stages. Some technical difficulty is anticipated with the re-equipment of wells, especially if the well depth or casing diameter limits the ability to install new pumps. Overall, the ease of implementing Baseline B is rated as fair.

Alternative 1 requires the construction of 14 new wells, the conversion of four existing wells to dual-purpose wells, a pipeline and a booster station. Minimal technical difficulties are anticipated with the implementation of Alternative 1. Hence, this alternative is rated as good.

Alternative 2 requires the construction 16 wells and substantial re-equipment of existing wells to lower the pumps and add additional pump stages. The construction of the spreading basins is expected to be difficult due to site conditions and the difficult accessibility of the upper part of

Leach Canyon. In addition, the upper part of Leach Canyon contains many native trees that must be removed causing environmental damage, and pipelines are required that bring water to the top of the canyons. Overall, the construction of the spreading basins is expected to be difficult. The ease of implementing Alternative 2 is rated as poor.

Alternative 3 does not require substantial construction other than the eight peaking wells. However, implementation of water conservation measures that contribute to 10 percent conservation may be difficult as participation and investments of the public are required. The overall rating of Alternative 3 is fair.

Alternative 4 requires the construction of 11 new wells, the conversion of six existing wells to dual-purpose wells, a pipeline and a booster station. As described under public acceptability, implementation of water conservation measures that contribute to 5 percent water conservation is not anticipated to be difficult. Overall, minimal technical difficulties with the implementation are expected. Hence, this alternative is rated as good.

Selection of Preferred Alternative

The preferred alternative is selected based upon the evaluation criteria and consideration discussed in the previous paragraphs. **Table 7-8** provides a summary of the comparison and ranking of each alternative. The evaluation results indicate that Alternative 4 would best meet the evaluation criteria and with that, the objectives of the GWMP.

Table 7-8
Summary of Alternative Rating

Evaluation Criteria	Weighting Factor	Rating[1]				
		Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Ability to Reduce Overdraft	3	1	4	2	3	5
Expected Costs	3	4	3	3	5	4
Environmental Impacts	3	1	4	2	4	5
Risk	2	2	4	1	3	4
Legal and Regulatory Issues	2	2	3	3	4	3
Public Acceptability	2	1	5	2	3	4
Funding	2	1	3	2	4	4
Reliability	2	3	3	3	2	4
Water Quality	1	1	5	5	5	5
Flexibility	1	2	5	3	3	5
Ease of Implementation	1	3	4	2	3	4
Total Rating		**21**	**43**	**28**	**39**	**47**
Weighted Rating		**42**	**83**	**53**	**79**	**94**

1 – A rating of 1 is the lowest, and a rating of 5 is the highest.

The overall ranking of the four alternatives is presented in **Table 7-9**. This table shows that Alternative 4 scores the highest of all alternatives with and without the use of weighting factors. The ranking order in which the alternatives score are the same with and without weighting factors for all alternatives, which indicates that the outcome of the evaluation is not sensitive to the weighting factor assignment.

The second best alternative is Alternative 1, while Alternative 3 is the third best alternative. Alternatives 1, 3, and 4 have fairly similar scores. Alternative 2 does not score much higher than Baseline B and has about 55 to 60 percent of the score of the Alternative 4. Alternative 4 is selected as the preferred alternative because it has the highest overall rating and because the District and stakeholders have indicated that water conservation should be part of the final plan.

Table 7-9
Summary of Alternative Ranking

Ranking	**Ranking[1]**				
	Baseline B	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
Total Score without weighting	21	43	28	39	47
Ranking without weighting	**5**	**2**	**4**	**3**	**1**
Total Score with weighting	42	83	53	79	94
Ranking with weighting	**5**	**2**	**4**	**3**	**1**

1 – A ranking of 1 is the highest, and a ranking of 5 is the lowest.

The implementation strategy of the preferred alternative, Alternative 4, is described in **Section 8**.

Section 8
Implementation Plan

INTRODUCTION

Implementation of the Elsinore Basin GWMP will require numerous decisions regarding the priorities for implementation, the financing mechanisms for various elements of the plan, potential cooperative agreements with other agencies, and balancing water needs with available resources. This section discusses the recommendations for managing EVMWD's groundwater resources, and the financial and implementation strategies needed to actualize the proposed activities.

COMPONENTS OF THE RECOMMENDED PLAN

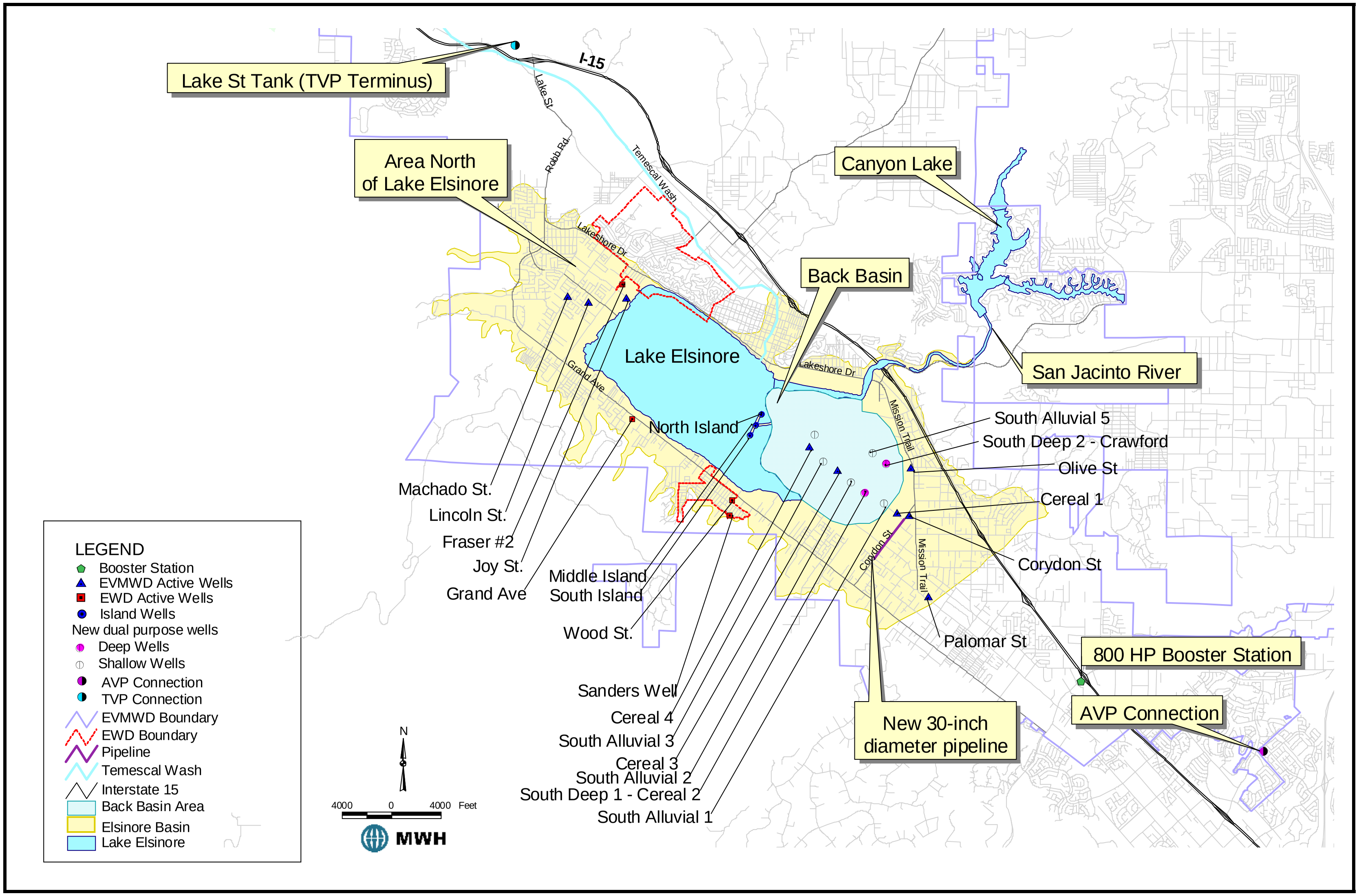
The recommended plan includes water conservation, dual-purpose wells for basin recharge, the use of recycled water as the primary source for lake replenishment, and a basin monitoring program. In addition, the plan contains recommendations for stakeholder involvement through an advisory committee, wellhead protection, well construction and abandonment procedures, the development of septic tank policies, and agency coordination. Each of these components is discussed below. A map depicting the location of the structural components required for the implementation of the recommended plan is presented in **Figure 8-1**.

Water Conservation

The prudent use of water is the focus of many utilities, regulatory agencies and the public throughout the nation. Population growth, environmental concerns, periodic droughts and the economics of new water supply development demonstrate the need to make efficient use of the available water supplies. Water conservation is described as any beneficial reduction in water use or reduction in water losses. Conservation measures can be applied to all water uses; however, in the service areas of EVMWD and EWD, the primary focus of water conservation is on municipal uses including irrigation. The minimum water conservation goals for the recommended plan is 5 percent. Water conservation measures that are part of the recommended plan are:

- Residential plumbing retrofits,
- Water system audits, leak detection and repair,
- Financial incentives for large landscape irrigation,
- Promotion of low water use landscaping,
- Promotion of high-efficiency appliances,
- ULF toilet replacement program, and
- Public information to increase water awareness.

Figure 8-1
Components of the Recommended Plan



- Use of recycled water for landscape irrigation and other non-potable uses.
- School education programs.
- Water use audits for commercial, industrial, and institutional users.
- Implementation of commercial, industrial, and institutional water conservation programs.
- Assignment of water conservation coordinator.
- Development and enforcement of water waste prohibition.
- Water audits programs for residential customers.

These measures are estimated to reduce the total projected water demand for year 2020 from 50,500 to 48,000 acre-ft/yr. This level of water conservation must be achieved to ensure the additional water supplies will not be required.

Per State law, the District has completed and adopted an urban water management plan (UWMP) in 2000 which is required to be updated every five years according to the California Water Code, Sections 10610-10656. This UWMP includes most of the water conservation measures listed above and estimated that these will achieve about 3 percent water conservation due to implementation of BMPs. Additional measures such as the promotion of low water landscaping or higher participation rates in municipal programs are required to achieve the water conservation goal of 5 percent.

State law establishes a number of policies regarding water conservation and the use of recycled water and it mandates water conservation techniques, which have been already implemented in the District. Examples of these policies are:

- California plumbing codes have required the installation of ULF toilets and low-flow showerheads on all new construction since 1992.
- The *Water Conservation in Landscaping Act* (California Government Code, Sections 65591-65600) required each city and county to adopt a water efficiency ordinance for landscaping.
- The *Water Recycling in Landscaping Act* (California Government Code, Sections 65601-65607) require recycled water producers to notify local agencies of the availability of recycled water and requires local agencies to adopt and enforce a recycled water ordinance within 180 days of being notified.

In December 2002, the District has signed the *Memorandum of Understanding Regarding Urban Water Conservation* (MOU) that commits participating water agencies to make a "good faith effort" to develop comprehensive conservation Best Management Practices (BMPs) programs using sound economic criteria. This GWMP considers water conservation on an equal basis with other water management options and is one of the key components of the recommended plan.

Water conservation may be expanded for large-scale irrigation users such as schools and golf courses by increasing the use of recycled water for irrigation. There are three principal sources of recycled water, the Regional WWTP and the regional water reclamation facilities of EMWD and Rancho California Water District (RCWD) that will discharge their effluent in the near future through a new pipeline from EMWD. The potential users of recycled water will be identified in an upcoming study, the Wildomar Recycled Water Master Plan. To determine the full potential and economic feasibility of an expanded recycled water network, the 1992 non-potable water master plan should be updated with a separate study that covers the entire service area of EVWMD and EWD. The recommended plan does not include the expansion of the recycled water network as part of the water conservation measures. This could be included in the future updates of the GWMP.

Minimizing Basin Pumping

In addition to conservation there is a need to minimize basin pumping for all potable use, including pumping from the Island wells for lake replenishment. Using groundwater to recharge the lake causes an increase in the amount water that is needed for recharging the basin. There is a lot of potable water being used for non-potable purposes. For example, irrigation sprinkler systems currently use potable water. If you can capture some of the septic tank water, treat it and use it to off-set potable water being used to keep grass green that saves the water that is normally pumped out of the basin or imported in.

Groundwater Recharge with Dual Purpose Wells

Groundwater recharge is a critical tool for modern water management. In the recommended plan, groundwater recharge involves the injection of treated imported water into the groundwater aquifer through dual-purpose wells that can both extract and inject water. Dual-purpose wells would be installed in the Back Basin area as well as in the area north of Lake Elsinore (see **Figure 8-1**). The dual-purpose wells are distributed over the entire groundwater basin to allow management of groundwater levels throughout the basin. Concentrating all dual-purpose wells in one area would also require more capital investments for booster stations and/or pipelines to convey water from the imported water connections to the injection locations. It would also limit the ability to manage water levels effectively and increase well interference. The recommended plan includes the 14 dual-purpose wells as listed in **Table 8-1**.

Table 8-1
Summary of Dual Purpose Wells

Area	Quantity	Description	Extraction Capacity (gpm)	Injection Capacity (gpm)
Back Basin Area	3	Cereal 1, 3, and 4 (conversion to dual p.)	1,750	1,400
	1	Corydon (conversion to dual p.)	1,000	750
	2	Crawford and Cereal 2 (new)	1,750	1,400
	5	South Alluvial 1 through 5 (new)	700	350
Area North of Lake Elsinore	1	Joy Street (equipped as dual p.)	1,000	750
	2	Deep Dual-Purpose Wells (new)	1,000	750
Total	**14**		**7,200**	**5,400**

Other Facilities

In addition to the dual-purpose wells listed in **Table 8-1**, the recommended plan requires the construction of the following facilities and pipelines. The locations of these facilities are indicated in **Figure 8-1**.

- Four additional wells are required for peaking to meet MDD. These wells should have an extraction capacity of at least 1,000 gpm each, otherwise more peaking wells are required.
- An in-line booster station of 800 HP (15,000 gpm at 100 feet of TDH) to increase the head in the Loop Zone when AVP water is required for injection in the Back Basin. This booster station is currently proposed near the intersection of Clinton Keith Road and Interstate 15. A more in-depth analysis is recommended to determine the best location.
- A 4,000 lineal foot 30-inch diameter pipeline on Corydon Street is required to convey groundwater when the Back Basin dual-purpose wells are in extraction mode. The capacity of existing pipelines is not sufficient to distribute the water directly in the Loop Zone.

Lake Level Maintenance

Maintenance of water levels in Lake Elsinore would be accomplished with a combination of recycled water and groundwater when the lake level drops below 1,240 feet MSL. Recycled water would be used as the primary source of replenishment water up to 17.7 mgd. This is the projected capacity of the Regional Plant in year 2020 minus 0.5 mgd reserved for discharge to Temescal Wash. One of the three Island Wells would be used as the secondary source when the recycled water supply is not adequate to maintain the lake level at 1,240 feet MSL in year 2020, while all three wells are required to maintain lake levels before year 2020 when less recycled water is available. Based on lake balance calculations as described in **Appendix F**, replenishment with groundwater would occur twice in 41 years with an average of five acre-ft/yr. EVMWD should continue to pursue Regional Board approval for discharge of Regional Plant effluent into Lake Elsinore when needed to maintain the elevation. This will require a combination of phosphorus removal at the plant and nitrogen offsets to comply with the Lake Elsinore TMDL. EVMWD should gradually reduce the use of Island Well water until the recycled water supply is sufficient to meet the total lake replenishment need.

[Note: that since the draft plan was prepared, EVMWD has developed a plan to commenced lake replenishment when water levels drop below elevation 1,247 feet MSL to reduce the likelihood that levels will drop below elevation 1,240 feet MSL.]

Surface Spreading

Although the use of surface spreading facilities is not included in the recommended plan, it is recommended that EVMWD further investigate the possibilities of surface recharge in Railroad Canyon. Discussions between EVMWD and MWDSC are required to determine if raw water can be obtained from MWDSC at the turnout 12 miles upstream from Canyon Lake and then spilled over Railroad Canyon Dam to be infiltrated in the San Jacinto River before reaching Lake Elsinore. Access to State Water Project water is desirable due to its lower TDS. This source of lake replenishment water will indirectly offset the amount of Tier 2 water that needs to be purchased for potable demand needs, as more groundwater is preserved for potable water needs.

Use of Recycled Water

The recommended plan limits the use of recycled water to the use for lake replenishment as discussed above. However, the pipeline from the EMWD Temecula Regional plant to the

Temescal Wash discharge location near Wasson Sill in the Lake outlet channel, brings additional recycled water to EVMWD's service area when the production of recycled water exceeds EMWD's recycled water demand. This new recycled water source offers the potential for the expansion of recycled water use within the District's service area. Neither the use of EMWD recycled water nor the expansion of the recycled water system are included in this GWMP as this is beyond the scope of this project. The purpose of this component is to recognize that this additional recycled water source may be available. It is recommended that potential recycled water demands be identified and the feasibility of a dual water system be determined in a future recycled water planning study. An expansion of the use of recycled water may result in a reduced need for peaking wells. It should be noted that the availability of recycled water will increase with growth, and that the current shortage of recycled water is expected to change to an excess of recycled water in the future.

Advisory Committee

This plan recommends that an Advisory Committee should be formed that represents the users of the Elsinore Basin. This committee may consist of five members, with three members from EVMWD, one member from EWD, and one member representing the private pumpers in the Elsinore Basin. EVMWD's Board of Directors would appoint the members of the Advisory Committee. The Advisory Committee would be involved with the following programs and activities:

- Provide advise on the implementation of the Groundwater Management Plan,
- Provide advise on the implementation of the Monitoring Program, and
- Provide advice on the development and implementation of Well Construction, Destruction, and Abandonment Policies.

The Advisory Committee shall provide their comments on these activities to the EVMWD Board of Directors.

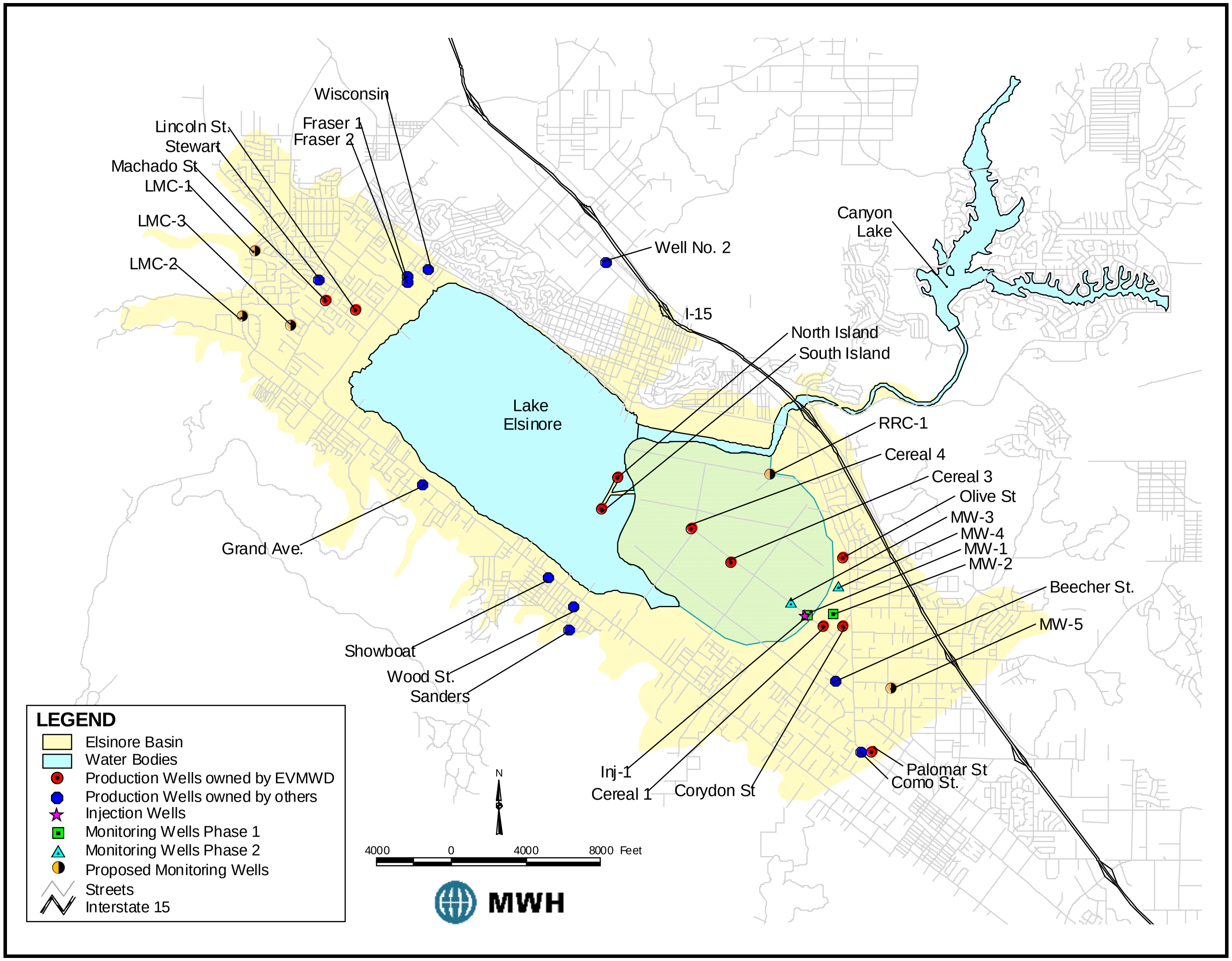
Monitoring Program

As the Plan is implemented, the District's ongoing groundwater monitoring program will play an integral role in understanding the basin response to different plan elements. The effectiveness of the Plan will be measured through its impacts on groundwater levels, water quality and subsidence potential.

A basin monitoring program is important to better understand the groundwater basin and to measure the effects of the activities that are implemented. In addition, basin monitoring provides a basis for effective adaptive management. The monitoring program that is developed as part of this GWMP is presented in **Appendix K** (MWH, 2003). The monitoring program incorporates the Joint Groundwater Monitoring Program that was established by the May 2000 agreement between EVMWD and EWD. The key components of the proposed monitoring plan are listed below and the locations of monitoring wells are identified in **Figure 8-2**.

- Conduct a well canvass to obtain information from private well owners. These additional background data can be used to further characterize the basin to guide EVMWD's future

Figure 8-2
Location of Monitoring Wells



groundwater supply needs. A canvass of private wells owners was conducted in 2004 that identified about 34 active private wells in the basin.

- Construct five new monitoring wells, three nested piezometer wells and two single wells. These wells will be used to obtain additional background water level and water quality data to characterize the basin. In addition, these wells can be used to monitor the impact of future facilities. One of these five new monitoring wells was recently drilled at McVicker Canyon while another was constructed near the San Jacinto River near The Diamond, Lake Elsinore's minor league stadium.
- Measure water levels in existing production and monitoring wells and the new monitoring wells on a monthly basis. Monthly data is important to understanding the seasonal variations in water levels throughout the basin and confirm the basin yield.
- Collect water quality data from the existing wells on an annual basis and the new monitoring wells two times annually. Changes in water quality may be caused by operations throughout the basin. New monitoring wells should be monitored more frequently to obtain background data for comparison to future water quality.
- Perform spinner logging to identify where most of the production comes from in existing production wells. These data may indicate the depth to which new production wells should be drilled in the future.
- Perform water quality zone testing, in conjunction with the spinner logging. This analysis can be used to isolate which areas are causing variations in water quality. This may include continuous water quality logging or zone specific testing.
- Perform continuous aquifer testing. The data can be used to confirm transmissivity and storativity estimates that can used to estimate future drawdown and basin yield.
- Perform surface water monitoring of Lake Elsinore, the San Jacinto River and Leach and McVicker Canyons.
- Perform land subsidence monitoring, which should initially consist of a GPS monument network.

The information collected through this monitoring program will lead to more efficient implementation of management activities, as it would provide guidance for adjusting management parameters according to the results over time. The data collection will play an integral role in the District's understanding of the basin's response to different plan elements and provide a baseline that can be used to evaluate the success of the GWMP and other projects. Information gathered on the effectiveness of individual plan element can be used for future updates of the GWMP.

Well Construction, Destruction and Abandonment Policies

Improperly constructed wells can result in poor yield and contaminated groundwater by establishing a pathway for pollutants to enter a well, allow communication between aquifers of varying quality, or the unauthorized disposal of waste into the well. This GWMP recommends that well construction, destruction, and abandonment policies be developed in cooperation with Riverside County. These policies should include the following principles:

- All wells drilled in the Elsinore Basin must be in compliance with the California Water Code §13700 through §13806.

- All well drilling contractors must be in possession of an active C-57 Contractor's license.
- Permits for the drilling, deepening, modification, or repair of any well must be obtained and be in accordance with Riverside County Ordinance 682.3. These permits should conform to well construction standards that are specified in DWR Bulletins 74-81 and 74-90.
- All wells within the Elsinore Basin, whether active, inactive, abandoned or improperly destroyed, should be identified by conducting a well canvass. All identified wells should be included in the groundwater GIS.
- The status of all wells should be evaluated to identify which wells should be destroyed and which wells can be capped or retained as monitoring wells. If no future use is anticipated, wells must be properly destroyed according to the destruction procedures are also specified in the DWR Bulletins 74-81 and 74-90. If future use is anticipated, wells can be capped and maintained as outlined in Riverside County Ordinance 682.3.
- Coordination between Riverside County and the District should take place to ensure that property owners, who are responsible for proper well destruction and capping of wells, follow the destruction procedures and guidelines.

Septic Tank Conversion Plan and Policies

The recommended plan presumes that at least all septic tanks in the high-risk zone, as shown in **Figure 5-2**, should be connected to the sewer system by year 2020. Approximately 2,900 septic tanks, which is about 80 percent of all the septic tanks in the basin, are located in this high-risk zone and need to be connected to the sewer system, while no additional septic tanks are added within the high-risk zone. The District is currently developing the policies to accomplish the conversion of at least all septic tanks is the high-risk zone.

Integrated Planning

Due to the integrated nature of water resources in the Elsinore Basin, it will be critical that future projects consider their potential effects on the management of the basin. As described in Section 1, management decisions regarding the source of water used for lake replenishment could affect the availability of groundwater for potable use. Similarly, flood control activities may divert stormwater that previously percolated into the groundwater basin into Lake Elsinore, reducing basin recharge. EVMWD will need to monitor land use planning activities of the City of Lake Elsinore and the County of Riverside to ensure that proposed developments do not adversely affect the water resources of the basin. It is recommended that EVMWD periodically meet with the City and the County to review development plans and develop collaborative solutions to potential problems that could affect the groundwater resources of the basin.

Periodic Reporting and GWMP Updating

As basin manager, EVMWD will need to prepare periodic reports documenting the conditions of the groundwater basin. This "State of the Basin" report should summarize historical monitoring data as collected under the basin monitoring program and include a description of management activities implemented since adoption of plan. This report would provide information on the condition of the basin to the basin advisory committee that could be used in making management recommendations for the basin. It is recommended that the report be updated bi-annually.

The GWMP should not be a static document. As development proceeds in the basin, the challenges affecting EVMWD will change. In addition, as work proceeds on the recommendations of this plan, new knowledge will be gained which could affect the methods used to manage the basin. Consequently, EVMWD, in conjunction with the Basin Advisory Committee, should perform a comprehensive review of the GWMP and make periodic adjustments to reflect changes in land use and development as well as knowledge gained from the construction and operation of new wells. As part of the review, consideration should be given to updating the groundwater model of the basin to more accurately reflect the current state of hydrogeological understanding of the basin.

IMPLEMENTATION

The implementation plan consist of a discussion of the project cost, financing options, phasing of activities, phasing of cost, operation of the basin, and agency coordination.

Costs of the Recommended Plan

The total capital and annual costs of the recommended plan are summarized in **Table 8-2.** As shown in this table, the total capital costs are $24.3 million, which corresponds to an annual investment of $0.73 million at a discount rate of 3 percent. Other annual cost include $0.9 million for groundwater pumping, and $17.6 million for the purchase of imported water from MWDSC, and $2.0 million for others. The total annual costs are $20.6 million, which equals $422 per acre-foot of base water demand. The costs presented in this plan are based on an Engineering News Record (ENR) Construction Cost Index (CCI) of 7,572 (Los Angeles, March, 2003).

Funding Options

The primary beneficiaries of the GWMP are the municipal water users in the Elsinore Basin, EVMWD and EWD. Private pumpers throughout the basin with generally small domestic demands will either be beneficially impacted or experience no impacts. The plan’s cost should be allocated between the existing users and future growth-related users (through connection fees). As Elsinore Basin groundwater is supplied to customers outside the basin area, all customers in the entire combined service area of the District and EWD should pay for the cost of this plan. Cost savings experienced by local private pumpers should be an incentive to participate in the implementation of this GWMP. The capital cost required for structural improvement projects need to be financed by the District and recovered based on the sale of water. As shown in the cost comparison in **Section 7**, the unit cost of implementing the recommended plan of the GWMP is about the same as the continuation of current operations as presented in Baseline B, thus funding of the plan is not anticipated to be an issue. However, the recommended plan requires that most of the investments are made early on, while the cost of Baseline B are more equally spread over time. The capital cost of the recommended plan is $31 million lower than Baseline B. Mechanisms for financing include the following:

- Water rates
- General property taxes
- Grants, such as DWR construction grants
- Developer fees

Table 8-2
Summary of Capital and Annual Cost

Cost Type	Project Description		Capital Cost	Annual Cost
Capital Cost	4 Peaking Wells		$ 7,480,000	$ 194,000
	6 Conversion of Existing Wells to Dual Purpose Wells		$ 600,000	$ 37,000
	Equipping Joy Street as a Dual Purpose Well		$ 100,000	$ 7,000
	7 New Dual Purpose Wells		$ 13,090,000	$ 339,000
	30-inch diameter pipeline on Corydon Street (4,000 LF)		$ 1,360,000	$ 50,000
	800 HP in-line PS (near Clinton Keith Rd./I-15)		$ 1,680,000	$ 103,000
	Subtotal		**$ 24,310,000**	**$ 730,000**
O&M Cost	**Quantity (acre-feet/yr)**	**Cost Item**		**Annual Cost**
	8,188	Groundwater Pumping in Back Basin Area		$ 691,000
	2,132	Groundwater Pumping N/O Lake		$ 166,000
	380	Groundwater Pumping EWD		$ 31,000
	0	Groundwater Pumping for Lake Replenishment		$ -
	3,400	Recycled water for Lake Replenishment		$ 510,000
	3,000	Canyon Lake WTP		$ 690,000
	13,320	Purchase of MWD Water (Tier 1)		$ 5,568,000
	19,880	Purchase of MWD Water (Tier 2)		$ 9,921,000
	5,900	Purchase of MWD Water for Injection		$ 1,770,000
	1,100	Purchase of MWD Water for In-Lieu recharge		$ 330,000
	12,000	Pumping Cost in-line PS (near Clinton Keith Rd./I-15)		$ 232,000
	2,500	Water Conservation		$ 650,000
	71,800	**Subtotal**		**$ 20,559,000**
Total				**$ 21,472,000**

It is not possible to predict the specific financing mechanisms that will be applied to each of the elements of the recommended plan. Funding will likely be through a combination of mechanisms that best meet the needs of the District. Public input regarding financing options should be sought as specific items are proposed or constructed.

Phasing of Activities

An implementation plan has been developed which describes the phasing of the various project components over the next twenty years. The phasing of this project and other components is presented in **Figure 8-3**.

The following factors are considered per project in the phasing of project components:

- The impact of the project on the groundwater balance
- The estimated construction time
- The need for the project in relation to the water demands
- The distribution of cost over time

Figure 8-3
Phasing of Activities

Project	2003-2005	2006-2010	2011-2015	2016-2020
4 Peaking Wells				■
Conversion of 6 Existing Wells to Dual Purpose Wells	■			
Equipping Joy Street as a Dual Purpose Well	■			
7 New Dual Purpose Wells	■			
30-inch diameter pipeline on Corydon Street (4,000 LF)		■		
800 HP in-line PS (near Clinton Keith Rd./I-15)	■			
Water Conservation	■	■	■	■

The implementation of dual-purpose wells in the Back Basin has already started with pilot testing. Design of the full-scale facilities is underway as part of a grant application under Proposition 13. To allow injection of treated imported water as soon as possible, it is recommended that the all dual purpose wells and the associated booster station be implemented as soon as possible. As shown in Figure 8-3, all related projects are phased for the period 2003-2005. The pipeline at Corydon Street is postponed till the period 2006-2010 as the need for this pipeline is demand-driven and is required for extraction only. The current well configuration is assumed to be sufficient to meet MDD till at least 2005. With the installation of the eight new dual-purpose wells (Joy Street and seven new dual-purpose wells), the available supply capacity is increased and can meet MDD up to year 2018. The four peaking wells are therefore phased in the last period, 2016-2020. Water conservation is an on-going effort as many of the water conservation measures are focused on public participation, which needs to be carried out continuously to include the future growth-related customers.

Phasing of Cost

Based on the phasing of activities as described above, the distribution of capital investments is calculated and presented in **Table 8-3**. This table does not include annual cost and can be used to update the District's Capital Improvement Program and rate studies.

Table 8-3
Phasing of Capital Cost (in $1,000)

Project	2003-2005	2006-2010	2011-2015	2016-2020
4 Peaking Wells	$ -	$ -	$ -	$ 7,480
Conversion of 6 Existing Wells to Dual Purpose Wells	$ 600	$ -	$ -	$ -
Equipping Joy Street as a Dual Purpose Well	$ 100	$ -	$ -	$ -
7 New Dual Purpose Wells	$ 13,090	$ -	$ -	$ -
30-inch diameter pipeline on Corydon Street (4,000 LF)	$ -	$ 1,360	$ -	$ -
800 HP in-line PS (near Clinton Keith Rd./I-15)	$ 1,680	$ -	$ -	$ -
Total	**$ 15,470**	**$ 1,360**	**$ -**	**$ 7,480**

As shown in this table, the capital investments are not evenly distributed over time. Deferring a portion of the injection projects is possible, for example the wells in the area north of Lake Elsinore; however, the groundwater basin is managed best when injection takes places at both locations. In addition, deferring the implementation of dual-purpose wells will advance the need for peaking wells. Since the cost of new dual-purpose wells and peaking wells are the same, deferring the injection projects would not change the cost distribution significantly.

Operation of the Basin

The basin will require an operation plan that varies over the time. The GWMP provides an operational strategy for the demand conditions in year 2020. The operation plan would address the operational strategy under various supply and demand scenarios for the intermediate periods, as demands and available supplies vary over time. This plan would also include an emergency supply plan that describes the system operations under drought conditions.

The in-lieu operation of the basin can start immediately, provided that MWDSC has replenishment water available. Once the dual-purpose wells and associated facilities are in place, conjunctive use operations can start to recharge the groundwater basin during wet periods and provide storage for dry periods. In general, injection would take place between October and March in years when replenishment water is available, which depends on the hydrologic conditions of the sources that contribute to MWDSC's overall supply. It should be noted that injection may be possible year around during wet years if excess replenishment water is available. The dual-purpose wells would be used for extraction in the summer months of dry years when the demands increase and the available imported supply from MWDSC decreases. The injection and extraction cycles of the recommended plan as a function of the hydrologic conditions of 1960 through 2001 are presented in **Figure 6-7**. During the 41-year hydrologic cycle, about 240,000 acre-feet of imported water would be injected. With these operations, the groundwater basin remains in a long-term balance, meaning that the amount extracted is equal to the amount replenished over the 41-year hydrologic analysis period. To exercise all the wells regularly, cycling the use of dual-purpose wells for extraction along with the regular production wells is recommended. The use of groundwater for lake replenishment is very limited in the recommended plan. This is discussed in more detail under Lake Level Maintenance.

The water supply distributions for the year 2020 demands in an average, wet and a dry year are presented in **Figure 6-8**. As shown in this figure, the peaking wells are only required in dry years, when demands increase, and when the production of Canyon Lake WTP is almost zero. To provide a more detailed picture of the conjunctive use operation in the recommended plan, the water supply mix during average rainfall years, wet years and dry years are presented on a monthly basis in **Figure 8-4**, **Figure 8-5,** and **Figure 8-6** respectively.

These figures indicate the need for additional peaking wells to meet the water demand in the summer months under dry year conditions. During average rainfall and wet years, peaking wells are likely to be needed as well on to meet MDD, as the graphs only present the average demand of the summer months, which is about 20 percent lower than MDD. Figure 8-6 shows that the injection potential is zero in dry years, while during average and wet years injection can take place from October through March. The system demands in October require full use of the imported water connection capacity; hence, injection can not take place. Once the demands drop, the imported water can be used for groundwater recharge.

Figure 8-4
Water Supply Mix during an Average Rainfall Year

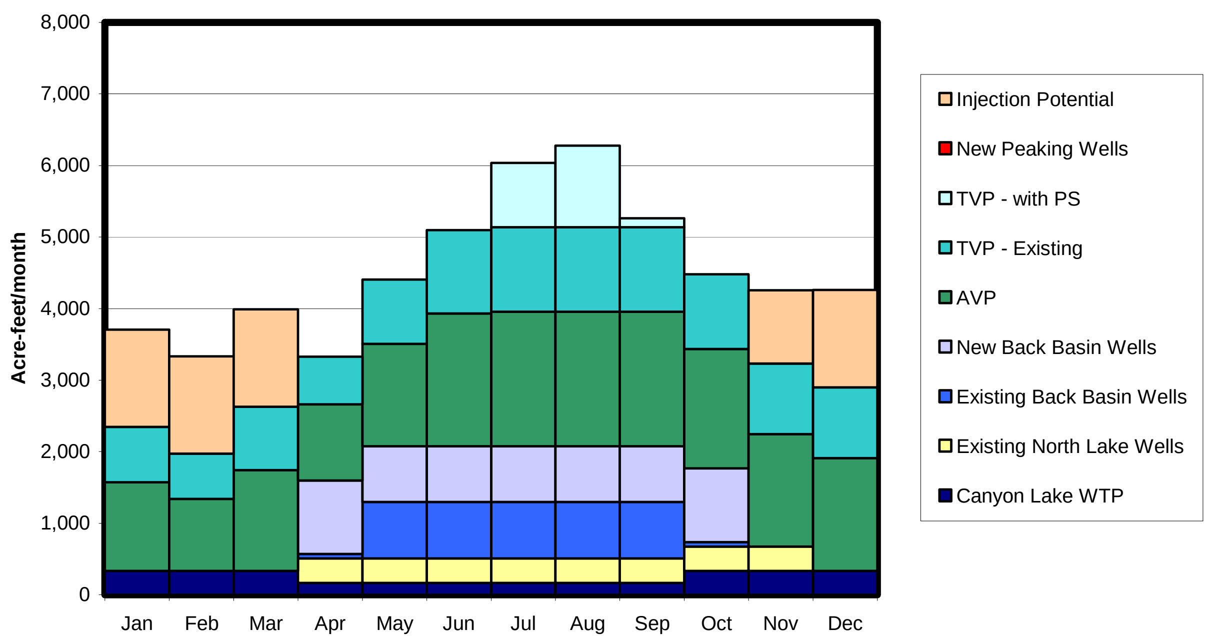


Figure 8-5
Water Supply Mix during a Wet Year

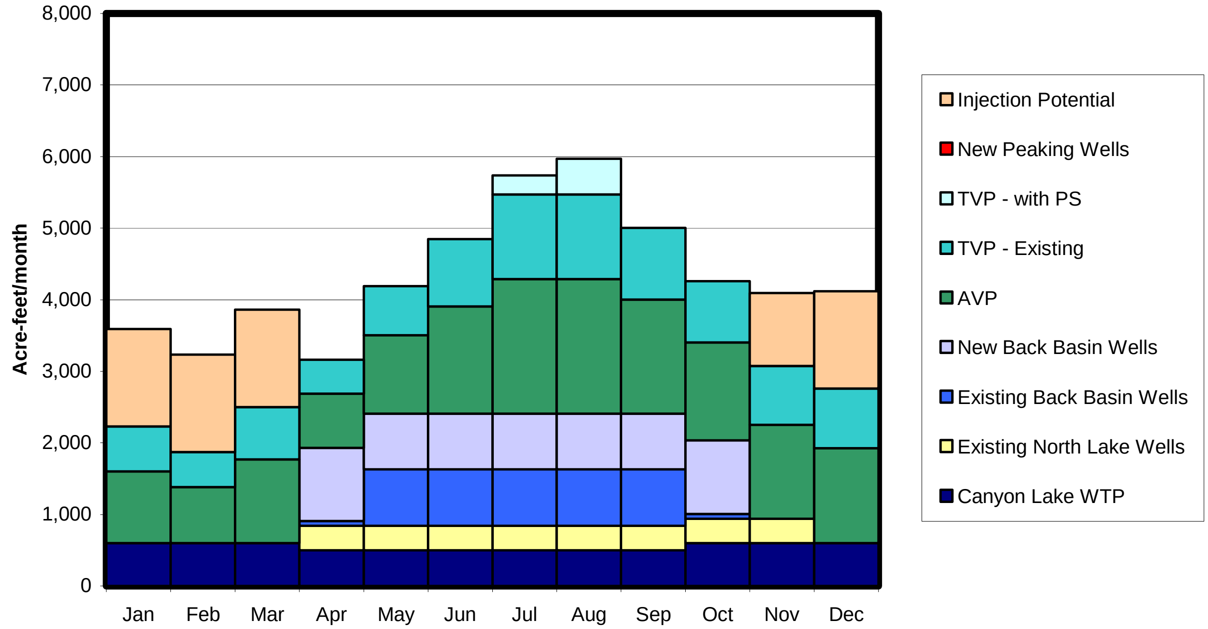
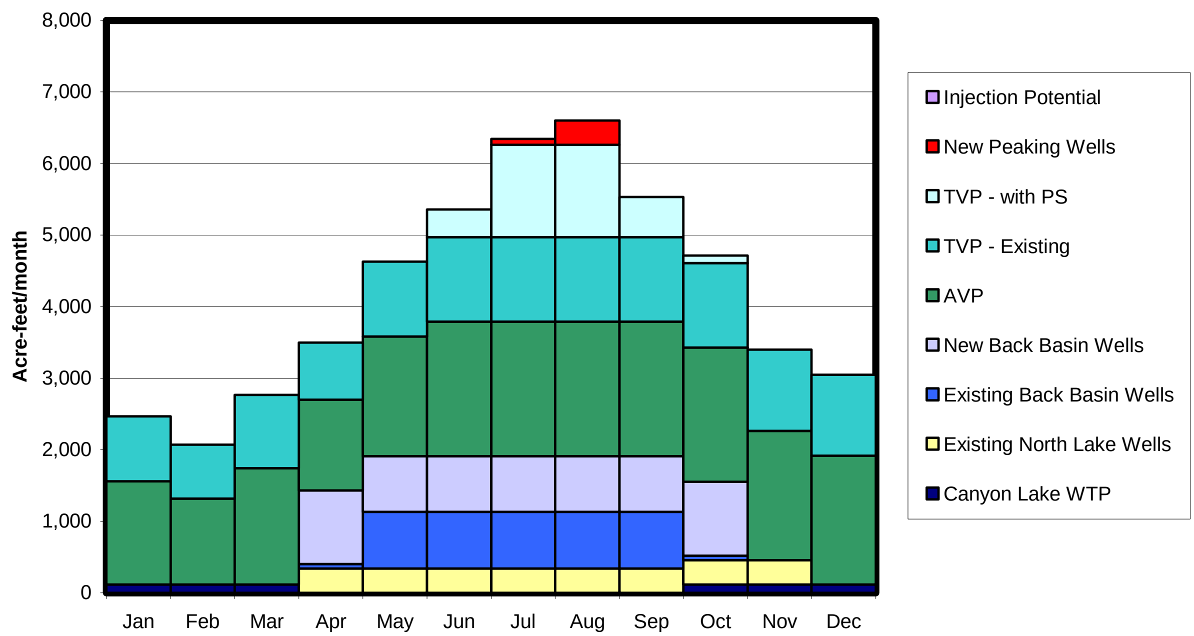


Figure 8-6
Water Supply Mix during a Dry Year



The graphs also show the difference in production of Canyon Lake WTP. During wet years, the TVP pumping station needs to operate two months per year, while this increase to four months under dry year conditions. Injection is estimated to take place in eight out of ten years.

Agency Coordination

For successful implementation of this GWMP, coordination of activities, plans and programs between the District and other agencies is required. **Table 8-4** summarizes the agencies involved and the associated activities that are described under the recommendations of the recommended plan earlier in this section.

CONCLUSION

The goal of the Elsinore Basin GWMP is to ensure a reliable, high quality, cost-efficient, groundwater supply for the users of the Elsinore Basin in an environmentally friendly manner. If the Plan is to succeed, it must be a living document that is flexible and can be adapted to meet the changing needs of the Elsinore Valley area. As management elements are established and results of implementation strategies are quantified, the GWMP should be periodically evaluated to determine how well it is meeting the needs of the Elsinore Valley area, to consider new information and opportunities, and if needed to make appropriate adjustments. The success of this GWMP will allow the Elsinore Valley to grow and double its demands over the next 20 years, with a reliable, affordable, and stable water supply.

Table 8-4
Summary of Agency Coordination

Agency and Basin Users	Activities/Plan/Programs that require Coordination
Advisory Committee	• Monitoring Program • Well Construction, Destruction, and Abandonment Policies • Septic Tank Conversion Policies • Feedback on the GWMP to the District Board of Directors
City of Lake Elsinore	• Lake Level Maintenance Agreement (Lake Elsinore)
DWR	• Well logs • Possible Grant Opportunities
EMWD/RCWD	• Construction of Reclaimed Water Pipeline • Availability of Reclaimed water
EWD	• Joint Groundwater Monitoring Program • Enhanced Monitoring Program of GWMP
Private Pumpers	• Well Canvass • Well Destruction/Capping of Wells
Riverside County	• Permits for the drilling, deepening, modification or repair of wells • Well Destruction/Capping of Wells • Planning Documents (e.g. general and specific plans)
RWQCB	• Groundwater Contamination Notices • Revisions of the Santa Ana Basin Plan Objectives • Reclaimed water projects • Current discharge of Reclaimed water in Lake Elsinore • NPDES permit
SWRCB	• Production records of public and private pumpers

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Appendix B
List of Abbreviations

The abbreviations used in this report are listed in **Table B-1**.

Table B-1
List of Abbreviations

Abbreviation	Description
acre-ft/yr	Acre-feet per Year
ADD	Average Day Demand
APN	Assessor's Parcel Number
ASR	Aquifer Storage and Recovery
AVP	Auld Valley Pipeline
BBIPP	Back Basin Injection Pilot Project
BMP	Best Management Practices
CAFG	California Department of Fish and Game
CCI	Construction Cost Index
CEQA	California Environmental Quality Act
CPT	Cone Penetrometer Test
CY	Cubic Yard
DHS	Department of Health Services
DWR	Department of Water Resources
EIR	Environmental Impact Report
EMWD	Eastern Municipal Water District
ENR	Engineering News Record
EPA	Environmental Protection Agency
ESRI	Environmental Systems Research Institute
ET	Evapotranspiration
EVMWD	Elsinore Valley Municipal Water District
EWD	Elsinore Water District
FCD	Flood Control District
GIS	Geographic Information System
GMA	Groundwater Management Agency
GWMP	Groundwater Management Plan
HE	High Efficiency
I-15	Interstate 15
LADWP	Los Angeles Department of Water and Power
MCL	Maximum Contaminant Level
MDD	Maximum Day Demand
mgd	million gallons per day
mg/L	milligram per liter
MDD	Maximum Day Demand
MMD	Maximum Monthly Demand

Table B-1(Continued)
List of Abbreviations

Abbreviation	Description
MOU	Memorandum of Understanding
MSL	Mean Sea Level (feet)
MWDSC	Metropolitan Water District of Southern California
MWH	Montgomery Watson Harza
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
PEIR	Program Environmental Impact Report
psi	Pounds per square inch
RCFCD	Riverside County Flood Control District
RCFCWCD	Riverside County Flood Control and Water Conservation District
RCWD	Rancho County Water District
RWQCB	Regional Water Quality Control Board
RWWTP	Regional Wastewater Treatment Plant
SAWPA	Santa Ana Watershed Project Authority
SJRWT	San Jacinto River Raw Water Turnout
SWP	State Water Project
SWRCB	State Water Resources Control Board
TBD	To be determined
TDS	Total Dissolved Solids (mg/L)
TRC	Technical Review Committee
TVP	Temescal Valley Pipeline
ULF	Ultra Low Flow
USFWS	United States Fish and Wildlife Services
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
WCFSP	Water Conservation Field Serviced Program
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

Appendix C
Stakeholder Involvement and Management Plan Adoption

This appendix contains the following documents:

- Meeting Minutes - Stakeholder Planning Meeting No. 1 - May 9, 2002
- Meeting Minutes - Stakeholder Planning Meeting No. 2 – June 4, 2002
- Meeting Minutes - Stakeholder Meeting No. 1 – October 3, 2002
- Meeting Minutes - Stakeholder Meeting No. 2 – February 5, 2003
- Notice of Public Hearing – Preparation of Groundwater Management Plan for the Elsinore Groundwater Basin – published May 25, 2004 and June 1, 2004
- Publication of Resolution of Intent to Prepare a Groundwater Management Plan – adopted June 10, 2004
- Public Meeting Announcement - Public Meeting on Groundwater Management Plan – August 10, 2004
- Presentation – Public Meeting on Groundwater Management Plan – August 10, 2004
- Notice of Availability/Notice of Intent to Adopt a Mitigate Negative Declaration – Groundwater Management Plan for the Elsinore Basin – January 18, 2005
- Notice of Public Hearing – Adoption of a Groundwater Management Plan for the Elsinore Basin – published February 25, 2005 and March 4, 2005.
- Resolution No. 05-03-06 – Elsinore Valley Municipal Water District – Adoption of Groundwater Management Plan – adopted March 24, 2005.

MEETING MINUTES

Stakeholder Planning Meeting
EVMWD/DWR/MWH
May 9, 2002

Attendees:

Dale E. Schafer – DWR Facilitator
Mansour Hojabry. - DWR Coordinator
Mir Fattahi.– EVMWD
George Cambero – EVMWD present for discussion of stakeholders
Chris Petersen. - MWH

Discussion Items

Purpose of Meeting: Mir explained that part of the groundwater program is to do outreach to public and private agencies and pumpers. The purpose of this meeting is to:

- determine who we invite to stakeholder meetings, what information we present at the meetings, planning for meeting with stakeholders because we don't want to be surprised at the meeting,
- This is the first of 2 planning meetings before we go before stakeholders. Second meeting will be with Ron Young, General Manager and Phil Miller District Engineer.
- GM's main concern is not the public water agencies, but the private well owners, because they are often more resist to groundwater projects.

Overview of Project: Mir explained that EVMWD has 1 grant from AB303, and 2 Prop 13 Grants totaling $1.8M projects. AB303 has to be done by June 2003. The Back Basin Pilot Project needs to move quickly to be eligible for the last round of Prop 13 funding.

1. Stakeholder Identification

It was mentioned that EVMWD divide the list of stakeholders into public pumpers and private pumpers. Then we should develop criteria for inviting each. A preliminary listing of stakeholders was provided by Mir.

<u>List of potential stakeholders–</u>

- City of Lake Elsinore
- Elsinore Water District
- County of Riverside
- SAWPA
- DWP
- RWQCB
- SDHS
- City of Corona – Coldwater Basin
- MWD
- Western MWD -
- Eastern MWD
- Farm Mutual Water Company

Mir will identify contacts and phone numbers for each of these agencies.

George Cambero explained that:

- Private pumping volumes are recorded with the County of Riverside and DWR – It is the pumpers responsibility to report to the appropriate agencies, but they are not metered, so there is no way to verify absolute pumping volumes.

- Groundwater level declines have occurred in the last 5 years and George can provide records.
- Farm Mutual Water Company has 2 domestic wells
- Whitney Water Company uses groundwater for bottled water, they have 2 wells and they sell to locals

2. Invitation of Stakeholders to participate in Groundwater Planning Process

- Dale explained that it is not impossible to get all the pumpers to attend a stakeholders meeting, so EVMWD should try and identify an association or advocate group for these pumpers that could be in attendance. This person can go back and educate the reluctant pumpers not in attendance at the stakeholders meeting.
- Limit this to someone who pumps 10-25 AF/Y or more. Because these people are required by law to report to DWR.

3. Stakeholder Education

Concerning communication style at the stakeholders meeting, Dale recommends the following:

- Be very forth coming with information, because these people will have their own thoughts, so this needs to be countered with solid scientific fact
- Get the best scientific information available to educate the stakeholders,

4. Structure of Stakeholder Meetings

The group discussed the following ideas:

- Have two separate meetings, 1 with public agencies, 1 with individual pumpers
- Begin with general presentation to give them an overview of the project. Similar to presentation at the Western MWD board meeting back in September.
- Following the presentation Dale will begin questioning the attendees to better understand their concerns,
- Provide a forum for these people to provide written statements of concern,
- Identify what the stakeholder concerns are right away, because these are the things that could lead to litigation later on. Dale thought this could be done through a questionnaire. Use this information to identify strategy for dealing with these concerns.
- Public information meetings – at a restaurant, serve a light dinner in a non-threatening environment.

Chris introduced the idea of a stakeholder matrix to target different stakeholder groups with the appropriate information. Chris will further develop the matrix for discussion at the next planning meeting.

AB 303 Stakeholder Involvement		
Stakeholder Groups	**Pumpers Impacted by water level or quality changes in Elsinore Basin**	**Entities Outside Elsinore Basin but inside EVMWD service area**
Public Water Agencies	Meeting Type A, Medium Priority	Meeting Type C, Medium Priority
Private Water Agencies	Meeting Type B, High Priority	Meeting Type D-passive involvement, Low Priority
Other Interest Groups	Invited to Meeting Listed above	

- Other interest groups include institutional Groups like Fish and Game, RWQCB, State DHS, USGS, or local environmental groups (i.e. “Save the Lake”)

Frequency of Stakeholder Meetings

5. Location of Stakeholder Meetings

6. Other

Meeting Handouts:

- Well Owner Workshop Flyer – Mansuor
- Elsinore Basin Well Location Map - Mir

Attachment: Outreach plan from AB303 application

Public Outreach

STAKEHOLDER COLLABORATION PLAN

Collaboration with area stakeholders will be an integral part of developing a successful Groundwater Management Plan. Key elements of EVMWD's Stakeholder Collaboration Plan include:

- **Informative Mailing** – EVMWD staff will develop a brochure describing the Water Management Plan for wide distribution to area stakeholders. The brochure will also serve as the announcement of the Initial Public Hearing. Stakeholders will include: Santa Ana Regional Water Quality Control Board (Jerry Thibault), City of Lake Elsinore (Dick Watenpaugh), Santa Ana Watershed Project Authority (Joe Grindstaff), interested citizen groups and individuals, Western MWD (Don Harriger) Elsinore Water District (Sharon Sweesey), City of Canyon Lake (Del Powers), Metropolitan Water District (Robert Harding).
- **Initial Public Hearing** – The first hearing for the project will serve as a public forum to determine if a Groundwater Management Plan should be developed. EVMWD will present initial information on the project and review project goals and expectations. All public meetings for the project will be held at EVMWD's headquarters in Lake Elsinore.
- **Public Scoping Meeting** – A second public meeting will allow more detailed discussion of the Groundwater Management Plan and public input on alternatives development. The second public meeting will be widely advertised and held in a workshop format to maximize stakeholder participation.
- **Formation of a Citizen's Advisory Committee (CAC)** – EVMWD will facilitate development of a Citizen's Advisory Committee (CAC) to guide development of the Groundwater Management Plan. The CAC will be afforded meeting space at EVMWD's headquarters and access to project information as it is developed. The goal will be to develop an open dialog between EVMWD staff and CAC members. Questions and comments posed by the CAC will be answered in a public forum.
- **Board Meeting Updates** – Updates on the Groundwater Management Plan will be made at three EVMWD Board meetings during the project. Board meetings are generally held twice per month and are open to the public. The Board also holds two public study sessions per month.
- **Final Public Hearing** – The final public hearing will be held after publication of the draft Groundwater Management Plan. Comments received from stakeholders will be fully addressed by EVMWD.

• EVMWD COMMUNITY OUTREACH ACTIVITIES

EVMWD has a long history and established method for outreach to the local community. The Director of Legislative and Community Affairs and supporting staff work to educate the public, including local school children, on water resources issues. A sampling of existing public outreach efforts and tools are describe below. Examples of EVMWD outreach materials are also included in this application as **Attachment 2**

- **The EVMWD Website** (http://www.evmwd.com) – The site provides easy access to information of concern to EVMWD customers. From identifying the correct contact person to finding out the percentage of groundwater in the local water supply, the site is a convenient and ever expanding tool. Meeting announcements for the Groundwater Management Plan and other project materials will be posted on EVMWD's website.
- **Speakers Bureau** – EVMWD staff make a wide array of presentations to local community groups as well as school children. For example, *Project Wet* is a portable groundwater model presentation that introduces students to the concepts of the water cycle, watershed protection, water well hydrology, and conservation.

- **Landscape Workshop** – In an effort to facilitate water conservation, EVMWD's Landscape Workshop program is in its 11th year. Topics include landscape design, drip irrigation, and sprinkler troubleshooting.
- **Outreach to Schools** – In addition to making presentations in classrooms, EVMWD staff provides tours of water and wastewater facilities. The District also co-sponsors mini-grants for area teachers for the development of water education lessons.

Chris Peterson

Groundwater Management Plan
Elsinore and Coldwater Basin Assessment

Planning Meeting No. 2
June 4, 2002

Attendees:

Dale E. Schafer – DWR Facilitator
Mansour Hojabry – DWR Coordinator
Carl J. Hauge – DWR Chief Hydrogeologist
Phil Miller – EVMWD District Engineer
Greg Morrison – EVMWD Director of Legislative and Community affairs
Mir Fattahi – EVMWD Senior Engineer

- This meeting was the continuation of the previous meeting held on May 9, 2202, in which a stakeholder meeting for the Groundwater Management Plan (project) was being planned.
- There will be two- (2) separate public outreach meetings, one for Elsinore Basin, and one for Coldwater Basin.
- The purpose of this meeting was to make final decisions and preparations for the meeting and determine who should be invited to the stakeholders meeting, the format, and issues that should be addressed and discussed.
- EVMWD has identified the list of public agencies, and will identify list of private pumpers who should be notified and invited to the meeting. Below are the list of public agencies:

Elsinore Basin
City of Lake Elsinore
Elsinore Water District
County of Riverside
RWQCB
SAWPA
DWR
SDHS
MWD
Western MWD
Eastern MWD
Farm Mutual Water Company
City of Canyon Lake

Coldwater Basin
City of Corona
Lee Lake Water District
County of Riverside
RWQCB
SAWPA
DWR
SDHS
MWD
Western MWD

- EVMWD had issued a press release on July 25, 2002 about the project.
- EVMWD will have more information available at its web-site about the project and up to date progress.

- Greg Morrison will contact Supervisor Buster's office to inform him of the project and request a staff member to participate in Technical Review Committee (TRC).
- Greg Morrison will have a Town Hall meeting with three (3) local groups to introduce the project and benefit to the local area

  1. Wildomar MAC
  2. Lakeland Village
  3. Vista De-Lago Association

- Mir Fattahi will gather the list of contact persons with public agencies to be invited to the meeting
- Mir Fattahi will the contact following people who will be in TRC. They'll meet quarterly or on an as needed basis, especially prior to quarterly report to DWR. Meetings will be held at EVMWD headquarter.

  1. Carl Hauge – DWR
  2. Roy Herndon – Orange County Water District
  3. Behrooz Mortazavi – Eastern MWD
  4. Roger Shintaku – Independent Consultant
  5. Representative form Supervisor Buster's office

- Stakeholders meeting will be held at Town Hall or local Schools, open forum with food and drinks provided by EVMWD.
- Mir Fattahi and MWH (EVMWD consultant) will put together a list of private pumpers name and address (where possible) to send information flyer, and meeting notices.
- Meeting will start with comments from EVMWD, followed by MWH presentation about the project, and DWR remarks about the importance of the project and discussion of similar projects in and around the State.

ELSINORE VALLEY MUNICIPAL WATER DISTRICT
Element I – Elsinore Basin Groundwater Management Plan

MINUTES
Stakeholders' Meeting
October 3, 2002

Contents

QUESTION AND ANSWER SESSION

notes taken by Beth McDonough (MWH) and Inge Wiersema (MWH)

20-25 Attendees (see attached sign-in sheet)

Introduction: Ron Young, General Manager, Elsinore Valley Municipal Water District (EVMWD)

The Department of Water Resources (DWR) has sponsored (50%) the District to prepare the *Groundwater Management Plan* to look at conjunctive use in the Elsinore Basin. Increase storage to decrease demands.

Speaker Panel:

- Carl Hauge, Chief Hydrogeologist, DWR
- Eric Hong, Chief, San Joaquin Valley/Southern California Section, DWR
- Dale Schaefer, Mediator/Facilitator, California Center for Public Dispute Resolution
- Mark Abbott, Project Manager, MWH

Presentation: Proposition 13 / AB 303 Funding by: Eric Hong, DWR

Q. Jack Wamsley, Canyon Lake City Council, JPA Board: If 60 projects are submitted and only 20 are accepted, are criteria not well defined?

Prop 13	$ 349.8 M requested	60 projects submitted
	$ 103 M awarded	17 projects awarded
AB 303	$ 107 M requested	51 projects submitted
	$ 4.4 M awarded	21 projects awarded

A. Eric Hong: Ranking criteria are established to pick the best projects. Additional workshops were held to help applicants understand the minimum requirements. Many applicants do not meet the minimum criteria to be evaluated to receive funding.

Carl Hauge: All of the available funds were distributed. The highest ranked projects received funds.

Q. Edith Stafford: Review; 17 projects were approved for Prop. 13 in 2001-2002. What was the total amount of money available?

A. Eric Hong: $103M was available and $349M requested.

Presentation: EVMWD Groundwater Management Plan by: Mark Abbott, MWH

Q. Jack Wamsley: If we are looking at recharging at the end of the basin, how will that affect the water elevations in the north island wells (NIWs)?

A. Mark Abbott: This will be part of our project, to evaluate the effects of injection on the NIWs.

Q. Gary Grant: Is water stationary or is there an underground river (moving)? He lives in the higher plane area, north of here (Highland Park). His wells are going dry. He understands that water rights are in certain geographical areas.

A. Mark Abbott: This basin is closed. This project's main focus is to store water in the basin for increased yield in dry years. We are in the very early stages of project development.

Q. Edith Stafford: She is interested in the wet years. Are we studying run-off in wet years, containing it, and storing it underground? (If lake overflows to ocean, wouldn't we want to look at capturing the overflow to groundwater storage? (see attached sketch).)

A. Mark Abbott: Flood control is first concern. 1. option is to recharge import water; 2. option is to capture and store flood water for recharge. Other agencies in California (e.g., Orange County) are evaluating this source for groundwater recharge.

Q. Gale Lerma: How does a person keep up with progress of committees of this project?

A. Mir Fattahi, EVMWD: Workshops continue and progress reports are posted on website. Call him if you have any questions.

Mark Abbott: We hope to use the workshops to answer any questions.

Q. Nick Fosco: Will water prices go up or down as a result of this project? If it is water under our ground, we should not pay more for it.

A. Mark Abbott: A cost benefit analysis will be done on all alternatives included in this project.

Ron Young: All sources of water come to the District at different prices; additional supplies and groundwater storage costs are unknown, if additional supplies of water are required, then costs may change.

Q. Nick Fosco: Domenigoni (Diamond Valley) reservoir is that for us? It is so close.

A. Ron Young: Eastside reservoir is a reliability for winter wet years for Metropolitan Water District (MWD) to use for dry years same as the conjunctive use program. It is not enough to meet all future demands.

Q. Nick Fosco: Where are we (EVMWD) in the pecking order?

A. Ron Young: There are 33 member agencies, and everyone is at the same level.

Q. Nick Fosco: Will our (EVMWD) geographical location help us?

A. Ron Young: It helps all in California; MWD is working on keeping supplies adequate.

Q. Pat Kilroy, City of Lake Elsinore: What are sources for recharge?

A. Mark Abbott: Potable drinking water from Mills and Skinner Treatment Plants. The water needs to meet DHS and groundwater basin objectives; the pilot test is using Skinner water. Skinner or Mills (through the Temescal Valley Pipeline) water will be used for the full scale project.

Q. Pat Kilroy: Hard money for water, is EVMWD looking to adjudicating basin?

A. Mark Abbott: Doesn't want to speak on behalf of the District, but no one is wanting to adjudicate the basin. This project will benefit all the users of the Basin.

Q. Gary Grant: 3 pumps have been installed in the lake for recreation. They are straws into the basin. Is the price of water determined by EVMWD?

A. Mark Abbott: The Lake and EVMWD customers will benefit from the Groundwater Management Plan.

Ron Young: We are sharing the basin and until more data are available, we will not know how the basin will react. EVMWD is doing a study and if management can supply to fill white area on graph (demand), if we can use wet flow to store water in the groundwater basin; a lot of pumpers who are using groundwater will benefit. The recharge areas are outside of EVMWD's boundaries, but may help the entire basin.

Q. Pat Kilroy: I do not know of many people that actually drink tap water. What role will conservation play?

A. Mark Abbott: The alternatives include four areas one of which is conservation. The four areas are recharge, direct storage, in-lieu pumping, and conservation.

Q. Pat Kilroy: Is conservation shown in the dry year graph?

A. Mark Abbott: It will be looked at.

Q. Pat Kilroy: In Lake Elsinore water quality is good in the higher level and salty in the lower levels; is there more than one aquifer?

A. Carl Hauge: MWH indicated 2 aquifers; all of California has decreasing water quality I the deeper levels.

Mark Abbott: He further described 2 aquifers at the bottom of the Fernando Group and the lower water quality. The water quality commonly degrades, but we are really only looking at upper 2000 feet of the aquifer.

Q. Nick Fosco: Are minerals addressed in program, arsenic may be present because of old mining activities.

A. Mark Abbott: One strategy is to look at water quality.

Q. Nick Fosco: Is there any detection system?

A. Mark Abbott: District regularly performs water quality sampling.

Ron Young: Annual water quality data is posted on the District's website.

Carl Hauge: Also, arsenic is naturally occurring in California groundwater.

Q. Pat Kilroy: 20-25 square miles with 1 foot or less rainfall per year; have we developed the amount of water that will be placed into the groundwater basin and the safe yield?

A. Mark Abbott: We are gathering data now and will develop water balance for the water model.

Q. Jack Wamsley: Are we working with group from back east – TetraTech? Funding by District San Jacinto Watershed Authority (SJWSA) TMDL Regional Board.

A. Mark Abbott: Thank you – contact Mark Knorr

Q. Jeff Hesley, Elsinore Water District: Can we get copies of the Groundwater Management Plans?

A. Mark Abbott: We are hoping to put the information on the website; we will not be writing the text until the information is presented to the Stakeholders.

Q. Nick Fosco: Are cisterns cost prohibitive?

A. Mark Abbott: Cisterns are generally for private homes – other uses than potable have been evaluated for other projects.

Ron Young: In Bermuda every house has a special roof to collect water for drinking water; there is not enough rain here.

Q. Robert Wilders, Farm Mutual Water Company: Oil companies can determine size of underground storage, have you looked at contacting them?

A. Carl Hauge: Slumberjay – big difference in oil field and water; money. There is a big difference in trying to move into the water department. The technology is too expensive.

Elsinore Valley Municipal Water District

ELSINORE BASIN GROUNDWATER MANAGEMENT PLAN

Stakeholders' Meeting
Wednesday, February 5, 2003
Minutes

Phil Miller (EVMWD): Thank you for coming tonight to our second Stakeholders' Meeting on our Elsinore Basin Groundwater Management Plan. I am just going to do a couple quick introductions, then turn it over to Montgomery Watson Harza for our presentation for this evening. I am Phil Miller, I am the District Engineer for Elsinore Valley. Tonight's presentation will be performed by Mark Abbott, Matt Hacker, Inge Wiersema, and Dave Ringel of Montgomery Watson Harza. I would also like to acknowledge Eric Hong and Dale Schafer, representing the Department of Water Resources tonight. And last, but certainly not least, I would like to acknowledge our newest director, Director Chris Highland. And with that, I am going to turn the show over to Mark.

Mark Abbott (MWH): Thank you Phil. So, all I have got here tonight … it is our second Stakeholder meeting – many of you, hopefully, were with us back in October; we look forward to share with you where we are and where we are going with the project. I am Mark Abbott, I am MWH's Project Manager on this effort. Matt Hacker is our Project Geologist; he is working on several of the projects. Inge Wiersema is our Team Leader on the Management Plan itself. And Dave Ringel is our Senior Technical expert.

We have a little agenda for tonight. As Phil mentioned, we want to talk to you about the Groundwater Management Plan. We want to review with you the goals and objectives that We have set for the project itself – the directives. Inge is going to talk to you about the project status – the work We have done since we were last together in October. Then review some of the work We have completed so far as far as the Management Plans, looking at the alternatives. And then We will talk a little about the upcoming activities and where we go from here.

I want to touch briefly on some of the issues and what we are facing. We have identified a number issues that the Basin is looking at as far as groundwater management; providing water for the citizens and all the users and people that rely on water here in the basin. We will touch a little more on these in detail in a few minutes. The question is "why do we need a Groundwater Management Plan?". We have put together kind of a problem statement – we feel water demand is projected to double over the next 20 years here at the Elsinore Basin. Cooperative groundwater management is required to achieve a sustainable water balance in the Basin. There is a lot of people that rely on water from the groundwater basin for their …. the Lake needs water, the people need water, the environment has a water need, so we want to do a management plan that will try to meet all those goals with this. Our goal is to ensure a reliable, high-quality, cost-efficient groundwater supply for the use in the Elsinore Basin in an environmentally responsible manner. These are great words and we wanted to present them to you tonight – this is really where we are going with this project and it is still a draft. We want you to have the opportunity to take a look at this and provide comments to us if you have them. We going to be spending, hopefully, the next 1½ hours with you, talking about this project, getting your comments – so, if at any point during the presentation, either now or later, please feel free to speak up and ask any questions or give comments.

The benefit of implementing a Groundwater Plan is to increase the water supply or reliability. A lot of the water comes in as import – we show it on those issues in 2020, 80% of the water supply is going to be imported to the Basin from outside the area. So we want to try to increase the reliability, so that during those droughts, instead of dry periods, that portions of demand can be met with supply stored in the basin. We want to minimize water quality risk. We need to recognize the fact that bringing in water from a different area, is going to have a different water quality. We need to make sure we can control that and make sure there are not problems associated with storing that water here in the basin. As we said in our goal, Stakeholders involvement is key – everybody who has use of the water in the basin, needs to be involved in this process to promote it; to provide knowledge we need to manage it, we need to know what is there. The other thing we say is "maximize the use of lower cost water sources." No matter what we do, we are still going to rely on imported water to store. There is only a finite amount of water in the basin, so to increase that storage, we have to bring it in. But there is a lot of water that flows through the basin right now that is either lost down the wash or is maybe … find better uses of it. So we want to be able to find water that is a lowest cost and try to use that and capture that and store it for future use. We have mentioned a drought-proof water supply – through the groundwater storage project, we think that a portion of the water supply for the basin could come from within the basin and become more of a drought-proof supply. And of course, the basin has a lot of storage capacity, it is a very large basin and has the potential to store a large volume of water.

Project status: we were together here back in October, we had our first Stakeholder Meeting where we actually presented to you all the groundwater management efforts that are currently undergoing here in the Elsinore Basin. Since we got together, we have completed, developed, and compiled all the information and developed a good understanding of the basin and how it works. Developed a monitoring plan to actually keep track and expand the knowledge, identify the holes and data gaps, and we are right now preparing a groundwater model to use in evaluation of different alternatives for groundwater storage. And of course, here we are in the beginning of February, we are having our second Stakeholders' Meeting, first to bring you up to speed with what we have learned over the last few months, and also to start the discussion about what type of alternative management strategies are available to us to help promote that goal. So that being said, I would like to turn it over now to Inge, who is going to talk to you about the work we have done to date. And I will be your tour guide here on the computer and see how it goes.

Elsinore Basin

Slide #10

Inge Wiersema: Thank you Mark. I will update you on the work that we have completed to date and then we will go over the alternatives. The first thing we did is looked at the water demand as compared to the supply sources that are available. And, as Mark said, the water demand doubles in 20 years, so we are right here and it is going to go all the way up to about 50,000 acre-feet on an average basis. There are multiple supply sources – there are some wells, Canyon Lake Water Treatment Plant, and there is imported supplies from both Temescal Valley Pipeline and Auld Valley Pipeline. There are additional supply sources required and that starts in about 2010-2012.

Slide #11

The additional supply is only required in years normal dry years with respect to local precipitation. In a normal year the water demand is about average, while in a dry year demands will increase. Thus the total demand is a little higher, while at the same time, some of the supply sources, such as Canyon Lake Water Treatment Plant will produce smaller amounts of water. And that will result in a fairly large amount of additional supplies required 5,000 acre-feet. And in a normal year, it is about half, about 2,500 acre-feet of additional supplies. While in a wet year, you actually have lower demands because of less irrigation and you have more water available from the treatment plant, so you do not need additional supplies. So, I just want to point out, the needs are dependant on the actual rainfall available and whether it is a dry or wet year.

Slide #12

Secondly, what we did is we collected a lot of the information to start this project. Most of the information is being collected and stored in a GIS – all the well information and geology, faults. Everything that we need to know about a basin is pretty much stored in the GIS. And then there is some other collected information that could not be compiled in the GIS format, that helped us gain a better understanding of the basin.

Slide #13

The yellow shading in the back that is pretty much the boundary of the Elsinore Basin and there is two fault zones – there is the Glen Ivy Fault that actually also extends out of the basin boundary and then on the south side of the lake, you have the Wildomar Fault Zone. So there is all these fault lines in the Basin that makes the basin fairly complicated. MWH has a good understanding of the basin at this point.

Slide #14

The groundwater generally flows from the north side to the south side of the basin, and that is primarily because there is a lot more pumping going on this side of the basin, so that results in lower water levels. While the water level on this side of the basin, where there is more recharge from the mountains through the canyons, is more stable. The groundwater levels here are more stable over the past 10 years and levels here are declining a little bit.

Slide #15

To get a better understanding of the basin, we developed some cross-sections. Section A-A' that cuts right through the basin. The basis consists of two aquifers shaded in yellow is the upper alluvial aquifer and shaded in gray is the lower Fernando Group aquifer. There is a clay layer separating the two aquifers. The water levels that we just showed you in the previous slide represent the water level in this aquifer. Then there is the Bedford Canyon Formation (the blue shaded area) which is more of a rock formation. There is no water flow from the lake down to the alluvial aquifer as there is a clay layer that separates the lake from the upper aquifer.

Q: That shallower aquifer, does it continue south through Wildomar and heading south further?

Mark Abbott : No, it does not. The Fernando Group actually comes up to land surface and the alluvium does not extend down to the south.

Q: So you are saying the flow does not continue south and Temecula is not pumping our groundwater?

Mark Abbott : Under certain circumstances, you could have flow down there, but you would have to have water very high up. So no, the activities in Temecula are not taking the water.

Q: What is GIS?

Inge Wiersema: it is the Geographical Information System … the best way to think about it is it is a graphical interface, like a map with a database attached.

Q: Is it available to us?

Inge Wiersema: The District has all the information.

Mark Abbott : It is actually a data base, it is just a graphical data base – it is geographic in that you have points on the map that you can point to and pull up attributes for that particular point.

Q: I do not even have the name of your company here – on the Agenda, I do not even have who you guys are …

Inge Wiersema: MWH

Dave Ringel: Montgomery Watson Harza, and we are consultants to the District.

Inge Wiersema: So, a GIS is a map and in the back of the map there is a data base that has all the information that is presented on the map.

So, that is the understanding of the basin – there is two aquifers and you can store water in either the upper or the lower aquifer and I will go into more detail on that in a little bit.

Slide #17

Another thing we did in the past few months is to make a water balance to look at all the inflows in the basin and the outflows. So the inflows into the basin will be precipitation, water that comes down the watershed. Infiltration through the San Jacinto River that comes down from Canyon Lake – so it will actually infiltrate from the river into the basin. Return flows through use – this can be irrigation water that will infiltrate to the basin or returns from the septic tanks. And then there is subsurface flows, which are flows between the basin and the other underground flows – we determined those are zero because the basin is isolated.

Slide #18

And then there is outflows – the only outflow that we have identified is the groundwater pumping to supply the demand in the basin's. If you look over the past 10 years, this is a water year starting in October going to September, from 1990 to 2000. The average difference is minus 1,300 acre-feet per year. I want to point out it is an average over a 10-year period, there was less inflow than there was outflow. But as you can see in the next slide, this varied over the 10 years. So if you have a wet year, those 3 years are relatively wet, you have a lot more inflow than outflow – so in those years you have a positive water balance. And as you can see, over 11 years, we only had 3 years that had substantial rainfall. So, we will get an El Nino this year, and we will get a lot of water. So it is very dependent on the climate. If it is a lot of rain, the balance is positive; and if it is dry the balance will be negative for the year – natural pattern of flow that will vary on a year to year basis.

Slide #19

The last thing we submitted to the District was a monitoring program. What you see here is all the wells in the basin that we have included in this monitoring program. All the blue dots are the existing wells; and then there are eight red dots that are future wells or wells that are currently in the process of being installed. Those include both wells from the District, all incorporating into a combined monitoring program.

What is a monitoring program? The District measures all sorts of information; water quality information and water level data for the groundwater levels. And we have proposed that only water level information is collected on a monthly basis and the water quality information is annually, with the exception of the inactive and new wells where we do not have data for a period of time, then we will collect two samples for the first year and after that it will be also an annual sample taking. This is proposed for all the wells that you saw on the previous slide.

Q: Did you include any other water departments in your study?

<u>Inge Wiersema</u>: Elsinore Water District is included in this as well. Yes, it is a combined effort.

Q: Why are you running water quality only once a year?

Inge Wiersema: Water quality data does not change – on a very small increment of time – water levels are much more varying over time based on seasonal fluctuations.

Q: So this is only the level, it does not have to do with what is in the water?

Inge Wiersema: Right – the water quality is actually what is in the water … but groundwater moves very slow, so there is not a lot of mixing it goes on a long time scale, so the water quality does not vary on a weekly basis.

Q: Do you know if they already have a problem over by Lakeland Village with – they drilled wells and then they were not able to use them because there is some kind of poison in them?

Inge Wiersema: I am not familiar with that.

Phil Miller: Yes there are some contaminated wells at Lakeland Village …

Q: If all this stuff is in that purple area on your map, what is to keep it from contaminating this stuff?

Phil Miller: There is small wells and there is a small contamination area that I know exists, but I am not particularly familiar with it.

Q: Would not they have picked it up on their monitoring?

Phil Miller: No.

Inge Wiersema: We would pick it up on the wells that are closely located to it. So if you are monitoring this well, you will not notice it at the groundwater level.

Q: So you have not actually monitored those yet?

Dave Ringel: No, this is a proposed plan.

Inge Wiersema: We are supposed to collect more data on the water quality and levels.

Q: I was wondering what caused all those septic tanks over there to evidentially get in the wells?

Inge Wiersema: There are septic tanks all around the lake area and there is one well where there are bacterial problems, but we are not sure whether that is related to the septic tanks at this point.

Q: On the west end of the lake, when they had the floods back in the 80s, all those trailers and everything that were not able to be moved out of there, with the outhouses and everything – I do not think that situation was ever taken care of …

Mark Abbott : One thing we would like to point out – we pointed at the geology is that the upper 100 feet is a series of interbedded clays and sands, so there is really a good separation between the zone where those septic tanks are and where the water withdrawals actually occur. The dark orange you see between the yellow and the gray, is actually a fairly competent aquitard, a clay layer that separates those two zones. On that particular cross-section, the majority of the withdrawals are occurring from what we call the Fernando Group which starts at a depth of around 500 feet below the ground surface. So, typically in an area where you see that the aquifer is really thick is on the south side of the lake.

Q: Aren't all those septic tanks contaminating the lake? You know, most places, you have septic tanks within 100 yards of a body of water, especially a lake, you got problems.

Mark Abbott : I am not familiar with any septic tanks within 100 yards of the lake itself.

Phil Miller: In Lakeland Village and that side of the lake there are septic tanks. We did sewer it years ago, but not everybody hooked up. There is speculation that part of the lake's problems are related to septic tanks, but I do not think anybody has made a direct correlation.

Comment (continuation of preceding question): Well you know, years ago, you done any skiing in that lake, you broke out with ear infection and a rash and the whole nine yards.

Comment: EVMWD did a study on septic tanks around the lake and found negative contamination. That was less than 10 years ago.

Comment (continuation of preceding question): Yes but that is kind of hard to believe.

Dale Schaefer: I think it might be a good idea to contain your questions. I think all of these are really good discussion points and I would like to hear all of them, but I think we ought to let them finish their presentation and note your questions and then ask them later. Not that we are not going to address the questions, Phil is sitting here and he is going to address the questions; but I think we need to let these guys finish their presentation and then we will get into a question period – I think we will have enough time. If you have questions concerning what she is talking about right now, great! And the rest of them, let us hold till after – is that okay with everyone?

Slide #21

Inge Wiersema: So far on the monitoring plan, one of the things that concludes all the information that we have gathered is that we have a much better understanding of the entire water balance. And as Mark said earlier, the goal of this plan is to provide a management plan that will be sustainable water balancing the entire basin – that does not mean just the Elsinore Basin but also talk about the lake. There is a lot of interaction between all these water bodies. Most of the water that will come to the Elsinore Basin comes from the canyons and the watershed. And there is some extra water coming from San Jacinto watershed and will enter the basin through Canyon Lake. That is where most of the inflow comes from to the basin. Some of the run-off from the watershed will actually ends up in the lake. There is a lot of evaporation from the lake and there are other imported supplies that will end in Canyon Lake and that water will go to the Elsinore Basin through infiltration or it will go directly to the San Jacinto in the river to the Elsinore Lake.

Water from Canyon Lake can be treated in a water treatment plant, as I pointed out in the first figure – these are potable demands. Potable demands are also served from import of water, from either Temescal Valley Pipeline or the Auld Valley Pipeline connection, and then there is a whole stream of waste water and recycled water related to the Elsinore Basin and some of these discharges go through Temescal Wash. And all these interactions need to be taken into account in the Groundwater Management Plan – we cannot just look only at the basin or only at the lake; it is a lot of interaction. To maintain lake level, there needs to be water pumped from the basin to the lake to maintain the levels. We have looked at this, identified all the interactions and now we are at the point of quantifying these and moving on to developing alternatives.

That brings us to the alternative discussion. First to verify a little bit, how that works. Mark talked about our management issues, the reasons why we do this groundwater management plan, and our goals. There are different strategies that I want to identify in a little bit on how to address these issues and these goals. For each strategy there are multiple activities; I will go into detail pretty soon, but for example if you do some surface spreading, you can do it in one location or another which are defined as different activities. Then we will link alternatives that can either contain activities that will be included in each alternative or certain activities will be specific for alternatives. The reason we do this is so we can evaluate a whole package of activities and evaluate what would be the best way to manage the groundwater basin. So, over here for today also is to get your feedback on if maybe we have overlooked some of these issues and if there is other activities that we have not identified yet that you think really a good idea to be implemented in this groundwater management plan.

So, let us go over the main issues that we have identified so far. As discussed, groundwater … the water demand will double in the next 20 years – that is just the demand of the Elsinore Water District. Because of this increase, there will be more reliance on imported water. So, what was identified in the water management plan is that in 2020, 80% of the water that we serve to the customers comes from imported supplies. That does not include all the water that needs to be used for lake augmentation. So in total, we can conclude that the demand on groundwater is increasing due to the increase of water demand. It is also seen over the past 10 years, the groundwater levels have been declining. At least in the area south of the lake, water levels have been declining. While in the area north of the lake, water levels have been fairly stable. Those are issues when it comes to water quantity. Then there are some water quality issues – arsenic and some other issues – that we need to take into account when we do this groundwater management plan. One of the other things that we have identified doing this GIS, is about 300 wells in the basin and there is only a small portion of them – about 8 – are production wells of the District and then there is a lot of other wells that the status is unknown and maybe some of these wells are not abandoned properly and they pose a threat to groundwater quality as these wells provide a connection from the surface to groundwater aquifer. So, these are all the issues that we want to address in this management plan.

Q: What was the source of the arsenic contamination?

Inge Wiersema: It is a natural occurring problem.

Mark Abbott : The Federal government reduced the standard on arsenic. So that we are reducing it down to a level below – lower than where it is now.

Q: What about radon? We have a lot – because of our geography here, I know that radon … because of the granite – it is naturally occurring in granite – are you testing for that too?

Matt Hacker: No detection of Radon in this area.

Slide #25

Inge Wiersema: So to address all these management issues that I just went over, there is a number of strategies that we can use to obtain the goals that we have envisioned. These are strategies that may be you have some other ideas – we have been thinking about dual-purpose wells; those are injection wells that inject imported water into the surface, into the aquifer and then in times of drought, we can extract the water again. So dual-purpose means you can both inject and extract water. Surface spreading – that means there are surface spreading basins in the canyon, so there is a lot of run-off into rainfall – you can actually infiltrate that water more effectively and recharge the groundwater basin. New supply sources, as indicated in the slide with all the arrows (#21), the raw water turnout from Metropolitan that is maybe a new source, we will go over a few more examples in a little bit.

Pumping restrictions may be a strategy. Water conservation – I have already noted that would be a good solution to reduce a little of the peak demand increase. Basin monitoring – that would be a strategy that we will carry throughout all the alternatives – monitoring will be important no matter what alternative will be chosen, as proposed in the monitoring plan. We have in-lieu recharge – which means that you, rather than that existing pumper pumps water out of the basin the demand gets supplied with imported water. Then the pumper does not have to pump, and the basin will recharge by itself as you do not need to extract water from the basin. And, of coarse, Stakeholder involvement is an important strategy that we will continue to follow on.

Slide #26

When we go to the next level, we have our management issues – these are strategies again – and then below are some activities that we have identified. So, for single purpose wells we have identified that it is possible to do ASR (aquifer storage and recovery) north of the lake and south of the lake. For surface spreading we have identified multiple locations, did some evaluations, and identified two locations – McVicker Canyon and Leach Canyon, that are very feasible locations for surface spreading; and then in Railroad Canyon there will be more surface recharge, where by discharging more water from the raw water turnout, and having more water flowing through San Jacinto River that will also result in more infiltration.

In-lieu can be accomplished by either using imported water or Canyon Lake Water Treatment Plant water. New supply sources, as I mentioned, were the raw water turnout, we can expand the reclaimed water demand. Earlier this week we had another meeting which brought up the idea of dam modification or maybe other imported water sources.

Pumping restrictions – that will mean that you will operate station under safe yield. For water conservation, there are different activities that you can do – financial incentives; you can do some landscaping, called "xeriscaping", where you use plans that do not use as much water as a lawn for example; and you want to create more water awareness, so people are more aware of conserving their water. Basin monitoring – we have the existing monitoring going on and the expanded network as proposed in the monitoring plan to get a better handle on the information. Not only to get the information, but also operate the basin with knowing what is going on.

Surface flows can be monitored better to have a better handle on how much water is available to be recharged. We can also use the groundwater model that we have created for this project. It runs different scenarios and updates the way you could manage the basin most effectively. And then Stakeholders' involvement is another strategy that we need to continue.

Q: What is that line – Lake Elsinore Dam Modification?

<u>Mark Abbott</u>: It was brought up by the City that maybe we could raise the weir elevation on the dam to store more water – it would in a sense be a new supply source by increasing the amount of water stored within the lake, especially in those periods when it really rains a lot and you have got water …

Continuation of previous question: Are you talking about the outflow weir?

<u>Mark Abbott</u>: Yes.

Q: I am trying to figure out which – where the dam they are talking about is … by the Back Basin?

Phil Miller: It is not really a dam – they are talking about the outlet channel that has a weir at the famous 1255 elevation – about raising that spill up to a number of a higher elevation.

<u>Mark Abbott</u>: We are not sure that it is really feasible to do that – there are flood control issues. But it has been brought up as an option, and we are going to look at it just to see if it is possible.

Q: I do not know if this is appropriate yet. Why is the outflow going to double – what areas is Elsinore Municipal Water District servicing – is the water staying local or are we exporting it to Corona or Horsethief Canyon or what is going on?

<u>Inge Wiersema</u>: The water demand increase means you pump more water out of the basin.

Q: Can't we control the growth or something? How far … or where does our water go? What communities do we service?

Phil Miller: The cities of Canyon Lake, Lake Elsinore, Murietta, and the incorporated Riverside County areas like Lakeland Village. The District extends basically from the Horsethief Development as far south as … we are not a box, but Clinton-Keith Road is probably our southerly boundary and parts of Cal Oaks.

… That is where most of the development is going to be because of the topography here it is kind of hard to build houses and tract homes … Horsethief Canyon …

Inge Wiersema: There is a lot of development proposed north of the freeway.

Mark Abbott: Just to keep moving on this … hold the thought, but let us get through the end of this one … we are almost there I promise.

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Inge Wiersema: So we have the different strategies and different activities and no more than different activities and combine them into alternatives that we will evaluate in the Groundwater Management Plan and we will look at four alternatives is what we have come up with so far. They have more of a theme – so one alternative will focus mostly on dual-purpose wells, the injection and extraction wells. The second one will focus more on using surface spreading as an opportunity to recharge the basin. Then the third alternative will look at the combination of in-lieu recharge and water conservation. Then the combination alternative – what we have proposed so far is to work on these three alternatives, collect a lot of information, cost environmental constraints, difficulties of implementation, work out all the details, and then combine that information into a "best" alternative – and that will be the combination alternative were you take the "best" of each alternative 1 through 3. Here is a little table that we have developed … (table was hard to see) … Inge will read –

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Alternative 1 – Dual-Purpose Wells: activities that are included are dual-purpose wells north of the lake and south of the lake. As a new supply source, other imported water, the existing imported water supply, and maybe additional imported water to inject it in dual-purpose wells. In periods when there is a lot of water available in wet years, when Metropolitan has excess of water and also in the winter months … store all the water underground and pump it out during the dry months or the dry years.

Water awareness … under water complications, is an activity that we have included in all three alternatives.

Basin monitoring – existing network, expanded network, monitoring service flows and using the model to manage the basin are all activities that we have included in all alternatives, so we do not make a distinction. Stakeholder involvement is also included in all the activities.

The things that make Alternative 1 unique are dual-purpose wells and using imported water as a supply source.

Alternative 2 – Surface Spreading: included all the surface spreading locations that we have found feasible at this point in the project, McVicker Canyon, Leach Canyon, and Railroad Canyon. And now we have selected the San Jacinto River turnout as the source, because that can be used for a Railroad Canyon recharge and that water will be used as recharge

Another idea was to sewering or septic tanks to collect that water, treat, and make it available for either recharge or to use it as supplementing the lake and therefore saving some water to be pumped out for lake leveling.

Alternative 3: The distinctive components that we have selected are in-lieu recharge, both from import long-term water and also Canyon Lake Water Treatment Plant water.

Q: Can you explain what in-lieu recharge is?

Inge Wiersema: With in-lieu recharge you supply imported water directly to pumpers that currently take water out of the basin. So, those people do not have to pump water out of the basin. Water will naturally continue to flow into the basin. When there is no outflow, the basin will recharge.

Mark Abbott: The pumpers we are talking about is Elsinore Valley Municipal Water District. We are not asking people to shut off their wells at this point.

Q: Can I ask a question about the surface spreading? Is this when you take the reclaimed water put it over a specific area and let it flow down?

Inge Wiersema: Currently we are thinking of using mostly runoff water and import water for spreading in the spreading basins which are constructed for that purpose and then it will infiltrate. Reclaimed water may be an option to be used as well.

Mark Abbott: Actually, they are not really big holes full of water, they are going to be open areas of land when water is available. About 90% of the time it is just going to be grass or vegetation or whatever is in it. When it rains, we will try to capture that water when we can to store. During dry periods, if we find it financially feasible, we will pipe imported water up and use that to recharge the groundwater supply. I hesitate to say that there are going to be big holes of water. During the summer, it is not going to make sense to store the recharge water.

Q: So, you are going to take an area and you are going to create a place where the water can trickle down through– will you have to go through a kind of environmental study …

Inge Wiersema: Absolutely.

Mark Abbott: We have already started some of that work. We are not looking at modifying any current activities. The county has some flood control areas up Leach and McVicker Canyons where they have some debris basing. We are working with the County right now to see about the possibilities to make some slight modifications to existing facilities, already in place for this purpose. Because right now, water just passes through them. We are trying to see if we can do something to capture that water, store it, and slow it down a little bit so that it has more time to infiltrate.

-- additional discussion about this topic … too quiet, not clear enough to transcribe.

Inge Wiersema: I think that concludes the Alternatives. We have proposed to look at other imported water and we have this idea about the lake dam modifications – we will evaluate them before it becomes part of an alternative to see what flood control issues are and that will bring up.

For water conservation, we have included options as xeriscaping and financial incentives, and evaluate what types of possibilities there are to stimulate water conservation to a level as high as possible. Once we have evaluated all these three alternatives we can fill in the table for the fourth alternative, and compose it such that it will be the most optimum alternative from different perspectives.

Mark Abbott: Any other questions or comments about the activities or strategies that need clarification? Any ideas you have on better ways to manage the water …

Q: I do not see controlled growth – you have your graphs, you have your comfort zones, why not tell these developers "I am sorry, here is what we have." Why are we letting out permits for thousands of homes being built, when we only have so much water?

Mark Abbott: This does not answer your question, but I just want to touch one issue somewhat related. We are not talking about providing a source of water for the entire district service area. We are just trying, at this point, to find out what the basin storage is. The focus of our study is not growth-related, in fact in reality, it is not even demand-related. It is a matter of we have got a basin, a groundwater basin, that has a certain amount of storage. What can we do within that basin to manage the water resources, to increase the yield, to give us some protection no matter whether the demand is 50,000 acre-feet/year or 10,000 acre-feet/year; no matter what happens with growth – maybe all the projections are way off, maybe it is only going to be half of that. The growth is driving the project because there is a need to provide a more reliable source, but the project is not going to find a water supply for all the growth. The project is going to find a way to manage the basin, to get more water for the existing district and the future growth.

Comment: The future growth can be managed by control … you are doubling your demands – but where is the demand coming from for future growth. … maybe we cannot do some of that stuff …

Mark Abbott: Nothing we do is going to relieve the need for imported water. All we are trying to do with this project is to better time our purchases … when you are in the middle of a drought, the water is the most expensive; when you are in the middle of a rainy period, the water gets very cheap – Supply and Demand. So what we want to do is buy the water when it is cheap and plentiful and store it and have it available to us when it is needed. I am not trying to avoid your question, it is just that we are not really looking at the growth issues, we just looking at how do we better manage the water resources.

Q: On Alternative 1, that is where you propose special wells. You are going to put water in them when it is cheap, and then take the water out when it is dry – is that right?

Mark Abbott: That is close enough.

Inge Wiersema: You do not use those wells in the period that there is water available you just give it to the District to buy more import water directly and pump less out of the basin. And in periods where the water gets expensive, you will pump more out.

Mark Abbott: Let us back up a few slides … this might help answer your question. Right now, these are output … that is the water being pumped out of the basin; wherever it is going is the outflow. If we can reduce that number to kind of bring it more in balance with what the inflows are … so we are talking about just stop pumping water. Instead of using water from the groundwater basin to meet demand, find more water and bring it in. So we can balance the situation by simply reducing our pumpages to meet or be closer to inflows on any given year. It is a very cheap way to do it. I mean, it is expensive to buy the water, but it is very easy … you just rest the wells while the natural recharge to fill up the basin.

Inge Wiersema: You do not need any additional facilities.

Mark Abbott: Can you hold on – I do not think I have answered this question. I just want to go back to one of the issues that we brought up is that, with the current usage in the basin, we said that we know the groundwater management – even if you take out the demand over the next 20 years**,** groundwater levels decline. So, even without the growth, there is still a need for the project. So even with the way it is today, you will need some sort of groundwater management.

Q: So, you were asking us to consider the three different alternatives?

Inge Wiersema: I was asking if people had other ideas on different activities or different approaches that would not include in the list so far and we can consider when we evaluate these alternatives. That was the question.

Q: Lee, Lake Elsinore – You are talking about pumping water back into the well – how many acre-feet are you talking about in your project, how many acre-feet can you store?

Mark Abbott: We did a pilot project back in September/October where we took one of the existing production wells and over a 2-week period we pumped about 88 feet of water. Just allowing water flows naturally through the existing system pressure. We did see an increase in storage in the basin. And that was at a rate of about 2M gallons a day that we stored over the 2-week period.

Q: Does it actually conserve water, how does that play into changing the water in the basin or the possibility of sewering septic tanks?

Inge Wiersema: It just makes the water available to you in a different way and, currently, the water in the septic tanks will infiltrate into the basin. And there are some quality issues. If you actually sewer the people you will collect the wastewater and be able to treat it. Once it is treated you have more flexibility to use it. You can use the water to augment the lake for example and more flexibility to use it the way you want.

Q: That is not necessarily true, when you are on a septic system, that water actually goes into the surrounding area and enters the leach field and it percolates down anyway.

Mark Abbott: It does not leach into an area that you can take advantage of. Right now – we talked about the geology – the upper 100 feet is interbedded clays and sands – with the water up in that area, though not necessarily bad, there is things that happen up there, but that does not necessarily give water that we can have access to.

Q: I see what you are saying – you are saying if you switch it off of septic tanks, the Water District will have more advantage for water. Who would pick up the bill?

Mark Abbott: The real benefit – there is a lot of potable water being used for non-potable purposes. Irrigation sprinkler systems are a wonderful example – if you can capture some of that septic tank water, treat it and use it to off-set potable water being used to keep grass green that saves the water that is normally pumped out of the basin or imported in. It is going to be multiple uses of the same water.

Q: Are you also talking about a system where you can take your shower water and also your wash water?

Mark Abbott: At this point, we are really looking in the District's side of the system, not once it goes into your house … and when it comes back out of your house, we want it back if we can … but what you do with it inside of your house, I do not think we are going to change the regulations.

Q: When you are talking about switching, the people in Lakeland Village off septic and onto sewers, who will pick up that cost?

Mark Abbott: We would evaluate – the cost of that would be incorporated into an evaluation …

Q (continuation of preceding question): So they would not come out and say "now you have to spend $10,000 to go into it"?

Mark Abbott: There will be some recommendations made and there will be some decisions made and that is why we are going to continue the Stakeholder involvement process, the Public

Hearings and if that is a recommendation, you will hear about it and have an opportunity to comment it.

Q: Just one more question on that same issue – is that a significant amount of water?

Mark Abbott: It is not insignificant. If the demand is 20,000 acre-feet and the water goes in at 20,000, that water is going to come back out. Maybe not all of it, but if half of it comes back out, and we can reuse it for another purpose …

Inge Wiersema: The additional source is not needed, it is not that high – you have seen in the beginning the bar chart, it is not a very thick piece of the bar. So, you have 10 percent more supply available by sewering the current septic tanks, that would definitely help. It is definitely worth considering because of the amount. But if it is really small, then it would not help us to solve, the problems that we are trying to solve.

Q: There is one area of water source that you are not considering. The major amount that comes in about every 10 or 11 years, in a very wet year, we were thinking not about how to conserve it, but how do we get rid of it, and we are hell bent on sending it down to the Pacific Ocean, when we should be trying to save as much of it as we can.

Inge Wiersema: That was part of the idea.

Q (continuation of preceding question): You did not really expand on it – you hid the thought of raising the sill at the outflow channel, but you did not talk about the other half of that. We really should raise the sill at the outflow channel and lower the sill to the Back Basin. Do not think about putting 9,000 houses there. Store water and replenish the aquifer, we could have a variable-height sill to the Back Basin, eliminate that first flow which is extremely contaminated, eliminate the very last flow in let us say Mystic Lake overflows and is very contaminated, and take the middle flows where the water is quite clean, put it in the Back Basin and pump it down as rapidly as we can.

Mark Abbott: One of our goals, you may remember, that there was a board up there that said "maximize use of lower cost water". We may not have said it the way you did, but there is always the flood control issues and whatever we do, we have to remember that there is competing uses for the water. Not only the people that want to use the water, there is the people that want to get rid of the water because they do not want to have water in their house. So, yes it is in there; it may not be quite as big a role as … we are going to look at the possibilities of producing the sill elevating, and maybe it is a temporary-type of sill, but realizing also the results of the regulatory agencies such as the Corps of Engineer limits the flexibility of the things we can do.

Inge Wiersema: Also, the surface spreading of the basin, if you have a lot more rainfall in those years and you have to build facilities to capture a lot more rain, and two of the main canyons that are currently producing a lot of water that will actually reach the lake. By installing the spreading basins, you do capture a lot of that water in those years when you do not know how to get rid of the water. So we are thinking about using that opportunity to maximize the capture of rainfall.

Mark Abbott: And also, we are restricted to only the surface spreading and surface recharge. If we put water into an injection well, Federal requirements state you can only put drinking water into a well. When you do direct recharge right into the aquifer system, it has to be drinking water.

Q: Can you use the Back Basin as a spreading unit?

Mark Abbott: There is a lot of clays … we have looked at the geology in the Back Basin area; what has happened is that all the deposits have come down are sediments of the surrounding hills and what has happened in the area of the lake – historically, the Lake is much larger, but what happens when that lake is larger you get a lot of very fine sediments that build up at the bottom. As we talked about earlier, there is a hundred-foot plus layer of interbedded clays and sand and what happens is that restricts the ability of water to recharge. So, just like we mentioned, Lake Elsinore does not really recharge the aquifer system, nor would water kept at land surface recharge the area of the Back Basin.

Inge Wiersema: Actually the opposite will happen – there is a lot of water ponding on the Back Basin because it does not infiltrate very easy, because of all these fine sediments, you will lose more water because there is a larger surface area – you have more water evaporating. And that has been one of the reason, or that has been THE reason that the lake has been reduced in size. To reduce the loss, due to evaporation.

Q: Lee, Lake Elsinore: Would really make sense would be to talk to people that seem to be in the know. When a water level in a lake is so low, why do not you put a dike across the berm, pump the water out of it, go in there with scrapers and get down there 4, 6, 8, 10, 12 feet, whatever, and then pump the water back? And do that until they go all the way through the lake. That way they got a lot of sediment out of it, a lot garbage out of it. During a heavy rain, do you ever watch the water come down that drainage ditch there by the west end of the lake there? When they put out all the signs on Grand – "Running Water" – you see all the garbage floating down across Grand going into the lake. There is nothing catching that stuff – it all ends up in the lake. I have seen bicycles, I have seen grocery carts floating down that ditch many times.

Inge Wiersema: I think that is mostly a flood control problem.

Mark Abbott: That is an issue that is important, but it is

Q: Lee, Lake Elsinore: We are talking about water.

Mark Abbott: Yes, I know – this probably is not the right venue to have the particular conversation.

Q: Daryl Hickman, Tuscany Hills – I am a neophyte to this area and I have always heard that it had salt water – where is the salt water underground? Is that flowing through here too somewhere, is it natural?

Mark Abbott: You are probably talking about the mineral springs … Matt, can you show us where the mineral springs.

Matt points out the location of the hot springs, basin areas and faults.

Inge Wiersema: The last thing that I want to talk about is the evaluation criteria that we will use to evaluate the three alternatives.

1. Reliability of Supply – One of the major reasons why we do this study is to improve the District's reliability on water in periods when there is a drought and there is not much water available, so when we evaluate the alternatives, we look at how drought-proof the water supply is in each alternative.

2. Water Quality. Different alternatives will have different effects on the water quality in the basin. If you inject imported water with high salt content or if you spread the water by passing through to the aquifer, a different effect on each alternative that will impact the water quality or may not impact the water quality at all.

3. Utilization of the Basin's Storage Capacity. The basin can be operated under different water levels and we are in the process of determining what the range is, what the highest and the lowest water level that we can fluctuate the levels within and all the water that can store using the basin. So, in the wet years, you will inject as much water or recharge as much water as possible, levels will go up; and then in dryer years, you will pump the levels down. And this operating range will be evaluated, how much we use the basin in each alternative.

4. Cost Efficiency – first we will look at costs for all these activities and then determine how efficient is it – how much reliability will we get for the money; how much initial supply will we get by implementing a certain alternative or activity. In each activity – different implementation; certain activities require a lot of construction or permitting, so one alternative may be a lot easier to implement than the others. So we will evaluate the alternatives like that.

5. Flexibility – if you do surface recharge or spreading, you think of different water quality to spread the water. You can use treated water, runoff water coming down a hill, you can use raw imported water that is not treated. Where as you directly inject the water into those dual-purpose wells, you need to have water of drinking water quality – so that is the import water. So, it is less flexible for future situations.

6. Environmental Impacts have to do with construction impact. Water quality is evaluated separately. Certain activities will have more environmental constraints than others. So we will look at all that.

7. And then we will look at Stakeholder Acceptance and how it will impact the Stakeholders and what can be done to satisfy all the needs of the Stakeholders.

Those are the criteria that we will use to evaluate the alternatives. That is where we are and Mark will talk about one of the last things that we are going to do.

Mark Abbott: We started this meeting with a discussion of where we have been and I want to finish it up with where we are going to be over the next few months. We are here, the beginning of February, we are having our second Stakeholder meeting we wanted to present where we are at to you, get your feedback, which we are doing right now. Based on what we have heard, not only through you all, but through the Technical Advisory Committee that the District's put together, we are now going to go back and start evaluating and developing these different alternatives with information we saw on that matrix that Inge talked about. Then from there, once we have developed these alternatives and given some life to them, describe and build them up a little bit more, we will be evaluating them. The bottom line is that by the middle of May, we plan to put out a final draft of our Groundwater Management Plan, which will then go back up to the State - we have not really talked about their role in this, but they are kind of overseeing the effort, they are providing some funding for the District to actually go through this process. So, our goal right now is that by May 15, we would have a final draft of a Groundwater Management Plan available for review.

One thing I just realized we did not touch on in the beginning is the District's website. At this point, we had that presentation in October, the website is going through an upgrade. We hope to have that finished shortly. Once it is finished, all the information will be available on the website. If there is any – this presentation, as well as the last presentation, and there is work products – all the stuff we have talked about as far as the project status, really comes from the work products we have been preparing. We call them Technical Memoranda, which will – we have got four or five of them out now and as they come out, they will be finalized and put into the final report as different sections. So, those will also be available on the website. They will be contact information – myself, Phil. So, if you want to get additional information or if you are having trouble printing it off, we can printed it off for you and send it to you. For the time being, if you are interested in getting this information, please let me know, we can send you a CD that has the presentations that we gave at the last Stakeholder Meeting, as well as today's presentation.

Right now we are in the final efforts of putting together the groundwater model. We expect to have it complete by the middle of February and have that documented. We also can take out today from the discussions we have had, finalize the alternatives and get those documented. So, starting February 15th through roughly the middle of April, we will be doing all of our evaluations. And then between April 10th and May 15th, actually compiling the final draft of the report.

I think that concludes the formal part of our presentation. So, now we can go back into your question and answers. If you have any questions about what you have seen so far, or any other questions – I would like to keep it focused on groundwater management. And I would add, again, identify yourself and where you are from.

Dale Schaefer: I wanted to just emphasize that if you want contact with any of us, we need contact information from you. So be sure that you sign up, that you give us some kind of way that we can get in touch with you. If you do not have an email, then give phone, fax, some other way. Because I know you all do not have email, but you might have a way that you would like to be contacted, whether it be through mail, through fax. Make sure that when you leave, that you give as much information as you can about who you are, and then if you want to speak to us we can call you or you can call us – either way.

Q: I have got a question about input from the community – you had one previous meeting like this and I am kind of curious if you will have one more.

Mark Abbott: From this point, we will be making presentations to the District Board.

Q: Do you go to the different governments and governmental agencies that affect this valley and have they received – have they been given an opportunity (I guess) to provide input into this or is this solely a water project .

Mark Abbott: Well, the easy answer is "yes". Actually, the District has put together, as I referred to earlier, a Technical Advisory Committee. On that committee, we have brought in some experts from local government as well as from State. For instance, Carl Hauge, who is the Chief Hydrogeologist who works with Eric at the Department of Water Resources. He sits on this committee, so he is looking over our shoulder, giving us suggestions, you know "gee, this is the way they did it wherever." We also have Behrooz Mortazavi from Eastern Municipal Water District who is serving on that Technical Advisory Committee. Roy Herndon from Orange County, the guy at the other end of the SAWPA Temescal wash to capture water we do not get. As well as some local experts and we have also invited some Stakeholders to this meeting as well. And also, we are also talking – you mentioned Riverside Flood Control District – we are talking to them; Western Municipal Water District who is the member agency that Elsinore is a submember agency to Metropolitan. We have gone to Metropolitan Water District, we given similar presentations to them. So I guess the short answer is "yes".

Phil Miller: Let me add to that … we have representatives from the City of Lake Elsinore here tonight, Bob Buster's office is here tonight, the Elsinore Water District is here tonight …

Q: Can you go back and look at the map of the basin, please? Elsinore is up there, but not in the basin. What area is in the basin? Has Lakeland Village Association been notified?

Yes, the Supervisor's Office.

Q: Wait a minute, why the Supervisor's office? We are right there, we have 8 people here. Why aren't you guys communicating with Lakeland Village Association?

Dale Schaefer: Lakeland Village will be contacted.

Q: Pete Dawson, Lakeland Village – you mentioned a couple times that the Riverside County Flood Control - as having been affiliated with them for nine years now, I can tell you, you and they regularly misrepresent themselves as Riverside County Flood Control, when they are, in fact, Riverside County Flood Control and Conservation District. And time after time, I have tried to emphasize that with that organization and now, it seems, perhaps with you. That is the half of the organization that is so un-represented and that is probably the most important part of that organization – it really should be. The conservation of water is going to be much more important in the future than how the heck to send it to the Pacific Ocean. I think perhaps, they should be here hearing your reference information. They should be considering how can they rather than build a debris basin, build a facility to store stormwater so that they can recharge the aquifer.

Mark Abbott: That is our goal in talking to them, is to get them to modify some of their facilities. So rather than getting the water to run through, to slow it down and give it a chance to percolate.

Q: Pete Dawson, Lakeland Village – I heard you suggest that – it seems to me that that is a big emphasis that perhaps you need to go further with, perhaps kind of pushing them – they need more than a gentle prod in that area.

Mark Abbott: I agree. We have noted your comment. There is a tremendous opportunity to capture water in some of these canyons and existing basins. But realizing that we are limited by the flood control requirements on one side and the habitat on the other side. There is only so much we can do and we want to try to find the maximum we can do and still protect the people downstream from getting flooded out and the environment upstream from killing off the habitat.

Q: Linda Wright, Lakeland Village – I am concerned that, and I may be totally wrong, but do not we have an excess of reclaimed water that we have available?

Phil Miller: There is a tremendous shortage.

Q (continuation of preceding question): of reclaimed water? I thought that they had enlarged the plant, and they still have a shortage?

Phil Miller: Well, yes. We have enlarged the plant, and we are going to have a whole lot of new customers some day with that, but there will be a shortage of reclaimed water for a long time.

Linda Wright: That will explain why we do not use more reclaimed water in some areas if we do not have enough, right?

Mark Abbott: Realizing that the suggestion was made, that is it financial feasible to sewer more areas, to create more reclaimed water to offset more non-potable demands? So, in a sense, we are looking at it – it is in there.

Q: Have you thought about where in the Canyons is land available for spreading basins?

Mark Abbott: Actually, one of the ongoing efforts right now, it is really kind of a piece of the – we have not really talked about it – is three service spreading options as Inge mentioned. (Mark points the location out on the maps.) Leach Canyon is here, McVicker Canyon is here, Railroad Canyon runs through here. There is already, in this area here, this is where the flood control facilities are right now for Riverside County. There is two areas – a long strip of land and then the debris dam and then another area up above that. So, there is an area, in fact before we even started on the project 10 years ago, people were looking at these two particular places as being potential sites. The other thing we know – this is Railroad Canyon, we know water comes through here and it passes across this part of the Back Basin. Remember there is a fault that runs through here, called the Glen Ivy Fault, there is another fault, the Sedco fault, we have got some offset in the sediments. There is been references to an area called the Sedco Cone, where water seems to flow in and just disappear into the groundwater system. So, we have done some of the preliminary environmental habitat investigation and we have seen that, based on what is up here, there is really no opportunity to construct a facility for surface spreading. But, we have to remember that water balance – there is a lot of water that comes down the San Jacinto that just recharges – this is really the only area that gets water into the south end of the lake and the groundwater basin. So, I guess the short answer is "yes" – there is three main areas, two fairly small areas where we think we can probably have natural recharge, where we can capture between 500 to 2,000 acre-feet/year based on average growth conditions. And that can go up very high, if you start also bringing imported water to put in there when it is available. We can also, by discharging imported water at this turnout in the San Jacinto River, the more water that flows through the river, spill over the dam and recharge this part of the aquifer, because it's the Sedco cone and it recharges. That is the theory. Now, we are doing the work now to try to see if we do recharge this, where does that benefit. Is the fault restricting flow down in this area. We do not think so, we think the is the recharge area where the water comes from.

Q: Darryl Hickman, Lake Elsinore – Would you have to put a dam or something to capture the water?

Mark Abbott: Are you talking about this stretch in here? The recharge rates are very high – Matt's done some work looking at it. And 2,000 acre-feet was their average recharge that occurs in the Back Basin. What we are talking the sediments right along this river channel here, soak up the water because the offsets of the fault. In this particular area the clay isn't quite as thick So, there is an opportunity, we think at this point that if we can keep water flowing into this area here, that will actually benefit the groundwater basin.

Matt Hacker: That is actually – in the stream channel itself, there is a certain capacity for when it rains for it to infiltrate in the San Jacinto River Channel itself. And that channel is about 51 acres, so can get whatever water will infiltrate over a time period, in a 51-acre area, that pretty much is just the river channel itself. So that is what we have calculated as you can get about 2,000 acre-feet plus or minus, just in the channel itself per year.

Inge Wiersema: And we are not planning to construct anything, because there are some environmental constraints.

Matt Hacker: So that what currently occurs now. If you added more water you can get more infiltration in the river channel itself, without doing any modifications to the existing structure.

Q: There is an infiltration of groundwater from the inland channel – how much of the 15,000 acre-feet of water did we lose out of the lake due to evaporation?

Mark Abbott: I guess the simple answer for that is to take a look at our budget. The numbers we have put together now in this particular effort we kind of treat the lake as a black box, because once it goes into the lake, it no longer benefits the groundwater system. So we have not done a lot of accounting for the water in the lake – evaporative losses. So, over the past 10 years of the existing flows that have gone into the lake, have resulted in an average of 2,200 acre-feet per year of recharge into the Elsinore Basin.

Q: I do not recall it ever being mentioned that we were losing water from the lake and that area through the Sedco cone I was under the impression that that was a old channel that was on the other side of the dike?

Mark Abbott: There is a lot of history in the Sedco Cone. Everybody has seen that … we actually tried to map it and everybody we talked to has different locations. The only thing we had to really go by was when they dug … I believe that the best story we have – and I say "story" because this is just someone's experience and what they remember seeing – when they dug this channel, they uncovered a layer of clay. That layer of clay was continuous through a certain spot and then disappear. And as water came down through this channel, it ran over the clay, as soon as it hit the sand it would disappear. So, what we think is – we do not know exactly where the clay was, but we suspect that where it went from clay to sand is where the fault is. So that was where you had the offset of the sediments. So that created that recharge feature that allows water to recharge the aquifer.

Mark Abbott: And the area to look at is really up in here – so it is

Matt Hacker: You can actually see it when you are looking and you come across on where the freeway comes in, you can see a whole bunch of bushes in the river. And all of a sudden, right at just south of where the freeway ramp comes over, the bushes stop. And that is probably where the clay comes in, allowing water to sit on top of the clay. When the clay drops down, the water can no longer sit on the clay, because it is dropped down quite a bit. So that is where the vegetation stops.

(continued at the map) So, this is all bushy, grassy stuff right here. And then come right here, right as you pass underneath the freeway, and this time of year, it will be grassy on the top and lots of big bushes and nothing on the other side. So that tells you that is probably right about where the fault is and that is probably where we can get a lot of infiltration in through that area right south of that fault. So there about 51 acres from here to here and if you get down in there and look and see what the fault type is, it takes water pretty well.

Q: Linda Wright – If you purchase water and you put it into Canyon Lake and it comes down, will there be some kind of quality check on that water?

Mark Abbott: I am not aware of …

Q: (continued from preceding question) That would be part of your monitoring would not it?

Mark Abbott: Yes, oh yes, yes.

Q: (continued from preceding question) Would you monitor every time you introduced water?

Mark Abbott: Our basin monitoring … earlier we talked about the existing expanded network – that is the groundwater system. If we are looking at a new surface source or new source of water, depending upon what it is, we would be looking at the surface flows – whether it be water quality or water quantity. To be honest with you, I do not think we have really addressed significantly the water quality issues – that is a comment we will take back and incorporated into our alternatives.

Q: Daryl Hickman, Lake Elsinore – My concern is that if we were trying to fill the lake, should we put some kind of barrier back there to prevent the water so it can wait a little before it gets washed out?.

Mark Abbott: Well, Matt what was … I mean, the percentage of water that actually goes into there is very small …

Matt Hacker: It is like, the total amount of flow that is coming down the San Jacinto River, over the past 10 years, is about 17,000 acre-feet – that includes all the big storms and everything. We are having about 2,000 is going into the groundwater basin. So that is roughly 10 percent goes into the groundwater basin and 90 percent of it goes into the lake. That is where the calculations come in, in allowing that you do not exceed the infiltration capacity of the river channel itself. So that the water that you are putting in there, you get most of it into the groundwater basin. And I am not sure if I want to go too much further than that.

Dave Ringel: You bring up an interesting point. I think it really gets back to that really complicated flow chart that everything is so interrelated here, that if you divert water or percolate water from the San Jacinto River, it does not get into the lake and it reduces the amount of natural inflows. That would create a demand for some other source. Those sources right now are principally recycled water or pumping additional groundwater. So it is a question of did the water percolate into the ground in that channel and then get pumped out and get put back in the lake, or do we manage it a little differently so we can maximize that use and maybe get two benefits out of that water. That is really what we are trying to do – is see how we can operate the groundwater basin without causing lake management issues at the same time.

Phil Miller: I will close by saying thanks for coming tonight. We appreciate your input; it will all be incorporated into Groundwater Management Plan. And once again, sorry about the website, but it will get there. Thanks a lot.

Mark Abbott: We will be available here for a few minutes, if you have questions or would like to give us some information to send you something else.

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Ad Desc.: Groundwater Basin

I am a citizen of the United States. I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am an authorized representative of THE PRESS-ENTERPRISE, a newspaper of general circulation, printed and published daily in the city of Riverside, County of Riverside, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Riverside, State of California, under date of April 25, 1952, Case Number 54446, under date of March 29, 1957, Case Number 65673 and under date of August 25, 1995, Case Number 267864; that the notice, of which the annexed is a printed copy, has been published in said newspaper in accordance with the instructions of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

05-25-04
06-01-04

I Certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: Jun. 1, 2004
At: Riverside, California

[signature] L. Lozano

ELSINORE VALLEY MWD

PO BOX 3000
MARGIE ARMSTRONG
LAKE ELSINORE CA 92531

Ad #: 5879537

PO #:

Agency #: ______________

Ad Copy:

NOTICE OF PUBLIC HEARING
ELSINORE VALLEY MUNICIPAL WATER DISTRICT PREPARATION OF A GROUNDWATER MANAGEMENT PLAN FOR THE ELSINORE GROUNDWATER BASIN

The Elsinore Valley Municipal Water District (EVMWD) intends to conduct a public hearing at its Board of Directors meeting on June 10, 2004 to obtain input from interested parties on whether to prepare a groundwater management plan for the Elsinore Groundwater Basin. The Elsinore Groundwater Basin generally consists of the valley fill surrounding Lake Elsinore and is bounded on north and west by the Santa Ana Mountains, on the east by Glen Ivy and Freeway faults, and on the south by a groundwater divide with the Murrieta Basin.

The Elsinore Groundwater Basin is an important component of the water supply of the EVMWD, the Elsinore Water District, and numerous private pumpers. EVMWD plans to prepare and adopt a groundwater management plan in accordance with Section 10750 et seq. of the California Water Code. EVMWD invites public comment on whether to prepare groundwater management plan. For additional information, please contact:

5/25,6/1

THE PRESS-ENTERPRISE

Corona-Norco Independent, Elsinore Sun-Tribune,
Rancho News, Sun City News, Menifee Valley News

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02-19-05
02-26-05

I Certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: Feb. 26, 2005
At: Riverside, California

K. Peoples

ELSINORE VALLEY MWD

PO BOX 3000
MARGIE ARMSTRONG
LAKE ELSINORE CA 92531

Ad #: 6574381

PO #:

Agency #: ______________

Ad Copy:

RESOLUTION NO. 04-06-01
ELSINORE VALLEY MUNICIPAL WATER DISTRICT
INTENT TO PREPARE A GROUNDWATER MANAGEMENT PLAN

WHEREAS, water demands in the Elsinore Valley Municipal Water District are projected to more than double in the next twenty years; and

WHEREAS, groundwater from the Elsinore Groundwater Basin is an important water supply component of the Elsinore Valley Municipal Water District's, the Elsinore Water District and private pumpers; and

WHEREAS, the Elsinore Groundwater Basin has experienced recent water level declines that threaten the long-term sustainability of this supply; and

WHEREAS, California Water Code Section 10750, et seq., (AB 3030, as amended) provides that any local agency whose service area includes a groundwater basin, or a portion of a groundwater basin, that is not subject to groundwater management pursuant to other provisions of law or a court judgment or decree, may, by ordinance or by resolution, adopt and implement a groundwater management plan for all or a portion of its service area; and

WHEREAS, the Elsinore Groundwater Basin is not currently subject to groundwater management by a local agency or a watermaster pursuant to other provisions of law or a court order, judgment, or decree; and

WHEREAS, the Elsinore Valley Municipal Water District has committed to the development of a groundwater management plan for the Elsinore Groundwater Basin; and

WHEREAS, the Elsinore Valley Municipal Water District has published notice of a public hearing pursuant to Section 6066 of the California Government Code, has conducted a public hearing and no public objection has been expressed regarding the District preparing a groundwater management plan for the Elsinore Groundwater Basin.

NOW, THEREFORE, BE IT RESOLVED that the Elsinore Valley Municipal Water District intends to prepare a groundwater management plan for the purpose of establishing and implementing a groundwater management program for the Elsinore Groundwater Basin, in accordance with Water Code Section 10750, et seq., subject to final approval by the Board of Directors and the landowner protest provision of California Water Code Section 10753.6; and

BE IT FURTHER RESOLVED that the Elsinore Valley Municipal Water District invites interested parties to participate in developing the groundwater management plan.

APPROVED, ADOPTED AND SIGNED on the 10th day of June 2004.

Terese Quintanar
Board Secretary/Administrative Services Supervisor
Elsinore Valley Municipal Water District
(951) 674-3146, extension 8223
2/19,26

RECEIVED
MAR 07 2005
ADMIN. DEPT.
EVMWD

Elsinore Valley Municipal Water District

P.O. Box 3000
31315 Chaney Street
Lake Elsinore, CA 92531-3000
(909) 674-3146
Fax: (909) 674-9872

Public Meeting Announcement

The Elsinore Valley Municipal Water District (EVMWD) would like to invite you to a public stakeholder meeting for the Elsinore Basin Groundwater Management Plan (GWMP). The meeting is being held to present the Draft Final GWMP that has been prepared to assist with the management of the groundwater basin. The meeting will include the following agenda items:

1. Summary of GWMP
2. Public Comment Procedures
3. Adoption Process

The meeting date, time and location is as follows:

Date:	Tuesday, August 10, 2004
Time:	6:00 PM to 8:00 PM
Location:	Elsinore Valley Municipal Water District Administration Office 31315 Chaney Street Lake Elsinore, California 92531

Please contact Mr. Joe Mouawad, Senior Engineer at (909) 674-3146, extension 8347 if you have any questions regarding this meeting.

Copies of the GWMP are available for review during normal business hours at the District Offices, 31315 Chaney Street, and the public library both in the city of Lake Elsinore. Electronic copies are also available, for you to keep, during normal business hours at the District Offices.

EVMWD Public Meeting

Presentation To:

Public Meeting

August 10, 2004

Elsinore Basin Groundwater Management Plan

Discussion Items

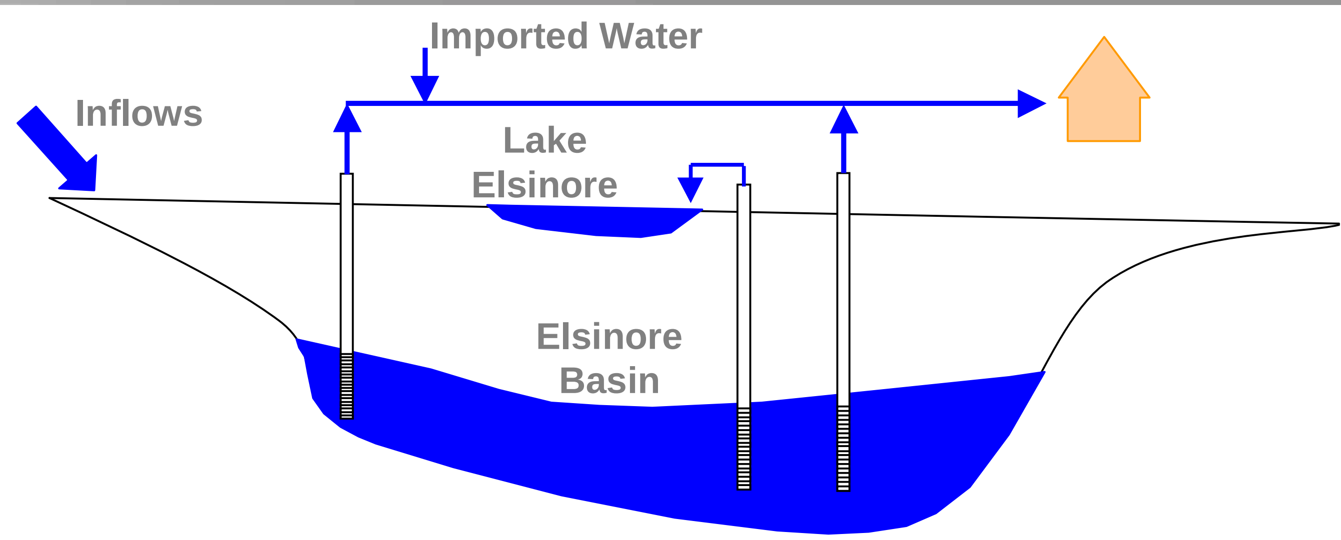
- Definitions
- Management Plan Development
- Implementation and Adoption

EVMWD Public Meeting

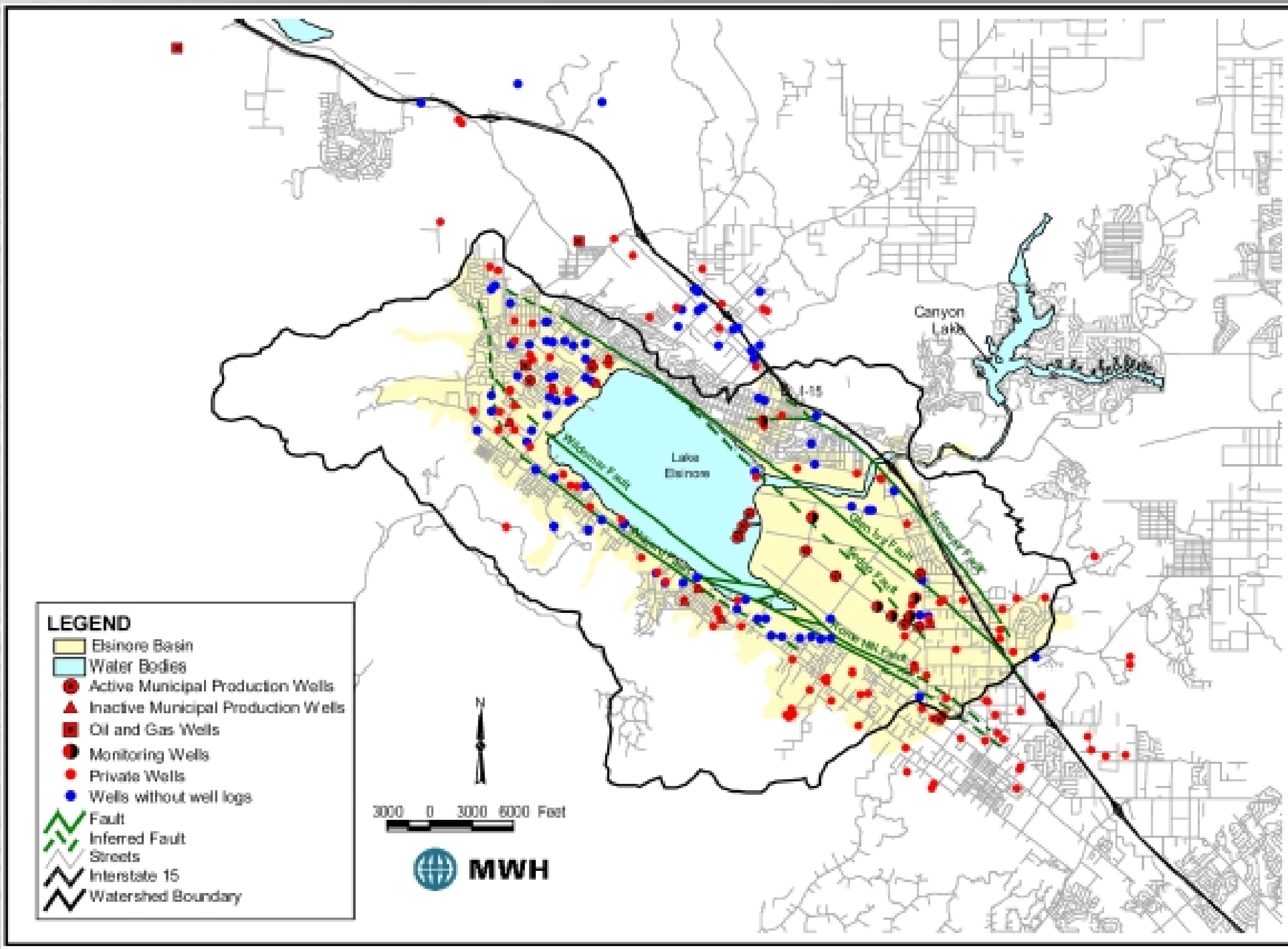
Definitions

Groundwater Basin

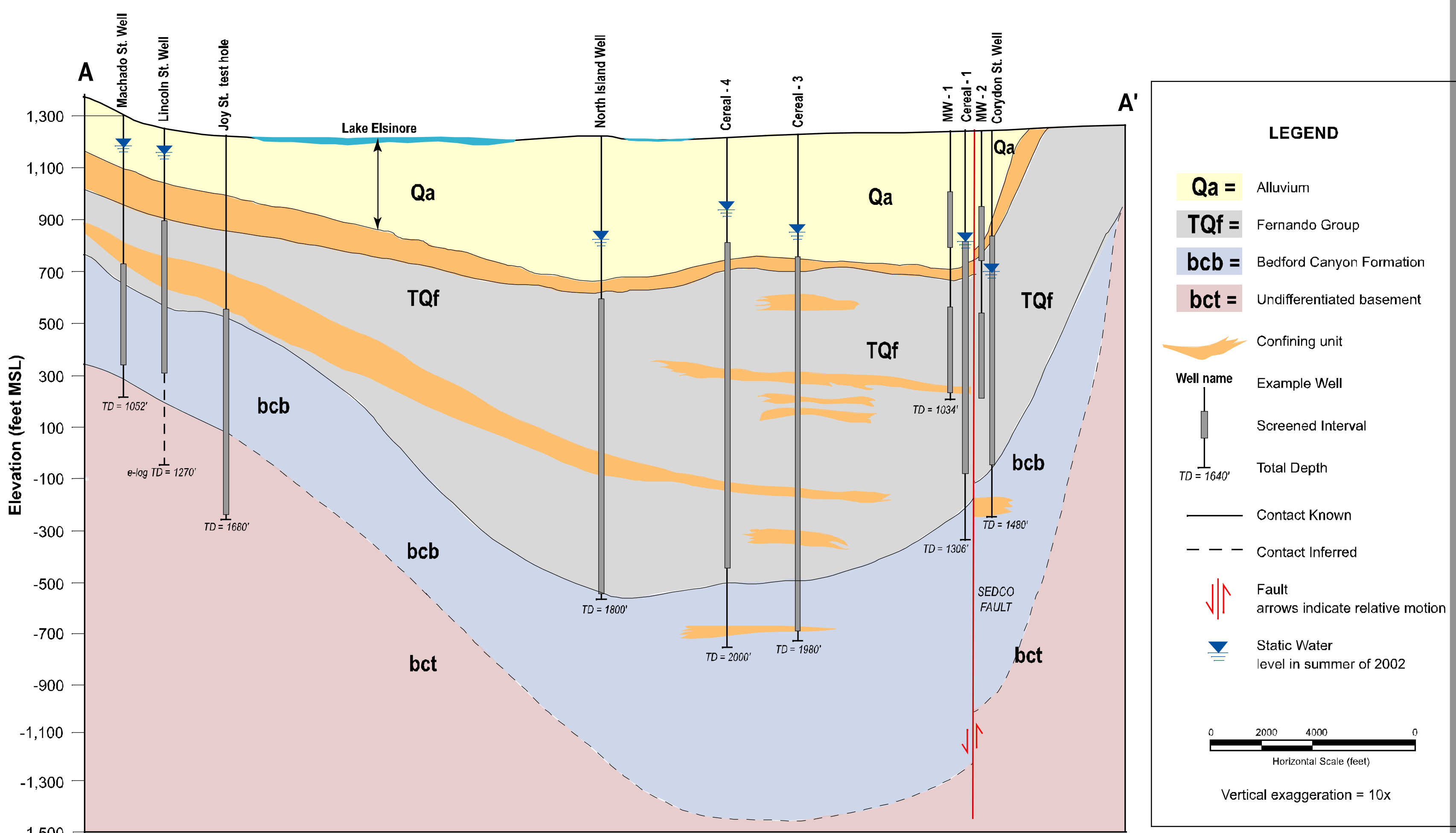
- An **aquifer** is a body of rock or sediment that is porous and can store, transmit, or yield significant quantities of groundwater to wells and springs.
- A **groundwater basin** is an alluvial aquifer or a stacked series of aquifers with well defined boundaries and a definable bottom.



Elsinore Basin



Cross Section of Elsinore Basin



EVMWD Public Meeting

Management Plan Development

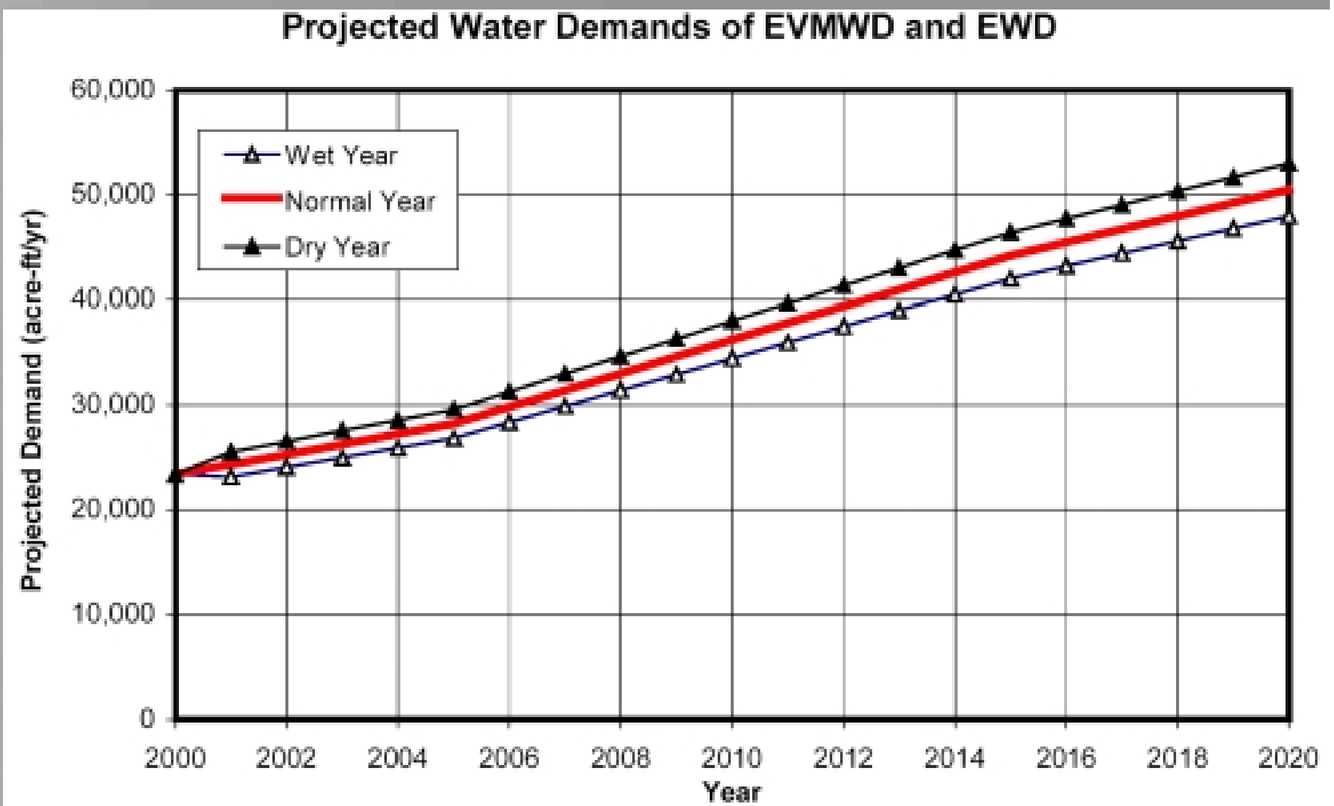
Groundwater Management Plan

- A **Groundwater Management Plan (GWMP)** is a plan intended to provide a better understanding of a groundwater basin and to provide recommended management strategies.

- **Assembly Bill 3030 (AB3030) and Senate Bill 1938 (SB1938)** provide legal authority to prepare groundwater management plans. The intent of AB3030 is to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdiction.

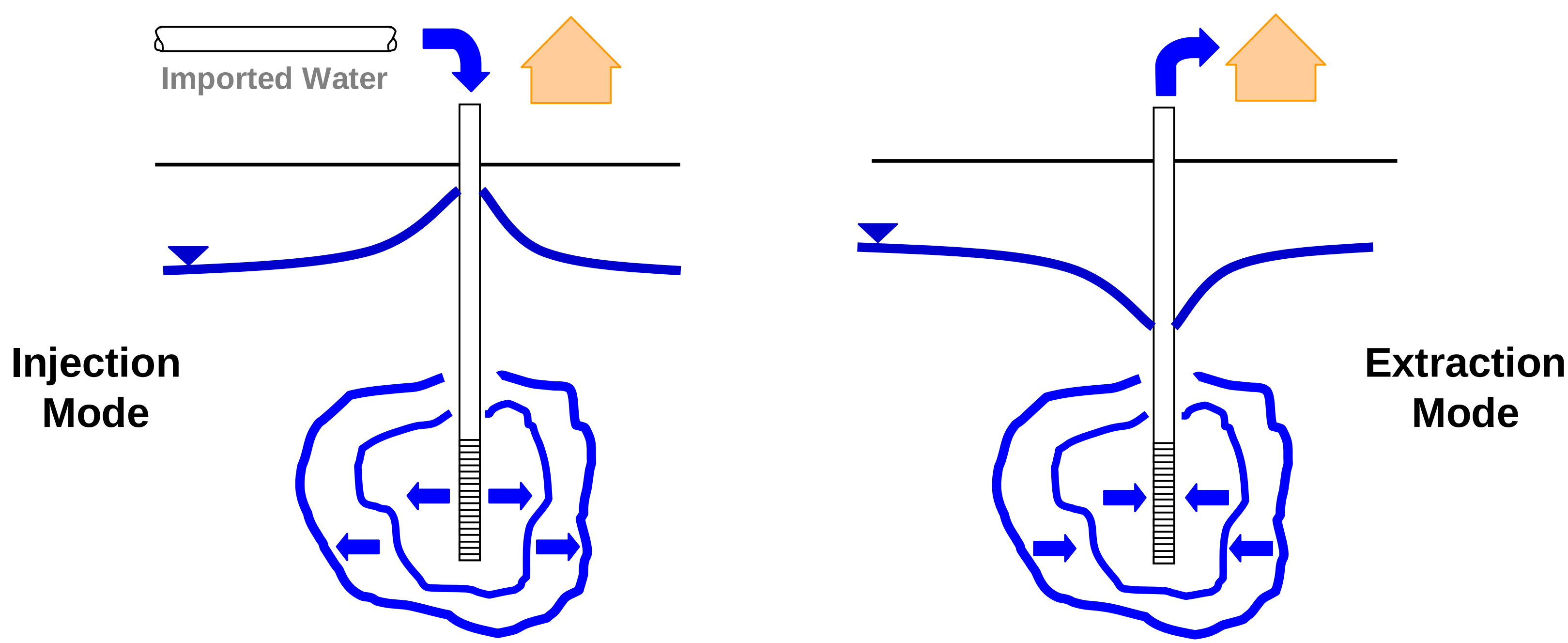
Why do we need a GWMP?

"Because water demand is projected to double in the next 20 years, cooperative groundwater management is required to achieve a sustainable water balance in the Elsinore Basin."



What is the Goal of the GWMP?

"The goal of this GWMP is to ensure a reliable, high quality, cost-efficient groundwater supply for the users of the Elsinore Basin in an environmentally responsible manner."



Elsinore Basin Specifics

- **Safe Yield -** *The safe yield (maximum quantity of water that can be continuously withdrawn from the basin without adverse affects) of the basin is estimated to be 5,000 acre-feet.*

- **Inflows -** *The estimated inflow into the Elsinore Basin is 6,100 acre-feet per year.*

- **Outflows -** *During the base period of 1990-2000 approximately 7,900 acre-feet of water was pumped from the Elsinore Basin.*

What is in a GWMP?

- Description of Basin
- Problems and Issues
- Potential Solutions
- Evaluation of Alternatives
- Implementation Plan

Management Issues

- Declining Water Levels/Overdraft
- Increasing Water Demands
- Lake Elsinore Replenishment Needs
- Well Head Protection
- Groundwater Contamination
- Well Construction/Destruction/Abandonment Policies
- Compliance with Drinking Water Reg’s & Basin Plan
- Expansion of Basin Monitoring
- Subsidence

Management Strategies

- Storage of Imported Water using Dual Purpose Wells
- Storage of Imported Water using Surface Spreading
- Increase Use of Local Supplies with Surface Spreading
- Save Groundwater for Dry Years with In-Lieu Recharge
- Save Groundwater for Potable Use Only
- Develop New Sources of Supply
- Water Conservation
- Measure Progress with Basin Monitoring
- Protect Groundwater Quality with New Policies

What Alternatives were Considered?

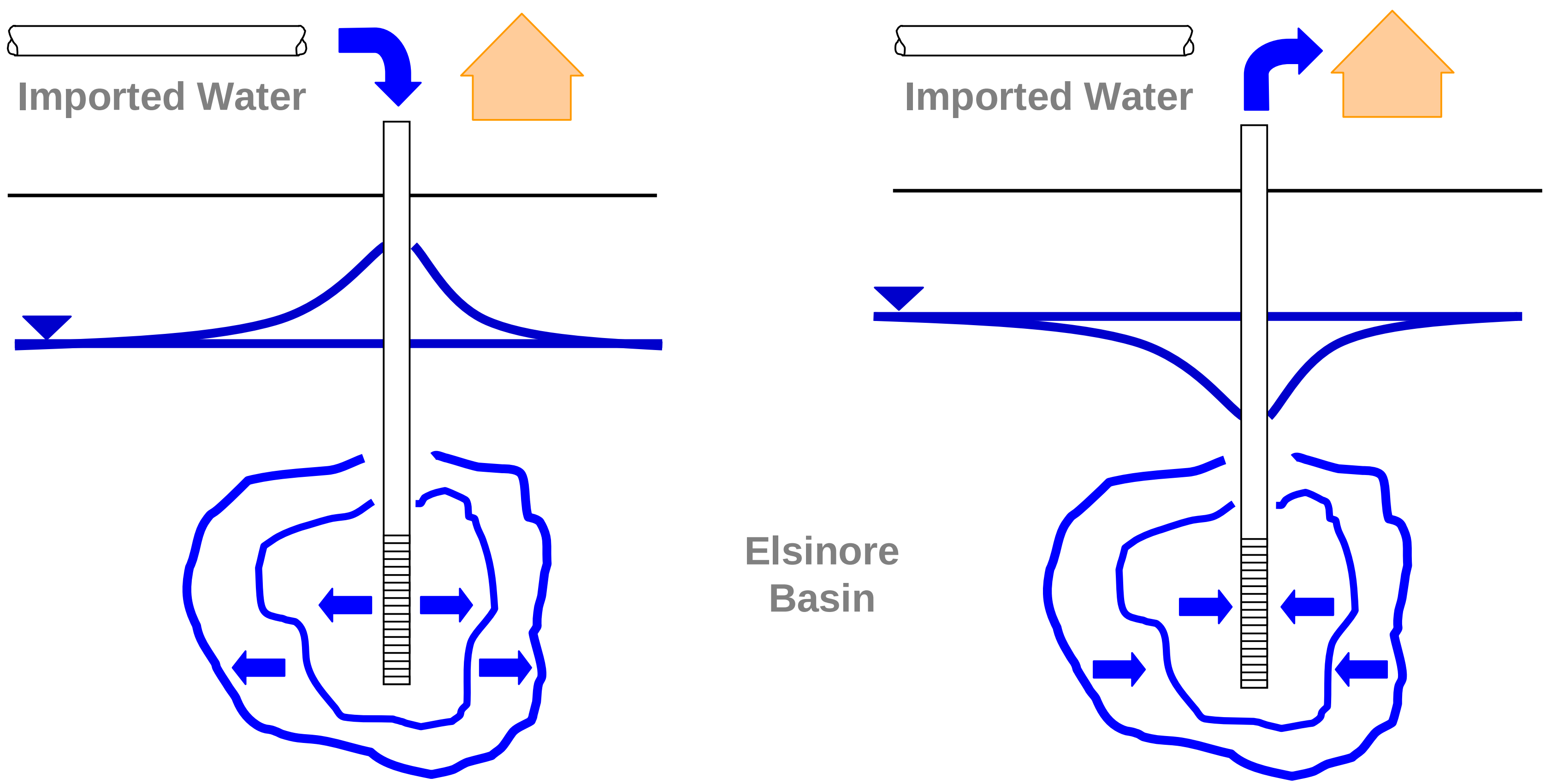
- Alternative 1 - Dual Purpose Wells
- Alternative 2 - Surface Spreading
- Alternative 3 - In-lieu Recharge
- Alternative 4 - Combination

All Four Alternatives Included the Following:

- At Least 4 New Peaking Wells
- Convert Septic Tanks to Sewer System
- Advisory Committee

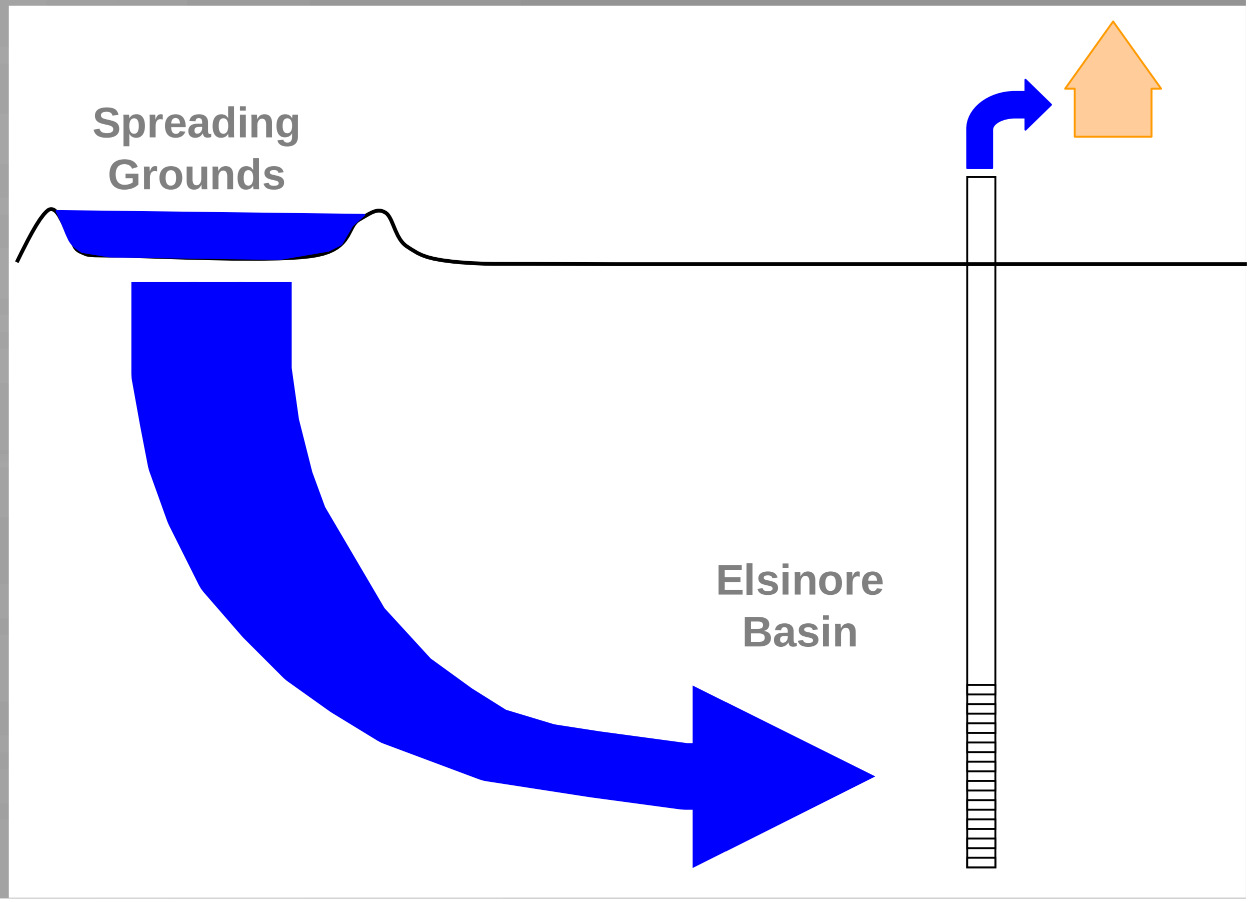
Alternative 1 - Dual Purpose Wells

- 10 New and 4 Converted Dual-Purpose Wells
- Island Wells (3)



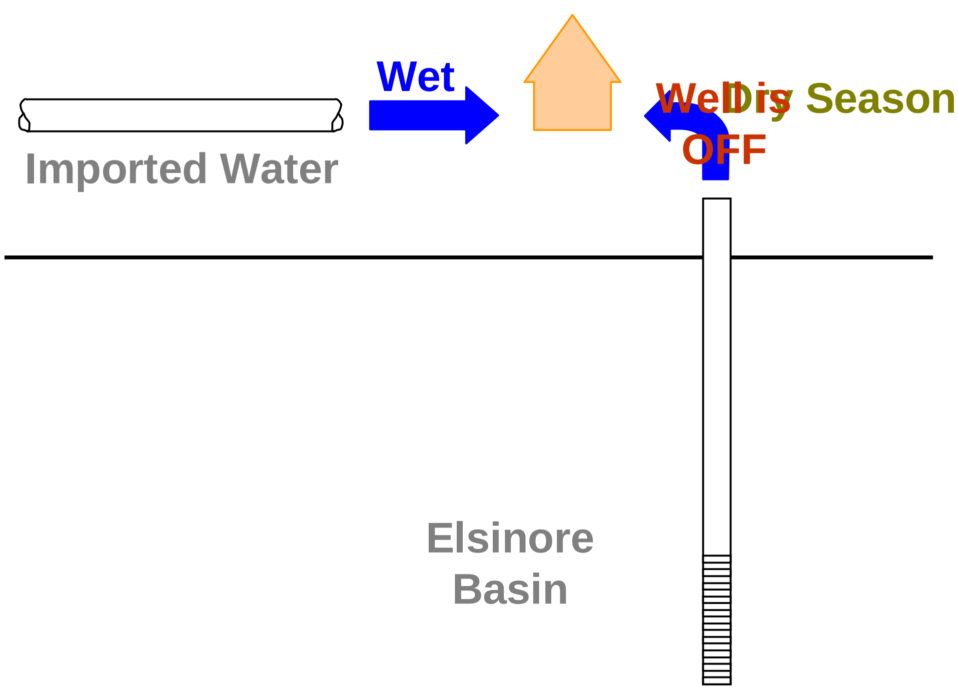
Alternative 2 - Surface Spreading

- Surface Spreading in: Leach Canyon (25 acres) and McVicker Canyon (15 acres)
- 5 New Extraction Wells
- 11 New Peaking Wells
- Island Wells (3)



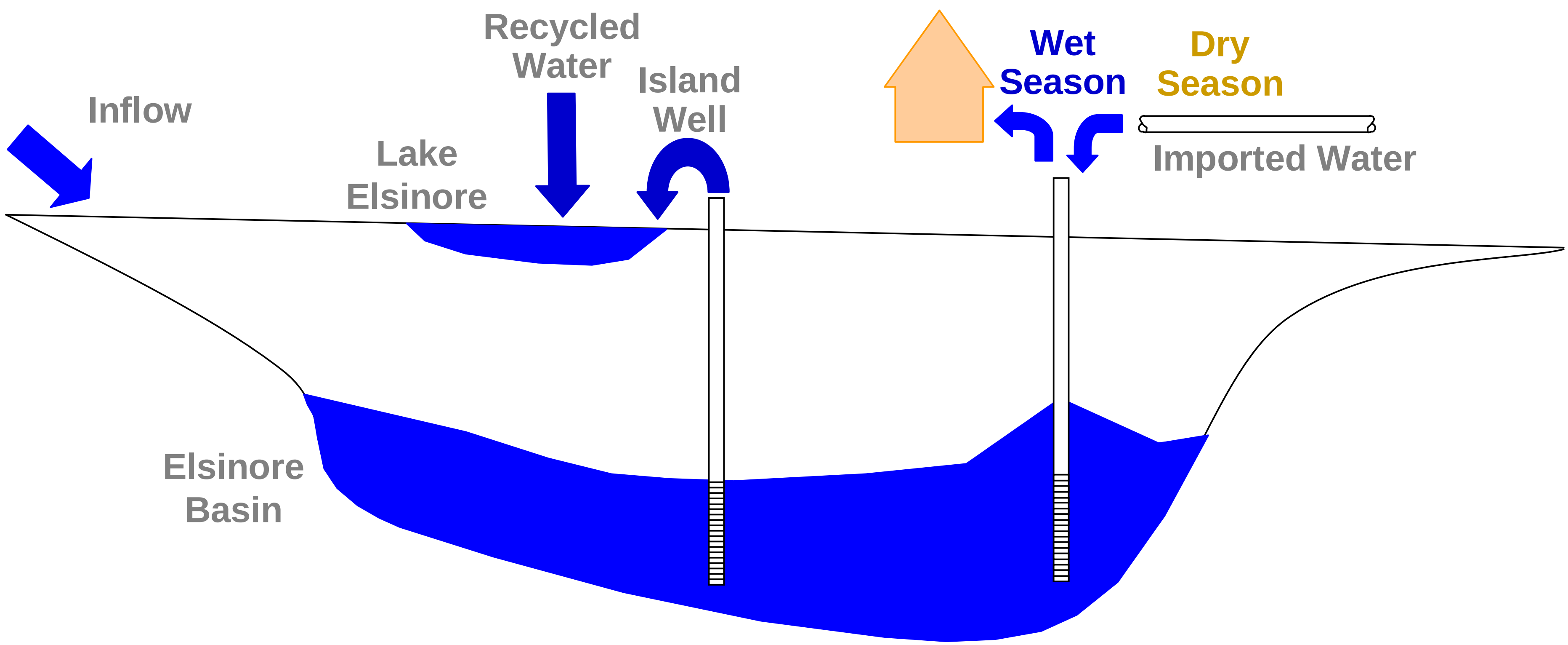
Alternative 3 - In-Lieu Recharge

- In-Lieu Recharge
- 10% Conservation
- 8 New Peaking Wells
- Island Wells (3)



Alternative 4 - Combination

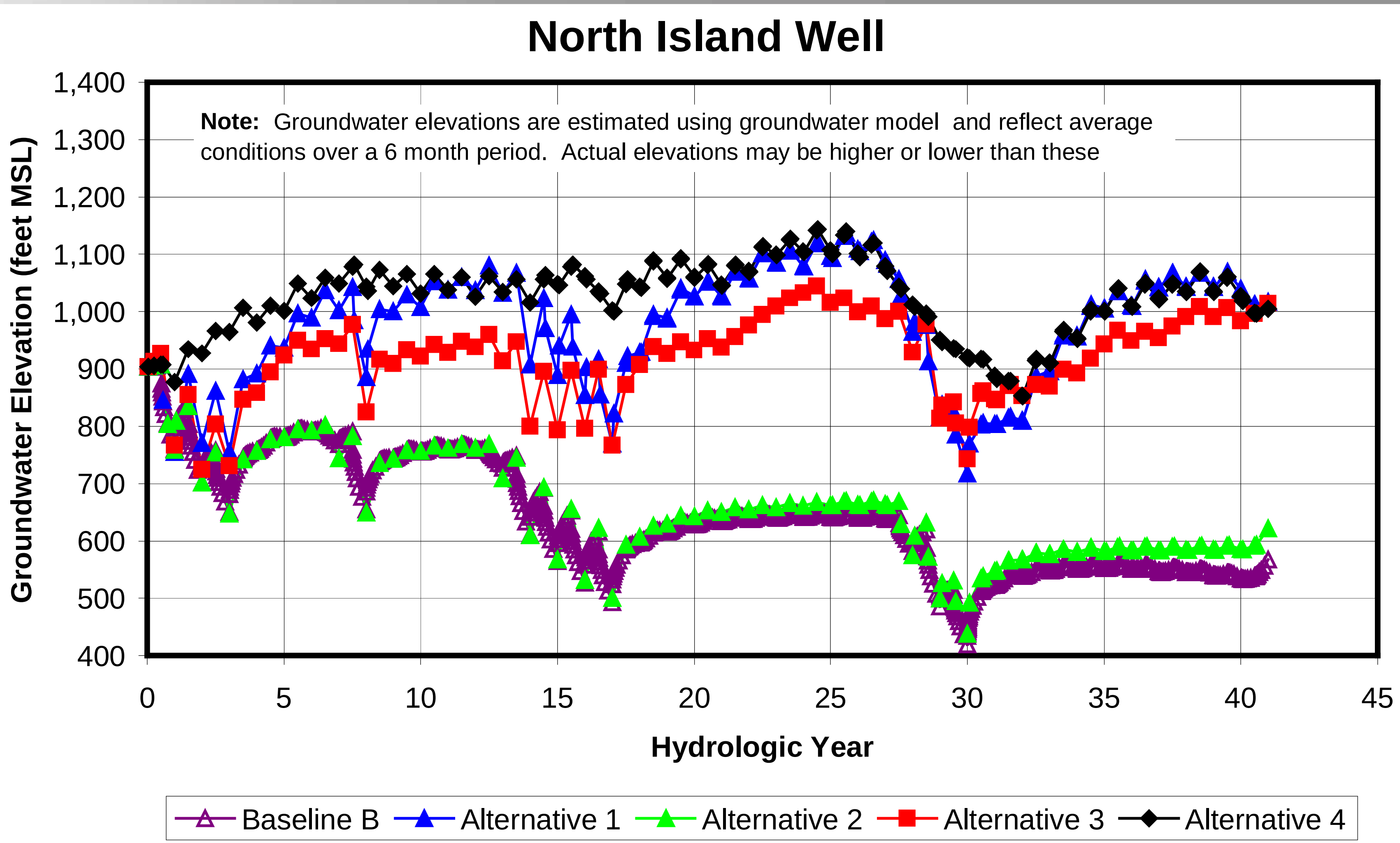
- 7 New and 6 Converted Dual-Purpose Wells
- Lake Make-up with 17.7 mgd recycled water and 1 Island Well



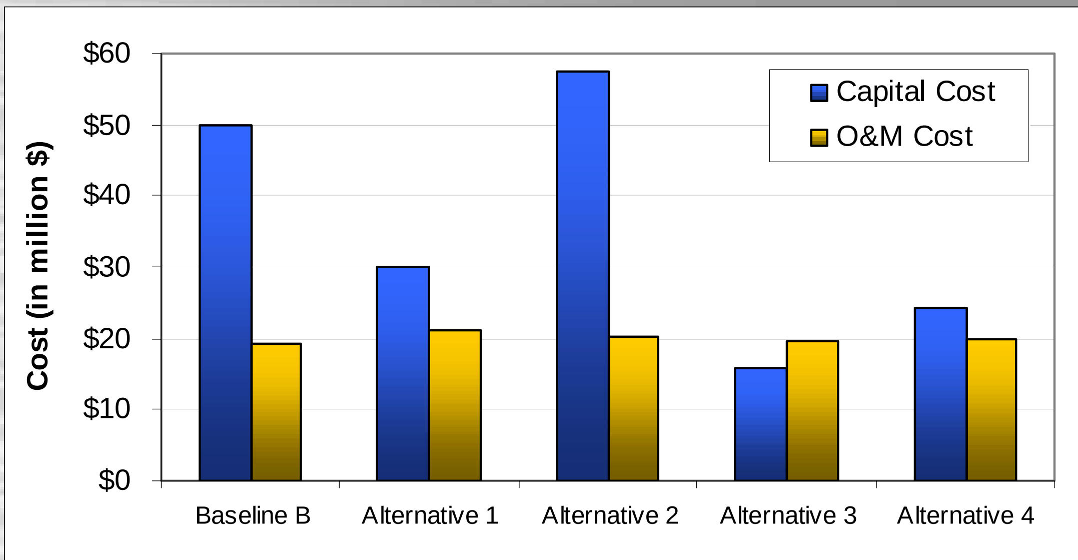
Alternative Evaluation Criteria

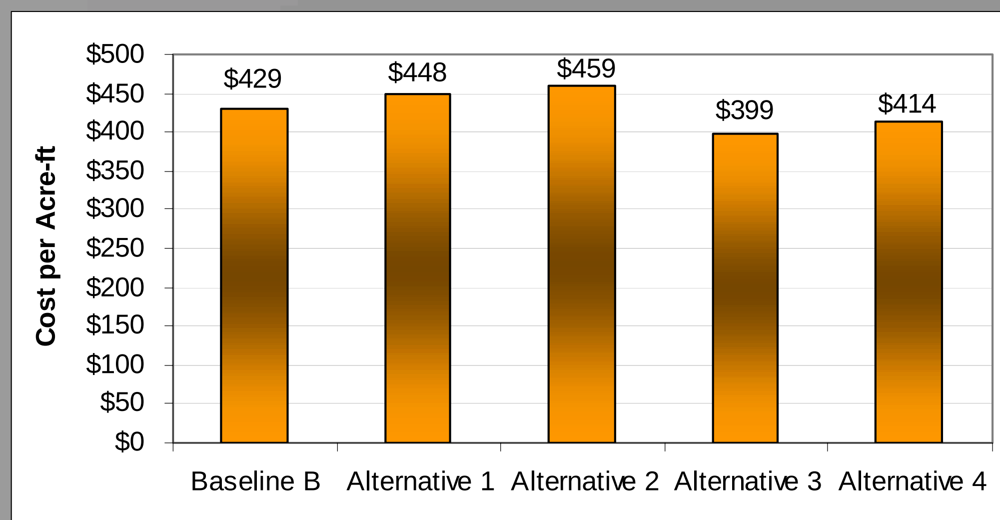
Criteria	Weighting
• Ability to reduce overdraft • Expected cost • Environmental impacts	Weighting Factor 3
• Risk • Legal & Regulatory issues • Public acceptability • Funding	Weighting Factor 2
• Flexibility • Reliability • Implementation	Weighting Factor 1

Alternatives Evaluation
Ability to Reduce Overdraft



Alternatives Evaluation Expected Cost





Alternatives Evaluation Evaluation Summary

Evaluation Criteria	Weighting Factor	Rating				
		Baseline B	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Ability to Reduce Overdraft	3	1	4	2	3	4
Expected Costs	3	3	3	3	4	3
Environmental Impacts	3	1	4	2	4	4
Risk	2	2	4	1	3	4
Legal and Regulatory Implementation	2	2	3	3	4	3
Public Acceptability	2	1	5	2	3	4
Funding	2	1	3	2	4	4
Flexibility	1	2	5	3	3	5
Reliability	1	3	3	3	2	4
Ease of Implementation	1	3	4	2	3	4
Total Rating	**MAX 50**	**19**	**38**	**23**	**33**	**39**
Weighted Rating	**MAX 100**	**35**	**75**	**45**	**69**	**76**

Note: Alternative 4 is the preferred alternative.

EVMWD Public Meeting

Implementation Plan and Adoption

What is in the Proposed GWMP?

- Groundwater Storage Facilities
- Basin Operating Plan
- Groundwater Monitoring Plan
- Formation of Basin Advisory Committee

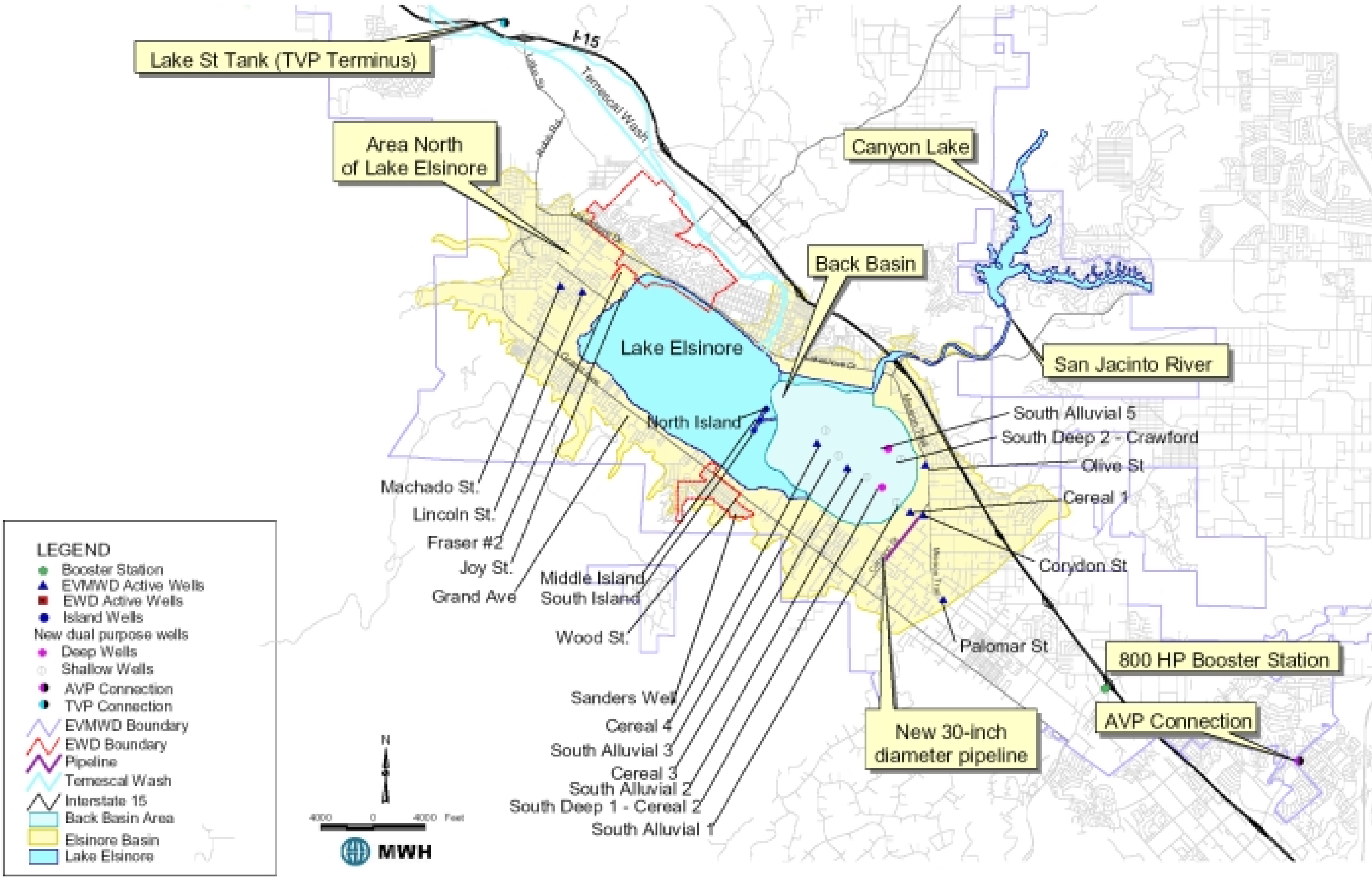
What Facilities Are Proposed?

Summary of Proposed Plan

- 14 dual-purpose wells

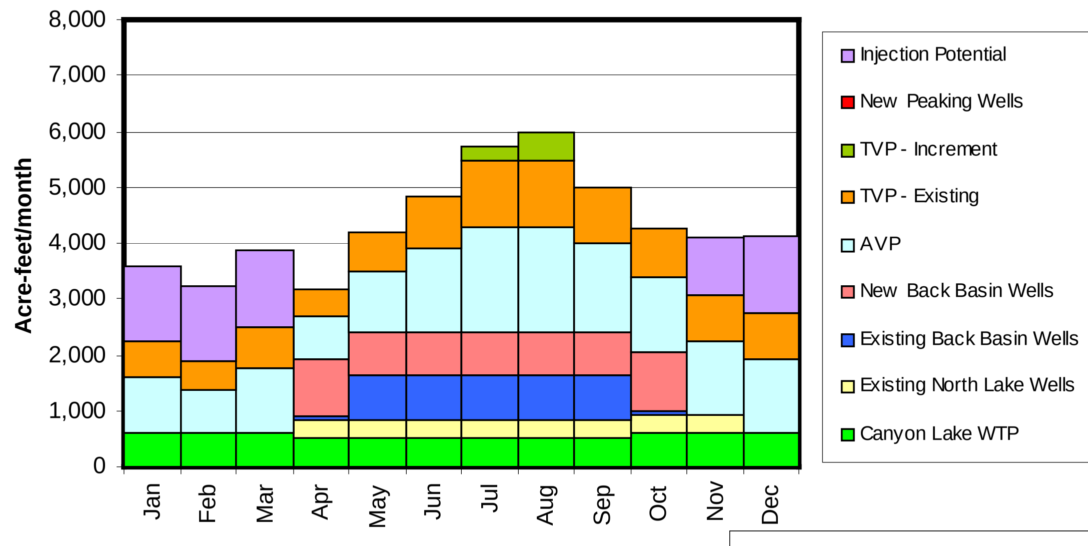
  (7 new, 6 converted, and one existing)
- 4 new peaking wells
- 1-800 HP Pump Station
- 4,000 ft of 30-inch diameter pipeline
- Lake make-up with recycled water (17.7 mgd)

Summary of Proposed Plan

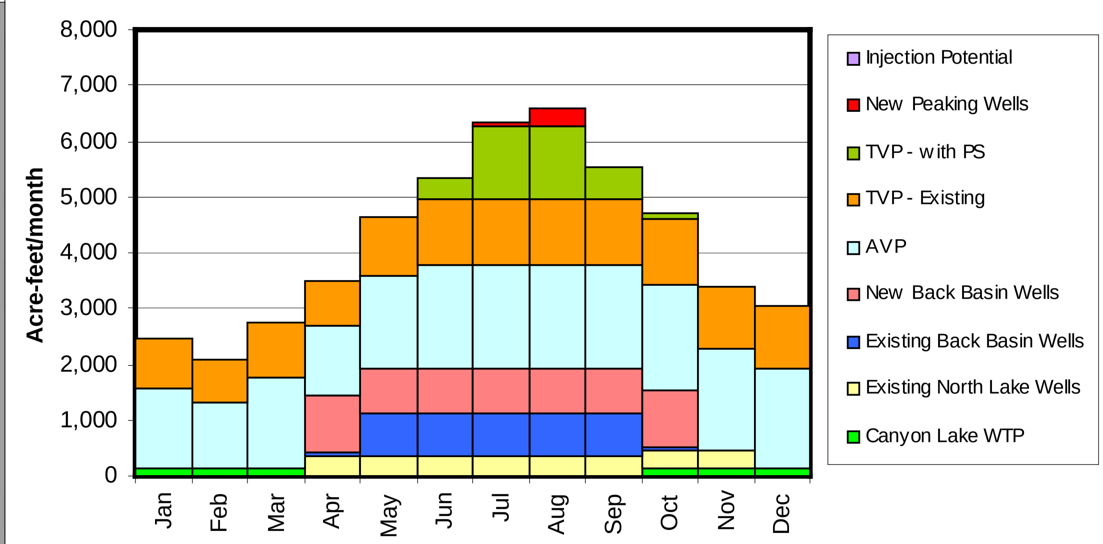


Operation of the Elsinore Basin

Wet Year



Dry Year



Monitoring Plan
Summary of Recommendations

- Well Canvas - locations and usage
- Construction of 5 new Monitoring Wells
- GW level and production - monthly
- GW quality - annually
- Spinner logging + WQ zone testing
- Aquifer testing
- Surface flows - monthly
- Subsidence

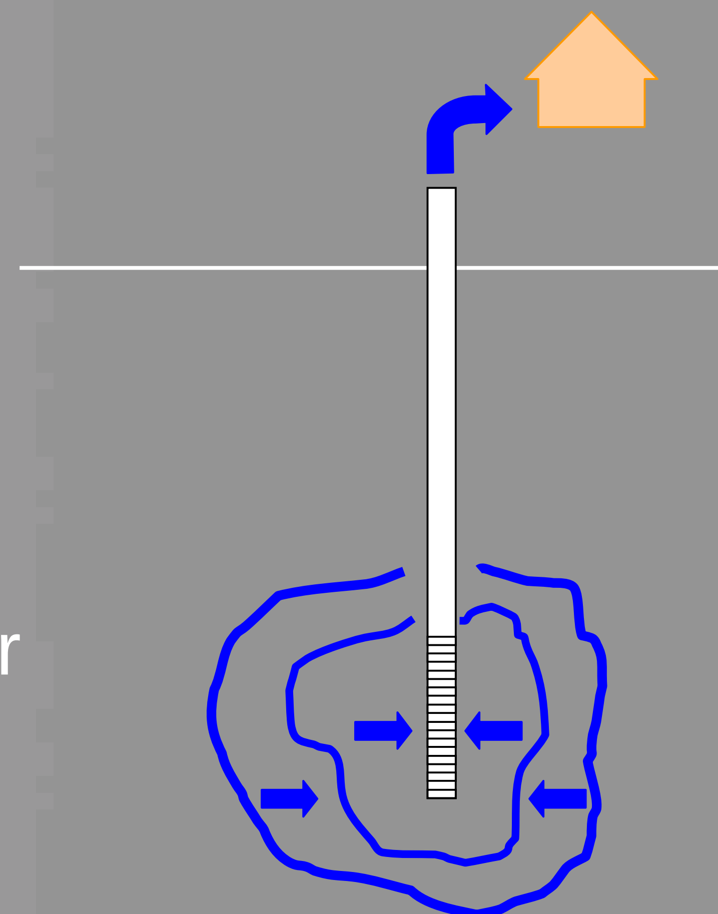
Implementation Plan Advisory Committee

Tasks

- Implementation of Monitoring Plan
- Development and Implementation of:
  - Well Construction, Destruction, & Abandonment Policies
  - Septic Tank Conversion Policies
  - Agency Coordination

How does the GWMP Affect my Well?

- No proposed changes to the operation of privately owned wells.
- Possible assistance with collection and tabulation of production data.
- No proposed taxes or fees for privately owned wells.
- More reliable source of water from the Elsinore Basin.

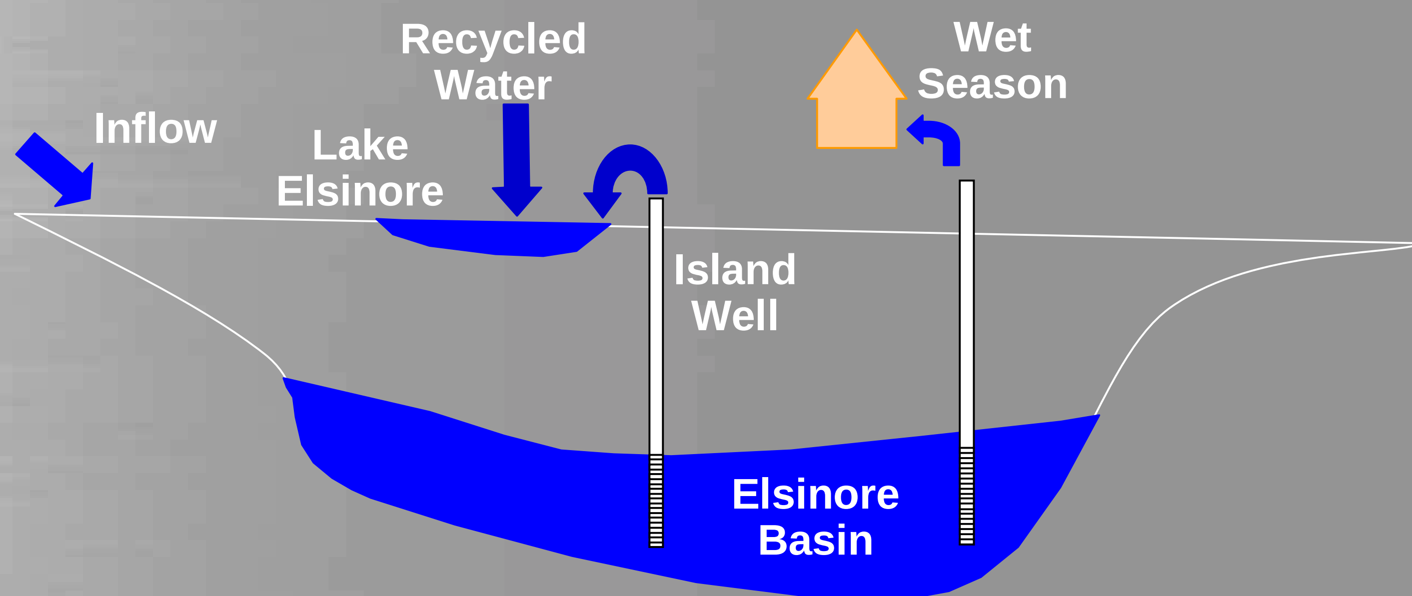


Adoption Procedures

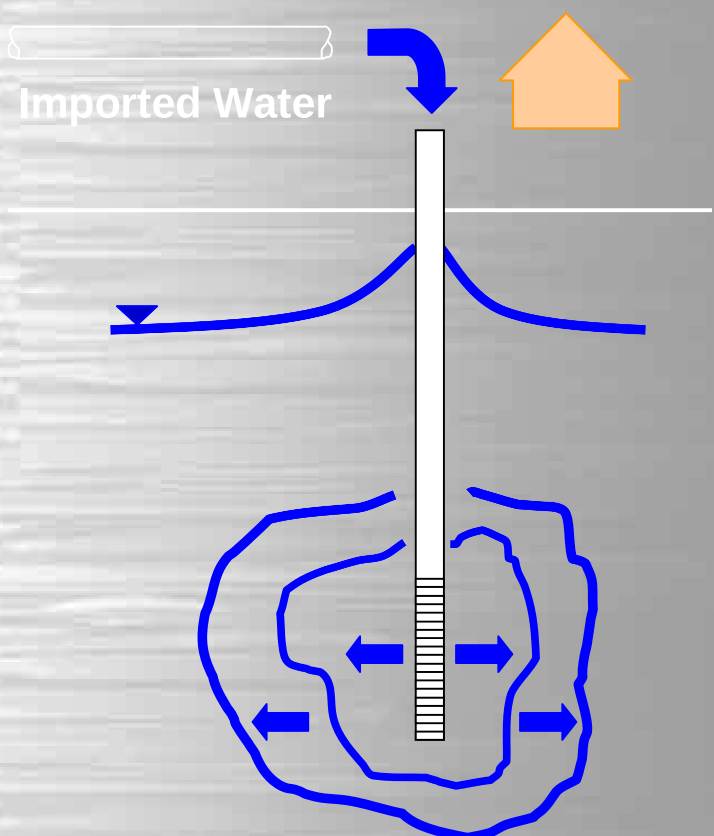
- Adopt the Resolution of Intention (ROI)
- Obtain Public Input on Plan (until August 25, 2004)
- Prepare Environmental Documents
- Finalize the Groundwater Management Plan
- Public Review of Environmental Documents
- Public Hearing to Certify Environmental Documents, Receive Protests and Adopt the Final Groundwater Management Plan

Environmental Documents

- Initial Environmental Study (IES)
- Mitigation Negative Declaration (MND)
- Mitigation Monitoring and Reporting Plan (MMRP)
- Notice of Determination (NOD)
- Findings



Adoption Schedule



- Draft Final GWMP Completed in June 2003
- ROI adopted by the Board on June 10, 2004
- Complete the Environmental Documents in November 2004
- Adopt the Environmental Documents and the GWMP in December 2004

EVMWD Public Meeting

Presentation To:

Public Meeting

August 10, 2004

Elsinore Basin Groundwater Management Plan

THE PRESS-ENTERPRISE

Corona-Norco Independent, Elsinore Sun-Tribune,
Rancho News, Sun City News, Menifee Valley News

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01-18-05

I Certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: Jan. 18, 2005
At: Riverside, California

ELSINORE VALLEY MWD

PO BOX 3000
MARGIE ARMSTRONG
LAKE ELSINORE CA 92531

Ad #: 6483214

PO #:

Agency #: ____________

Ad Copy:

NOTICE OF AVAILABILITY/NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION ELSINORE VALLEY MUNICIPAL WATER DISTRICT

GROUNDWATER MANAGEMENT PLAN FOR THE ELSINORE BASIN

Notice is hereby given that the Elsinore Valley Municipal Water District (EVMWD) has completed an Initial Study of the project described as the Elsinore Basin Groundwater Management Plan (GWMP), Lake Elsinore, western Riverside County, California. The Elsinore Basin underlies Lake Elsinore and the Back Basin and surrounding recharge areas.

The GWMP evaluated the groundwater basin to ensure a reliable groundwater supply for existing and future conditions through year 2020. The GWMP concluded with a plan for implementation of proposed plan elements:

1. Water Conservation
2. Policies for Well Construction, Destruction and Abandonment
3. Septic Tank Policies and Plan
4. Formation of an Advisory Committee
5. Groundwater Recharge with Dual Purpose Wells (Injection - Extraction)
6. Lake Elsinore Level Maintenance
7. Surface Spreading in Railroad Canyon
8. Groundwater Monitoring Program
9. Use of Recycled Water to Offset Potable Water Irrigation Demand

This Initial Study addresses the overall impacts on the Elsinore Basin of implementing the GWMP and those proposed project elements for early construction. The proposed project elements to be constructed that are evaluated in the Initial Study consist of 4,000 feet of 30-inch pipeline constructed in Corydon Street between Cereal Street and Palomar Street, and an in-line booster pumping station in Wildomar near Clinton Keith Road and Stable Lanes Road, south of the Interstate 15 Freeway.

The Initial Study was completed in accordance with the District's Guidelines implementing the California Environmental Quality Act. This Initial Study was undertaken for the purpose of deciding whether the project may have a significant effect on the environment. On the basis of such Initial Study, the District's Staff has concluded that the project will not have a significant effect on the environment with implementation of identified mitigation measures, and has therefore prepared a Draft Mitigated Negative Declaration. The Initial Study reflects the independent judgment of the District. The proposed project sites are not on lists compiled pursuant to Government Code section 65962.5. The project is not considered a project of statewide, regional or areawide significance. The proposed project will not affect highways or other facilities under the jurisdiction of the State Department of Transportation. A scoping meeting will not be held by the lead agency.

Copies of the Initial Study and draft Mitigated Negative Declaration are on file at the District's offices: 31315 Chaney Street, Lake Elsinore, CA 992351, and are available for public review during normal working hours.

The comment period is from January 18 to February 18, 2005. Any person wishing to comment on this matter must submit such comments in writing to Mr. Joe Mouawad at the District prior to the end date. Mr. Mouawad may also be contacted for further information at (951) 674-3146. Comments of all Responsible Agencies are also requested.

The EVMWD Board of Directors will consider the Project and the Mitigated Negative Declaration. If the Board of Directors finds that the project will not have a significant effect on the environment, it may adopt the Mitigated Negative Declaration and associated Mitigation Monitoring and Reporting Plan. This means that the Board of Directors may proceed to consider the project without the preparation of an Environmental Impact Report.

Date Received for Filing:
Staff
Title: Senior Engineer

1/18

RECEIVED
JAN 2 6 2005
FINANCE DEPT.

$219.70

THE PRESS-ENTERPRISE

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PROOF OF PUBLICATION OF

LE-Open

Ad Desc.: Groundwater Mgmt Plan

I am a citizen of the United States. I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am an authorized representative of THE PRESS-ENTERPRISE, a newspaper of general circulation, printed and published daily in the city of Riverside, County of Riverside, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Riverside, State of California, under date of April 25, 1952, Case Number 54446, under date of March 29, 1957, Case Number 65673 and under date of August 25, 1995, Case Number 267864; that the notice, of which the annexed is a printed copy, has been published in said newspaper in accordance with the instructions of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

02-25-05
03-04-05

I Certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: Mar. 4, 2005
At: Riverside, California

[signature]

ELSINORE VALLEY MWD

PO BOX 3000
MARGIE ARMSTRONG
LAKE ELSINORE CA 92531

Ad #: 6584102

PO #:

Agency #: ______________

Ad Copy:

NOTICE OF PUBLIC HEARING ELSINORE VALLEY MUNICIPAL WATER DISTRICT ADOPTION OF A GROUNDWATER MANAGEMENT PLAN FOR THE ELSINORE GROUNDWATER BASIN

The Elsinore Valley Municipal Water District (EVMWD) intends to conduct a public hearing at its Board of Directors meeting on March 10, 2005 to a groundwater management plan for the Elsinore Groundwater Basin. The Elsinore Groundwater Basin generally consists of the valley fill surrounding Lake Elsinore and is bounded on north and west by the Santa Ana Mountains, on the east by Glen Ivy and Freeway faults, and on the south by a groundwater divide with the Murrieta Basin.

The Elsinore Groundwater Basin is an important component of the water supply of the EVMWD, the Elsinore Water District, and numerous private pumpers. The groundwater management plan describes the goals, objectives and recommended management actions needed to effectively manage the basin and ensure the reliability of this critical water supply. EVMWD plans to adopt a groundwater management plan in accordance with Section 10750 et seq. of the California Water Code. EVMWD invites the public to attend and provide comment on whether to adopt a groundwater management plan. Any protests by landowners within the area covered by this plan must be provided to EVMWD in writing prior to the completion of this hearing and must include the landowner's signature and a description of the land owned sufficient to identify the land. For additional information, please contact:
Joe Mouawad,
Senior Engineer
Elsinore Valley Municipal Water District
31315 Chaney Street
Lake Elsinore,
California 92531-3000
(951) 674-3146 2/25,3/4

RECEIVED
MAR 14 2005
ADMIN. DEPT.
EVMWD

RESOLUTION NO. 05-03-06

ELSINORE VALLEY MUNICIPAL WATER DISTRICT
ADOPTION OF GROUNDWATER MANAGEMENT PLAN

WHEREAS, the Elsinore Valley Municipal Water District Board of Directors adopted a resolution of intent to prepare a groundwater management plan on June 10, 2004; and

WHEREAS, the District has prepared a draft groundwater management plan entitled "Elsinore Basin Groundwater Management Plan"; and

WHEREAS, the District has made copies of the plan available to the public and notice of the public hearing on whether to adopt the draft Groundwater Management Plan was given in the manner prescribed by law; and

WHEREAS, all persons desiring to be heard at the public hearing were given the opportunity to present their views to the Board of Directors and any written communications received by the District concerning adoption of the plan were publicly presented at the public hearing of March 10, 2005; and

WHEREAS, the District has considered all protests to the adoption of the plan and has determined that a majority protest under Section 10753.6 of the California Water Code does not exist.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of Elsinore Valley Municipal Water District finds that it is in the best interest of the District and the groundwater producers to adopt the Elsinore Basin Groundwater Management Plan pursuant to Part 2.75 (commencing with Section 10750) of Division 6 of the California Water Code and that the General Manager is authorized to take all actions reasonably necessary to carry out the intent of Elsinore Basin Groundwater Management Plan.

APPROVED, ADOPTED AND SIGNED this 24th day of March, 2005.

Kristine M. Anderson

Kristine M. Anderson, President of the
Board of Directors of
Elsinore Valley Municipal Water District

ATTEST:

Terese Quintanar

Terese Quintanar, Board Secretary of the
Board of Directors of
Elsinore Valley Municipal Water District

STATE OF CALIFORNIA)
) ss:
COUNTY OF RIVERSIDE)

I, Terese Quintanar, Secretary of the Board of Directors of the Elsinore Valley Municipal Water District, do hereby certify that the foregoing Resolution No. 05-03-06, was duly adopted by said Board at its Regular Meeting held on March 24, 2005, and that it was so adopted by the following roll call vote:

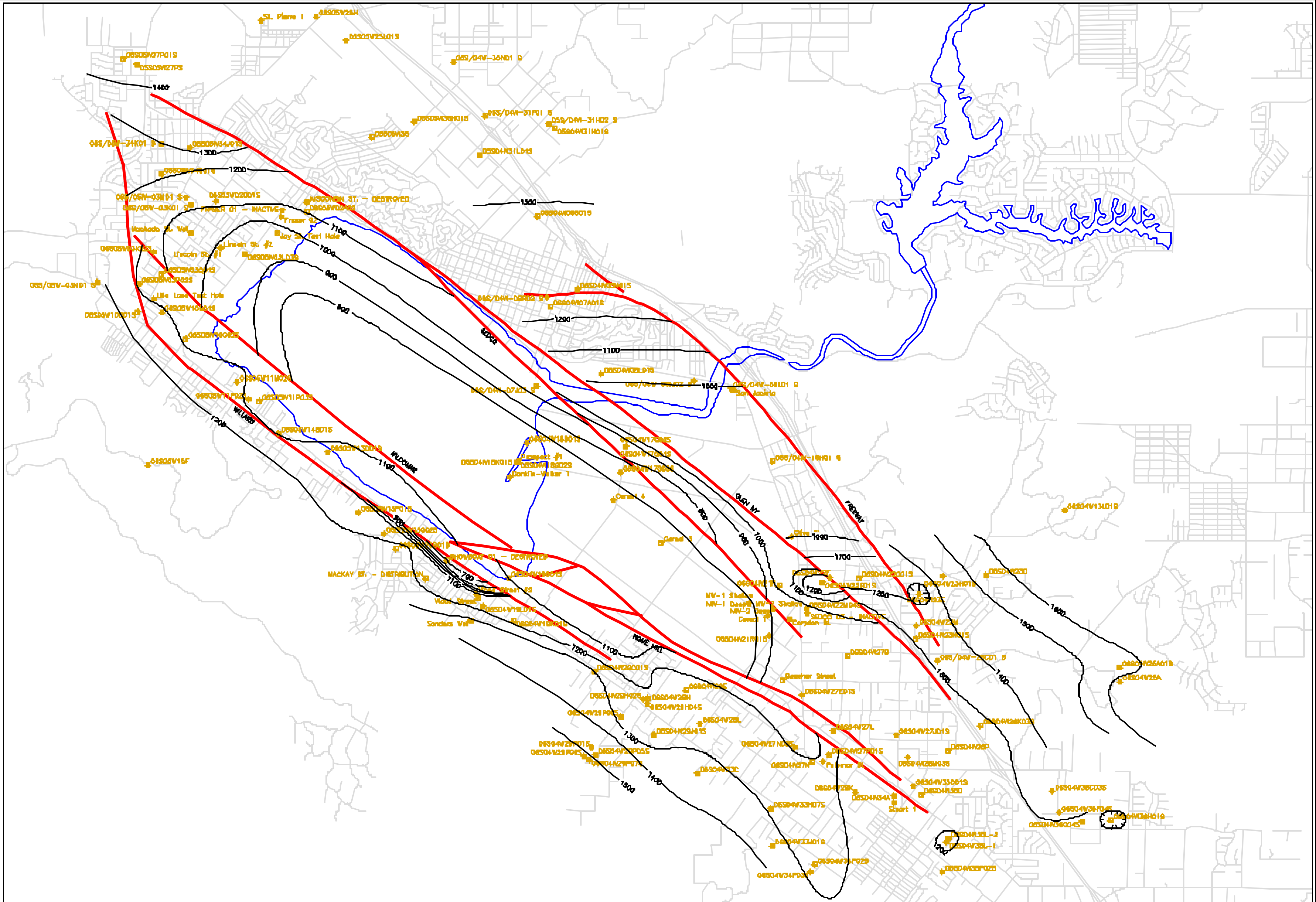
AYES: Anderson, Hyland, Ryan, Wicke, Williams

NOES: None

ABSENT: None

ABSTAIN: None

Terese Quintanar, Secretary of the
Board of Directors of the
Elsinore Valley Municipal Water District



LEGEND

- FAULT (KNOWN)
- WATER BODY BOUNDARY
- FORMATION NOT PRESENT

NOTES:

CONTOUR INTERVAL 100 FEET
CONTOURS DASHED WHERE INFERRED

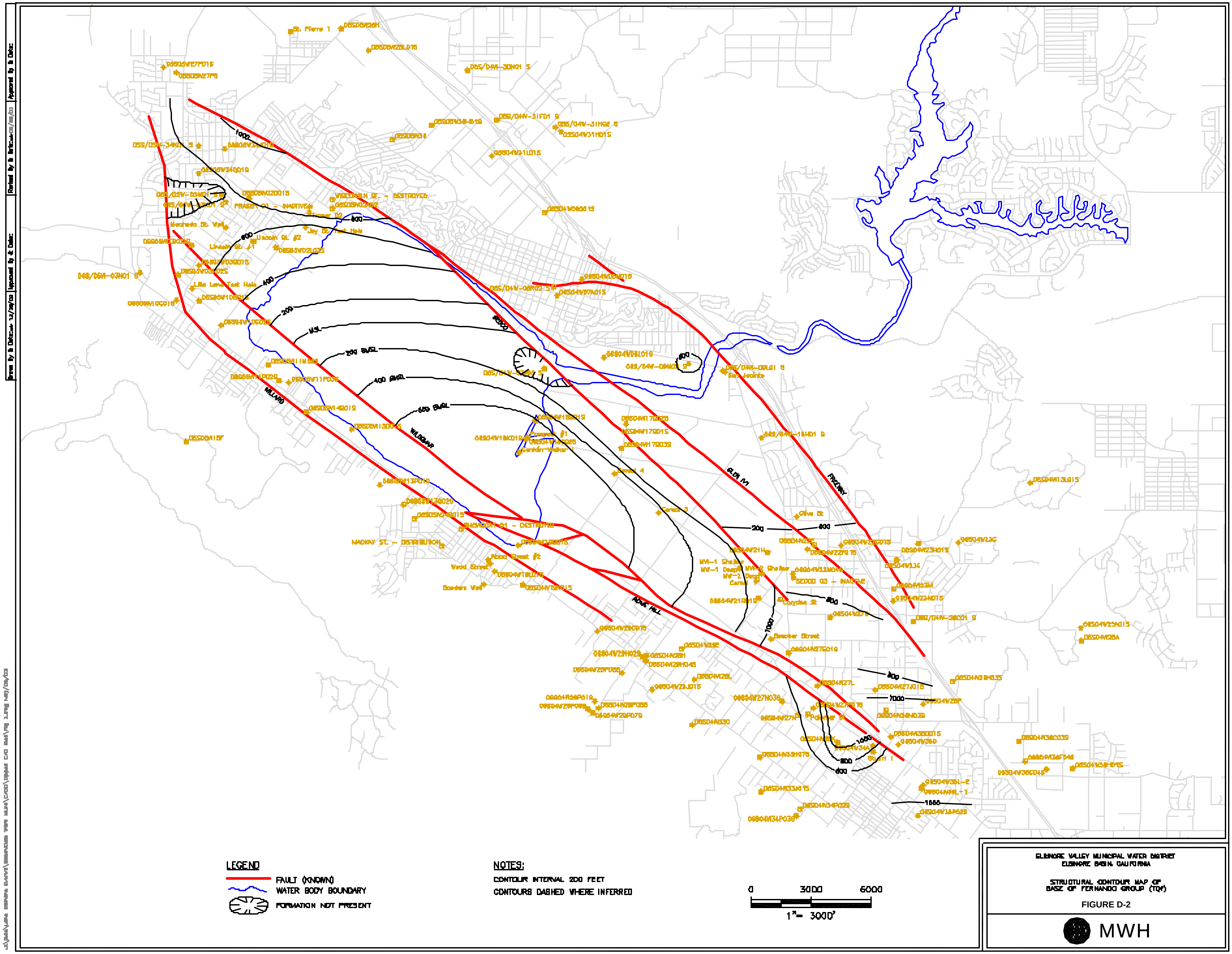
0 3000 6000
1" = 3000'

ELSINORE VALLEY MUNICIPAL WATER DISTRICT
ELSINORE BASIN, CALIFORNIA

STRUCTURAL CONTOUR MAP OF
BASE OF ALLUVIUM (Qal & Qt)

FIGURE D-1

MWH



NOTES:

CONTOUR INTERVAL 200 FEET

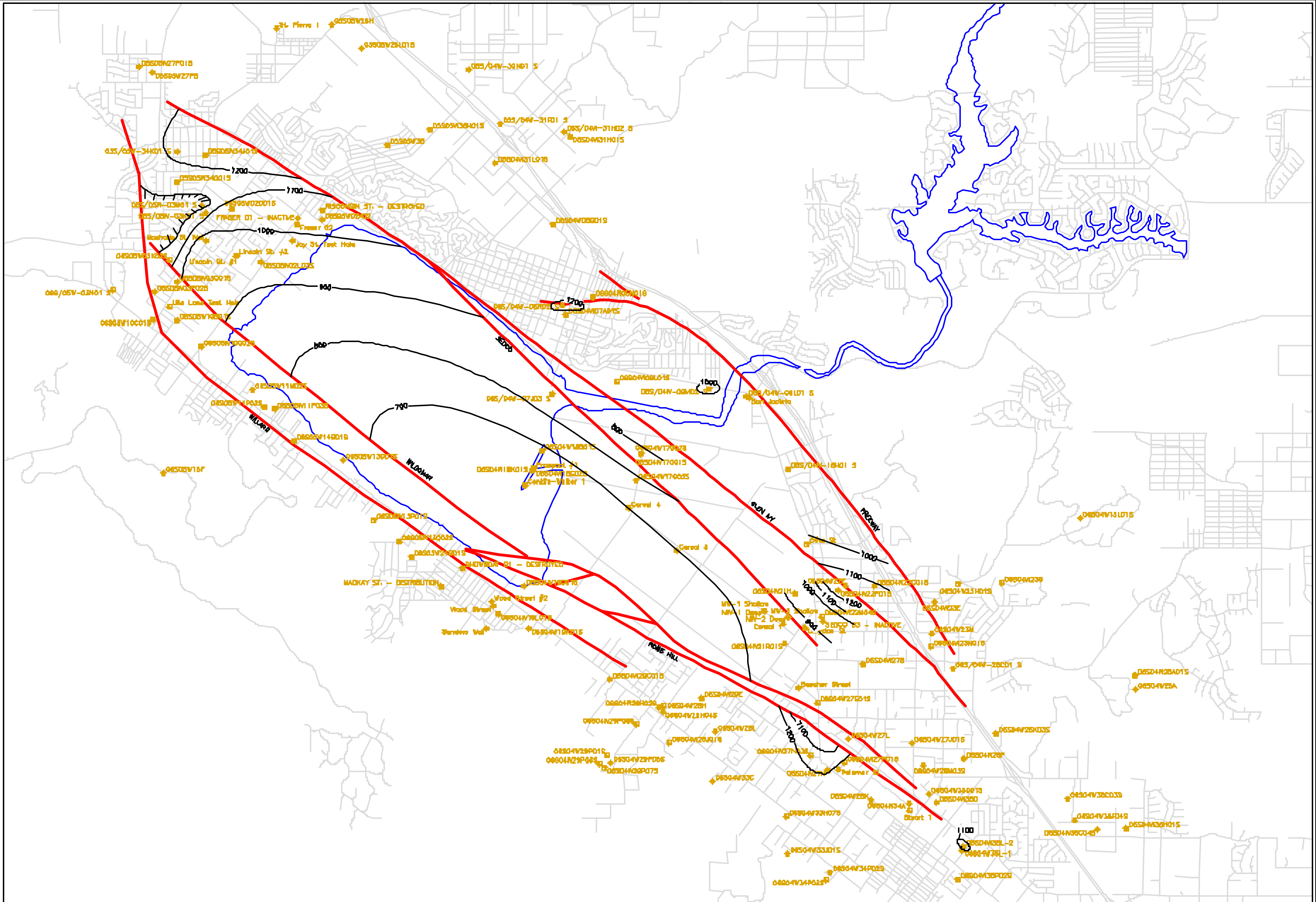
CONTOURS DASHED WHERE INFERRED

ELSINORE VALLEY MUNICIPAL WATER DISTRICT
ELSINORE BASIN, CALIFORNIA

STRUCTURAL CONTOUR MAP OF
BASE OF FERNANDO GROUP (TQf)

FIGURE D-2

MWH



LEGEND

FAULT (KNOWN)

WATER BODY BOUNDARY

FORMATION NOT PRESENT

NOTES:

CONTOUR INTERVAL 100 FEET

CONTOURS DASHED WHERE INFERRED

0 3000 6000

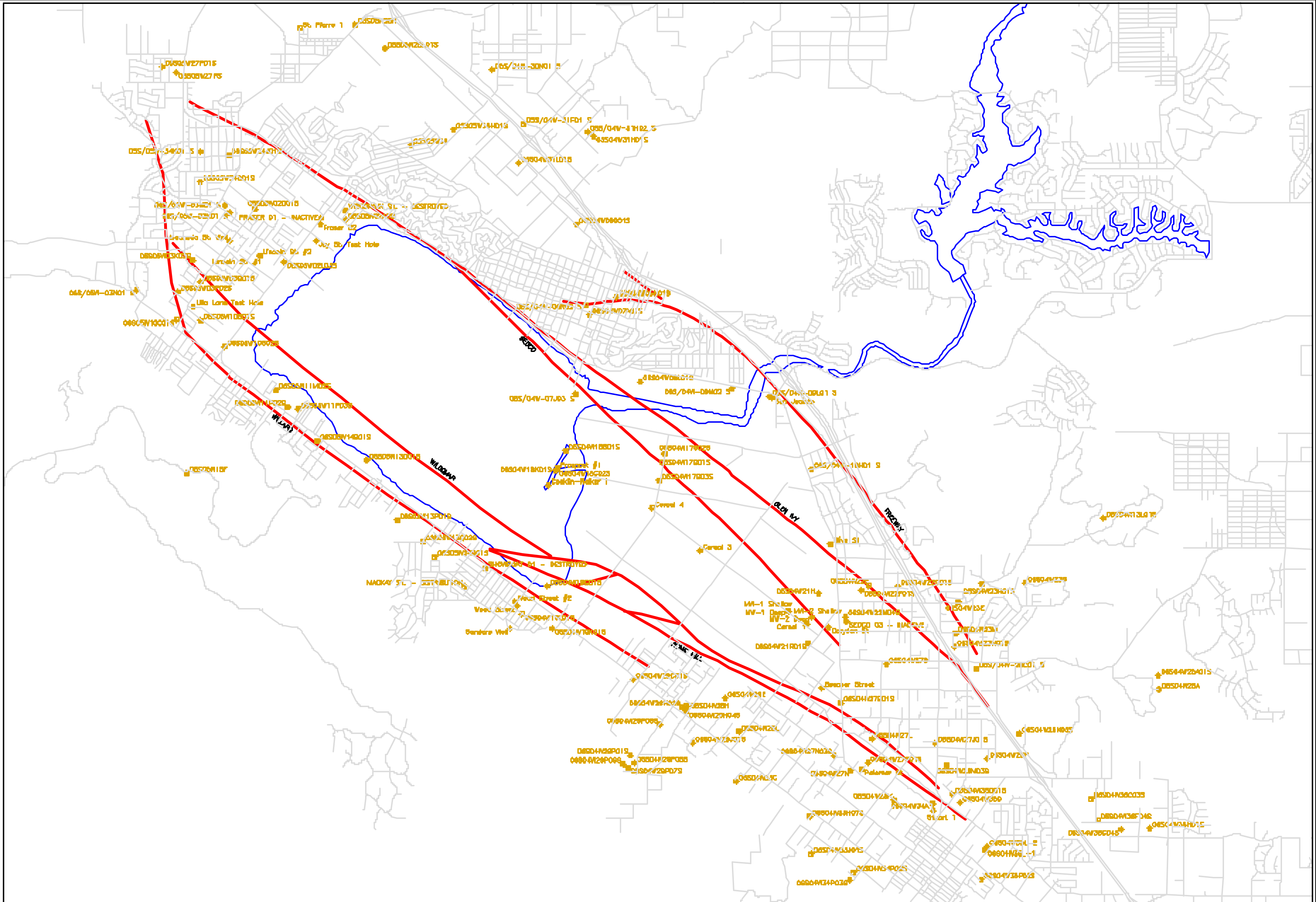
1"= 3000'

ELSINORE VALLEY MUNICIPAL WATER DISTRICT
ELSINORE BASIN, CALIFORNIA

STRUCTURAL CONTOUR MAP OF
BASE OF AQUITARD (Aq1)

FIGURE D-3

MWH



LEGEND

FAULT (KNOWN)

WATER BODY BOUNDARY

NOTES:

CONTOUR INTERVAL 200 FEET

CONTOURS DASHED WHERE INFERRED

MSL = MEAN SEA LEVEL

BMSL = BELOW MEAN SEA LEVEL

0 3000 6000

1" = 3000'

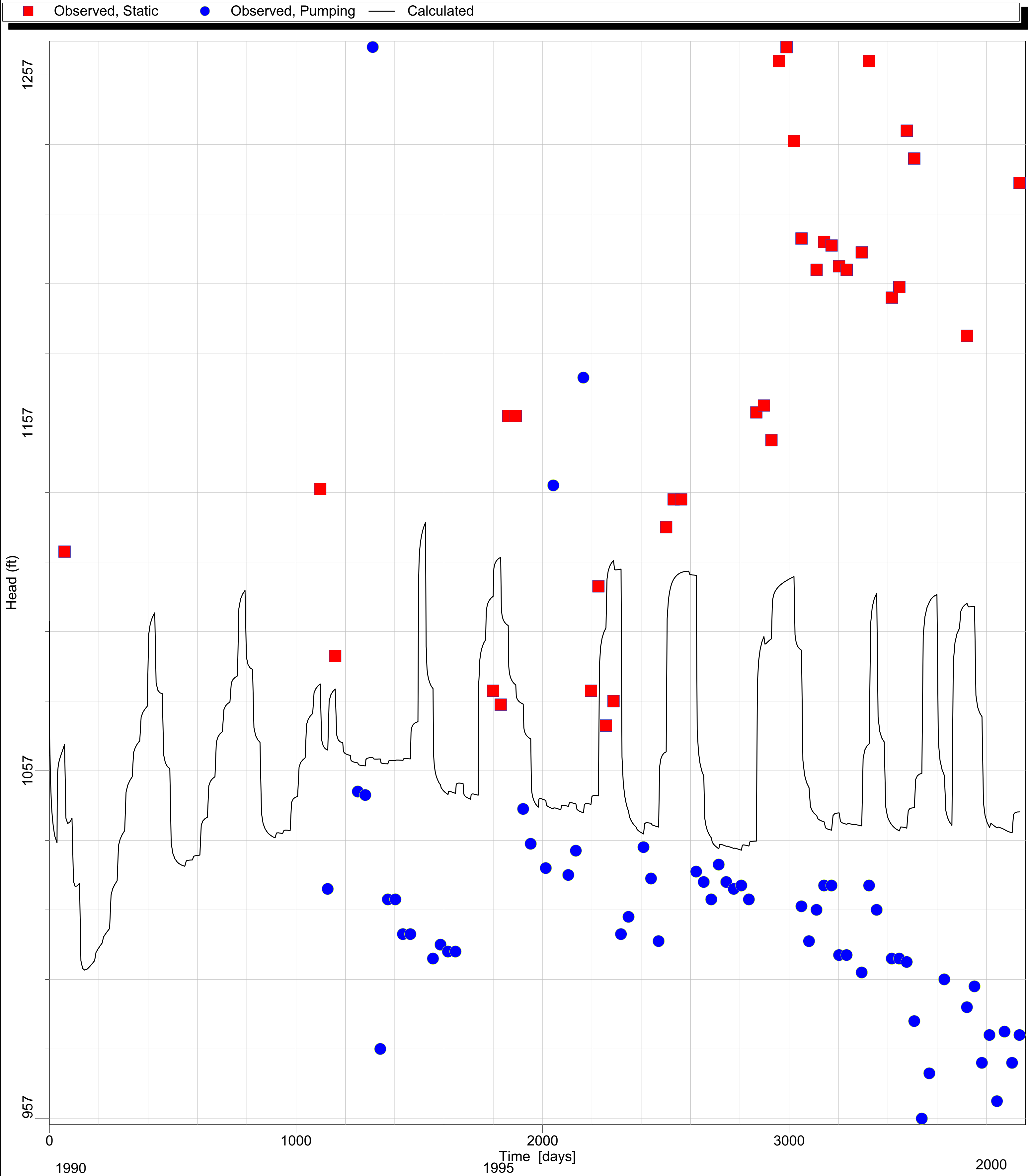
ELSINORE VALLEY MUNICIPAL WATER DISTRICT
ELSINORE BASIN, CALIFORNIA

STRUCTURAL CONTOUR MAP OF BASE
OF BEDFORD CANYON FORMATION (bcb)

FIGURE D-4

MWH

Figure E-1 - Head vs. Time (Lincoln)

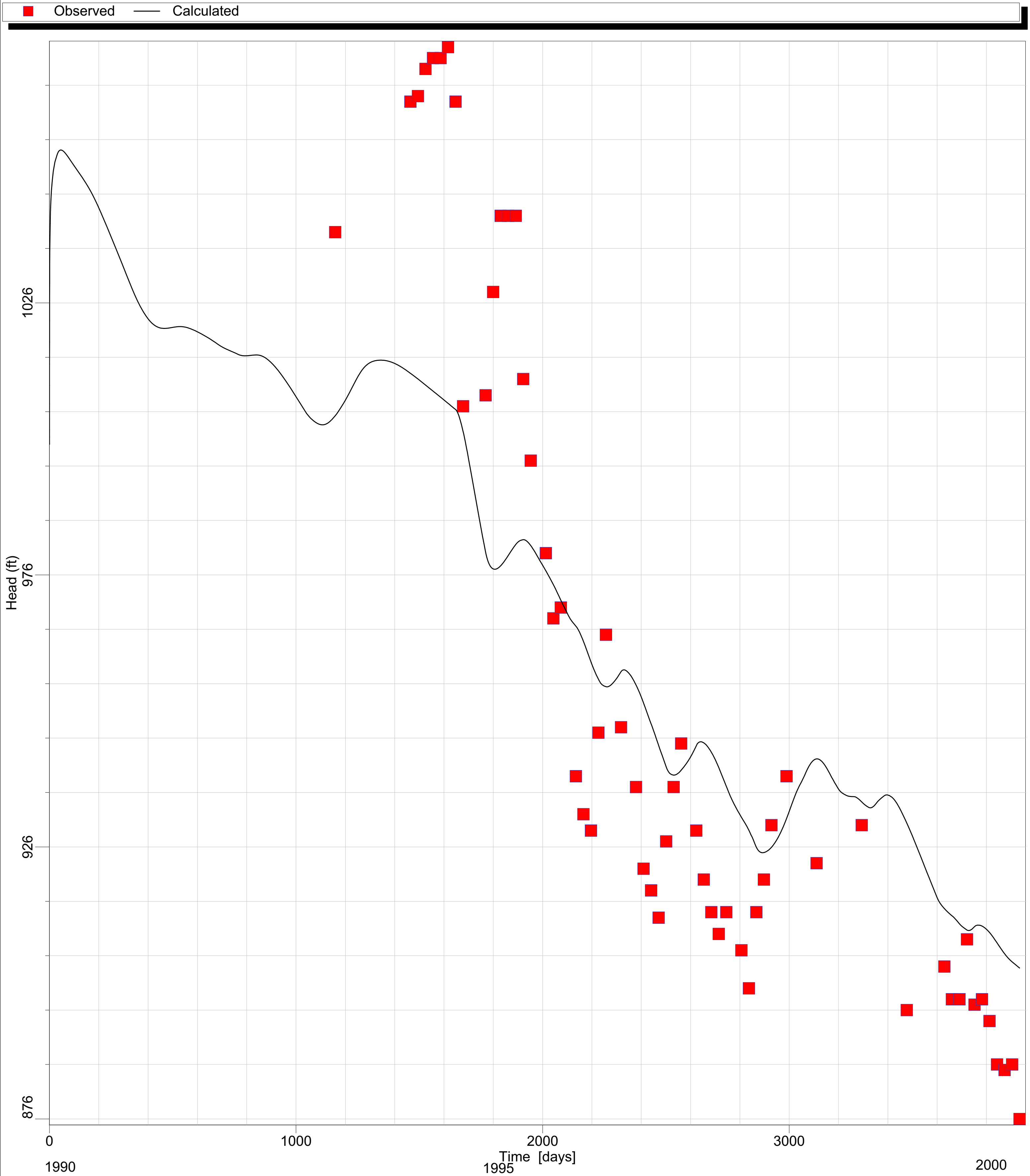


EVWMD
T(0)=January 1990

MWH

Project: Elsinore Basin
Modeller: MWH

Figure E-2 - Head vs. Time (North Island)

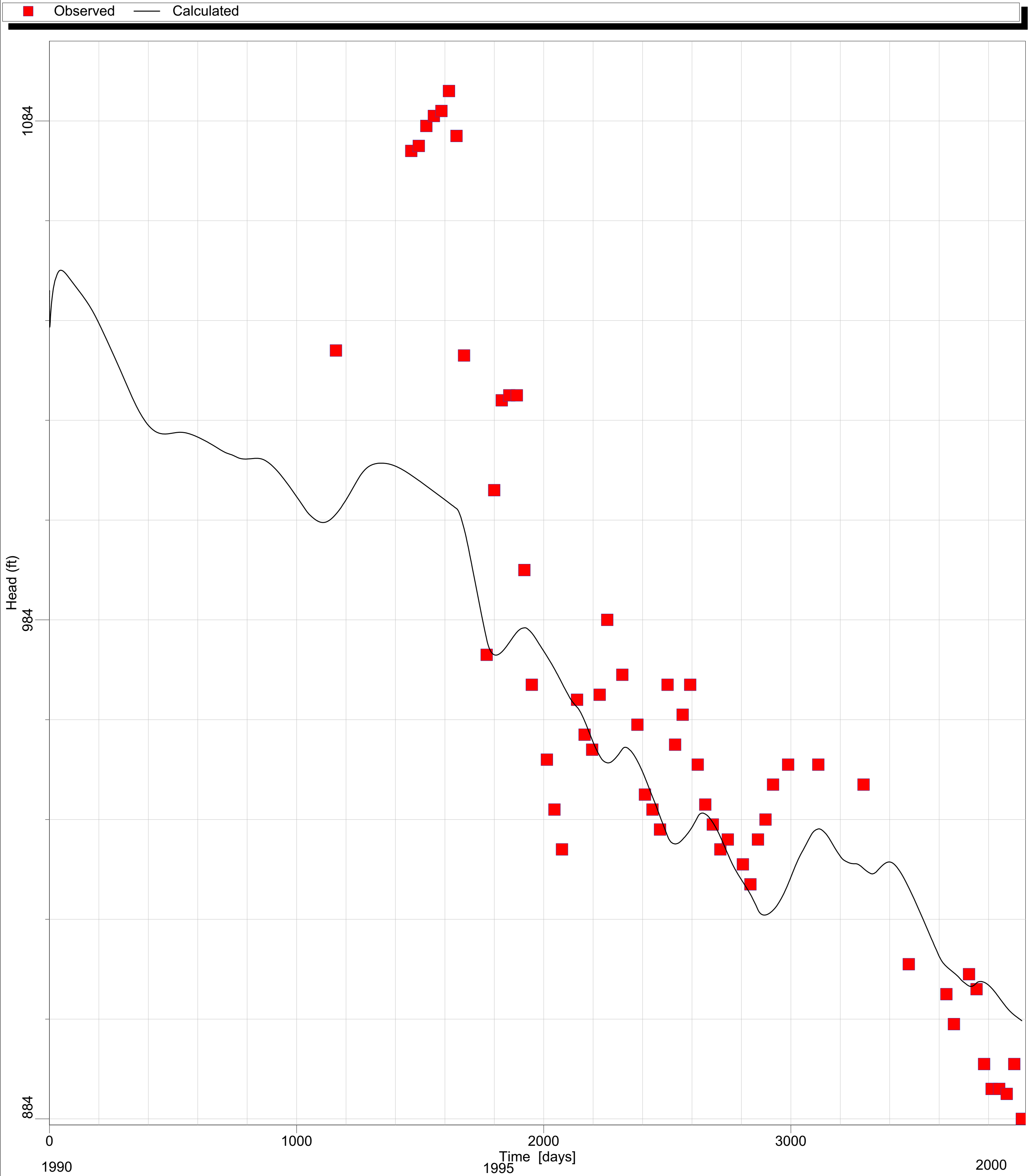


EVWMD
T(0)=January 1990

MWH

Project: Elsinore Basin
Modeller: MWH

Figure E-3 - Head vs. Time (South Island)

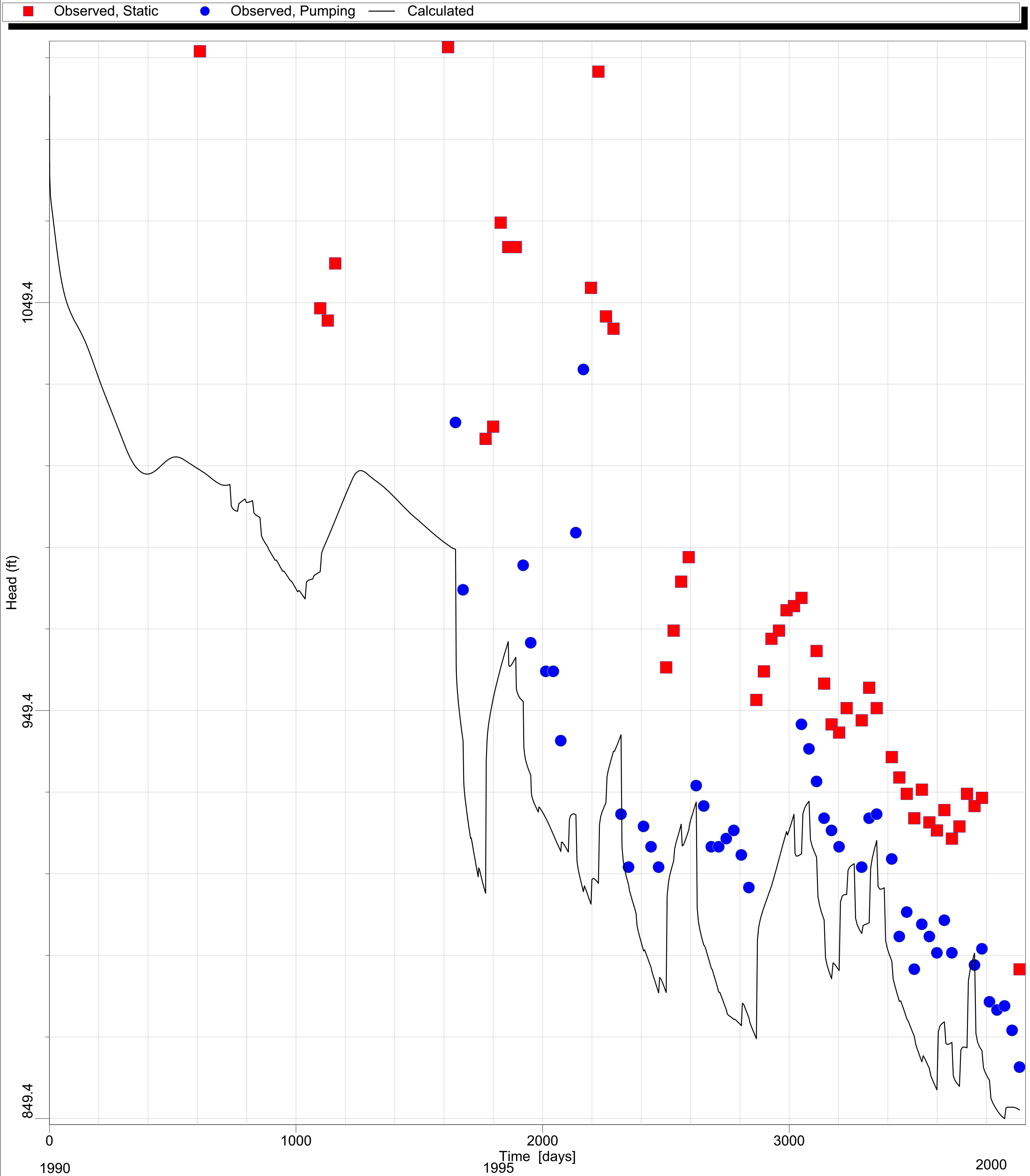


EVWMD
T(0)=January 1990

MWH

Project: Elsinore Basin
Modeller: MWH

Figure E-4 - Head vs. Time (Cereal 4)

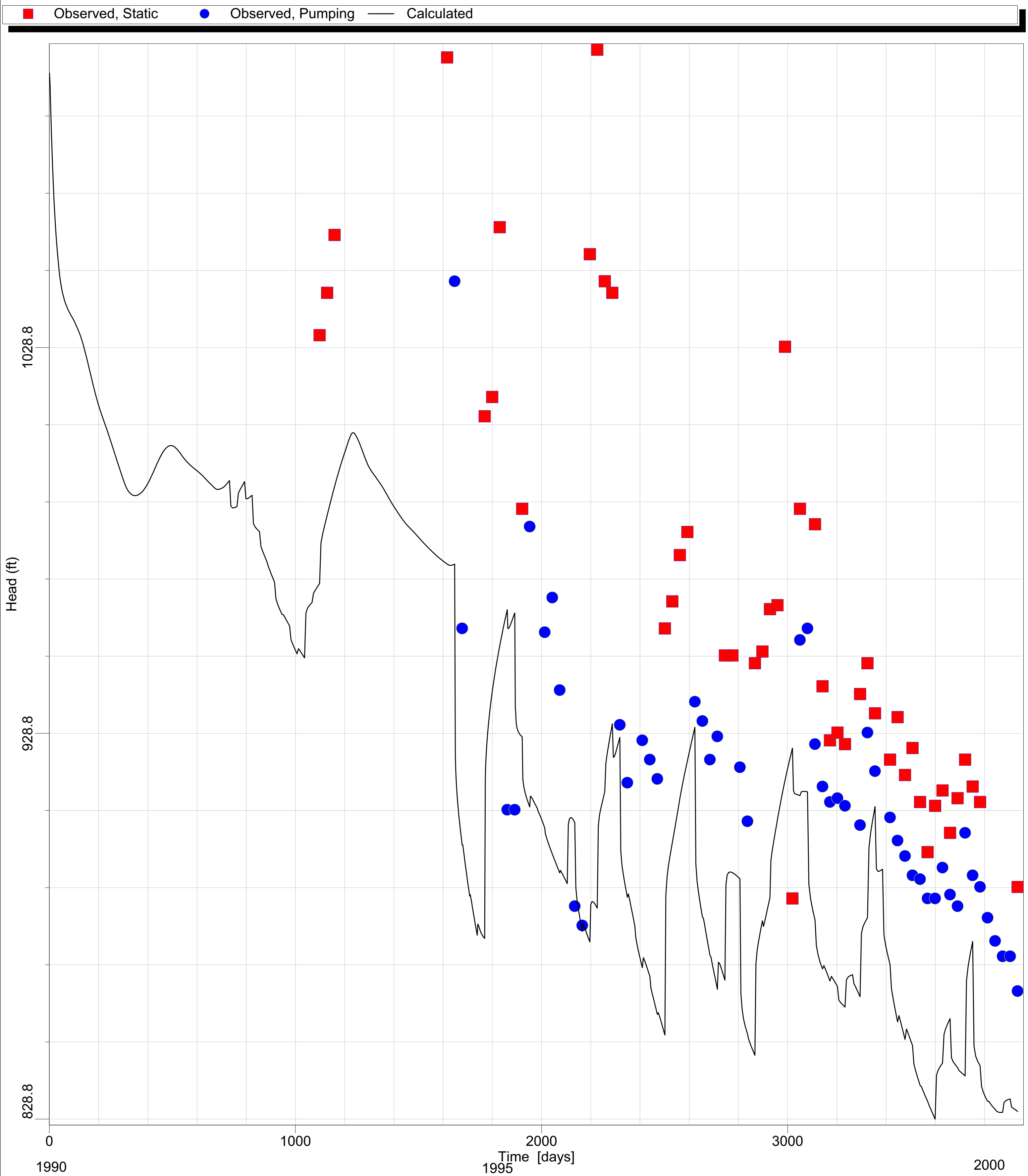


EVWMD
T(0)=January 1990

MWH

Project: Elsinore Basin
Modeller: MWH

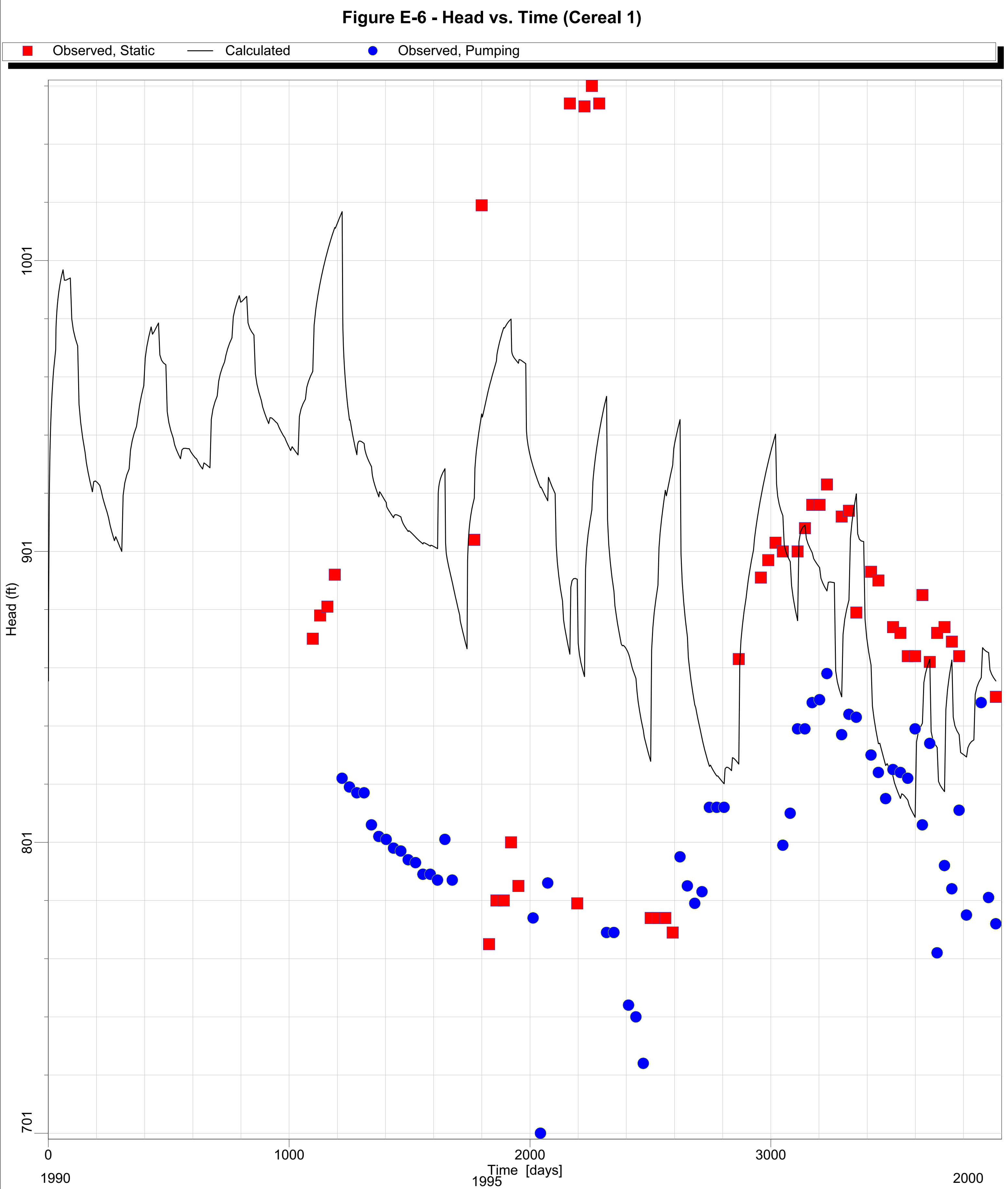
Figure E-5 - Head vs. Time (Cereal 3)



EVWMD
T(0)=January 1990

MWH

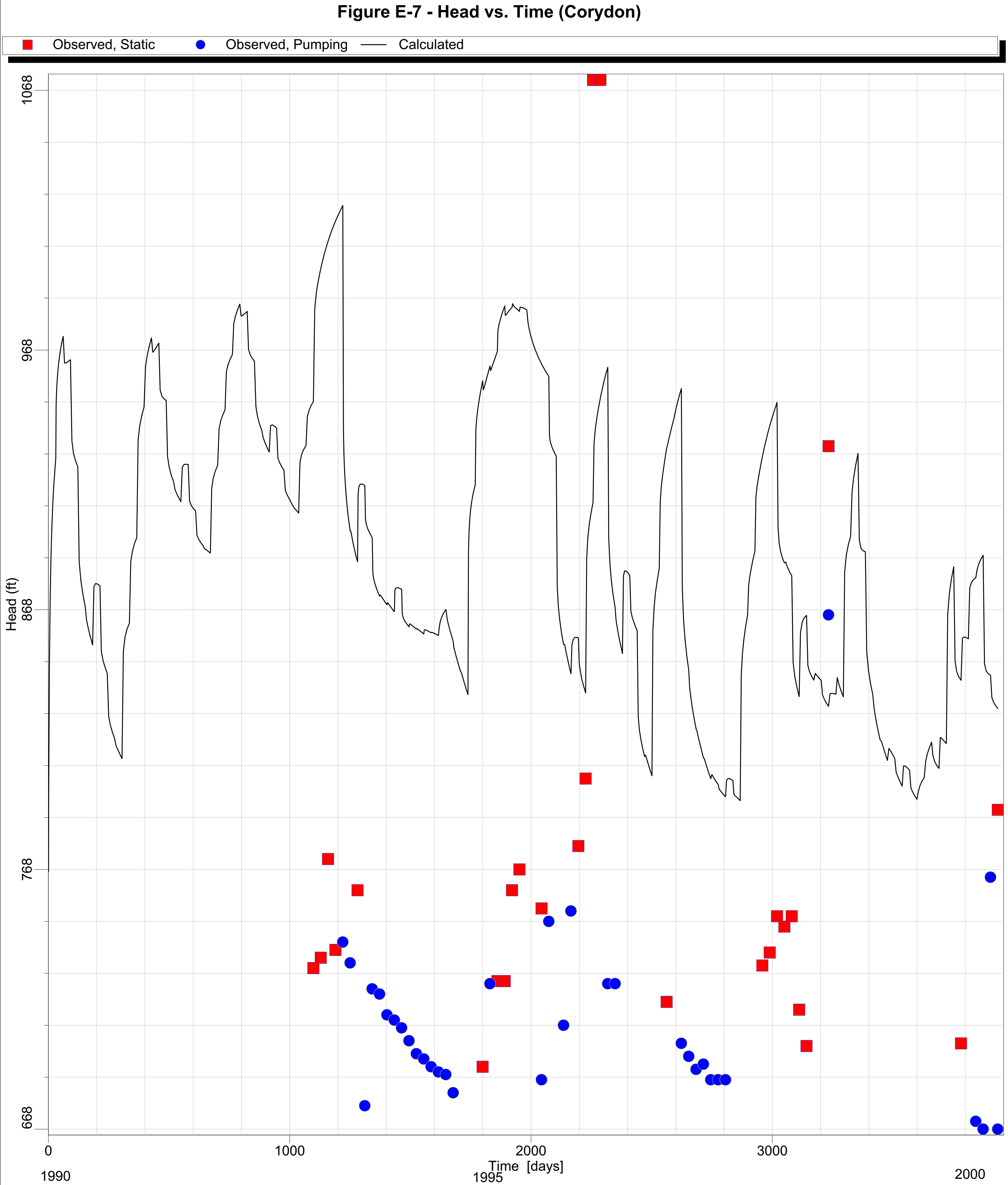
Project: Elsinore Basin
Modeller: MWH



EVWMD
T(0)=January 1990

MWH

Project: Elsinore Basin
Modeller: MWH

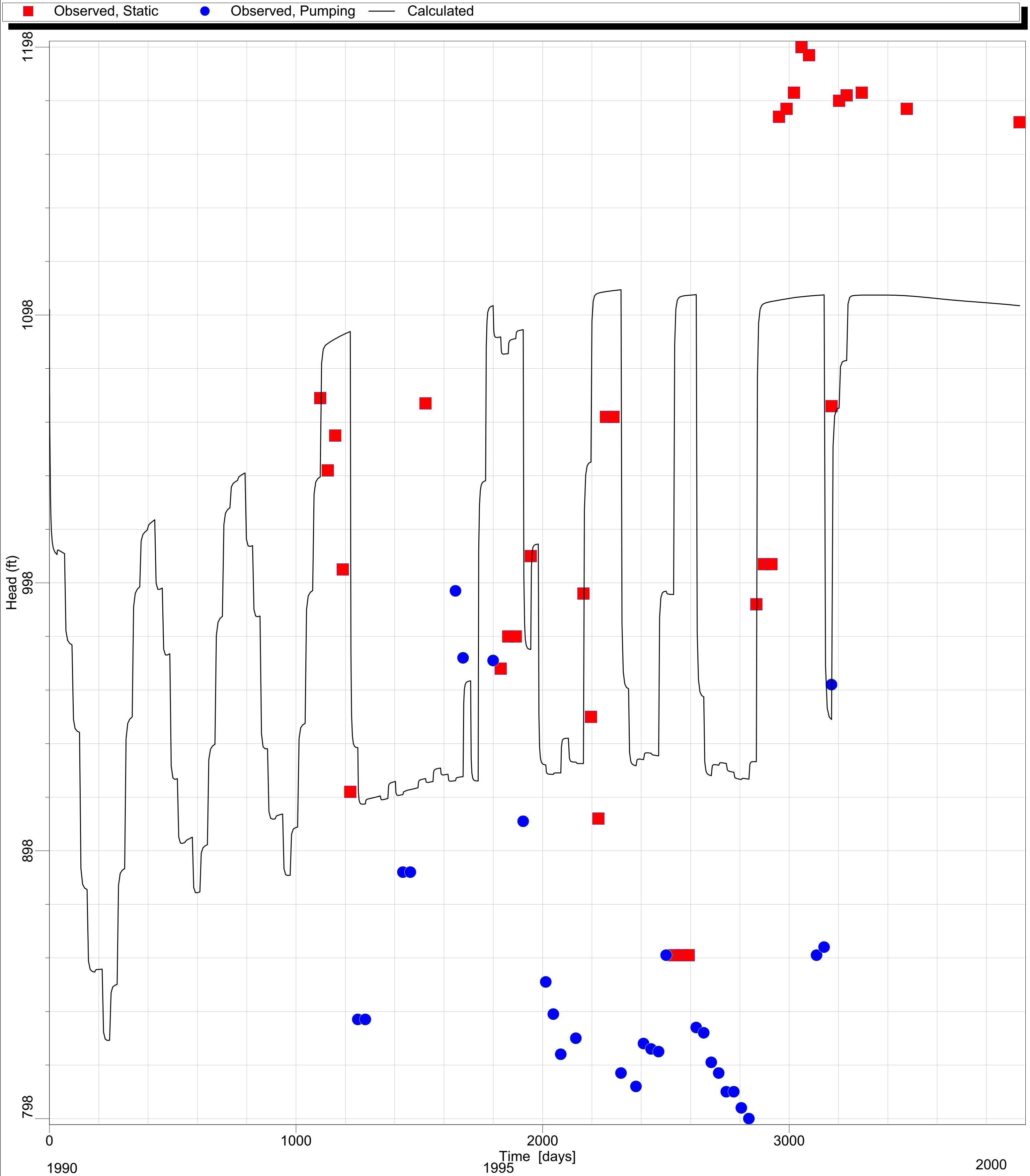


EVWMD
T(0)=January 1990

MWH

Project: Elsinore Basin
Modeller: MWH

Figure E-8 - Head vs. Time (Olive St)

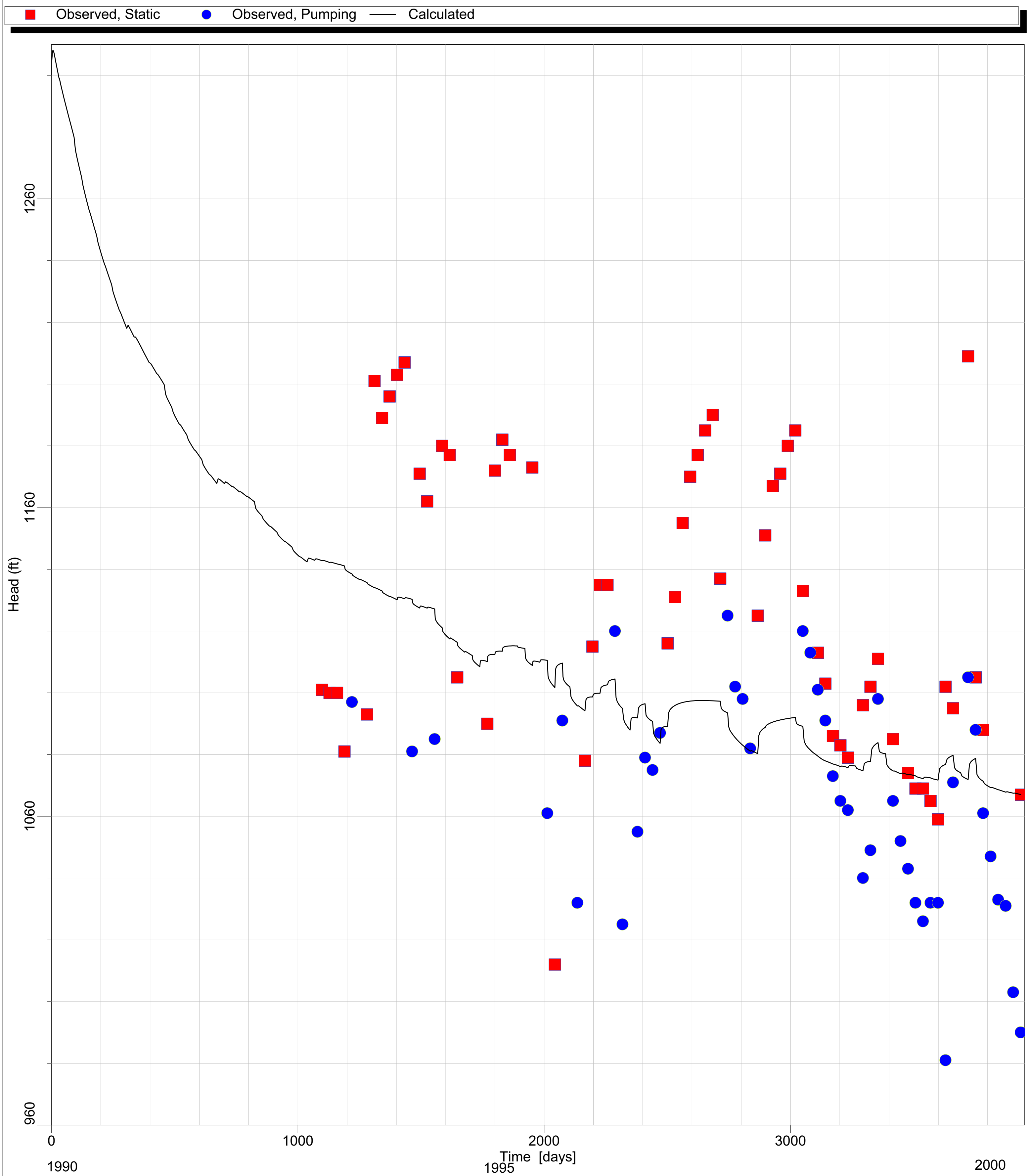


EVWMD
T(0)=January 1990

MWH

Project: Elsinore Basin
Modeller: MWH

Figure E-9 - Head vs. Time (Palomar)

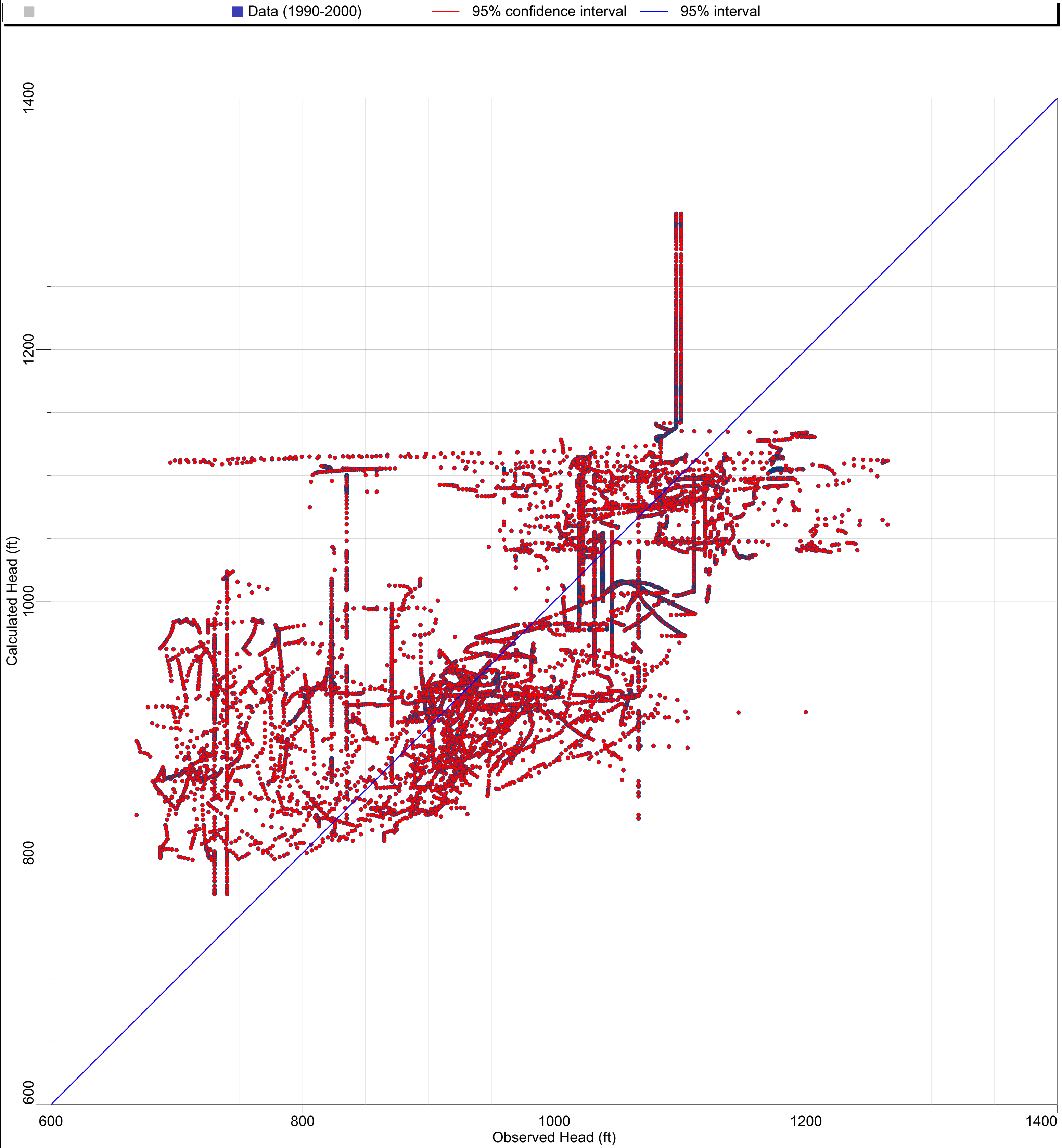


EVWMD
T(0)=January 1990

MWH

Project: Elsinore Basin
Modeller: MWH

Figure E-10 - Model Calibration (1990-2000)

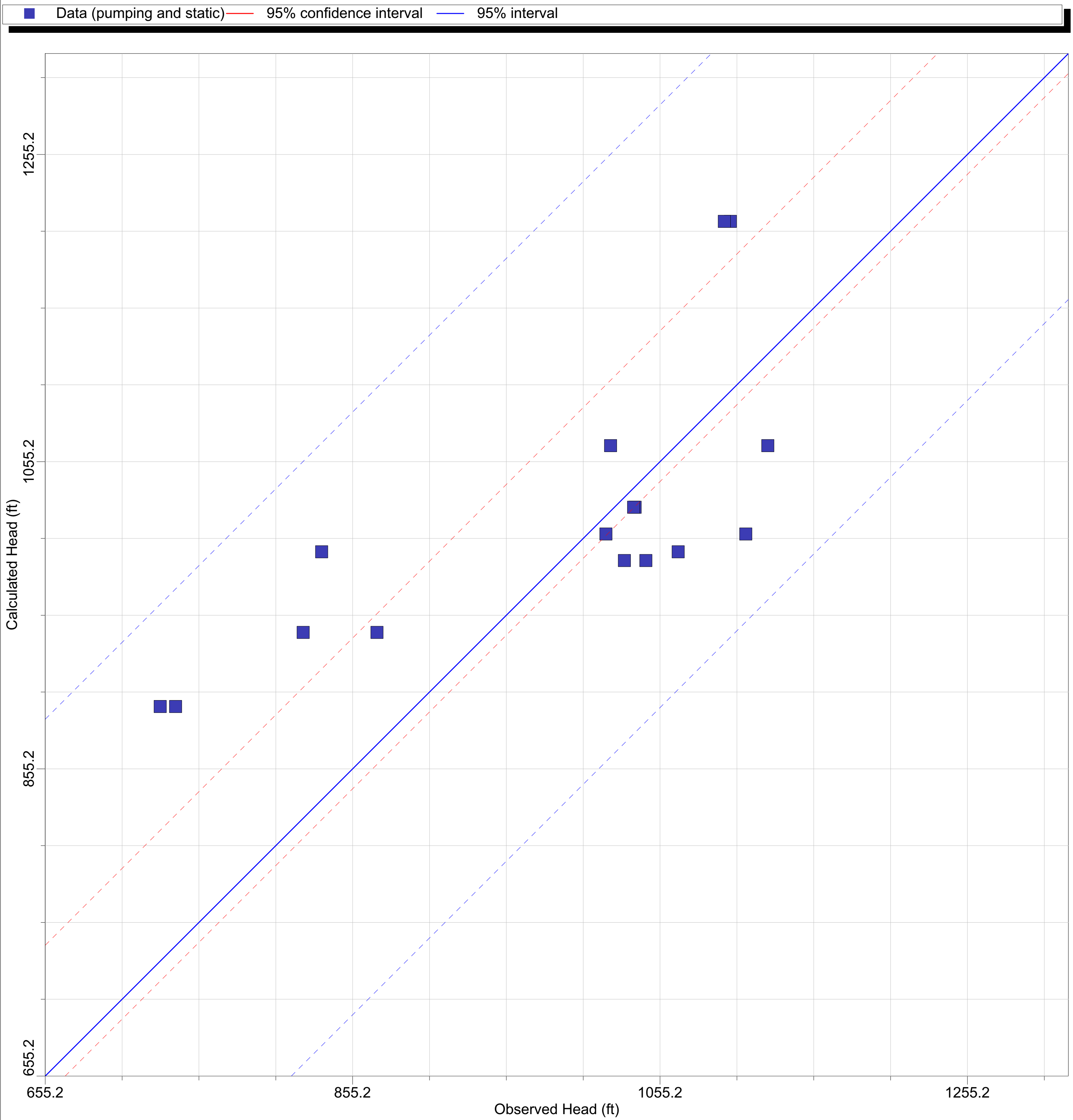


T(0)=January 1990
All static and pumping heads shown.

MWH

Project: Elsinore Basin
Modeller: cdd

Figure E-11 - Model Calibration (January 1991)



Num.Points : 16
Max. Residual: 165.7774 (ft) at Cory/Cory
Min. Residual: -11.89063 (ft) at C_4p/C_4p
Residual Mean : 36.1099 (ft)
Absolute Residual Mean : 82.01377 (ft)

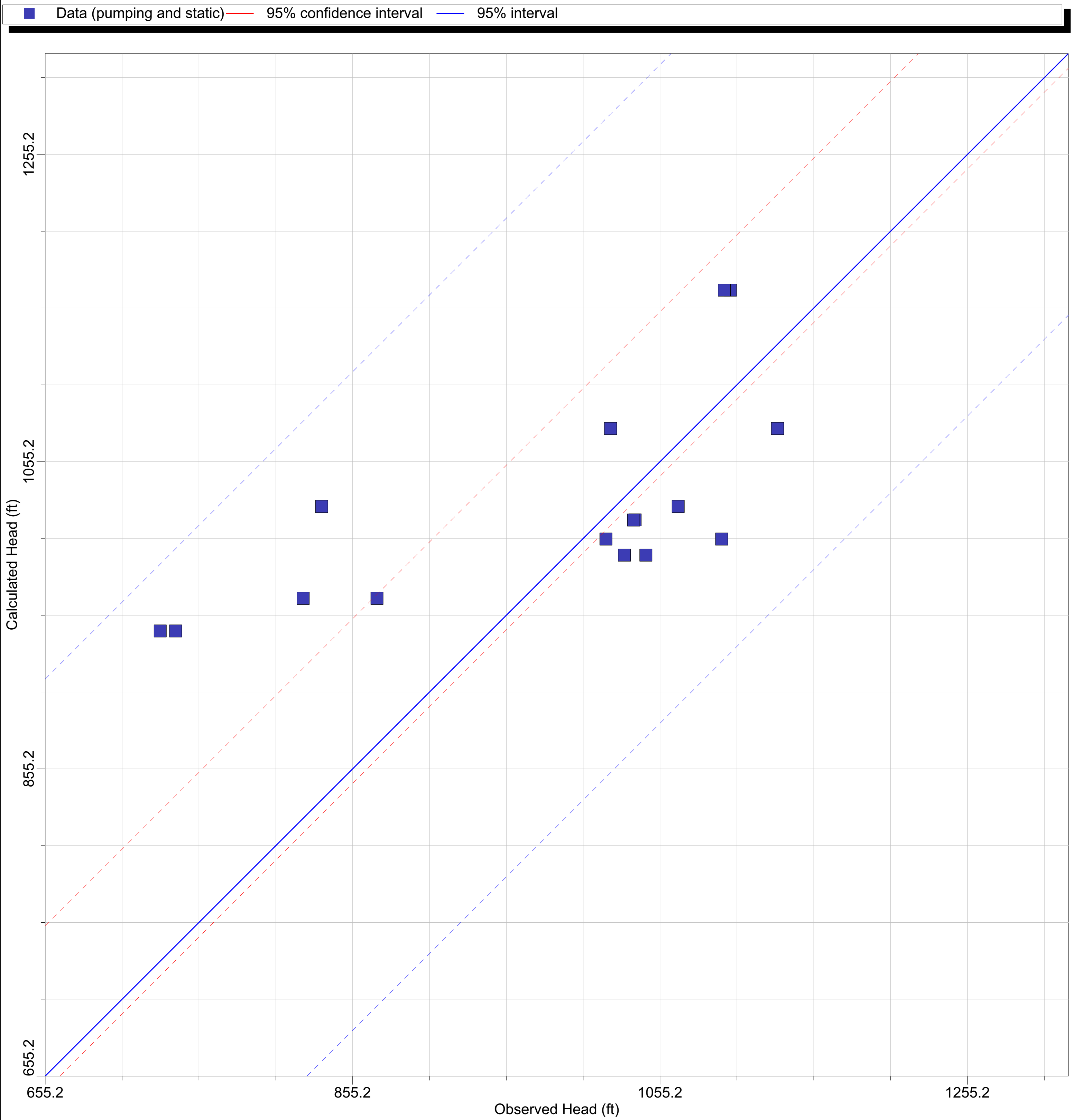
Standard Error of the Estimate : 23.13704 (ft)
Root mean squared : 96.61141 (ft)
Normalized RMS : 24.44039 (%)
Correlation coefficient : 0.7245784

T(0)=January 1990
Time Shown: 366 days (January 1991)

MWH

Project: Elsinore Basin
Modeller: cdd

Figure E-12 - Model Calibration (January 1992)



Num.Points : 16
Max. Residual: 214.9662 (ft) at Cory/Cory
Min. Residual: -15.19879 (ft) at C_4p/C_4p
Residual Mean : 44.08617 (ft)
Absolute Residual Mean : 85.76492 (ft)

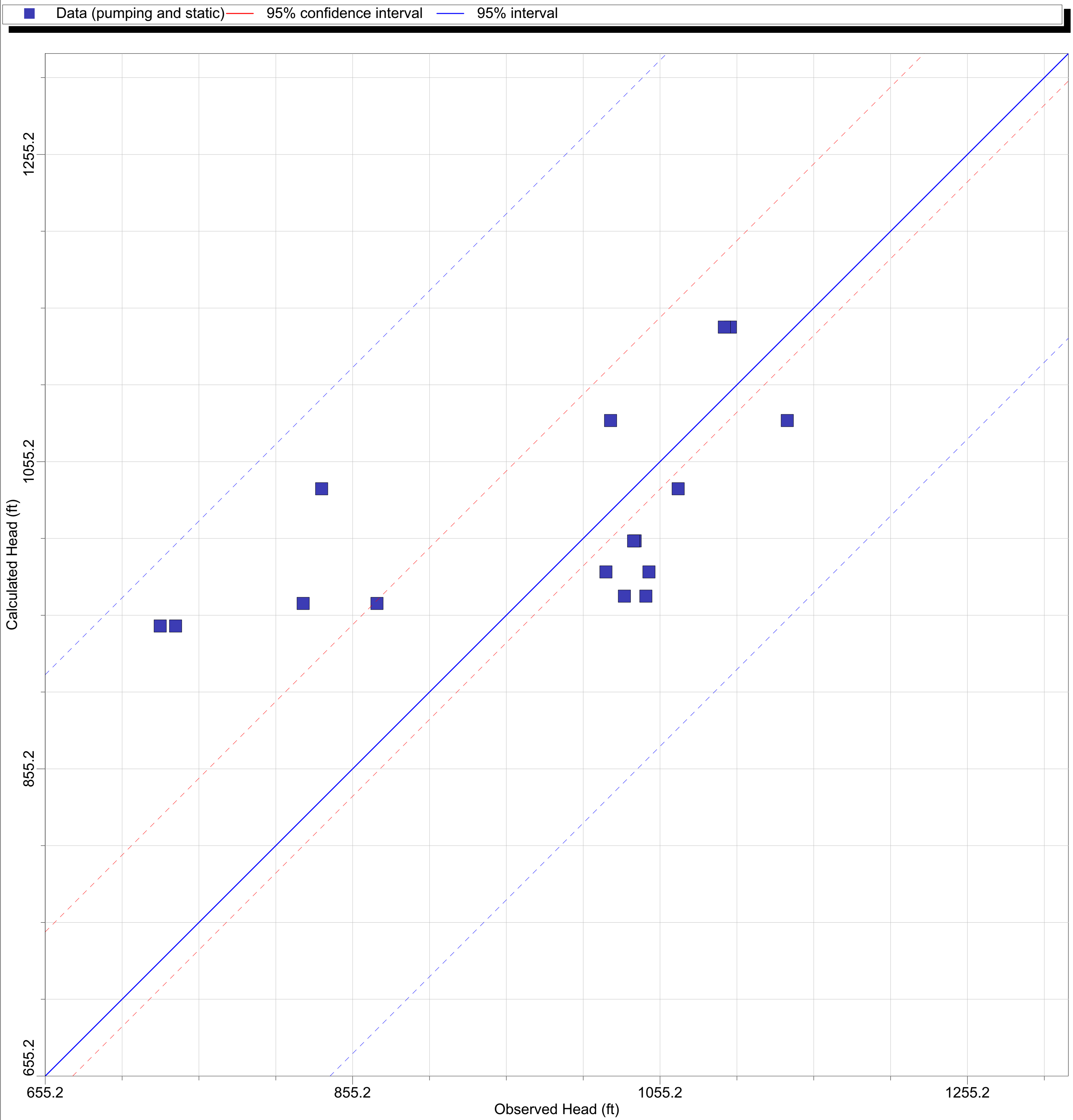
Standard Error of the Estimate : 25.28128 (ft)
Root mean squared : 107.3813 (ft)
Normalized RMS : 26.73523 (%)
Correlation coefficient : 0.6741636

T(0)=January 1990
Time Shown: 732 days (January 1992)

MWH

Project: Elsinore Basin
Modeller: cdd

Figure E-13 - Model Calibration (January 1993)



Num.Points : 16
Max. Residual: 218.2281 (ft) at Cory/Cory
Min. Residual: -29.44702 (ft) at O/O
Residual Mean : 38.01263 (ft)
Absolute Residual Mean : 87.90433 (ft)

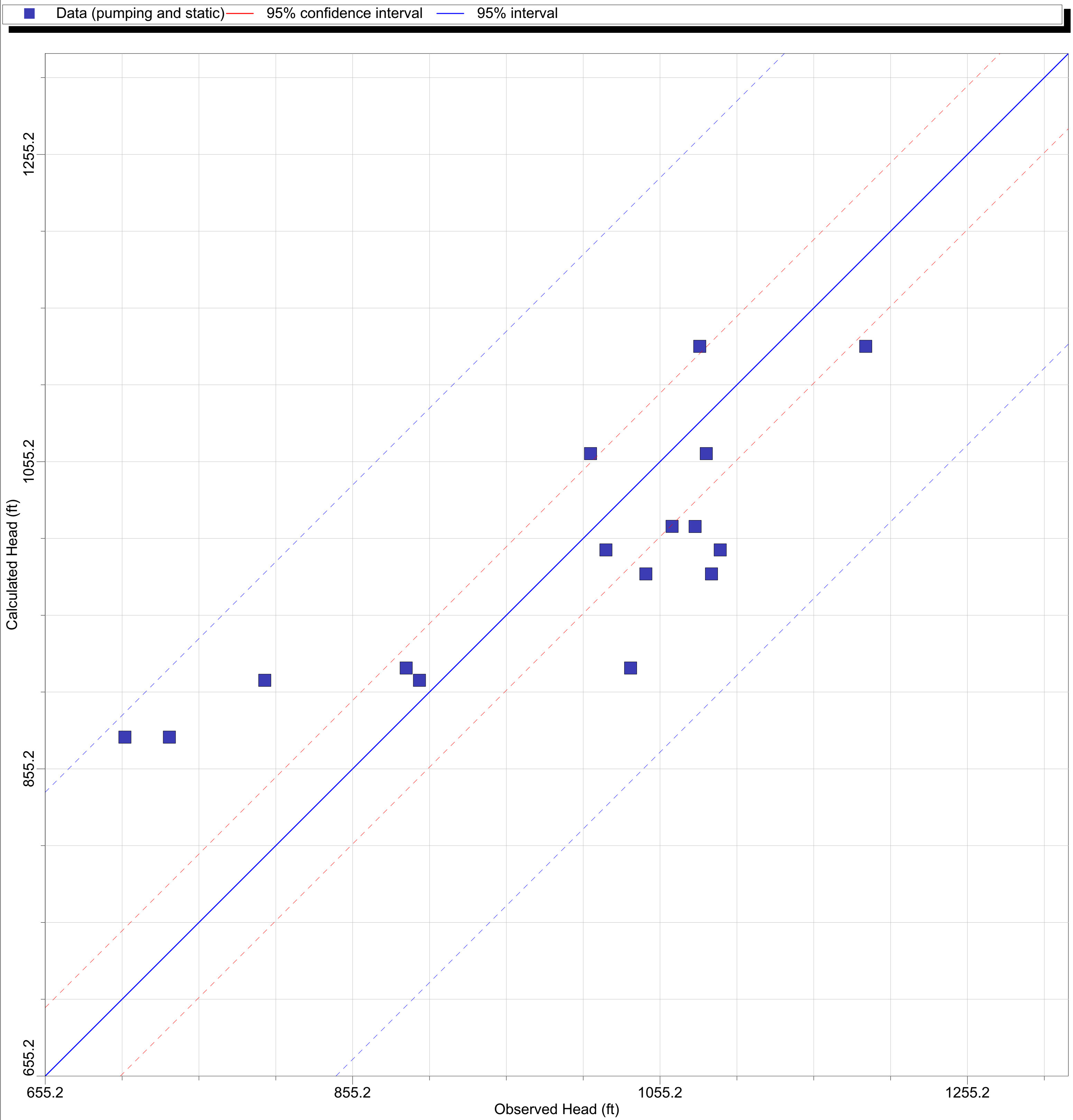
Standard Error of the Estimate : 26.33583 (ft)
Root mean squared : 108.8513 (ft)
Normalized RMS : 26.67923 (%)
Correlation coefficient : 0.612077

T(0)=January 1990
Time Shown: 1098 days (January 1993)

MWH

Project: Elsinore Basin
Modeller: cdd

Figure E-14 - Model Calibration (January 1994)



Num.Points : 16
Max. Residual: 168.864 (ft) at Cory_p/Cory_p
Min. Residual: 14.19927 (ft) at C_1/C_1
Residual Mean : -2.170574 (ft)
Absolute Residual Mean : 73.2122 (ft)

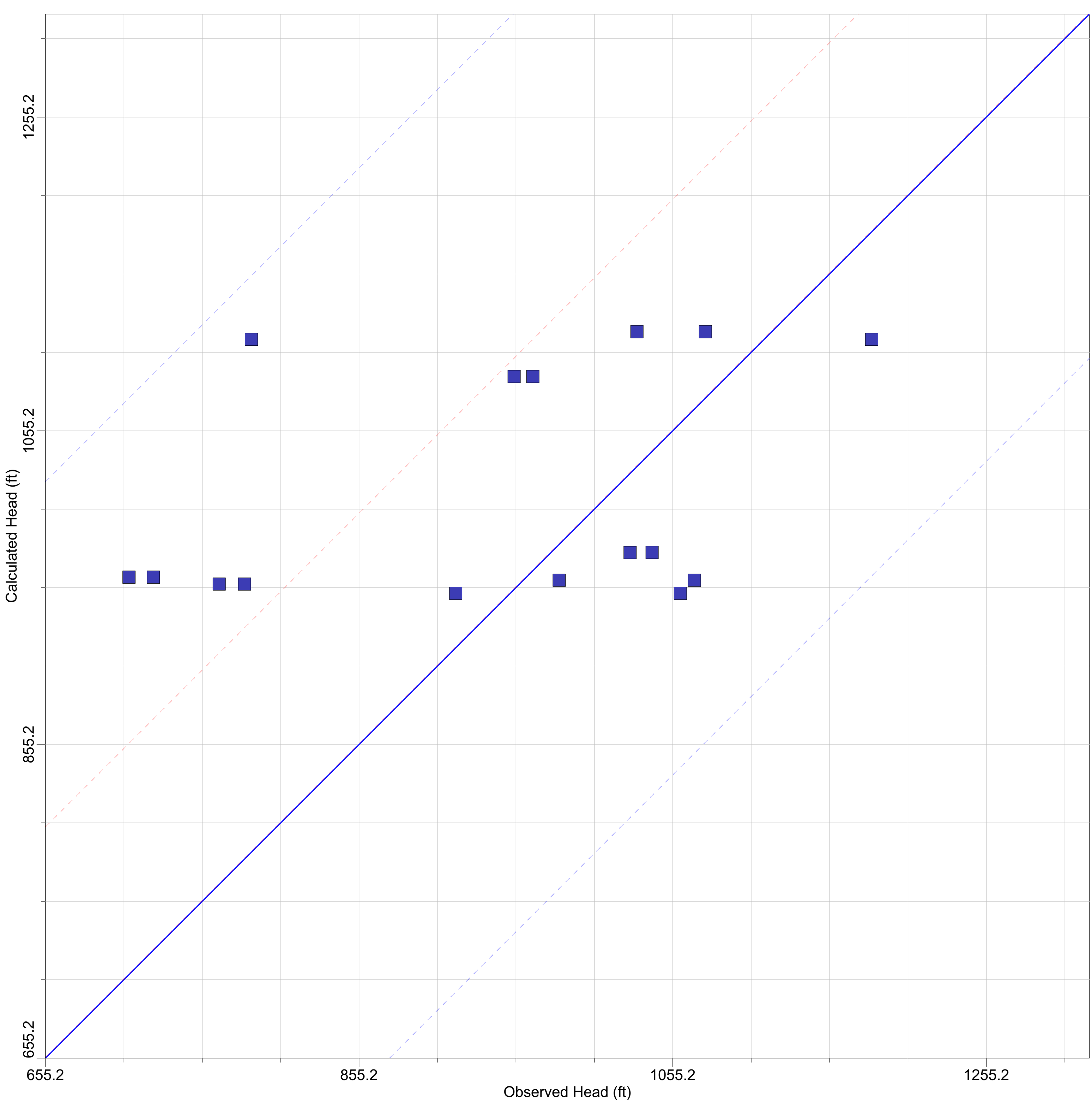
Standard Error of the Estimate : 22.04592 (ft)
Root mean squared : 85.41105 (ft)
Normalized RMS : 17.72014 (%)
Correlation coefficient : 0.8158778

T(0)=January 1990
Time Shown: 1464days (January 1994)

MWH

Project: Elsinore Basin
Modeller: cdd

Figure E-15 - Model Calibration (January 1995)



Num.Points : 16
Max. Residual: 326.995 (ft) at P_p/P_p
Min. Residual: -22.82623 (ft) at C_4p/C_4p
Residual Mean : 74.01883 (ft)
Absolute Residual Mean : 126.9661 (ft)

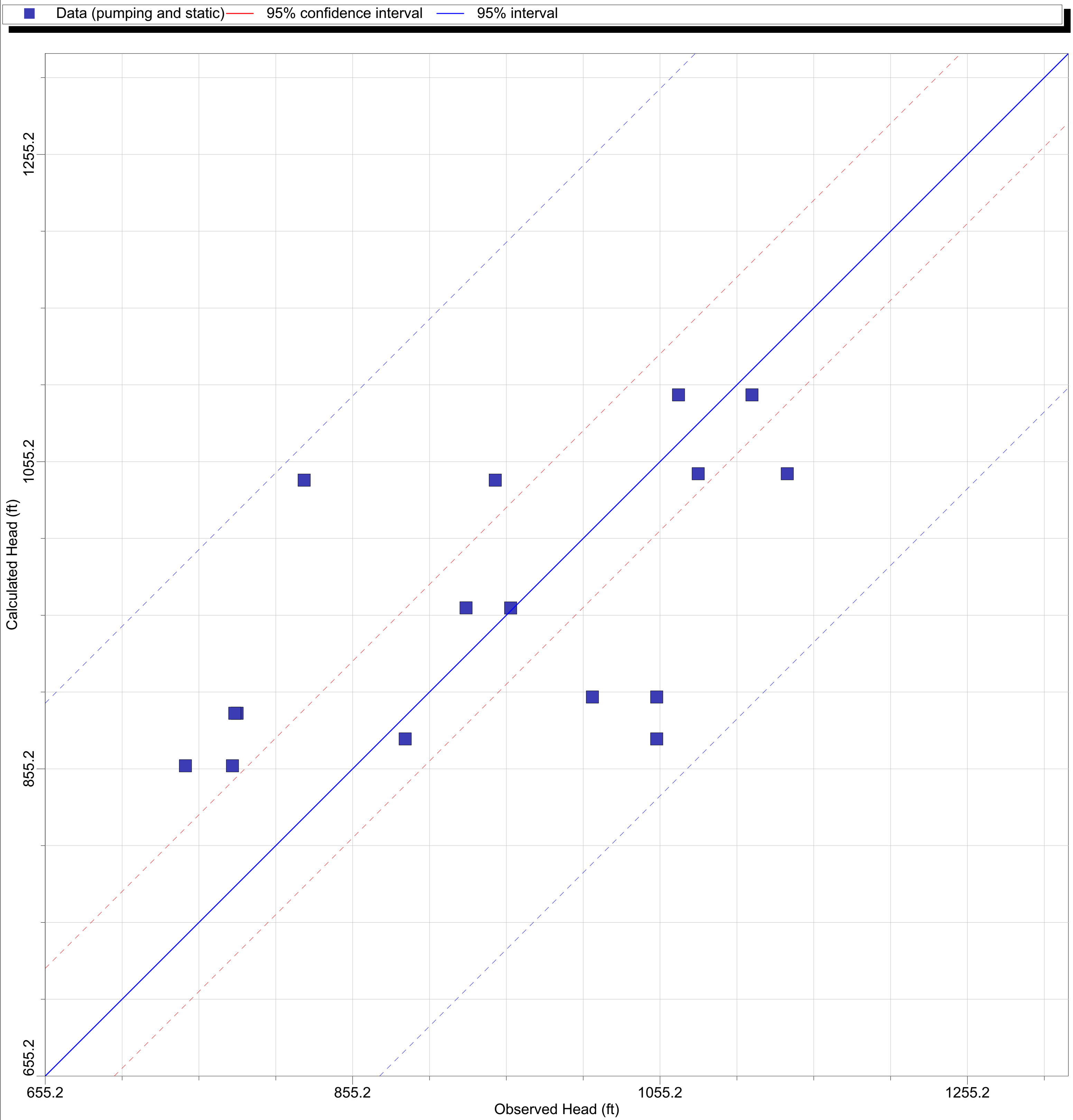
Standard Error of the Estimate : 34.59231 (ft)
Root mean squared : 153.0627 (ft)
Normalized RMS : 32.32582 (%)
Correlation coefficient : 0.3457494

T(0)=January 1990
Time Shown: 1830 days (January 1995)

MWH

Project: Elsinore Basin
Modeller: cdd

Figure E-16 - Model Calibration (January 1996)



Num.Points : 16
Max. Residual: 219.4797 (ft) at O_p/O_p
Min. Residual: 1.971375 (ft) at S_ls/S_ls
Residual Mean : 12.59436 (ft)
Absolute Residual Mean : 86.70548 (ft)

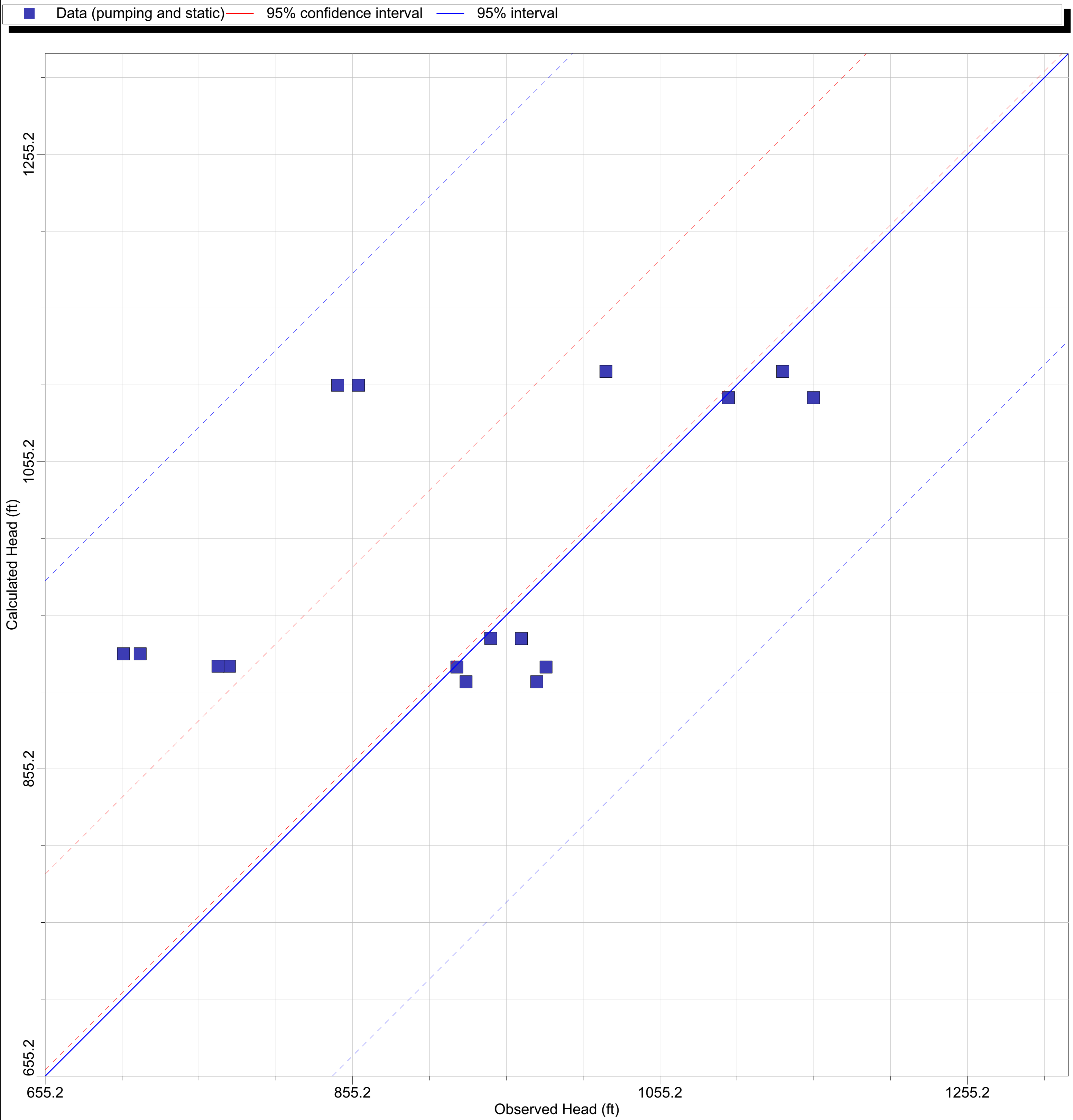
Standard Error of the Estimate : 27.14255 (ft)
Root mean squared : 105.8744 (ft)
Normalized RMS : 27.03636 (%)
Correlation coefficient : 0.5883181

T(0)=January 1990
Time Shown: 2196 days (January 1996)

MWH

Project: Elsinore Basin
Modeller: cdd

Figure E-17 - Model Calibration (January 1997)



Num.Points : 16
Max. Residual: 259.4382 (ft) at O_p/O_p
Min. Residual: -1.482666 (ft) at C_4p/C_4p
Residual Mean : 67.80388 (ft)
Absolute Residual Mean : 99.42454 (ft)

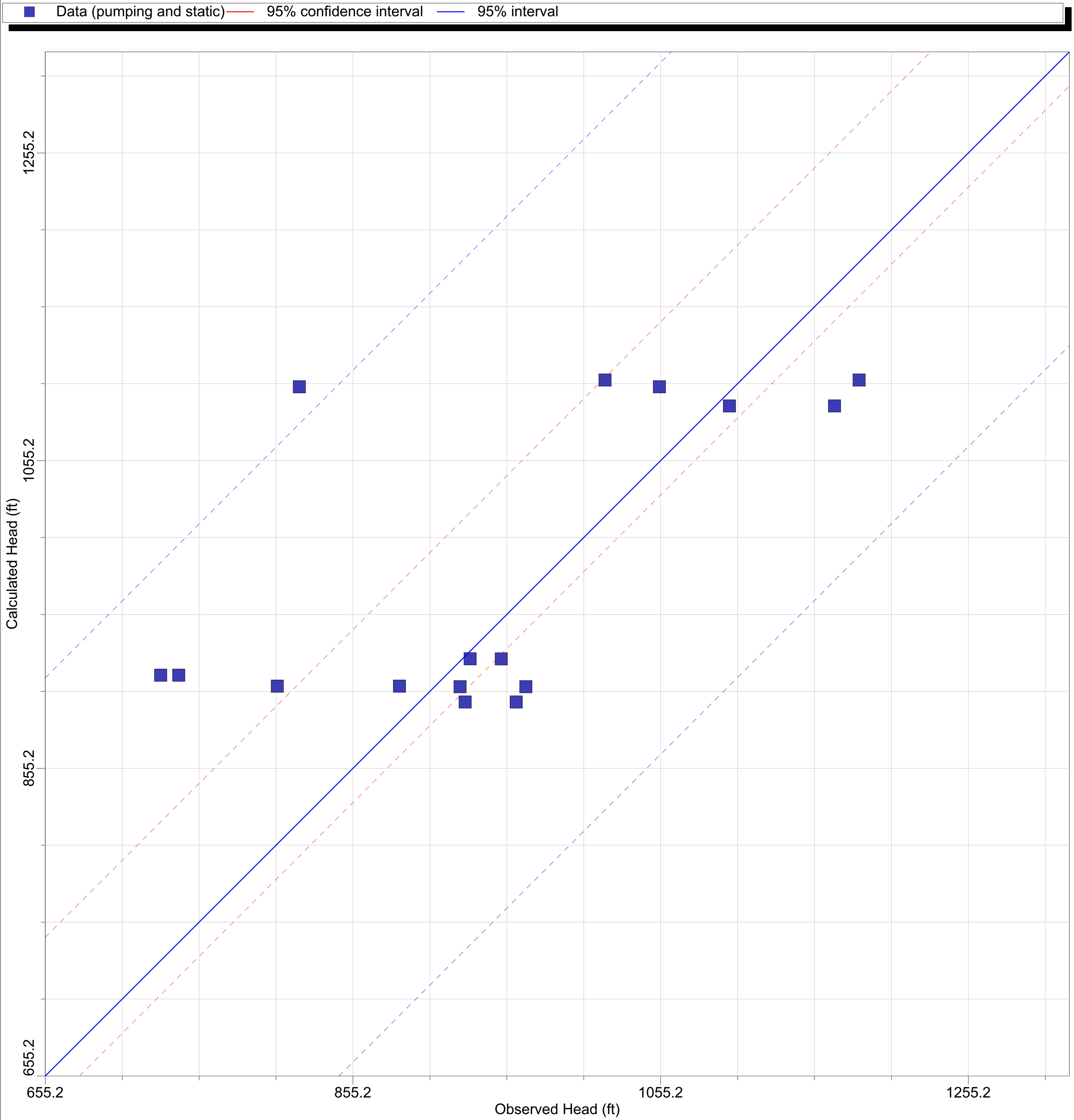
Standard Error of the Estimate : 30.02689 (ft)
Root mean squared : 134.6164 (ft)
Normalized RMS : 29.98881 (%)
Correlation coefficient : 0.526229

T(0)=January 1990
Time Shown: 2562 days (January 1997)

MWH

Project: Elsinore Basin
Modeller: cdd

Figure E-18 - Model Calibration (January 1998)



Num.Points : 16
Max. Residual: 282.868 (ft) at O_p/O_p
Min. Residual: -4.922827 (ft) at N_Is/N_Is
Residual Mean : 33.94425 (ft)
Absolute Residual Mean : 79.20999 (ft)

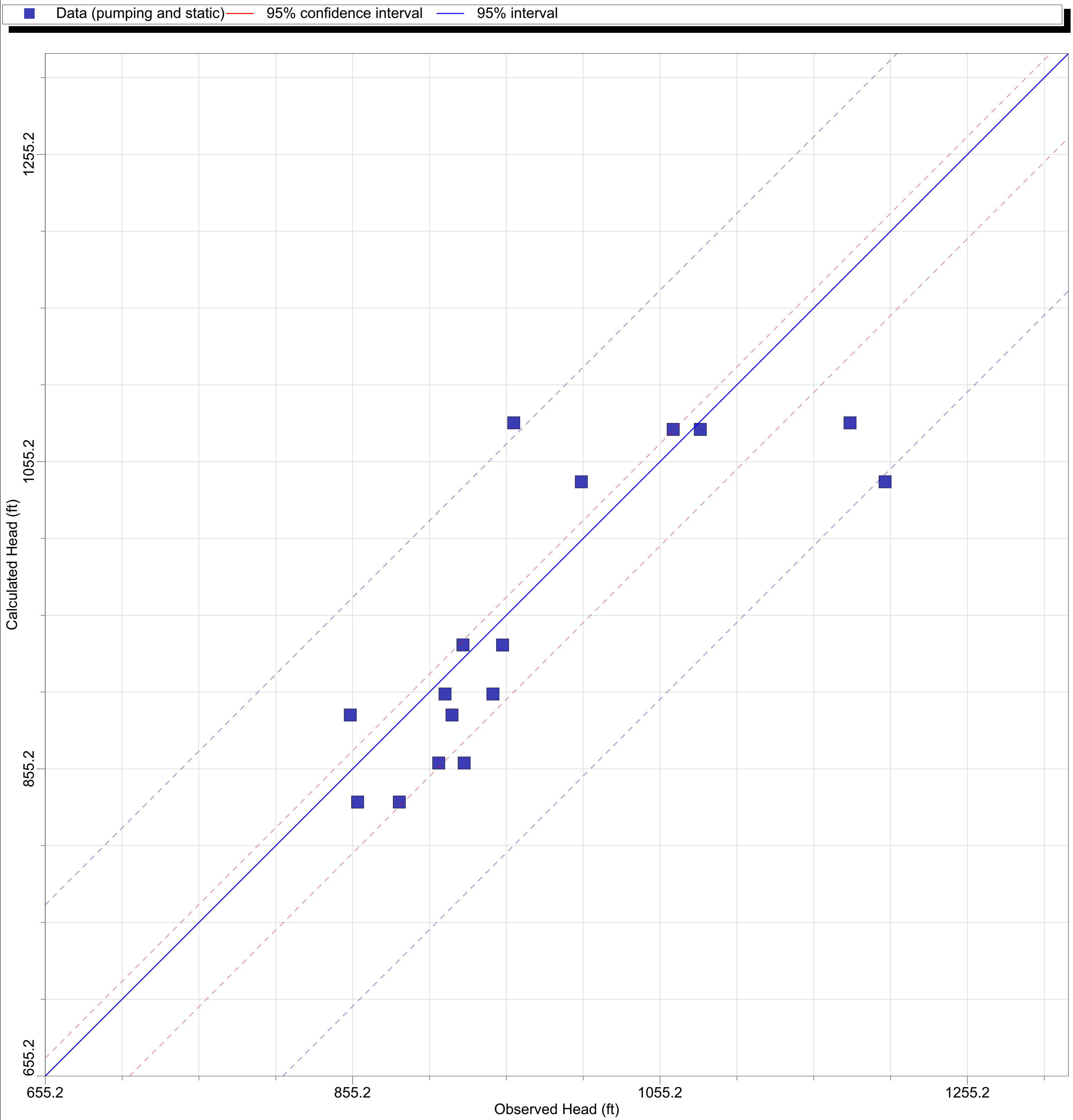
Standard Error of the Estimate : 26.51521 (ft)
Root mean squared : 108.1576 (ft)
Normalized RMS : 23.82415 (%)
Correlation coefficient : 0.627241

T(0)=January 1990
Time Shown: 2937 days (January 1998)

MWH

Project: Elsinore Basin
Modeller: cdd

Figure E-19 - Model Calibration (January 1999)



Num.Points : 16
Max. Residual: -159.5461 (ft) at L/L
Min. Residual: -5.171691 (ft) at P/P
Residual Mean : -21.55193 (ft)
Absolute Residual Mean : 48.60233 (ft)

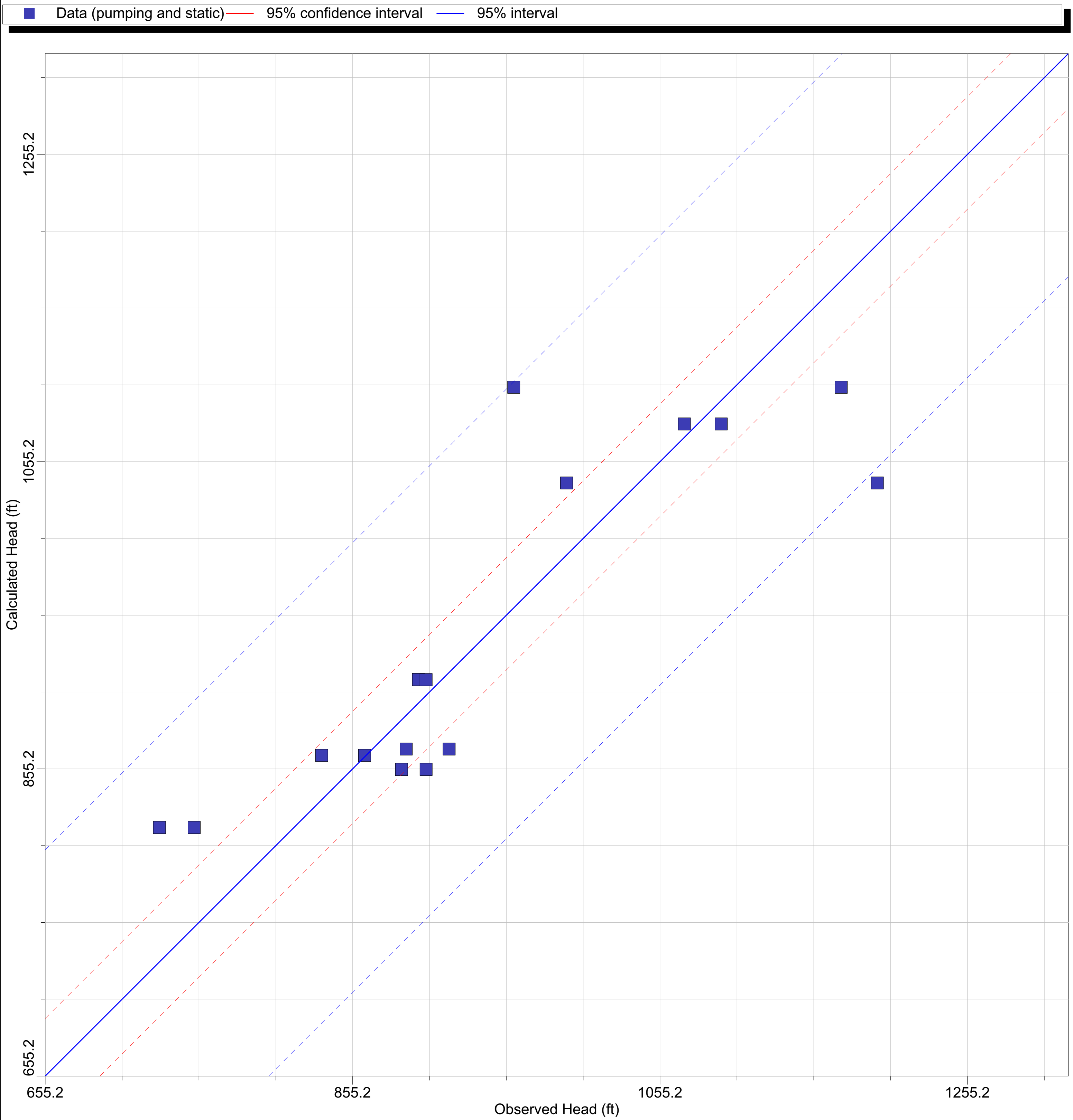
Standard Error of the Estimate : 15.6949 (ft)
Root mean squared : 64.49366 (ft)
Normalized RMS : 18.5379 (%)
Correlation coefficient : 0.8089869

T(0)=January 1990
Time Shown: 3215 days (January 1999)

MWH

Project: Elsinore Basin
Modeller: cdd

Figure E-20 - Model Calibration (January 2000)



Num.Points : 16
Max. Residual: -155.2866 (ft) at L/L
Min. Residual: 0.9388428 (ft) at C_1/C_1
Residual Mean : 0.9484441 (ft)
Absolute Residual Mean : 49.9602 (ft)

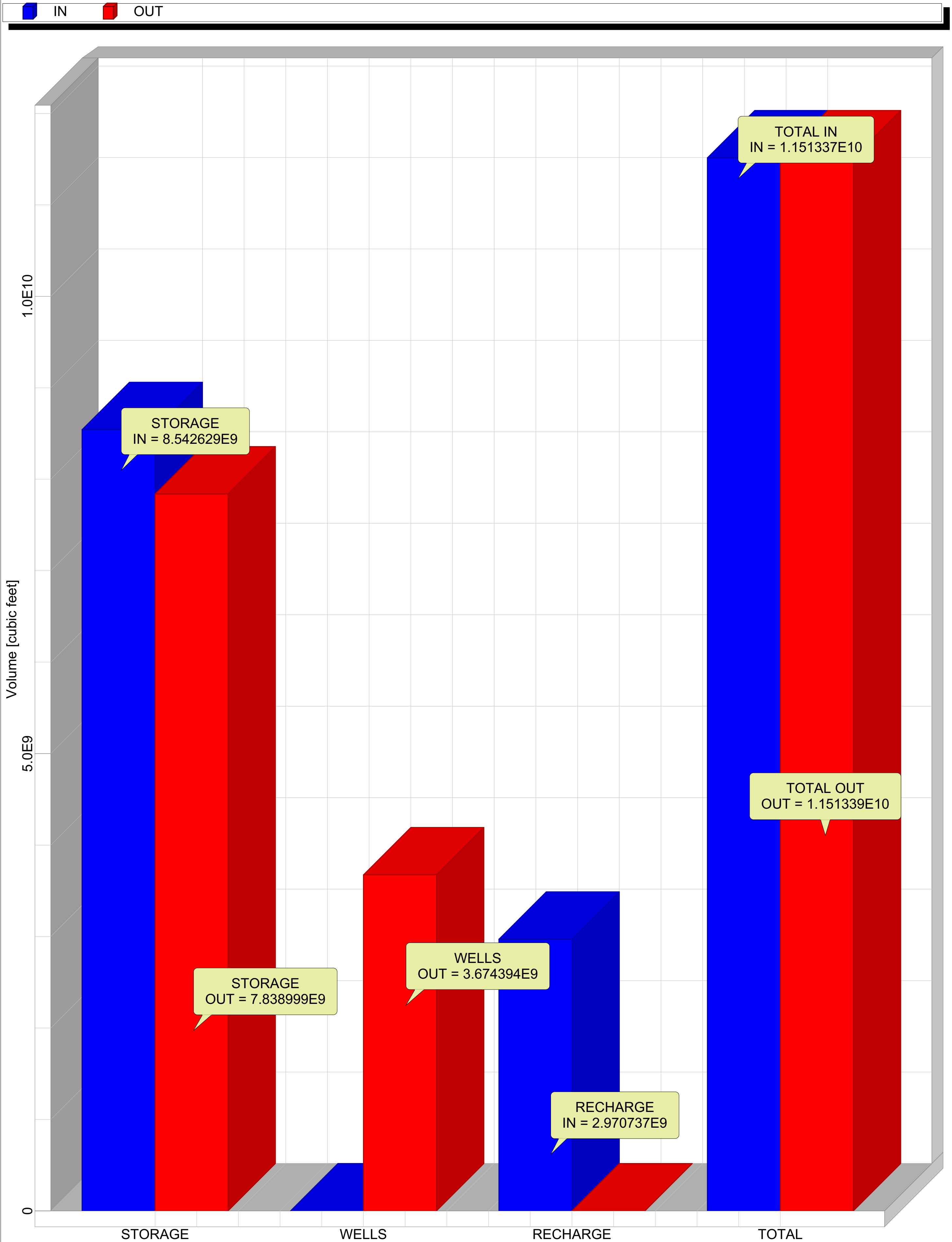
Standard Error of the Estimate : 17.25176 (ft)
Root mean squared : 66.82251 (ft)
Normalized RMS : 14.3067 (%)
Correlation coefficient : 0.8594786

T(0)=January 1990
Time Shown: 3660 days (January 2000)

MWH

Project: Elsinore Basin
Modeller: cdd

Figure E-21 - Mass Balance



MWH

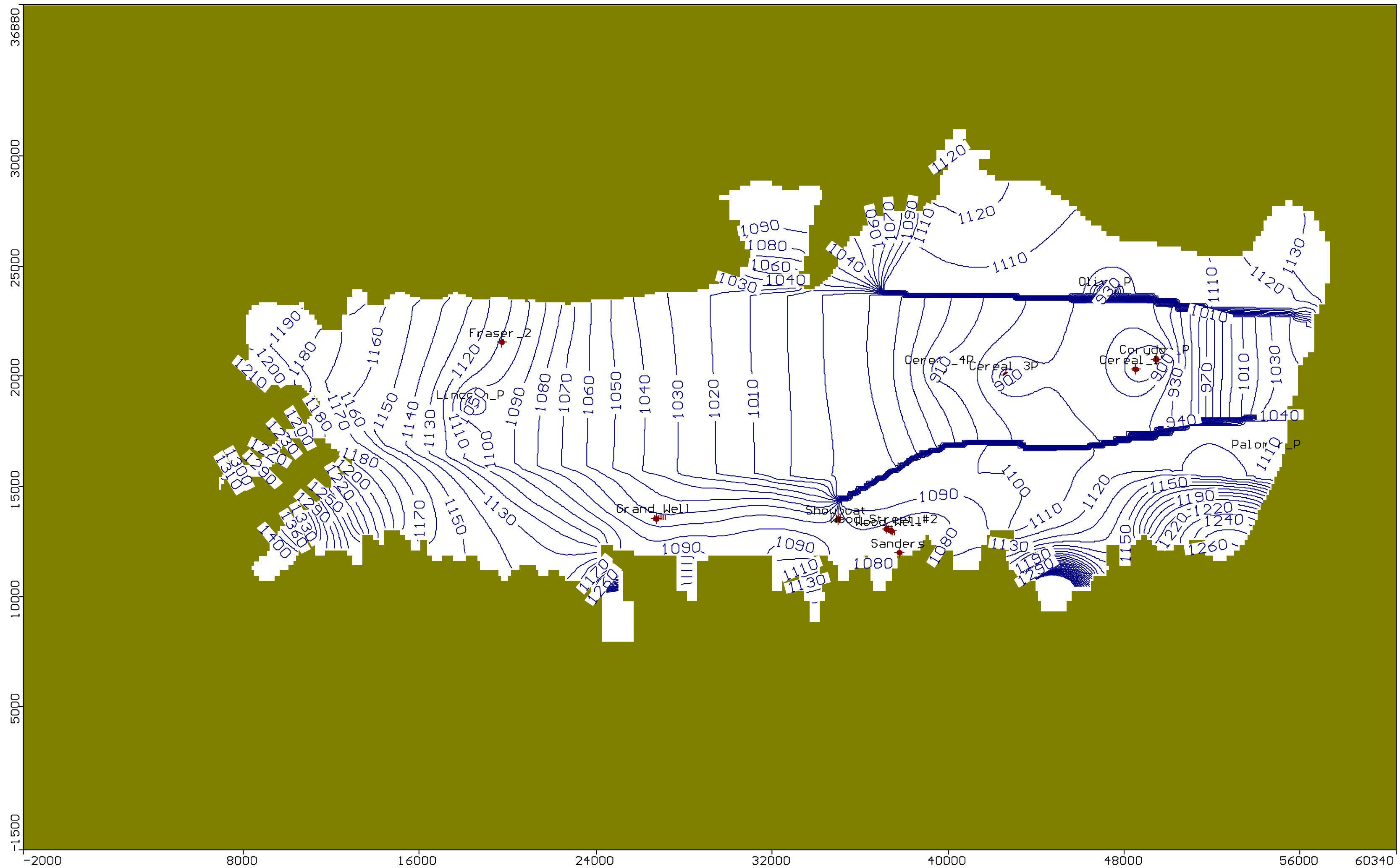
Mass Balance: MODFLOW
Date: 3/23/2003

Figure E-22
Calculated Equipotentials and Flow Directions: Model Layer 1

HSW Engineering
Project: Elsinore
Description: Model Layer 1 (1730days)
13 Jun 03

Visual MODFLOW v.3.1.0, (C) 1995-2002
Waterloo Hydrogeologic, Inc.
NC: 382 NR: 158 NL: 4
Current Layer: 1

Figure E-23
Calculated Equipotentials and Flow Directions: Model Layer 3



HSW Engineering
Project: Elsinore
Description: Model Layer 3 (1730days)
13 Jun 03

Visual MODFLOW v.3.1.0, (C) 1995-2002
Waterloo Hydrogeologic, Inc.
NC: 382 NR: 158 NL: 4
Current Layer: 3

APPENDIX F – LAKE REPLENISHMENT ANALYSIS

The following describes the methodology for determining the amount of water required to maintain the level of Lake Elsinore.

Lake Level Assumptions

The following presents the relationship between the surface area and the volume of the Lake and the lake level.

Figure F-1
Surface Area versus Lake Level

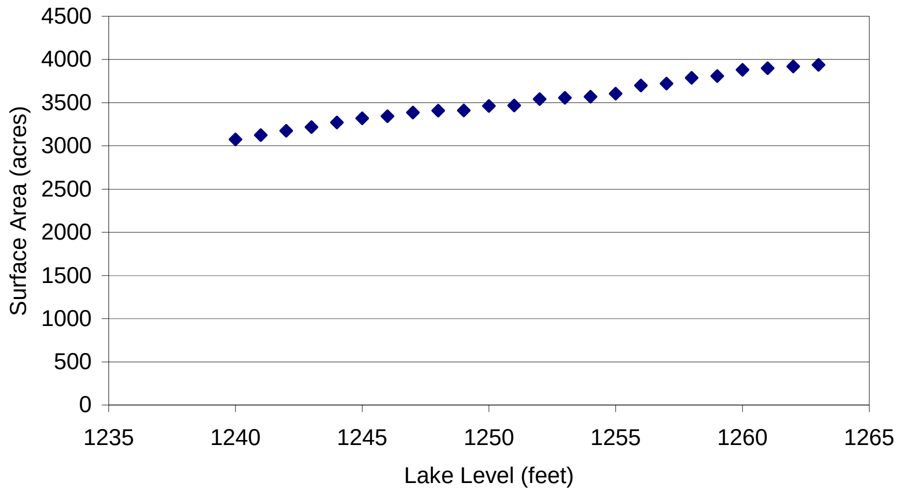
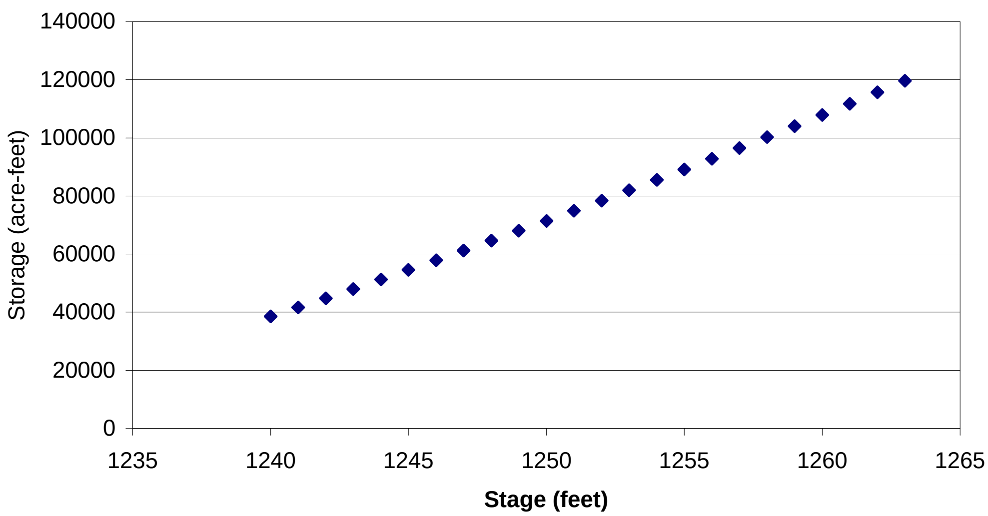


Figure F-2
Stage Storage



The lake parameters were extrapolated above 1263 feet MSL and below 1240 feet MSL.

For modeling purposes, it was assumed that the minimum average lake level was 1229 feet MSL (at which point the lake would be dry). It was also assumed that the lake would overflow to Temescal wash above a level of 1255 feet MSL and spill into the Back Basin at an elevation above 1263 MSL. For simplicity, the model does not differentiate between these overflows and simply assumes that all overflow goes to Temescal Wash.

Historical Balance and Calibration

Inflows to Lake Elsinore include precipitation directly on the lake, inflow from the San Jacinto River, runoff from the local watershed, and lake makeup. For the calibration period, no lake makeup was assumed. Outflows include evaporation and spills to Temescal Wash. The range in inflows and outflows to Lake Elsinore are provided in the following table.

Annual Lake Elsinore Balance (1961-2001)

Parameter	Units	Dry Year 1961	Wet Year 1980	Average
Inflows	AF	1,700	179,200	18,900
Outflows	AF	-15,100	-163,100	-20,000
Net	AF	-13,400	16,100	-1,100

The precipitation (in acre-ft) onto Lake Elsinore was determined by indexing the average precipitation for each time period based upon the County of Riverside isohyetal map and multiplying it by the area of the lake (based upon the previous time step).

The inflow from the San Jacinto River was calculated assuming that flows less than about 15 cfs would be infiltrated into the groundwater basin. Anything over 15 cfs would flow into Lake Elsinore.

The inflows from the remainder of the watershed were estimated using a modification of the results obtained from the San Jacinto Watershed Modeling System software (TetraTech, 2003). The watershed modeling software calculates runoff and nutrient loading from the San Jacinto watershed into Lake Elsinore for the time period from 1990 to 2001. Because the watershed modeling software did not include results prior to 1990, the runoff data calculated using the methodology described in Tech Memo No.3 was compared. In general, the calculated runoff from the runoff model was on the order of 15 percent of the calculated runoff as described in Tech Memo No. 3. This difference occurs because the calculation presented in Tech Memo No. 3 assumes that all runoff generated during a storm event makes it to Lake Elsinore. In reality, factors such as depression storage, evaporation of ponded water and shallow infiltration likely account for the difference.

Figure F-3
Summer Comparison

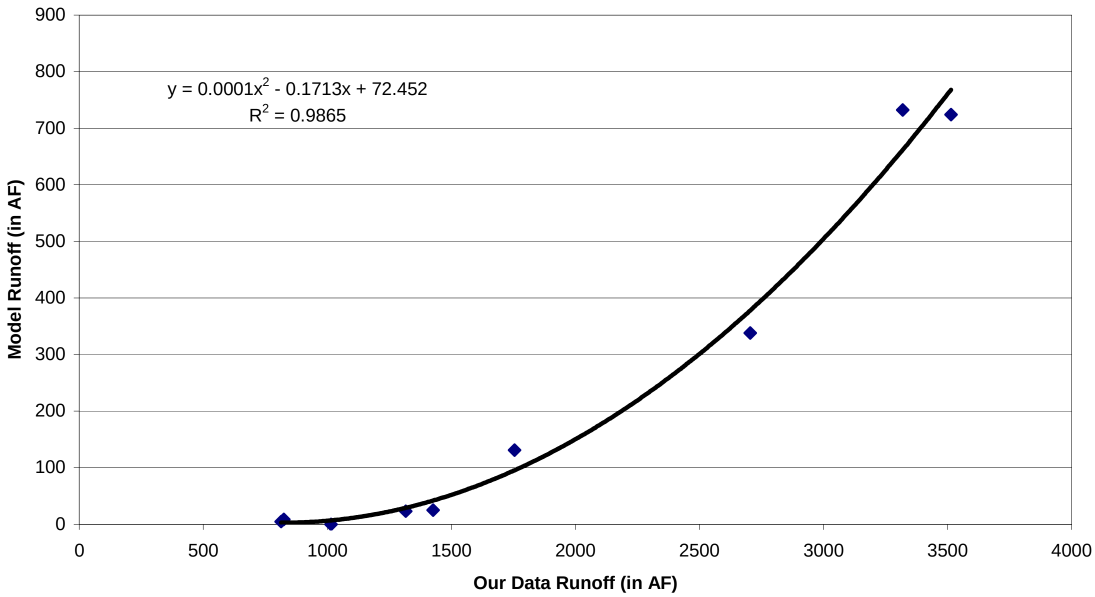
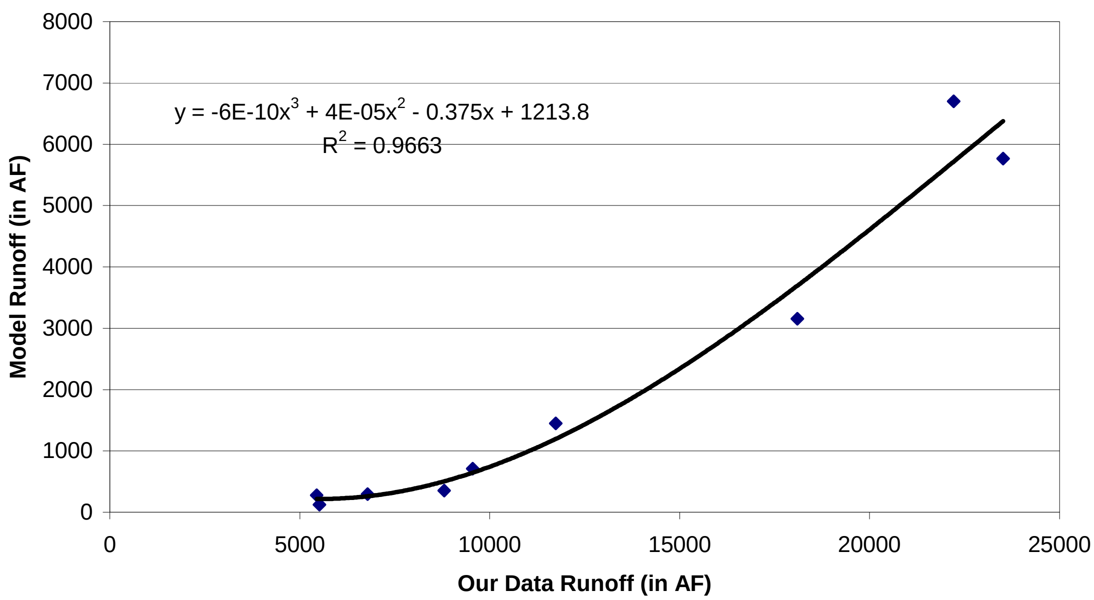


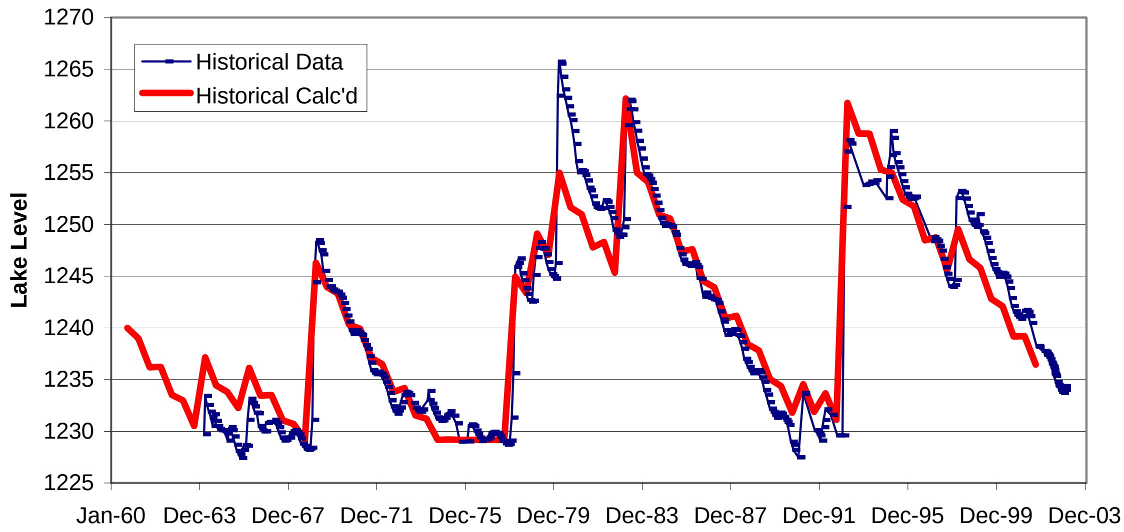
Figure F-4
Winter Comparison



Therefore, the winter and summer runoff data for the historical time period 1961 to 2001 as calculated in TM I-3 were adjusted according to the formulas described above.

Based upon the assumptions summarized above, a simple spreadsheet model was created to model the changes in lake level with historical chances in inflow and outflow. A comparison between the calculated lake level and the actual lake level is provided below.

Figure F-5
Historical Levels of Lake Elsinore



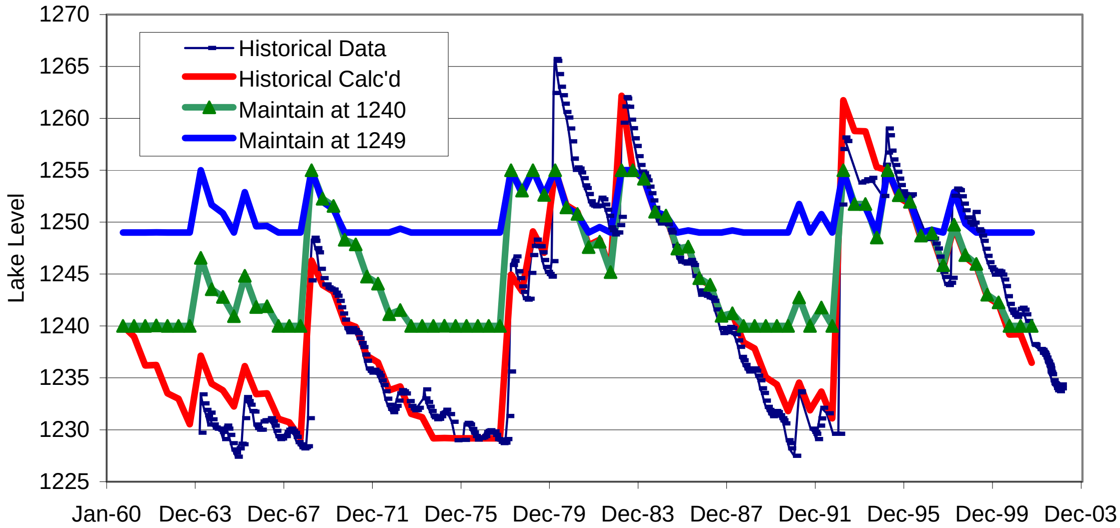
Projected Balance

Lake Levels were calculated assuming both an operating level of 1240 feet MSL and 1249 feet MSL to evaluate the volume of lake makeup water required under each scenario given historical inflows and outflows from the lake. They are described below.

Based upon our discussions with District staff, the following assumptions regarding the Lake for baseline conditions were applied:

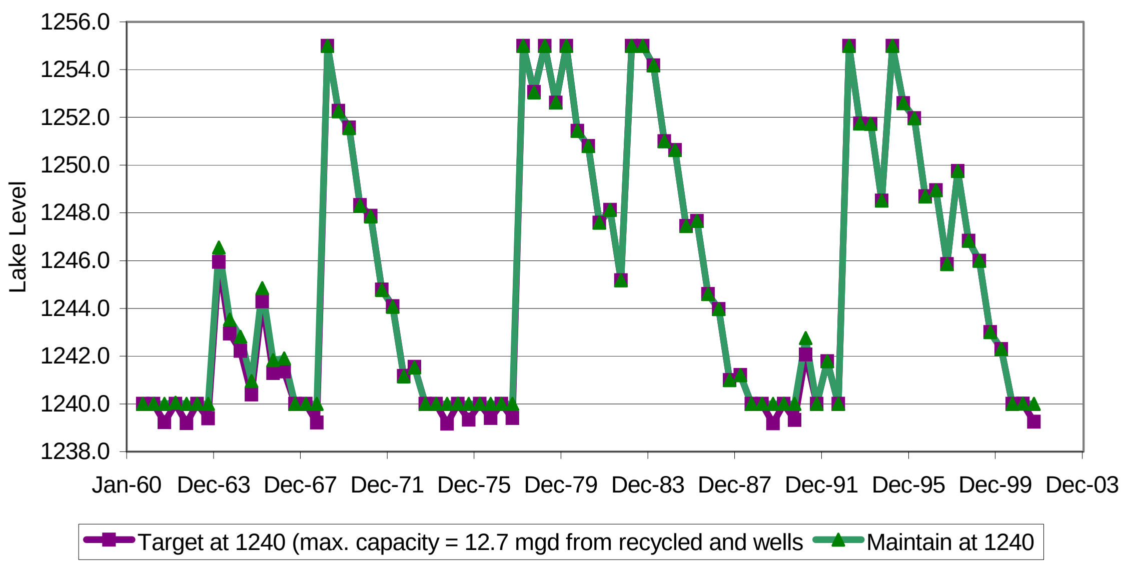
- The target lake level is 1240 feet MSL
- To maintain the lake at this level, approximately 7.5 mgd of reclaimed water would be available for lake makeup
- Once the reclaimed water supply had reached capacity, the wells could be pumped at approximately 5.2 mgd/
- No additional supplies would be available unless lake levels dropped below 1240 feet MSL for more than 2 consecutive 6 month periods

Figure F-6
Projected Levels of Lake Elsinore



The results compared to maintaining the lake at 1240 feet MSL are provided in the following figure.

Figure D-7
Levels of Lake Elsinore when maintained at 1240 feet MSL

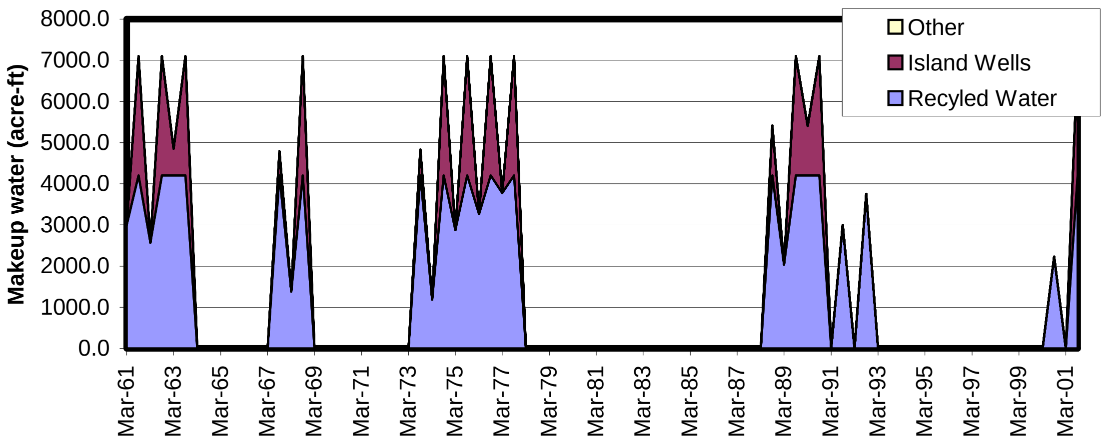


This figure indicates that projected lake levels do not drop below 1240 feet MSL in consecutive 6-month periods. . The makeup water requirements are summarized below.

Table F-1
Summary of Lake Level Maintenance

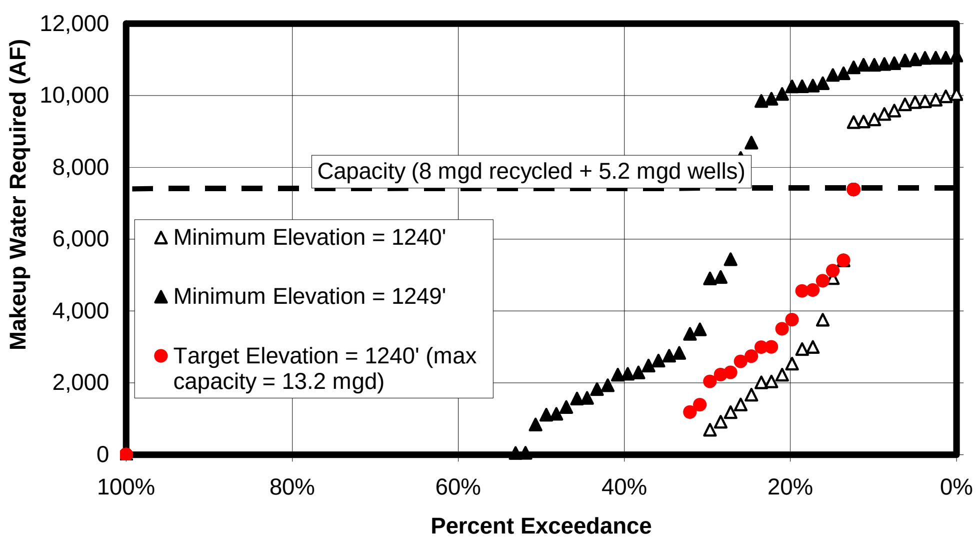
Parameter	Units	1980 Wet Year	1961 Dry Year	Average
Maintain Minimum Level = 1240'				
Inflows				
Natural Inflows	AF/yr	180,000	2,000	19,000
Lake Makeup	AF/yr	-	13,000	3,000
Total Inflows	AF/yr	**180,000**	**15,000**	**22,000**
Outflows				
Evaporation	AF/yr	23,000	14,000	15,000
Outflows to Temescal Wash	AF/yr	161,000	-	7,000
Total Outflows	AF/yr	**184,000**	**14,000**	**22,000**
Average Lake Elevation	ft MSL	1,245		
Maintain Minimum Level = 1249'				
Inflows				
Natural Inflows	AF/yr	180,000	2,000	19,000
Lake Makeup	AF/yr	-	14,000	7,000
Total Inflows	AF/yr	**180,000**	**16,000**	**26,000**
Outflows				
Evaporation	AF/yr	23,000	16,000	16,000
Outflows to Temescal Wash	AF/yr	161,000	-	10,000
Total Outflows	AF/yr	**184,000**	**16,000**	**26,000**
Average Lake Elevation	ft MSL	1,251		
Additional Calculations				
Average Lake Elevation - No Action	ft MSL	1,241		
Average Water to Temescal Wash	AF/yr	5,000		
Difference between 1249' and 1240'		**Average**		
Additional Water for Lake Makeup	AF/yr	3,400		
Additional Water to Temescal Wash	AF/yr	2,700		
% of Lake Makeup to Temescal Wash	AF/yr	80%		
Difference between 1240' and no action				
Additional Water for Lake Makeup	AF/yr	3,400		
Additional Water to Temescal Wash	AF/yr	1,800		
% of Lake Makeup to Temescal Wash	AF/yr	55%		

Figure F-8
Replenishment Requirements for Level Maintenance at 1240 feet MSL



The following shows the frequency in which lake makeup will be required. As shown in this figure, lake makeup water will be required approximately 35 percent of the time. Similarly, about 15 percent of the time, there will not be enough capacity to meet all of the lake makeup requirements and the lake level will drop below 1240 feet MSL.

Figure F-9
Semi-Annual Lake Replenishment Frequency Curve



Differences in Volume of Lake Make-Up Water Required

There are several reasons for different results between the 1997 MWH study, the 2004 CH2Mhill study, and the GWMP. These differences are described below.

The hydrologic analysis performed for the 1997 MWH study used the period of 1928 through 1991 with monthly time steps based on data developed by the U. S. Army Corps of Engineers (COE) for the Lake Management Program. MWH evaluated several alternatives for make-up water into the lake including one involving the discharge of 13 mgd of recycled water (3 mgd from the Regional Plant and 10 mgd from Eastern MWD) to the lake. This alternative was able to maintain the lake at elevation 1,240 ft msl. The modeling performed for this alternative indicated that make-up water was taken 55 percent of the months or an average inflow of 8,008 acre-ft/yr (13 mgd × 1,120 acre-ft/yr/mgd × 0.55).

The LESJWA Nutrient Removal Study prepared by CH2M-Hill used the 1928 to 2000 hydrologic period; this additional nine years included two years of very high runoff into the lake. CH2M-Hill estimated that the make-up water needed to maintain the lake elevation at 1240 ft was 13,800 acre-ft/yr (equal to evaporation at a 1,247 ft lake level less 1,400 acre-ft/yr of local runoff) in dry years. CH2M-Hill assumed that up to 7.5 mgd of recycled water from the Regional Plant and 5,000 acre-ft/yr of groundwater from the Island Wells was available for lake make-up with the remainder coming from EMWD. This evaluation computed an average make-up water need of 6,611 acre-ft/yr (see Appendix B of that report) and then adjusted that average to 8,000 acre-ft/yr presumably based on the findings of the 1997 MWH study.

The CH2M-Hill hydrologic evaluation differed from the 1997 evaluation in several ways. First, it did not include direct precipitation on the lake surface. Direct precipitation provides an average of about 3,300 acre-ft/yr of inflow to the lake when maintained at a minimum elevation of 1,240 ft msl. This would reduce the amount of make-up water required for the lake. CH2M-Hill also used unadjusted San Jacinto River flows as measured at the USGS gauge. The 1997 used the same COE data used previously by Black and Veatch for the Lake Elsinore Management Plan. This data was no longer available. For the GWMP, MWH estimated that an average of 1,300 acre-ft/yr of river water infiltrates into the groundwater basin. Since this water was included in CH2M-Hill's water balance, the make-up water to the lake would increase by this amount. If CH2M-Hill's water balance were adjusted for direct precipitation and losses to infiltration, the average make-up water needs would be reduced from 6,600 acre-ft/yr to about 4,600 acre-ft/yr.

For the GWMP, the hydrologic analysis period chosen was October 1960 through September 2001. This period was chosen because it had essentially the same local precipitation (11.96 inches) for the Lake Elsinore rain gauge as the period of January 1928 through December 2001 (11.83 inches). However, the San Jacinto River inflows to the lake as measured at the USGS gauge during the 1960-2001 period was about 27 percent wetter than the 1928-2001 period. This difference in the hydrologic periods adds about 2,900 acre-ft more inflow from the San Jacinto River and local runoff to the lake for the GWMP analysis than the 1928-2000 hydrologic period used by CH2M-Hill. If the longer hydrologic period were used in the GWMP, this difference in local flows would increase the average amount of make-up water for Alternative 4 (the Preferred Plan) from 3,400 acre-ft/yr to about 4,500 acre-ft/yr. This value is essentially the same as the adjusted CH2M-Hill value.

MWH has assumed that the available sources of supply for lake make-up include up to 7.5 mgd of recycled water from the District's Regional Wastewater Reclamation Plant and up to 5.2 mgd of groundwater from the Island Wells for Alternatives 1 through 3. Effluent from Eastern MWD was excluded due to its anticipated availability primarily in the winter months of wet years when make-up water was less likely to be needed. The amount of District effluent was increased in Alternative 4 (the Preferred Plan) to 17.7 mgd based on projected sewer flows in 2020, the planning year for the GWMP. The average lake makeup amount was calculated in the GWMP by evaluating the lake inflows and outflows under conditions that existed over the historical time period of 1961 to 2001 and then identifying the amount of supplemental water required to maintain a lake level of 1240 MSL under those conditions.

The difference between the adjusted CH2M-Hill and the GWMP average amounts and the 1997 average of 8,000 acre-ft/yr are believed to be the result of the analytical approaches used. Both the CH2M-Hill analysis and the GWMP computed the annual volume of make-up water needed to raise the elevation at the end of the year to 1,240 ft msl. In addition to using a different set of natural inflows to the lake, the 1997 report evaluated the result of putting a fixed amount of water in the lake in each month that the elevation was below 1,240. The higher summer evaporation rates are believed to account for these differences.

In summary, there are differences between the various studies, mostly the result of different hydrologic analysis periods. The most significant difference between the GWMP and the CH2M-Hill report is emphasis on reducing groundwater pumping to a bare minimum. MWH will add a discussion of these difference in the Final GWMP.

Local Runoff

The District agrees that before additional runoff is captured for surface spreading, an analysis should be performed to determine the effect of capturing the runoff on lake levels. In fact, such an analysis was performed for those GWMP alternatives that considered spreading of local runoff. However, surface spreading is not included in the recommended alternative due to its high cost and relatively low benefit in terms of groundwater yield. Therefore, it is not part of the proposed GWMP program.

Compliance with Nutrient TMDL of Recycled Water for Lake Replenishment

The GWMP includes recycled water as a component of the lake makeup water and appreciates the support provided by the City. As the City is aware, a separate EIR is being prepared by LESJWA to address the potential effects of recycled water use for lake make-up. The District envisions that that document will support the District's NPDES permit for discharge of Regional Plant effluent to Lake Elsinore. The LESJWA EIR, for which the LESJWA Nutrient Removal

Study, MWH's review of that study, MWH's Feasibility Study, and LESJWA's proposed subsurface in-lake aeration system are now the project description, evaluates the proposed nutrient TMDL requirements by the Santa Ana Regional Water Quality Control Board, existing effluent nutrient concentrations and loading requirements, nutrient removal approaches at the Regional Plant, and potential nutrient offsets. Conclusions of the Regional Board's Technical Report and other studies are also considered in the EIR.

The District has long held that the addition of recycled water to Lake Elsinore is an environmental enhancement measure. As the City is aware from recent LESJWA TAC meetings, the Regional Board's target nutrient concentrations and loadings for supplemental water to Lake Elsinore under the TMDL process have not been adopted. The Regional Plant NPDES permit was adopted on March 4, 2005. The District is committed to meeting the permit requirements through a combination of effluent treatment, offsets through the lake aeration, and others if appropriate.

Higher Use and Replacement of Groundwater with Recycled Water

The District agrees that the environmental enhancement of a natural lake with groundwater is on a par with most other uses of groundwater and the wide range of domestic water uses. As a water supplier, the District is keenly aware that water is a scarce resource in southern California that needs to be managed for its highest and best uses. This is reflected in the District's conservation programs, ongoing and in the GWMP, to reduce domestic water use.

With the rapidly-occurring development in the District's service area, most of which is within and approved by the City, the District's first supply priority must be provision of water for drinking and other domestic uses. Therefore, the GWMP includes an aggressive water conservation program that includes: residential plumbing retrofits, water system and water use audits, leak detection and repair, financial incentives for large landscape irrigation, promotion of low water use landscaping, promotion of high-efficiency appliances, a ULF toilet replacement program, public information programs to increase water awareness, use of recycled water for landscape irrigation and other non-potable uses, school education programs, implementation of commercial, industrial, and institutional water conservation programs, assignment of a water conservation coordinator, and development and enforcement of prohibitions on water wasting,

Over time, as effluent supplies increase along with development, the District anticipates that sufficient recycled water would be available for landscape irrigation and other non-potable uses as well as lake supplementation with only minimal or occasional use of well water from a basin already experiencing falling water levels.

The City must realize that continued overdraft of the Elsinore Basin is not an acceptable situation, regardless of the use of the groundwater. Even without any pumping of the Island Wells, pumping from the basin appears to be approximately double the basin's natural recharge. Adding 5,000 acre-ft/yr of Island Well pumping will significantly add to that deficit. Beside recycled water, the only other water source that can offset this overdraft is imported water. Whether imported water is used to replenish the basin, or to offset pumping, the effect and the costs are essentially the same. In an overdrafted basin, any increased pumping for lake replenishment is the equivalent of purchasing imported water. The District recognizes that the current recycled water supply is not adequate to maintain the lake levels long term, and that some temporary groundwater pumping is needed. However, this must be considered an interim or occasional solution, as it will only add to basin overdraft.

Advisory Committee

The District agrees that the Advisory Committee should be made up of stakeholders in the Elsinore Basin. The District Board of Directors will decide the committee's composition at the time of its formation.

Table G-1
Summary of Potential Water Quality Issues

No.	Potential Management Issue	Assessment Summary	Recommendation
	Identified under AB3030		
1	The control of saline water intrusion	• Not an issue due to the location of the basin	• Not to be addressed
2	Identification and management of wellhead protection areas and recharge areas	• Wellhead protection plan completed for EVMWD's production wells only. • No assessment made for remaining 200+ wells	• Conduct a well canvass (house by house survey) • Expand Well Head Protection Plan • Identify potential contamination paths
3	Regulation of the migration of contaminated groundwater	• No contamination recorded by RWQCB	• Conduct an EDR (environmental data regulation) search • Implement a contamination prevention plan
4	Identification of well construction policies	• The EVWMD wells are constructed in compliance with the DWR Guidelines • The construction policies used for the remaining 200+ wells is unknown	• Include the evaluation of construction methods used in the well canvas • Implement procedures for well construction from this point
5	Administration of a well abandonment and well destruction program	• The basin contains many wells that have an unknown status. • Improper well abandonment is present in the basin	• Include the evaluation of well status and type of abandonment in the well canvas • Implement a Well Abandonment Program
6	The construction and operation of: • Contamination cleanup projects • Storage projects • Recharge projects • Extraction projects • Conservation projects • Water recycling projects	• No current contamination recorded by RWQCB • Strategies are developed for storage, recharge and extraction projects • Conservation can result in reduced return flows • Recycling water is used for lake level maintenance	• Develop Strategies for Basin Storage, Recharge, and Extraction • Evaluate Strategies with groundwater model and cost-benefit analysis. • Evaluate Water Conservation Potential and Impact
7	Activities listed in land use plans which create a risk of groundwater contamination	• Sensitive development areas are the southern part of the Basin and the Canyons where water infiltrates to the basin • The remainder of the basin is protected from contamination by fingering clay layers	• Implement procedures to prevent groundwater pollution from new developments
	Identified for Existing Basin Conditions		
8	Meeting drinking water quality regulations for EVMWD's potable wells	• Water quality information is not available on a consistent basis throughout the basin • Natural occurring Arsenic exists (primarily in the Cereal Wells) • Contamination by bacteria exists in the Olive Street Well (possibly due to septic tanks).	• Develop and implement a water quality monitoring plan • Evaluate the location of the natural occurring Arsenic in more detail to determine actions required
	Identified for Future Basin Conditions		
9	Water quality of imported may not comply with Basin Plan Objectives when injected	• Imported water quality from Skinner (Auld Valley) and Mills (TVP) connection fluctuate, which may lead to exceeding of the Basin Plan Objectives for TDS, Sulfate, and Chloride • Increasing salt concentration as a result of long-term injection • The injectability of Mills water is unknown as the use of this water has not been tested a pilot study	• Compliance with Basin Objective: Action TBD • Perform water quality analysis of the compatibility of Mills water and groundwater • Conduct a pilot test for injecting Mills water when this is part of the recommended strategy.

Table G-2
Summary of Potential Water Quantity Issues

No.	Potential Management Issue	Assessment	Recommendation/Action
	Identified under AB3030		
10	Mitigation of conditions of overdraft	• No groundwater level information was available for the EWD Wells • Declining groundwater levels in the southern part of the Basin.	• Gather water level data from EWD • Declining Levels Back Basin: To be determined in this GWMP
11	Replenishment of groundwater extracted by water producers	• Groundwater is not replenished in the back basin as levels are declining • Groundwater is replenished in the area north of the lake as levels are stable	• Declining Levels the southern part of the basin: To be determined in this GWMP • Maintain levels in the area north of the lake • Include basin level maintenance as an objective in the management strategies
12	Monitoring of groundwater production, levels, and storage.	• Groundwater production is monitored recorded on a regular basis by EVMWD and EWD only • Water levels and production records for remaining 200+ wells are reported inconsistently or not available. • Water level information at production wells has a poor reliability due to unknown stabilization time of production wells	• Include the evaluation of well status, water use, and production recording method in the well canvas • Determine number of active wells in the basin • Develop a monitoring program for water production and water level measurements • Implement a production recording system with the basin pumpers • Measure water levels at non-production wells
13	Facilitating conjunctive use operations	• This is the purpose of the GWMP (not a management issue)	• Evaluate various conjunctive use strategies
	Identified for Existing Basin Conditions		
14	A doubling of water demands in 20 years leads to a water supply shortfall	• Water Demands are projected to exceed the supplies in Year 2011 • Additional water supplies are required • The use of available reclaimed water for water conservation is limited due to the need of lake level replenishment with reclaimed water	• Promote water conservation • Implement conjuctive use operations • Identify additional new sources of supply • Evaluate the cost-effectiveness of using untreated imported water through the Canyon Lake Spills for surface recharge
15	Increasing dependence on imported water supplies	• Imported water will be 80 percent of the water supply in 2020 • Decreasing water supply reliability • Cost of imported water are estimated to be higher than implementing conjunctive use	• Develop strategies that increase water supply reliability • Implement conjunctive use operations
16	Groundwater is required for lake replenishment	• It is uncertain whether reclaimed water is acceptable for replenishment • The need for lake replenishment water from the basin increases when runoff water is used for surface recharge	• Include the groundwater needs for lake replenishment in the strategy evaluation • Evaluate the cost-effectiveness of increasing the use of untreated imported through the Canyon Lake Spill for lake replenishment
17	Reduced groundwater recharge as a result of increasing urbanization	• Urbanization potential in the basin area is limited due to topography and flood plain • Reduced recharge does not negatively impact the basin storage as the runoff will reach the lake, reducing the need for level maintenance water from the basin	• Not to be addressed
	Identified for Future Basin Conditions		
18	Impact of groundwater management activities on hotspring wells	• Not anticipated to be an issue as the hotspring wells are located north of the Glen Ivy Fault (north of the basin)	• No action
19	Groundwater storage may lead to a groundwater outflow.	• Groundwater outflows at the southeastern end of the basin may occur if groundwater levels will rise above the saddle height.	• Evaluate potential of groundwater outflows with groundwater model. • Prevent outflows by adjusting water storage levels

Table G-3
Summary of Other Potential Management Issues

No.	Potential Management Issue	Assessment	Recommendation/Action
	Identified under AB3030		
20	Development of relationships with State and Federal Regulatory Agencies	• The District is evaluating the benefit of including Regulatory Agencies in the Stakeholders Process	• Pending and further recommendations follow in this GWMP
	Identified for Existing Basin Conditions		
21	Limited information on recharge characteristics	• The “Sedco Cone” location is unknown • Recharge capacities in the canyons are unknown	• Evaluate the “Sedco Cone’ location with the groundwater model • Conduct pilot testing for recharge locations in preferred strategy
	Identified for Future Basin Conditions		
22	Risk of subsidence	• Decreasing groundwater levels as a result of ASR operations may lead to subsidence when clay layers are dewatered • The basin’s storage capacity will decrease as a result of subsidence.	• Include surface level measurements in the monitoring program • Determine the water level operating range conservatively. • Evaluate the subsidence potential for the preferred alternative.
23	Risk of liquefaction	• Liquefaction may occur in perched areas due to increased groundwater levels in combination of an earthquake. • Potential areas for liquefaction are located in the northern portion of the back basin	• Conduct Cone Penetrometer Testing (CPT) in the back basin area to determine the potential of liquefaction.

APPENDIX H– DETAILS ON WATER CONSERVATION PROGRAMS

Low Water Use Landscaping

Low water use landscaping can be created by adhering to the following key principals:

- Plan and design comprehensively with the consideration of aesthetics, soil type, sloping, intended land use, and native plants.
- Evaluate soil for plant selection and improve if necessary with amendments, such as, spaghnum peat moss or compost to improve root development, water penetration and retention.
- Select the size and location of turf areas based on the purpose and function in the landscape. A reduction of turf areas, and locating them separately, can result in significant reductions in water use due to more efficient watering.
- Use appropriate plants and group according to their water needs and a focus on varieties that have low water needs.
- Water efficiently with properly designed irrigation systems.
- Use organic mulches to reduce evaporation and weed growth, slow erosion, and help prevent soil temperature fluctuations.
- Practice appropriate maintenance: proper pruning, weeding and fertilization, plus attention to the irrigation system, will preserve and enhance the quality of the low water use landscaping.

Water Conservation Program of LADWP

The following strategies for implementing water conservation in households are recommended by the Los Angeles Department of Water and Power (LADWP):

- Check for household leaks
- Displace water in toilet tank or buy an ultra-low-flush toilet
- Water saving shower heads, and take shorter showers
- Turn off the water while brushing teeth, shaving, cleaning vegetables, washing dishes, or washing your car.
- Use appliances such as dishwater and washing machine only when full
- Water lawns deeply and less frequently, early in the morning or late in the evening. Change watering frequency based on season and time of day.
- Use a broom instead of a hose.

The ten recommended steps to conserving water for businesses are:

1. Start with a desire to eliminate waste
2. Appoint a Conservation Manager
3. Determine where your water is used
4. Check your system for leaks
5. Set a conservation goal

6. Apply common sense
7. Involve your employees
8. Install low flow devices
9. Be aware of water efficient equipment
10. Monitor your results

Examples of Rebate Programs

Based on an evaluation of rebate programs of other agencies, including LADWP and MWD, rebates commonly offered are:

- A $150 rebate for residential customers who purchase qualifying high efficiency clothes washers.
- A $250 rebate for commercial customers who purchase qualifying high efficiency clothes washers.
- A $100 for residential customers who replace a toilet in a single family residence and a $75 rebate for each toilet replaced in a multi-family residence.
- A $50 rebate for commercial customers who purchase pre-rinse kitchen sprayers.

In addition, MWD will pay as much as $154 for every acre-foot of water that is saved from industrial process changes done to increase water efficiency. MWD will provide payment for up to five years as long as the process change is expected to save at least 10 acre-feet of water per year (MWD, 2003).

Implementation of Rebate Programs

Implementing a financial incentives program for water conservation would involve the following tasks:

1. Acquiring funds
2. Informing the community about the available rebates and benefits
3. Carrying out the rebate program
4. Tracking participation rates to evaluate the effectiveness of the programs

There are existing programs in California already in place to provide assistance to agencies in both of these capacities. For example, MWD's Innovative Conservation Program portion is designed to provide grants to explore the water savings potential and practicality of new water conserving technologies. Similarly, the Bureau of Reclamation has the Water Conservation Field Services Program (WCFSP) to assist water agencies in developing and implementing effective water management and conservation plans. One of the WCFSP's areas of emphasis is conservation education, and this program could be particularly useful in formulating an outreach effort to accomplish Task 2 above.

Appendix I
Cost Estimate

Table I-1
Cost of Surface Spreading Basins

Location	Size (acres)	Net cut (CY)	Rock Excavation (CY)	Landscaping (ft2)	Construction Cost	Capital Cost
McVicker Canyon	6	83,000	8,300	27,000	$ 1,189,000	$ 1,940,000
Leach Canyon Bottom	14	165,000	16,500	61,000	$ 2,371,000	$ 3,860,000
Leach Canyon Top	11	95,000	9,500	48,000	$ 1,378,000	$ 2,240,000

Appendix J
Model Results

Figure J-1
Baseline B Groundwater Results

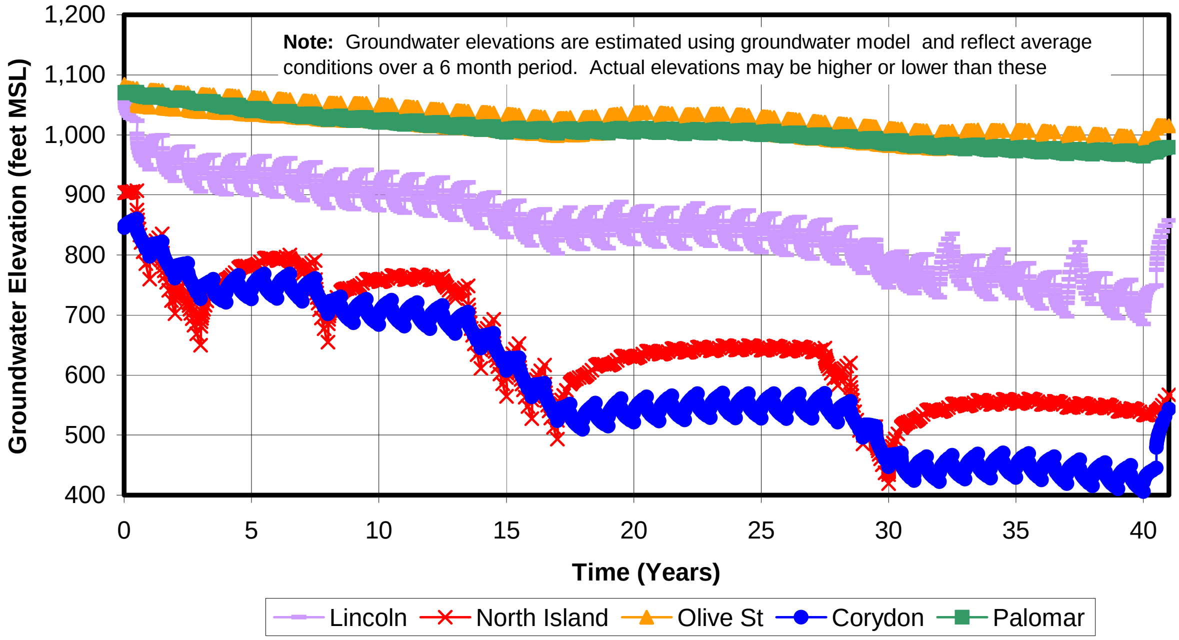


Figure J-2
Alternative 1 Groundwater Results

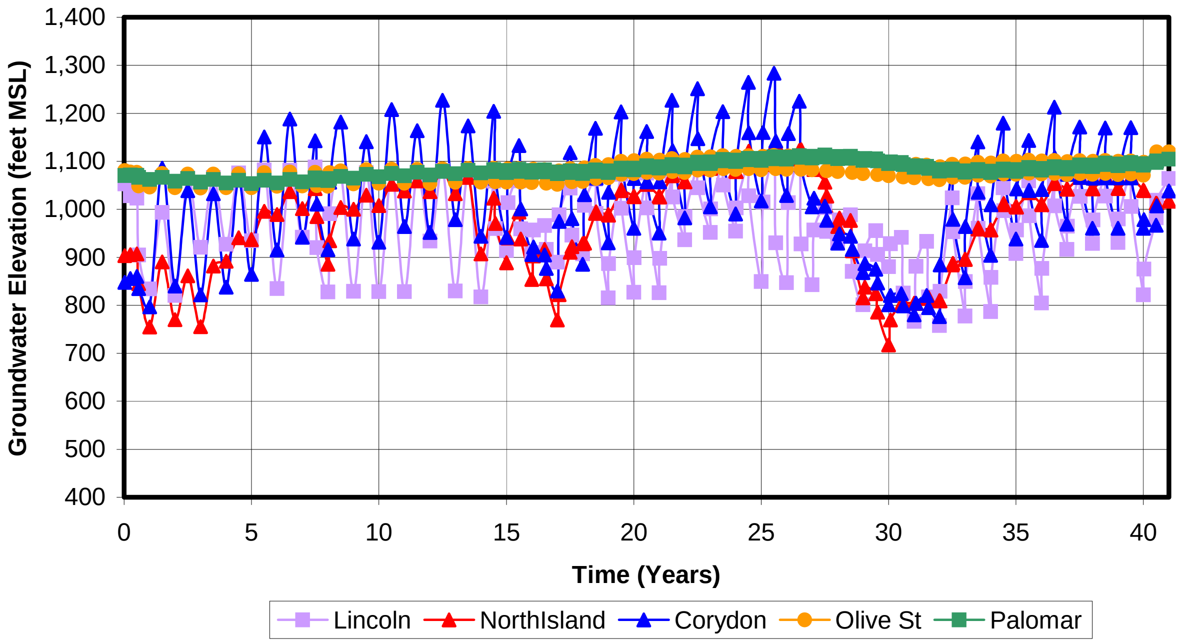


Figure J-3
Alternative 2 Groundwater Results

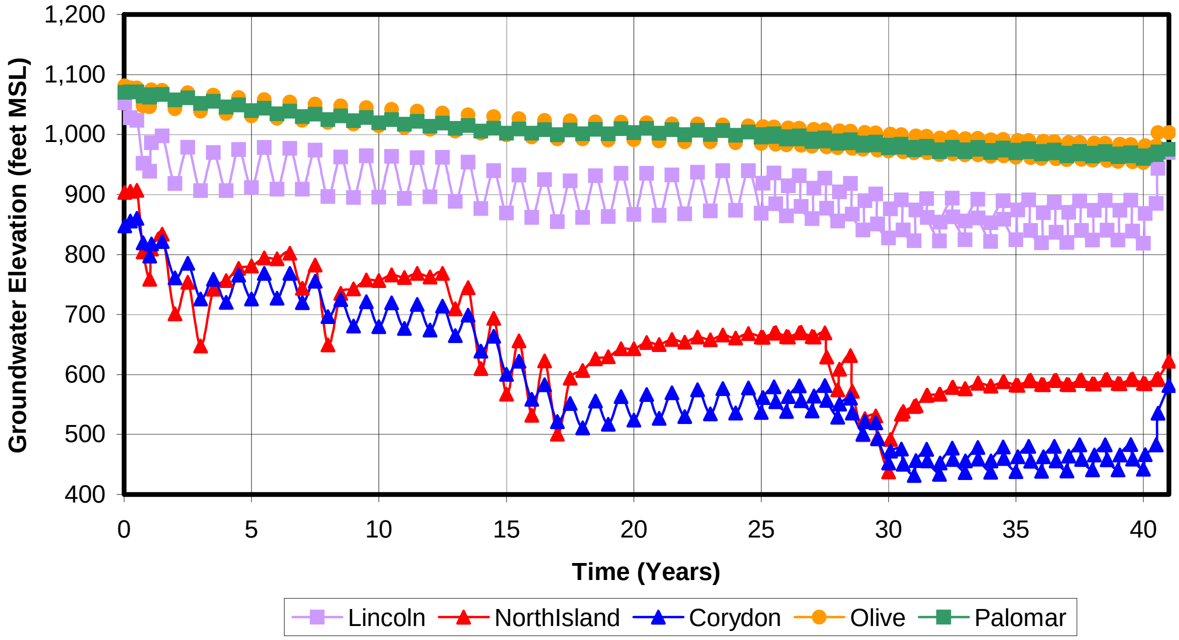


Figure J-4
Alternative 3 Groundwater Results

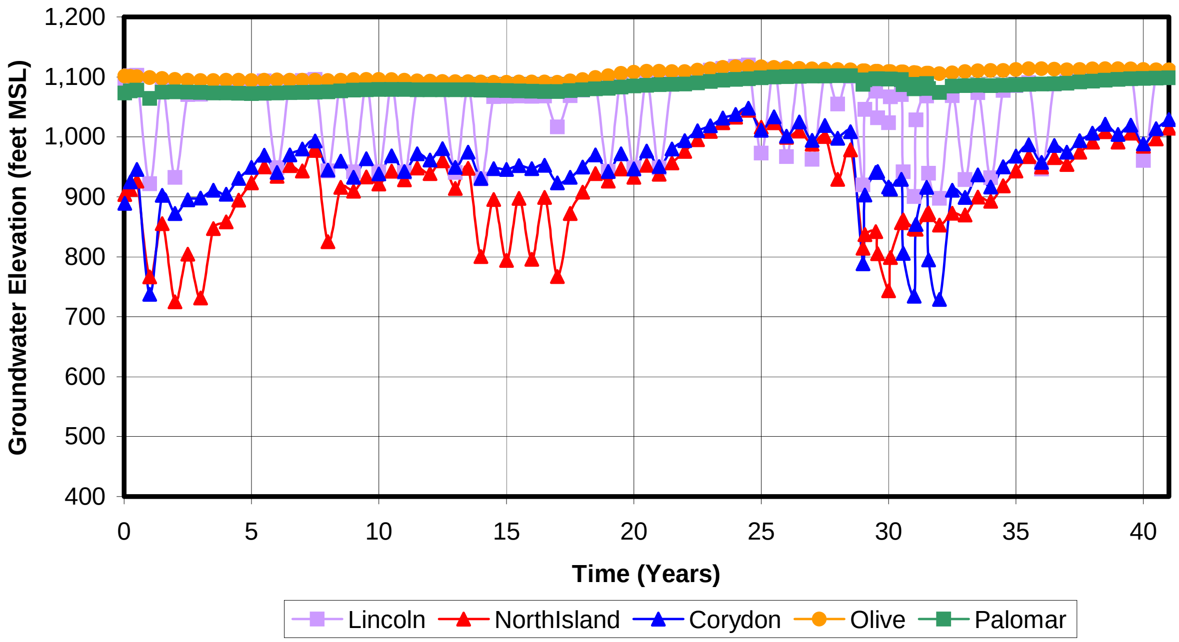
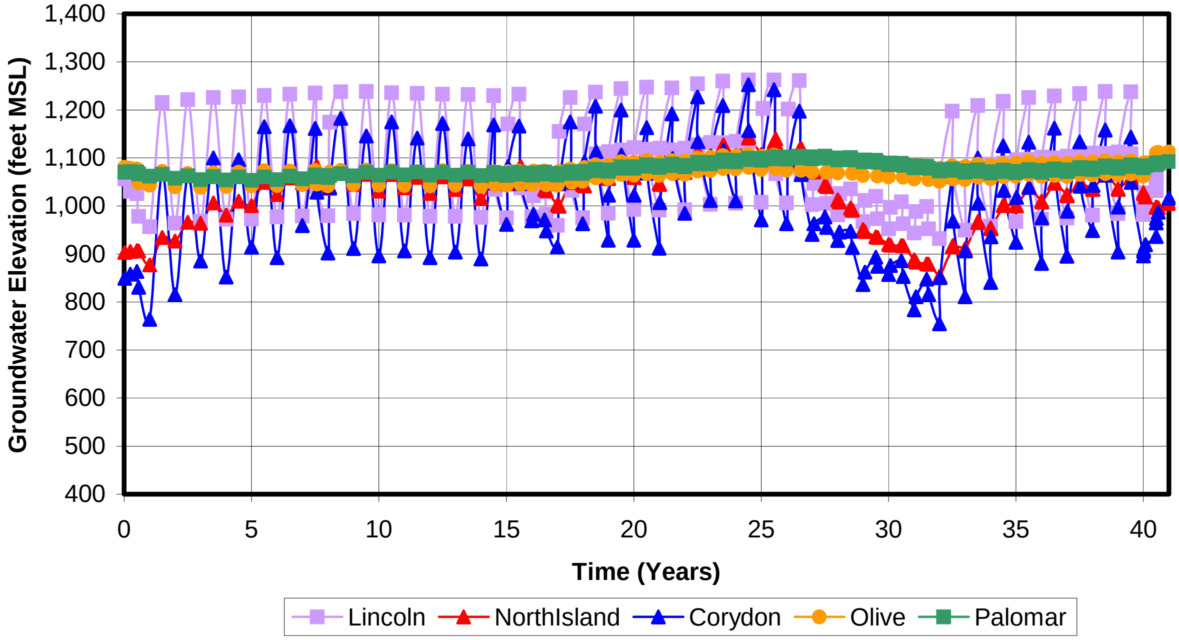


Figure J-5
Alternative 4 Groundwater Results



Appendix K
Groundwater Monitoring Plan

INTRODUCTION

The following report provides the framework for the groundwater monitoring plan for the Elsinore Basin. This report includes a summary of the:

- hydrogeologic setting
- current groundwater monitoring program
- data assessment and
- recommendations for future monitoring in the basin

The activities presented herein will be used in the development of the Groundwater Management Plan for the Elsinore Basin.

Purpose of the Monitoring Program

The primary objective of the monitoring program is to guide the collection of groundwater information in the Elsinore Basin. This task includes an inventory of existing wells within the Basin to determine suitability for use as monitoring points. The monitoring plan will identify existing and new wells to be used to monitor groundwater conditions beneath and adjacent to the proposed groundwater recharge and injection facilities. Recommendations will be made regarding the additional data to be collected and the frequency of monitoring.

This plan also describes the current groundwater monitoring activities in the basin and identifies additional data that are needed to evaluate the groundwater conditions in the basin. The purpose of the data collection is to compile information to:

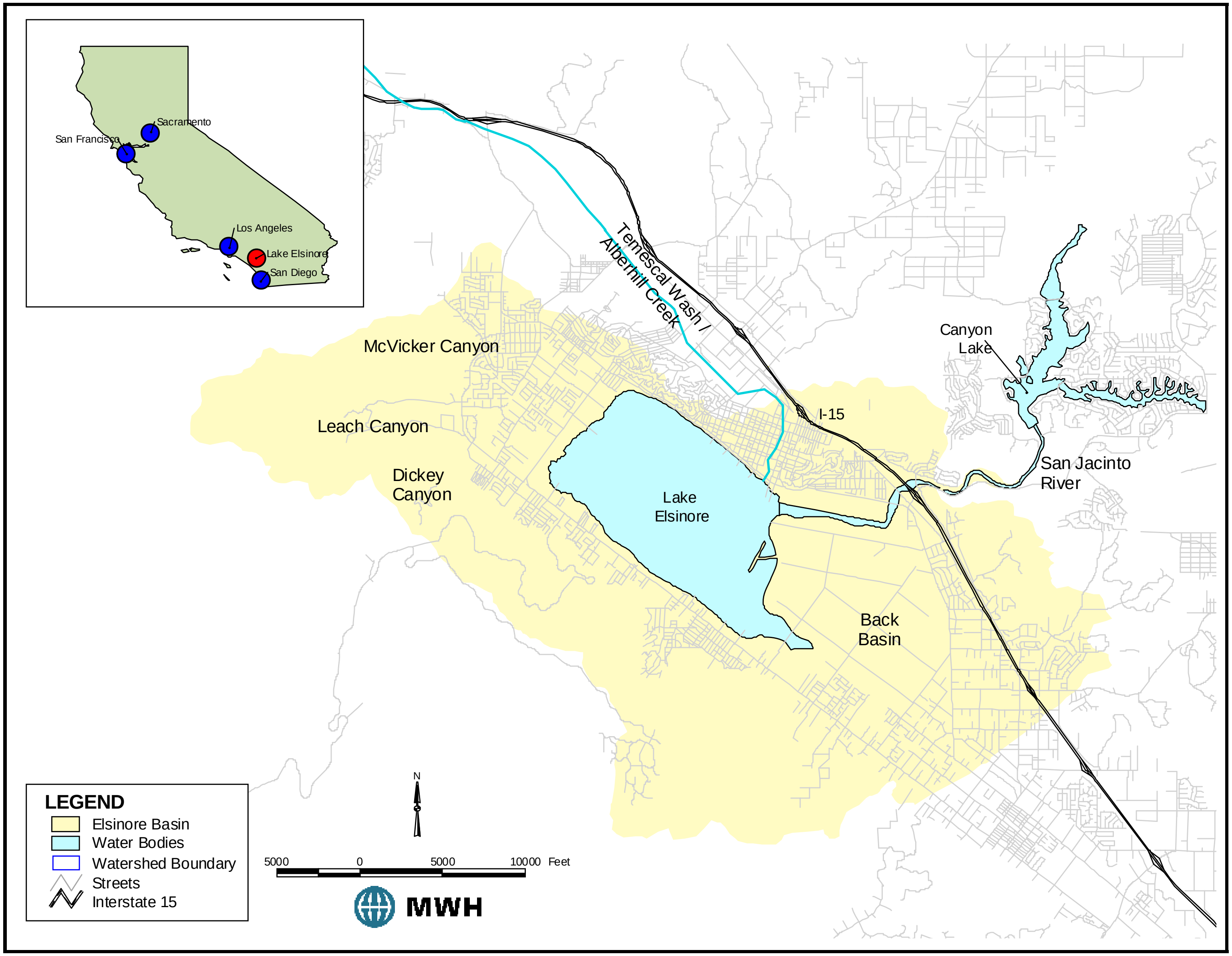
- characterize existing and future vertical and horizontal groundwater flow conditions throughout the basin
- evaluate the influence of faulting on groundwater flow particularly in the area of Leach and McVicker Canyons, which recharge groundwater northeast of Lake Elsinore
- identify and evaluate vertical and horizontal variations in water quality particularly with respect to constituents of concern (TDS, sulfate, nitrate and arsenic)
- quantify sources of groundwater recharge to the basin particularly in the area of Leach and McVicker Canyon and
- provide the framework for evaluating future groundwater management actions in the basin

The remainder of this section describes the area of interest and existing conditions within the Elsinore Basin.

Area of Interest

The area of interest for the monitoring program is the Elsinore Basin as shown in **Figure 1**. The surface drainage area shown on this figure includes approximately 42 square miles, of which

Figure 1
Study Area



about 25 square miles are located within the basin floor and Lake Elsinore. The remaining portions of the Elsinore Basin include the surrounding highlands and associated streams and canyons. In general, the surface water in the study area drains toward Lake Elsinore. Major surface water canyons and rivers include McVicker, Leach and Dickey Canyons along the western margin of Lake Elsinore and the San Jacinto River from the north and east. During periods of high lake levels, water in Lake Elsinore flows into the lake outlet channel, which discharges to Temescal Wash. The area southeast of the lake, referred to as the Back Basin, is part of the flood plain for Lake Elsinore and the San Jacinto River. The boundary of the groundwater basin is approximately coincident with the surface drainage boundary shown on **Figure 1**.

EXISTING CONDITIONS IN THE BASIN

Hydrogeologic Setting

The following provides a brief description of the hydrogeologic setting for the Elsinore Basin. A complete description of the hydrogeology is provided in the Groundwater Management Plan (MWH, 2003). This information provides the framework for the development of the monitoring program. **Figure 2** shows the general hydrostratigraphy of the Elsinore Basin.

The principal water-bearing units in the Elsinore Basin from top to bottom are the Recent and Older alluvium (referred to as "alluvium" throughout this memorandum) and the Fernando Group. Although some wells are screened in the Bedford Canyon Formation, this formation does not generally yield high-producing wells.

The Elsinore Basin is dominated by the Elsinore graben, a downdropped block between the Glen Ivy fault zone and the Wildomar fault zone located to the north and south of Lake Elsinore, respectively. Major faults zones in the Elsinore Basin include the Glen Ivy fault zone, which includes the Glen Ivy fault, the Freeway fault and the Sedco fault, and the Wildomar fault zone, which includes the Wildomar fault, the Rome Hill fault, and the Willard fault. These faults are shown on **Figure 3**.

Other faults identified by DWR (1981), which subdivided the Elsinore Basin into additional hydrogeologic compartments, appear to be limited to the basement rocks and do not appear to provide barriers or restriction to groundwater flow.

Groundwater Levels

An evaluation of current groundwater levels is important to understanding the behavior of the groundwater basin. Recent groundwater data from wells other than those owned by EVMWD is limited. Therefore, most of the groundwater level data available comes from wells that are located between the Glen Ivy fault and the Wildomar fault (see Figure 3) in the Back Basin and in the area northwest of Lake Elsinore.

Figure 2
Hydrostratigraphy in the Elsinore Basin

Formation	Symbol	Graphic	Description
Recent Alluvium	Qal		Interfingering sands and clays
			Perched groundwater conditions present
Older Alluvium	Qt		Interfingering sands and clays
			Slightly more consolidated than above
Fernando Group	TQf		Poorly sorted, subangular granitic sands, cobbles, and boulders
			Most produced groundwater comes from this zone
Bedford Canyon Formation	bcb		Blue to black slate and sandstone
			Relatively low groundwater production rates in this zone
Undifferentiated Basement	bct		Granitic basement rocks
			Limited groundwater production except in fractures

A detailed discussion of the groundwater conditions within the basin is provided in the Groundwater Management Plan. A groundwater contour map for the Fernando Group, the principal water-producing aquifer, is shown in **Figure 4**. As shown in this figure, groundwater generally flows from the northwest to the southeast across the basin and the gradient appears to steepen toward the Corydon Street well as a result of pumping within the Back Basin. In the summer of 2002, the groundwater elevation in the Olive Street well, which is on the upthrown side of the Glen Ivy fault, is 1,156 feet above MSL, more than 400 feet higher than water levels in the Corydon Street well about a mile away. This suggests that the Glen Ivy fault provides a barrier to groundwater flow. However, observed offsets in the bedrock associated with Glen Ivy fault may also cause fluctuations in water level.

Figure 5 shows groundwater levels for wells that penetrate the alluvium. Because there are few wells screened exclusively in the alluvium, it is not possible to generate a contour map with existing data. Water levels in monitoring wells MW-1 and MW-2, which have piezometers screened exclusively in the Lower alluvium, are about 100 to 150 feet higher than wells (e.g. Cereal-1 and Cereal-3) that are also screened in the Fernando Group. This appears to suggest a hydrogeologic separation between the alluvium and the underlying Fernando Group.

Figure 3
Faults of the Elsinore Basin

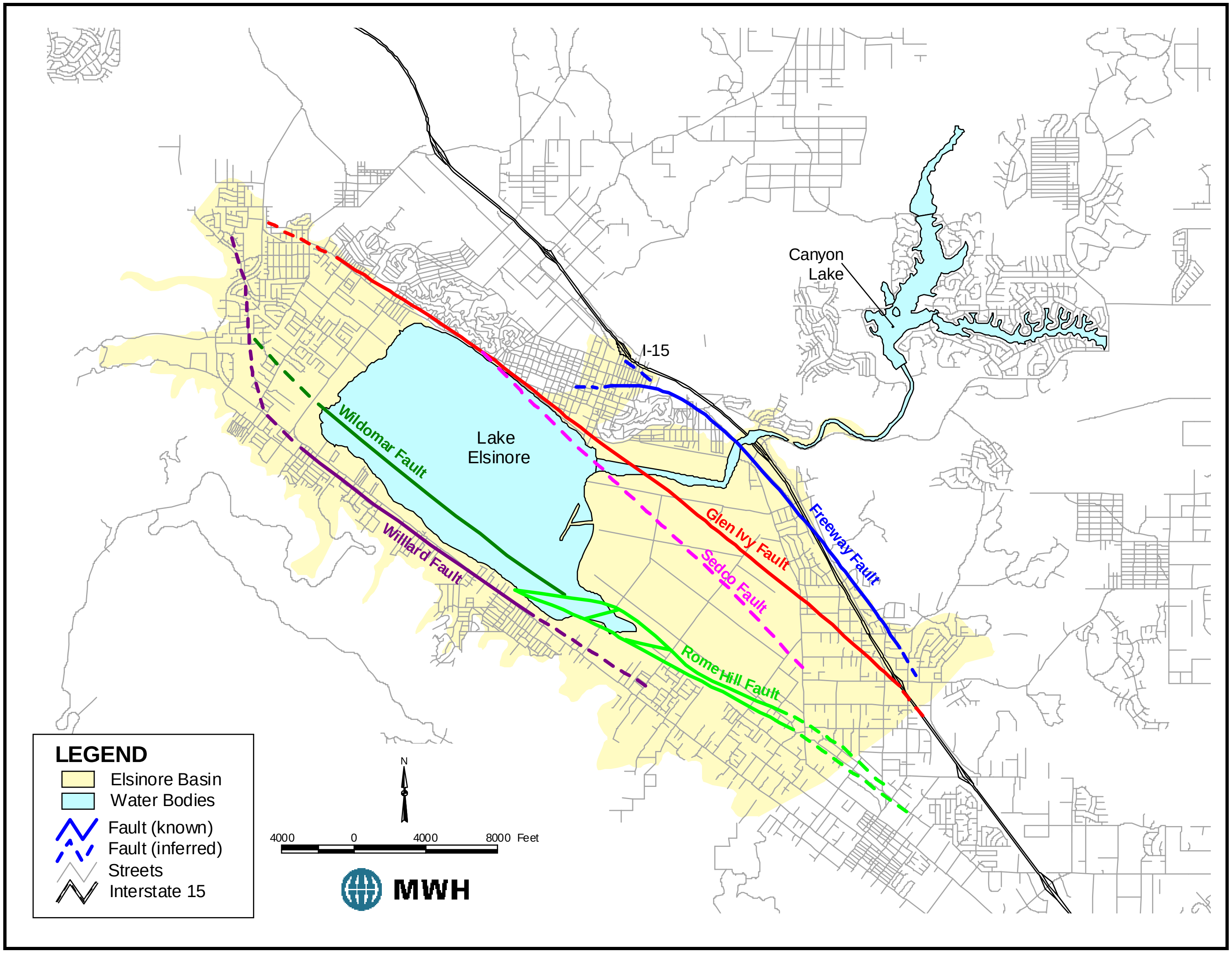


Figure 4
Groundwater Contour Map of the Fernando Group (Summer 2002)

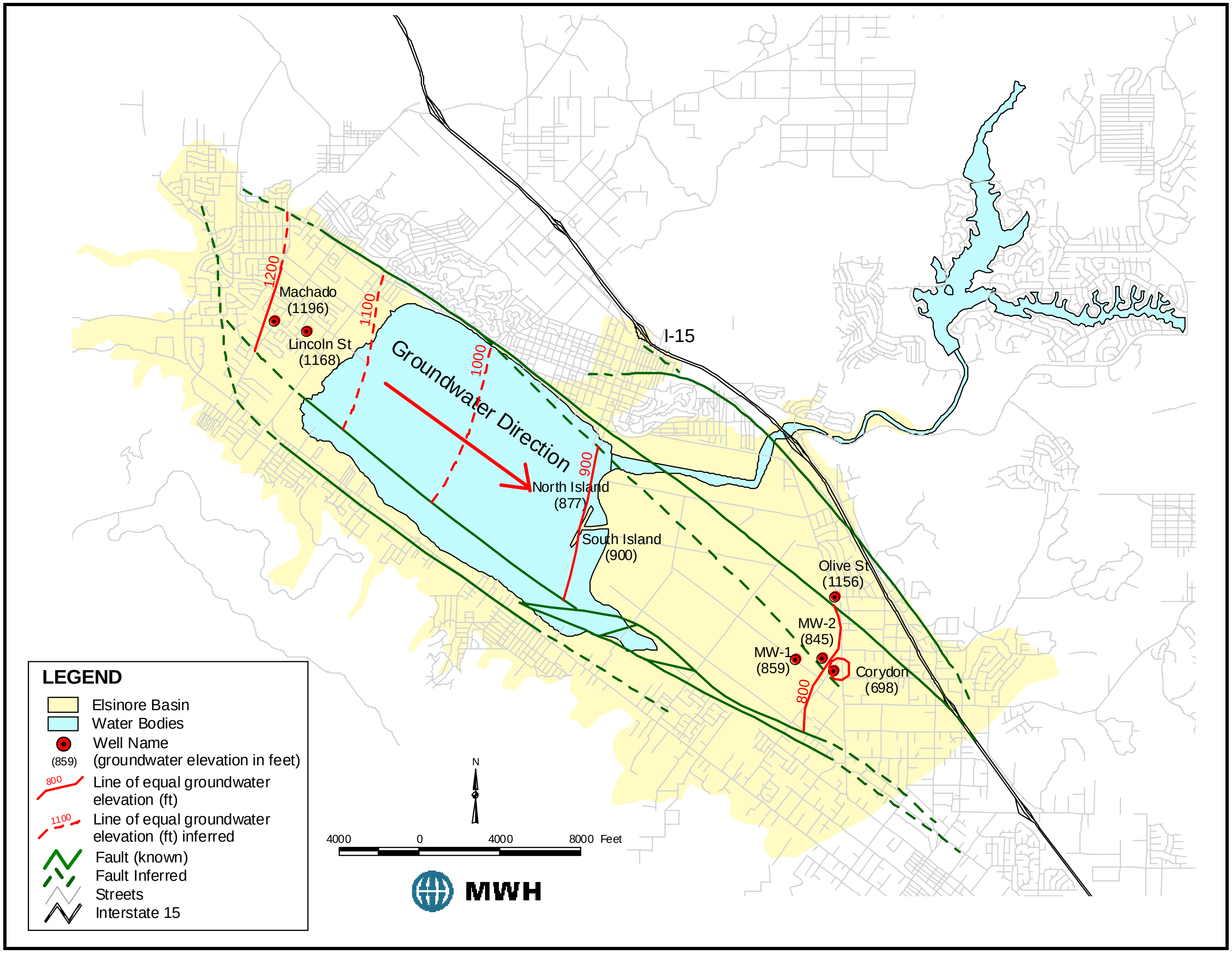
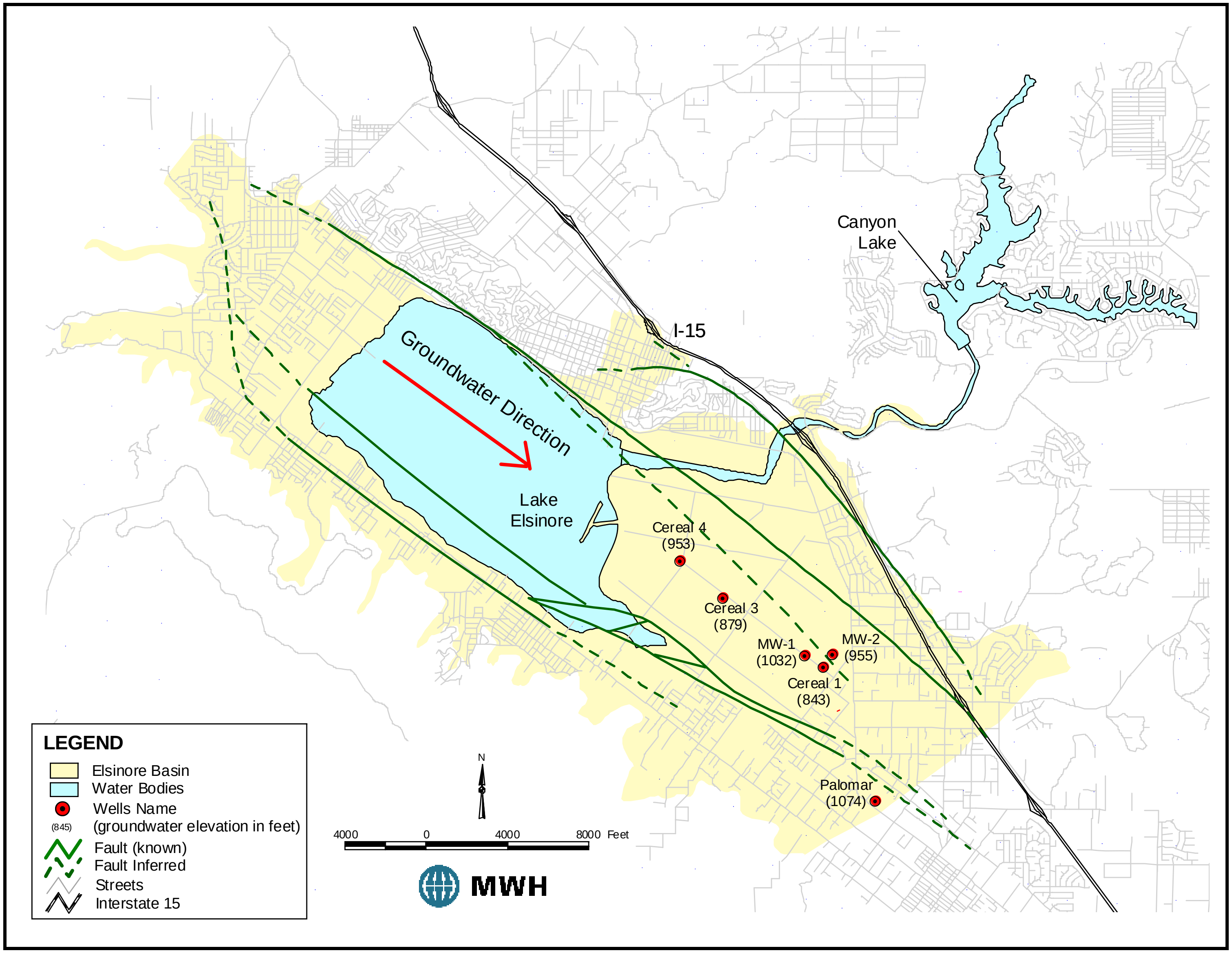


Figure 5
Groundwater Levels in the Alluvium and Fernando Group (Summer 2002)



The Palomar well, located on the south side of the Wildomar Fault Zone, has a water elevation of 1,074 feet above MSL. Because no other water level data are available for the area near the Palomar well during 2002, it is impossible to contour water levels in this area for this time period. Based upon the available data, more shallow monitoring points are necessary to characterize the groundwater flow conditions within the alluvium.

Groundwater Quality

An understanding of the existing water quality is also an important aspect of the groundwater monitoring plan. The following section provides a description of the current groundwater quality within the basin.

General

Piper diagrams are often used to observe differences in general water quality from various sources. A Piper diagram plots various cation and anion concentrations on the same graph as a relative percentage, which allows for identification of water quality similarities and differences among various water sources that may not be detected simply by comparing bulk concentrations. A Piper diagram representing groundwater quality during Summer 2002 for the Elsinore Basin is provided in **Figure 6**.

These data suggest various water quality signatures throughout the basin and vertical and horizontal differences in water quality. For example, the Cereal-1 well, which is screened across the alluvium and the Fernando Group, has intermediate quality between the Corydon Well (which is screened only in the Fernando Group) and the monitoring wells (MW-1 and MW-2) that are screened in the Lower Alluvium. Similarly, the Lincoln Street Well and the Machado Well, which are screened in the Fernando Group and the Bedford Canyon Formation, appear to have similar water quality.

Time-series plots for total dissolved solids (TDS), nitrate, sulfate and arsenic in select wells are presented in **Figure 7** through **Figure 10**. These constituents are often used to identify changes in water quality. General observations made from these data include:

- TDS (caused by higher nitrate and sulfate) is generally higher in the area north of the lake and along basin margins than in the Back Basin
- Highest concentrations of TDS, sulfate and nitrate are found at the Lincoln Street Well
- Lowest concentrations of TDS and sulfate are found in the Olive Street Well
- Concentrations of TDS have exceeded the secondary standard of 500 mg/L historically in the Lincoln Street Well and Cereal-4
- Concentrations of nitrate and sulfate, although higher in some locations, have not exceeded applicable standards in any EVMWD well
- Nitrate (as nitrate) concentrations in the Palomar Well appear to be increasing
- Concentrations of arsenic are below the current standard of 50 μg/L, however, they have exceeded the proposed new (effective 2006) maximum contaminant level of 10 μg/L in the Back Basin wells (Cereal-1, Cereal-3, Cereal-4 and Corydon Street)
- Highest concentrations of arsenic are found in deeper wells such as Cereal-1, Cereal-3 and Cereal-4

Figure 6
Piper Diagram in the Elsinore Basin

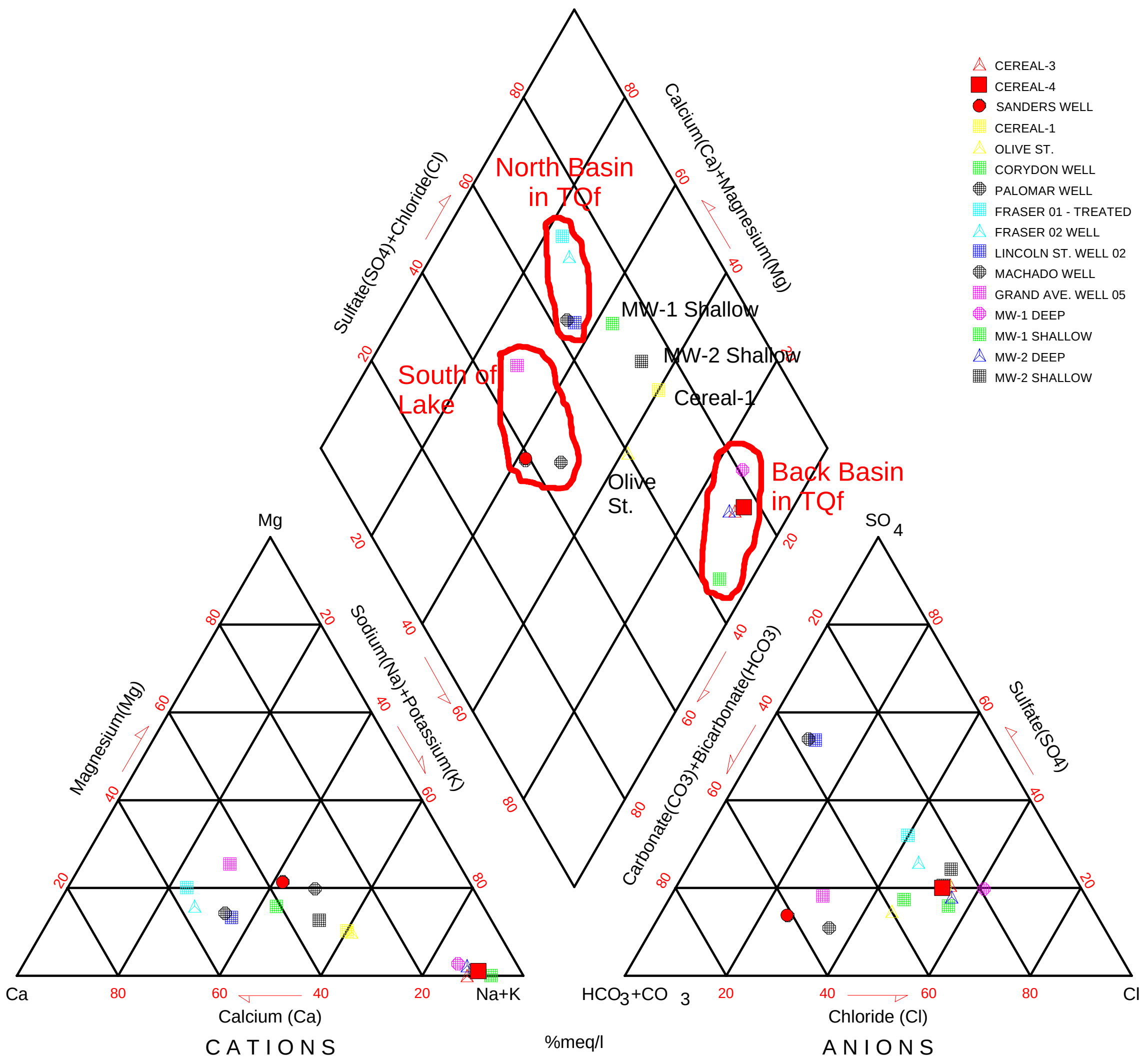


Figure 7
Historical Total Dissolved Solids Concentrations in Wells in the Elsinore Basin

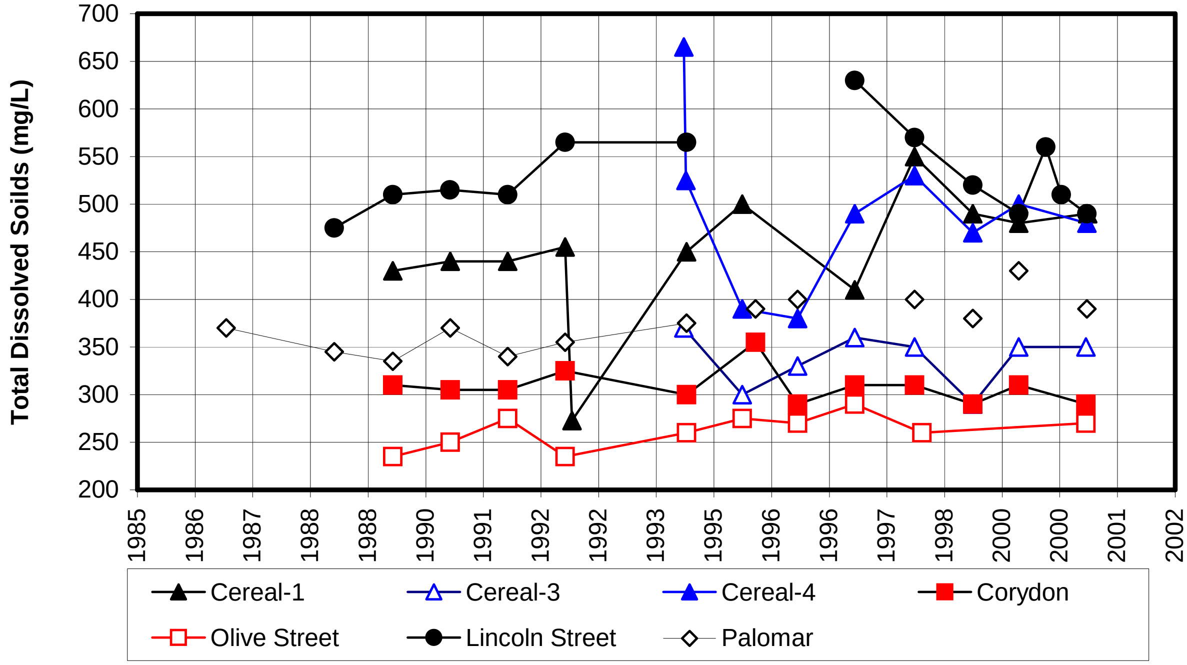


Figure 8
Historical Sulfate Concentrations in Wells in the Elsinore Basin

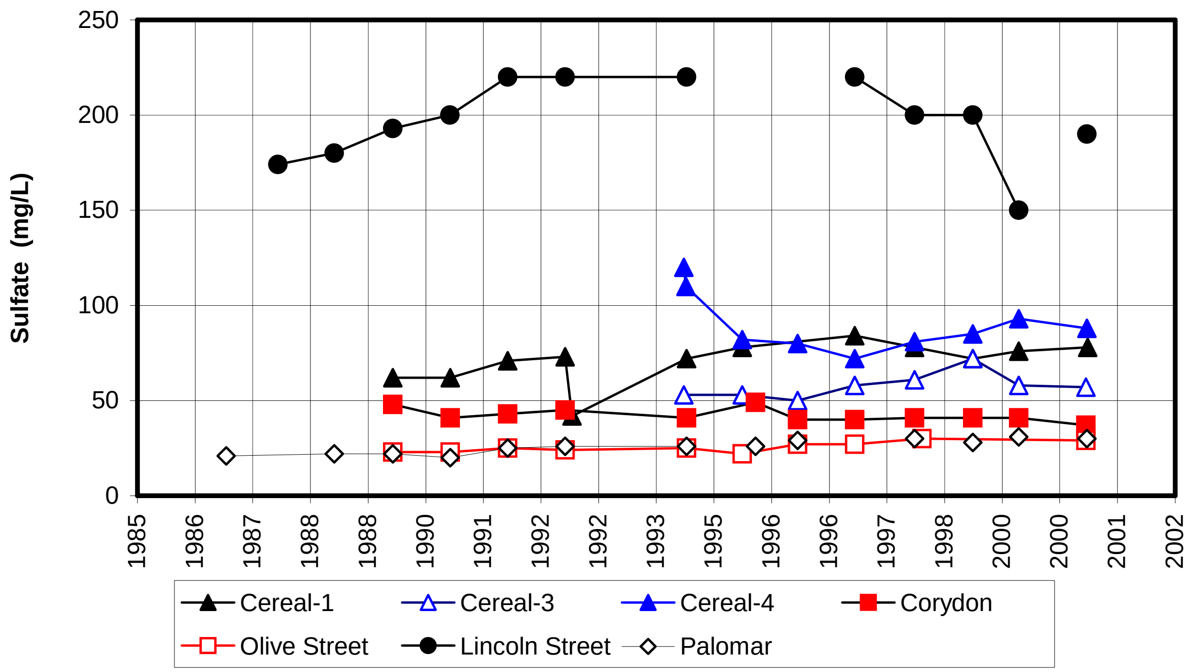


Figure 9
Historical Nitrate Concentrations in Wells in the Elsinore Basin

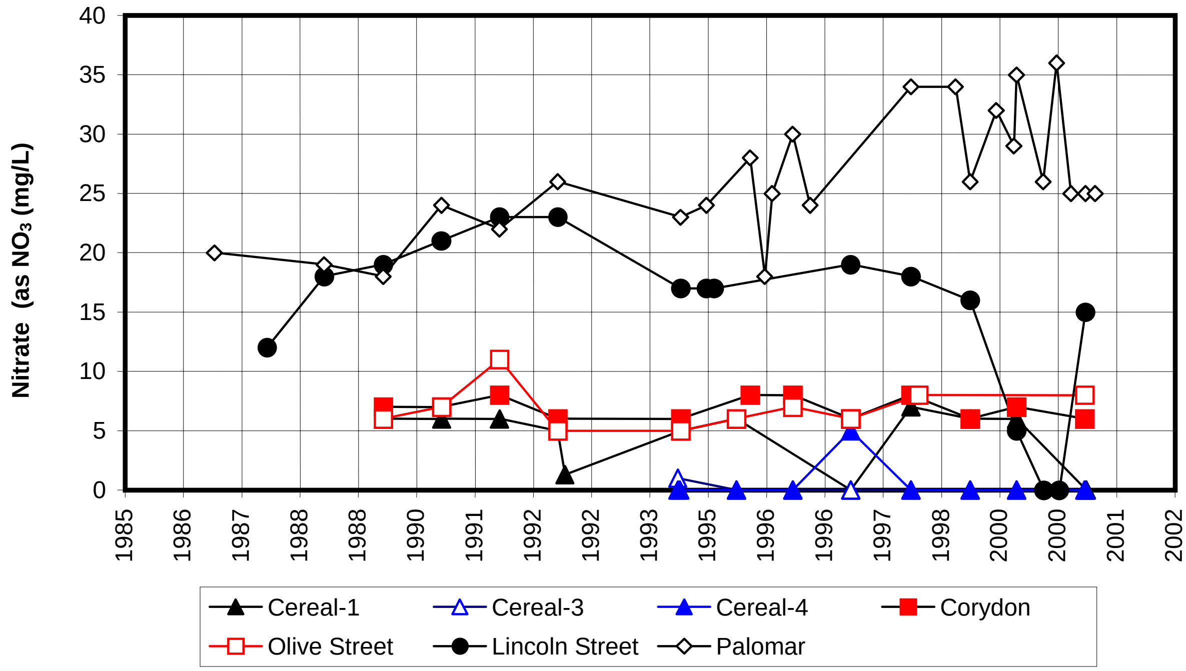
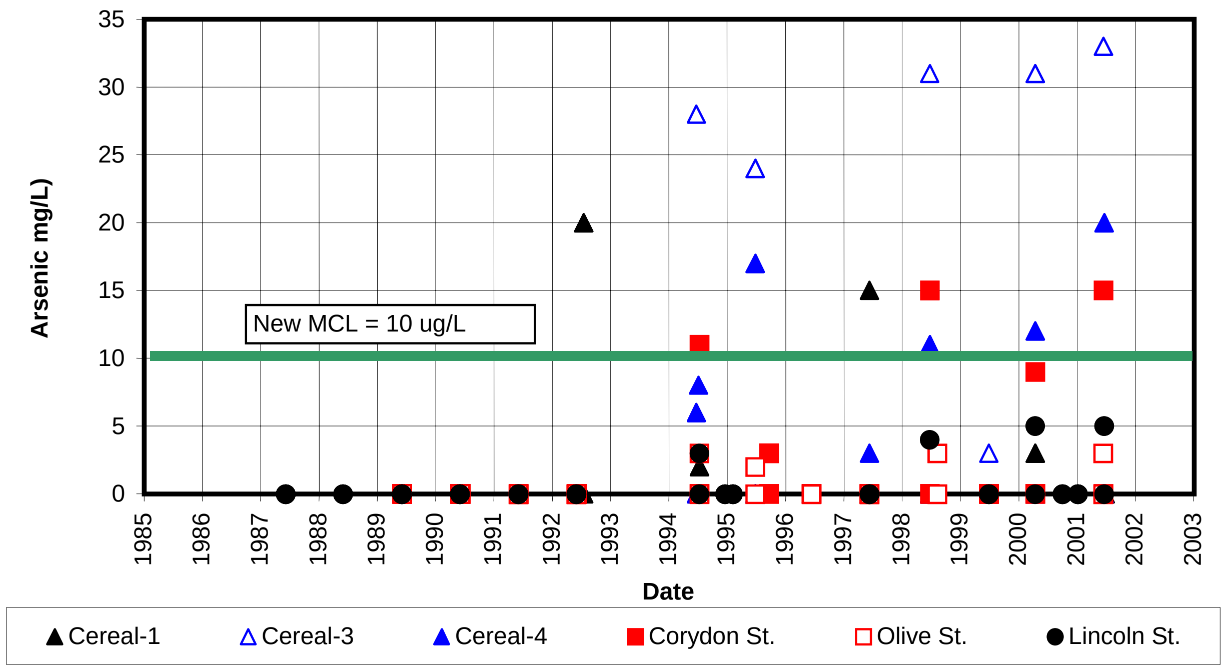


Figure 10
Historical Arsenic Concentrations in Wells in the Elsinore Basin



CURRENT MONITORING PROGRAM

The following section describes current groundwater monitoring activities within the Elsinore Basin and identifies data gaps.

Joint Groundwater Monitoring Program

In May, 2000, EVMWD and Elsinore Water District (EWD) entered into an agreement to participate in a Joint Groundwater Monitoring Program to monitor groundwater levels, quality, production and precipitation in the area of the Elsinore Basin northwest of Lake Elsinore (EWD and EVMWD, 2000). This agreement established specific groundwater trigger points for wells in the basin and developed a specific monitoring program for these wells. Inactive wells in the vicinity of active EWD wells Fraser I and Fraser II (trigger well Wisconsin well) and EVMWD's Machado well (trigger well Stewart well) were selected as "trigger wells" to monitor groundwater changes in the basin. These wells are listed in **Table 1**.

Table 1
Summary of Joint Groundwater Monitoring Program

Production Well	Non-Production Well (Trigger Well)	Trigger Point	Monitoring Analyses
Fraser I	Wisconsin (6S/4W 02B01)	1,106 feet MSL	• Water level and production monthly • Water quality annually
Fraser II			
Machado	Stewart (6S/4W 03G01)	1,057 feet MSL	

When groundwater levels in the trigger wells drop below the specified trigger point for three consecutive months (based upon historic low groundwater levels in the respective well), EVMWD agreed to pay EWD for the additional power costs and/or provide mitigation water if EWD could not produce sufficient groundwater to meet their customer needs.

EVMWD Wells

EVMWD also monitors monthly groundwater levels (both pumping and static) and production and annual groundwater quality in other wells in its distribution system. The wells included in EVMWD's current monitoring program other than those listed in Table 1 are listed in **Table 2**. MWH has recently installed four monitoring wells (MW-1 through MW-4) and a new production well (Inj-1) in the Back Basin. These wells are included in the future monitoring program.

Table 2
Summary of Current Monitoring Frequency for EVMWD Wells

Well Name	Monitoring Frequency		
	Water Level	Production	Water Quality
Cereal-1	Monthly	Monthly	Annually
Cereal-3	Monthly	Monthly	Annually
Cereal-4	Monthly	Monthly	Annually
Corydon	Monthly	Monthly	Annually
Lincoln Street	Monthly	Monthly	Annually
Machado Street	Monthly	Monthly	Annually
Olive Street	Monthly	Monthly	Annually
Palomar Street	Monthly	Monthly	Annually
North Island	Monthly	NA	NA
Middle Island	Monthly	NA	NA
South Island	Monthly	NA	NA

AREAS OF CONCERN

The following discusses areas of concern within the Elsinore Basin that should be monitored as part of the groundwater monitoring program.

Overdraft

The groundwater balance, which accounts for the inflows and outflows in the basin, is one of the components of overdraft. From 1990 through 2000, the average annual basin storage decreased by about 1,800 acre-ft/yr. It should be noted that this period was wetter than the historical average and, as such, would underestimate the actual deficit in the basin. In addition, water levels in some wells in the south portion of the basin declined more than 200 feet. Groundwater levels remained fairly constant in the northern part of the basin where most of the recharge occurs. Because of the negative groundwater balance and declining water levels, the sustainability of this condition is an issue that will need continued monitoring.

Land subsidence is the lowering of the ground surface due to groundwater withdrawal or seismic activity. Groundwater withdrawal is the most likely mechanism or cause for land subsidence in the Elsinore Basin. Groundwater withdrawal causes the sediments of the aquifer to compact. The amount of compaction depends upon the thickness and hydrogeologic character of the aquifer, as well as the rate and amount of decrease in the water level. Fine-grained sediments (clays), such as those composing the aquitard that separates the alluvium and the Fernando Group, are more susceptible to compaction and subsidence than coarse-grained sediments (sands) when groundwater is removed from them. However, the low permeability and high specific storage of fine-grained sediments cause compaction to occur slowly, over a period of several years, rather than as an instantaneous response to water level decline. Therefore, a short-term impact might be difficult to detect and subsidence may occur years after the water level had declined. However, once it has occurred, compaction of fine-grained sediments is permanent, due to a permanent rearrangement of soil particles. This results in a permanent loss of groundwater storage capacity and land subsidence. It is unclear whether land subsidence is actually occurring in the Elsinore Basin at this time. The groundwater monitoring plan should include identification of potential areas of land subsidence.

Groundwater Quality

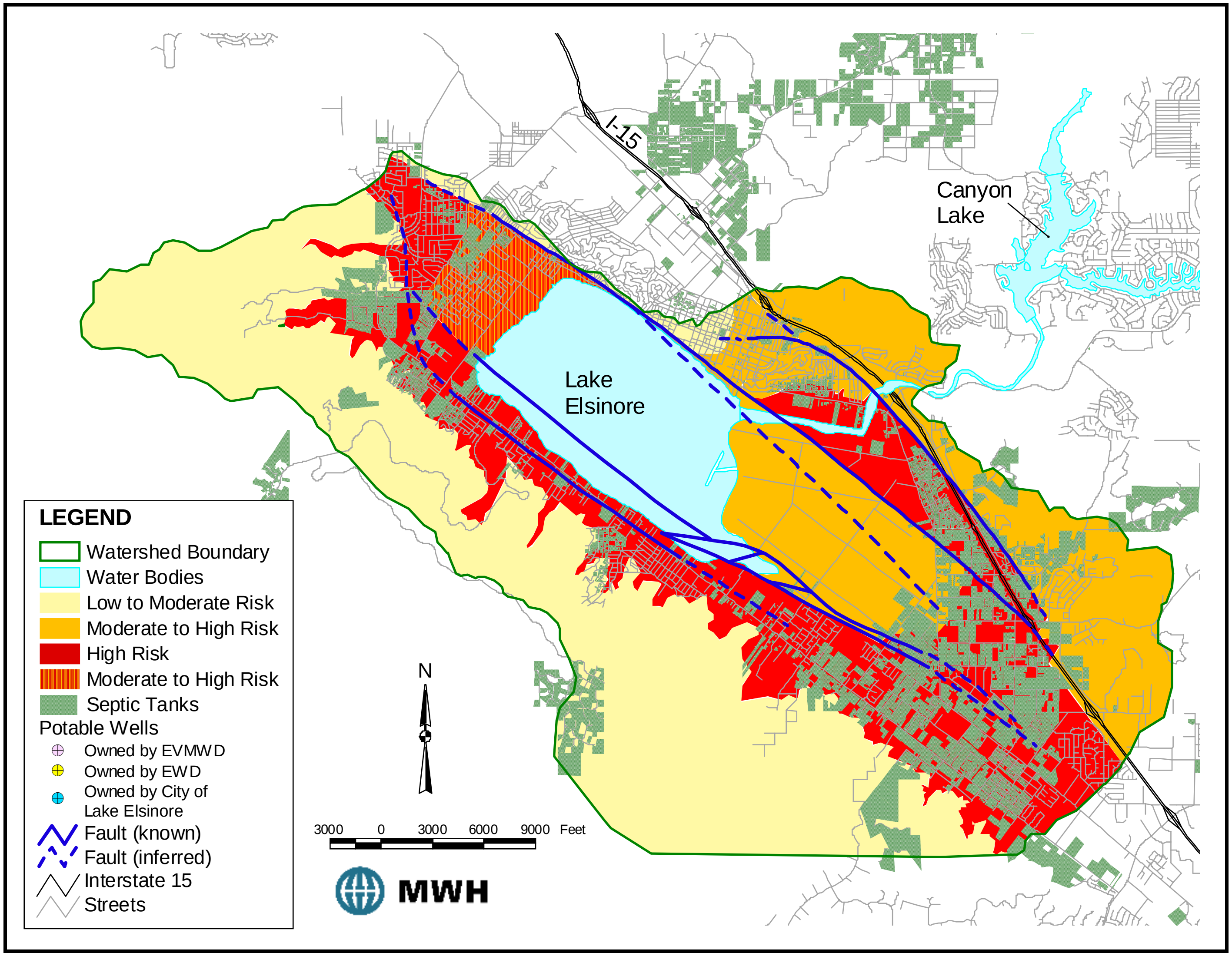
The downward seepage of sewage, agricultural, or industrial waste is a potential source of groundwater contamination. The District service area includes residential and industrial land use. Agricultural land use has greatly diminished in the last ten years. However, in some areas (e.g. the north end of the lake) where historical agricultural land use was present, there is a potential for downward migration of higher TDS and sulfate water. The higher concentrations of various constituents in the area north of the lake could be a result of historical land use practices in this area. Much of the area north of the lake historically has been an agricultural area. In addition, much of this area was on septic systems, which can result in higher nitrate concentrations in the groundwater.

In addition, approximately 4,000 parcels in the City of Lake Elsinore and surrounding areas have septic systems that are still used (see **Figure 11).** Risk zones associated with septic tank locations relative to groundwater supply are proposed based on the previously mentioned material. Generally, the level of risk is related to existing or potential future groundwater supply development and recharge potential. The categories and the basis for their selection are as follows:

- **Areas of Low to Moderate Risk:** These areas generally consist of bedrock. There is little or no potential for the development of groundwater supply projects in these areas.
- **Areas of Moderate to High Risk:** These are areas where there are existing groundwater supply facilities or the potential for the development of future groundwater supply. However, the clay content is higher in the shallow sediments which provides limited separation between septic tank effluent and the deeper water supply aquifers.
- **Areas of High Risk:** These are areas where there are existing groundwater supply facilities or the potential for future groundwater supply development. Based on the location relative to the basin boundaries, and the lack of fine-grained sediments in the shallow sediments, these areas are where most of the aquifer recharge occurs and are the most vulnerable to contamination.

One of the eight EVMWD wells (Palomar) and two of EWD's wells (Wood and Sanders) are currently located in high risk zones. The Palomar well has experienced an increase in nitrate concentrations (a indicator parameter for septic tank contamination) over the past 15 years. If nitrate concentrations in this well continue to increase, it is possible that it could exceed the MCL of45 mg/L in the near future. Sufficient data are not available to evaluate the nitrate concentrations in the Wood and Sanders wells. Although concentrations are currently below the MCL of 45 mg/L for nitrate in these well, nitrate presents an issue for groundwater quality in portions of the basin.

Figure 11
Septic Tank Risk Zones



An additional concern for contamination is from leaky underground storage tanks (LUSTs) discharging petroleum products, solvents or other organic constituents. In particular, the gasoline oxygenate known as MTBE (methyl tertiary-butyl ether) has become a major problem throughout California. According to the Regional Board (2003), MTBE has been detected in the groundwater as a result of LUSTs in four locations throughout the Elsinore Basin since 1998. In addition, 35 cases of LUSTs have been reported to the Regional Board (Regional Board, 2003). Based upon recent groundwater production well quality data, no District or EWD well has had detections of MTBE or other organic compounds attributed to these LUSTs.

Concentrations of arsenic for select wells in the basin are provided in **Table 3**. Arsenic is a naturally occurring element that is commonly found in granitic or metasedimentary source rocks. Higher concentrations of arsenic in the Back Basin area appears to be a function of the screened depth and the aquifer from which the well receives its water. Wells screened within the lower portion of the Fernando Group and/or the Bedford Canyon Formation (e.g. Cereal-3 and Cereal-4) tend to have higher concentrations than those screened shallower.

Table 3
Summary of Arsenic Concentrations in Select Wells (2000-2)

Well	Screened Interval (fbgs)	Aquifer Zone	Concentration Range (μg/L)
Cereal-1	420-1,410	Qa and TQf	1.5-2.7
Cereal-3	440-1960	Qa, TQf and bcb	33
Cereal-4	380-1,700	Qa and TQf	20
Corydon Street	340-1,260	TQf	9
Fraser-01	180-400	Qa and TQf	2-3
Lincoln Street	360-940	TQf and bcb	5
Machado Street	570-960	TQf and bcb	5
Olive Street	398-698	TQf	3-15
Palomar Street	200-900	Qa and TQf	ND
MW-1 Shallow	230-430	Qa	ND
MW-1 Deep	700-1,000	TQf	6.1
MW-2 Shallow	280-480	Qa and TQf	2.1
MW-2 Deep	700-1,000	TQf	4.6

According to EVMWD staff, the Olive Street well is not currently in production because of elevated bacteria levels. These elevated levels may be caused by a variety of environmental conditions including: influence of septic tanks and surface water and/or conditions such as vegetable oil leakage within the pump. Because the elevated bacteria levels are not associated with a corresponding increase in nitrate concentrations or other nutrients, it is unlikely to be caused by septic tanks. Further investigation will be required to address this issue.

Identification of Data Gaps

Additional data are needed in the following areas:

- Groundwater level and production data for wells other than those controlled by EVMWD throughout the basin
- Estimates of vertical distribution of flow within existing production wells with water quality issues particularly those wells with elevated TDS, sulfate, nitrate and arsenic
- Additional groundwater level and water quality data for wells screened exclusively in the alluvium
- Groundwater level and quality in the area north of the lake between Leach and McVicker Canyons and Machado Street to evaluate the effect of faulting on groundwater flow from the canyons and the feasibility of surface recharge in this area. In addition, because there is limited data in this area, background water level and water quality data are needed to evaluate future recharge impacts. These wells will also be used to monitor the recharge operations once constructed.
- Groundwater level and quality in the area southeast of the Corydon Well between the Glen Ivy fault and the Wildomar fault zone to evaluate the impact of groundwater storage activities to the area downgradient of the Corydon Well.
- Groundwater level and quality along the San Jacinto River southwest of I-15 between the Freeway fault and the Glen Ivy fault to evaluate the feasibility of surface recharge in the area where bedrock is downdropped creating a thicker alluvial section.
- Groundwater level and quality in the area south of the lake to evaluate whether the Wildomar fault zone is a barrier to groundwater flow

The groundwater monitoring plan provides the framework for obtaining these data.

GROUNDWATER MONITORING PROGRAM

The following section outlines the activities associated with the groundwater monitoring program. This includes a discussion of the wells included in the program, recommendations for new wells, a description of the water quality sampling protocol, and a description of the groundwater level monitoring for the Elsinore Basin.

The Groundwater Management Plan recommends that the EVMWD Board of Directors appoint an Advisory Committee, which is expected to include local agencies and interested stakeholders, to oversee the implementation of the plan. EVMWD should implement the groundwater monitoring program through this Advisory Committee.

Wells Included in Monitoring Program

As part of the development of the water management plan, MWH identified 235 well locations within the Elsinore Basin, of which only 147 had well log information that could be used to verify their owners and locations (MWH, 2003). However, in most cases, no additional data, other that the data provided on the DWR well log were available for private wells. The following section identifies wells within the Elsinore Basin that should be included in the groundwater monitoring program. The initial list includes 29 existing or pending production and monitoring wells owned and operated by public agencies including EVMWD and Elsinore Water District. Specific private domestic and agricultural wells for monitoring have not been identified at this time. Recommendations for new monitoring wells are also included.

Existing Wells

Table 4 lists the existing municipal production and monitoring wells in the Elsinore Basin that are recommended for inclusion in the first phase of the groundwater monitoring program. The location of existing wells to be included in the monitoring program are included in **Figure 12**.

Table 4
Summary of Existing Municipal Wells in the Elsinore Basin

Well Name	State Well No.	Owner	Well Type	Status	Aquifer
Cereal-1	06S04W21J03	EVMWD	Production	Active	Qa and TQf
Cereal-3	06S04W17K01	EVMWD	Production	Active	Qa and TQf
Cereal-4	06S04W17L01	EVMWD	Production	Active	Qa and TQf
Corydon	06S04W22N01	EVMWD	Production	Active	TQf
North Island Well	06S04W18B01	State Parks	Production	Active	TQf
South Island Well	06S04W18K01	State Parks	Production	Active	TQf
Middle Island Well	06S04W18G02	State Parks	Production	Active	TQf
Olive Street	06S04W22D04	EVMWD	Production	Inactive	TQf
Wood	06S04W19L03	Elsinore Water District	Production	Inactive	Qa and bedrock
Sanders	06S04W19L04	Elsinore Water District	Production	Inactive	Qa and bedrock
Palomar	06S04W27P02	EVMWD	Production	Active	Qa
Grand	06S05W24A01	Elsinore Water District	Production	Active	Qa and bedrock
Showboat	06S04W19D04	Elsinore Water District	Production	Unknown	Qa and bedrock
Wisconsin	06S05W02A	Elsinore Water District	Production	Unknown	Qa and TQf
Fraser No. 1	06S05W02B02	Elsinore Water District	Production	Inactive	Qa and TQf
Fraser No. 2	06S05W02B03	Elsinore Water District	Production	Inactive	Qa and TQf

Table 4 (continued)
Summary of Existing Municipal Wells in the Elsinore Basin

Well Name	State Well No.	Owner	Well Type	Status	Aquifer
Well No. 2	06S04W06A	City of Lake Elsinore	Production	Unknown	Qa
Lincoln Street Well	06S05W02M04	EVMWD	Production	Active	TQf and bcb
Machado Well	06S05W03H01	EVMWD	Production	Active	TQf and bcb
Beecher Street Well	06S04W28A01	EVMWD	Production	Inactive	TQf and bcb
Como Well	Unknown	EVMWD	Production	Inactive	Qa
Stewart Well	06S05W03G01	EVMWD	Production	Inactive	Unknown
MW-1	Not assigned	EVMWD	Monitoring	Active	Qa and TQf
MW-2	Not assigned	EVMWD	Monitoring	Active	Qa and TQf
MW-3	Not assigned	EVMWD	Monitoring	Active	Qa and TQf
MW-4	Not assigned	EVMWD	Monitoring	Active	Qa and TQf
Inj-1	Not assigned	EVMWD	Dual Purpose	Inactive	Qa

EVMWD should perform a well canvas that includes obtaining the location (latitude and longitude) and other well information for all wells in the basin. This well canvassing task may include door-to-door interviews and evaluations with private well owners by EVMWD staff to obtain additional data. Groundwater monitoring of these wells may be included in a follow-up phase of the monitoring program at a later time if suitable wells are encountered.

Proposed New Monitoring Wells

Based on the comments from the District’s Technical Review Committee meeting and our understanding of the groundwater basin, MWH recommends a total of five new monitoring well sites. The location of each new proposed monitoring well is provided in **Figure 13** and listed in **Table 5**.

The purpose of the Leach Canyon and McVicker Canyon wells is to monitor water levels and water quality from the natural recharge areas to the Elsinore Basin and to evaluate the flow conditions across the Willard and Wildomar faults. Two monitoring wells screened to bedrock are proposed for the upward side of the fault at the mouths of Leach and McVicker Canyons. One multi-level monitoring well screened in the alluvium and the Fernando Group is proposed on the basin-side of the faults.

Figure 12
Location of Proposed Wells for Monitoring Program

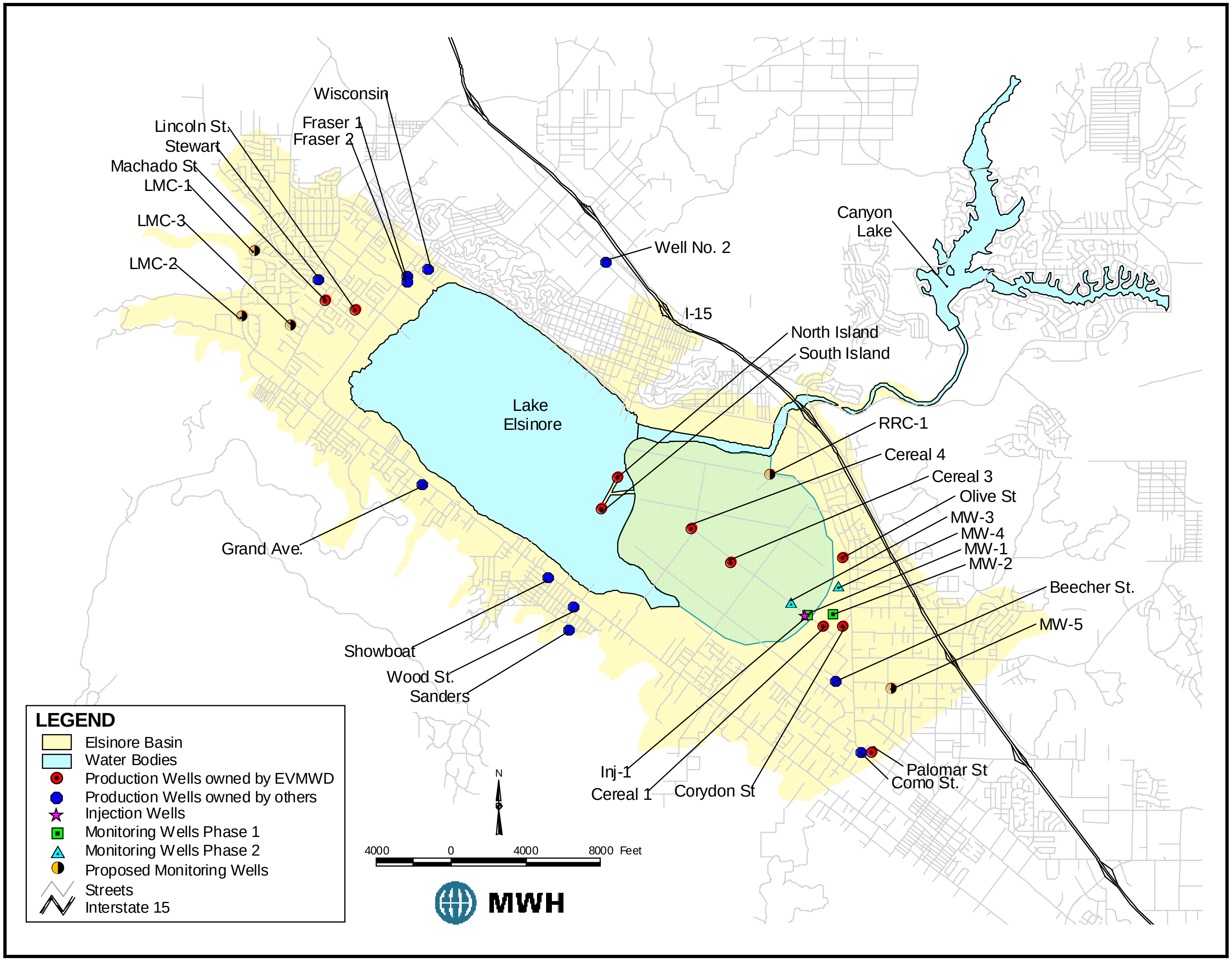
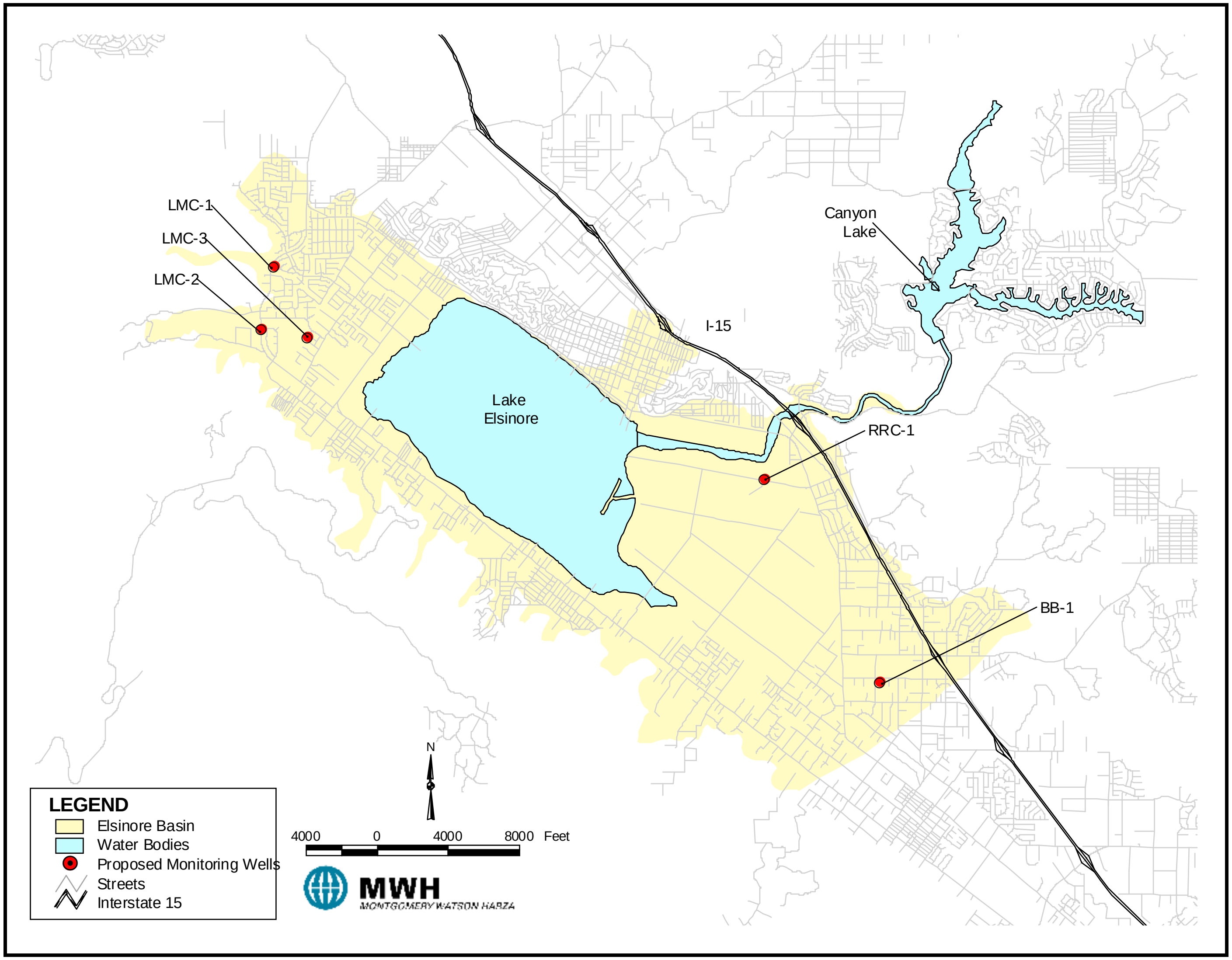


Figure 13
Location of Proposed New Monitoring Wells



Another proposed monitoring well location is near the outlet of the San Jacinto River south of I-15. The purpose of this well is to document groundwater flow and quality in the vicinity of the Sedco Cone. The compartment between the Freeway fault and the Glen Ivy fault may be a possible location for groundwater storage. In addition, this area is a source of natural recharge to the basin. This well can be used to monitor inflows into the basin. The well will be screened in both the alluvium and the Fernando Group to evaluate flow conditions in the alluvium and downward migration from the alluvium into the Fernando Group.

Table 5
Summary of Proposed New Monitoring Wells

Monitor Well Location	Symbol	Number of Piezometers	Monitoring Interval(s) (ft, bgs)
McVicker Canyon	LMC-1	1	200 to 300
Leach Canyon	LMC-2	1	200 to 300
Downgradient of Leach & McVicker Canyons	LMC-3	2	200 to 300 & 800 to 900
Railroad Canyon (San Jacinto River Outlet)	RRC-1	2	200 to 300 & 600 to 700
Fernando Group Outcrop in Wildomar	MW-5	2	200 to 300 & 800 to 900

Another proposed monitoring well site is located in the Wildomar area southeast of the Corydon well. The purpose of this well is to monitor water levels and water quality downgradient of the injection well network proposed further north. The bedrock surface rises substantially in this area and provides a barrier to groundwater flow to the southeast. This well can be used to evaluate the potential regional effects of the Corydon well and the injection well network.

In general, the proposed monitoring wells should be completed with Schedule 40, 4-inch nominal mild steel casing, and Schedule 40 Type 304 stainless steel well screen and associated dissimilar metal connectors. Under certain conditions, PVC may be substituted for the shallow wells. The slot size for the well screens is anticipated to be 0.050 inches. Monitoring wells will be completed with an 8x16 filter pack from the bottom of the borehole to 20 feet above the top of the screen, surface sand cement seals, and flush-mounted vaults fitted with steel traffic-rated lids. For multi-level wells, annular seals should be filled with sand cement. If PVC well materials are used (for the shallow wells), care should be taken during installation of the grout seal so as not to cause damage to the PVC casing from the heat of hydration. In areas of asphalt or concrete, the surrounding area will be repaired with similar materials. The materials may be modified based upon site specific conditions.

Permits and access agreements will be needed in order to install the monitoring wells at each site. The requirements for access will vary depending on ownership, (i.e. private vs. public property). The types of issues addressed in permits and access agreements are site specific, but may include the following:

- Public notification before construction.
- Traffic controls.
- Notification of the Underground Service Alert 48 hours before the start of well construction.
- Access to the site for periodic monitoring.
- Responsibility for maintenance of monitoring facilities.
- Responsibility for abandonment of monitoring facilities at the conclusion of the monitoring period.
- Coordination with officials at the municipal, county, and state levels, before and during construction.
- Ownership of monitoring facilities.

Groundwater Level Monitoring

Water levels should be measured in each identified well on a monthly basis as described in **Table 6**.

Pumping and static water levels shall be taken with a sounding device in each active production well. Pumping rate, pumping and static water levels should be recorded. To obtain an accurate reading, the pumping well should be allowed to recover at least 2 hours prior to recording static water levels. Two hours may not be sufficient to allow complete recovery for some wells. The well should be shut off until recovery is obtained. If allowing for a full recovery period is not possible, the time allowed for recovery should be the same for each well every month. Water levels in the monitoring wells and inactive wells can be measured directly (no pumping water level or production rate can be measured, however).

Groundwater Quality Monitoring

Water quality monitoring will be an important part of the monitoring program. A list of parameters for analysis is presented in **Table 7**. Sampling frequency is provided in **Table 6**. As shown in this table, water quality sampling will not be performed every month. When both water level and water quality data are to be collected, water levels from all wells should be collected prior to collecting a water quality sample. Water quality sampling is required on an annual basis for all active municipal production wells – sampling for this monitoring plan should be performed at the same time to avoid duplicate sampling events. The groundwater sampling program should be implemented in accordance with ASTM D5903-96(2001), ASTM D4448-01 and other related standards. Details specific to this groundwater monitoring plan are discussed below.

Table 6
Monitoring Frequency for Wells in Elsinore Basin

Well Type	Activity	Recommended Monitoring Frequency
Active Production Wells	Water Quality	Annually
	Water Level	Monthly
Inactive Production Wells	Water Quality	Two times per year for 1 year Annually after 1 year
	Water Level	Monthly
Monitoring Wells	Water Quality	Two times per year for 1 year Annually after 1 year
	Water Level	Monthly

To be valid, a groundwater sample must be representative of the particular zone of the water being sampled. The physical, chemical, and bacteriological integrity of the sample must be maintained from the time of collection to the time of analysis in order to minimize changes in water quality parameters. The primary considerations in obtaining a representative sample of the groundwater are to avoid collecting stagnant (standing) water in the well, to avoid physically or chemically altering the water due to improper sampling techniques, sample handling, or transport, and to document that proper sampling procedures have been followed. For this monitoring program, it is recommended that three (3) casing and annulus volumes be evacuated from a well prior to sample collection. During well purging, the well should never be pumped dry. Rather, the flow rate should be adjusted such that flow can be maintained throughout the purge process and a subsequent groundwater sample may be collected. Water-quality parameters (pH, electrical conductivity, temperature and turbidity) should be measured during each well's purge. Purging shall continue until the indicator parameters have stabilized and three consecutive measurements are reproducible within ten percent. Other parameters to be measured in the field are included in **Table 7**.

This monitoring plan recommends the use of a Grundfos® pump for sample purging of monitoring wells. The Grundfos® pump takes in water and pushes the sample up a sample tube to the surface. The power sources for this pump is a portable generator. Pumps are available for 2-inch-diameter wells and larger, and these pumps can lift water up to several hundred feet. Production wells can be sampled from an existing sample port if available. For inactive large-diameter wells that are not equipped with a pump, it may be necessary to install a temporary pump to purge the well.

Table 7
Water Quality Analyses for Monitoring Program

Field Parameters	Laboratory Parameters	
	General	**Trace Metals**
pH	Total Dissolved Solids	Aluminum
Turbidity	Total Suspended Solids	Arsenic
eH	Specific Conductance	Barium
Temperature	Langlier Index	Boron
Dissolved oxygen	pH	Cadmium
Specific Conductance	Total Alkalinity	Chromium
	Carbonate Alkalinity	Cobalt
	Bicarbonate Alkalinity	Copper
	Total Hardness	Iron
	Non-carbonate Hardness	Lead
	Calcium Hardness	Mercury
	Chloride	Nickel
	Sulfate	Selenium
	Nitrite	Silver
	Nitrate	Zinc
	Organic Nitrogen	
	Ammonia	
	Phosphorous	
	Calcium	
	Iron	
	Magnesium	
	Sodium	
	Manganese	
	Potassium	
	Fluoride	
	Color	
	Odor	
	MBAS	
	Oil and Grease	

Aquifer Testing

This plan recommends that aquifer testing be performed on various production wells in the basin. Aquifer testing includes relatively inexpensive methods to obtain a variety of different data that can be used to evaluate management strategies in the basin such as

- static and dynamic spinner logging
- static and dynamic temperature/fluid resistivity logging
- continuous water quality logging, which can continuously record parameters such as pH, nitrate, or fluoride
- depth-discrete water quality sampling and
- continuous pump testing

Aquifer testing can be used to identify vertical and horizontal variations in production capacity and groundwater quality in existing wells. As discussed previously, there are several wells in the basin that have water quality concerns that may eventually require some sort of wellhead treatment or blending. Based upon preliminary data compiled, it appears that some of the water quality issues in the basin are related to specific water-bearing units. Therefore, a series of aquifer tests as described below can further evaluate this hypothesis.

Static Spinner Logging

Spinner logging is used to measure fluid flow rates within either cased or uncased wells. The surveying results may be used to determine production rates from all zones to the well. The impeller-type, 3-inch diameter spinner logging tool measures the movement of water by the use of a low inertia impeller, which spins on precision carbide bearings. A small perforated disc connected to the end of the impeller shaft activates a magnetorestrictive counter in the body of the tool. As the impeller and the disc turn, these perforations cause a magnetic field fluctuation which is electronically converted to pulses and transmitted to the surface recording system for further processing (e.g., pulses or "counts" per second may be converted to flow rate in gallons per minute).

Static spinner logging (i.e., conducting spinner logging under nonpumping conditions) is typically performed to establish whether groundwater flow is occurring between shallower and deeper aquifers which may have been intersected by the well during drilling and construction. One "down run" (lowering the spinner logging tool down the well) and one "up run" (raising the spinner logging tool up the well) is usually performed at the well. Any "mirror image" divergence in the static spinner log between the "up run" and the "down run" would indicate a zone of flow in that portion of the well.

Continuous and Stop-Count Spinner Logging

Continuous spinner logging (i.e., conducting spinner logging under pumping conditions) and stop-count spinner logging (i.e., suspending the spinner logging tool at selected depths under pumping conditions) should be performed during well purging. Continuous spinner logging consisting of three "down runs" at three different "line speeds" (rate of ascent or descent of logging tool) should be performed. The continuous spinner logs can be evaluated to identify vertical zones of flow contribution to the well. Because vertical zones showing a change in "counts per second" during the constant-rate pumping conditions may represent zones of flow contribution to the well, the subsequent stop-count spinner logging and depth-discrete sampling intervals should be selected based on these potential zones of flow contribution.

Depth Discrete Sampling

The flow information from the spinner logs and the depth-discrete groundwater analytical results can be evaluated into the method presented by Collar and Mock (1997) to calculate concentrations from each vertical zone of flow contribution to the well. When groundwater flow data and solute concentration data for a solute of interest is available above and below a zone of flow contribution to a well, the following algebraic equation may be used to solve for solute concentration from the zone of flow contribution:

$$C_i = (Q_aC_a-Q_bC_b)/(Q_a-Q_b)$$

where

C_i = solute concentration in zone of flow contribution
Q_a = groundwater flow rate above zone
C_a = solute concentration above zone
Q_b = groundwater flow rate below zone
C_b = solute concentration below zone

These data can be used to evaluate whether a specific zone should be sealed off to reduce the concentration of the constituent of concern in the produced water from a well without reducing production capacity. Zone sampling can be performed using a passive groundwater sampling system where a small pump is lowered to the screened section of interest and a sample is collected. Packer testing, which isolates a particular zone during pumping, may also provide zone specific samples.

Continuous Aquifer Testing

As part of the Monitoring and Mitigation Program for the Elsinore Basin, aquifer tests were to be performed at Fraser I, Fraser II, and Lincoln Street wells. In addition, a continuous aquifer test should be performed for each municipal production well in the basin. A continuous test is used to estimate aquifer parameters such as transmissivity and storativity. These parameters can be used to estimate the impact of future groundwater management activities on groundwater levels. Groundwater levels should be monitored in at least one additional non-pumping production well or monitoring well if feasible to evaluate the influence of pumping to adjacent wells.

Surface Water Monitoring

In addition to the groundwater monitoring activities discussed above, EVMWD should compile water quality and water level data from surface water bodies within the Elsinore Basin. These include:

- Water surface elevation and water quality data for Lake Elsinore
- Flow and water quality data from the San Jacinto River
- Flow and water quality data from Leach and McVicker Canyons

The monitoring frequency for surface water is provided in **Table 8**.

EVMWD currently records water surface elevation data for Lake Elsinore monthly. The USGS currently records flow data from stream gauge 11070500 on a daily basis. These data can be obtained from the USGS in real-time from their website:

http://waterdata.usgs.gov/ca/nwis/uv?11070500.

Table 8
Monitoring Frequency for Surface Water Bodies in the Elsinore Basin

Well Type	Activity	Recommended Monitoring Frequency
Lake Elsinore	Water Quality	Two times per year
	Water Level	Monthly
San Jacinto River	Water Quality	Two times per year
	Flow	Daily [1]
Leach and McVicker Canyons	Water Quality	Two times per year r
	Flow	Daily

1 – Data are currently collected by USGS (Stream Guage No. 11070500)

This plan recommends installation of stream gauges in Leach and McVicker Canyons. These stream gauges should be installed upstream of the debris dams in each canyon. Coordination with the Riverside County Flood Control District will be required to implement this recommendation.

Land Subsidence Monitoring

As discussed previously, there is a potential for land subsidence associated with declining groundwater levels in the Elsinore Basin, particularly in the area south of the Lake. It is currently unknown whether land subsidence is actually occurring in the basin. Therefore, a land subsidence monitoring program is recommended.

Options for land subsidence monitoring include:

- Performance of GPS leveling surveys
- Collection of INSAR (data
- Installation of extensometers

GPS Leveling Survey

The Global Positioning System (GPS) is a highly-accurate, satellite-based, spatial positioning technology. It is capable of providing sub-centimeter horizontal positions (coordinates) over large distances. However, because of the nature of the GPS satellite configuration and other considerations it is not able to provide equally accurate vertical positions (elevations). Generally speaking, the accuracy of GPS-derived elevations is only one-half to one-third as accurate as GPS-derived horizontal positions (latitude and longitude), and achieving this vertical accuracy requires a greater effort than that required for horizontal accuracy.

EVMWD should establish a network of benchmarks within the Elsinore Basin to measure land subsidence. Monuments should include benchmarks in areas that are not anticipated to be susceptible to subsidence as well as areas where land subsidence could be expected. Successive land survey measurements in various locations should be made semi-annually. If these data suggest land subsidence, additional analysis as described below should be performed.

InSAR Data Collection

Interferometric Synthetic Aperture Radar (InSAR) is a technology suited for detection of land surface elevation changes. The technology employs aircraft- or satellite-based sensors that monitor the ground and in successive passes can determine the change in elevation over large areas to about five centimeter accuracy. It should be noted that the technology cannot distinguish between the ground and the tops of vegetation. In an extreme case, successive passes over a field lying fallow at the first observation and with a full mature crop of corn at the second would indicate the change of perhaps a couple of meters. It should be remembered that InSAR is a change detection technology. It can record the relative differences in an area over time, but cannot measure the absolute change without some ground-truth mechanism. InSAR should be used in concert with a GPS leveling survey. The USGS is actively involved in InSAR data collection efforts throughout Southern California. If subsidence is suggested in the Elsinore Basin, a cooperative effort with the USGS is recommended.

Extensometer Installation

The installation of extensometers is the most expensive subsidence monitoring activity. If subsidence is indicated with InSAR and GPS measurements, then EVMWD should consider installing extensometers in various locations throughout the basin. A borehole extensometer, which can be constructed to measure subsidence in various depths in the aquifer, measures soil deformation at a particular location. Costs could exceed $200,000 per extensometer for installation.

SUMMARY

The groundwater monitoring program includes:

- A well canvas to obtain information from private well owners. These additional background data can be used to further characterize the basin to guide EVMWD's future groundwater supply needs.
- Construction of five new monitoring wells (three nested piezometer wells and two single wells). These wells will be used to obtain additional background water level and water quality data to characterize the basin. In addition, these wells can be used to monitor the impact of future facilities.
- Measuring of water levels in existing production and monitoring wells and the new monitoring wells on a monthly basis. Monthly data is important to understanding the seasonal variations in water levels throughout the basin and confirm the basin yield.
- Collecting water quality data from the existing wells on an annual basis and the new monitoring wells two times annually. Changes in water quality may be caused by operations throughout the basin. New monitoring wells should be monitored more frequently to obtain background data for comparison to future water quality.
- Performing spinner logging to identify where most of the production comes from in existing production wells. These data may indicate the depth to which new production wells should be drilled in the future.
- Performing water quality zone testing, in conjunction with the spinner logging. This analysis can be used to isolate which areas are causing variations in water quality. This may include continuous water quality logging or zone specific testing.
- Performing continuous aquifer testing. These data can be used to confirm transmissivity and storativity estimates that can used to estimate future drawdown and basin yield.
- Performing surface water monitoring of Lake Elsinore, the San Jacinto River and Leach and McVicker Canyons
- Perform land subsidence monitoring, which should initially consist of a GPS monument network

This monitoring plan should be implemented as quickly as possible so that data can be incorporated into future groundwater management plan activities. In addition, these data will be used to evaluate future potential pilot projects such as surface spreading, injection, and other groundwater storage projects.

REFERENCES

ASTM, 2001. ASTM Standard D5903-96 (2001) – Standard Guide for Planning and Preparing for a Groundwater Sampling Event.

ASTM, 2001. ASTM Standard D4448-01 – Standard Guide for Sampling Ground-Water Monitoring Wells.

California Department of Water Resources, 1981. Investigation of Ground Water Supply for Stabilization of Level of Lake Elsinore, Riverside County.

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Collar, Robert J. and Peter A. Mock, "Using Water-Supply Wells to Investigate Vertical Ground-Water Quality", Ground Water, September-October 1997, p. 743-750.

MWH, 2003. Elsinore Basin Groundwater Management Plan. Prepared for the Elsinore Valley Municipal Water District.

APPENDIX D EVMWD DROUGHT SHORTAGE ORDINANCES 78 AND 81

APPENDIX F

EVMWD

DROUGHT SHORTAGE ORDINANCES (NOs. 78 and 81)

Ordinance No. 78

AN ORDINANCE OF THE BOARD OF DIRECTORS OF THE ELSINORE VALLEY MUNICIPAL WATER DISTRICT FINDING THE NECESSITY OF, AND PROVIDING FOR THE IMPLEMENTATION AND ENFORCEMENT OF MANDATORY WATER CONSERVATION MEASURES TO MITIGATE EFFECTS OF THE 1991 DROUGHT

WHEREAS, California is in the fifth consecutive year of below normal precipitation, and reduced supplies in storage will cause shortfalls in imported water deliveries to the region unless appropriate conservation measures are implemented; and

WHEREAS, more than 50% of the District's total water supply is imported from the Metropolitan Water District of Southern California; and

WHEREAS, on Tuesday, January 8, 1991 the Board of Directors of the Metropolitan Water District of Southern California adopted a Stage III drought response effective February 1, 1991, that sets a total water savings goal of 430,000 acre-feet for an overall reduction in water consumption of 17% in fiscal year '90–91; and

WHEREAS, Stage III of MWD's Incremental Interruption and Conservation Plan sets target water savings goals of 30% for interruptible deliveries and 10% for firm deliveries for the remainder of FY '90–91; and

WHEREAS, the Metropolitan Water District of Southern California has called upon its member agencies and subagencies to comply with its mandatory water conservation program to mitigate a water supply shortfall and related impacts;

WHEREAS, the Elsinore Valley Municipal Water District has the power and the authority to adopt and enforce water conservation measures within its district boundaries pursuant to Water Code Sections 350 <u>et seq.</u>, 375 <u>et seq.</u>, and 71640 <u>et seq.</u>; and

NOW THEREFORE the Board of Directors of Elsinore Valley Municipal Water District does hereby resolve, determine and order as follows:

Section 1. Definitions.

The following terms are defined for the purposes of the Ordinance:

(a) "Emergency supply shortage" means any water shortage caused by an earthquake, loss of electrical power, pipeline breakage, or any other threatened or existing water shortage caused by a disaster or facility failure which results in District inability to meet the water demands of its customers.

(b) "Waste" means any unreasonable or nonbeneficial use of water, or any unreasonable method of use of water, including, but not limited to, the specific uses prohibited and restricted by this Ordinance as hereinafter set forth.

(c) "Customer" means any person, firm, partnership, association, corporation, or local political entity using water obtained from the water system of Elsinore Valley Municipal Water District.

(d) "Water" means water supplied by Elsinore Valley Municipal Water District.

(e) "New Construction" means any construction of a previously non-existent structure requiring a discretionary or ministerial permit issued after the effective date of this Ordinance. "New Construction" shall include additions, modifications, or structural improvements which add square footage to floor space of existing structures.

(f) "IICP," or *Incremental Interruption and Conservation Plan*, is the water conservation contingency plan adopted by the Metropolitan Water District of Southern California.

(g) "MWD" is an abbreviated term for the Metropolitan Water District of Southern California.

Section 2. Purpose and Scope.

(a) The purpose of this Ordinance is to provide a mandatory water conservation plan to minimize the effect of a shortage of water supplies on the customers of the District during a water shortage emergency. Pursuant to Water Code Sections 350 et seq., 375 et seq., and 71640 et seq., The Board of Directors is authorized to declare a water shortage emergency and adopt water conservation measures to (1) protect the health, safety, and welfare of the inhabitants and customers of the District, (2) assure the maximum beneficial use of the water supplies of the District, and (3) ensure that there will be sufficient water supplies to meet the basic needs of human consumption, sanitation and fire protection.

(b) This Ordinance adopts regulations to implement a mandatory water conservation plan consistent with the goals of Metropolitan Water District of California's *Incremental Interruption and Conservation Plan.*

(c) This Ordinance shall remain in effect until the Board of Directors finds and declares by resolution that the provisions of the Ordinance are no longer applicable to existing water supply conditions and until the supply of water available for distribution within the District's service area has been replenished or augmented.

Section 3. Declaration of Policy.

As a result of five consecutive years of drought which has depleted water reserves normally held in storage for emergency use, it is hereby declared that the general welfare requires that the existing water resources available to the District be put to the maximum beneficial use to the extent to which they are capable, and that waste or unreasonable use be prevented, and that the conservation of such water be practiced with a view to the reasonable and beneficial use thereof in the interest of the people of the District and for the public welfare.

Section 4. Authorization to Implement Water Conservation Ordinance.

(a) The Board of Directors, after compliance with the notice and hearing procedures of Water Code Sections 351 and 352, and 375 et seq., may declare a Water Emergency as set forth in the Water Conservation Ordinance whenever it finds and determines that the ordinary demands and requirements of water consumers are either under threat of being insufficient to satisfy, or cannot be satisfied, without depleting the water supply of the District to the extent that there would be insufficient water for human consumption, sanitation and fire protection (Authority: Water Code, Section 355).

(b) The Board of Directors is authorized to implement the provisions of this Ordinance, following the public hearing required by sub-Section (c), upon its determination that such implementation is necessary to protect the public welfare and safety.

(c) Prior to implementation of this Ordinance, the Board of Directors shall hold a public hearing for the purpose of determining whether a shortage exists and which measures provided by this Ordinance should be implemented. Notice of the time and place of the public nearing shall be published not less than ten (10) days before the hearing in a newspaper of general circulation within the District.

(d) The Board of Directors shall issue its determination of shortage and corrective measures by Ordinance effective immediately upon adoption and by public proclamation published in a daily newspaper of general circulation within the District. Any prohibitions on the use of water shall become effective immediately upon adoption. Any provisions requiring curtailment in the use of water shall become effective within the first full billing period commencing on or after the date of such adoption.

Section 5. Findings.

The Board of Directors finds, determines and declares that the following conditions exist:

1. Factoring for growth and historic water consumption for the area, additional imported water supplies will be needed to meet increasing seasonal demand;

2. Without regional water conservation efforts, imminent water shortages in State Water Project and MWD's Colorado River supplies and critically low levels of stored water supplies throughout the state will affect the District's ability to serve its customers;

3. The regulations set forth herein are necessary and proper to manage and protect the water supply for human consumption, sanitation and fire protection in anticipation of short-term water supply reductions or in the event of a water emergency condition.

Section 6. General Prohibition.

No customer of the District shall make, cause, use, or permit the use of water from the District in a manner contrary to any provision of this Ordinance or in an amount in excess of that use permitted by any curtailment provisions then in effect pursuant to action taken by the governing board in accordance with the provisions of this Ordinance.

Section 7. Determination of Water Condition Stages I, II and III.
The General Manager, after consultation with the Board of Directors, is hereby authorized and directed to determine when the water supply conditions prevailing in the District meet the Stage I through Stage III criteria set forth in the water conservation Ordinance. Wherever appropriate, conservation measures and target reduction goals will be consistent with regional policies set by the Metropolitan Water District of Southern California and Western Municipal Water District, which wholesale imported water to the District.

Retail Water User Measures

(a) **STAGE I. Voluntary Compliance—Water Watch**

Allows for voluntary compliance and indicates the possibility exists that the District may not be able to meet all the demands of its customers. In compliance with MWD's *Incremental Interruption and Conservation Plan*, establishes a voluntary reduction goal of 10% for firm deliveries and an unspecified voluntary conservation reduction goal in non-firm deliveries.

Elements of Stage I for retail water users:

1) Use of running water to wash driveways, sidewalks, patios, and other paved areas is prohibited, except as required for sanitary purposes;

2) Failure to repair a controllable leak is defined as "waste of water" and is prohibited;

3) Parks, school grounds, and golf courses shall be watered before 11:00 A.M. or after 5:00 P.M., with the exception of those using reclaimed water;

4) Irrigation of lawns and landscaping shall occur before 11:00 A.M. or after 4:00 P.M.;

5) Failure to prevent excessive runoff from irrigation activities is prohibited;

6) Sprinklers and irrigation systems shall be adjusted to avoid overspray, runoff, and waste. Watering on windy days is to be avoided;

7) Using a hand-held bucket or hose equipped with an automatic shut-off nozzle shall be required for car washing, unless car washing takes place at a commercial car wash or service station which utilizes reclaimed or recycled water;

8) Installation of water saving devices, such as low flow shower heads and faucet aerators, is encouraged;

9) Selection of low-water-demand shrubs, groundcovers and trees for all new landscaping is strongly encouraged;

10) Limitation of turf areas except in active areas of residential yards or public landscapes is encouraged. Use of turfgrass in medians, dividers and in other non-active areas is discouraged;

(b) **STAGE II. Mandatory Compliance—Water Alert**
Requires mandatory compliance during periods when the probability exists that the District will not meet all the demands of its customers. The following restrictions shall apply to all persons. In compliance with MWD's *Incremental Interruption and Conservation Plan*, establishes a mandatory reduction goal of 5% for firm deliveries and a 20% conservation reduction in non-firm deliveries from the base year.

Elements of Stage II for retail water users:
The restrictions listed in Stage I shall remain in effect with the additions below:

1) Using movable or permanent sprinkler systems for lawn irrigation and watering of plants, trees, shrubs or other landscaped areas is prohibited between 6:00 A.M. and 6:00 P.M.. Sprinkler operation shall be permitted no more than once every third (3^{rd}) day. However, irrigation of lawns, gardens, landscaped areas, trees, shrubs or other plants is permitted at anytime if:

   a. A hand-held hose is used, or
   b. A hand-held bucket is used, or
   c. A drip irrigation system is used, or
   d. Reclaimed wastewater is used.

EXCEPTION: Commercial nurseries, commercial sod farmers and similarly situated establishments are exempt from Stage II irrigation scheduling restrictions, but will be required to follow all other restrictions to curtail all nonessential water use;

2) Washing of motor vehicles, trailers, boats and other kinds of mobile equipment shall be done only with a hand-held bucket or hose equipped with a positive shutoff nozzle for quick rinses, except where washing is done on the immediate premises of a commercial car wash or service station using recycled water.

EXCEPTION: Such washings are exempted from these regulations where the health, safety and welfare of the public is contingent upon frequent vehicle cleaning, such as garbage trucks and vehicles to transport food and perishables;

3) The filling, refilling or adding of water to uncovered outdoor swimming pools, wading pools or spas is prohibited except on designated irrigation days after 6:00 P.M. and before 6:00 A.M.;

4) The use of water for irrigation of golf courses is permissible after 5:00 P.M. and before 10:00 A.M.; however, the irrigation of golf courses utilizing reclaimed wastewater shall not be subject to irrigation prohibitions;

5) No new construction services or meters will be issued;

6) All restaurants, cafes, and other public food service establishments are prohibited from serving drinking water unless specifically requested by their customers;

7) The operation of any exterior ornamental fountain or similar structure is prohibited.

8) Water shall not be used to wash down sidewalks, driveways, parking areas, tennis courts, patios or other paved areas, except to alleviate immediate fire or sanitation hazards or unless reclaimed wastewater is used.

(c) **STAGE III. Mandatory Compliance—Water Warning**

Upon implementation by the District, the following restrictions shall apply to all persons. In compliance with MWD's *Incremental Interruption and Conservation Plan*, establishes a mandatory reduction goal of 10% for firm deliveries and a 30% conservation reduction in non-firm deliveries from the base year.

Elements of Stage III:

Measures addressed previously remain in effect with the following additions:

1) All sprinkler irrigation of vegetation shall occur only after 6:00 P.M. and before 6:00 A.M.. Sprinkler operation shall be permitted no more than once every fourth (4th) day. However, irrigation of lawns, gardens, landscaped areas, trees, shrubs or other plants is permitted on odd/even calendar days corresponding to the last two digits of a service address, provided:

   a. A hand-held hose is used, or
   b. A hand-held bucket is used, or
   c. A drip irrigation system is used, or
   d. Reclaimed wastewater is used.

2) The washing of private automobiles, trucks, trailers, boats, and other kinds of mobile equipment, except in the immediate interest of the public health, safety and welfare, shall be permitted only on the immediate premises of commercial car washes or commercial service stations using recycled water;

3) The filling, refilling or adding of water to uncovered outdoor swimming pools, wading pools or spas is prohibited.

4) The watering of all golf course areas, except greens, is prohibited unless done with reclaimed wastewater. Irrigation of golf greens shall occur only between the hours of 11:00 P.M. and 6:00 A.M. unless done with reclaimed wastewater;

5) Use of water from fire hydrants shall be limited to fire fighting, related activities and/or other activities necessary to maintain the health, safety and welfare of the citizenry;

6) Commercial nurseries, golf courses and other water-dependent industries shall be prohibited from watering lawn, landscaping and other turf areas more often than every third (3rd) day. Such watering shall occur between the hours of 6:00 P.M. and 6:00 A.M. only ; except that there shall be no restriction on watering using reclaimed water.

Section 8. Declaration of Water Condition Stage IV—Water Shortage Emergency.

a) **System Breakage or Failure.** The General Manager is authorized and directed to declare a Stage IV Water Emergency whenever, in his sole discretion, there has been a breakage or failure of a dam, pump, pipeline or damage to facilities causing an immediate emergency. In the event of such an emergency, the General Manager shall notify Board members of the need for Stage IV emergency measures within a reasonable period.

b) **Water Supply Shortage.** The Board of Directors, after compliance with the notice and hearing procedures of Water Code Sections 351 and 352, may declare a Stage IV Water Emergency as set forth in the Water Conservation Ordinance whenever if finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the District to the extent that there would be insufficient water for human consumption, sanitation and fire protection (Authority: Water Code, Section 355). The regulations and restrictions under a Stage IV Water Shortage Emergency shall remain in full force and effect during the period of the emergency and until the supply of water available for distribution within the District has been replenished or augmented, all as determined by the Board of Directors (Authority: Water Code, Section 355).

(c) **STAGE IV. Mandatory Compliance—Water Emergency**
Upon implementation by the District, the following restrictions shall apply to all persons. In compliance with MWD's *Incremental Interruption and Conservation Plan*, establishes a mandatory reduction goal of 15% for firm deliveries and a 40% conservation reduction in non-firm deliveries from the base year.

Elements of Stage IV include:

Includes all measures within prior stages and the following additional measures:

1) All sprinkler irrigation of vegetation shall be allowed only between the hours of 6:00 P.M. and 6:00 A.M., unless done with reclaimed water. Sprinkler operation shall be permitted no more than once every fifth (5^{th}) day. However, irrigation of lawns, gardens, landscaped areas, trees, shrubs or other plants is permitted on odd/even days provided:

   a. a hand-held hose is used, or
   b. a hand-held bucket is used, or
   c. a drip irrigation system is used, or
   d. reclaimed wastewater is used.

2) Commercial nurseries, golf courses, and water-dependent industries shall be prohibited from watering lawn, landscaping and other turf areas more often than every third (3^{rd}) day between the hours of 6:00 P.M. and 6:00 A.M.; except there shall be no restriction on watering using reclaimed water;

3) The washing of private automobiles, trucks, trailers, boats, and other types of mobile equipment shall be permissible only at commercial car washes using recycled water;

4) The watering of all golf course areas, except greens, is prohibited unless done with reclaimed wastewater. Irrigation of golf greens shall occur only between the hours of 6:00 P.M. and 6:00 A.M. unless done with reclaimed wastewater;

5) Use of water from fire hydrants shall be limited to fire fighting and/or other activities immediately necessary to maintaining the health, safety and welfare of the citizenry;

6) Water shall not be used to wash down sidewalks, driveways, parking areas, except to alleviate immediate fire or sanitation hazards, or unless done with reclaimed wastewater;

7) No water shall be used for evaporative air conditioning purposes.

Section 9. Wholesale Water Users.

Elsinore Valley Municipal Water District serves wholesale water to retailers within its service area, including the Elsinore Water District and the Farm Mutual Water Company. The District's conservation plan for wholesalers consists of a direct pass through of MWD's IICP penalty payments for deliveries greater than adjusted targets for each wholesale entity. Target reduction goals for each stage of the IICP program are illustrated in the table below:

STAGE	REDUCTION IN FIRM DELIVERIES
I	Voluntary Goal 10%
II*	5%
III*	10%
IV*	15%
V*	20%
* Indicates Mandatory Compliance	

The monthly procedure for implementing MWD's IICP with each wholesale customer will be as follows:

1. The base allocation for FY '90–91 will be the actual amount of water delivered in FY '89–90 less the target reduction goal for the stage currently in effect as set by the Elsinore Valley Municipal Water District.

2. The difference between the FY '89–90 target amount and the actual amount delivered during the month will be determined.

3. If the actual usage is greater than the FY '89–90 target amount for the same monthly period, a disincentive charge, calculated at the amount of $394 per acre foot (or the prevailing rate and penalty factor set by MWD), will be added to the regular bill.

These wholesale entities are hereby urged to adopt mandatory conservation measures within their boundaries to reduce water consumption commensurate with the target reduction goals adopted by the District, and to take immediate steps to inform their retail customers of the urgent need to conserve and protect water because of a critical shortage in the supplemental water supplies for their area.

Section 10. Retail Agricultural Water Users.

Elsinore Valley Municipal Water District serves agricultural water users within its service area, including the Temescal Division. Agricultural users are subject to the terms and conditions of MWD's interruptible water program, which was designed to provide supplemental imported water at a reduced cost subject to availability. As MWD restricts the availability of interruptible water, the District's conservation plan for agricultural water users consists of a direct pass through of MWD's IICP penalty payments for deliveries greater than adjusted reduction targets for each agricultural customer.

Target reduction goals for each stage of the IICP program are illustrated in the table below:

STAGE	INTERRUPTIBLE REDUCTION GOALS
I	Non-Specific Voluntary Savings
II*	20%
III*	30%
IV*	40%
V*	50%
* Indicates Mandatory Compliance	

The monthly procedure for implementing MWD's IICP with each agricultural customer will be as follows:

1. The base allocation for FY '90–91 will be the actual amount of water delivered in FY '89–90 less the target reduction goal for the stage currently in effect by MWD.

2. The difference between the FY '89–90 target amount and the actual amount delivered during the month will be determined.

3. If the actual usage is greater than the FY '89–90 target amount for the same monthly period, a disincentive charge, calculated at the amount of $394 per acre

foot (or the prevailing rate and penalty factor set by MWD), will be added to the regular bill.

Section 11. Moratorium on Service Commitments and Connections.

Effective at such time as may be required to ensure there will be sufficient water supplies to meet the basic needs of human consumption, sanitation and fire protection and to protect the health, safety and welfare of the inhabitants and customers of EVMWD, the District shall not make any oral or written commitments to provide new retail service and shall not approve the installation of a turnout to any new wholesale customer, until otherwise determined by this Board. Any such commitment shall be without authority from this Board and shall be void and unenforceable. Furthermore, the District's wholesale customers are urged to impose a temporary moratorium on new service commitments.

Section 12. District Actions.

The Board hereby directs staff to take immediate steps to implement water conservation measures and to intensify its public information and education programs accordingly:

1. Immediately notify all retail water users of the conservation measures required by this Ordinance;

2. Immediately provide all wholesale customers with a copy of the Ordinance, together with a letter signed by the General Manager explaining the Board's request that wholesale customers adopt similar conservation measures;

3. Develop emergency water management plans for consideration by the Board for use in the event more stringent mandatory conservation measures are required.

Section 13. Relief from Compliance.

(a) A customer may file an application for relief from any provisions of this Ordinance. The General Manager shall develop such procedures as he considers necessary to resolve such applications and shall, upon the filing by a customer of an application for relief, take such steps as he or she deems reasonable to resolve the application for relief. A customer shall have the right to appeal the General Manager's decision by writing the Board of Directors. The decision of the Board of Directors shall be final. The General Manager may delegate his duties and responsibilities under this section as appropriate.

(b) The application for relief may include a request that the customer be relieved, in whole or in part, from the water use curtailment provisions of sections 6, 7(a)–(c), and 8(c).

(c) In determining whether to grant relief, and the nature of any relief, the General Manager shall take into consideration all relevant factors including, but not limited to:

1) Whether any additional reduction in water consumption will result in unemployment;
2) Whether additional members have been added to the household;
3) Whether any additional landscaped property has been added to the property since the corresponding billing period of the prior calendar year;
4) Changes in vacancy factors in multi-family housing;
5) Increased number of employees in commercial, industrial, and governmental offices;
6) Increased production requiring increased process water;
7) Water uses during new construction;
8) Adjustments to water use caused by emergency health or safety hazards;
9) First filling of a permit-constructed swimming pool;
10) Water use necessary for reasons related to family illness or health; and
11) Livestock on property.

(d) In order to be considered, an application for relief must be filed with the District within (15) fifteen days from the date the provision from which relief is sought becomes applicable to the applicant. No relief shall be granted unless the customer shows that he or she has achieved the maximum practical reduction in water consumption other than in the specific areas in which relief is being sought. No relief shall be granted to any customer who, when requested by the General Manager, fails to provide any information necessary for resolution of the customer's application for relief.

<u>Section 14. Failure to Comply.</u>

Violation by any customer of the water use prohibitions of Section 6, 7(a)–(c), and 8(c), shall be penalized as follows:

a) **First Violation—Notice of Non-Compliance.** The General Manager is authorized and directed to issue a written warning notice of non-compliance to any District customer who, in the judgment of the General Manager, has failed or refused in a significant way to comply with the provisions of the water conservation ordinance. Any such warning notice shall specify the time, place and manner of non-compliance and shall specify a reasonable period to achieve compliance. Any warning notice of non-compliance shall be directed to the customer of record for the premises where the non-compliance was observed. Delivery may be by regular mail or by personal delivery with a declaration of delivery returned to the General Manager.

b) **Second Violation—Fine, Flow Restriction, or Water Service Shutoff.**

1) For a second violation by any customer of the water use curtailment provisions of Sections 7(a)–(c), or 8(c), a surcharge shall be imposed in an amount equal to the percentage of the customer's most recent water bill, excluding sewer charges, for the stage in effect upon the occurrence of the most recent violation. The penalty surcharge for each stage is shown below:

Stage II.................................25%
Stage III................................50%
Stage IV................................75%

2) If a water customer fails or refuses to comply with the requirements of a warning notice of non-compliance issued according to sub-Section (a) of Section 11, or if the water customer repeats the infraction noted in a prior warning notice of non-compliance, the General Manager has discretionary authority to provide for a flow-restricting device to be installed at the meter to minimize water availability to the customer's service address. If installation of a flow restrictor is infeasible, impractical or is unlikely to induce compliance with the water conservation ordinance, the General Manager may authorize a shutoff of service to the premises involved (Authority: Water Code Sections 377 and 35423).

c) **Referral of Misdemeanor Charges.** When warranted, the General Manager may refer evidence of non-compliance to the District Attorney of Riverside County with a request for misdemeanor prosecution as authorized by Water Code Section 377 and/or Section 35423. Pursuant to Water Code Section 377, any conviction resulting from a violation of a water conservation program restriction, prohibition or requirement published in this Ordinance shall be punishable by imprisonment in the County jail for not more than thirty (30) days or by fine not exceeding one thousand dollars ($1,000), or both.

Section 15. Hearing Regarding Violations.

(a) Any customer receiving notice of a second or subsequent violation of sections 6, 7(a)–(c), or 8(c) shall have a right to a hearing by the General Manager of the District within (15) fifteen days of mailing or other delivery of the notice of violation.

(b) The customer's timely written request for a hearing shall automatically stay installation of a flow-restricting device on the customer's premises until the General Manager renders his decision.

(c) The customer's timely written request for a hearing shall not stay the imposition of a surcharge unless within the time period to request a hearing, the customer deposits with the District money in the amount of any unpaid surcharge due. If it is determined that the surcharge was wrongly assessed, the District will refund any money deposited to the customer.

(d) The decision of the General Manager may be appealed to the Board of Directors, whose decision shall be final, except for judicial review.

(e) The General Manager may delegate his duties and responsibilities under this section as appropriate.

Section 16. Additional Water Shortage Measures—Pricing Incentives, Disincentives, and Alternative Measures.

The Board of Directors may order implementation of alternative water conservation measures in addition to those set forth in Sections 7 and 8. The need for water rate incentive or disincentive pricing to achieve target water conservation goals may also be taken into consideration by the Board of Directors at any time it is determined that existing measures may be insufficient to achieve target reductions. Such alternative water conservation measures or pricing incentives/disincentives shall be implemented in the manner provided in Section 4(c).

Section 17. Incompatible Provisions.

To the extend any provision of this ordinance is incompatible with or at variance with any prior adopted ordinance or resolution, the provisions of this ordinance shall take precedence, and all prior ordinance shall be interpreted to harmonize with and not change the provisions of this Ordinance.

Section 18. Severability.

If any section, subsection, paragraph, sentence, clause, phrase or word of this Ordinance is declared by a court of competent jurisdiction, adjudicated to a final determination, to be void, this Board of Directors finds that said voided part is severable, and that this Board of Directors would have adopted the remainder of this Ordinance without the severed and voided part, and that the remainder of this Ordinance shall remain in full force and effect.

Section 19. Public Health and Safety Not to be Affected.

Nothing in this ordinance shall be construed to require the District to curtail the supply of water to any customer when such water is required by that customer to maintain an adequate level of public health and safety.

Section 20. Exemption from California Environmental Quality Act.

The Board of Directors hereby determines that this Ordinance is exempt from review under the California Environmental Quality Act (California Public Resources Code Section 21080 {b} {4} et seq.) because it is an action taken to mitigate a water shortage emergency. The Board of Directors hereby directs the General Manager or his designee to prepare and file a Notice of Exemption as soon as possible following adoption of this Ordinance.

APPROVED, ADOPTED AND SIGNED this 6th day of February, 1991.

GARY KELLEY, President of the Board of Directors
Elsinore Valley Municipal Water District

ATTEST

NANCY SHAFER, Secretary of the Board of Directors
Elsinore Valley Municipal Water District

I, NANCY SHAFER, Secretary-Treasurer of the Board of Directors of Elsinore Valley Municipal Water District certify that the foregoing is a full, true and correct copy of ORDINANCE NO. 78 adopted by said Board at a Special Meeting held February 6, 1991 by the following roll call vote:

AYES:	Shafer, Bryant, Kelley, Jeffries, Attridge
NOES:	None
ABSENT:	None
ABSTAIN:	None

Nancy Shafer, Secretary-Treasurer

Ordinance No. 81

AN ORDINANCE OF THE BOARD OF DIRECTORS OF THE ELSINORE VALLEY MUNICIPAL WATER DISTRICT FINDING THE NECESSITY OF, AND PROVIDING FOR THE IMPLEMENTATION AND ENFORCEMENT OF MANDATORY WATER CONSERVATION MEASURES TO MITIGATE EFFECTS OF THE 1991 DROUGHT AND AMENDING ORDINANCE NO. 79 TO PROVIDE IN PART FOR THE RESCISSION OF THE EXISTING MORATORIUM ON NEW SERVICE CONNECTIONS

WHEREAS, California is in the fifth consecutive year of below normal precipitation, and reduced supplies in storage will cause shortfalls in imported water deliveries to the region unless appropriate conservation measures are implemented; and

WHEREAS, more than 60% of the Elsinore Valley Municipal Water District's ("District") total water supply is imported from the Metropolitan Water District of Southern California ("MWD"); and

WHEREAS, on Tuesday, January 8, 1991 the Board of Directors of MWD adopted a Stage III drought response effective February 1, 1991, that sets a total water savings goal of 430,000 acre-feet for an overall reduction in water consumption of 17% in fiscal year '90-91; and

WHEREAS, Stage III of MWD's Incremental Interruption and Conservation Plan sets target water savings goals of 30% for interruptible deliveries and 10% for firm deliveries for the remainder of FY '90-91 and imposes economic penalties for failure to meet such goals; and

WHEREAS, the MWD has called upon its member agencies and subagencies to comply with its mandatory water conservation program to mitigate a water supply shortfall and related impacts; and

WHEREAS, the District has the power and the authority to adopt and enforce water conservation measures within its district boundaries pursuant to Water Code Sections 350 et seq., 375 et seq., and 71640 et seq.; and

WHEREAS, the Board of Directors of the District ("Board of Directors") adopted Ordinance No. 78 on February 6, 1991, which makes the finding of a water shortage emergency and implements a mandatory water conservation plan ("Plan") and continues in full force and effect, as amended and set forth herein; and

WHEREAS, on February 6, 1991, the District's General Manager, in consultation with the District's Board of Directors, declared and implemented Stage III of the Plan and adopted a sixty (60) day moratorium on new service connections; and

WHEREAS, on April 9, 1991, MWD implemented Stage V of its Incremental Interruption and Conservation Plan, which requires its member agencies to achieve a minimum reduction of fifty percent (50%) in the use of water for interruptible deliveries and twenty percent (20%) for firm deliveries and imposes economic penalties for failure to meet such goals; and

WHEREAS, on March 6, 1991, the Board of Directors adopted Ordinance No. 79 which modified the moratorium on new service connections and adopted a formal appeals procedure; and

WHEREAS, due to the reduction in supply, the District currently has a water supply deficit in that it has insufficient supply for the ordinary demands and requirements of the District's existing consumers, including sufficient water for human consumption, sanitation and fire protection, but the recent rain has decreased the water supply deficit to allow some new connections without jeopardizing the public health, safety and welfare.

NOW THEREFORE the Board of Directors of Elsinore Valley Municipal Water District does hereby resolve, determine and order as follows:

Section 1. Definitions.

The following terms are defined for the purposes of the Ordinance:

(a) "Board" means the Board of Directors of the Elsinore Valley Water District.

(b) "Emergency supply shortage" means any water shortage caused by an earthquake, loss of electrical power, pipeline breakage, or any other threatened or existing water shortage caused by a disaster or facility failure which results in District inability to meet the water demands of its customers.

(c) "District" means the Elsinore Valley Municipal Water District.

(d) "Waste" means any unreasonable or nonbeneficial use of water, or any unreasonable method of use of water, including, but not limited to, the specific uses prohibited and restricted by this Ordinance as hereinafter set forth.

(e) "Customer" means any person, firm, partnership, association, corporation, or local political entity using water obtained from the water system of the District.

(f) "Water" means water supplied by the District.

(e) "New Construction" means the construction of a previously non-existent structure requiring a discretionary or ministerial permit issued after the effective date of this Ordinance.

(f) "IICP" means the Incremental Interruption and Conservation Plan adopted by MWD.

(g) "MWD" means the Metropolitan Water District of Southern California.

Section 2. Purpose and Scope.

(a) The purpose of this Ordinance is to provide a mandatory water conservation plan to minimize the effect of a shortage of water supplies on the customers of the District during a water shortage emergency. Pursuant to Water Code Sections 350 et seq., 375 et seq., and 71640 et seq., the Board of Directors is authorized to declare a water shortage emergency and adopt water conservation measures to (1) protect the health, safety, and welfare of the inhabitants and customers of the District, (2) assure the maximum beneficial use of the water supplies of the District, and (3) ensure sufficient water supplies to meet the basic needs of human consumption, sanitation and fire protection.

(b) This Ordinance adopts regulations to implement a mandatory water conservation plan consistent with the goals of MWD's IICP and projected water supply availability.

(c) This Ordinance shall remain in effect until the Board of Directors finds and declares by ordinance that the provisions of this Ordinance are no longer applicable to existing water supply conditions and the supply of water available for distribution within the District's service area has been replenished or augmented.

Section 3. Authorization to Implement Water Conservation Ordinance.

(a) The Board of Directors, after compliance with the notice and hearing procedures of Water Code Sections 351 and 352, and 375 et seq., may declare a water emergency as set forth in this Ordinance whenever it finds and determines that the ordinary demands and requirements of water consumers are either under threat of being insufficient to satisfy, or cannot be satisfied, without depleting the water supply of the District to the extent that there would be insufficient water for human consumption, sanitation and fire protection.

(b) The Board of Directors is authorized to implement the provisions of this Ordinance, following the public hearing required by sub-Section (c), upon its determination that such implementation is necessary to protect the public welfare and safety.

(c) Prior to implementation of this Ordinance, the Board of Directors shall hold a public hearing for the purpose of determining whether a shortage exists and which measures provided by this Ordinance should be implemented. Notice of the time and place of the public hearing shall be published not less than ten (10) days before the hearing in a newspaper of general circulation within the District.

(d) The Board of Directors shall issue its determination of shortage and corrective measures by Ordinance effective immediately upon adoption and by public proclamation published in a daily newspaper of general circulation within the District. Any prohibitions on the use of water shall become effective immediately upon adoption. Any provisions requiring curtailment in the use of water shall become effective at the start of the first full billing period commencing on or after the date of such adoption.

Section 4. Findings.

The Board of Directors finds that a drought emergency and existing water shortage exists which requires the enactment and enforcement of this Ordinance. The Board of Directors finds that the following conditions exist:

1. Factoring for growth and historic water consumption for the area, additional imported water supplies will be needed to meet increasing seasonal demand;

2. Without regional water conservation efforts, imminent water shortages in State Water Project and critically low levels of stored water supplies throughout the state will affect the District's ability to serve its customers;

3. MWD requires its member agencies to achieve a substantial reduction in water use, which will directly impact the customers of the District;

4. The regulations set forth herein are necessary and proper to manage and protect the water supply for human consumption, sanitation and fire protection in anticipation of short-term water supply reductions or in the event of a water emergency condition.

5. The ordinary demands and requirements of water consumers are either under threat of being insufficient to satisfy, or cannot be satisfied, without depleting the water supply of the District to the extent there would be insufficient water for human consumption, sanitation and fire protection, however the recent rain has decreased the water supply deficit to allow some new connections without jeopardizing the public health, safety and welfare.

Section 5. General Prohibition.

No customer of the District shall make, cause, or permit the use of water from the District in a manner contrary to any provision of this Ordinance or in excess of the amount permitted by any curtailment provisions in effect. The waste or unreasonable use of water shall be prevented.

Section 6. Determination and Declaration of Water Condition Stages I, II and III.

The General Manager, after consultation with the Board of Directors, is hereby authorized and directed to determine when the water supply conditions prevailing in the District meet the Stage I through Stage III criteria set forth in this Ordinance. Wherever appropriate, conservation measures and target reduction goals will be consistent with regional policies set by MWD and Western Municipal Water District, which wholesale imported water to the District.

Retail Water User Measures

(a) **STAGE I. Voluntary Compliance-Water Watch**

Stage I allows for voluntary compliance and indicates that the possibility exists that the District may not be able to meet all the demands of its customers. Based on projected water supply availability, Stage I establishes a voluntary reduction goal of 10% for firm deliveries and an unspecified voluntary conservation reduction goal in non-firm deliveries. Stage I also imposes the following mandatory restrictions on water use:

Elements of Stage I for retail water users:

1) Use of running water to wash driveways, sidewalks, patios, and other paved areas is prohibited, except as required for sanitary purposes;

2) Failure to repair a controllable leak is defined as "waste of water" and is prohibited;

3) Commercial nurseries, golf courses and other water-dependent industries shall water before 11:00 a.m. or after 5:00 p.m., with the exception of those using reclaimed water;

4) All public use and governmental facilities, including but not limited to schools, churches, parks, cemeteries and hospitals shall water before 11:00 a.m. or after 5:00 p.m., except as required for sanitary purposes;

5) Irrigation of lawns, landscaping and other turf areas shall occur before 11:00 a.m. or after 4:00 p.m.;

6) Failure to prevent excessive runoff from irrigation activities is prohibited;

7) Sprinklers and irrigation systems shall be adjusted to avoid overspray, runoff and waste. Watering on windy days is to be avoided;

8) Use of a hand-held bucket or hose equipped with an automatic shut-off nozzle shall be required for car washing, except where car washing occurs on the immediate

premises of a commercial car wash or service station using reclaimed or recycled water;

9) Installation of water saving devices, such as low flow shower heads and faucet aerators, is encouraged;

10) Selection of low-water-demand shrubs, groundcovers and trees for all new landscaping is strongly encouraged;

11) Limitation of turf areas except in active areas of residential yards or public landscapes is encouraged. Use of turfgrass in medians, dividers and in other non-active areas is discouraged;

(b) **STAGE II. Mandatory Compliance-Water Alert**

Stage II requires mandatory compliance during periods when the probability exists that the District cannot meet all the demands of its customers. Based on projected water supply availability, Stage II establishes a mandatory reduction goal of 10% for all deliveries from the base year. The restrictions required by Stage II apply to all retail users.

Elements of Stage II for retail water users:

The restrictions listed in Stage I shall remain in effect with the following additions:

1) Use of movable or permanent sprinkler systems for lawn irrigation and watering of plants, trees, shrubs or other landscaped areas is prohibited between 6:00 a.m. and 6:00 p.m. Sprinkler operation shall be permitted no more than three times per week. However, irrigation of lawns, gardens, landscaped areas, trees, shrubs or other plants is permitted at anytime if:

    a. A hand-held hose is used, or
    b. A hand-held bucket is used, or
    c. A drip irrigation system is used, or
    d. Reclaimed wastewater is used.

    EXCEPTION: Commercial nurseries, commercial sod farmers and similarly situated establishments are exempt from Stage II irrigation scheduling restrictions, but will be required to follow all other restrictions to curtail all nonessential water use;

2) Washing of motor vehicles, trailers, boats, aircraft and other kinds of mobile equipment shall be done only with a hand-held bucket or hose equipped with a positive shutoff nozzle for quick rinses, except where washing occurs on the immediate premises of a commercial car wash or commercial service station using recycled or reclaimed water.

EXCEPTION: Such washings are exempted from these regulations where the health, safety and welfare of the public is contingent upon frequent vehicle cleaning, such as garbage trucks and vehicles to transport food and perishables;

3) The filling, refilling or adding of water to uncovered outdoor swimming pools, wading pools or spas is prohibited except after 6:00 p.m. and before 6:00 a.m.;

4) The use of water for irrigation of golf courses is permissible after 6:00 p.m. and before 6:00 a.m.; however, the irrigation of golf courses utilizing reclaimed wastewater shall not be subject to irrigation prohibitions;

5) Construction meters utilizing potable water shall be issued only in those instances where non-potable sources are not reasonably available to those persons who have been issued valid grading and/or building permits.

6) All restaurants, cafes, and other public food service establishments are prohibited from serving drinking water unless specifically requested by their customers;

7) The operation of any exterior ornamental fountain or similar structure is prohibited.

8) Water shall not be used to wash down sidewalks, driveways, parking areas, tennis courts, patios or other paved areas, except to alleviate immediate fire or sanitation hazards or unless reclaimed wastewater is used.

(c) **STAGE III. Mandatory Compliance-Water Warning**

Upon implementation of Stage III by the District, the following restrictions shall apply to all persons. Based on projected water supply availability, Stage III establishes a mandatory reduction goal of 20% for all deliveries from the base year.

Elements of Stage III:

The restrictions listed in Stage I and II shall remain in effect with the following additions:

1) All sprinkler irrigation of vegetation shall occur only after 6:00 p.m. and before 6:00 a.m. Sprinkler operation shall be permitted no more than two times a week. However, irrigation of lawns, gardens, landscaped areas, trees, shrubs or other plants is permitted on odd/even calendar days corresponding to the last two digits of a service address, provided:

   a. A hand-held hose is used, or
   b. A hand-held bucket is used, or
   c. A drip irrigation system is used, or
   d. Reclaimed wastewater is used.

2) The washing of private automobiles, trucks, trailers, boats, aircraft and other kinds of mobile equipment, except in the immediate interest of the public health, safety and welfare, shall be permitted only where washing occurs on the immediate premises of a commercial car wash or commercial service stations using recycled or reclaimed water;

3) The filling, refilling or addition of water to uncovered outdoor swimming pools, wading pools or spas is prohibited;

4) The watering of all golf course areas, except greens, is prohibited unless done with reclaimed wastewater. Irrigation of golf greens shall occur only between the hours of 6:00 p.m. and 6:00 a.m. unless using reclaimed wastewater;

5) Use of water from fire hydrants shall be limited to fire fighting, related activities and/or other activities necessary to maintain the health, safety and welfare of the citizenry and shall not be used for construction uses;

6) Commercial nurseries, golf courses and other water-dependent industries shall be prohibited from watering lawn, landscaping and other turf areas more often than twice a week. Such watering shall occur between the hours of 6:00 p.m. and 6:00 a.m. only; except that no such restriction on the intervals of water use shall be imposed on watering using reclaimed water;

7) All public use and governmental facilities, including but not limited to schools, churches, parks and hospitals, shall be prohibited from watering lawns, landscaping and other areas more often than twice a week. Such watering shall occur between the hours of 6:00 p.m. and 6:00 a.m. only, except that no such restriction on the intervals of water use shall be imposed on the use of reclaimed water for watering purposes;

8) No District water, with the exception of reclaimed water or as provided herein, shall be used for construction purposes except for system pressurization and/or testing.

Section 7. Declaration of Water Condition Stage IV-Water Rationing.

Pursuant to Water Code Section 355, the Board of Directors, after compliance with the notice and hearing procedures of Water Code Sections 351 and 352, is authorized and directed to declare a Stage IV Water Emergency as set forth in this Ordinance whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the District to the extent that there would be insufficient water for human consumption, sanitation and fire protection. The regulations and restrictions under a Stage IV

Water Shortage Emergency shall remain in full force and effect during the period of the emergency and until the supply of water available for distribution within the District has been replenished or augmented, as determined by the Board of Directors.

(c) **STAGE IV. Mandatory Compliance-Water Emergency**

Upon implementation of Stage IV by the District, the following restrictions shall apply to all persons. Based on projected water supply availability, Stage IV establishes a mandatory usage limit.

Elements of Stage IV include:

The restrictions listed in Stage I, II and III shall remain in effect with the following additions:

1) Sprinkler irrigation of vegetation shall be permitted no more than once a week. However, irrigation of lawns, gardens, landscaped areas, trees, shrubs or other plants is permitted on odd/even calendar days corresponding to the last two digits of a service address, provided:
   a. A hand-held hose with automatic shut off nozzle is used, or
   b. A hand-held bucket is used, or
   c. A drip irrigation system is used, or

d. Reclaimed wastewater is used.

2) The District shall ration water to its customers by establishing allocations for each class of service based upon projected water availability to the District.

Section 8. Wholesale Water Users.

The District serves wholesale water to retailers within its service area, including the Elsinore Water District and the Farm Mutual Water Company. The District's conservation plan for wholesalers consists of a direct pass through of MWD's IICP penalty payments for deliveries greater than adjusted targets for each wholesale entity. Target reduction goals for each stage of the IICP program are illustrated in the table below:

STAGE	REDUCTION IN FIRM DELIVERIES
I	Voluntary Goal 10%
II*	5%
III*	10%
IV*	15%
V*	20%
* Indicates Mandatory Compliance	

The District will directly pass through any other Stages and corresponding reduction goals as implemented by MWD. The monthly procedure for implementing MWD's IICP with each wholesale customer will be as follows:

1. The base allocation for FY '90-91 will be the actual amount of water delivered in FY '89-90 less the target reduction goal for the stage currently in effect as set by the District.

2. The difference between the FY '89-90 target amount and the actual amount delivered during the month will be determined.

3. If the actual usage is greater than the FY '89-90 target amount for the same monthly period, a disincentive charge, calculated at the amount of $394 per acre foot (or the prevailing rate and penalty factor set by MWD), will be added to the regular bill.

These wholesale entities are required to adopt mandatory conservation measures within thirty (30) days of the effective date of this Ordinance to reduce water consumption commensurate with the target reduction goals adopted by the District, and to take steps to inform their retail customers of the urgent need to conserve and protect water because of a critical shortage in the supplemental water supplies for their area.

Section 9. Retail Agricultural Water Users.

The District serves agricultural water users within its service area, including the Temescal Division. The agricultural users of the Temescal Division are subject to the terms and conditions of MWD's interruptible water program, subject to water availability from the Division's alternative water sources prior to implementation of MWD's program, which was designed to provide supplemental imported water at a reduced cost subject to availability. If MWD's program is implemented and restricts the availability of interruptible water, the District's conservation plan for agricultural water users consists of a direct pass through of MWD's IICP penalty payments for deliveries greater than adjusted reduction targets for each agricultural customer.

Target reduction goals for each stage of the IICP program are illustrated in the table below:

STAGE	INTERRUPTIBLE REDUCTION GOALS
I	Non-Specific Voluntary Savings
II*	20%
III*	30%
IV*	40%
V*	50%
* Indicates Mandatory Compliance	

The District will directly pass through any other stages and corresponding reduction goals as implemented by MWD. The monthly procedure for implementing MWD's IICP with each agricultural customer will be as follows:

1. The base allocation for FY '90-91 will be the actual amount of water delivered in FY '89-90 less the target reduction goal for the stage currently in effect by MWD.

2. The difference between the FY '89-90 target amount and the actual amount delivered during the month will be determined.

3. If the actual usage is greater than the FY '89-90 target amount for the same monthly period, a disincentive charge, calculated at the amount of $394 per acre foot

(or the prevailing rate and penalty factor set by MWD), will be added to the regular bill.

Section 10. Rescission of Moratorium on Service Commitments and Connections.

The District hereby declares that the moratorium on service commitments and connections is rescinded effective immediately. New service connections will be issued subject to all District rules, regulations and procedures.

Section 11. District Actions.

The Board hereby directs staff to take immediate steps to implement water conservation measures and to intensify its public information and education programs accordingly:

1. Immediately notify all retail water users of the conservation measures required by this Ordinance;

2. Immediately provide all wholesale customers with a copy of the Ordinance, together with a letter signed by the General Manager explaining the Board's request that wholesale customers adopt similar conservation measures;

3. Develop emergency water management plans for consideration by the Board for use in the event more stringent mandatory conservation measures are required.

4. Meet with appropriate cities and counties to adopt and implement water conservation measures as necessary.

5. Establish a task force, including but not limited to, representatives of the building industry, homeowner and consumer organizations and local and regional public officials, to develop ongoing measures for the implementation of water conservation programs.

Section 12. Relief from Compliance.

An applicant may file a request for relief from any provisions of this Ordinance. Such a written request shall include all information he or she deems necessary for resolution of the request. The General Manager shall review all requests for relief and may grant relief from the provisions of this Ordinance where he determines that the requested relief is necessary to protect public health, sanitation, safety or welfare of the customers and inhabitants of the District. The General Manager may at his discretion receive oral information from the person applying for relief.

The General Manager may grant, deny or modify the request for relief, or impose any conditions he deems proper. The General Manager shall make his determination within a reasonable period of time following receipt of the request for relief and shall inform the applicant of the decision in writing. The General Manager may delegate his duties and responsibilities under this section as appropriate.

An applicant shall have the right to appeal the General Manager's decision regarding his or her application to the Board of Directors or its designee. The appeal must be in writing and received by the District within ten (10) days of the date of the General Manager's written decision. The appeal shall be heard by the Board of Directors or its designee within a reasonable period of time from the date the appeal is filed. The District shall provide written notice of said hearing to applicant of the time and date of the hearing. The Board may at its discretion provide the applicant with the opportunity to be heard.

The Board of Directors or its designee, at its discretion, may affirm, reverse or modify the General Manager's decision and impose any conditions it deems proper. The decision of the Board shall be final.

Section 13. Failure to Comply.

Violation by any customer of the water use prohibitions of Sections 6, 7, and 8 of this Ordinance, shall be penalized as follows:

a) **First Violation-Notice of Non-Compliance.** The General Manager is authorized and directed to issue a written warning notice of non-compliance to any District customer who, in the judgment of the General Manager, has failed or refused in a significant way to comply with water use curtailment provisions of Sections 6, 7 and 8 of this ordinance. Any such warning notice shall specify the time, place and manner of non-compliance and shall specify a reasonable period to achieve compliance. Any warning notice of non-compliance shall be directed to the customer of record for the premises where the non-compliance was observed. Delivery may be by regular mail or by personal delivery with a declaration of delivery returned to the General Manager.

b) **Second Violation-Fine, Flow Restriction, or Water Service Shutoff.**

1) For a second violation by any customer of the water use curtailment provisions of Sections 7(a)-(c), or 8(c), a surcharge shall be imposed in an amount equal to the per-

centage of the customer's most recent water bill, excluding sewer charges, for the stage in effect upon the occurrence of the most recent violation. The penalty surcharge for each stage is shown below:

Stage II	25%
Stage III	50%
Stage IV	75%

2) If a water customer fails or refuses to comply with the requirements of a warning notice of non-compliance issued according to sub-Section (a) of Section 14, or if the water customer repeats the infraction noted in a prior warning notice of non-compliance, the General Manager has discretionary authority pursuant to Water Code Section 375 to cause a flow-restricting device to be installed at the meter to minimize water availability to the customer's service address. Pursuant to Water Code Section 35423, if installation of a flow restrictor is infeasible, impractical or is unlikely to induce compliance with this ordinance, the General Manager may authorize a shutoff of service to the premises involved.

c) **Referral of Misdemeanor Charges.** The General Manager may at his discretion refer evidence of non-compliance to the District Attorney of Riverside County with a request for misdemeanor prosecution as authorized by Water Code Section 377 and/or Section 35423. Pursuant to Water Code Section 377, any conviction resulting from a violation of a water conservation program restriction, prohibition or requirement published in this Ordinance shall be punishable by imprisonment in the County jail for not more than thirty (30) days or by fine not exceeding one thousand dollars ($1,000), or both.

Section 14. Hearing Regarding Violations.

(a) Any customer receiving notice of a second or subsequent violation of Sections 6, 7(a)-(c), or 8(c) shall have a right to a hearing by the General Manager within fifteen (15) days of mailing or other delivery of the notice of violation.

(b) The customer's written request for a hearing within the fifteen (15) day period shall automatically stay installation of a flow-restricting device on the customer's premises until the General Manager renders his decision.

(c) The customer's timely written request for a hearing shall stay the imposition of a surcharge if the customer deposits with the District money in the amount of any unpaid surcharge within such fifteen (15) day period. If it is determined that the surcharge was wrongly assessed, the District will refund any money deposited to the customer.

(d) The decision of the General Manager may be appealed to the Board of Directors, whose decision shall be final, except for judicial review.

(e) The General Manager may delegate his duties and responsibilities under this section as appropriate.

Section 15. Additional Water Shortage Measures-Pricing Incentives, Disincentives, and Alternative Measures Use Restrictions.

The Board of Directors may order implementation of alternative water conservation measures in addition to those set forth in Sections 7 and 8. The need for water rate incentive or disincentive pricing to achieve target water conservation goals may also be taken into consideration by the Board of Directors at any time it is determined that existing measures may be insufficient to achieve target reductions. Such alternative water conservation measures or pricing incentives/disincentives shall be implemented in the manner consistent with in Section 4(c).

Section 16. Incompatible Provisions.

To the extent any provision of this Ordinance is incompatible with or at variance with any prior adopted ordinance or resolution, the provisions of this Ordinance shall take precedence, and all prior ordinance shall be interpreted to harmonize with and not change the provisions of this Ordinance.

Section 17. Severability.

If any section, subsection, paragraph, sentence, clause, phrase or word of this Ordinance is declared by a court of competent jurisdiction, adjudicated to a final determination, to be void, this Board of Directors finds that said voided part is severable, and that this Board of Directors would have adopted the remainder of this Ordinance without the severed and voided part, and that the remainder of this Ordinance shall remain in full force and effect.

Section 18. Continuing Applicability of Ordinance No. 79. as Amended.

Ordinance No. 79, as adopted on March 6, 1991, is amended as set forth herein and the provisions of Ordinance 79, except as amended or superseded by this Ordinance No. 80, shall continue in full force and effect.

Section 19. Public Health and Safety Not to be Affected. Nothing in this Ordinance shall be construed to require the District to curtail the supply of water to any customer when such water is required by that customer to maintain an adequate level of public health and safety.

Section 20. Exemption from California Environmental Quality Act. The Board of Directors hereby determines that this Ordinance is exempt from review under the California Environmental Quality Act (California Public Resources Code Section 21080(b) (4)) because it is an action taken to mitigate a water shortage emergency. The Board of Directors hereby directs the General Manager or his designee to prepare and file a Notice of Exemption as soon as possible following adoption of this Ordinance.

APPROVED, ADOPTED AND SIGNED this 24 day of April, 1991.

GARY KELLEY, President of the Board of Directors Elsinore Valley Municipal Water District

ATTEST

NANCY SHAFER, Secretary of the
Board of Directors Elsinore Valley
Municipal Water District

I, NANCY SHAFER, Secretary-Treasurer of the Board of Directors of Elsinore Valley Municipal Water District certify that the foregoing is a full, true and correct copy of ORDINANCE NO. 81 adopted by said Board at a Special Meeting held April 24, 1991 by the following roll call vote:

AYES: Kelley, Bryant, Shafer, Attridge, Jeffries

NOES: None

ABSENT: None

ABSTAIN: None

Nancy Shafer, Secretary-Treasurer

M044648

APPENDIX E EVMWD ORDINANCE 185

ORDINANCE NO. 185

AMENDING ORDINANCE NO. 185 OF THE BOARD OF DIRECTORS OF THE ELSINORE VALLEY MUNICIPAL WATER DISTRICT ESTABLISHING REGULATIONS GOVERNING WATER WASTE AND WATER CONSERVATION PRACTICES

WHEREAS, a reliable minimum supply of potable water is essential to the public health, safety and welfare of the people and economy of the southern California region; and,

WHEREAS, Southern California is a semi-arid region and is largely dependent upon imported water supplies. A growing population, climate change, environmental concerns, and other factors in other parts of the State and in the western United States, make the region highly susceptible to water supply reliability issues; and,

WHEREAS, careful water management that includes active water conservation measures not only in times of drought, but at all times, is essential to ensure a reliable minimum supply of water to meet current and future water supply needs; and,

WHEREAS, California Constitution article X, section 2 and California Water Code section 100 provide that because of conditions prevailing in the state of California (the "State"), it is the declared policy of the State that the general welfare requires that the water resources of the State shall be put to beneficial use to the fullest extent of which they are capable, the waste or unreasonable use of water shall be prevented, and the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and the public welfare; and

WHEREAS, pursuant to California Water Code section 106, it is the declared policy of the State that the use of water for domestic use is the highest use of water and that the next highest use is for irrigation; and

WHEREAS, pursuant to California Water Code section 375, Elsinore Valley Municipal Water District ("District") is authorized to adopt and enforce a water conservation program to reduce the quantity of water used by persons within its jurisdiction for the purpose of conserving the water supplies; and

WHEREAS, because of the prevailing conditions in the State, the current statewide drought, and the declared policy of the State, the District hereby finds and determines that it is necessary and appropriate for the District to adopt, implement, and enforce a water conservation program to reduce the quantity of water used by its Customers to ensure that there is sufficient water for human consumption, sanitation, and fire protection; and

WHEREAS, the District has the power and the authority to adopt and enforce water conservation measures within its district boundaries pursuant to Water Code Sections 350 et seq., 375 et seq., and 71640 et seq.; and,

WHEREAS, the adoption and enforcement of a water waste ordinance is necessary to manage the District's potable water supply in the short and long-term and to maximize water use efficiency within the District. Such programs are essential to ensure a reliable and sustainable minimum supply of water for the public health, safety, and welfare.

NOW THEREFORE, the Board of Directors of the Elsinore Valley Municipal Water District does hereby resolve, determine and order as follows:

Section 1. The District hereby finds and determines that the above recitals are true and correct and incorporated herein.

Section 2. The District hereby adopts the following Ordinance prohibiting the waste and inefficient use of water:

Section 1. Findings and Declaration of Policy.

(a) The District finds and determines that because of the prevailing conditions in the State, and the declared policy of the State, it is necessary and appropriate for the District to adopt, implement, and enforce a water conservation program to ensure that there is sufficient water for human consumption, sanitation, and fire protection. The District further finds and determines that the general welfare requires that the District maximize the beneficial use of its available water resources to the extent that it is capable, and that the waste or unreasonable use, or unreasonable method of use of water shall be prevented and that water conservation practices shall be encouraged at all times.

(b) In times of drought or water supply cutbacks, provisions of this Ordinance may be modified in accordance with the Metropolitan Water District of Southern California's Water Surplus and Drought Management Plan, as well as Elsinore Valley Municipal Water District's Water Shortage Contingency Plan.

Section 2. Declaration of Purpose and Intent.

(a) This Ordinance establishes regulations prohibiting the waste or unreasonable use of water and encourages water conservation practices in the District.

(b) This Ordinance establishes permanent water conservation regulations intended to alter behavior related to water use during non-shortage conditions.

(c) This Ordinance adopts regulations to reduce water waste and encourage conservation practices consistent with the goals of Metropolitan Water District of California's Water Supply Allocation Plan.

(d) This Ordinance shall be known as the Prohibition of Water Waste Ordinance.

(e) This Ordinance is not intended to repeal, abrogate, annul, impair or in any way interfere with the free use of property by covenant, deed, or other private agreement or with restrictive covenants running with the land to which the District provides water services.

(f) The provisions of this Ordinance shall apply to Customers of the District and all property served by the District, wherever situated.

Section 3. Definitions.

(a) "Appellant" means the Customer appealing a decision of the General Manager, or other designated official for relief from the requirements of this Ordinance.

(b) "Board of Directors" means the Board of Directors of the Elsinore Valley Municipal Water District.

(c) "District" means the Elsinore Valley Municipal Water District.

(d) "Customer" means any person, firm, partnership, association, corporation, or local political entity using water obtained from the water system of Elsinore Valley Municipal Water District.

(e) "General Manager" means the General Manager of the Elsinore Valley Municipal Water District or his or her authorized designee.

(f) "Waste" means any unreasonable or non beneficial use of water, or any unreasonable method of use of water, including, but not limited to, the specific uses prohibited and restricted by this Ordinance as hereinafter set forth.

(g) "Water" means water supplied by Elsinore Valley Municipal Water District.

Section 4. Water Conservation Requirements.

(a) All Customers shall abide by the following requirements at all times unless otherwise excused from compliance by the terms of this Section 4, a Variance granted pursuant to Section 6 of this Ordinance, or a grant of relief issued in compliance with Section 9 of this Ordinance.

(b) It shall be a violation of this Ordinance for any Customer, at any time, to make, cause, use or permit the use of water for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner constituting Waste within the meaning of this Ordinance. Waste includes, but is not limited to, the following practices:

1. allowing excessive water flow or runoff. Watering or irrigating any lawn, landscape or other vegetated area in a manner that causes or allows excessive water flow or runoff onto an adjoining sidewalk, driveway, street, alley, gutter or ditch is prohibited;

2. excessive use, loss or escape of water through breaks, leaks or other malfunctions in the water user's plumbing or distribution system for any period of time after such escape of water should have reasonably been discovered and corrected and in no event more than seven (7) days is prohibited;

3. washing down hard or paved surfaces, including but not limited to sidewalks, walkways, driveways, parking areas, tennis courts, patios or alleys, is prohibited except when necessary to alleviate safety or sanitary hazards, and then only by use of a positive self-closing water shut-off device, a low-volume, high-pressure cleaning machine equipped to recycle any water used, or a low-volume high-pressure water broom;

4. watering or irrigating lawn, landscape or other vegetated area is prohibited between the hours of 9:00 a.m. and 5:00 p.m. on any day except by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, or for very short periods of time for the express purpose of adjusting or repairing an irrigation system.

5. using decorative fountains that are not equipped with a recirculating system;

6. allowing water to run while washing automobiles, trucks, trailers, boats, airplanes and other types of mobile equipment, rather than using a bucket or a hose with an automatic shutoff valve to avoid run off into gutters, streets or alleys; and

7. operating irrigation systems when it is raining.

(c) In addition to avoiding water Waste as defined in Section 4(b), Customers shall abide by the following requirements:

1. Customers shall adjust and operate all landscape irrigation systems in a manner which will maximize irrigation efficiency, and avoid over watering, watering of hardscape, and runoff.

2. Customers shall refrain from excessively irrigating any lawn or landscaped area, and shall eliminate water runoff from lawns or landscaped areas unless it is used to irrigate other landscaped portions of their property.

3. Customers shall install plumbing fixtures with low-flow devices, unless high-flow fixtures are required for health and/or sanitary reasons.

4. Where possible, Customers shall install pool and spa covers to minimize water loss due to evaporation.

5. When installing new landscaping, Customers shall plant low-water demand trees and plants, and shall not install or otherwise incorporate non-functional turf areas into new landscape designs.

6. Water served in restaurants only upon request.

7. Restaurants must use low-flow pre-rinse spray valves.

8. Commercial lodging establishments shall provide option to not launder linens.

9. No single pass cooling systems installed in new construction.

10. No new non-re-circulating commercial car washes or commercial laundries.

Section 5. Penalties.

(a) All Customers found to be in violation of the requirements of this Ordinance shall be subject to the following penalties:

1. For the first violation, the District shall issue a final written notice of fact of such violation to the Customer.

2. For a second violation within twelve months from the first notice of violation, the District shall issue a final written notice of the fact of such violation to the Customer.

3. For a third violation within twelve months from the first notice of violation, a surcharge in the amount of $100 shall be added to the Customer's water bill.

4. For a fourth violation within twelve months from the first notice of violation, a surcharge in the amount of $200 shall be added to the Customer's water bill.

5. For a fifth and any subsequent violation within twelve months from the first notice of violation, a surcharge of $250 shall be added to the Customer's water bill.

Section 6. Variance Conditions

(a) The District may issue Variances to the requirements of this Ordinance, in writing, to temporarily allow water uses otherwise prohibited under this Ordinance.

(b) Written applications for a Variance shall be accepted, and may be granted or denied, by the General Manager at his or her sole discretion. The grounds for granting or conditionally granting a relief are:

1. due to unique circumstances, application of this Ordinance would result in undue hardship that is disproportionate to the impacts to other Customers generally or to similar property or classes of water users;

2. failure to grant a Variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance, and if one or more of the following conditions are met:

    a. Compliance with this Ordinance cannot be technically accomplished without adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance; and

    b. Alternative methods can be implemented which will achieve the same level of reduction in water use;

(a) The application for a Variance shall be accompanied, as appropriate, with photographs, maps, drawings, and other information substantiating the applicant's request. The District may request such other additional information as it deems appropriate in order to process and/or review the application for relief.

(b) An application for relief shall be denied unless the General Manager, or the Board of Directors on appeal, finds that based on the information provided in the application, supporting documentation, or such other additional information as may be requested, and on water use information for the property as shown by the records of the city, all of the following are true:

1. granting the Variance would not constitute a grant of special privilege inconsistent with the limitations upon other Customers;

2. authorization of the Variance will not cause substantial detriment to adjacent properties, will not materially affect the ability of the District to effectuate the purposes of this Ordinance, and will not be detrimental to the public interest; and

3. the condition or situation of (a) the subject property or the intended use of the property for which the relief is sought is not common, recurrent, or general in nature, or (b) the applicant's health or safety is not common, recurrent, or general in nature.

(b) Appeals of the denial of a request for a Variance shall be made in accordance with the requirements of Section 7 of this Ordinance.

<u>Section 7. Appeals</u>

(a) Any Customer may appeal the imposition of penalties or non-compliance settlement charges, or denial of a Variance by filing an appeal in accordance with the requirements of this Section.

(b) Appeals shall be made in writing to the General Manager within 30 days of the Customer's receipt of notice of the District action that is the subject of the appeal. Any such appeal should include the following:

1. A description of the reasons why the penalties and/or charges should not be imposed, or in the case of a Variance, reasons why the proposed use or activity meets the requirements of Section 6 of this Ordinance;

2. A description of the Appellant's efforts to conserve water, avoid Waste, and increase water efficiency, if any; and

3. Documentation of the Appellant's actions to conserve water and their effectiveness.

(c) The General Manager shall have the discretion to approve or deny any appeal based upon the merits of the Appellant's claim, and the requirements of this Ordinance.

(d) If, upon receipt of documentation of the Appellant's water conservation efforts, the General Manager determines that an Appellant's actions resulted in a sufficient increase of efficient water use, it shall be in the General Manager's discretion to waive penalties and charges imposed for non-compliance with the provisions of this Ordinance.

(e) Within thirty days of the District's receipt of an appeal, the General Manager shall notify the Appellant of the General Manager's decision. Notice of the decision shall be provided by certified mail, and shall include a description of steps the Appellant could take to increase water efficiency in the future, including site audits and installation of water efficient devices.

(f) Any Appellant who is dissatisfied with the decision of the General Manager may appeal such decision to the Board of Directors. The District must receive the notice of appeal within 30 days of the mailing of the District's decision on the reconsideration request. The decision of the Board of Directors on the matter shall be final.

Section 8. District Actions.

(a) The Board of Directors hereby directs staff to take immediate steps to implement water conservation measures and to intensify its public information and education programs accordingly:

1. Immediately notify all retail water users of the conservation measures required by this Ordinance;

2. Immediately provide all wholesale Customers with a copy of the Ordinance, together with a letter signed by the General Manager explaining the Board's request that wholesale Customers adopt similar conservation measures; and

3. Develop emergency water management plans for consideration by the Board for use in the event more stringent mandatory conservation measures are required.

Section 9. Relief from Compliance.

(a) A Customer may file an application for relief from any provisions of this Ordinance. The General Manager shall develop such procedures as he or she considers necessary to resolve such applications and shall, upon the filing by a Customer of an application for relief, take such steps as he or she deems reasonable to resolve the application for relief.

(b) The application for relief may include a request that the Customer be relieved, in whole or in part, from the water use curtailment provisions of Section 4.

(c) In determining whether to grant relief, and the nature of any relief, the General Manager shall take into consideration all relevant factors including, but not limited to:

1. Whether any additional reduction in water consumption will result in unemployment;

2. Whether additional members have been added to the household;

3. Whether any additional landscaped property has been added to the property since the corresponding billing period of the prior calendar year;

4. Changes in vacancy factors in multi-family housing;

5. Increased number of employees in commercial, industrial, and governmental offices;

6. Increased production requiring increased process water;

7. Water uses during new construction;

8. Adjustments to water use caused by emergency health or safety hazards;

9. First filling of a permit-constructed swimming pool;

10. Water use necessary for reasons related to family illness or health; and

11. The needs of livestock on the Customer's property.

(e) In order to be considered, an application for relief must be filed with the District within (15) fifteen days from the date the provision from which relief is sought becomes applicable to the Customer. No relief shall be granted unless the Customer shows that he or she has achieved the maximum practical reduction in water consumption other than in the specific areas in which relief is being sought.

(f) No relief shall be granted to any Customer who, when requested by the General Manager, fails to provide any information necessary for resolution of the Customer's application for relief.

(g) Any Customer shall have the right to appeal the General Manager's to the Board of Directors. The Board of Director's decision on the matter shall be final.

<u>Section 10. Incompatible Provisions.</u>

(a) To the extent any provision of this ordinance is incompatible with or contradictory of any prior adopted ordinance or resolution, the provisions of this ordinance shall take precedence, and all prior ordinances shall re interpreted to harmonize with and not change the provisions of this Ordinance.

<u>Section 11. Severability.</u>

(a) If any section, subsection, paragraph, sentence, clause, phrase or word of this Ordinance is declared by a court of competent jurisdiction, adjudicated to a final determination, to be void, this Board of Directors finds that said voided part is severable, and that this Board of Directors would have adopted the remainder of this Ordinance without the severed and voided part, and that the remainder of this Ordinance shall remain in full force and effect.

Section 12. Public Health and Safety Not to be Affected.

(a) Nothing in this ordinance shall be construed to require the District to curtail the supply of water to any Customer when such water is required by that Customer to maintain an adequate level of public health and safety.

Section 13. Exemption from California Environmental Quality Act.

(a) The Board of Directors hereby determines that: this Ordinance is exempt from review under the California Environmental Quality Act (California Public Resources Code Section 21080(b)(4).) because it is an action taken to prevent a water shortage emergency. The Board of Directors hereby directs the General Manager or his designee to prepare and file a Notice of Exemption as soon as possible following adoption of this Ordinance.

ADOPTED, AMENDED AND SIGNED this 11th day of June, 2009, at Lake Elsinore, California.

Phil Williams

Phil Williams, President of the
Board of Directors of
Elsinore Valley Municipal Water District

ATTEST:

Terese Quintanar

Terese Quintanar, Secretary
Board of Directors of
Elsinore Valley Municipal Water District

STATE OF CALIFORNIA)
) ss:
COUNTY OF RIVERSIDE)

I, Terese Quintanar, Secretary of the Board of Directors of the Elsinore Valley Municipal Water District, do hereby certify that the foregoing Ordinance No. 185, was duly adopted by said Board at its Regular Meeting held June 11, 2009, and that it was so adopted by the following roll call vote:

AYES: Guglielmana, Lloyd, Ryan, Wicke, Williams

NOES: None

ABSENT: None

ABSTAIN: None

Terese Quintanar, Secretary of the
Board of Directors of the
Elsinore Valley Municipal Water District

APPENDIX F 2009-2010 BMP COVERAGE REPORT

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: **Elsinore Valley Municipal Water District Retail** **District Name:** **Elsinore Valley MWD Retail** **CUWCC Unit #:** **6296**

Primary Contact Rob Whipple **Telephone** 951-674-3146 ext 82 **Email:** rwhipple@evmwd.net

Compliance Option Chosen By Reporting Agency:
(Traditional, Flex Track or GPCD)

Foundational BMPs

BMP 1.1 Operational Practices

Conservation Coordinator provided with necessary resources to implement BMPs?

		2009	2010
1.Conservation Coordinator provided with necessary resources to implement BMPs?	Name	Rob Whipple	Rob Whipple
	Title	Conservation Specialist	Conservation Specialist
	Email	rwhipple@evmwd.net	rwhipple@evmwd.
		On Track	**On Track**

2. Water waste prevention documentation

	2009	2010
Descriptive File	WaterWasteOrdinance185Final7-	
Descriptive File 2010		WaterWasteOrdinance185Final7-6-09
URL	EVMWD Ordinance 185 is a Prohibition of Water Waste	
URL 2010		0
Describe Ordinance Terms	EVMWD Ordinance 185 is a Prohibition of Water Waste	
Describe Ordinance Terms 2010		Ordinance 185 is a prohibition of water waste ordinance
	On Track	**On Track**

On Track if any one of the 6 ordinance actions done, plus documentation or links provided

Agency: **Elsinore Valley Municipal Water District Retail** District Name: **Elsinore Valley MWD Retail** CUWCC Unit #: **6296**

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 1.2 Water Loss Control

	2009		
Complete a prescreening Audit	yes	On Track	On Track if Yes
Metered Sales	29,184		
Verifiable Other Uses	178		
Total Supply	29,006		
(Metered Sales + System uses)/ Total Supply >0.89	1.01		On Track if =>.89, Not on Track if No
If ratio is less than 0.9, complete a full scale Audit in 2009?	Yes	On Track	On Track if Yes
Verify Data with Records on File?	Yes	On Track	On Track if Yes
Operate a system Leak Detection Program?	Yes	On Track	On Track if Yes

	2010		
Compile Standard Water Audit using AWWA Software?	No	Not on Track	On Track if Yes, Not on Track if No
AWWA file provided to CUWCC?	0	Not on Track	On Track if Yes, Not on Track if No
AWWA Water Audit Validity Score?	0		Info only until 2012
Completed Training in AWWA Audit Method?	yes		Info only until 2012
Completed Training in Component Analysis Process?	No		
Complete Component Analysis?	No		Info only until 2012
Repaired all leaks and breaks to the extent cost effective?	Yes	On Track	On Track if Yes, Not on Track if No
Locate and repair unreported leaks to the extent cost effective.	Yes	On Track	On Track if Yes, Not on Track if No
Maintain a record-keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.			Info only until 2012

Provided 7 types of Water Loss Control Info — Info only until 2012

Leaks Repaired	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost of Interventions	Water Saved
732	$ -	$ -	6	Off	$ 131,200	0

Agency: Elsinore Valley Municipal Water District Retail **District Name:** Elsinore Valley MWD Retail **CUWCC Unit #:** 6296

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

1.3 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS

	2009		2010		
Exemption or 'At least as Effective As' accepted by CUWCC					If signed MOU prior to 31 Dec 1997, On Track if all connections metered; If signed after 31 Dec 1997, complete meter installations by 1 July 2012 or within 6 yrs of signing and 20% biannual reduction of unmetered connections.
Numbered Unmetered Accounts	0	On Track	0	On Track	On Track if no unmetered accounts
Metered Accounts billed by volume of use	Yes	On Track	Yes	On Track	Volumetric billing required for all connections on same schedule as metering
Number of CII accounts with Mixed Use meters	15		15		Info only
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	No		No		Info only until 2012
Feasibility Study provided to CUWCC?	Yes	On Track	No	On Track	On Track if Yes, Not on Track if No
Completed a written plan, policy or program to test, repair and replace meters	Yes	On Track	Yes	On Track	On Track if Yes, Not on Track if No

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: **Elsinore Valley Municipal Water District** **District Name:** **Elsinore Valley MWD Retail** **CUWCC Unit #:** **6296**
Retail

Primary Contact Rob Whipple **Email:** rwhipple@evmwd.net

1.4 Retail Conservation Pricing

On Track if: Increasing Block, Uniform, Allocation, Standby Service; Not on Track if otherwise

Metered Water Rate Structure

Customer Class	2009 Rate Type	Conserving Rate?	Customer Class	2010 Rate Type	Conserving Rate?
Single-Family	Allocation Based	0	Single-Family	Increasing Block	Yes
Other	Increasing Block	Yes	Commercial	Uniform	Yes
Dedicated Irrigation	Allocation Based	0	Other	Increasing Block	Yes
Commercial	Uniform	Yes	Agricultural	Uniform	Yes
Institutional	Uniform	Yes	Dedicated Irrigation	Increasing Block	Yes
	On Track			On Track	

Year Volumetric Rates began for Agencies with some Unmetered Accounts

Info only

Agencies with Partially Metered Service Areas: If signed MOU prior to 31 Dec. 1997, implementation starts no later than 1July 2010. If signed MOU after 31 Dec. 1997, implementation starts no later than 1July 2013, or within seven years of signing the MOU, Agency: Elsinore Valley Municipal Water District Retail

District Name: Elsinore Valley MWD Retail

CUWCC Unit #: 6296

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Adequacy of Volumetric Rates) for Agencies with No Unmetered Accounts

Customer Class	2009 Rate Type	2009 Volumetric Revenues $1000s	2010 Rate Type	2010 Volumetric Revenues $1000s
Single-Family	Allocation Based	$ 15,217	Single-Family	$ 17,907
Other	Increasing Block	$ 620	Commercial	$ 1,035
Dedicated Irrigation	Allocation Based	$ 5,372	Other	$ 513
Commercial	Uniform	$ 926	Agricultural	$ 156
Institutional	Uniform	$ 115	Dedicated Irrigation	$ 6,594
Agricultural		$ 144		$ 136
Fire Lines		$ 214		$ 469
Total Revenue Commodity Charges (V):		$ 22,607		$ 26,810
Total Revenue Fixed Charges (M):		$ 7,015		$ 7,644
Calculate: V / (V + M):		76%		78%
		On Track		On Track

Agency Choices for rates:

A) Agencies signing MOU prior to 13 June2007, implementation starts 1 July2007: On Track if (V / (V + M) ≥ 70% x .8 = **56% for 2009** and 70%x0.90 = **63% for 2010**; Not on track if (V / (V + M)) < 70%;

B) Use Canadian model.

Agencies signing MOU after 13June2007, implementation starts July 1 of year following signing.

	2009	2010
Canadian Water & Wastewater Rate Design Model Used and Provided to CUWCC	No	No
If Canadian Model is used, was 1 year or 3 year period applied?		

Wastewater Rates

	2009	2010
Does Agency Provide Sewer Service?	Yes	Yes

If 'No', then wastewater rate info not required.

Customer Class	2009 Rate Type	Conserving Rate?	Customer Class	2010 Rate Type	Conserving Rate?
Single-Family	Non-Volumetric Flat Rate	No	Single-Family	Non-Volumetric Flat Rate	No
Multi-Family	Non-Volumetric Flat Rate	No	Multi-Family	Non-Volumetric Flat Rate	No
Other	Non-Volumetric Flat Rate	No	Other	Uniform	Yes
Other	Uniform	Yes	Other	Non-Volumetric Flat Rate	No
	Uniform	Yes		Uniform	Yes
	Not On Track			Not On Track	

* Water Other is Wholesale. Water fixed charges are for all classes combined. Sewer: Other 1 is Sewer Only customers, Other 2 (203794) is reclaimed water sales

On Track if: 'Increasing Block', 'Uniform', 'based on long term marginal cost' or 'next unit of capacity'

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 2. EDUCATION PROGRAMS

BMP 2.1 Public Outreach Actions Implemented and Reported to CUWCC

	2009	2010	
Does a wholesale agency implement Public Outrach Programs for this unility's benefit?	No	No	Yes/No
1) Contacts with the public (minimum = 4 times per year)	32	28	
2) Water supplier contacts with media (minimum = 4 times per year, i.e., at least quarterly).	20	12	
3) An actively maintained website that is updated regularly (minimum = 4 times per year, i.e., at least quarterly).	Yes	Yes	All 6 action types implemented and reported to CUWCC to be 'On Track')
4) Description of materials used to meet minimum requirement.	Newsletter articles on conservation Website News releases Newspaper contacts	Newsletter articles on conservation Website News releases Newspaper contacts	
5) Annual budget for public outreach program.	$ 413,904	$ 425,306	
6) Description of all other outreach programs	Description is too large for text area. Data will be stored in the BMP Reporting database when online.	Description is too large for text area. Data will be stored in the BMP Reporting database when online.	
	On Track	On Track	

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

2.2 School Education Programs Implemented and Reported to CUWCC

	2009	2010	
Does a wholesale agency implement School Education Programs for this unility's benefit?	No	No	
1) Curriculum materials developed and/or provided by agency	Teacher's guides, water conservation activities, coloring books, branded giveaways	Teacher's guides, water conservation activities, coloring books, branded giveaways, science projects	Yes/ No
2) Materials meet state education framework requirements and are grade-level appropriate?	Yes	Yes	All 5 actions types implemented and reported to CUWCC to be
3) Materials Distributed to K-6?	Yes	Yes	
Describe K-6 Materials	Teacher's guides, water conservation activities, coloring books, branded giveaways	Teacher's guides, water conservation activities, coloring books, branded giveaways, science projects	Describe materials to meet minimum requirements
Materials distributed to 7-12 students?	Yes	Yes	Info Only
4) Annual budget for school education program.	$ 27,148	$ 40,775	
5) Description of all other water supplier education programs	Teacher grant program for water conservation related class activities	No data provided	
	On Track	On Track	

CUWCC BMP COVERAGE REPORT BMP 3 RESIDENTIAL

Agency: Elsinore Valley Municipal Water District **District Name:** **CUWCC Unit #:** 6296

Date:

Primary Contact Rob Whipple **Email** rwhipple@evmwd.net

Compliance Option Chosen By Reporting Agency: Flex Track

Date 2009 Data Downloaded from PDF June 6, 2011
Date 2010 Data Downloaded from PDF June 6, 2011

BMP 3 C 1) Residential Assistance

	2009 Single Family Accounts	2009 SF Target	2009 Multi Family Units	2009 MF Targets	2010 Single Family Accounts	2010 SF Target	2010 Multi Family Units	2010 MF Targets	
Total Number of Customers	35,540		307		35,812		308		
Total Participants during Reporting Period	834		1		1,003		1		
Number of Leak Detection Surveys or Assistance on Customer Property	0	533	0	5	0	537	0	5	"On Track" if annual number of surveys/assistance >= 1.5% of SF accounts and MF units
Number of Faucet Aerators Distributed	0		0		0		0		
Number of WSS Showerheads Distributed	373		0		900		208		

Agency: Elsinore Valley Municipal Water District | **District Name:** | **CUWCC Unit #:** 6296

BMP 3 C2) Landscape Water Surveys	2009 SF		2010 SF	
Number of SF account landscape water surveys completed	22	533	73	537
Surveys as Percent of SF Accounts	0.06%		0.20%	

"On Track" if annual number of landscape surveys >= 1.5% of SF accounts

BMP 3 C3) High Efficiency Clothes Washers	2009		2010	
Number Financial Incentives Provided to Customers	315	320	370	358
Percent	0.89%		1.03%	

"On Track" if number of incentives for HECW (WF,=5.0) => 0.9% SF accounts in 2009 and 1.0 % in 2010

BMP 3 C4) Water Sense Specification Toilets	2009	2010
Retrofit 'On Resale' Ordinance exists	No	No
75% Market Penetration Achieved If 'Yes' is documentation provided?	No	No

Ordinance must require replacement of toilets => 3.5 gpf when property is sold
On Track if ordinance exists

On Track if 75% penetration achieved and documentation provided

	2009 SF	2009 MF Units	2010 SF	2010 MF Units
Five year average Resale Rate	5.8%	4.3%	5.8%	4.3%
Number Toilets per Household	2	2	2	2
Number WSS Toilets Installed	196	365	130	177
Ave Resale Rate X Toilets /residence	4,087	27	4,087	27

On Track If number of toilets installed => average resale rate X number toilets per residence (from Base Year Data)

Agency: Elsinore Valley Municipal Water District | **District Name:** | **CUWCC Unit #:** 6296

BMP 3 C5) WSS for New Residential Development

	2009 SF	2009 MF	2010 SF	2010 MF
Does an Ordinance Exists Requiring WSS Fixtures and Appliances in new SF and MF residences?	No	No	Yes	Yes
If 'Yes' is documentation provided?	No	No	Yes	Yes
Incentives				
Number of new SF & MF units built	358	6	272	1

On Track if ordinance exists requiring WSS in new residential units and documentation is provided

If no ordinance, to be On Track, provide incentives and describe, Including:

List Incentive Types, $ amounts, number of WSS fixtures installed; and number of participating SF & MF homes

2009 New Residential Development Incentives and Results

Types of Incentives	Incentive Value SF	Number WSS Fixtures Installed	Number SF Participants	Number MF Participants	Measured SF Water Savings AF	Measured MF Water Savings AF

Number of other components distributed:	2
Decription:	High Efficiency sprinkler nozzles, artificial turf

2010 New Residential Development Incentives and Results

Types of Incentives	Incentive Value SF	Number WSS Fixtures Installed	Number SF Participants	Number MF Participants	Measured SF Water Savings AF	Measured MF Water Savings AF

Number of other components distributed:	2
Decription:	High Efficiency sprinkler nozzles, artificial turf

Agency: Elsinore Valley Municipal Water District **District Name:** **CUWCC Unit #:** 6296

FLEX TRACK

2009 F) Educate residential customers about the behaviroial aspects of water conservation		
Method used	# of Events	# of Customers Reached
Workshop	2	160

2009 I) Provide unique water savings fixtures that are not included in the BMP list above			
Fixture/Device	Description	Quantity Installs	Measure Water Savings (AF/YR)
MP Rotator	High Efficiency Sprikler Nozzle	7,301	27
Artificial Turf	Replacing live grass (square feet)	34,966	4.2

2009 L) Implement an automatic meter reading program for residential customers		
AMR or AMI	Type of Network	Number of connections installed
AMR	Mobile	35,847

2010 F) Educate residential customers about the behaviroial aspects of water conservation		
Method used	# of Events	# of Customers Reached
Workshop	2	130

2010 I) Provide unique water savings fixtures that are not included in the BMP list above			
Fixture/Device	Description	Quantity Installs	Measure Water Savings (AF/YR)
MP Rotator	High Efficiency Sprikler Nozzle	13,465	40
Artificial Turf	Replacing live grass (square feet)	10,691	1.3

2010 L) Implement an automatic meter reading program for residential customers		
AMR or AMI	Type of Network	Number of connections installed
AMR	Mobile	36,120

On Track

Traditional Water Savings Targets / **Flex Track Savings**

Measures	Target 2009 Water Savings (AF)		Actual 2009 Water Savings (AF)
SF			
Leak Detection Surveys	11.9		
Landscape Water Surveys	11.9		0.2
MF			
Leak Detection Surveys	0.1		
2010			2010
SF			
Leak Detection Surveys	12.0		
Landscape Water Surveys	12.0		0.8
MF			
Leak Detection Surveys	0.1		
2009			
SF			
WSS Toilets installed	58.3		5.6
MF			
WSS Toilets installed	77.4		18.4
2010			
SF			
WSS Toilets installed	58.8		3.7
MF			
WSS Toilets installed	77.4		8.9
2009			
HECW	9.0		8.8
2010			
HECW	10.0		10.4
		2009	
		MP Rotator	27
		Turf Replacement	4.2
		2010	
		MP Rotator	40
		Turf Replacement	1.3
BMP 3 Sub-Total	**339.0**		**129.4**
BMP 4 Sub-Total	**5.1**		**3.5**
BMP 5 Sub-Total	**143.3**		**573**
Total Track	**487.4**		**705.9**

CUWCC BMP COVERAGE REPORT

Traditional BMP 4 - Comercial Industrial Institutional

Agency: Elsinore Valley Municipal Water District **District Name:** **CUWCC Unit #:** 6296

Primary Contact Rob Whipple **Email:** rwhipple@evmwd.net **Report Date:**

Compliance Option Chosen By Reporting Agency: Traditional

Date Agency Signed MOU: 12/11/2002 **Initial 10 year period completed:** Y **If "Yes" , 50% credit for past BMP 9 Implementation?** Y

Flex Track **50% of Water Savings Credit:** 3.5

CII Baseline Water Use (AF): 1024 Target CII Water Use Reduction (AF) 102.4

Year 2 Target 5.12

Target Reduction is 10% of Baseline CII water use over 10 years.

Water Efficiency Measures	**2009 Quantity Installed**	**2009 Water Savings AF**	**2010 Quantity Installed**	**2010 Water Savings AF**
1 High Efficiency Toilets (1.2 GPF or less)	0		0	
2 High Efficiency Urinals (0.5 GPF or less)	0		0	
3 Ultra Low Flow Urinals				
4 Zero Consumption Urinals	0		0	
5 Commercial High Efficiency Single Load Clothes Washers	0		0	
6 Cooling Tower Conductivity Controllers	0		0	
7 Cooling Tower pH Controllers	0		0	
8 Connectionless Food Steamers	0		0	
9 Medical Equipment Steam Sterilizers	0		0	
10 Water Efficient Ice Machines	0		0	
11 Pressurized Water Brooms	0		0	
12 Dry Vacuum Pumps	0		0	
Total Water Savings		0		0

Guideline: 'On Track' if estimated savings as percent of baseline:
0.5% by the end of first reporting pe
2.4% by end of yr 4,
6.4% by end of year 8
9 % by end of yr 10

CII List of Efficiency Measures from MOU Compliance Policies Tier 3, page 5, dated 10-06-09

CUWCC BMP COVERAGE REPORT

Traditional BMP 5 - Landscape

Agency: **Elsinore Valley Municipal Water District** **District Name:** **CUWCC Unit #:** **6296**

Primary Contact Rob Whipple **Email:** rwhipple@evmwd.net **Report Date:**

Compliance Option Chosen By Reporting Agency: Traditional

Date Agency Signed MOU: 12/11/2002 **Initial 10 year period completed:** **Y** **If "Yes" , 50% credit for past BMP 9 Implementation?** **Y**

Flex Track **50% of Completed Accounts:** **157**

Required Documentation

	2009		2010
Number of dedicated irrigation meter accounts	851		856
Number of dedicated irrigation meter accounts with water budgets.	0		856
Percent of dedicated irrigation meters with water budgets	0.0%		100.0%
Target Rate for Year 1	9%	Target Rate for Year 2	18%
Aggregate water use for dedicated non-recreational landscape accounts with budgets	**0**		4,510

ETo-based water use budgets developed for 90% of CII accounts with dedicated irrigation meters at an average rate of 9% per year over 10 years

15% Estimated Water Savings (AF)	795.9
BMP 5 Target Water Saving Equivalent (18%)	143.3
Flex Track Excess Water Savings (AF)	573.0

Note: This excess Water Savings estimate will go down in future years as the target rate for completed water budget increases toward 90%

	2009 Acres	2009 Average ET	2010 Acres	2010 Average ET
Aggregate acreage assigned water budgets and average ET for dedicated non-recreational landscape accounts with budgets.	0		1,416	

2009 Accounts >20% over-budget			2010 Accounts >20% over-budget		
Number of Accounts	**Offered Technical Assistance**	**Accepting Technical Assistance**	**Number of Accounts**	**Offered Technical Assistance**	**Accepting Technical Assistance**
0		0	196	31	31

Offer site-specific technical assistance annually to all accounts that are 20% over budget within six years of the date implementation was to commence.

	2009 Acres	2009 Average ET	2010 Acres	2010 Average ET
Aggregate acreage of recreational areas assigned water budgets and average ET for dedicated recreational landscape accounts with budgets.	n/a		n/a	

Agency: **Elsinore Valley Municipal Water District** **District Name:** **CUWCC Unit #:** **6296**

CII Accounts without Meters or with Mixed-Use Meters

	2009	2010
Number of mixed use and un-metered accounts.	15	15

Incentive Type	2009 Incentives and Responses: Incentive Value $	2009: Number offered to Customers	2009: Number accepted by Customers	2010 Incentives and Responses: Incentive Value $	2010: Number offered to Customers	2010: Number accepted by Customers
Controllers 630/acre	630		316	630		85
MP Rotators	n/a		n/a	3		26,746

Agency will implement and maintain a customer incentive program(s) for irrigation equipment retrofits.

	2009 Surveys: Number offered.	2009 Surveys: Number accepted	2010 Surveys: Number offered.	2010 Surveys: Number accepted
Landscape Irrigation Surveys	0	0	0	0
Agregate acreage for Mixed Use and un-metered accounts	0		0	

Complete irrigation water use surveys for not less than 15% of CII accounts with mixed-use meters and un-metered accounts within 10 years of the date implementation is to commence. (Note: CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both the Landscape and CII BMPs.)

On Track if the percent of CII accounts with mixed-use meters receiving a landscape water use survey equals or exceeds the following: 1.5% by the end of the first reporting period (year two) following the date implementation is to commence; 3.6% by the end of year four; 6.3% by the end of year six; 9.6% by the end

	2009 Savings AF	2010 Savings AF
Estimated annual water savings by customers receiving surveys and implementing recommendations.	n/a	n/a

APPENDIX G ADOPTED RESOLUTION

RESOLUTION NO. 11-06-01

RESOLUTION OF THE BOARD OF DIRECTORS OF ELSINORE VALLEY MUNICIPAL WATER DISTRICT ADOPTING THE URBAN WATER MANAGEMENT PLAN (UWMP) 2010

WHEREAS, the California Legislature enacted Assembly Bill 797 during the 1983-94 Regular Session of the California Legislature (Water Code Section 10610 et. seq.) known as the Urban Water Management Planning Act, which mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare an Urban Water Management Plan, the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS, Elsinore Valley Municipal Water District is an urban supplier of water providing to over 32,000 customers, and has therefore, prepared and circulated for public review a Draft Urban Water Management Plan, in compliance with requirements of AB 797; and

WHEREAS, a properly noticed public hearing regarding said Draft Plan was held by the Board of Directors of Elsinore Valley Municipal Water District on June 9, 2011;

NOW, THEREFORE BE IT RESOLVED, by the Board of Directors of the Elsinore Valley Municipal Water District as follows:

1. The 2010 Urban Water Management Plan is hereby adopted;
2. The General Manager is hereby authorized and directed to submit the Plan to the California Department of Water before July 31, 2011, in accordance with AB 797;
3. The General Manager is hereby authorized and directed to implement the Water Conservation Programs as detailed in the adopted Urban Water Management Plan, including recommendations to the Board of Directors regarding necessary procedures, rules, and regulations to carry out effective and equitable water conservation programs.

APPROVED, ADOPTED AND SIGNED this 9th day of June, 2011.

W. Ben Wicke

W. Ben Wicke, President of the
Board of Directors of the
Elsinore Valley Municipal Water District

ATTEST:

Terese Quintanar

Terese Quintanar, Secretary to the
Board of Directors of the
Elsinore Valley Municipal Water District

STATE OF CALIFORNIA)
) ss:
COUNTY OF RIVERSIDE)

I, Terese Quintanar, Secretary of the Board of Directors of the Elsinore Valley Municipal Water District, do hereby certify that the foregoing Resolution No. 11-06-01, was duly adopted by said Board at its Regular Meeting held on June 9, 2011, and that it was so adopted by the following roll call vote:

AYES: Guglielmana, Morris, Ryan, Wicke

NOES: None

ABSENT: Williams

ABSTAIN: None

Terese Quintanar, Secretary of the Board of Directors of the
Elsinore Valley Municipal Water District