Technical Appendix I

Water Supply Assessment

EASTERN MUNICIPAL WATER DISTRICT
SINCE 1950

January 22, 2014

TO: Board of Directors

FROM: General Manager

SUBJECT: Approve the Water Supply Assessment for the Modular Logistics Center

RECOMMENDATION

The following proposal was presented to the Board Planning Committee on January 21, 2014, and received its full concurrence. It is recommended that the Board approve the Water Supply Assessment for the Modular Logistics Center, in accordance with the provisions of Senate Bill 221 (SB 221) and Senate Bill 610 (SB 610).

Concur:

Paul D. Jones II, P.E.
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Submitted by:

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BACKGROUND

Senate Bills 221 and 610 require the District respond to requests for a statement that adequate water supplies are or will be available to meet the water demands associated with proposed land development. Senate Bill 610 focuses on the content of a water supply agency's Urban Water Management Plan and stipulates that when an Environmental Impact Report (EIR) is required in connection with a project, the appropriate water supply agency must provide an assessment of whether its total projected water supplies will meet the projected water demands associated with the proposed project. Senate Bill 221 also requires water supply verification when a tentative map, parcel map or development agreement for a project is submitted to a land-use agency for approval. Senate Bill 221 applies to proposed residential development of more than 500 dwelling units with some exceptions. Senate Bill 610 applies to a proposed residential development of more than 500 dwelling units, or large commercial, industrial or mixed-use development.

The City of Moreno Valley is the lead agency for the preparation of an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA), Public Resources Code Section 21000, et seq. for the Modular Logistics Center (Proposed Project) located at 17300 Perris Boulevard. The Proposed Project site encompasses 50.7 acres, at the northeast corner of Perris Boulevard and Modular Way, and includes a 1,109,378 square foot warehouse building. As part of the project an existing warehouse facility will be demolished. The existing water demand on the site was 11.6 acre-feet (AF) in 2012. Demand form the Proposed Project is estimated to be 38.03 acre feet per year (AFY). The project developer is Kearny Real Estate Company.

This project supports the District's Strategic Plan Objective "Community Relations: Promote and sustain timely and effective two-way communication between the District and the communities it serves and continue to be a trusted resource for the communities on all water, wastewater, and recycled water issues."

EL:sgc

Attachment: Exhibit A – Water Supply Assessment for the Modular Logistics Center

Finance ML

Purchasing/Contracts JL

Author: Elizabeth Lovsted

Modular Logistics Center WSA Ltr.012214.docx

Exhibit A

EASTERN MUNICIPAL WATER DISTRICT

SINCE 1950

Water Supply Assessment Report for the Modular Logistics Center

January 22, 2014

Section I - Introduction

1.1 Purpose

Water Code 10910 (a)(b)(c)

The purpose of the "Water Supply Assessment Report" is to satisfy the requirements under Senate Bill 610 (SB 610), Water Code Section 10910 et seq., and Senate Bill 221 (SB 221), Government Code Section 66473.7, that adequate water supplies are or will be available to meet the water demand associated with the proposed development. SB 610 focuses on the content of a water supply agency's Urban Water Management Plan (UWMP). It also stipulates that, when an environmental impact report is required in connection with a project, the appropriate water supply agency must provide an assessment of whether its total projected water supplies will meet the projected water demand associated with the Proposed Project. SB 221 requires water supply verification when a tentative map, parcel map, or development agreement for a project is submitted to a land use agency for approval. Senate Bill 221 applies to proposed residential development of more than 500 dwelling units with some exceptions. Senate Bill 610 applies to a proposed residential development of more than 500 dwelling units, or large commercial, industrial, or mixed-use development. The need for an assessment or verification is determined by the lead agency for the project.

1.2 Project Description

The City of Moreno Valley is the lead agency for the preparation of an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA), Public Resources Code Section 21000, et seq. for the Modular Logistics Center (Proposed Project) located at 17300 Perris Boulevard. The Proposed Project site encompasses 50.7 acres, located on the northeast corner of Perris Boulevard and Modular Way, and includes a 1,109,378 square foot warehouse building. As part of the project an existing warehouse facility will be demolished. The existing water demand on the site was 11.6 acre-feet (AF) in 2012. Demand form the Proposed Project is estimated to be 38.03 acre feet per year (AFY). The project developer is Kearny Real Estate Company. Figure A shows the location of this project.

1.3 Requirements

The City of Moreno Valley requested that Eastern Municipal Water District (EMWD) prepare this updated Water Supply Assessment Report. EMWD has confirmed that the demand from the Proposed Project is within the limits of demand accounted for in the EMWD 2010 UWMP adopted in June of 2011. Accordingly, the District has elected to incorporate information from the 2010 UWMP in the preparation of this Water Supply Assessment Report as authorized by Water Code Section 10910 (c)(2). The 2010 UWMP is attached as Appendix A.

In accordance with Water Code Section 10910(d) – (f), the Water Supply Assessment shall:

1. Identify any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the Proposed Project, and provide a description of the quantities of water received in prior years by the public water system, under existing water supply entitlements, water rights, or water service contracts;

2. If no water has been received in prior years by the public water system, identify other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts to the same source of water as the public water system.

3. If groundwater is included in the proposed supply, identify the groundwater basin or basins from which the Proposed Project will be supplied; and include any applicable documentation of adjudicated rights to pump. If the basin is not adjudicated, regardless of whether the basin has been identified as over-drafted; provide a detailed description and analysis of the amount and location of groundwater pumped by the public water system for the past five (5) years from any groundwater basin from which the Proposed Project will be supplied; and provide a detailed description and analysis of the amount and location of groundwater from the basin or basins from which the Proposed Project will be supplied to meet the projected water demand associated with the Proposed Project.

If the Proposed Project includes a "subdivision" of more than 500 residential dwelling units as defined by Government Code Section 66473.7(a)(1), the public water system shall also provide verification as to whether the public water system is able or unable to provide a sufficient water supply based upon an analysis of whether water supplies available during normal, single-dry, and multiple-dry years within a 20-year projection, will meet the projected demand associated with the proposed subdivision which considers:

1. The historical record for at least 20 years;
2. The applicability of any urban water shortage contingency analysis;
3. The reduction in water supply for "specific water use sector" per an adopted resolution, ordinance or contract; and
4. The amount of water that can be reasonably relied upon from specified supply projects.

This assessment is a technical, informational, advisory opinion only. It is a supporting document for an environmental impact report and is not a commitment by EMWD to supply water for the Proposed Project. The information included is based on information available at the time of the report and changing circumstances could affect EMWD's water supply evaluation presented in this document.

This assessment does not specifically address funding of new or existing supplies. The cost of water supplies will increase over time. The developer of this project will be required to fund the acquisition of new supplemental supplies, treatment or recycled water facilities and water efficiency measures for existing customers. The extent of additional funding will be determined by EMWD and may take the form of a new component of connection fees or a separate charge. New customers may also be required to pay a higher commodity rate for water used than existing customers. This would offset the rising costs of new supplies.

Prior to project construction, the developer of this project is required to meet with EMWD staff to develop a plan of service. The plan of service will detail water, wastewater and recycled water requirements to serve the projects. If there is a change in the circumstances detailed in this assessment, EMWD will address the changes in the plan of service for the project. Modifications at the plan of service stage could reduce the amount of water available to serve this project.

1.4 Background

Eastern Municipal Water District was formed in 1950 and annexed into The Metropolitan Water District of Southern California (MWD) in 1951 to deliver imported water. With the acquisition of the Fruitvale Mutual Water Company in 1971, EMWD assumed the role of a groundwater producer. Presently, EMWD's supply portfolio includes desalted groundwater and recycled water in addition to imported water and potable groundwater.

EMWD's service area encompasses 540 square miles with an estimated population of over 755,000. The service area includes areas where EMWD provides retail water directly or indirectly through the following agencies:

City of Hemet Water Department
City of Perris Water System
City of San Jacinto Water Department
Lake Hemet Municipal Water District (LHMWD)
North Perris Water System
Nuevo Water Company
Rancho California Water District (RCWD)

1.5 Urban Water Management Plan

Water Code 10910 (c) (1)

In June of 2011, the EMWD Board of Directors adopted the 2010 UWMP. This plan details EMWD's demand projections and provides information regarding EMWD's supply. The majority of EMWD's existing and future planned demand is met through imported water delivered by MWD. EMWD's 2010 UWMP relies heavily on information and assurances included in the 2010 MWD Regional Urban Water Management Plan (2010 RUWMP) when determining supply reliability. Demand for EMWD included in the 2010 UWMP is calculated across the District and is not project-specific. The 2010 RUWMP is attached as Appendix B.

1.6 Population Projection

EMWD used the Riverside County Center for Demographic Research (RCCDR) 2010 Projection to estimate the future population. RCCDR considers land use and land agency information to develop projections. The RCCDR projection has been adopted by the Western Riverside Council of Governments.

As evidenced by the population projection, EMWD is located in a developing area. Approximately 40 percent of EMWD's service area remains undeveloped. As population and the associated water demand increase, EMWD will increase the amount of water imported through MWD to meet demands.

Table 1 - Projected Population – 2015 – 2035

	2015	2020	2025	2030	2035
EMWD Retail Service Area	548,718	628,918	709,729	785,810	849,059
City Of Perris Water Department	9,151	9,464	9,906	10,312	10,699
North Perris Water Company	4,977	4,977	4,977	4,977	4,977
Nuevo Water Company	7,781	8,580	6,903	5,902	5,346
City of San Jacinto Water Department	19,706	21,467	22,738	23,635	24,341
City of Hemet Water Department	27,474	29,363	31,273	33,181	35,217
Lake Hemet Municipal Water District	47,446	50,865	54,296	57,742	59,167
Rancho California Water District	114,604	116,969	120,231	122,259	122,923
Total	**779,857**	**870,603**	**960,053**	**1,043,818**	**1,111,729**

Source: Riverside County Center for Demographic Research

Section 2 - Identification of Supply and Quantity
Water Code 10910 (d) (1)

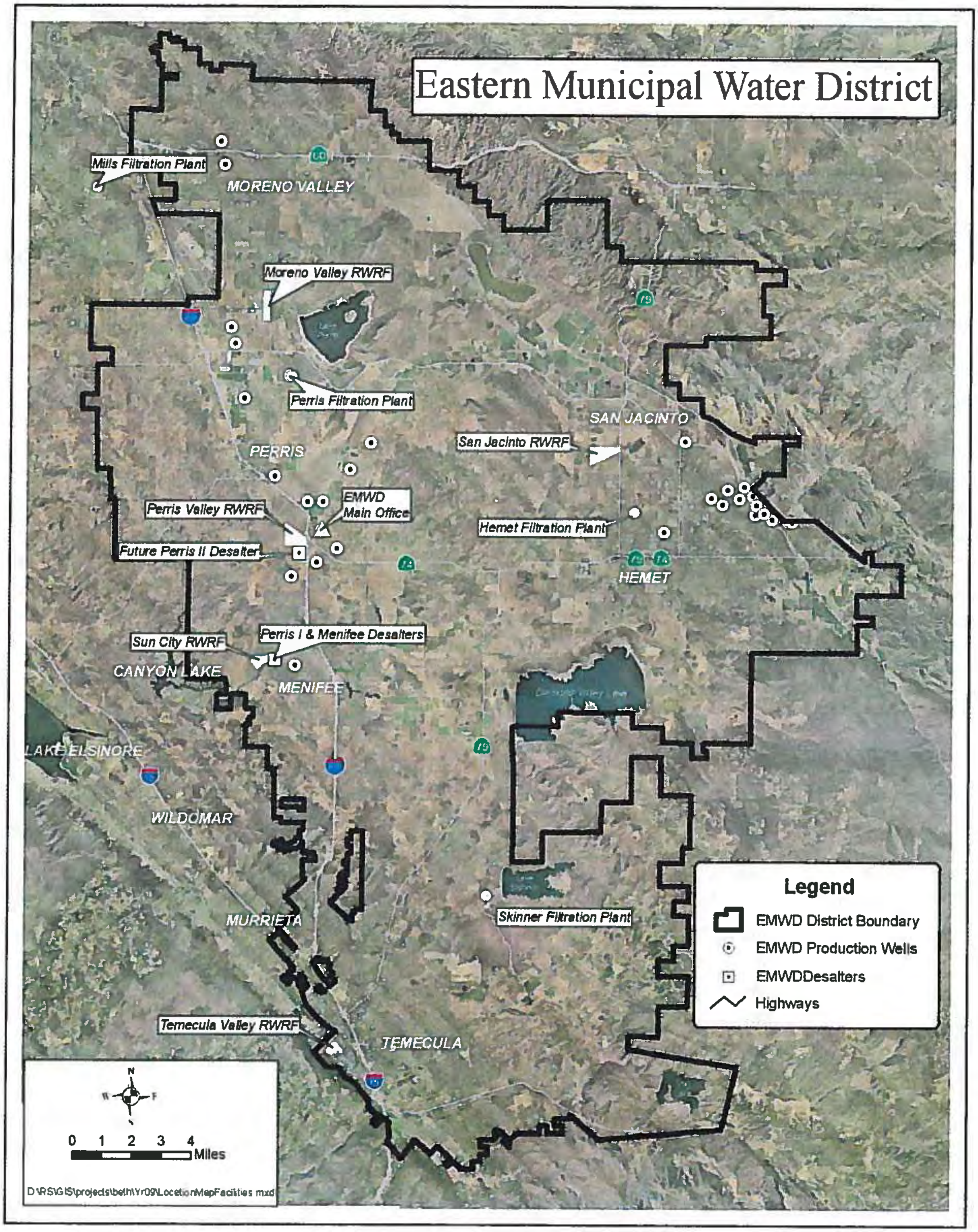
2.1 Overview of Supplies

EMWD has four (4) sources of water supply: imported water purchased from MWD, local potable groundwater, local desalted groundwater and recycled water. Imported water accounts for approximately 67 percent, local potable groundwater is approximately 12 percent, desalted groundwater is 3 percent, and recycled water is 19 percent of supply. Table 2, with information taken from the 2010 UWMP, lists the past supply quantities by source. Figure 1 shows the location of EMWD supplies.

Table 2 - Water Supply (AFY) – 2008– 2012

Type	Source	2008	2009	2010	2011	2012
Imported	Metropolitan Water District	94,400	84,200	75,000	72,500	75,900
Imported – Locally Treated	Metropolitan Water District	16,600	17,000	16,600	17,000	20,300
Groundwater	West San Jacinto Management Area	20,000	18,100	15,800	17,400	15,500
Desalination	West San Jacinto Management Area	3,000	4,800	5,800	5,700	5,700
Recycled Water	EMWD Regional Water Reclamation Facilities	27,500	32,400	28,200	31,000	36,800
Total		**161,500**	**156,500**	**141,400**	**143,700**	**154,200**

Figure 1 - Location of Supply Sources



It is anticipated that the majority of the water demands within EMWD's jurisdiction caused by future development will be met through additional water imports from MWD recognizing the conditions described in this document. Imported sources will be supplemented by an increase in desalination of brackish groundwater, recycled water use and water use efficiency. In the 2010 RUWMP, MWD analyzed the reliability of water delivery through the State Water Project (SWP) and the Colorado River Aqueduct (CRA) and concluded that with the storage and transfer programs developed by MWD, MWD will have a reliable source of water to serve its member agencies' needs through 2030 during normal, historic single-dry and historic multiple-dry years within a 20-year projection. Unprecedented shortage will be addressed through the principles of the Water Surplus and Drought Management Plan as described in the MWD RUWMP.

Table 3 - Existing Water Supply Resources – Average Year Hydrology – 2015 – 2035

	2015	2020	2025	2030	2035
Metropolitan Water District	149,300	170,700	190,700	210,000	226,200
Recycled Water	43,900	50,000	53,900	54,900	55,300
Groundwater	13,200	13,200	13,200	13,200	13,200
Existing Desalter	7,500	7,500	7,500	7,500	7,500
Total Existing Supplies	**213,900**	**241,400**	**265,300**	**285,600**	**302,200**

Based on a average of 2004- 2009 conditions

To supplement existing water supplies, EMWD has identified several projects that would supplement imported supplies, retrofit of potable water landscape customers, indirect potable recharge and additional water use efficiency. These projects will offset the demand of existing water and free up resources for new development. Table 4 provides a summary of additional potential local supplies.

Table 4 - Potential Water Supply – 2015 - 2035

	2015	2020	2025	2030	2035
Additional Recycled Water	6,100	13,500	16,400	22,200	28,200
Desalination	4,500	4,500	4,500	4,500	4,500
Planned Additional Conservation	0	0	1,300	4,300	6,400
Water Transfers/Exchanges	0	0	0	0	0
Total	**10,600**	**18,000**	**22,200**	**31,000**	**39,100**

These projects are in the planning stage of development and costs and implementation timelines are subject to change. New development will be required to help fund new water supply sources. The extent of additional funding will be determined by the EMWD and may take the form of a new component of connection fees or a separate charge. Details about funding will be developed with the plan of service

2.2 Wholesale Water Supplies

2.2a Written Contracts or Other Proof of Entitlement

Water Code Section 10910 (d) (2) (A)

EMWD is one of the 26 member agencies that make up MWD. The statutory relationship between MWD and its member agencies establishes the scope of EMWD's entitlements from MWD. Typically there are no set limits on supply quantities to member agencies and MWD has provided evidence in the 2010 RUWMP that its supplies will meet member agency demands during normal, historic single-dry and historic multiple-dry years within a 20-year projection.

During unprecedented shortage events, the MWD Water Supply Plan (WSAP) is implemented, requiring a reduction in demand by member agencies. The allocation plan takes into account member agency population growth and investments in local resources. Member agencies are allocated a portion of their anticipated demand with the assurance that a member agency will not see a retail shortage greater than the regional shortage. Water supply is not limited under the allocation plan but water use above a member agency's allocation is charged at a much higher rate. Several years of dry conditions and limitations on State Water Project operations required MWD to implement the allocation plan at a 10 percent regional shortage level from July of 2009 through April of 2011. This action follows the principles in the Water Surplus and Drought Management Plan as described in the 2010 RUWMP. During the allocation from MWD, EMWD implemented demand reduction strategies as outlined in its Water Shortage Contingency Plan and reduced imported demand below the allocation level.

2.2b Metropolitan Water District of Southern California Supply

EMWD relies on MWD to provide the majority of its potable water supply and a small percent of its non-potable water supply. The majority of EMWD's potable water is supplied in the northern part of EMWD by the Mills MWD Water Treatment Facility and in the southeastern portion of EMWD by the MWD Lake Skinner Water Treatment Facility. Untreated water from MWD is treated at EMWD's Perris and Hemet Microfiltration Plants for use as a potable source of water.

It is anticipated that the majority of the water demands within EMWD's jurisdiction caused by future development, will be met through additional water imports from MWD recognizing the conditions described in this document. Imported sources will be supplemented by an increase in desalination of brackish groundwater, recycled water use and water use efficiency. In the 2010 RUWMP, MWD analyzed the reliability of water delivery through the State Water Project (SWP) and the Colorado River Aqueduct. The RUWMP concluded that with programs developed, MWD will have a reliable source of water to serve its member agencies' needs through 2035. The analysis included in the UWMP included reliability data for historic single-dry and historic multiple-dry years. Unprecedented shortage will be addressed through the Water Supply Allocation Plan as described in the MWD RUWMP.

2.2c MWD Regional Urban Water Management Plan

The 2010 RUWMP provides information about MWD supply reliability and demand. MWD does not provide supply projections for each member agency; instead MWD uses a regional approach to developing projections. MWD calculates the demand for the entire region, as discussed in Appendix A.1 of the 2010 RUWMP, and then, using information about existing and proposed local projects, determines the amount of imported water that will be needed in the future. EMWD staff worked with MWD on the 2010 RUWMP, exchanging information about demand, local supply and projects, and clarification on boundary information and population projections. Based on this information and additional data provided by other member agencies, MWD states it is able to meet the projected demands of all member agencies through 2035. The information supplied in the 2010 RUWMP provides assurance that MWD will have a reliable water supply available to deliver the demand required by all the member agencies including EMWD through 2035, even during dry periods. Under extreme conditions, water supply could be allocated to member agencies using the WSAP to preserve storage. The 2010 RUWMP is included as Attachment B of this assessment.

2.3 Local Resources

Water Code 10910 (d) (1)

In an effort to reduce dependency on imported water from MWD, EMWD has developed several programs designed to take advantage of local resources. High-quality groundwater is a source of water for local customers in the Hemet/San Jacinto Area. In the West San Jacinto Basin, groundwater is blended with imported water for use in the western portion of EMWD. EMWD has also constructed two (2) desalination facilities to recover poor quality groundwater with high total dissolved solids (TDS) levels in the West San Jacinto groundwater basin areas. The product water from the desalters enters EMWD's potable distribution system. A third desalter is now in the final stages of design.

2.4 Groundwater

Water Code Section 10910 (f)

Groundwater information is included in this assessment to assist the lead agency in determining the adequacy of EMWD's total supply. Groundwater is not being proposed to serve this project. New developments, including this project, will be supplied with imported water – (1) treated imported water directly from The Metropolitan Water District of Southern California (MWD); (2) untreated imported water from MWD subsequently treated by EMWD; or (3) untreated imported water treated by EMWD and recharged into the basin for later withdrawal.

2.4a Urban Water Management Plan Review

Water Code Section 10910 (f) (1)

The 2010 UWMP discusses projected groundwater use in EMWD and explains assumptions made about groundwater. In the following sections, portions of the 2010 UWMP are included with information about groundwater resources. The water supply for the Proposed Project will not include groundwater. The following information regarding EMWD's groundwater supply is for informational purposes only.

2.4b San Jacinto Watershed - Groundwater Management Zones in EMWD's Service Area

Water Code Section 10910 (f) (2)

The San Jacinto Watershed covers an area of approximately 728 square miles, measured above a point just downstream from Railroad Canyon Dam. The groundwater management zones of the San Jacinto Watershed lie within alluvium-filled valleys carved into the elevated bedrock plateau of the Perris Block. Collectively, the groundwater management zones are nearly surrounded by impermeable bedrock mountains and hills. Internally, island-like masses of granite and metamorphic bedrock rise above the valley floor.

The San Jacinto Fault Zone, which contains the Claremont and Casa Loma faults, is the major geologic feature that bounds and/or crosscuts many of the groundwater management zones, and typically provides effective barriers to groundwater flow. The area between the Claremont and Casa Loma faults is a deep, alluvium-filled graben of tectonic origin, commonly referred to as the San Jacinto Graben. The effective base of freshwater in the graben is known to be quite deep but has not been precisely determined. The San Jacinto Graben consists of a forebay area in the southeast where surface water recharge primarily occurs, and a pressure area in the northwest where deep aquifers exist under confined conditions. To the east, the San Jacinto mountain range is the dominant geographic feature of the region, rising to a height of 10,805 feet.

Groundwater management zones were delineated based on major impermeable boundaries, constrictions in impermeable bedrock, groundwater divides, and internal flow systems. The eight groundwater management zones in the San Jacinto Watershed within EMWD's service area include the Canyon, San Jacinto Upper Pressure, San Jacinto Lower Pressure, Lakeview/Hemet North, Hemet South, Perris South, Perris North, and Menifee Management Zones.

Detailed descriptions of each Management Zone are included in the 2010 UWMP under Section 3 attached as Appendix A of this report.

2.4c Groundwater Management

Water Code 10910 (f) (2)

Since 2001, the Cities of Hemet and San Jacinto, Lake Hemet Municipal Water District (LHMWD), EMWD, and representatives of the private groundwater producers, with DWR acting as an impartial mediator, have been working on a groundwater management plan for the Hemet/San Jacinto Water Management Plan area. Over the past several years, the group has discussed and resolved several controversial issues, including San Jacinto Tunnel seepage water, export of groundwater from the basins, and how to maximize the use of recycled water. As a result of their efforts, a final Hemet/San Jacinto Water Management Plan (HSJWMP) was completed in 2007 and a Stipulated Judgment was final in 2013. The Stipulated Judgment for the Hemet/San Jacinto Water Management Plan is in effect, and has established a Watermaster responsible for managing the basins.

The Hemet/San Jacinto Water Management Plan:

- Limits the amount of water being extracted from the basin to a sustainable yield.
- Implements continued recharge of the basin using imported water through the Integrated Recharge and Recovery Project (IRRP).
- Insures settlement claims by the Soboba Band of Luiseño Indians are facilitated and accommodated.
- Expands existing water production and water services system to meet future urban growth through the use of imported water recharged into the basin.
- Protects and/or enhances water quality in the management plan area.
- Supports cost-effective water supplies and treatment by the public agencies.
- Eliminates groundwater overdraft and enhances basin yield.
- Continues the monitoring program to promote and provide for best management and engineering principles to protect water resources.

Long term groundwater management includes artificial recharge using MWD replenishment water via permanent facilities through the IRRP. An agreement with the Soboba Band of Luiseño Indians requires, on average, an annual delivery of 7,500 acre-feet of water from MWD for the next 30 years. Water will be delivered to EMWD, LHMWD, and the Cities of Hemet and

San Jacinto. This is part of an effort to recharge groundwater in the Hemet/San Jacinto area, fulfilling the Soboba Tribe's water rights and addressing chronic groundwater overdrafts.

EMWD's rights under the HSJWMP are a base groundwater production right of 10,869 AFY in 2012/13. If water levels continue to decline EMWD will be required to reduce production by up 10% annually over six years. Any pumping above that amount is subject to replenishment fees.

In the West San Jacinto area, a cooperative groundwater management plan is already in place to insure the reliability and quality of the water supply. In June 1995, EMWD adopted the West San Jacinto Groundwater Basin Management Plan (WSJGBMP) in accordance with the statutes in the State Water Code Sections 10750 through 10755 resulting from the passage of Assembly Bill 3030 (AB 3030). The plan was adopted after extensive public outreach and meetings with interested individuals and agencies.

Implementation of the WSJGBMP began directly after its adoption. Initial efforts to implement the WSJGBMP included establishing an advisory committee; prioritizing the management zones; evaluating groundwater resources including establishing groundwater quality, level, and extraction monitoring programs; and conducting hydro-geophysical investigations. The West San Jacinto Groundwater Basin Management Plan Annual Report, documenting the implementation of the plan and activities in the groundwater management zones, has been published annually since 1996.

2.4d Groundwater Recharge

Through pilot programs and using temporary facilities, EMWD has recharged groundwater in the Hemet/San Jacinto area with imported surplus water from MWD since 1990. Long term facilities have been built as part of the Integrated Recharge Recovery Program (IRRP). The IRRP is an integral piece of the water management plan and the Soboba settlement. The IRRP initially consists of 35 acres of basins or ponds for recharging State Project Water; three extraction wells; three monitoring wells; modification to two existing pump stations; and pipelines within, and adjacent to, the San Jacinto River. In 2012 over 8,000 AF was recharged at the IRRP ponds, and about 7,500 AF in 2013.

EMWD is also contributing to the replenishment of the basin by providing recycled water in lieu of groundwater production. The Recycled In-Lieu Program supplies recycled water for agricultural irrigation in-lieu of pumping native groundwater. The project can deliver up to 8,540 acre-feet per year to local agricultural water producers. The project costs are jointly funded by EMWD, LHMWD, and the Cities of Hemet and San Jacinto. Agreements that set limits on groundwater production, and provide for a payment of a portion of the operation and maintenance costs have been in place since 2008.

2.4e Groundwater Pumping Rights

Water Code 10910 (f)

The eastern portion of EMWD's service area or Hemet/San Jacinto area contains good quality groundwater and is a major source of municipal as well as private production, although groundwater levels are in serious decline. To manage the groundwater in the area the HSJWMP is in place. EMWD's rights under the HSJWMP will be a base groundwater production right of 10,869 AFY in 2012/13. If water levels continue to decline EMWD will be required to reduce production by up 10% annually over six years. Any pumping above that amount is subject to replenishment fees.

2.4f Surface Water Diversion Rights
License No. 10667

EMWD holds a right to divert up to 5,760 AFY of San Jacinto River flows for recharge and subsequent use from November 1 through June 30 each year. EMWD's diversion and recharge of San Jacinto River surface water to the Canyon Management Zone takes place at EMWD's Grant Avenue Ponds in the Valle Vista area. EMWD's diverted water is recharged into the groundwater aquifer of the Canyon Management Zone and is not used for direct use or sale. The San Jacinto River is an ephemeral river and, consequently, river flows may be insufficient for any diversion at all. In 2012, river flows were insufficient to divert surface water. Additional information about surface water diversion is available in Chapter 3 of the Annual Report.

2.4g Past Groundwater Extraction
Water Code 10910 (f) (3)

Table 2 depicts the total potable groundwater extracted by EMWD from 2008 through 2012. The majority of EMWD's groundwater is extracted from the Hemet/San Jacinto area. The remaining groundwater is extracted from the area covered by the WSJGBMP, including brackish groundwater extraction for the desalters. The location of wells used to pump groundwater and the desalters can be seen on Map 1.

2.4h Projected Groundwater Extraction
Water Code 10910 (f) (4)

Table 3 lists the amount of potable groundwater that EMWD is projecting to be availible. Groundwater extraction in the Hemet/San Jacinto area is limited by the HSJWMP. EMWD's rights under the HSJWMP are a base groundwater production right of 10,869 AFY in 2012/13. If water levels continue to decline EMWD will be required to reduce production by up 10% annually over six years. Any pumping above that amount is subject to replenishment fees. The Perris/Moreno Valley wells in the WSJGBMP area are projected to continue to produce 6,000 AFY. The desalters are part of managing the WSJGBMP area and will reduce salinity in the groundwater management zones with the added benefit of providing a source of potable water. The well locations shown on Figure 1 should remain consistent in the future.

2.4i Analysis of the Sufficiency of Groundwater
Water Code 10910 (f) (5)

Protecting the available groundwater supply is an important part of EMWD's planning efforts. EMWD is actively working with other agencies and groups to insure that groundwater will be a reliable resource far into the future. Part of managing groundwater responsibly requires the replacement of groundwater extracted beyond the safe yield. Groundwater extraction in Hemet/San Jacinto area will be replaced with imported water as water is recharged through the HSJWMP, and groundwater extraction in the WSJGBMP area will remain static. Although the desalters will provide an additional supply of water, the amount of water produced is not sufficient to accommodate the proposed growth within EMWD. The majority of the increased water demand caused by this project will be met by increasing the use of imported water from MWD recognizing the conditions of approval outlined in this document.

2.5 *Recycled Water*

Water Code 10910 (d) (1)

Recycled water is extensively used in EMWD's service area in place of potable water. To offset municipal demand, recycled water is used to irrigate landscape and for industrial purposes. The majority of EMWD's agricultural customers also use recycled water. In some cases, recycled water is used by agricultural customers in lieu of groundwater production, increasing the amount of groundwater available for municipal use without increased recharge.

The supply of recycled water will continue to grow with EMWD's population growth. The four (4) regional water reclamation facilities that EMWD is currently operating are all either in the process of expansion or have an expansion planned in the near future. Recycled water is currently used for both municipal and agricultural purposes. Municipal customers use recycled water for landscape irrigation and industrial process water. Agricultural customers use recycled water for irrigation of crops. A portion of agricultural demand of recycled water is in lieu of using groundwater. Currently, the use of recycled water is limited by the amount available to serve during peak demands and with livestream discharge occurring in off peak periods. EMWD has developed plans to eliminate discharge and use all of the recycled water available within the District, and to offset demand of existing potable customers, including retrofit of potable water landscape customers and indirect potable recharge.

2.6 *Water Use Efficiency Measures*

The Water Conservation Act of 2009, Senate Bill 7x-7, set a requirement for water agencies to reduce their per capita water use by the year 2020. The overall goal is to reach a state wide reduction of per capita urban water use of 20 percent by December 31, 2020, with an intermediate 10 percent reduction by December 31, 2015. Demand reduction can be achieved through both conservation and the use of recycled water as a potable demand offset. EMWD will reduce potable water demand to meet the goals of SB7x-7 two ways; using recycled water to offset potable water demand and reducing demand for water through conservation. Three methods have been identified for conserving water: 1) a budget based tiered rate, 2) requirements for water efficiency in new construction, and 3) an active conservation program. Water use reduction will be focused on outdoor demand reduction by all customer types. Table 5 summarizes water savings by type.

Table 5 - Water Efficiency Savings (AFY) – 2005 - 2035

Saving Type	2005	2010	2015	2020	2025	2030	2035
Recycled Water Potable Offset	3,601	4,041	5,000	6,300	11,500	13,900	14,300
Tiered Rate	0	8,700	8,700	8,700	8,700	8,700	8,700
New Construction	0	200	2,000	4,100	6,100	8,000	9,600
Active Conservation	1,500	3,400	6,500	9,500	10,700	11,700	12,600
Total	**5,101**	**16,341**	**22,200**	**28,600**	**37,000**	**42,300**	**45,200**

Recycled water will be used to offset potable demand through the expansion of the existing recycled water system.

Tiered Rate savings are an estimate of water saved by customers, after the implementation of a budget based tiered rate. In April 2009, EMWD implemented a tiered rate billing structure for its residential and landscape customers. Customers are provided an allocation for reasonable water use and are required to pay a higher rate for water use over their allocated limit. Water savings by existing customers has been estimated. Actual water demand since the implementation of the tiered rate has been lower than the estimated amounts, likely as a result of several factors and not the tiered rate implementation alone.

Water Use Efficiency Requirements in New Development includes installing lower water use landscape and interior fixtures. Water use efficiency is mandated statewide through existing ordinances, plumbing codes and legislation. To enforce water use efficiency in new development EMWD has lowered the water budget allocations for new development. Any residential or dedicated landscape account installed after January 1, 2011 has an outdoor budget allocation based on only 70 percent of ET, compared to up to 100 percent of ET for older accounts. Water use savings shown in Table 5 are calculated assuming lower budgets allocation will result in a reduction in a proportionate reduction in water use. Actual savings will be measured based on average use by new meters.

Active Conservation savings are the result of water use efficiency programs implemented by EMWD. EMWD encourages the replacement of inefficient devices and includes monetary rebate, distribution and direct installation programs. Water savings are based on estimated water savings for each device and takes into account the lifetime of each device.

Through the above three methods of reducing water use, and recycled water use, EMWD anticipates the reduction of potable water demand to meet the requirements of SB7x-7.

2.7 Local Resources Documentation

2.7a Written Contracts or Other Proof

Water Code 10910 (d) (2) (A)

Below is a list of documents related to EMWD's local water supply:

- **EMWD 2010 Urban Water Management Plan (June 2010)** - EMWD's 2010 Urban Water Management Plan is attached as Appendix A. This plan supplies additional information on EMWD, its service area, and water management and supply capabilities.
- **West San Jacinto Groundwater Basin Groundwater Management Plan 2012 Annual Report (July 2013)** - Detailed information on the history and progress of groundwater basin management and the Groundwater Monitoring Program can be found in the 2011 Annual Report on the Status of the Groundwater Subbasins, located on EMWD's Website (www.emwd.org).
- **Hemet/San Jacinto Groundwater Water Management Area Water Management Plan 2012 Annual Report (May 2013)** - Detailed information on the history and progress of the Water Management Plan and Groundwater Monitoring Program can be found in the 2011 Annual Report on the Status of the Groundwater Subbasins, located on EMWD's Website (www.emwd.org).
- **Hemet/San Jacinto Groundwater Management Area Water Management Plan** – This plan was developed by the stakeholders in the Hemet/San Jacinto area to provide a foundation to guide and support responsible water management into the future. The plan was finalized in 2007 and an EIR was approved for the project on November 21, 2007 by EMWD's Board of Directors.

With regard to EMWD's ownership and use of reclaimed/recycled water, California Water Code Section 1210 states:

The owner of a waste water treatment plant operated for the purpose of treating wastes from a sanitary sewer system shall hold the exclusive right to the treated waste water as against anyone who has supplied the water discharged into the waste water collection and treatment system, including a person using water under a water service contract, unless otherwise provided by agreement.

With regard to the Water Use Efficiency Ordinance that will result in additional supplies through conservation:

The County of Riverside Board of Supervisors approved an update to Ordinance No. 859 on October 20, 2009, requiring water efficient landscaping in any new development requiring a permit.

EMWD's Board of Directors approved Ordinance 72.25 for implementation on January 1, 2011, requiring water efficient landscaping in new developments and requiring water efficiency enforced through tiered rates. Ordinance 72.25 can be found on EMWD's website www.emwd.org.

2.7b EMWD's Capital Improvement Plan

Water Code 10910 (d) (2) (B)

EMWD maintains and periodically updates a comprehensive Water Facilities Master Plan (WFMP). This working plan defines water supply, transmission mains, and storage facilities required for the accommodation of projected growth within EMWD. On a yearly basis, a five-year Capital Improvement Plan (CIP) is prepared, which is based on a further refinement of the WFMP. The CIP outlines specific projects and their funding source. Each project is also submitted individually to the Board for authorization and approval. This allows EMWD to accurately match facilities' needs with development trends. Financing information for the desalter plant construction, regional water reclamation facilities expansion, and well replacement can also be found in the CIP.

2.7c Federal, State and Local Permits Needed for Construction

Water Code 10910 (d) (2) (C)

As part of EMWD's CIP, an Environmental Review Committee has been established. This Committee, made up of representatives from the Engineering, Planning, and Environmental and Regulatory Compliance Departments, discuss each project and the steps needed to comply with regulatory requirements. EMWD works with various government agencies, including the U.S. Department of Fish and Wildlife, the U.S. Army Corps of Engineers, the California Department of Public Health, the California State Water Resources Board, the California Air Quality Management District, and the California Department of Fish & Game to obtain permits when necessary. The Engineering Department procures additional construction permits on a case-by-case basis. EMWD has already, or is in the process of, obtaining Environmental Impact Reports or other environmental documents necessary for desalter construction, regional water reclamation facilities expansion, and well replacements. Any necessary permits secured by EMWD are kept on file at the District office.

2.7d Regulatory Approvals

Water Code 10910 (d) (2) (D)

The Department of Public Health (DPH) has issued a system-wide permit for EMWD's water supply system. EMWD's Environmental and Regulatory Compliance Department conforms to specific regulations and obtains any additional necessary approvals. As new facilities are constructed by EMWD, they are subject to inspection and testing by regulatory agencies and the DPH permit is amended.

Section 3 - Demand

3.1 Demand Projections

Water Code 10910 (c) (2), 10631 (e) (1)

EMWD's primary retail customers can be divided into residential, commercial, industrial, institutional and landscape sectors. Although the residential section is by far EMWD's largest customer segment, each market segment plays a role in the growth and development of EMWD's service area. See Table 6 for water use by various customer types.

Table 6 - Retail Water Deliveries by Customer Type – 2005 - 2035

Year /Type	Units	Single family Res.	Multi-family Res.	Comm-ercial	Indus-trial	Inst/ gov.	Land-scape	Agri-culture	Total
2005	No. of accounts	114,100	1,000	1,500	100	40	1,500	200	**118,440**
Actual	Volume (AF)	62,300	5,500	3,900	400	2,900	7,500	2,400	**84,900**
2010	No. of accounts	129,400	4,300	2,100	100	500	2,200	100	**138,700**
Actual	Volume (AF)	54,000	6,100	4,200	400	2,300	8,900	1,800	**77,700**
2015	No. of accounts	140,600	5,700	2,300	1,200	100	3,300	100	**153,300**
Projected	Volume (AF)	74,400	8,300	5,600	600	3,600	18,500	2,800	**113,800**
2020	No. of accounts	150,200	6,100	2,400	1,300	100	3,500	85	**163,685**
Projected	Volume (AF)	79,600	8,800	5,900	600	3,800	19,600	2,400	**120,700**
2025	No. of accounts	169,600	6,900	2,700	1,400	100	4,000	85	**184,785**
Projected	Volume (AF)	89,800	10,000	6,700	700	4,300	22,200	2,400	**136,100**
2030	No. of accounts	187,700	7,700	3,000	1,500	100	4,400	85	**204,485**
Projected	Volume (AF)	99,400	11,000	7,400	800	4,800	24,500	2,400	**150,300**
2035	No. of accounts	202,800	8,200	3,300	1,700	100	4,700	85	**220,885**
Projected	Volume (AF)	107,400	11,900	8,000	800	5,200	26,500	2,400	**162,200**

Note: Water Quantities include raw water to agricultural customers but does not include recycled water deliveries.

Table 7 shows sub-agency water use and Table 8 shows other water uses. Total water use is shown in Table 9.

Table 7 - Wholesale to Other Agencies – 2005 - 2035

	Actual Sales (AF)		Projected Sales (AF)				
Water distributed	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
City of Hemet	100	0	0	0	0	0	0
City of Perris	1,900	1,700	1,700	1,800	1,900	2,000	2,100
City of San Jacinto	0	0	0	0	0	0	0
Lake Hemet MWD[1.]	100	1,300	1,100	1,100	1,000	1,100	1,100
North Perris Water Company	0	0	0	0	0	0	0
Nuevo Water Company	800	600	800	1,600	1,700	1,700	1,700
Murrieta Water Company	100	1,600	0	0	0	0	0
Rancho California Water District	26,300	21,900	36,500	48,600	50,800	53,000	55,200
Hemet/San Jacinto Basin Plan Water Master	0	0	7,500	8,500	9,600	11,200	12,300
Total	29,300	27,100	47,600	61,600	65,000	69,000	72,400

1. Sales of water to Lake Hemet are for non-potable supplies used to meet agricultural demand.

Table 8 - Other Water Uses – 2005 – 2035

	Actual Use (AF)		Projected Use (AF)				
	2005	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Recycled Water	32,600	28,200	43,900	50,000	53,900	54,900	55,300
Recharge Water [1]	7,000	0	0	0	0	0	0
Distribution System Water Loses	7,600	8,200	8,400	8,900	10,100	11,200	12,100
Treatment Water Losses	100	200	200	200	200	200	200
Total	47,300	36,600	52,500	59,100	64,200	66,300	67,600

1. Future recharge will be through the Hemet/San Jacinto Basin Plan Water Master as seen in Table 8.

Table 9 - Water Demand (AFY) – 2005 - 2035

	Actual		Projected				
	2005	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Retail Potable Water Sales	84,900	77,700	113,800	120,700	136,100	150,300	162,200
Water Sales to Other Agencies	29,400	27,100	47,600	61,600	65,000	69,000	72,400
Other Water Uses/Losses	47,300	49,900	52,500	59,100	64,200	66,300	67,600
Total	**161,600**	**154,700**	**213,900**	**241,400**	**265,300**	**285,600**	**302,200**

3.2 Project Demand

The City of Moreno Valley is the lead agency for the preparation of an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA), Public Resources Code Section 21000, et seq. for the Modular Logistics Center (Proposed Project) located at 17300 Perris Boulevard. The Proposed Project site encompasses 50.7 acres, located on the northeast corner of Perris Boulevard and Modular Way, and includes a 1,109,378 square foot warehouse building. As part of the project an existing warehouse facility will be demolished. The existing water demand on the site was 11.6 acre-feet (AF) in 2012. Demand form the Proposed Project is estimated to be 38.03 acre feet per year (AFY). The project developer is Kearny Real Estate Company. Table 10 contains the calculated average water demand for the Proposed Project.

Table 10 – Project Demand

Description	Quantity	Units	Demand per Unit (AFY)	Demand (AFY)
Warehouse Industrial	50.7	Acres	0.75	**38.03**

Per project description

The demand for this project is estimated based on average annual demand from similar landuse and is for supply planning only. Demand for facilities planning will be based on peak flows and determined as part of the plan of service for the project. The demand for this project is within the limits of projected demand accounted for in the 2010 UWMP and would be included in the projected demand shown in Table 9 of this water supply assessment report.

3.3 Database of Proposed Projects

Water Code 10910 (c) (3)

To develop the projections used in this Water Supply Assessment, EMWD uses a development-tracking database that assesses future water demands for specific projects. EMWD uses this database to help plan for future water supply and infrastructure needs by monitoring new projects through various stages of development. Subject to the Board of Director's approval of this assessment, information associated with this project will be updated in the supply and demand projections EMWD uses for planning. Changes in density and land use are also tracked in this database for planning purposes. The developer is required to notify EMWD if any changes to project density or land use occur.

Section 4 Evaluation of Supply and Demand
Water Code 10910 (c) (2)

4.1 Supply and Demand Evaluation under Historic Conditions

Tables 11, 12 and 13, taken from the 2010 UWMP, are an estimate of EMWD's demand during average, single and multiple dry years.

Table 11 - Existing Water Supply Resources – Average Year Hydrology – 2015 - 2035

	2015	2020	2025	2030	2035
Metropolitan Water District	149,300	170,700	190,700	210,000	226,200
Recycled	43,900	50,000	53,900	54,900	55,300
Groundwater	13,200	13,200	13,200	13,200	13,200
Existing Desalter	7,500	7,500	7,500	7,500	7,500
Total Existing Supplies	**213,900**	**241,400**	**265,300**	**285,600**	**302,200**
Total Projected Demands	**213,900**	**241,400**	**265,300**	**285,600**	**302,200**
Shortfall/Surplus	**0**	**0**	**0**	**0**	**0**

Based on a repeat of 2004- 2009 conditions

Table 12 - Existing Water Supply Resources – Dry Year Hydrology – 2015 – 2035

	2015	2020	2025	2030	2035
Metropolitan Water District	155,300	177,600	198,300	218,300	235,100
Recycled	45,500	51,800	55,800	56,900	57,300
Groundwater	13,200	13,200	13,200	13,200	13,200
Existing Desalter	7,500	7,500	7,500	7,500	7,500
Total Existing Supplies	**221,500**	**250,100**	**274,800**	**295,900**	**313,100**
Total Projected Demands	**221,500**	**250,100**	**274,800**	**295,900**	**313,100**
Shortfall/Surplus	**0**	**0**	**0**	**0**	**0**

Note: Based on a repeat of 1977 conditions

Table 13 - Existing Water Supply Resources – Multi - Dry Year – 2015 - 2035

	2015	2020	2025	2030	2035
Metropolitan Water District	156,600	179,000	199,800	219,900	236,900
Recycled	45,800	52,200	56,200	57,300	57,700
Groundwater	13,200	13,200	13,200	13,200	13,200
Existing Desalter	7,500	7,500	7,500	7,500	7,500
Total Existing Supplies	**223,100**	**251,900**	**276,700**	**297,900**	**315,300**
Total Projected Demands	**223,100**	**251,900**	**276,700**	**297,900**	**315,300**
Shortfall/Surplus	**0**	**0**	**0**	**0**	**0**

Note: Based on a repeat of 1990-1992 conditions

EMWD's 2010 UWMP discusses the supply reliability for EMWD during dry years. It is anticipated that the majority of water for future development will be supplied by imported water from MWD during single dry years. Typically, MWD does not place imported water limits on a member agency, but predicts the future water demand based on regional growth information. MWD stated in its 2010 RUWMP that with the addition of all water supplies, existing and planned, MWD would have the ability to meet all of its member agencies' projected supplemental demand through 2035, even under a repeat of historic drought scenarios.

4.2 Contingency Planning

Included in the 2010 UWMP is a copy of EMWD's Water Shortage Contingency Plan (WSCP). In the case of unprecedented shortage EMWD will reduce demand using significant penalties for wasteful water use. EMWD's WSCP details the plan for demand reduction for several stages of shortage up to 50 percent. Additional information about contingency planning is included in Section 5 of EMWD's 2010 UWMP.

Section 5 - Water Supply Assessment

5.1 Potable Water

From a facilities perspective, the Proposed Project would be conditioned to construct off-site and on-site water facilities needed to distribute water throughout the project area. Prior to construction the developer should contact EMWD staff to develop a plan of service and determine if any revisions are required to the master plan. See Figure B for existing water facilities in relation to the project.

With respect to water supply, as discussed above, the project will be served using imported water from MWD supplemented with new local supply projects during multi-dry years, if needed. Allocation from MWD may result in water supplies being made available at a significantly higher cost depending on circumstances.

5.2 Recycled Water

EMWD policy recognizes recycled water as the preferred source of supply for all non-potable water demands, including irrigation of recreation areas, green-belts, open space common areas, commercial landscaping, and supply for aesthetic impoundment or other water features. The proposed project is near an existing recycled water line and in the future recycled water may be required for the project.

According to EMWD policy, the project may be conditioned to construct a recycled water system physically separated from the potable water system. The system will need to be constructed to recycled water standards. The project may also be conditioned to construct off-site recycled water facilities. EMWD will make a final determination on requirements for recycled water use and facilities during the plan of service phase of the project.

5.3 Duration of Approval

This assessment will be reviewed every three years until the project begins construction. The project applicant shall notify EMWD when construction has begun. The review will insure that the information included in this assessment remains accurate and no significant changes to either the project or EMWD's water supply have occurred. Further, if the environmental impact report (EIR) for the project is not certified within three (3) years after the adoption of this WSA, the WSA may be updated at such time if there are changed circumstances warranting updated analysis. If the EIR is certified within three (3) years of the adoption of the WSA, then the applicant shall provide updates to EMWD every three (3) years on the status of the project until construction commences; however, in such instance, the WSA shall not be amended or invalidated by EMWD. If neither the project applicant nor the lead agency contacts EMWD within three years of approval of this WSA, it will be assumed that the Proposed Project no longer requires the estimated water demand calculated, the demand for this project will not be considered in assessments for future projects, and the assessment provided by this document will become invalid.

5.4 Conclusion

EMWD relies on MWD to meet the needs of its growing population. MWD stated in its 2010 RUWMP that with the addition of all water supplies, existing and planned, MWD would have the ability to meet all of its member agencies' projected supplemental demand through 2035, even under a repeat of historic multi-year drought scenarios.

Based on present information and the assurance that MWD is engaged in identifying solutions that, when combined with the rest of its supply portfolio, will ensure a reliable long-term water supply for its member agencies, EMWD has determined that it will be able to provide adequate water supply to meet the potable water demand for this project as part of its existing and future demands.

In the event the lead agency determines adequate water supply exists for this project, the developer of this project is required to meet with EMWD staff to develop a plan of service. The plan of service will detail water, wastewater and recycled water requirements to serve the projects. An agreement developed prior to construction will determine additional funding required to reduce existing customer demand on imported supplies through the expansion of local resources. The reduction of existing customer demand on imported water supplies will free up allocated imported water to be used to serve this project under multiple dry year conditions. The amount of funding will be determined by the EMWD and may take the form of a new component of connection fees or a separate charge. The estimated cost of desalinated water is between $1,400 and $1,700 per AF. These costs are expected to increase over time.

If there is a change in the circumstances detailed in this assessment, EMWD will address the changes in the plan of service for the project. Modifications at the plan of service stage could reduce the amount of water available to serve this project.

Section 6 - Conditions of Approval

This assessment is not a commitment to serve the project, but a review of EMWD supplies based on present information available. This assessment is conditioned on MWD's ability to continue to supply imported water to meet EMWD's requirements, including the requirements for this project. This project is subject to any special or additional requirements imposed by MWD or EMWD on such deliveries, including increased pricing or a different pricing structure.

The lead agency for the project is responsible to evaluate the adequacy of the water supply assessment and make the ultimate decision of the sufficiency of the water supply. The developer for the project is responsible for keeping EMWD informed about progress in the planning and development of the project. The project applicant will contact EMWD with project status information and updates every three years until the project begins construction. This will insure that the information included in this assessment remains accurate and no significant changes to either the project or EMWD's water supply have occurred. Further, if the environmental impact report (EIR) for the project is not certified within three (3) years after the adoption of this WSA, the WSA may be updated at such time if there are changed circumstances warranting updated analysis. If the EIR is certified within three (3) years of the adoption of the WSA, then the applicant shall provide updates to EMWD every three (3) years on the status of the project until construction commences; however, in such instance, the WSA shall not be amended or invalidated by EMWD. If neither the project applicant nor the lead agency contacts EMWD within three years of approval of this WSA, it will be assumed that the Proposed Project no longer requires the estimated water demand calculated, the demand for this project will not be considered in assessments for future projects, and the assessment provided by this document will become invalid.

If the lead agency determines adequate water supply exists for this project, to the greatest extent possible, recycled water shall be used on the Proposed Project. Details about the feasibility of recycled water use shall be included in the plan of service for the project.

Figure A Project Location

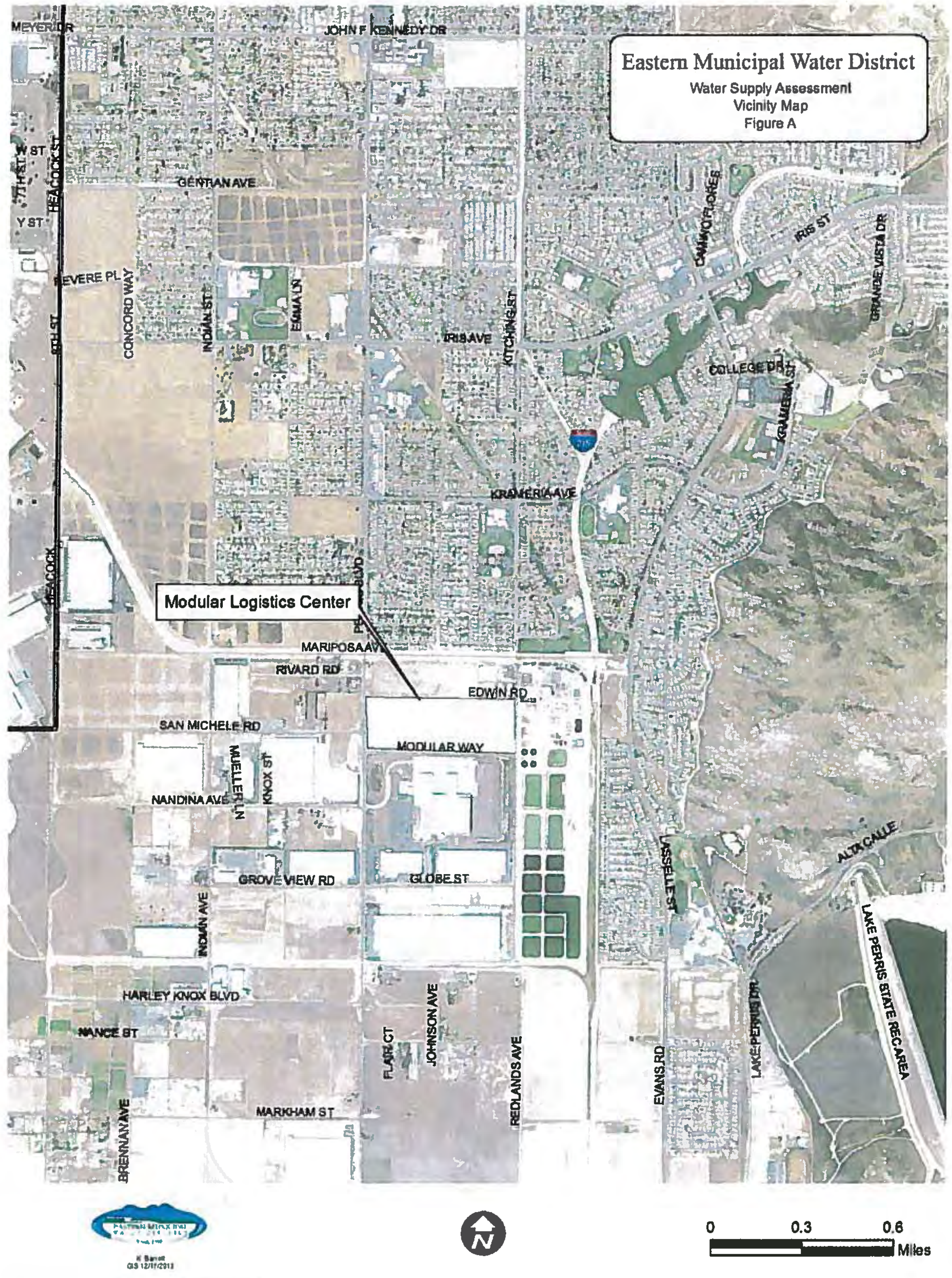
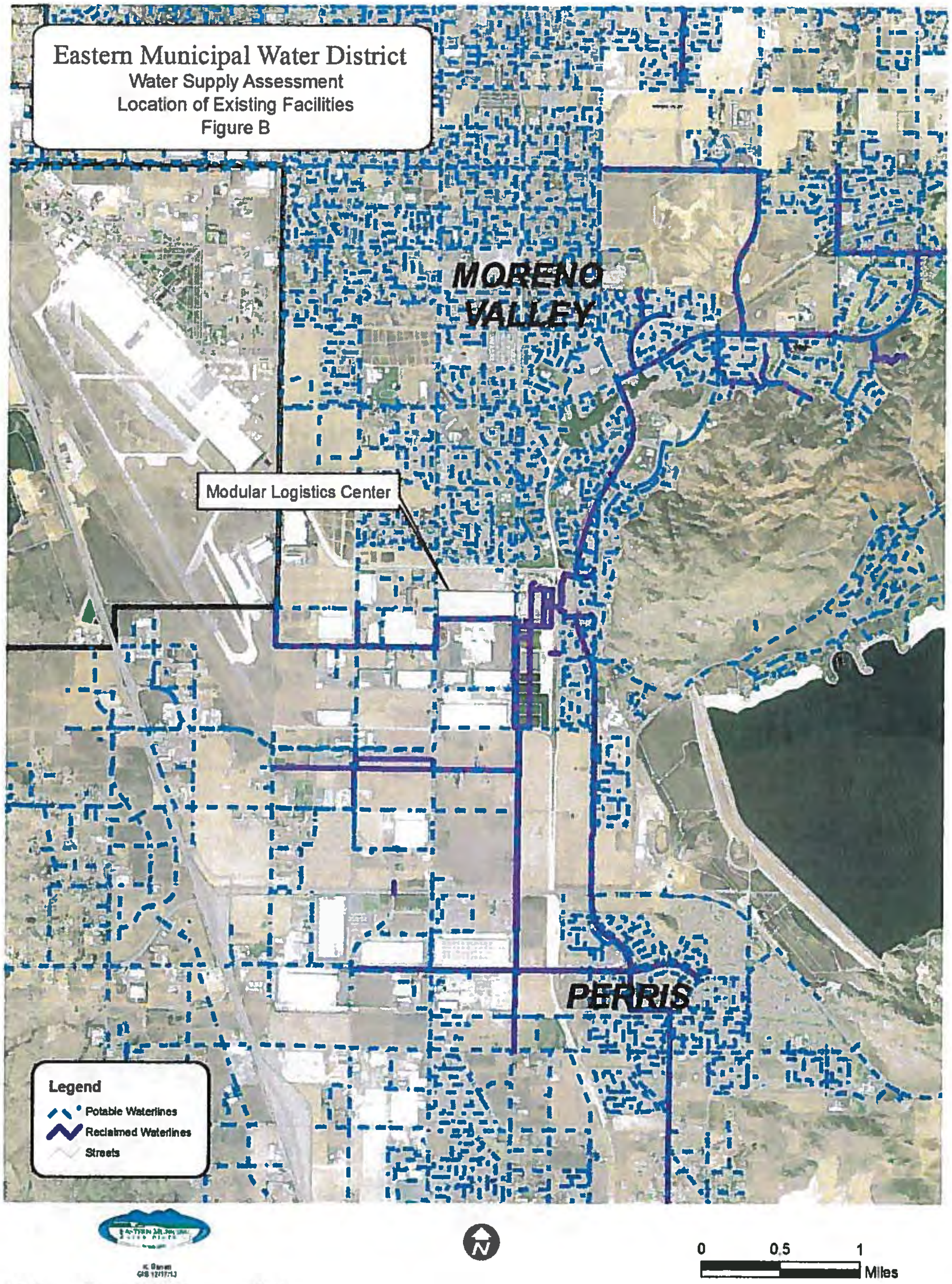


Figure B Project Location in Relation to Existing Waterlines



WATER SUPPLY ASSESSMENT REPORT

Supplemental Information

Appendix A
2010 Urban Water Management Plan

Appendix B
2010 MWD's RUWMP

Appendix C
EMWD's CIP Budget

EASTERN MUNICIPAL WATER DISTRICT
2010 URBAN WATER
MANAGEMENT PLAN

Prepared By:
Eastern Municipal Water District
Resource Development
June 2011

Table of Contents

2011 UWMP – List of Abbreviations & Acronyms

AB 3030	Assembly Bill 3030
AF	acre-feet
AFY	acre-feet pe-r year
AWWA	American Water Works Association
Bay-Delta	San Francisco Bay /Sacramento-San Joaquin Delta
BDCP	Bay Delta Conservancy Plan
BMPs	best management practices
CFS	cubic feet per second
CII	Commercial, industrial, and institutional
CRA	Colorado River Aqueduct
CRW	Colorado River Water
CUWCC	California Urban Water Conservation Council
DBPs	disinfection byproducts
DMM	Demand Measurements Measures
DOE	US Department of Energy
DWR	California Department of Water Resources
ECs	emerging constituents
EMWD	Eastern Municipal Water District
ESA	Endangered Species Act
ET	Evapotranspiration
ETo	reference Evapotranspiration
Forum	Colorado River Basin Salinity Control Forum
FY	fiscal years
GPCD	gallons per capita per day
HECW	high-efficiency clotheswashers
HET	high-efficiency toilets
HSJWMP	Hemet/San Jacinto Water Management Plan
IEUA	Inland Empire Utilities Agency
IPR	Indirect Potable Recharge
IRP	Integrated Resource Plan
IRRP	Integrated Recharge and Recovery Program
LHMWD	Lake Hemet Municipal Water District
MCL	maximum contaminant level
Mills	Mills Filtration Plant
MOU	Memorandum of Understanding
MFR	multi-family residential
MWD	Metropolitan Water District of Southern California
NDMA	N-Nitrosodimethylamine
OEHHA	Office of Environmental Health Hazard Assessment
PG&E	Pacific Gas and Electric
PHG	public health goal
PPCPs	pharmaceuticals and personal care products
RCCDR	Riverside County Center for Demographic Research
RCWD	Rancho California Water District
RUWMP	Regional Urban Water Management Plan
RWRF	Regional Water Reclamation Facilities
SAWPA	Santa Ana Watershed Project Authority
SB7x-7	Senate Bill 7 of Special Extended Session7, the Water Conservation Bill of 2009
SDCWA	San Diego County Water Authority
SFR	single-family residential
Skinner	Skinner Filtration Plant
Soboba Tribe	Soboba Band of Luiseño Indians
SWP	State Water Project

TAF	thousand acre-feet
TDS	total dissolved solids
TMDL	total maximum daily load
ULFT	ultra low-flush toilets
USBR	U.S. Department of the Interior, Bureau of Reclamation
USEPA	U.S. Environmental Protection Agency
UWMP	Urban Water Management Plan
VOCs	volatile organic compounds
WBIC	weather-based irrigation controller
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WSDMP	Water Surplus and Drought Management Plan
WSEOP	Water Shortage Emergency Operations Plan
WSJGBMP	West San Jacinto Groundwater Basin Management Plan
WSO	Water System Optimization
WSS	Water Sense Specified
WUIW	Water Use It Wisely

Section 1 - Introduction

1.1 Urban Water Management Planning Act

Water Code Section 10620 (a) of the Urban Water Management Act, states "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)". These plans are to be updated every five years and submitted to the Department of Water Resources (DWR). Requirements for the urban water management plan include:

- Assessment of current and projected water supplies.
- Evaluation of Demand and Customer Types.
- Evaluation of the reliability of water supplies.
- Description of conservation measures implemented by the urban water supplier.
- Response plan, in the event of a water shortage.
- Comparison of demand and supply projections.

In November of 2009, the State legislation passed Senate Bill 7 as part of the Seventh Extraordinary Session, referred to as SBx7-7 or the Water Conservation Act of 2009. This law requires that every Urban Water Management Plan includes:

- Baseline per capita water use data.
- Urban water use target.
- Interim urban water use targets.

SBx7-7 also sets the deadline for approval of the 2010 Urban Water Management Plan (UWMP) by an urban water supplier's governing board at July 1, 2011 with submittal to DWR required by August 1, 2011.

This report has been prepared to comply with the Urban Water Planning Act and SBx7-7. In addition to meeting the requirements of the Act, this report will be used to support water supply assessments and verifications required by Senate Bills 610 and 221 of 2001. These bills require that water supply information be provided to counties and cities for projects of a certain size, prior to project approval. Both bills allow an UWMP to be used as a source document to fulfill these legislative requirements. This UWMP was adopted by Eastern Municipal Water District (EMWD) Board of Directors on June 15, 2011 by I.C. Resolution No. 5023. Appendix A includes the adoption order and. Appendix A.1 includes the DWR UWMP checklist.

1.2 Coordination

Article 3, Section 10642 of the UWMP Act requires each urban water supplier to encourage the active involvement of diverse social, cultural and economic elements of the population within the service area. EMWD has encouraged the participation of sub agencies, cities and the County of Riverside and other public groups. Public participation and coordination efforts are detailed in Appendix B.

1.3 Eastern Municipal Water District

EMWD is a public water agency formed in 1950 by popular vote. In 1951, it was annexed into the Metropolitan Water District of Southern California (MWD) and gained a supply of imported water from the Colorado River Aqueduct (CRA). Today, EMWD remains one of MWD's twenty-six member agencies and receives water from Northern California through the State Water Project (SWP) in addition to deliveries through the CRA.

EMWD's initial mission was to deliver imported water to supplement local groundwater for a small, mostly agricultural, community. Over time, EMWD has evolved to include groundwater production, desalination, water filtration, wastewater collection and treatment, and regional water recycling on the list of products and services it offers to its over 135,000 customers. Located in one of the most rapidly growing regions in the Nation, EMWD's mission is "to provide safe and reliable water and wastewater management services to our community in an economical, efficient, and responsible manner, now and in the future."

A five-member Board of Directors governs EMWD. Each Director serves an area of equivalent population size within EMWD's boundaries and is elected to office every four years. As a member agency of MWD, EMWD also has a board member appointed to the MWD Board.

1.4 Service Area Physical Description

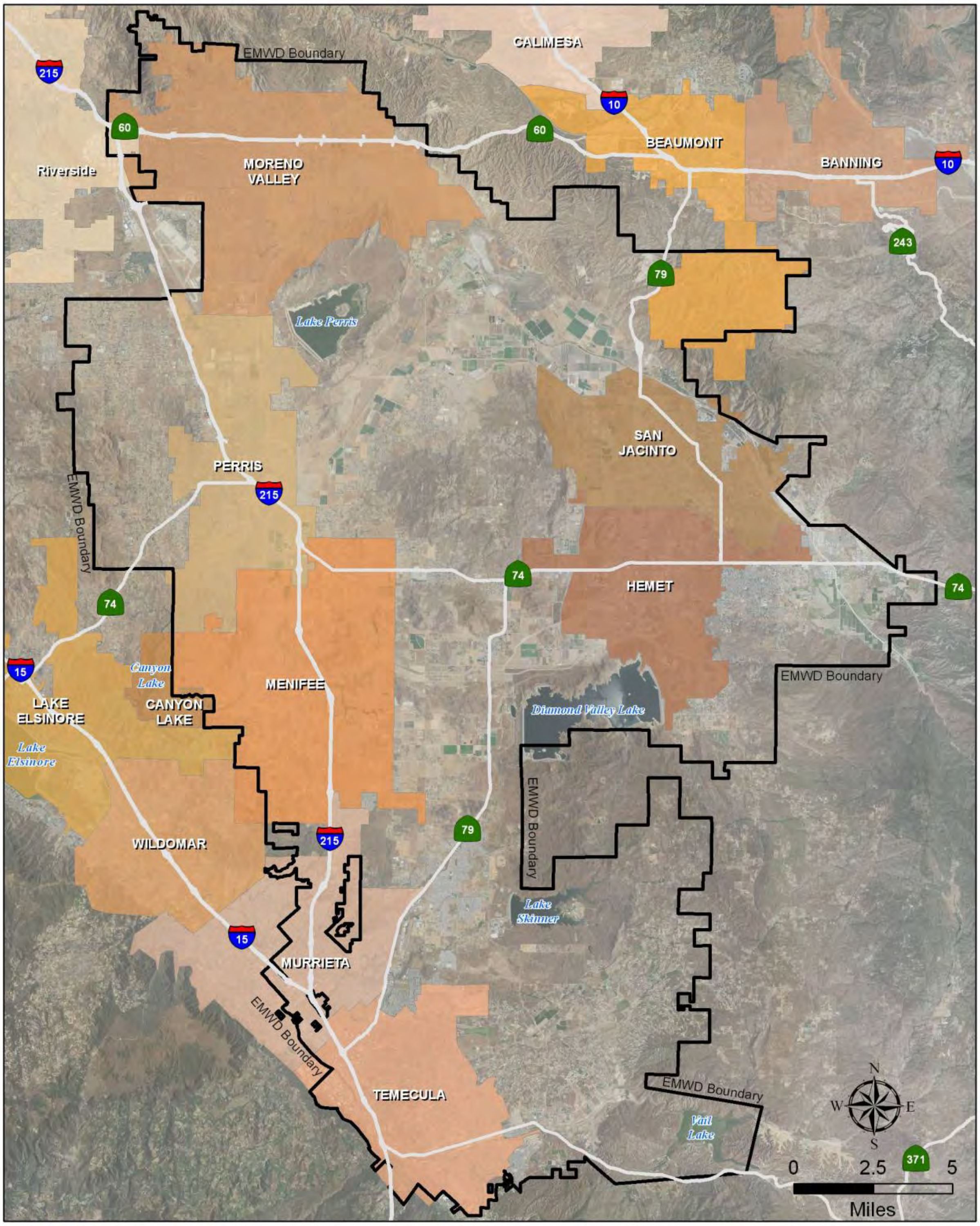
EMWD is located in western Riverside County, approximately 75 miles east of Los Angeles. The 555 square mile service area includes seven incorporated cities in addition to the unincorporated areas of the County of Riverside.

The areas within EMWD's boundary are:

City of Hemet
City of Menifee
City of Moreno Valley
City of Murrieta
City of Perris
City of San Jacinto
City of Temecula
Homeland
Lakeview
Nuevo
Quail Valley
Romoland
Valle Vista
Winchester

In most of the listed areas, EMWD provides both water and sewer service. However, in some places EMWD provides only sewer or water service, or provides wholesale water to a sub agency.

Figure 1.1 - Areas Within EMWD Boundaries



Eastern Municipal Water District
Cities

EMWD is a wholesale provider to the following sub agencies:

City of Hemet Water Department
City of Perris Water System
City of San Jacinto Water Department
Lake Hemet Municipal Water District (LHMWD)
North Perris Water System
Nuevo Water Company
Rancho California Water District (RCWD)

Several of these agencies have or will prepare their own UWMP. EMWD has discussed and reviewed the supplemental water demand required by each agency with representatives of that agency. The demand requirements and water supply are discussed in this plan.

1.5 Climate

EMWD has a semi-arid climate characterized by hot, dry summers and cooler winters. The average total rainfall is between 10 and 11 inches, occurring mostly in December through March. The region experiences a wide variation in rainfall and periodic local drought. Table 1.1 has a summary of average evapotranspiration (Et_o), temperature and precipitation for EMWD's service area taken from 3 local climate stations (Riverside-44, Temecula-62, Winchester-179).

Table 1.1 - EMWD Climate

	Standard Monthly Average ETo (inches)	**Average Rainfall (inches)**	**Average Max. Temperature (Fahrenheit)**	**Average Min. Temperature (Fahrenheit)**
January	2.37	2.2	66.7	41.3
February	2.57	3.0	65.1	42.1
March	4.13	0.9	70.3	44.3
April	5.03	0.9	72.1	45.9
May	6.23	0.2	77.6	51.4
June	6.83	0.0	83.2	55.5
July	7.57	0.1	91.4	60.8
August	7.27	0.0	91.8	60.1
September	5.70	0.1	89.2	57.6
October	4.03	0.5	78.9	51.9
November	2.70	0.7	72.6	45.6
December	2.30	2.0	64.6	40.4
Total	56.63	**10.6**	**77.0**	**49.7**

In dry years, potable water demand increases slightly during the months when rainfall usually occurs, but peak demand for dry or wet years during hot summer months remains fairly constant.

The recycled water system, which serves agricultural and landscape demand, is slightly more sensitive to climate fluctuation. In dry years, there may be an increase in demand during typically wet months to make up for the lack of rainfall, but summer demand typically remains high.

1.6 Population

Through the past decade EMWD's service area within Riverside County was one of the fastest growing regions in California. Since 1990, nearly 350,000 people have been added to the service area of EMWD, doubling the population. Table 1.2 summarizes the 1990-2010 population for EMWD.

Table 1.2 - Population within EMWD's Boundary – 1990 - 2010

Water Service Area	1990	1995	2000	2005	2010
EMWD Retail Service Area	240,293	277,013	297,111	383,286	475,841
City Of Perris Water System	5,189	6,531	7,043	7,928	8,883
North Perris Water System	0	0	0	3,270	4,977
Nuevo Water Company	3,825	5,320	5,891	6,509	7,141
City of San Jacinto Water Department	11,078	13,538	14,138	15,602	17,819
City of Hemet Water Department	22,345	22,627	22,801	23,347	24,921
Lake Hemet Municipal Water District	34,536	39,535	42,607	43,617	44,963
Rancho California Water District	25,389	47,381	74,624	94,779	111,387
Total	**342,655**	**411,945**	**464,215**	**578,338**	**695,932**

The population within EMWD's retail service area represents the area directly served by EMWD's distribution system. Population for EMWD's retail service area has been calculated based on data available from the 1990 and 2000 Census and the California Department of Finance available in 2010.

1.6.1 Projected Population

To insure that planning efforts for future growth are comprehensive, EMWD incorporates regional projections in its UWMP. The Riverside County Center for Demographic Research (RCCDR) 2010 Projection is used to calculate future population. RCCDR considers land use and land agency information to develop projections. The RCCDR projection has been adopted by the Western Riverside Council of Governments.

Table 1.3 - Projected Population – 2010 - 2035

	2015	2020	2025	2030	2035
EMWD Retail Service Area	548,718	628,918	709,729	785,810	849,059
City Of Perris Water System	9,151	9,464	9,906	10,312	10,699
North Perris Water System	4,977	4,977	4,977	4,977	4,977
Nuevo Water Company	7,781	8,580	6,903	5,902	5,346
City of San Jacinto Water Department	19,706	21,467	22,738	23,635	24,341
City of Hemet Water Department	27,474	29,363	31,273	33,181	35,217
Lake Hemet Municipal Water District	47,446	50,865	54,296	57,742	59,167
Rancho California Water District	114,604	116,969	120,231	122,259	122,923
Total	**779,857**	**870,603**	**960,053**	**1,043,818**	**1,111,729**

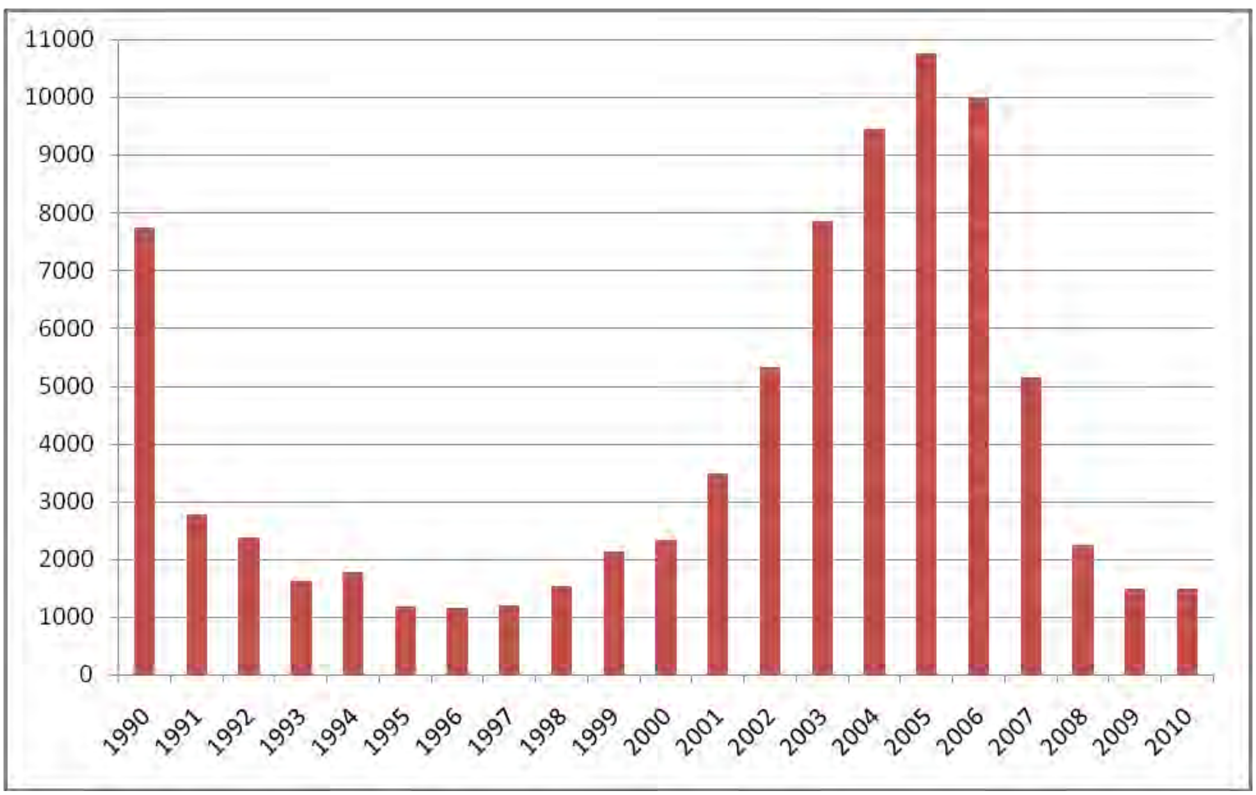
Source: Riverside County Center for Demographic Research

1.7 Other Demographic Factors

As the population within EMWD's service area continues to grow, the characteristics of the service area are continually changing. District-wide, tract homes, commercial centers and new industrial warehouses are replacing acres of agriculture and vacant land. The average household size is becoming smaller and the median income is increasing. Over the next 25 years, EMWD's population is projected to grow by over 400,000 people, a sixty percent increase over the current retail area population.

From the mid -1980's to 1990's, population growth in EMWD routinely exceeded 10% per year. In the early 1990's, growth slowed during an economic recession. During the late 1990's, growth began to steadily increase, and the first five years of the 2000's brought accelerated population growth to the area. This growth has challenged EMWD to develop new sources of supply and construct new facilities and infrastructure to bring water to hundreds of new customers each month. Growth within EMWD's service area reached its peak rate in 2005. In the late 2000's there was a major decline in the housing development and growth slowed again during the recent economic recession. However, EMWD is still a growing water agency. Ultimate demand estimates indicate that before EMWD reaches build out, the population will nearly triple its current size. Land will continue to be developed in western Riverside County as more and more people move into the area. Just as it has in the past, EMWD will continue to meet the challenges of new development with innovation, efficiency and responsibility. Table 1.4 shows EMWD new retail connections for 1990 through 2010.

Table 1.4 - EMWD New Connections – 1990 - 2010



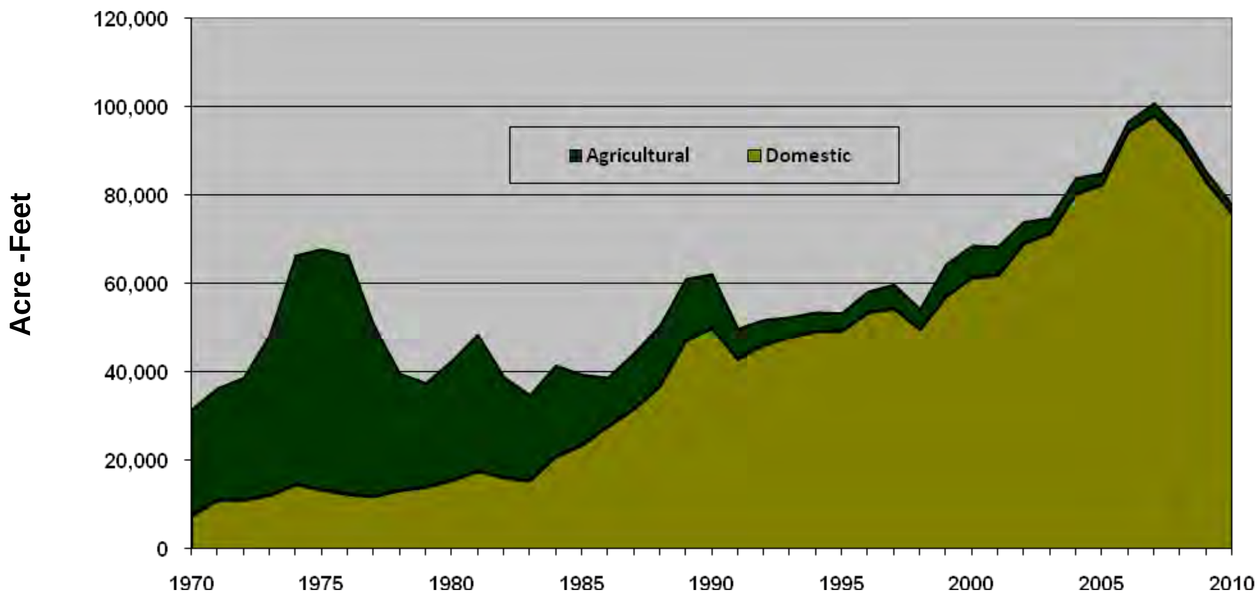
Section 2 - System Demands

2.1 Overview

Over the past several decades the potable water use in EMWD's service area has shifted from agricultural to urban use. The reduction in agricultural demand has two major causes: rural farm land has been transformed to urban housing as people moved from neighboring counties in search of affordable housing and agricultural demand have been shifted to the recycled water system. The development of new homes and the accompanying increase in population led to the increasing demand for domestic water. Influenced by the last period of a construction boom and drier than average weather conditions, water demands peaked in 2007 before declining through 2010. The reduced demand can be attributed to several different factors including the implementation of a tiered rate billing system, and a water shortage with the accompanying outreach calling for conservation throughout California, but much of it can also be associated with the decline in the economy. High unemployment and record high foreclosure rates have reduced demand for all customers, especially EMWD's largest customer group, single family residential.

Through 2007, EMWD per capita water consumption was trending upwards. Moving forward, EMWD has devised a plan to reverse that trend and insure efficient water use standards are met by customers, in order to meet the requirements of the Water Conservation Act of 2009.

Figure 2.1 - Retail Potable Water Sales – 1970 – 2010



In addition to retail potable water demand, EMWD delivers water to seven wholesale customers and meets a significant portion of demand with recycled water. Table 2.1 summarizes the past and projected demand for water within EMWD's service area.

Table 2.1 - Water Demand (AFY) – 2005 - 2035

	Actual		Projected				
	2005	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Retail Potable Water Sales	84,900	77,700	113,800	120,700	136,100	150,300	162,200
Water Sales to Other Agencies	29,400	27,100	47,600	61,600	65,000	69,000	72,400
Other Water Uses/Losses	47,300	49,900	52,500	59,100	64,200	66,300	67,600
Total	**161,600**	**154,700**	**213,900**	**241,400**	**265,300**	**285,600**	**302,200**

2.2 Water Conservation Act of 2009

The Water Conservation Act of 2009, Senate Bill x7-7, set a requirement for water agencies to reduce their per capita water use by the year 2020. The overall goal is to reach a state wide reduction of per capita urban water use of 20% by December 31, 2020 with an intermediate 10% reduction by December 31, 2015. Demand reduction can be achieved through both conservation and the use of recycled water as a potable demand offset.

An urban water provider's 2010 UWMP must include a target for per capita water use in 2020 and an interim target for 2015. The 2020 target may be updated in the 2015 UWMP. These targets must be developed using one of four methods. Effective 2016, urban water retailers who do not meet their water conservation targets will be ineligible for state water grants or loans unless one of two exceptions is met. The first exception states that an urban supplier may be eligible if they have submitted a compliance schedule, financing plan and budget to DWR for approval, showing how they will meet their target per capita water use by 2020. The second exception states that an urban water supplier may be eligible for funding if their entire water service area qualifies as a disadvantaged community.

Any one of the four methods can be used to determine the per capita water use targets. Three methods were specified in the legislation, and the fourth was developed by DWR. The four methods are:

- Using eighty percent of the baseline as the per capita water use target.
- Using an efficiency standard with targets for indoor use, landscape use, commercial, industrial and institutional use and an optional target for agricultural use.
- Using ninety-five percent of the applicable state hydrologic region target developed by DWR and published in the state's *20X2020 Water Conservation Plan.*
- Using a method developed by DWR that accounts for water savings due to water metering and achieving water conservation measures in three water use sectors.

DWR, through a public process, developed and published *Methodologies for Calculating Baseline and Compliance Urban Water Per Capita Use* in October of 2010 for consistent application of the Act throughout the state.

2.3 EMWD Baseline and Compliance Targets

Using the methodology established by DWR, EMWD has calculated its baseline and compliances target.

2.3.1 Gross Water Use

Gross water use was calculated using the best available meter data about water entering and exiting EMWD's distribution. The distribution system includes a potable water system service that serves both domestic and agricultural demand, and a raw water system used to provide water to a few agricultural customers.

Potable sources are potable groundwater wells, treated water from two desalination plants, imported water from MWD and water imported from other agencies. Imported water from MWD includes water delivered directly to the distribution system and raw water treated at EMWD facilities. Small amounts of water are also delivered from WMWD. Only water delivered to the distribution system is included in the gross water calculations. The single source for the raw water system is imported water from MWD.

EMWD sells a portion of the water that enters its distribution system to wholesale customers. Some MWD connections also have a portion of water that is diverted to other agencies without being part of EMWD's distribution system. RCWD, EMWD's largest whole sale customer has dedicated connections to MWD's system and does not impact EMWD's distribution system. Table 2.2 shows gross water use calculations.

Table 2.2 - Gross Water Use Calculations (AF) – 1999 - 2008

	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Potable Wells	20,280	21,287	18,536	18,861	17,574	16,564	18,064	19,644	19,489	20,043
Desalter	0	0	0	4	999	1,440	855	4,802	4,792	2,973
Mills and Skinner	62,896	68,454	68,260	77,313	74,516	60,798	73,029	72,515	70,430	62,900
MWD Raw Water	0	0	0	1,064	760	233	108	91	41	353
EMWD Water Filtration Plants	0	0	0	0	3,741	7,911	5,636	8,405	17,271	16,594
Other Agencies	76	111	39	36	35	37	31	39	37	831
Exported to other Utilities	-13,862	-17,847	-16,776	-15,995	-11,309	-7,006	-3,046	-4,665	-7,682	-6,510
Gross Water Use	**69,389**	**72,005**	**70,060**	**81,283**	**86,315**	**79,977**	**94,677**	**100,832**	**104,378**	**97,184**

2.3.2 Baseline per Capita Water Use

EMWD used several sources of data to calculate the historical population of its retail service area and project the future population of its service area including: the Riverside County Center for Demographic Research (RCCDR) 2010 Projection, the 1990 and 2000 United States Census and the California Department of Finance annual population estimates for cities and counties. GIS was used to segregate data between sub agencies and EMWD's retail service area and Department of Finance data was used to calculate annual growth rates Table 2.3 has the retail service area population and daily per capita water use for the base years to calculate the baseline per capita use. Table 2.4 has the population and daily per capita use for 2003-2007 for use in calculating the minimum per capita reduction.

Table 2.3 - Daily Per Capita Use (1999-2008, Calendar Year)

Base Years	Service Area Population	Gross water Use (gal. per day)	Daily Per Capita Water Use (gallons)
1999	291,637	61,946,331	212
2000	297,111	64,281,539	216
2001	307,103	62,545,269	204
2002	324,678	72,564,859	223
2003	336,579	77,057,492	229
2004	359,198	71,399,100	199
2005	383,286	84,522,023	221
2006	416,954	90,017,125	216
2007	440,933	93,183,042	211
2008	457,771	86,759,842	190
		Total	**2121**
Divide Total by Number of Base Years			**212**

Table 2.4 - Five Year Daily Per Capita Use (2003-2007, calendar year)

Base Years	Service Area Population	Gross water Use (gal. per day)	Daily Per Capita Water Use (gallons)
2003	336,579	77,057,492	229
2004	359,198	71,399,100	199
2005	383,286	84,522,023	221
2006	416,954	90,017,125	216
2007	440,933	93,183,042	211
		Total	**1076**
Divide Total by Number of Base Years			**215**

Using the methodology established by DWR, EMWD has calculated its baseline use to be 212 gallons per capita per day water (GPCD), based on the average GPCD between 1999 and 2008.

2.3.3 Compliance Target

EMWD has selected method two to determine compliance with SBx7-7. Method two efficiency standards for water demand are:

- Indoor residential per capita use to meet target demand of 55 GPCD.
- Landscape irrigation, delivered either through a residential meter or a dedicated landscape meter to meet the efficiency standards of the Model Water Efficient Landscape Ordinance.
- Commercial, industrial, and institutional demand to be reduced by ten percent from baseline per capita demand.
- Agricultural water use to meet the efficiency standards of the Model Water Efficient Landscape Ordinance.

In 2009, EMWD implemented a budget based tiered rate program. For residential and landscape customers, these budgets are based on persons per household and the irrigated landscape areas. To develop budgets for over 130,000 accounts EMWD estimated irrigated areas using parcel data supplied by the County of Riverside. Accounts with over 6,000 square-feet of irrigated area were verified using aerial photography or field measurements. Customers are also able to file a variance to correct EMWD estimated irrigated areas. This information was used to estimate the irrigated area for 2020. Actual irrigated area will be determined in the compliance year.

Table 2.5 - Landscape Irrigated Area Efficiency Standard

Account Installed:	Prior to Jan 1, 2010	After Jan 1, 2010	After Jan 1,2010	**Total**
Account Status	Existing	Existing	Projected	
Irrigated Area (SF)	682,427,442	6,983,623	112,320,000	**801,731,065**
% ETo	80%	70%	70%	
Reference ETo	56.63	56.63	56.63	
Target water Use (gal per day)	52801967.78	472805.44	7604291.79	**60,879,065**
2020 Population				**628,918**
Target Daily Per Capita Water Use (gallons)				**96.80**

Table 2.6 contains the calculation for the CII Target per capita water use. CII water use does not include multifamily.

Table 2.6 – Commercial, Industrial and Institutional, Daily Per Capita Use (1999-2008, Calendar Year)

Base Years	Service Area Population	Commercial Water Use (gal. per day)	Industrial Water Use (gal. per day)	Institutional Water Use (gal. per day)	Sum CII Water Use (gal. per day)	Daily Per Capita Water Use (gallons)
1999	291,637	3,282,584	355,279	2,382,239	6,020,101	20.6
2000	297,111	3,462,465	382,229	2,538,002	6,382,696	21.5
2001	307,103	3,520,994	384,146	2,450,010	6,355,150	20.7
2002	324,678	3,566,972	390,599	2,543,603	6,501,174	20.0
2003	336,579	3,696,911	374,467	2,378,707	6,450,085	19.2
2004	359,198	3,877,039	393,268	2,716,276	6,986,583	19.5
2005	383,286	3,519,052	360,928	2,616,731	6,496,711	17.0
2006	416,954	4,355,240	459,347	2,540,133	7,354,720	17.6
2007	440,933	4,369,360	404,093	2,702,941	7,476,395	17.0
2008	457,771	4,435,262	334,517	2,522,392	7,292,171	15.9
						189
Divide Total by Number of Base Years						18.9
Target GPCD (90% of Base)						17.0

Agricultural areas were measured using aerial photography and anticipated to decrease through 2020.

Table 2.7 - Agricultural Efficiency Standard

Account Installed:	**Total**
Account Status	Existing
Irrigated Area (SF)	74,564,916
% ETo	100%
Reference ETo	56.63
Target water Use (gal per day)	60,879,065
2020 Population	628,918
Target Daily Per Capita Water Use (gal)	**15.2**

Table 2.8 combines the four efficiency targets for a 2020 compliance target of 184 GPCD. The 2015 interim target is 198 GPCD. The target is lower than the minimum five percent reduction of the five year average GPCD.

Table 2.8 - Compliance Daily per Capita Water Use (GPCD)

Type of Target	**Target**
Residential Indoor	55
Irrigated Landscape	96.8
Commercial, Industrial and Institutional	17.0
Agricultural	15.2
2020 Compliance Target	**184**
2015 Interim Target	**198**

2.4 EMWD Implementation Plan for Water Use Reduction

EMWD will reduce potable water demand to meet the goals of SBx7-7 two ways; using recycled water to offset potable water demand and reducing demand for water through conservation. Three methods have been identified for conserving water: 1) a budget based tiered rate, 2) requirements for water efficiency in new construction and 3) an active conservation program. Water use reduction will be focused on outdoor demand reduction by all customer types.

Table 2.9 - Water Efficiency Savings (AFY) – 2005 - 2035

Saving Type	2005	2010	2015	2020	2025	2030	2035
Recycled Water Potable Offset	3,600	4,000	5,000	6,300	11,500	13,900	14,300
Tiered Rate	0	8,700	8,700	8,700	8,700	8,700	8,700
New Construction	0	200	2,000	4,100	6,100	8,000	9,600
Active Conservation	1,500	3,400	6,500	9,500	10,700	11,700	12,600
Total	**5,100**	**16,300**	**22,200**	**28,600**	**37,000**	**42,300**	**45,200**

Recycled water will be used to offset potable demand through the expansion of the existing recycled water system. Additional information about the use of recycled water can be found in section 3.5

Tiered Rate savings are an estimate of water saved by customers after the implementation of a budget based tiered rate. In April 2009, EMWD implemented a tiered rate billing structure for its residential and landscape customers. Customers are provided an allocation for reasonable water use and are required to pay a higher rate for water use over their allocated limit. Water savings by existing customers has been estimated. Actual water demand since the implementation of the tiered rate has been lower than the estimated amounts, likely as a result of several factors and not the tiered rate implementation alone.

Water Use Efficiency Requirements in New Development includes installing lower water use landscape and interior fixtures. Water use efficiency is mandated statewide through existing ordinances, plumbing codes and legislation. To enforce water use efficiency in new development EMWD has lowered the water budget allocations for new development. Any residential or dedicated landscape account installed after January 1, 2011 will have an outdoor budget allocation based on only 70% of ET, compared to up to 100% of ET for older accounts. Water use savings shown in Table 2.1 are calculated assuming lower budgets allocation will result in a reduction in a proportionate reduction in water use. Actual savings will be measured based on average use by new meters.

Active Conservation savings are the result of water use efficiency programs implemented by EMWD. EMWD encourages the replacement of inefficient devices and includes monetary rebate, distribution and direct installation programs. Water savings are based on estimated water savings for each device and takes into account the lifetime of each device.

EMWD has already experienced the economic impact of the implementation of tiered rates. In 2009, EMWD implemented the budget based tiered rate with the goals that it would encourage water use efficiency and provide revenue stability. The rate structure was developed to ensure that revenue would remain neutral as customers decrease their water use. Since the implementation of the tiered rate, EMWD has seen reduction in water use that puts EMWD on target to meet the SBx7-7 compliance target. In the future, EMWD will continue to monitor customer response to the budget based tiered rate and make any adjustments required to ensure revenue stability.

The long term economic impact of conservation and the use of recycled water to comply with SBx7-7 were evaluated as part of EMWD's Integrated Resource Plan (IRP). The IRP included financial stability as one objective when evaluating potential supply scenarios. Scenarios that included conservation and recycled water use in quantities that meet or exceed the reduction requirement for SBx7-7 performed better than those without. The costs associated with reducing EMWD's demand for potable water are offset by the avoided cost of importing additional water.

Through the above three methods of reducing water use, and recycled water use, EMWD anticipates the reduction of potable water demand to meet the requirements of SBx7-7.

2.5 Water Demand Projection

Demands for EMWD were developed using projections provided by the Riverside County Center for demographic research. EMWD retail demand projections include the water savings needed to meet the Water Conservation Bill of 2007 requirements. Although currently the area is experiencing a slowdown in new development, EMWD's service area is at about 40 percent of build out. To track new developments EMWD uses a spacial database, updated quarterly. Currently, EMWD is tracking the status of over 700 proposed projects and over 150,000 residential units.

2.5.1 Retail Market Segments

EMWD's primary retail customers can be divided into residential, commercial, industrial, institutional and landscape sectors. Although the residential section is by far EMWD's largest customer segment, each market segment plays a role in the growth and development of EMWD's service area. See Table 2.10 for water use by various customer types.

Table 2.10 - Potable Retail Water Deliveries by Customer Type – 2005 - 2035

Year /Type	Units	Single family Res.	Multi-family Res.	Com-mercial	Indus-trial	Inst/ gov.	Land-scape	Agriculture	Total
2005	No. of accounts	114,100	1,000	1,500	100	40	1,500	200	**118,440**
Actual	Volume (AF)	62,300	5,500	3,900	400	2,900	7,500	2,400	**84,900**
2010	No. of accounts	129,400	4,300	2,100	100	500	2,200	100	**138,700**
Actual	Volume (AF)	54,000	6,100	4,200	400	2,300	8,900	1,800	**77,700**
2015	No. of accounts	140,600	5,700	2,300	1,200	100	3,300	100	**153,300**
Projected	Volume (AF)	74,400	8,300	5,600	600	3,600	18,500	2,800	**113,800**
2020	No. of accounts	150,200	6,100	2,400	1,300	100	3,500	85	**163,685**
Projected	Volume (AF)	79,600	8,800	5,900	600	3,800	19,600	2,400	**120,700**
2025	No. of accounts	169,600	6,900	2,700	1,400	100	4,000	85	**184,785**
Projected	Volume (AF)	89,800	10,000	6,700	700	4,300	22,200	2,400	**136,100**
2030	No. of accounts	187,700	7,700	3,000	1,500	100	4,400	85	**204,485**
Projected	Volume (AF)	99,400	11,000	7,400	800	4,800	24,500	2,400	**150,300**
2035	No. of accounts	202,800	8,200	3,300	1,700	100	4,700	85	**220,885**
Projected	Volume (AF)	107,400	11,900	8,000	800	5,200	26,500	2,400	**162,200**

Residential consumption is the dominant demand for EMWD which will continue in the future according to current general plans for the County of Riverside and local cities. Residential accounts are required to keep their demands below a budgeted allocation or pay a high rate for water use. Accounts dedicated to irrigating landscaped areas have the second highest consumption rate. Just as with residential accounts, landscape accounts are subject to a budgeted allocation. New development in both of these account classes are provided lower budget allocations to account for water efficiency regulations in place requiring water efficient landscape and plumbing fixtures.

Commercial developments will also continue to increase and will be focused along the major transportation highways through EMWD's boundary (Interstate Highway 15, Interstate Highway 215, Highway 79, and Highway 74). Currently, commercial demands account for about 5% of EMWD's retail demand. Land use based projections indicate that the ratio of commercial demand to retail demand will increase slightly over time.

EMWD has a very small industrial use sector, accounting for less than 1% of retail demand. Industrial developments are proposed around Interstate Highway 215 and other main transportation corridors. Much of the proposed growth consists of large warehouse projects with minimal water demand. As much as possible, EMWD will try to meet the needs of industrial accounts with very high demands for potable water by using recycled water.

Currently, the demand from institutional accounts account for about 4% of retail demand for potable water. EMWD works closely with institutional and government accounts to help reduce their demand and promote the efficient use of water. Whenever possible, recycled water is used for landscape irrigation for schools and other government facilities. EMWD has also developed conservation programs designed to assist public sector accounts like schools to reduce demand through the retrofit of inefficient devices.

When EMWD was formed, it was primarily serving the agricultural community with imported water from MWD. Since then, EMWD service area has gone through a major transformation from a farming community to a residential community. Currently, agricultural demand accounts for about 4% of EMWD's potable water market. Agricultural demand from agricultural expected to remain relatively stable for the next twenty years with some fluctuations from year to year due to changes in weather or crop rotations.

2.5.2 Wholesale to Other Agencies

EMWD wholesales water to six different agencies. The demand for each agency differs based on its need each year. These demands can be unstable at times as these agencies use water from EMWD to supplement their system when their local facilities are inadequate or fail. EMWD will also provide backup for the North Perris Water System if an emergency should occur.

Each urban water supplier is responsible for compliance with SBx7-7. EMWD currently participates in and supports programs developed and implemented by MWD that benefit its entire service including EMWD's wholesale customers. These programs include region wide rebates for both commercial and residential customers, conservation messaging outreach, and research and development of new conservation programs and devices. EMWD also actively promotes conservation throughout Riverside County through participation in organizations such as the Riverside County Water Task Force and the San Jacinto Valley Conservation League. EMWD will continue to support water reduction by wholesale customers through outreach, providing technical support and encouraging participation in regional programs.

Under the Hemet/San Jacinto Water Management Plan, EMWD will be responsible for providing water to recharge the groundwater basin. A portion of the water supplied will be State Water Project Water imported through MWD to meet the requirements of the Soboba Settlement (see Section 3.3.4 infra) and improve the reliability of groundwater in the area. Individual agencies including EMWD will extract their allotted amount of the recharged water from the basin using wells already in place and new wells yet to be constructed.

A portion of the water EMWD wholesales to Lake Hemet Municipal Water District (LHMWD) is raw water for agricultural uses. This water is needed especially when surface water is not available to LHMWD in dry years. See Table 2.11 for water sales to other agencies.

Table 2.11 - Wholesale to Other Agencies (AF) – 2005 - 2035

	Actual Sales (AF)		Projected Sales (AF)				
Water distributed	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
City of Hemet	100	0	0	0	0	0	0
City of Perris Water System	1,900	1,700	1,700	1,800	1,900	2,000	2,100
City of San Jacinto	0	0	0	0	0	0	0
Lake Hemet MWD[1.]	100	1,300	1,100	1,100	1,000	1,100	1,100
North Perris Water System	0	0	0	0	0	0	0
Nuevo Water Company	800	600	800	1,600	1,700	1,700	1,700
Murrieta Water Company	100	1,600	0	0	0	0	0
Rancho California Water District	26,300	21,900	36,500	48,600	50,800	53,000	55,200
Hemet/San Jacinto Basin Plan Water Master	0	0	7,500	8,500	9,600	11,200	12,300
Total	29,400	27,100	47,600	61,600	65,000	69,000	72,400

1. Sales of water to Lake Hemet are for non-potable supplies used to meet agricultural demand.

2.5.3 Other Water Uses

EMWD also has recycled water use, potable water losses and process water that are described in this section. See Table 2.12, for the projected use of water by each type.

Table 2.12 - Other Water Uses (AFY)– 2005 - 2035

	Actual Use (AF)		Projected Use (AF)				
	2005	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Recycled Water	32,600	41,500	43,900	50,000	53,900	54,900	55,300
Recharge Water [1]	7,000	0	0	0	0	0	0
Distribution System Water Loses	7,600	8,200	8,400	8,900	10,100	11,200	12,100
Treatment Water Losses	100	200	200	200	200	200	200
Total	47,300	49,900	52,500	59,100	64,200	66,300	67,600

1 Future recharge will be through the Hemet/San Jacinto Basin Plan Water Master

There are several existing uses of recycled water; municipal use; including industrial and landscape use, agricultural use and environmental use.

Much of the increasing demand for EMWD's recycled water use from accounts that will use recycled water for industrial processing and for landscape irrigation. To meet the needs of these accounts, EMWD has taken steps to improve the reliability and quality of the recycled water system including pressurizing the recycled water system and monitoring account demands to prevent excessive peaking on the system.

Agricultural accounts may use recycled water to grow short-term row crops. Using potable water would not be cost-effective for these accounts. Their profitability is based on the availability of low-cost recycled water and low-cost land available for lease. The location of these accounts frequently changes each year depending on land availability. As more residential development takes place and the population grows, land is becoming less accessible for agricultural use. In the future, EMWD expects to have fewer and fewer agricultural accounts. Other agricultural accounts use recycled water to irrigate crops that require a long-term investment such as citrus trees. These accounts would use potable water if needed to protect their investment. Recycled water is also being used by agricultural accounts in lieu of potable ground water.

EMWD also sells water to the California Department of Fish and Game for the San Jacinto Wildlife Area. This wildlife refuge is the only refuge area in the state to use recycled water for habitat creation and recycled water is used to help maintain, enhance and improve this environmental preserve.

Water loss within EMWD's potable distribution system is estimated to be 7% of total water use. Losses are highest where pipelines are older and smaller in size, especially in the Hemet and San Jacinto areas that were once owned by the Fruitvale Mutual Water Company. To insure that water losses are accurately accounted for and to meet the requirements of the memorandum of understanding for the California Urban Water Conservation Council, EMWD has implemented a water loss study to prevent an increase in water losses. EMWD tracks leaky pipes and identifies pipes for replacement as part of its capital improvements program.

Treatment water losses include water purchased from MWD and used in the treatment processes at EMWD's filtration plants. This water does not enter EMWD's distribution system but is part of EMWD's demand for imported water.

2.6 Lower Income Housing Demand

Senate Bill 1087 requires that water use projections of a UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city and county in the service area of the supplier. EMWD used the percent of low income and very low income housing identified in the Housing Need Allocation Plan for January 1, 2006 through June 30, 2014, approved by the Southern California Association of Governments on July 12, 2007 to estimate the number of new low income housing units may be required within EMWD's retail service area. The number of low income housing units and associated demand is included in Table 2.13. The demand for these units is included in the total projected residential demand in Table 2.10.

Table 2.13 - Projected New Lower Income Housing Units and Demand (Retail Service Area) – 2015 - 2035

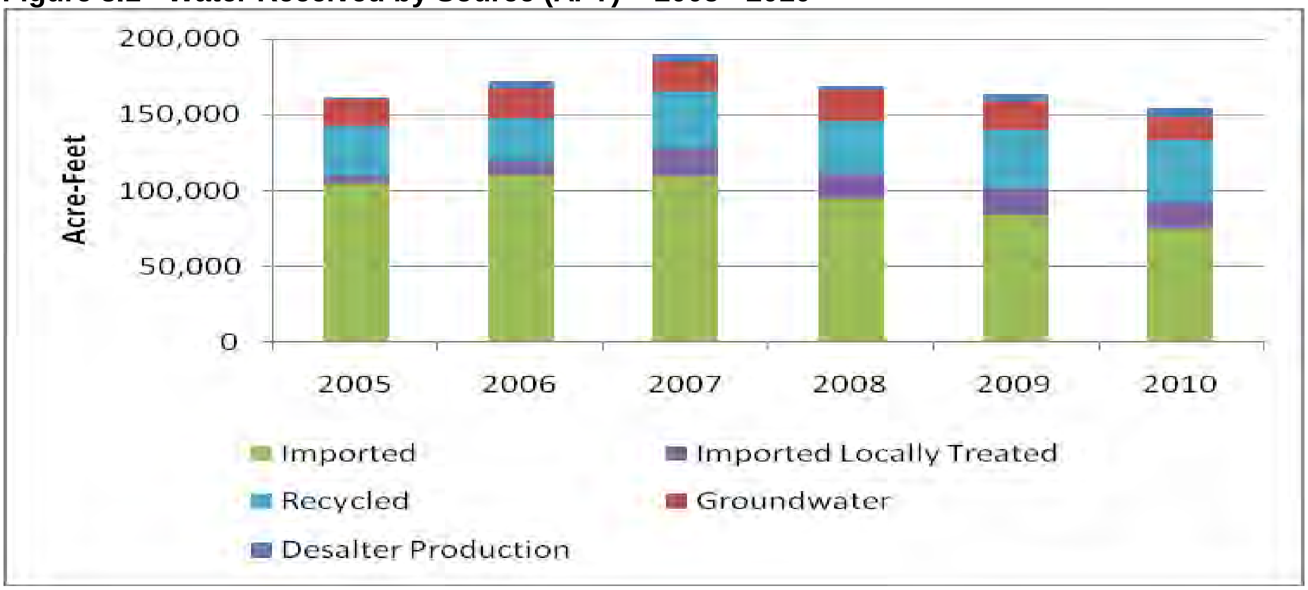
Year	Units	City of Hemet	City of Menifee	City of Moreno Valley	City of Murrieta	City of Perris	City of San Jacinto	City of Temecula	Riverside County	Total
2015	Housing Units	2,000	1,400	1,900	600	1,500	2,100	400	1,400	**11,300**
	Demand (AF)	700	500	700	200	500	700	100	500	**3,900**
2020	Housing Units	1,300	2,000	1,800	600	1,400	1,800	100	2,700	**11,700**
	Demand (AF)	500	700	600	200	500	600	35	900	**4,035**
2025	Housing Units	1,200	1,400	1,800	600	1,300	1,200	300	3,200	**11,000**
	Demand (AF)	400	500	600	200	500	400	100	1,100	**3,800**
2030	Housing Units	1,500	1,400	2,100	600	1,300	800	100	2,900	**10,700**
	Demand (AF)	500	500	700	200	500	300	35	1,000	**3,735**
2035	Housing Units	1,500	1,600	1,400	600	1,300	700	100	3,000	**10,200**
	Demand (AF)	500	600	500	200	500	200	35	1,100	**3,635**

Section 3 - Existing Water Sources

3.1 Overview

EMWD has four existing sources of water supply: imported water from MWD, recycled water, local groundwater production and desalted groundwater. Imported water from MWD is either delivered directly as potable water, delivered to EMWD as raw water and then treated at two local filtration plants owned and operated by EMWD or delivered to EMWD as raw water for non-potable use. Figure 3.1 quantifies the amount of water EMWD has received from each source annually in acre-feet from 2005 through 2010.

Figure 3.1 - Water Received by Source (AFY) – 2005 - 2010



1. Imported water includes water received at EMWD treatment plants and used in the treatment process.
2. Imported Treated by EMWD is water entering the distribution system after being treated at EMWD's filtration plants.
3. Recycled represents recycled water delivered water only, not total available supply.

For the past six years EMWD's reliance on imported water has remained proportionally consistent or decreased, even as EMWD added over 20,000 new water connections. This has been achieved through the construction of desalination facilities, a commitment to increase recycled water use and through a decrease in demand from water efficiency. These efforts have increased the reliability of supplies and decreased the dependence on imported water sources. Information about water deliveries from each source is included in Table 3.1.

Table 3.1 - Water Supply (AFY) – 2005 - 2010

Type	Source	2005	2006	2007	2008	2009	2010
Imported	Metropolitan Water District	104,400	110,400	109,900	94,400	84,200	75,000
Imported – Locally Treated	Metropolitan Water District	5,600	8,400	17,300	16,600	17,000	16,600
Groundwater	West San Jacinto Management Area	18,100	19,600	19,500	20,000	18,100	15,800
Desalination	West San Jacinto Management Area	900	4,800	4,800	3,000	4,800	5,800
Recycled	EMWD Regional Water Reclamation Facilities	32,600	28,800	38,600	35,100	39,200	41,500
Total		**161,600**	**172,000**	**190,100**	**169,100**	**163,300**	**154,700**

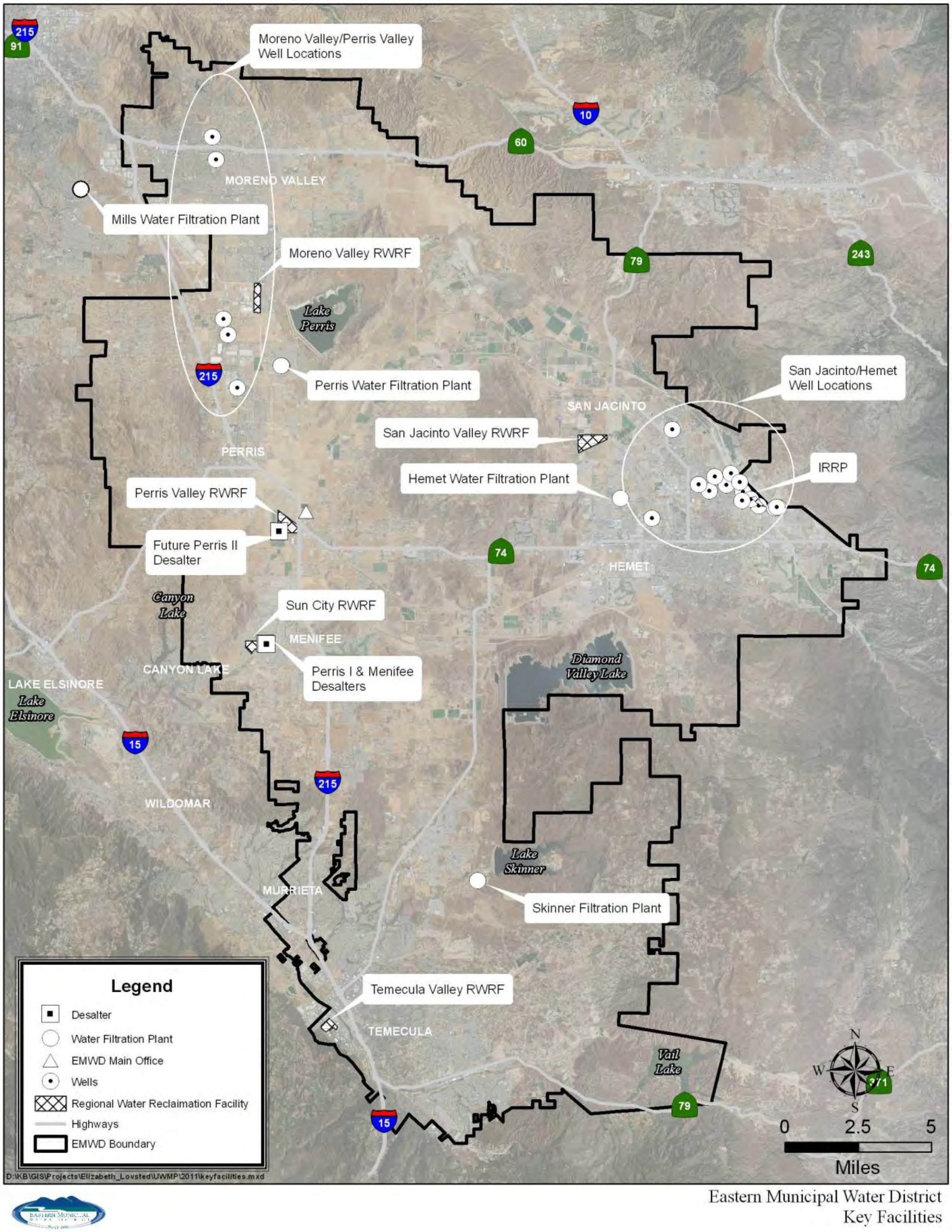
Delivery points for each source of water are located throughout EMWD service area. Groundwater wells are mostly located within the San Jacinto Watershed and serve the northern portion of EMWD area, with the largest amount of production taking place around the cities of Hemet and San Jacinto. Two desalination plants that treat brackish groundwater through reverse osmosis for drinking are located in Sun City.

Potable imported water is delivered directly from MWD's two large filtration plants. The Henry J. Mills Filtration Plant (Mills), owned and operated by MWD, treats water from northern California and provides it through two connection points located in the north east portion of EMWD. The Robert F. Skinner Filtration Plant (Skinner), also owned and operated by MWD, treats a blend of Colorado River Water (CRW) and water from northern California for potable use and provides water to EMWD through a connection point in the southwest portion of EMWD.

Microfiltration plants, owned and operated by EMWD, filtering water from the Colorado River and/or State Water Project (SWP) delivered by MWD through membranes to remove particulate contaminants to potable water standards are located in Hemet and Perris. Recharge water from MWD is used for groundwater replenishment in the eastern part of EMWD. This untreated water from MWD is percolated into the ground, adding water to the aquifer. EMWD and others can extract this water at a later date for beneficial uses. Untreated water from MWD used for agricultural purposes is delivered in the northeast portion of EMWD for use by EMWD retail and wholesale accounts and in the south for RCWD agricultural accounts.

Recycled water, highly treated wastewater, is used for many purposes including agriculture, landscape irrigation, and industrial use. An intricate web of pipelines connects EMWD's four Regional Water Reclamation Facilities (RWRF) as well as several storage ponds to deliver recycled water to appropriate accounts through the service area of EMWD. The location of each water source can be seen in Figure 3.2.

Figure 3.2 - Locations of Supplies



Future resources will continue to be a blend of local supply and imported sources. Table 3.2 through 3.4 show EMWD's existing supply resources under normal, single dry and multi-dry years. Since the majority of EMWD's supplies are imported from MWD, single and multi-dry year conditions are based on a repeat of 1977 hydrology and 1990-1992 hydrologies reflecting the dry year conditions in MWD's 2010 Regional Urban Water Management Plan (RUWMP). Existing supplies are in place and currently operational. Imported water makes up the difference between existing local supplies and projected demand.

Table 3.2 - Existing Water Supply Resources, Average Year Hydrology (AFY) - 2015 - 2035

	2015	2020	2025	2030	2035
Metropolitan Water District	149,300	170,700	190,700	210,000	226,200
Recycled	43,900	50,000	53,900	54,900	55,300
Groundwater	13,200	13,200	13,200	13,200	13,200
Existing Desalter	7,500	7,500	7,500	7,500	7,500
Total Existing Supplies	**213,900**	**241,400**	**265,300**	**285,600**	**302,200**
Total Projected Demands	**213,900**	**241,400**	**265,300**	**285,600**	**302,200**
Shortfall/Surplus	**0**	**0**	**0**	**0**	**0**

Based on a repeat of 2004- 2009 conditions

Table 3.3 - Existing Water Supply Resources, Dry Year Hydrology (AFY) - 2015 - 2035

	2015	2020	2025	2030	2035
Metropolitan Water District	155,300	177,600	198,300	218,300	235,100
Recycled	45,500	51,800	55,800	56,900	57,300
Groundwater	13,200	13,200	13,200	13,200	13,200
Existing Desalter	7,500	7,500	7,500	7,500	7,500
Total Existing Supplies	**221,500**	**250,100**	**274,800**	**295,900**	**313,100**
Total Projected Demands	**221,500**	**250,100**	**274,800**	**295,900**	**313,100**
Shortfall/Surplus	**0**	**0**	**0**	**0**	**0**

Note: Based on a repeat of 1977 conditions

Table 3.4 - Existing Water Supply Resources, Multi - Dry Year Hydrology (AFY) – 2015 - 2035

	2015	2020	2025	2030	2035
Metropolitan Water District	156,600	179,000	199,800	219,900	236,900
Recycled	45,800	52,200	56,200	57,300	57,700
Groundwater	13,200	13,200	13,200	13,200	13,200
Existing Desalter	7,500	7,500	7,500	7,500	7,500
Total Existing Supplies	**223,100**	**251,900**	**276,700**	**297,900**	**315,300**
Total Projected Demands	**223,100**	**251,900**	**276,700**	**297,900**	**315,300**
Shortfall/Surplus	**0**	**0**	**0**	**0**	**0**

Note: Based on a repeat of 1990-1992 conditions

The majority of EMWD's current and projected water supplies are imported through the MWD. In its 2010 RUWMP, MWD concluded that with the storage and transfer programs developed, MWD will have a reliable source of water to serve its member agencies' needs through 2035 during normal, historic single-dry and historic multiple-dry years. Unprecedented shortage will be addressed through the Water Supply Allocation Plan (see Section 3.2.8).

To supplement MWD sources and improve reliability, EMWD has several local resource programs. Production of local groundwater has been a source of supply for EMWD's service area for decades, but overproduction in groundwater, has lead to a need for groundwater management. Native production is expected to be limited but plans are in place to recharge local ground water basins with imported or recycled water to increase supply reliability. Desalination of high TDS groundwater also provides a reliable local supply of water.

Recycled water production and sales reduce the demand for imported water and provide a sustainable supply. EMWD's continued investment in improved facilities will continue to grow the market for recycled water, and innovative planning and recycled water management will allow EMWD's recycled water supply to bring an even greater benefit to the service area.

In addition to the development of local resource, EMWD aggressively promotes the efficient use of water. Through the implementation of local ordinances, conservation programs and an innovative tiered pricing structure, EMWD is reducing demand by retail accounts. Reducing demand allows existing and proposed water supplies to stretch farther and reduces the potential for water supply shortage.

Based on the information provided in the MWD 2010 RUWMP, EMWD has the ability to meet current and projected water demands through 2035 during normal, historic single-dry and historic multiple-dry years using existing supplies and imported water from MWD with existing supply resources. Planned local supplies will supplement imported supplies and improve reliability for EMWD and the region.

3.2 Metropolitan Water District Overview

EMWD relies on MWD for the majority of its water supply. Although MWD only delivers water from two sources, the Colorado River Aqueduct and the State Water Project, it takes a comprehensive and proactive approach to planning for the future. Through coordination with member agencies, MWD has developed regional targets for imported water, local resources and conservation to accommodate for growth, and face the challenges to future supply reliability. Through the past decade, MWD has undertaken several planning initiatives including the MWD Integrated Resources Plan (MWD IRP), the Water Surplus and Drought Management Plan (WSDMP), and the Strategic Plan. These programs and plans provide a framework and guidelines for the future Southern California Supply planning.

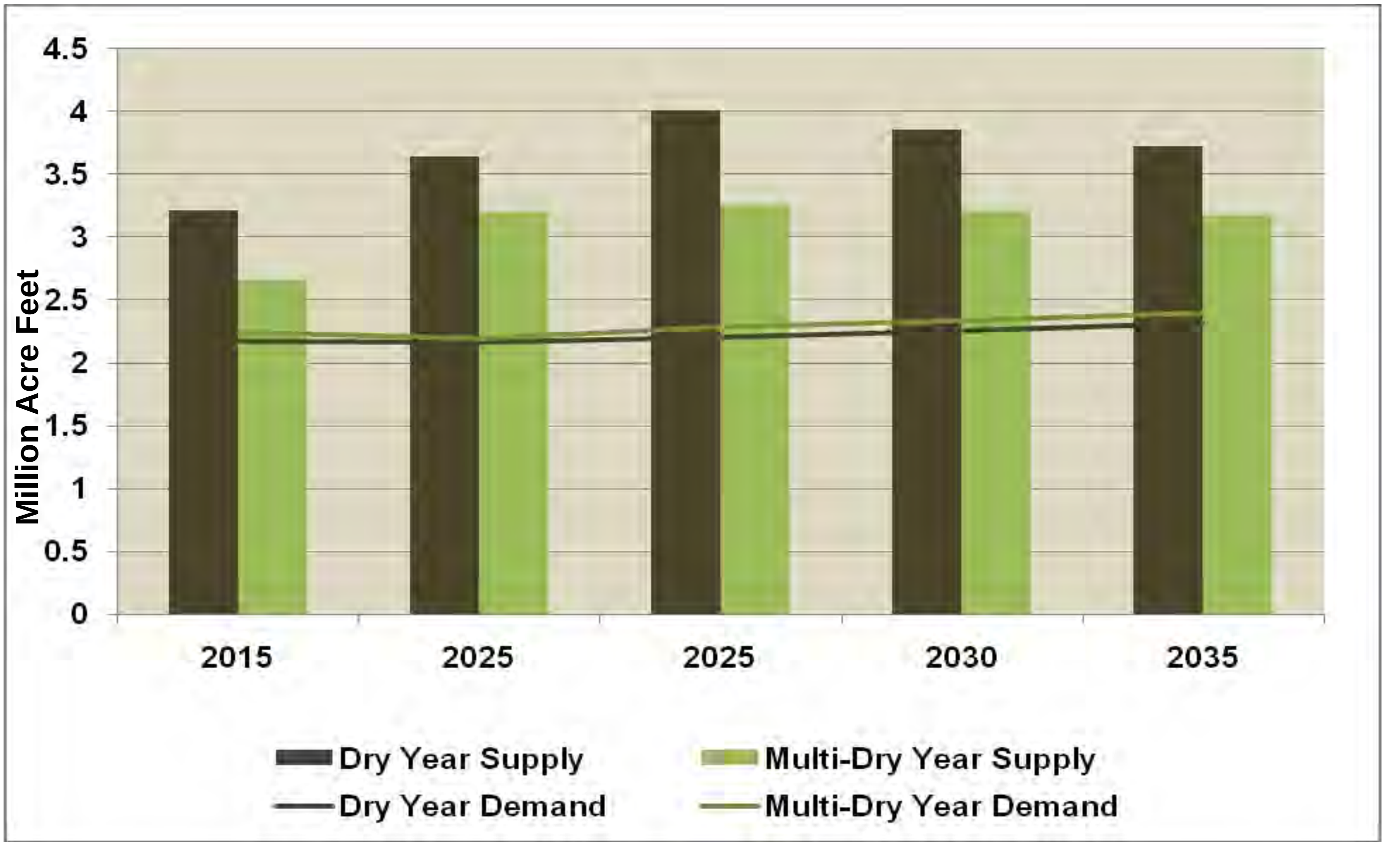
MWD's resource mix depends on a blend of improving the reliability and availability of imported water supplies into the region, increasing local storage and developing local resources. The 2010 MWD IRP update demonstrated that MWD and its member agencies have moved the region toward the goal of long-term water reliability and major achievements have been made in:

- Conservation
- Water recycling and groundwater recovery
- Storage and groundwater management programs within the Southern California region
- Storage programs related to the SWP and the Colorado River
- Other water supply management programs outside of the region

EMWD works closely with MWD staff and its leadership to coordinate planning efforts and quantify local supply resources.

The MWD 2010 RUWMP, documents current challenges to supply reliability including drought conditions, environmental regulations, water quality concern, infrastructure vulnerable to natural disaster, and response to variations in water supply availability from year to year. RUWMP concludes that MWD has supply capabilities that would be sufficient to meet expected demands from 2015 through 2035 under the single dry-year and multiple dry-year conditions. MWD supply capabilities under single dry-year and multiple dry-year conditions are presented in Figure 3.3.

Figure 3.3 - MWD Supply Capabilities under Single Dry and Multiple Dry-Year Hydrologies – 2015 – 2035



Source: MWD 2010 Regional Urban Water Management Plan

3.2.1 The Metropolitan Water District of Southern California Existing Conditions

The Metropolitan Water District of Southern California (MWD) was formed in 1928 by thirteen Southern California cities to develop, store and distribute water for domestic and municipal purpose to the residents of Southern California. Today, MWD service area stretches across the Southern California coastal plain and includes portions of Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties. In 2009, MWD's service area population was estimated to be 18,706,000 people, nearly 90% of the population in the six counties served by MWD.

MWD is a wholesale water provider, and has no retail customers. It provides treated and untreated water directly to its member agencies. The 26 member agencies then deliver to their customers a blend of groundwater, surface water, desalinated water, recycled water and imported water from MWD. MWD has provided between 45% and 60% of the municipal and agricultural water used in its nearly 5,200-square mile service area. The remaining water is provided through local resources and imported water from other sources.

EMWD is one of the 26 member agencies that make up MWD, including fourteen cities, ten other municipal water districts and one county water authority. The statutory relationship between MWD and its member agencies establishes the scope of EMWD's entitlements from MWD. EMWD, like other member agencies, receives deliveries at different points in the system and pays for the service through a rate structure made up of multiple components. Each year member agencies advise MWD how much water they anticipate they will need during the next five years. MWD also works with member agencies to develop a forecast of long term future water supply. MWD delivers supply to member agencies from two sources, the Colorado River Aqueduct, which it owns and operates, and the State Water Project. Figure 3.4 shows MWD facilities in California. Additional information about MWD is summarized in Section I.2 of the 2010 RUWMP.

Figure 3.4 - MWD Facilities in California

Source: MWD

3.2.2 EMWD and MWD

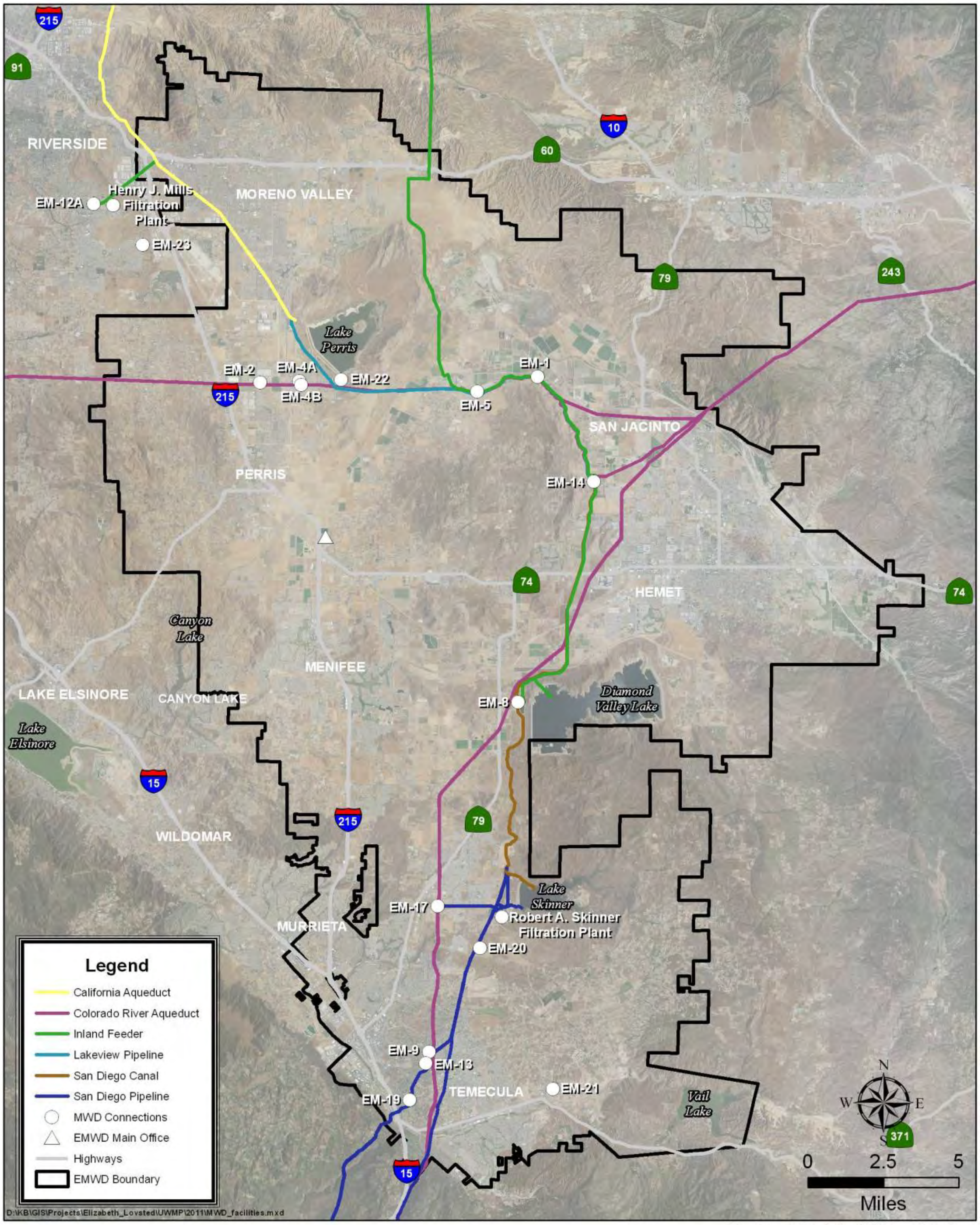
The first function of MWD was to build the Colorado Aqueduct bringing Colorado River water to Southern California. As MWD was constructing the San Jacinto Tunnel Portion of the project, a great amount of seepage was encountered. As the seepage began to affect local water resources within EMWD's region, residents began to organize to protect their water supply. About the same time, the region experienced years of dry weather and the underground basin began to experience overdraft. It became clear that a source of imported water was necessary. EMWD was formed in 1950 to bring imported water into the area. In 1951, it was annexed into MWD and the first major sale of Colorado River water within EMWD, began in July of 1952.

In 1960, MWD contracted for additional water supplies from the State Water Project (SWP) operated by the State of California Department of Water Resources (DWR). In 1972, the SWP began bringing water from the wet climate of northern California to the dry climate of Southern California. Through the 1980's, EMWD built facilities to take advantage of the SWP water available, and today, the largest portion of EMWD's water supply is provided from Northern California. Treated potable water is available in the North from the Henry J Mills Water Treatment Plant (Mills) and in the south through the Skinner Water Filtration Plant (Skinner). EMWD also owns and operates two water filtration plants that treat raw imported water: Perris Water Treatment Plant and Hemet Water Treatment Plant. Raw imported water is also used for recharge purposes and to meet agricultural demand.

MWD does not provide supply projections for each member agency. Instead MWD uses a regional approach to developing projections. MWD calculates the demand for the entire region as discussed in Appendix A.1 of the 2010 RUWMP and then using information about existing and proposed local projects, determines the amount of imported water. Throughout the preparation of the 2010 UWMP, EMWD has provided to MWD information about local supply and projects, clarification on boundary information and population projects. Based on this information and information provided by other member agencies, MWD has determined it is able to meet the demands of all member agencies through 2035.

Deliveries from MWD ranged between 75,000 AF and 91, 000 AF over the past several years. Deliveries decreased in recent years due to a decrease in demand resulting from several factors including conservation and economic down turn.

Figure 3.5 - MWD Facilities within EMWD's Service Area



Eastern Municipal Water District
Metropolitan Water District Facilities

3.2.3 MWD Resources Planning

In the 1990's, several years of drought and regulation requirements began to affect the reliability of MWD water supply. In response to this challenge, MWD and its member agencies began an IRP process to assess supply reliability needed and to find a cost-effective way to meet the goals established. The IRP was a collective effort drawing input from several groups including MWD's Board of Directors, an IRP workgroup (comprised of MWD staff, member agencies and sub agency managers, as well as groundwater basin managers), and representatives from the environmental, agricultural, business and civic communities. It was important for the IRP process to be collaborative because its viability is contingent on the success of local projects and local plans in achieving their individual target goals for resource management and development.

The outcome of the IRP process was a "Preferred Resource Mix" which would ensure MWD and its member agencies' reliability through 2020. The MWD Board of Directors adopted the first IRP in January of 1996. In November 2001, the MWD Board of Directors adopted a plan to update the IRP. The update focused on changed conditions, updated resource targets, and extending the planning horizon to 2025 and beyond. Again, the process was a collaborative effort. The 2003 IRP Update was adopted in July of 2004.

In 2010, MWD completed the most recent update to its IRP This dynamic long-term water plan, developed through an open, collaborative process, provides a strategy for meeting MWD's mission of providing adequate and reliable supplies to member agencies to meet present and future water supply needs. Challenges addressed in the IRP include: limitations on State Water Project (SWP) and Colorado River Aqueduct (CRA) supplies due to environmental issues and drought, regulatory restrictions, economics and climate. The MWD 2010 IRP proposes a strategy that balances the potential risks to water supplies with the need to avoid unnecessary investment in resources. The proposed approach is made up of three components:

1. The Core Resource Strategy, an effort to manage supply and demand based on currently available resources. Under this approach MWD and member agencies will advance water use efficiency through conservation and recycled water, and continue to develop local supplies, including groundwater recovery and seawater desalination. MWD will also stabilize resources from the CRA and the SWP.

2. The Uncertainty Buffer, a set of goals for a range of potential buffer supplies to protect the region from shortages. This starts with expansion of water use efficiency and conservation. Future water conditions could fall short of current estimates due to any one of the numerous challenges facing water supplies. The buffer supplies will allow the region to adapt to future challenges through regional collaboration.

3. Foundation Actions are preliminary steps to determine the feasibility of alternative supply programs. These actions are lower-cost efforts including feasibility studies, technological research and regulatory review, that will lay a foundation for implementation of alternative supplies if they are needed.

This adaptive planning approach provides MWD with a strategy for meeting the demands of the region under several different scenarios and mitigates supply uncertainties.

3.2.4 Colorado River Aqueduct Overview

MWD was established more than eighty years ago to obtain an allotment of Colorado River Water and today the Colorado River Aqueduct (CRA) continues to be a core supply for Southern California. The CRA, with a 1.25 MAF capacity, transports water from Lake Havasu, at the border of California and Arizona, approximately 242 miles to Lake Mathews in Riverside County. Since 1999, the Colorado River has been experiencing a prolonged drought. During 2005, 2008 and 2009, drought conditions eased somewhat with near or above average inflow conditions and net gains in storage. 2011 will be another above average inflow year so drought conditions are easing somewhat in the Colorado River Basin.

MWD has a legal right to receive water from the Colorado River under a permanent service agreement with the Secretary of the Interior and holds a basic apportionment of 550 TAF of water from the Colorado River. Over the years MWD has increased the reliable supply from the CRA through funding and implementing programs including: farm and irrigation district conservation programs, land management programs, improved reservoir system operations, and water transfers and exchanges through arrangements with agricultural water districts in Southern California and entities in Arizona and Nevada that use Colorado River delivered by the U.S. Department of the Interior, Bureau of Reclamation (USBR). Through these efforts MWD is able to obtain between 1.14 and 1.12 MAF of water during normal, historic single-dry and historic multiple-dry years. MWD also has an additional 186 TAF of supplies under development. In addition to MWD supplies, the CRA is also used to convey non-MWD supplies to other parties including over 200 TAF to the San Diego County Water Authority (SDCWA) as part of an agreement between SDCWA and the Imperial Irrigation District. Since the capacity of the CRA is limited to 1.25 MAF, the maximum supply MWD can deliver is limited to 1.25 MAF in any given year, including conveyance obligations. A detailed description of the limitations and management strategy for the CRA can be found in Section 3.1 of MWD's 2010 RUWMP.

3.2.5 State Water Project Overview

The State Water Project (SWP) is owned by the State of California and operated by the State Department of Water Resources (DWR). More than two thirds of California's resident's depend on the SWP for a portion of their drinking water. The SWP faces several environmental and water quality challenges as well as concerns about vulnerability to natural disasters.

The 600 mile SWP project delivers water to Southern California from Northern California through a series of pump station, reservoirs and aqueducts. At the hub of the SWP is the San Francisco Bay/Sacramento-San Joaquin Delta (Bay-Delta). The Bay-Delta's declining ecosystem, caused by a number of factors including agricultural runoff and operation of water pumps that can alter flow, has led to historic restriction on water supply deliveries from the SWP.

In 1960, MWD signed a contract with DWR to receive water from the SWP. MWD is one of the 29 agencies with long-term contracts for water service from DWR and the largest agency in terms of population served, its contracted amount of SWP water (46 percent), and the annual payments made to DWR. The original contract MWD held was for 1,911 TAF of SWP water. Before 1994 the SWP water reliability was rapidly deteriorating. MWD estimated its SWP delivery would be reduced to 171 TAF, about 8.9 percent of its SWP contract under a dry year scenario. After the 1994 Bay Delta Accord established new operating criteria DWR estimated that MWD's allocation under a dry year scenario would increase to 418 TAF. Although the accord improved conditions, MWD continues to address concerns that threaten reliability in the SWP.

The listing of several species as threatened or endangered in the Bay-Delta region have impacted operations and limited the flexibility of the SWP. Operations have been curtailed due to restrictions put into place to protect Delta Smelt, salmon, and other species that spawn in rivers flowing to the Bay-delta, which are federal and state-listed threatened fish species that inhabit the estuaries of the Bay-Delta region. Changes in SWP operation have affected the manner in which water is diverted from the Bay Delta, and limited deliveries. Based on the Water Allocation analysis released by the DWR on March 22, 2010, export restriction could reduce MWD deliveries by 150 to 200 TAF under mean hydrologic conditions, and operations could remain restricted until a long term solution is found to improve the stability of the Bay-Delta region.

SWP operations may also be restricted by the new biological opinions for listed species under the federal Endangered Species Act (ESA) or by the Department of Fish and Game's issuance of incidental take authorizations under the California ESA. Additional new litigation, listing of additional species or new regulatory requirements could also restrict operations and limit water supply. To address potential constraints on the SWP, MWD has developed near and long action plans to increase water supply reliability.

Part of the near term action developed to protect fish species includes the Two Gate System. This would provide movable barriers to modify flows and prevent vulnerable fish from being drawn toward pumping plants. This system is expected to help protect fish and allow an estimated 150 TAF of water to be exported from the Delta when SWP allocations exceed 35 percent. The Two Gate System is subject to operational studies, environmental documentation, acquisition of right of ways, completion of design, and construction. It is anticipated to be in place in 2013.

MWD is also working with stakeholders throughout the state to develop and implements long term solution to the problem in the Bay Delta. The Bay Delta Conservancy Plan (BDCP) developed by State and federal resource agencies, aimed at addressing ecosystem need and securing long term operating permits for the SWP. A working draft of the BDCP was released in November of 2010 and reflects significant progress toward consensus on a plan to restoring the Bay-Delta ecosystem and associated sensitive species and provide for improved water supply and reliability. In evaluating the supply reliability for the 2010 RUWMP, MWD assumed a new Delta conveyance would be fully operational by 2022, bringing supply reliability close to 2005 levels prior to supply restrictions imposed due to the Biological Opinions. This assumption is consistent with MWD's long-term Delta action plan approved in 2007, and supported by recently passed legislation that included a roadmap for establishing governance structures and financing approaches to implement and manage a Delta solution.

In Section 3.2 of the 2010 RUWMP, MWD provides details about the planned actions and achievements to date in improving the reliability of the SWP. MWD also describes other challenges affecting the SWP including water quality and climate change.

3.2.6 MWD System Storage

Storage is an important element in MWD's dry-year water supply reliability. Over the past several decades MWD has increased storage significantly through projects like Diamond Valley Lake, located within EMWD's service area, in order to insure that water needs will be met during years of drought or during a catastrophic event such as an earthquake. The MWD Water Surplus and Drought Management Plan established long goals for in basin storage and provides guidance in managing supplies in years of surplus and drought. MWD had identified an in-region surface storage goal of 620 TAF of dry-year storage. MWD has achieved that goal and aims to sustain this level of storage in Diamond Valley Lake.

The probability of MWD meeting dry year demands is dependent on the amount of storage MWD has in its reserves. In developing the 2010 RUWMP, MWD assumed a simulated median storage level at the beginning of each five year supply and demand scenario. All storage capability figures in the 2010 RUWMP reflect the actual storage program conveyance constraints. Under some conditions MWD may choose to implement the Water Supply Allocation Plan, allocating water to member agencies, to preserve storage reserved for a future year.

3.2.7 MWD Supply Reliability

Tables 3.5 through 3.7 from the 2010 RUWMP list Metropolitan's Supply Capability and Projected demands from 2015 through 2035. Single dry year conditions are based on a repeat of 1977 hydrology. Multi dry year conditions are based on a repeat of 1990-1992 hydrology, and average year conditions are based on a average of 1922-2004 hydrology.

Table 3.5 - MWD Supply Capability and Projected Demands, Single Dry-Year (AFY) – 2015 – 2035

Forecast Year	2015	2020	2025	2030	2035
Current Programs					
In-Region Storage and Programs	637,000	892,000	1,046,000	931,000	796,000
California Aqueduct[2]	508,000	588,000	642,000	600,000	601,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	1,407,000	1,815,000	1,675,000	1,425,000	1,425,000
Aqueduct Capacity Limit[4]	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Colorado River Aqueduct Capacity	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Capability of Current Programs	**2,395,000**	**2,730,000**	**2,938,000**	**2,781,000**	**2,647,000**
Demands					
Firm Demands of Metropolitan	1,922,000	1,719,000	1,726,000	1,767,000	1,818,000
IID-SDCWA Transfers and Canal Linings	180,000	273,000	280,000	280,000	280,000
Total Demands on MWD[5]	**2,102,000**	**1,992,000**	**2,006,000**	**2,047,000**	**2,098,000**
Surplus	**293,000**	**738,000**	**932,000**	**734,000**	**549,000**
Programs under Development					
In-Region Storage and Programs	34,000	34,000	34,000	34,000	34,000
California Aqueduct	556,000	556,000	700,000	700,000	700,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	206,000	206,000	191,000	186,000	186,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capacity	0	0	0	0	0
Capability of Proposed Programs	**590,000**	**590,000**	**734,000**	**734,000**	**734,000**
Potential Surplus	**883,000**	**1,328,000**	**1,666,000**	**1,468,000**	**1,283,000**

Source: MWD 2010 RUWMP

1. Represents Supply Capability for resource programs under listed year types.
2. California Aqueduct includes Central Valley transfers and storage programs supplies conveyed by the aqueduct.
3. Colorado River Aqueduct includes water management programs, IID-SDCWA transfers and canal lining conveyed by the aqueduct.
4. Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfers and canal linings.
5. Firm demands are adjusted to include IID-SDCWA transfers and canal linings. These supplies are calculated as local supply, but needs to be shown for the purposes of CRA capacity limit calculations without double counting.

Table 3.6 - MWD Supply Capability and Projected Demands, Multiple Dry-Year (AFY) – 2015 - 2035

Forecast Year	2015	2020	2025	2030	2035
Current Programs					
In-Region Storage and Programs	224,000	348,000	425,000	387,000	342,000
California Aqueduct[2]	741,000	790,000	832,000	808,000	809,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	1,282,000	1,591,000	1,423,000	1,422,000	1,407,000
Aqueduct Capacity Limit[4]	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Colorado River Aqueduct Capacity	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Capability of Current Programs	**2,215,000**	**2,388,000**	**2,507,000**	**2,445,000**	**2,401,000**
Demands					
Firm Demands of MWD	1,951,000	1,766,000	1,784,000	1,821,000	1,869,000
IID-SDCWA Transfers and Canal Linings	180,000	273,000	280,000	280,000	280,000
Total Demands on MWD[5]	**2,131,000**	**2,007,000**	**2,064,000**	**2,101,000**	**2,149,000**
Surplus	**84,000**	**381,000**	**443,000**	**344,000**	**252,000**
Programs Under Development					
In-Region Storage and Programs	34,000	34,000	34,000	34,000	34,000
California Aqueduct	242,000	273,000	419,000	419,000	419,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	206,000	206,000	191,000	186,000	186,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capacity	0	0	0	0	0
Capability of Proposed Programs	**262,000**	**299,000**	**450,000**	**452,000**	**453,000**
Potential Surplus	**346,000**	**680,000**	**893,000**	**796,000**	**705,000**

Source: MWD 2010 RUWMP

1. Represents Supply Capability for resource programs under listed year types.
2. California Aqueduct includes Central Valley transfers and storage programs supplies conveyed by the aqueduct.
3. Colorado River Aqueduct includes water management programs, IID-SDCWA transfers and canal lining conveyed by the aqueduct.
4. Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfers and canal linings.
5. Firm demands are adjusted to include IID-SDCWA transfers and canal linings. These supplies are calculated as local supply, but needs to be shown for the purposes of CRA capacity limit calculations without double counting.

Table 3.7 - MWD Supply Capability and Projected Demands (AFY) – 2015 - 2035

Forecast Year	2015	2020	2025	2030	2035
Current Programs					
In-Region Storage and Programs	637,000	892,000	1,046,000	931,000	796,000
California Aqueduct[2]	1,536,000	1,663,000	1,754,000	1,724,000	1,725,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	1,498,000	1,520,000	1,478,000	1,438,000	1,435,000
Aqueduct Capacity Limit[4]	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Colorado River Aqueduct Capacity	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Capability of Current Programs	**3,423,000**	**3,805,000**	**4,050,000**	**3,905,000**	**3,771,000**
Demands					
Firm Demands of MWD	1,728,000	1,524,000	1,526,000	1,566,000	1,615,000
IID-SDCWA Transfers and Canal Linings	180,000	273,000	280,000	280,000	280,000
Total Demands on MWD[5]	**1,908,000**	**1,797,000**	**1,806,000**	**1,846,000**	**1,895,000**
Surplus	**1,515,000**	**2,008,000**	**2,244,000**	**2,059,000**	**1,876,000**
Programs Under Development					
In-Region Storage and Programs	34,000	34,000	34,000	34,000	34,000
California Aqueduct	378,000	383,000	715,000	715,000	715,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	206,000	206,000	191,000	186,000	186,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capacity	0	0	0	0	0
Capability of Proposed Programs	**412,000**	**417,000**	**749,000**	**749,000**	**749,000**
Potential Surplus	**1,927,000**	**2,425,000**	**2,993,000**	**2,808,000**	**2,625,000**

Source: MWD 2010 RUWMP

1. Represents Supply Capability for resource programs under listed year types.
2. California Aqueduct includes Central Valley transfers and storage programs supplies conveyed by the aqueduct.
3. Colorado River Aqueduct includes water management programs, IID-SDCWA transfers and canal lining conveyed by the aqueduct.
4. Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfers and canal linings.
5. Firm demands are adjusted to include IID-SDCWA transfers and canal linings. These supplies are calculated as local supply, but needs to be shown for the purposes of CRA capacity limit calculations without double counting.

It is anticipated that water demands within EMWD's jurisdiction caused by future development, will be met through additional water imports from MWD, recognizing the conditions described in this document. Imported sources will be supplemented by an increase in desalination of brackish groundwater, recycled water use and water use efficiency. MWD analyzed the reliability of water delivery through the State Water Project (SWP), the Colorado River Aqueduct, and concluded that with the storage and transfer programs developed by MWD, MWD will have a reliable source of water to serve its member agencies' needs through 2035 during normal, historic single-dry and historic multiple-dry years within a 20-year projection. Unprecedented shortages will be addressed through the Water Supply Allocation Plan (see Section3.2.8).

3.2.8 MWD's Water Surplus and Drought Management Plan

In order to insure that water needs will be met during years of drought, surplus water must be managed during years of surplus. To accomplish this task, MWD developed the WSDMP. Adopted in April of 1999, this plan provides policy guidance for management of regional water to achieve the reliability goal of the IRP. The guiding principle of the WSDMP is to "Manage Metropolitan's water resources and management programs to maximize adverse impacts of water shortage to retail customers." Should mandatory imported water allocations be necessary, MWD adopted Water Supply Allocation Plan (WSAP) that allocates water based on needs throughout the region.

Water Supply Allocation Plan

In February 2008, MWD's Board adopted the WSAP which contains a specific formula and methodology to determine member agency supply allocation. The plan takes into consideration:

a. The impact on retail customers and the economy

b. Population and growth

c. Changes and/or loss of local supply

d. Reclamation and recycling

e. Conservation

f. Investment in local resources

In the event allocation is required, MWD will establish base period demands and then adjust them for growth and changes in local supply. Regional shortages will be phased in 10 stages and credits are given for conservation and investment in local supplies. At each stage, member agencies will not experience shortages on the wholesale level that are greater than one-and-a-half times the percentage shortage of regional water supplies. The member agency will also not face a retail shortage more than the regional shortage.

3.3 Groundwater Overview

EMWD produces potable groundwater from two management plan areas within the San Jacinto Watershed, the West San Jacinto Groundwater Basin Management Plan area and the Hemet/San Jacinto Water Management Plan area. EMWD also owns and operates two desalination plants that convert brackish groundwater into potable water. These plants not only provide a reliable source of potable water, they also support EMWD's groundwater salinity management program.

EMWD is a key player in two cooperative efforts to protect groundwater quality and reliability. The West San Jacinto Groundwater Basin Management Plan area is subject to an existing groundwater management plan, and the Hemet/San Jacinto Water Management Plan area is complete and will be approved by the adopting agency boards in 2011. The Hemet/San Jacinto Water Management Plan will be implemented by a Watermaster appointed and supervised by the Superior Court pursuant to a Stipulated Judgment involving the groundwater pumpers in the area. Native potable groundwater production is limited or will be limited according to management plan provisions to prevent continued overdraft. EMWD is anticipating limitations on native groundwater production and has developed alternatives to assure reliability including an Integrated Recharge and Recovery Program (IRRP), filtration plants to treat and deliver imported water to areas dependent on groundwater and recycled water use for irrigation of landscape and agriculture. Both management plan areas are part of Basin 8-5 the San Jacinto Basin in California's Groundwater - Bulletin 118.

Portions of EMWD also overlay the Santa Margarita Watershed. EMWD does not extract groundwater from the Santa Margarita Watershed and has no plans to do so.

3.3.1 Groundwater Existing Conditions

The West San Jacinto Groundwater Basin Management Plan area and the Hemet/San Jacinto Water Management Plan area are both located within the San Jacinto Watershed. Within the watershed, groundwater management zones were delineated based on major impermeable boundaries, constrictions in impermeable bedrock, groundwater divides, and internal flow systems.

The Hemet/San Jacinto Water Management Plan area covers the Hemet South, Canyon, and San Jacinto Upper Pressure Management Zones, and the Hemet North portion of the Lakeview/Hemet North Management Zone. The Perris North, Perris South, San Jacinto Lower Pressure, and Menifee Management Zones, and the Lakeview portion of the Lakeview/Hemet North Management Zone, are included in the West San Jacinto Groundwater Basin Management Plan. EMWD produces water for potable use or blending in four management zones; Perris North, Hemet South, San Jacinto Upper Pressure and Canyon. Desalter production wells are located in the Perris South and Lakeview/Hemet North Management Zones. Groundwater Management Zones are included in Figure 3.1.

The boundaries of the Canyon Management Zone include the San Jacinto Mountains to the east, north, and south, as well as the San Jacinto fault zone to the west. The San Jacinto Mountains are composed of consolidated crystalline bedrock and semi-consolidated sedimentary rocks. These rocks are virtually impermeable and bound the water-bearing, alluvium-filled canyons within this management zone. A branch of the San Jacinto fault zone extends southeast along the channel of Bautista Creek until it intersects the Park Hill fault. In the early 1900s, the barrier effect of the fault resulted in rising groundwater within the San Jacinto River upstream of the fault. This area is known as the Cienega and is an area of significant municipal groundwater production.

The San Jacinto Upper Pressure Management Zone is bounded by the San Jacinto fault to the northeast, the Casa Loma and Bautista Creek fault zones to the southwest and the flow system boundary with the San Jacinto Lower Pressure Management Zone to the northwest. The Claremont fault is a known barrier to groundwater flow, and separates the San Jacinto Graben from the San Timoteo Badlands and the San Jacinto Mountains. East of the City of San Jacinto, a branch of the San Jacinto fault zone cuts the alluvial fill by extending southeast across the San Jacinto River and along the channel of Bautista Creek until it intersects the Park Hill fault. This branch of the San Jacinto fault zone separates the San Jacinto Upper Pressure Management Zone from the Canyon Management Zone. The Casa Loma and Bautista Creek fault zones are known barriers to groundwater flow. However, groundwater leaks across the fault zones as underflow to the Hemet South and Lakeview/Hemet North Management Zones.

Boundaries of the San Jacinto Lower Pressure Management Zone include the Claremont fault to the northeast; the Casa Loma fault and its northwestward extension; various crystalline bedrock outcrops to the north and west; and the flow system boundary with the San Jacinto Upper Pressure Management Zone to the southeast. The Casa Loma fault zone is a known barrier to groundwater flow, however, groundwater leaks across the fault zone as underflow to the Perris North Management Zone.

Boundaries of the Lakeview/Hemet North Management Zone include the Casa Loma fault zone to the east; the groundwater divide near Esplanade Avenue to the south; the Lakeview Mountains to the west and south; the Bernasconi Hills to the north; and a bedrock constriction/saddle to the west. The Casa Loma fault zone is a known barrier to groundwater flow. However, groundwater leaks across the fault zone as underflow from the San Jacinto Upper Pressure Management Zone. Impermeable, crystalline bedrock outcrops that compose the Bernasconi Hills and the Lakeview Mountains to the north and south, respectively, are hard rock barriers to groundwater flow. To the west, the gap between the Bernasconi Hills and the Lakeview Mountains becomes narrow and the buried bedrock surface forms a saddle. This area of constriction in the water-bearing alluvium is the boundary between the Perris South and Lakeview/Hemet North Management Zones.

The boundaries include the Casa Loma and Bautista Creek fault zones to the east; the groundwater divide near Esplanade Avenue to the north; the groundwater divide in the Winchester area to the west; and various crystalline bedrock outcrops to the south. The Casa Loma and Bautista Creek fault zones are known barriers to groundwater. However, groundwater leaks across the fault zones as underflow from the San Jacinto Upper Pressure Management Zone.

Boundaries of the Perris North Management Zone include the Casa Loma fault to the northeast bordering the San Jacinto Lower Pressure Management Zone; a bedrock constriction to the south bordering the Perris South Management Zone; the Bernasconi Hills and the Lakeview Mountains to the west; and the bedrock and surrounding hills the north and west. The Casa Loma fault zone is a known barrier to groundwater flow, however, groundwater leaks across the fault zone as underflow from the San Jacinto Lower Pressure Management Zone.

Lake Perris is located to the east of the Perris North Management Zone and is surrounded by the Bernasconi Hills and Lakeview Mountains to the north, east, and south, and a dam on the west side. Seepage is known to occur under the dam through a subterranean channel into the Perris North Management Zone.

Boundaries of the Perris South Management Zone include a groundwater divide in the Winchester area; bedrock constrictions/saddles bordering the Menifee Management Zone; a bedrock constriction/saddle bordering the Lakeview/Hemet North Management Zone; a bedrock constriction bordering the Perris North Management Zone; and the surrounding bedrock mountains and hills. A groundwater high exists in the Winchester area near Highway 79. The divide is likely an artifact of natural and artificial recharge and groundwater production patterns. As such, the position (or the very existence) of this groundwater divide may vary with changing artificial recharge and/or production patterns.

Southwest of EMWD's Winchester Ponds, a narrow constriction in the bedrock coincides with a buried bedrock saddle. This area of constriction in the water-bearing alluvium is a boundary between the Perris South and Menifee Management Zones. Groundwater can flow through this bedrock gap from the Winchester area into the Menifee Management Zone; this is especially true during times of high groundwater levels. Southeast of Sun City, a bedrock constriction in the water-bearing alluvium also is a boundary between the Perris South and Menifee Management Zones. Groundwater flows through this bedrock gap from the Sun City area into the Menifee Management Zone.

To the northeast, the gap between the Bernasconi Hills and the Lakeview Mountains becomes narrow and the buried bedrock surface forms a saddle. This area of constriction in the water-bearing alluvium is the boundary between the Perris South and Lakeview Management Zones. Under original flow conditions, groundwater flowed westward from Lakeview into Perris South. However, groundwater now flows from Perris South eastward into Lakeview toward a “pumping depression” in the groundwater table.

Boundaries of the Menifee Management Zone include the bedrock constrictions/saddles bordering the Perris South Management Zone, a bedrock constriction to the east, and the surrounding bedrock mountains and hills. Southwest of the Winchester Ponds, a narrow constriction in the bedrock coincides with a buried bedrock saddle surface. This area of constriction in the water-bearing alluvium is a boundary between the Perris South and Menifee Management Zones. Groundwater can flow through this bedrock gap from the Winchester area into the Menifee Management Zone, especially during times of high groundwater levels.

Southeast of Sun City, a bedrock constriction in the water-bearing alluvium also is a boundary between the Perris South and Menifee Management Zones. Groundwater flows through this bedrock gap from the Sun City area into the Menifee Management Zone. The groundwater management zones in the San Jacinto Watershed within EMWD's service area are shown on Figure 3.6.

EMWD has an existing potable well capacity of 54.2 cubic feet per second (CFS). In the Hemet/San Jacinto Water Management Plan area, well capacity is 46.5 CFS including three wells dedicated to the future Integrated Recharge and Recovery Program (IRRP). The IRRP will recharge surplus imported water into the basin for future extraction. In the West San Jacinto Groundwater Basin Management Plan area, there is 7.7 CFS of well capacity. Potable wells deliver water to EMWD’s distribution system.

Figure 3.6 - Groundwater Management Zones

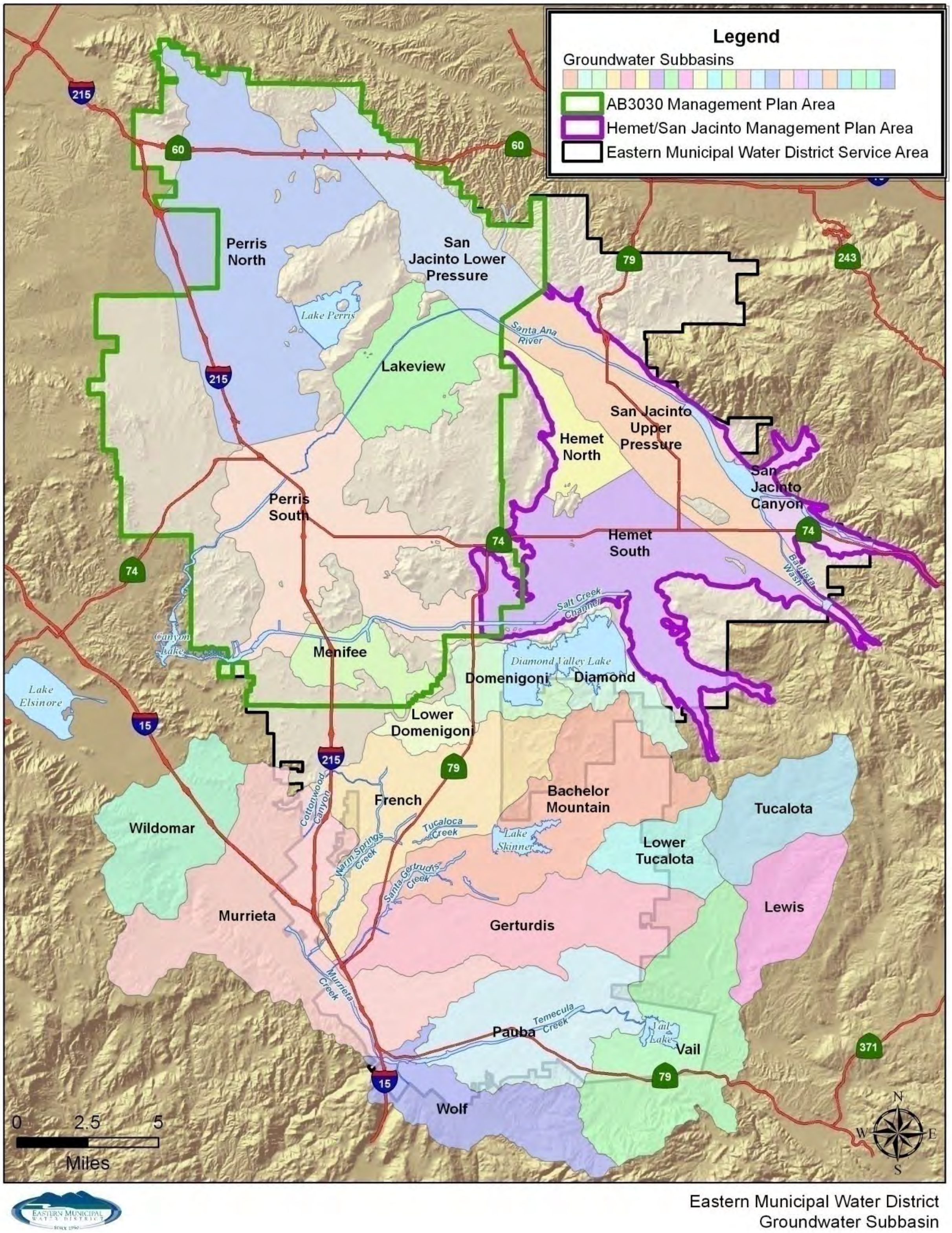


Table 3.8 - Existing Potable Groundwater Production Capability (CFS)

Facility	Capacity
Potable Groundwater Production by Management Zone	
San Jacinto Upper Pressure	
EMWD Wells	25.4
IRRP Wells	11.1
Hemet South	2.1
Canyon	7.9
Perris North	7.7
Total	**52.4**

As seen in Table 3.1 EMWD's potable groundwater extraction varied from a low of 15,800 acre-feet per year (AFY) up to 20,000 AFY from 2005 through 2010. Potable groundwater in the West San Jacinto Groundwater Basin is monitored limited by the basin management plan, but there are not restrictions on the amount of water that can be extracted. Current production in the Hemet/San Jacinto Water Management Plan area is limited by existing facilities if water is used within the management area. In the future, production will be limited by a management plan and administered by a water master. Production in recent years is reflective of a reduction in demand due to conservation, economic conditions and weather patterns and not a reflection of supply reliability.

3.3.2 Groundwater Rights

In the Hemet/San Jacinto Water Management Plan area, EMWD's groundwater production is currently constrained by the 1954 Fruitvale Judgment and Decree. Under that Judgment and Decree, EMWD, as successor-in-interest to the Fruitvale Mutual Water Company, may extract the subsurface waters of the Canyon Basin for use over or outside the entire basin without restriction as long as the static water level in a specific well is not over 25 feet below a specific elevation. If the water level in the well is more than 25 feet below the specified elevation, EMWD's extraction is limited to 4,500 AFY. The District may extract from the Entire Basin, a total of not more than 12,000 AFY from the Entire Basin for use outside the basin, subject to the 4,500 AFY Canyon Basin extraction limit. The perimeters of the Canyon Basin and Entire Basin are defined in the Judgment and Decree. The Hemet/San Jacinto area contains good quality water and is a major source of municipal as well as private production, although water levels are in serious decline. Once the Stipulated Judgment for the Hemet/San Jacinto Water Management Plan is in effect, it will supersede the Fruitvale Judgment and Decree.

Since 2001, the Cities of Hemet and San Jacinto, Lake Hemet Municipal Water District (LHMWD), EMWD, and representatives of the private groundwater producers, with DWR acting as an impartial mediator, have been working on a groundwater management plan for the Hemet/San Jacinto Water Management Plan area. Over the past several years, the group has discussed and resolved several controversial issues, including San Jacinto Tunnel seepage water, the Fruitvale Judgment and Decree, export of groundwater from the basins, and how to maximize the use of recycled water. As a result of their efforts, a final Hemet/San Jacinto Water Management Plan (HSJWMP) was completed in 2007 and a Stipulated Judgment is scheduled to be submitted to the courts in May of 2011. The final plan is included in Appendix C of this document.

The Hemet/San Jacinto Water Management Plan:

- Limits the amount of water being extracted from the basin free of the replenishment charge to a sustainable yield.
- Implements continued recharge of the basin using imported water through the Integrated Recharge and Recovery Project.
- Insures settlement claims by the Soboba Band of Luiseño Indians are facilitated and accommodated.
- Expands existing water production and water services system to meet future urban growth through the use of imported water recharged into the basin.
- Protects and/or enhances water quality in the management plan area.
- Supports cost-effective water supplies and treatment by the public agencies.
- Eliminates groundwater overdraft and enhances basin yield.
- Continues the monitoring program to promote and provide for best management and engineering principles to protect water resources.

Long term groundwater management includes plans for artificial recharge using MWD replenishment water via permanent facilities through the IRRP Program. An agreement with the Soboba Band of Luiseño Indians requires that, on average, an annual delivery of 7,500 acre-feet of water from MWD for the next 30 years to EMWD, LHMWD, and the Cities of Hemet and San Jacinto as part of an effort to recharge groundwater in the Hemet/San Jacinto area, fulfilling the Soboba Tribe's water rights and addressing chronic groundwater overdrafts (see Section 3.3.4).

EMWD's rights under the Hemet/San Jacinto Water Management Plan will be a base groundwater production right of 10,869 AFY. Any pumping above that amount is subject to replenishment fees.

In the West San Jacinto area, a cooperative groundwater management plan is already in place to insure the reliability and quality of the water supply. In June 1995, EMWD adopted the West San Jacinto Groundwater Basin Management Plan (WSJGBMP) in accordance with the statutes in the State Water Code Sections 10750 through 10755 resulting from the passage of Assembly Bill 3030 (AB 3030). The plan was adopted after extensive public outreach and meetings with interested individuals and agencies. A copy of the Management Plan is included in Appendix C.

Implementation of the WSJGBMP began directly after its adoption. Initial efforts to implement the WSJGBMP included establishing an advisory committee; prioritizing the management zones; evaluating groundwater resources including establishing groundwater quality, level, and extraction monitoring programs; and conducting hydro-geophysical investigations. The West San Jacinto Groundwater Basin Management Plan Annual Report, documenting the implementation of the plan and activities in the groundwater management zones, has been published annually since 1996.

3.3.3 Surface Water Diversion Rights

License No. 10667

EMWD holds a right to divert up to 5,760 AFY of San Jacinto River flows for recharge and subsequent use from September 1 through June 30 each year. EMWD's diversion and recharge of San Jacinto River surface water to the Canyon Management Zone takes place at EMWD's Grant Avenue Ponds in the Valle Vista area. EMWD's diverted water is recharged into the groundwater aquifer of the Canyon Management Zone and is not used for direct use or sale. The San Jacinto River is an ephemeral river and, consequently, river flows may be insufficient for any diversion at all.

3.3.4 Soboba Settlement Act

On June 7, 2006, after eleven years of negotiations, the Soboba Band of Luiseno Indians (Soboba Tribe), MWD, EMWD, and LHMWD signed the *Soboba Band of Luiseño Indians Water Settlement Agreement (Soboba Settlement Agreement)* at a 4:00 pm ceremony at The Country Club at Soboba Springs in San Jacinto. Tribal Chairman Robert Salgado, Jr., signed the Settlement Agreement for the Soboba Tribe.

On March 1, 2007, Congresswoman Mary Bono (CA-45) introduced *The Soboba Band of Luiseño Indians Settlement Act of 2007 (Soboba Settlement Act)* which was co-sponsored by Congressmen Jerry Lewis (R, CA-41), Joe Baca (D, CA-43), and Dale Kildee (D, MI-5), and codifies the agreement between the Soboba Tribe, MWD, EMWD, and LHMWD.

In 2008, Congress passed and the President signed the Soboba Settlement Act that will provide to the Soboba Tribe an annual water supply of 9,000 acre-feet, 128 acres of land near Diamond Valley Lake for commercial development, and approves and ratifies the Soboba Settlement Agreement that set forth $17 million from the local water districts for economic development. Additionally, the United States government will provide the Soboba Tribe with $11 million for water development.

The agreement will terminate litigation against MWD and EMWD, which was filed by the Soboba Tribe in April 2000 *(Soboba Band of Luiseño Indians v. MWD)*. That lawsuit sought damages and injunctive relief for the continuing drainage of water from the Soboba Reservation into MWD's nearby San Jacinto Tunnel which was constructed in the 1930s. The bill mandates, on average, an annual delivery of 7,500 acre-feet of water by MWD for the next 30 years to EMWD, LHMWD, and the cities of Hemet and San Jacinto, as part of an effort to recharge the San Jacinto groundwater basin, fulfilling the Soboba Tribe's water rights and addressing chronic groundwater overdrafts.

As outlined in the Soboba Settlement Act, the cities and agencies will also receive $10 million in federal funds to build the facilities to recharge the aquifer with the imported water, and between 6,100 and 4,900 acre-feet per year of the Soboba Tribe's water (on a declining scale over a 50 year period) to be used towards basin replenishment. The Soboba Tribe will also make 98 acres of Soboba Reservation land available for endangered species habitat, on an acre for acre basis, to replace EMWD land found to be not suitable for mitigation.

On March 8, 2007, the bill was referred to the House Natural Resources Subcommittee on Water and Power. (Subcommittee hearing held on March 13, 2008). Ratified by the U.S. House of Representatives and the Senate, and signed by the President, the pact will bring to an end decades of conflict between the Soboba Tribe, the U.S. Government, MWD, and EMWD.

3.3.5 Groundwater Replenishment

Through pilot programs and using temporary facilities, EMWD has recharged groundwater in the Hemet/San Jacinto area with imported surplus water from MWD since 1990. In April of 2004, EMWD, LHMWD, and the Cities of Hemet and San Jacinto executed a Memorandum of Understanding (MOU) for an Interim Water Supply Plan. The purpose of the plan was to address the deteriorating situation in the Hemet/San Jacinto area by providing recharge of imported water from the SWP into the aquifer at two sites – the Conjunctive Use Ponds in the Intake portion of the San Jacinto Upper Pressure Management Zone, and the Grant Avenue Ponds in the Canyon Management Zone. From 2004 through 2007, 20,819 AF of imported water from the SWP was recharged into the aquifer. Due to dry conditions, environmental restriction, and the level of demands in its service area, MWD curtailed Replenishment Service effective as of May 1, 2007. Since then, permits to recharge water at the two sites have expired. To replace the temporary recharge facilities, long term facilities are being designed and built as part of the IRRP, an integral piece of the water management plan and the Soboba settlement. The IRRP initially consists of 35 acres of basins or ponds for recharging State Project Water from MWD; three extraction wells; three monitoring wells; modification to two existing pump stations; and pipelines within, and adjacent to, the San Jacinto River.

EMWD and the other three local agencies are also contributing to the replenishment of the basin by providing recycled water in lieu of groundwater production. The Recycled In-Lieu Program supplies recycled water for agricultural irrigation in-lieu of pumping native groundwater. The project can deliver up to 8,540 acre-feet per year to local agricultural water producers. The project costs are jointly funded by EMWD, LHMWD, and the Cities of Hemet and San Jacinto. Agreements that set limits on groundwater production, and provide for a payment of a portion of the operation and maintenance costs have been in place since 2008.

3.3.6 Supply Reliability

Protecting the available groundwater supply is an important part of EMWD's planning efforts. EMWD is actively working with other agencies and groups to insure that groundwater will be a reliable resource far into the future. Part of managing groundwater responsibly requires the replacement of water produced beyond the basin's safe yield. Production in the Hemet/San Jacinto area will be supplemented with recharged imported water as the Hemet/San Jacinto Water Management Plan is implemented. Groundwater extraction in the West San Jacinto Groundwater Basin Management Plan area is anticipated to remain static.

3.4 Groundwater Desalination Overview

The West San Jacinto Groundwater Basin Management Plan was adopted in 1995. This 250 square mile area is experiencing increasing water levels due to high TDS groundwater and decreased production. The high TDS groundwater is migrating into the Lakeview portion of the Lakeview/Hemet North management zone, an area of good quality groundwater. Lowering groundwater levels and removal of saline groundwater is an integral element in the West San Jacinto Groundwater Basin Management Plan. To address these concerns, EMWD implemented a Groundwater Salinity Management Program. This program currently consists of two desalination facilities owned and operated by EMWD. These facilities recover high TDS groundwater from the Menifee and Perris South Management Zones, and the Lakeview portion of the Lakeview/Hemet North Management Zone, for potable use. In addition to being a source of potable water, the main role of the desalter is to play a part in managing the groundwater management zones by addressing the migration of brackish groundwater into areas of good quality groundwater.

3.4.1 Groundwater Desalination Existing Condition

Desalter wells deliver water to an integrated raw water system that delivers water to the desalination plants where it is treated prior to entering the distribution system. The Menifee Desalter was the first of three desalters to be built. This facility began producing potable water in 2003. The second desalter, the Perris I Desalter, is located next to the Menifee Desalter at the Sun City Regional Water Reclamation Facility. This plant began production in 2006. Plant production capacity is 10.5 CFS. Groundwater extraction for use in the desalter program has not caused a decline in water levels to date.

3.4.2 Groundwater Desalination Reliability

Groundwater extracted from desalter wells is limited by existing facilities and not groundwater supplies. Desalination helps manage increasing water levels due to high total dissolved solids (TDS) groundwater and decreased production, and prevents migration of brackish water. Extraction from the existing desalter wells has not caused a decline in water levels historically.

High iron and manganese concentrations will irreversibly impact the desalter membranes, and have resulted in several brackish groundwater extraction wells remaining off-line. In 2004, an effort was initiated to evaluate alternative technologies for removal of iron and manganese prior to desalination. A removal process was selected and final design was completed in 2009. Completion of construction is scheduled for September 2011 that will increase extraction capacity.

3.5. Recycled Water Overview

Recycled water is extensively used in EMWD's service area to meet non potable demands. The supply of recycled water will continue to increase with EMWD's population size. The four (4) regional water reclamation facilities that EMWD currently operates have either recently completed an expansion, are currently in the process of expansion or have an expansion planned in the near future. Recycled water is currently used for both municipal and agricultural purposes. Municipal customers use recycled water for landscape irrigation and industrial process water. Agricultural customers use recycled water for irrigation of crops. A portion of agricultural demand of recycled water is in-lieu of using groundwater. Currently the use of recycled water is limited by the amount available to serve during peak demands and with discharge occurring in off peak periods. EMWD has developed plans to eliminate discharge and use all of the recycled water available within EMWD and to offset demand of existing potable customers.

3.5.1 Recycled Water Existing Conditions

As a full-spectrum provider of water, wastewater collection, and treatment and recycled water services, EMWD has been active in developing local and regional plans for expanded water recycling in its service area. EMWD's first Recycled Water Facilities Master Plan was developed in 1990 and formally updated in 2010. In 2009, EMWD completed a Recycled Water System Strategic Plan that provides guidelines for moving forward with recycled water projects. Information from the strategic plan was incorporated into the EMWD Integrated Resource Plan to evaluate potential recycled water projects. EMWD's local water recycling plan is also incorporated into the Integrated Regional Water Management Plan developed by the Santa Ana Watershed Planning Authority for the San Jacinto and Santa Ana Watersheds.

EMWD has worked closely with the Santa Ana Regional Water Quality Control Board in updating local basin plans and developing a long-term salinity management plan to support and ensure compliance with local basin objectives for salinity and nitrogen. EMWD is also participating in the development of a Total Maximum Daily Load (TMDL) analysis for impacted surface waters in the Santa Ana Watershed.

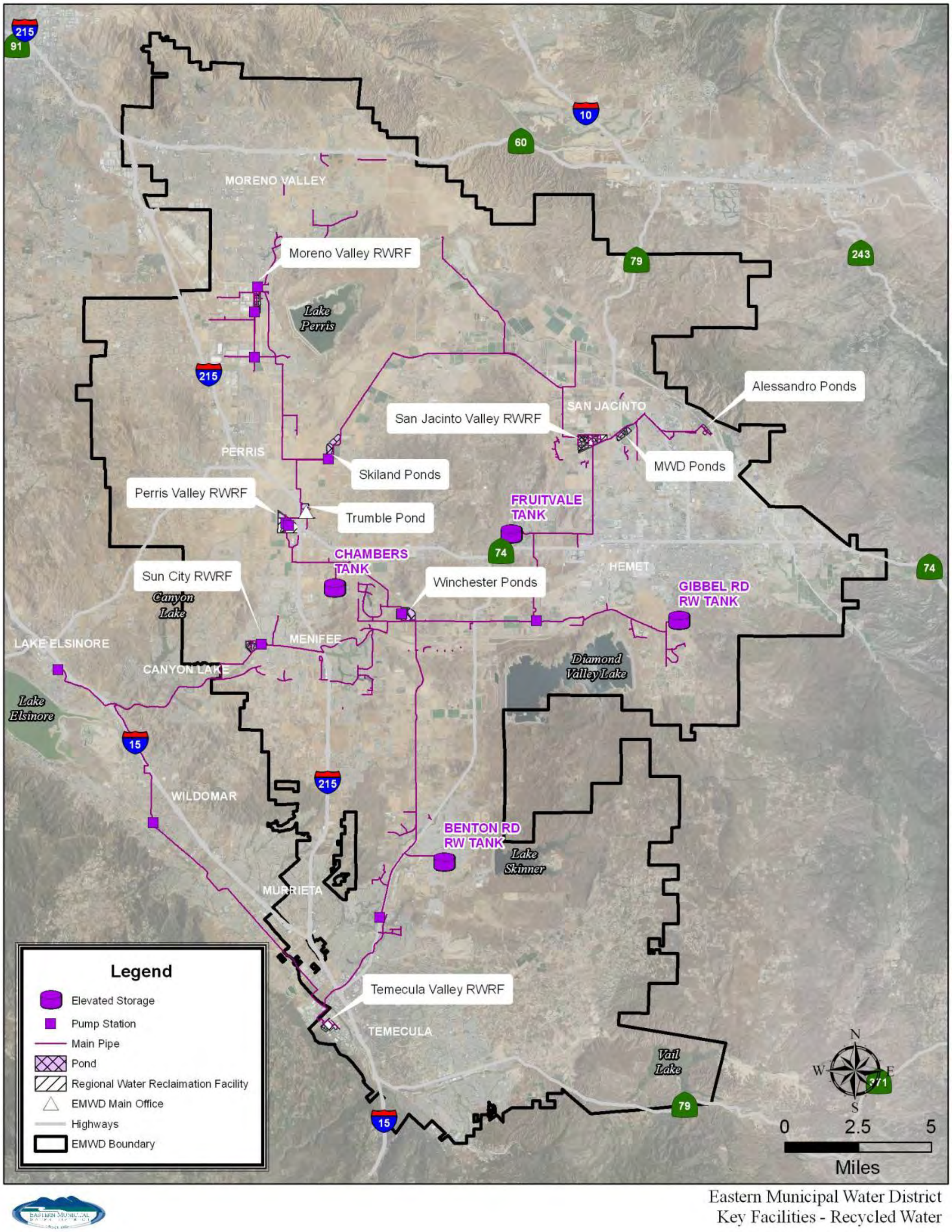
EMWD is involved with a variety of local agencies and public interest groups in recycled water planning efforts. Table 3.9 lists agencies participating in recycled water planning.

Table 3.9 - Recycled Water Coordinating Agencies

Group/Agency	Role
1) Santa Ana Watershed Project Authority	Regional Cooperative Planning
2) Santa Ana Regional Water Quality Control Board	Basin Planning/Salinity Mgmt.
3) Rancho California Water District	Facility Planning/Market Dev.
4) West San Jacinto Groundwater Management Plan Advisory Board	Plan Review/Public Oversight
5) Hemet/San Jacinto Groundwater Management Plan Policy Committee (Cities of Hemet, and San Jacinto and Lake Hemet Municipal Water District)	Plan Review/Public Oversight
6) Elsinore Valley Municipal Water District	Facility Planning/Market Dev.
7) EMWD Recycled Water Advisory Committee	Plan Review/public Oversight
8) San Jacinto Watershed Council	Plan Review/Public Oversight
9) Lake Elsinore/San Jacinto Watershed Authority	Plan Review/Water Quality
10) Metropolitan Water District of Southern California	Regional Urban Water Mgmt. Planning, Funding

EMWD is responsible for all wastewater collection and treatment in its service area. It has four operational regional water reclamation facilities (RWRF) located throughout EMWD and in 2010 treated 46,500 AFY. Inter-connections between the local collections systems serving each treatment plant allow for operational flexibility, improved reliability, and expanded deliveries of recycled water. All of EMWD's RWRF's produce tertiary effluent, suitable for all Department of

Figure 3.7 - Key Recycled Water Facilities



Health Services permitted uses, including irrigation of food crops and full-body contact. Table 3.10 summarizes existing and planned treatment capacities.

Table 3.10 - RWRF Treatment Capacity (AFY)

	Existing	Future	Year of Expansion
Moreno Valley	17,900	26,000	2012
Perris Valley	16,800	38,000	2011
San Jacinto	12,300	14,000	2014
Temecula Valley	20,200	20,200	NA

In addition to treatment facilities, EMWD has several recycled water storage ponds throughout EMWD. Using existing storage ponds, EMWD is able to sell more than the recycled water produced by its treatment plants during the peak demand months (June – September). During the cooler, wetter parts of the year, surplus recycled water is stored in unlined surface impoundments, resulting in extensive groundwater recharge. If storage capacity is full, surplus recycled water is disposed of through a regional outfall pipeline to Temescal Creek and the Santa Ana River.

EMWD treats all of the wastewater collected in its service area to tertiary standards and disposes of its recycled water in one of three ways; 1) customer sales 2) discharge to Temescal Creek, or, 3) through percolation and evaporation while stored in pond throughout EMWD. Table 3.11 provides the amount of wastewater collected, treated and disposed from 2006 through 2010.

Table 3.11 - Wastewater Collection, Treatment and Disposal (AFY) – 2006 - 2010

	2006	2007	2008	2009	2010
Wastewater Collected/ Treated to Tertiary Standards	45,100	47,600	44,500	45,500	46,500
Discharge	16,300	9,100	9,400	6,300	4,900
Total Sales	21,400	27,700	28,000	32,500	28,300
Peculated/Evaporated Water	7,400	10,800	7,100	6,700	13,300

EMWD has sold up to 32,500 AF annually of recycled water to retail and whole sale customers throughout its service area. The majority of recycled water sold is used for agricultural irrigation. A portion of the water sold for agriculture is used in lieu of groundwater preserving the groundwater basin and improving water supply reliability. In addition to meeting agricultural demand, recycled sales to municipal customers are increasing rapidly as residential and urban development replaces irrigated farmland. Landscape irrigation is an emerging market and in 2008, EMWD started selling recycled water to a large industrial customer for cooling towers in a power generation plant. EMWD also sells recycled water to the California Department of Fish and Game for environmental use within the San Jacinto Wildlife Area. EMWD uses existing storage facilities to store water during off peak periods for delivery in peak months and maximize the amount of recycled water sold.

Table 3.12 - Summary of Recycled Water Sales (AFY) – 2006 - 2010

	2006	2007	2008	2009	2010
Agricultural	14,200	19,400	19,700	18,200	13,800
Construction	800	600	100	0	0
Environmental	1,200	2,400	3,100	2,800	2,000
Agricultural In Lieu	0	0	0	4,600	4,800
Landscape	4,200	4,900	4,700	4,300	4,000
Industrial Process Water	0	0	300	1,700	3,000
Wholesale	1,000	400	200	900	700
Total Sales	**21,400**	**27,700**	**28,100**	**32,500**	**28,300**

3.5.2 2010 Recycled Water Use

Wastewater collected and treated in 2010 was 46,500 AF, approximately 15,000 AF less than projected in 2005. Several factors contributed to the reduction in wastewater flows including economic forces and conservation efforts. Between 2005 and 2010 EMWD experienced a slowdown in development and new connections. Thousands of planned new homes have been deferred and many homes remain vacant due to foreclosure. Public outreach and news media reports focused on water shortage and mandatory restrictions in place through 2010 have resulted in increased conservation.

In addition to reducing the amount of wastewater available to treat, economic conditions depressed new demand for recycled water due to new development. Landscape demand did not reach the anticipated 7,700 AF projected by 2010 and may not for several years as new development is delayed. New industrial customer demand did not materialize in the quantity projected in 2005. Only one of two power plants proposed in 2005 was constructed and to date has not required its full allotment of projected recycled water. In addition, the California Department of Fish and Game did not use its full projected demand for recycled water at the San Jacinto Wildlife Area or increase its use of recycled water as projected.

Even with the decrease in demand, EMWD has increased the percentage of recycled water sold and decreased the amount of recycled water discharged. This was achieved through implementing operational practices that encourage the storage of water in the winter for use during peak periods. Recycled water was also used to recharge groundwater basins through an in lieu agricultural program. EMWD is aggressively pursuing recycled water policies and programs that reduce discharge and increase recycled water use.

Table 3.13 - Proposed vs. Actual Recycled Water Use in 2010 (AF)

	Projected 2010	**Actual 2010**
Wastewater Collected and Treated	61,051	46,451
Quantity Meeting Tertiary Recycled Standards	61,051	46,451
Agricultural Sales	13,400	13,796
Construction Sales		27
Environmental Sales	4,300	1,999
Agricultural In Lieu Sales		4,785
Wetlands/Lakes/Supply Augmentation Sales	2,000	
Landscape Sales	7,700	4,041
Industrial Process Water Sales	5,000	2,950
Wholesale Sales		649
Total Sales	**32,400**	**28,246**
% Sold	**53%**	**61%**
Livestream Discharge	13,651	4,902
Groundwater Recharge	15,000	13,303

3.5.3 Recycled Water Reliability

In June of 2009, EMWD completed a recycled water strategic plan. The plan examined several options for the expansion of EMWD's recycled water system and considered the current and potential constraints and opportunities for reducing discharge and increasing the use of recycled water. Currently demand opportunities exceed projected supply through 2030 and less desirable programs were eliminated as part of the strategic plan evaluation.

Historically, EMWD has used recycled water to meet the needs of agricultural development with increasing landscape demand, as land use changes from agricultural to urban. Water has also been used for environmental purposes at the California Department of Fish and Game San Jacinto Wildlife Area. Recently, new demands have emerged for manufacturing and industrial processes and for use in lieu of ground water. Other proposed special projects with a potential recycled water demand include:

- Indirect Potable Recharge (IPR) would advance treat recycled water at the San Jacinto Valley regional Water Reclamation Facility to be used for groundwater recharge.

- An alternative recycled water project that that will provide recycled water to a wholesale customer as an imported water offset.

Table 3.14 list potential recycled water demand.

Table 3.14 - Recycled Water Use Potential (AFY) – 2015 - 2035

Type of Use	Feasibility	2015	2020	2025	2030	2035
Agriculture Irrigation	High	26,400	25,100	23,800	22,400	22,400
Landscape Irrigation	High	5,600	5,600	11,300	15,300	16,000
Golf Course Irrigation	High	4,400	4,400	4,400	4,400	4,400
Wildlife Habitat	High	4,500	4,500	4,500	4,500	4,500
Industrial	High	5,800	5,800	5,800	5,800	5,800
Storage Pond Recharge/Evaporation	High	11,000	11,000	11,000	11,000	11,000
Indirect Potable Reuse (Advanced Treatment)	Medium		5,000	5,000	15,000	15,000
Alternative Recycled Water Project (Advanced Treatment)	Medium					5,000
Retrofit of Potable Landscaped	Medium	400	400	1900	1900	1900
Total		**58,100**	**61,800**	**67,700**	**80,300**	**86,000**

One of the highest performing special projects, IPR, was included in the IRP potential portfolios and modeled under several hydraulic and supply conditions. EMWD's Recycled Water Strategic plan also evaluated the storage and system augmentation needed to offset peak demand. Additional storage is required to fully utilize EMWD's recycled water supply. Table 3.15 summarizes the projected supply and demand that can be met with the current existing recycled water system
.

Table 3.15 - Supply and Use of Recycled Water by Type (AFY) – 2015 - 2035

	2015	2020	2025	2030	2035
Recycled Water Supply					
Tertiary Treated Recycled Water	56,100	63,500	70,300	77,100	83,500
Recycled Water Use Existing System					
Agriculture Irrigation	20,000	22,500	23,800	22,400	22,400
Landscape Irrigation	5,100	8,100	10,700	13,100	13,500
Wildlife Habitat	2,000	2,600	2,600	2,600	2,600
Industrial	5,800	5,800	5,800	5,800	5,800
Storage Pond Recharge/Evaporation	11,000	11,000	11,000	11,000	11,000
Total Existing System	**43,900**	**50,000**	**53,900**	**54,900**	**55,300**
Balance	**12,200**	**13,500**	**16,400**	**22,200**	**28,200**

3.5.4 - Incentives to Encourage Use of Recycled Water

To ensure that recycled continues to be used to the fullest extent possible, EMWD uses five methods to expand the use of recycled water within its service area. These methods are:

Mandatory Recycled Water Use Ordinance – EMWD has adopted an ordinance requiring new and existing customers to use recycled water for appropriate permitted uses when it is available. This ordinance provides a basis for denying potable water service and providing recycled water for permitted uses.

Rate Incentives – Recycled water is currently priced below the cost of potable water for both municipal and agricultural use.

Water Supply Assessments – EMWD's Water Supply Assessments condition all major new developments to use recycled water as a condition of service where it is available and permitted.

Public Education – EMWD actively promotes the use of recycled water with its water education program. EMWD also places prominent signage at public recycled water use sites promoting the benefits of water recycling.

Facilities Financing – EMWD will work with private parties to arrange or provide financing for construction of facilities needed to convert potable demands to recycled water.

EMWD does not have any data to support a projection of how much increased recycled water sales will result from each of the listed methods of encouraging recycled water use. Historically, the low cost of recycled water was the primary inducement for agricultural customers to use recycled water in-lieu of groundwater. However, as municipal customers continue to replace agriculture, it is reasonable to assume that the mandatory provisions of the District's Recycled Water Use Ordinance will play a major role in program expansion.

Section 4 - Planned Water Supplies

4.1 Integrated Resource Plan

EMWD has developed an IRP to serve as a framework for planning and prioritizing supply options. Several supply portfolios were developed and evaluated using performance measures that meet EMWD's objectives for future water supplies. EMWD's objectives are:

- **Develop a sustainable water supply**. This is measured by increases in local groundwater storage.
- **Accomplish financial Stability.** Measurements include capital costs and escalated annual costs.
- **Provide a reliable water supply.** Reliability is measured under drought imported shortage conditions, under emergency conditions and for peak day demand.
- **Maximize water use efficiency**. Measurements for water use efficiency include the percent of demand offset by conservation and the reduced amount of recycled water discharged.
- **Maximize use of Local resources.** Value was placed on projects that use local resources to meet EMWD retail demand.
- **Implement projects that improve the environment and salinity conditions in the service area.** Measured by Carbon dioxide emissions per AF of delivered water, and TDS and TIN contribution to the groundwater management zones.

Several projects and supply options were proposed and evaluated during the IRP process. Portfolios that increased water use efficiency, and implemented local supply projects including additional desalination and recycled water projects met more objectives. EMWD will use the results of the IRP to guide the development of new water supply sources and implement new water supply programs. Table 4.1 summarizes potential water supply sources to meet future demands.

Table 4.1 - Potential Water Supply (AFY) – 2015 - 2035

	2015	2020	2025	2030	2035
Recycled Water	6,100	13,500	16,400	22,200	28,200
Desalination	4,500	4,500	4,500	4,500	4,500
Planned Additional Conservation	0	0	1,300	4,300	6,400
Water Transfers/Exchanges	0	0	0	0	0
Total	**10,600**	**18,000**	**22,200**	**31,000**	**39,100**

4.2 Potential Recycled Water Use

The IRP results demonstrate the benefit of expanding the use of recycled water and examined multiple options for expanding the recycled water program allowing for flexibility in implementation as EMWD's demands increase. The IRP process provides several portfolios that allow EMWD to achieve the goal of full utilization of recycled water by 2035. Using EMWD's entire recycled water supply to offset demand for potable will decrease the dependence of EMWD on imported water supplies and provide additional supply reliability. The two recycled water projects have been identified as candidates that assist EMWD in meeting our water supply goal; using advanced treated water for recharge of basins in the Hemet/San Jacinto Water Management Plan area (Indirect Potable Recharge) and alternative recycled water project that that will provide recycled water to a wholesale customer for a water supply project are being studied for implementation potential. Limitations on the amount of recycled water available to serve both projects could determine the feasibility, size and phasing of the proposed special projects.

In addition to special projects, storage and/or augmentation is needed to offset the balance between winter and summer demands and fully utilize recycled water. As EMWD continues to investment in the development of the recycled water program reliability will improve and all the recycled water produced by EMWD's treatment plants will be utilized.

4.3 Potential Desalinization

EMWD has an existing desalination program that recovers high TDS groundwater from the Menifee and Perris South Management Zones, and the Lakeview portion of the Lakeview/Hemet North Management Zone for potable use. A third desalination plant, Perris II, has been designed and is projected to be on line in 2015. Table 4.1 summarized water supply from an additional planned desalination.

A fourth desalter could be warranted to meet salinity management requirements for the Hemet/San Jacinto Water Management Plan area. The requirement to reduce salinity associated with the use of recycled water could also be met with the implementation of the Indirect Potable Recharge project.

4.4 Additional Potential Conservation

The IRP results demonstrated that reducing demand through conservation is a cost effective method of improving reliability and extending the capacity of supply programs. In addition to meeting the requirement of SBx7-7, EMWD is proposing a targeted thirty percent reduction in outdoor demand and a 10 percent reduction in indoor demand by 2035. This may be achieved through adjustment in the budget based tiered rate, additional legislation and code changes and through active conservation programs.

4.5 Water Transfers

EMWD currently relies on MWD for any transfers or exchanges. As a member agency, EMWD benefits from MWD's efforts to improve supply reliability through transfers and exchanges detailed in the 2010 Regional Urban Water Management Plan.

In addition to relying on MWD, water transfers have been identified as a method of improving reliability especially during periods of water shortage. EMWD is investigating opportunities for independent transfers and exchanges. Since there is no guarantee that exchanges or transfers will be feasible for EMWD, and it's impossible to quantify the amount of water that could be made available, transfers and exchanges are not listed as part of EMWD water supply.

Section 5 - Water Shortage Contingency Plan

5.1 Overview

Recognizing the need to preserve and protect public health and safety, EMWD's Water Shortage Contingency Plan (WSCP) applies regulations and restrictions on the delivery and consumption of potable outdoor water use during water shortages**.** Ordinance 117.2, the WSCP for EMWD was updated in April of 2009 to account for changes in EMWD's water pricing structure and the MWD Water supply allocation plan. The WSCP is attached as Appendix D.

The WSCP is based on the following priorities:

- Public safety, health and welfare
- Sustaining economic vitality
- Quality of life

Restrictions are structured to protect the safety, health and welfare of the public and minimize the impact a water shortage may have on the local economy and quality of life. This is done mainly through the use of EMWD's budget based tiered rate structure, focusing on those customers with wasteful behaviors first and then affecting other customers as a shortage becomes more severe.

The WSCP applies specific reduction requirements and restrictions to each of four separate groups of customer types:

- Single-family residential, multi-family residential and landscape customers
- Commercial, industrial and institutional (CII)
- Agricultural
- Wholesale

Over ninety percent of EMWD's customers are either single-family residential, multi-family residential or landscape customers. These customers are subject to a budget based tiered rate. There are four tiers in EMWDs rate structure; the first two tiers apply to indoor and outdoor use respectively, the third tier is applied to water use up to fifty percent above the tier one and two budgets, and tier four is applied to any water use in excess of tier 3. In times of water shortage, penalties are added to the highest tier and tiers two and three are reduced as shortage levels increase. Under the most extreme shortage conditions no outdoor water use is allowed.

Commercial, industrial and institutional (CII) and agricultural customers must reduce demand during periods of shortage. CII customers face event driven penalties and could face fines if found violating water use restrictions. Agricultural customers are required to reduce demand over historical use and face penalties for use over allocation. Wholesale customers are allocated water using the formula and methodology based on MWD's Water Supply Allocation Plan.

The WSCP can be implemented for either an extended term water shortage that may last months or years, or a limited shortage that may only last a few days or weeks.

5.2 Stages of Action

The WSCP limits water demand during times of shortage in seven stages. These stages can be triggered when there is water deficiency caused by limitations on supply or limitations on EMWD's delivery system. The plan shall be implemented in case of a long or short-term water deficiency, or in case of an emergency water shortage. The stages are summarized in the table below:

Table 5.1 - Water Shortage Contingency Plan Stages of Action

Stage No.	Water Supply Conditions	% Shortage
1	Anticipated or existing water demand exceeds available supply due to any of the following: – Shortfall at MWD's water treatment plants (Skinner or Mills) – Reduction in availability of MWD's raw water supply – Shortfall at EMWD microfiltration plants or desalination plants – Reduction in availability of water from EMWD wells. – Limitations on delivery system – Allocation from MWD	**< 5**
2		**5-10**
3		**10-15**
4		**15-25**
5		**25-35**
6		**35-50**
7		**>50**

When implementation of the plan is triggered by anticipated limitations in supply or delivery, EMWD's General Manager shall request the Board of Directors to authorize and implement the provisions of the Plan. The request shall be made at a regular or special meeting of the Board of Directors, to implement provisions of the Plan. The Board of Directors has the authority to initiate or terminate the water shortage contingency measures described in this Plan. When a water shortage emergency occurs, the WSCP authorizes the General Manager to declare the extent of a potable water shortage emergency and to implement the appropriate water shortage contingency measures.

5.3 Prohibition, Penalties and Consumption Reduction Methods

In order to reduce demand by EMWD customers in the case of deficiency in water supply, EMWD has developed several prohibitions and consumptive reduction methods. These methods are targeting outdoor water use, and under the most extreme deficiencies would reduce demand more than 50%.

5.3.1 Restrictions

The WSCP prohibitions and reduction methods are organized by customer groups with different limitations on each group. Stage 1 starts with voluntary measures. In the past, voluntary conservation that is the result of intense public relations costs has led to a 10% reduction in demand. As the water deficiency increases, measures become mandatory and will lead to the needed reduction in water demand. The tables below list limitations placed on customers in the event the WSCP is implemented.

Single-Family Residential, Multi-Family Residential and Landscape Customers

The WSCP targets a reduction in demand use in specific tiers for single-family residential, multi-family residential and landscape customer. Although methods that would allow customers to meet the proposed targets are listed in the WSCP, enforcement will be primarily through the tiered rate structure. Table 5.2 summarizes the required reduction in each tier by stage.

Table 5.2 - Water Shortage Contingency Measures (Single-Family Residential, Multi-Family Residential and Landscape Customers)

Shortage Stage	Tier 1 – Indoor Use	Tier 2 – Outdoor Use	Tier 3 – Excessive Use	Tier 4 – Wasteful Use
1	**Voluntary Reduction**			
2				100% reduction
3		25% reduction		100% reduction
4		50% reduction		100% reduction
5		50% reduction	70% reduction	100% reduction
6		50% reduction	100% reduction	100% reduction
7		100% reduction	100% reduction	100% reduction

EMWD's rate structure includes a multiplier that can restrict the size of a customer's allocation in any tier. To achieve the desired reduction, the allocation for each tier will be adjusted as listed and beginning in Stage 2, significant penalties will be added to the Tier 4 rate. The proposed restrictions at each stage were modeled to determine the potential for water reduction and to help insure the correct amount of water saving shall be achieved.

Commercial, Industrial and Institutional (CII)

CII demand makes a small portion of EMWD's demand and is not currently subject to a tiered rate. In the case the WSCP is implemented, CII customers are subject to restrictions on outdoor water use and event based penalties may be imposed to enforce water demand reduction. Table 5.3 summarizes CII restrictions.

Table 5.3 - CII Water Shortage Restrictions

Restriction	Stage
Refrain from hosing down driveways and other hard surfaces.	Stage 1 - Voluntary Stage 2 -Mandatory
Repair faucets, toilets, pipes and other potential sources of water leaks.	
Irrigate landscape only between 9:00 p.m. and 6:00 a.m.	
Refrain from watering or irrigating more than fifteen (15) minutes.	
Adjust and operate all landscape irrigation systems to avoid runoff.	
Refrain from watering or irrigating that causes or allows runoff.	
Do not use decorative fountains unless they are equipped with a recycling system.	
Do not allow water to run while washing vehicles.	
When installing new landscaping, plant low-water demand trees and plants. Do not incorporate non-functional turf areas.	
Refrain from watering during rain.	

Table 5.3 - CII Water Shortage Restrictions, Continued

Watering or irrigating of lawn, landscape or other vegetated areas with sprinklers will be limited to the following schedule: a. June through August – Three days a week b. September, October, and March through May – Two days a week c. November through February – One day a week	Stage 3 - Mandatory
Refrain from filling or re-filling of ornamental lakes or ponds.	
Refrain from using potable water to wash or clean a vehicle, including but not limited to, any automobile, truck, van, bus, motorcycle, boat or trailer, whether motorized or not.	
Refrain from refilling more than one foot and initial filling of residential swimming pools or outdoor spas with potable water.	
Watering or irrigating of lawn, landscape or other vegetated areas with sprinklers will be limited to the following schedule: a. June through August – Two days a week b. September through May – One day a week	Stage 4 - Mandatory
A 50 percent reduction in outdoor use is required with the restrictions of the previous stage continued.	Stages 4-6 Mandatory
No outdoor water use is permitted except for purposes of health and human safety.	Stage 7 - Mandatory

Beginning with Stage 2 event-driven penalties can be imposed for violating any of the restrictions in the WSCP. Table 5.4 lists penalties for event driven restrictions.

Table 5.4 - Event Driven Penalties and Charges

Penalty and Charges	Stage When Penalty Takes Effect
For the first monthly violation of the provisions of the water shortage contingency plan, the District shall issue a written notice of fact of such violation to the customer.	Any stage in which the measure or provision intentionally ignored or violated is mandatory.
For the second and third month violations, a surcharge of 100% of current charges.	Any stage in which the measure or provision intentionally ignored or violated is mandatory.
For the fourth and succeeding month(s) violation, a surcharge of 200% of current water bill commodity charge shall be added to the customer's water bill.	Any stage in which the measure or provision is intentionally ignored or violated is mandatory.
The District may also terminate a customer's irrigation/landscape meter service.	Any stage in which the measure or provision intentionally ignored or violated is mandatory.

Agricultural Customers

Agricultural customers must reduce demand between 5 and 50% over historical water use, depending on the shortage stage. A penalty rate is applied for use over the allocation.

Wholesale Customers

Under a water shortage plan, supply to wholesale customers will be allocated using the formula and methodology based on MWD's Water Supply Allocation Plan. EMWD will establish base period demands and then adjust them for growth and changes in local supply. Regional shortages will be phased in 10 stages. At each stage, the wholesale customers will not experience shortages on the wholesale level that are greater than one-and-a-half times the percentage shortage of regional water supplies. The wholesale customer will also not face a retail shortage less than the regional shortage. Credits will be given for conservation and investment in local supplies. Penalty rates apply for use over allocation.

5.4 Estimate of Minimum Supply

Under a dry year scenario, EMWD would increase deliveries from MWD to account for any losses in local supply. If an extreme shortage occurs MWD may implement its water supply allocation plan for member agencies in order to preserve storage reserves. The water supply allocation plan charges significantly higher rates for water deliveries over the allocated amount for each member agency. EMWD will meet allocation targets through demand reductions as outlined in the EMWD WSCP.

Table 5.5 - Three- Year Estimated Dry Year Supply (AFY) – 1990 - 1992 Hydrology

	2011	2012	2013
Current Supplies			
Groundwater	15,700	15,200	14,700
Groundwater Desalters	5,800	6,100	6,500
Imported Water	100,000	109,600	126,900
Recycled Water	29,400	29,500	31,300
Total	150,900	160,400	179,400
Demand	150,900	160,400	179,400
% of Normal	**100%**	**100%**	**100%**

5.5 Catastrophic Supply Interruption

EMWD is dependent on MWD for the majority of its supply. MWD has prepared for emergencies through storage, facility design and redundant power sources. Emergency storage requirements are based on the potential for a major earthquake that renders major water transportation facilities out of service for six months. Assuming 100 percent of its supplies are unavailable for six months, MWD has enough water storage to sustain 75 percent of normal year firm deliveries. MWD has reserved up to half of the capacity of Diamond Valley Lake for emergency supply. In the event of a major power outage water supply can be delivered by gravitational feed from recreational reservoirs including, Diamond Valley Lake Reservoir. For treatment plants MWD has a backup power generator in place in case of electrical outage. Additional information about addressing catastrophic Supply interruption can be found in Section 2.5 of MWD's RUWMP.

To protect EMWD customers in the case of an emergency, EMWD has developed the Water Shortage Emergency Operations Plan (WSEOP). This plan determines the operation response to any emergency. It specifies chain of command and provides the authority to respond in an emergency. Elements of that response can include interdepartmental staff notification and mobilization; activation of alternative water supply sources (i.e. interagency connections), use of temporary pumping facilities; use of power generators; public notification; and activation of conservation measures. An emergency is defined as any time MWD or EMWD facilities are incapable of supplying potable water. An emergency could be caused by a natural disaster such as an earthquake or through facility failures. The WSEOP describes the coordination required between operational staff, management, community involvement staff and other EMWD employees. In addition, communication and cooperation will be required with the community and other agencies such as the Department of Health Services and MWD. In the event that one or more water supply sources are unavailable, remaining sources of supply will be maximized to meet demand. If needed, the WSCP could be implemented to conserve water and reduce demand. If an electrical or gas power outage occurs, some of EMWD's booster facilities have backup generators. Facilities without redundant power sources may be served on a priority basis by portable generators.

5.6 Analysis of Revenue

As a result of a water shortage or emergency situation, there may be a reduction of revenue from water sales. To protect EMWD from financial hardship in such a situation, a financial reserve account has been established to meet the fixed cost associated with water delivery that may not be met in the case of reduced water sales. In the tables below, the revenue impacts of implementing the WSCP are analyzed.

Table 5.6 - Actions and Conditions that Impact Revenue

Type	Anticipated Revenue Reduction
Reduced Water Sales	Water sales are approximately 40% of EMWD's annual revenue. A reduction in the demand of water by 50% would also mean a reduction in revenue from water sales of 50% leaving a shortfall of approximately 20% of EMWD annual revenue.

Table 5.7 - Actions and Conditions that Impact Expenditures

Category	Anticipated Cost
Increased Staff Cost	Staff costs for implementing the WSCP could vary depending on the stage trigger by a deficiency in water supply. Stage 1 and 2 would probably be implemented with only current staff members. Stage 3 or 4 of the plan may require additional staff to implement. The amount and level of staff will vary greatly depending on the public's response to the plan.
O & M Cost	Operations and maintenance cost may be minimally impacted by the implementation of the WSCP, but these costs are projected to have minimal impact on EMWD's total revenue.
Cost of Supply and Treatment	Cost of supply would decrease due to a decrease in demand and would offset some of the costs associated with reduced water sales.
Public Outreach Costs	Costs associated with informing the public about implementing the WSCP will vary based on the public's response and the stage of the plan implemented.

Table 5.8 - Proposed Measures to Overcome Revenue Impacts and Increased Expenditures

Name of Measure	Summary of Effect
Rate Adjustment	Part of the WSCP is the ability to impose a penalty rate. This may offset some of the lost revenue due to a decrease in water sales.
Reserve Policy	EMWD, as a matter of policy, keeps a reserve of funds equivalent to 90 days of operational expenses. This reserve fund could be used to mitigate revenue shortfalls.
Rate Stabilization Fund	EMWD also has a rate stabilization fund with approximately $3 million available to offset increased costs and decreased sales.

Section 6 - Water Quality

6.1 Overview

Promoting and protecting the quality of its water resources is a vital part of EMWD's planning and operations. Water quality constraints and concerns are part of the criteria used to evaluate the value of a proposed project and the protection of groundwater resources is a priority. EMWD does not anticipate a reduction in supply reliability due to water quality constraints. Contaminants of concern may require treatment or blending but long term supply planning anticipates that the quantity of available water will not be diminished from projected levels.

6.2 Imported Water

As part of the Integrated Resource Plan and other planning efforts, MWD has concentrated on maintaining the quality of source water and developing management programs that protect and enhance water quality. MWD has two water sources: the Colorado River Aqueduct (CRA); and the State Water Project (SWP). MWD responds to water quality concerns by concentrating on protecting the quality of source water and developing water management programs that maintain and enhance water quality. Based on current knowledge the only threat to MWD water supplies is the potential for increased salinity levels that may require future treatment.

To date, MWD has not identified any other water quality issues that cannot be mitigated. Increased salinity may impact the amount of water available in the future. If additional treatment is required, MWD could experience a loss of up to 15 percent of the water processed. Since only a small portion of the total water supply would be treated and blended with the remaining unprocessed water, there is no significant risk to MWD's water supply availability.

Additional information and analysis of water quality is included in Section 4 of the 2010 RUWMP.

6.2.1 Colorado River

The most significant threat to the Colorado River supplies is salinity levels. Colorado River supplies must be blended with State Water Project (SWP) water to meet the MWD's adopted salinity standards. Several programs are in place to reduce the current salinity level and protect salinity levels from rising in the Colorado River. In addition, MWD is also working to protect the Colorado River from threats of uranium, perchlorate and hexavalent chromium. MWD has also been active in efforts to protect CRA supplies from potential increases in nutrient loading, and occurrences of N-Nitrosodimethylamine (NDMA) and constituents of emerging concern. MWD fully expects its source protection efforts to be successful, therefore only water quality concern with the potential to significantly impact the use of Colorado River Water is salinity levels.

Salinity

Water imported via the CRA has the highest level of salinity of all of MWD's sources of supply, with Total Dissolved Solids (TDS) averaging around 630 mg/L since 1976. Concerns about salinity lead the seven Colorado River basin states to form the Colorado River Basin Salinity Control Forum (Forum) to cooperatively address the issue. The Forum proposed and the U. S.

Environmental Protection Agency (USEPA) approved water quality standards in 1975 that established numeric criteria for salt loading and requires that the flow-weighted average annual salinity remain at or below the 1972 levels. The forum also resulted in the Colorado River Basin Salinity Control Program, designed to prevent a portion of the salt supply from moving into the river system through the interception and control of non-point sources, such as surface runoff, as well as wastewater and saline hot springs. Salinity control projects have reduced salinity concentrations of Colorado River water TDS on average by over 100 mg/L or $264 million per year (2005 dollars) in avoided damages. During periods of high flow, salinity levels have been known to drop to 525 mg/L, but drought has brought the return of higher salinity levels with Lake Havasu having a TDS level of 628 mg/L in November of 2009.

Uranium

Near Moab, Utah, 750 feet from the Colorado River, a 16 million ton pile of uranium mill tailings is a potential source of water contamination. In 1999, the US Department of Energy (DOE) began the remediation of the site, including the removal and offsite disposal of the tailings and onsite groundwater remediation. DOE projects that the cleanup should be completed by 2025. MWD is monitoring cleanup efforts and encourages the on-going funding and rapid cleanup of the site.

In recent years an increase in mining claims filed near Grand Canyon National Park and the Colorado River has caused concern. MWD has responded with letters to the Secretary of Interior to bring attention to the importance of source water protection and advocate for close federal oversight over these activities. In 2009, Secretary of Interior Ken Salazar announced a two-year hold on new mining claims on 1 million acres adjacent to the Grand Canyon. In 2009, H.R. 644 – Grand Canyon Watersheds Protection Act was introduced and if enacted, would permanently withdraw areas around the Grand Canyon from new mining activities.

Perchlorate

In June of 1997, percolate was first detected in Colorado River water and attributed to a chemical manufacturing site in Henderson, Nevada. Another large perchlorate plume has also been detected in the Henderson area but is not known to have reached Las Vegas wash. Remediation began in 1998 and has reduced perchlorate loading entering the Colorado River system by 90 percent. Levels of perchlorate in the Colorado River measured at Lake Havasu have decreased from a high of 9□ g/L to 2□ g/L since June of 2006. California's maximum contaminant level (MCL) for Perchlorate is 6 µg/L in finished drinking water.

Chromium VI

On August 20, 2009, The Office of Environmental Health Hazard Assessment (OEHHA) released a draft public health goal (PHG) of 0.06 µg/L for Chromium VI in drinking water. A Public Health Goal (PHG) is the level of a contaminant in drinking water, which there is no known or expected risk to health. OEHHA based these goals on the best available toxicological data in the scientific literature. These are goals and not regulations. Chromium VI has been detected in a groundwater aquifer on the site of Pacific Gas and Electric (PG&E) near the vicinity of the Colorado River at Topock, Arizona. Currently PG&E is operating an interim groundwater extraction and treatment system that is protecting the Colorado River. MWD participates in various stakeholder workgroups and forums that are involved in the corrective action report. Results from Chromium VI monitoring of the Colorado River from sites upstream and downstream of the Topock site have ranged from not detected (<0.03 □ g/L) to 0.06 □ g/L.

Nutrients

High levels of nutrients (phosphorous and nitrogen compounds) can stimulate algae and aquatic weed growth that affect consumer acceptability and produce taste and odor concerns. Nutrients and the resulting algae and aquatic weed growth can also impede conveyance, increase operational costs and provide a food source for invasive mussel species. The Colorado River naturally has low concentration in phosphorous but population increases in the future could increase loading. Additional phosphorous loading could prohibit MWD's ability to blend Colorado River with SWP, which has higher concentrations of nutrients. To prevent an increase in nutrient loading in CRA water, higher levels of wastewater treatment are required at existing reclamation facilities along the Colorado River. MWD is engaged with these agencies to encourage enhanced wastewater management.

N-Nitrosodimethylamine

N-Nitrosodimethylamine (NDMA) is a byproduct of disinfection of some natural water with chloramines. MWD uses chloramines as secondary disinfection at all of its treatment plants. MWD is in the process of understanding the watershed sources and developing treatment strategies to minimize NDMA formation. OEHHA set a public health goal for NDMA of 0.003 □ g/L. MWD has monitored sources waters and treated water on a quarterly basis since 1999 with results ranging from not detected to 0.014 □ g/L. It islikely that NMDA will be regulated by the USEPA in the future.

Pharmaceuticals and Personal Care Products

Pharmaceuticals and personal care products (PPCPs) are an emerging concern for the water industry. In 2007 MWD began a monitoring program to determine the occurrence of PPCPs in drinking water treatment plants and source water locations. PPCPs have been detected in source waters at very low part per trillion (ng/L) levels consistent with the results from other water agencies. More work is required to improve testing and analytical methods, characterizing PPCPs in drinking water sources and then determining the effects PPCPs may have on recycled water use and groundwater recharge.

6.2.2 State Water Project

Water quality issues in SWP include total organic carbon (TOCs), bromides, arsenic, nutrients, N-Nitrosodimethylamine, pharmaceuticals and personal care products (PPCPs), and salinity. TOCs and bromides present the greatest water quality concern for the SWP causing operational constraints and additional treatment at MWD facilities.

Total Organic Carbon and Bromides

TOCs and bromide concentration in SWP supplies present a significant challenge for MWD to maintain safe drinking water quality. High levels of TOC and bromide levels form disinfection byproducts (DBPs) during the water treatment processes. Agricultural drainage and seawater intrusion increase the levels of TOCs and bromide. The Bay Delta Conservancy Plan (BDCP) has outlined several options for improving water quality in the Delta. In addition to addressing the protection of source water, MWD uses CRA water to blend with SWP to reduce TOC and Bromide concentrations in two of their existing plants. MWD has upgraded three SPW facilities by installing ozone treatment. Ozone readily oxidizes organic compounds to reduce the formation of disinfection byproducts and taste and odor compounds. However, ozone can cause bromate formation when bromide is present in SPW.

Arsenic

Historically, arsenic in MWD supplies have been detected at very low levels that do not require treatment or blending. However, some of the ground water basins used by MWD for storage programs have higher levels of arsenic that are at or near the threshold requiring additional treatment. MWD has had to restrict flow from one program to meet arsenic limits in the SWP. One groundwater banking partner has installed a pilot treatment program increasing the cost of the groundwater banking program. MWD has also invested in solids handling facilities and implemented operation changes to manage arsenic in solids resulting from treatment.

Nutrients

The SWP has significantly higher nutrient levels than the CRA. Agricultural discharges, wastewater discharges and nutrient rich Delta soils contribute to higher concentrations of nutrients in the Delta. Algae growing in nutrient rich water also can release taste and odor compounds into the water. MWD reservoirs containing SWP have been bypassed at times to avoid taste and odor complaints causing short-term supply reliability concerns. To address nutrient levels, MWD is working with other agencies receiving Delta water to reduce nutrient loading in the Delta. MWD also uses a comprehensive algae monitoring program to provide early warning of problems and to better monitor water quality in the system. Implementation of ozonation has also helped with taste and odor problems associated with algae blooms.

N-Nitrosodimethylamine

As described under CRA supplies, N-Nitrosodimethylamine (NDMA) is an emerging concern and MWD is active in efforts to monitor and address NDMA.

Pharmaceuticals and Personal Care Products

As described under CRA supplies, pharmaceuticals and personal care products (PPCPs) are an emerging concern and MWD is active in efforts to monitor and address PPCPs.

6.3 Local Supply

EMWD has three sources of local supply, groundwater, desalinated groundwater and recycled water. Each of our local resources meets the water quality requirements for its intended use and EMWD does not anticipate significant water supply limitations due to water quality.

6.3.1 Groundwater and Desalinated Groundwater

EMWD has an extensive and proactive groundwater monitoring program that includes collecting, compiling and analyzing data related to groundwater quality. There are no known significant threats to EMWD's groundwater supply that cannot be mitigated by treatment or blending and EMWD does not anticipate a significant loss of supply due to water quality issues.

EMWD does take action to protect groundwater supplies from potential water quality risks including contamination from salinity, nitrates, chlorinated and other volatile organic compounds.

Other contaminants have been found in local groundwater sources at levels exceeding public health goals that may require additional treatment in the future.

Salinity and Nitrates

In partnership with other agencies, EMWD is responsible for the protection and preservation of local groundwater under the authority of the Hemet/San Jacinto Basin Water Management Plan and the West San Jacinto Groundwater Basin Management Plan. Salinity and nitrate levels in groundwater increase due to agricultural activities, urban use, and recycled water use. EMWD monitors the salinity and nitrate levels in local basins as part of the groundwater management plan. EMWD also protects the water quality of the basin through salinity management and considering the affect of various water supplies on the underlying basins.

Different sources of water can affect the concentrations of salinity and nitrates within groundwater. Imported water from MWD includes supplies from both SWP and CRA. As discussed previously, CRA has high salinity levels, while SWP has high nutrient levels (phosphorous and nitrogen compounds). Recycled water also has higher levels of salinity and nutrients than other water sources and the impact of recycled water application on underlying basins is considered when selecting recycled water users. Water quality objectives for salinity and nitrates can be achieved several different ways including: blending sources, additional treatment and demand management. As EMWD considers options to meet demands, water quality is a priority when selecting alternatives.

EMWD also actively addresses salinity concerns through the effort of our desalination program. Two operational and one planned desalination plants are part of EMWD's effort to remove salts from basins with high salinity levels. In addition to supplying a source of drinking water, desalination also prevents the migration of brackish groundwater to potable management zones and removes salts from the basins balancing the salts that may have been added through the application of recycled water or other sources of water.

Chlorinated Solvents and Other Volatile Organic Compounds

In the West San Jacinto Groundwater Basin Management Plan chlorinated solvents and other volatile organic compounds have been found in amounts that exceed public health goals. Chlorinated solvents are volatile organic compounds (VOCs) that contain chlorine. In general, they are used in aerospace and electronics industries, dry cleaning, and degreasing industries. EMWD is vigilant in protecting groundwater basins from VOC contamination by closely monitoring the construction of new businesses such as gas stations and manufacturing within the vicinity of production wells. Through the review of proposed new development EMWD works with local land agencies to ensure groundwater is protected.

Arsenic

Arsenic is a naturally occurring compound found in rocks, soil, water and air. Arsenic has been detected in several of EMWDs wells at levels that range from not detected to 7.7 μg/L (2006 to 2010 data). In 2006, the maximum contaminant level for arsenic in domestic water supplies was lowered to 10 μg/L by EPA. Should California lower the State's MCL below the Federal level some of EMWD's production wells could be impacted requiring additional treatment costs to utilize these wells.

Pharmaceuticals and Personal Care Products

Pharmaceutical and personal care product (PPCPs) are a constituents of emerging concern and EMWD has been and will continue to be proactive in addressing water quality concerns that arise.

6.3.2 Recycled Water

EMWD has an extensive recycled water program and this supply is used for irrigation of the landscape, agricultural and a cooling tower. It significantly offsets the non-potable water demands throughout the EMWD. One of the challenges with the use of the recycled water is that it has a higher salinity and nutrient concentrations than EMWD's potable water supply. In some of the groundwater water basins, the salt and nutrients that are applied through landscaping and storage must be mitigated to ensure protection of the groundwater basins. EMWD has an offset mitigation program for these basins that has been approved by the Santa Ana Regional Water Quality Control Board. This program ensures that for every pound of the salt or nutrient added to the basin that it is removed by desalinization wells or mitigated by replenishment with higher quality water.

Salinity Management

Pharmaceuticals and Personal Care Products

Pharmaceuticals and personal care products are a source of concern in EMWD's recycled water. In 2008, EMWD participated with the Santa Ana Watershed Project Authority (SAWPA) to form a Task Force to develop a plan to characterize emerging constituents (ECs) throughout the region. In 2009 the Task Force presented an acceptable monitoring plan to the Santa Ana Regional Water Quality Control Board to monitor specific ECs. The plan included monitoring by SAWPA members to evaluate EC levels in wastewater effluent, local receiving streams and other raw water supplies imported into the area. Samples were collected in the spring of 2010 and a final report was prepared by SAWPA in late 2010. The results indicated the presence of some ECs at trace levels (parts per trillion) in the wastewater effluent and are consistent with other wastewater agencies results. More work is required to improve testing and analytical methods, characterizing ECs in recycled water.

6.4 Reliability

There are no known water quality concerns that will significantly impact water supply reliability. Water supplies will be managed to protect water quality to the greatest extent possible and treatment will be implemented if necessary. Table 6.1 summarizes projected reductions in water supplies due to water quality issues.

Table 6.1 - Estimated Reduction in Water Supplies Due to Water Quality Constraints (AFY)

Water Source	Description of Condition	2010	2015	2020	2025	2030	2035
Imported Water	MWD has not identified any water quality issues that cannot be mitigated	0	0	0	0	0	0
Groundwater	EMWD has not identified any water quality issues that cannot be mitigated	0	0	0	0	0	0
Recycled Water	EMWD has not identified any water quality issues that cannot be mitigated	0	0	0	0	0	0

Section 7 - Climate Change

7.1 Impact of Climate Change

EMWD has considered the impact of climate change on water supplies as part of our long term strategic planning. Climate change has the potential to affect not only local demand and supplies, but to reduce the amount of water available for import. Potential changes that may impact water supply include:

- Warmer temperatures leading to higher demand for water within EMWD's service area and throughout California;
- Reduction in the Sierra Nevada snow pack;
- Increased intensity and frequency of extreme weather events; and
- Rising sea levels resulting in increased risk of damage from storms in the Delta, high tide event and the erosion of levees in the Delta.

7.2 Response to Climate Change

One of the outcomes of climate change could be more frequent limitations on imported supplies. To limit the impact of climate change, EMWD's long term planning focuses on the development of reliable local recourses and the implementation of water use efficiency. This includes the full utilization of recycled water and the recharge of local groundwater basins to increase supply reliability during periods of water shortage. EMWD is also focused on reducing demand for water supplies, especially outdoors. Increasing the use of local resource and reducing the need for imported water has the duel benefit of not only improving water quality reliability, but reducing the energy required to import water to EMWD's service area.

Section 8 - Demand Management Measures

8.1 Implementation of Conservation Demand Management Measures

EMWD has implemented the fourteen demand management measures as required by Senate Bill 1420. EMWD's compliance is in conjunction with the requirements of the California Urban Water Conservation Council Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California. As a signatory of the MOU, EMWD pledged to make a good faith effort to implement a prescribed set of urban water conservation best management practices (BMP). EMWD is both a retail and wholesale water agency and is responsible to fulfill the requirements of both retail and wholesale BMPs. In December 2008, the Urban MOU was amended and the BMPs were revised. The revision reorganized CUWCC's 14 BMPs into five categories. Two of the categories, Utility Operations and Education, are referred to as "Foundational BMPs" because they are considered to be essential water conservation activities by any utility and are adopted for implementation by all signatories to the CUWCC as ongoing practices with no time limits. The remaining three categories are "Programmatic BMPs" and are organized into Residential; Commercial, Industrial and Institutional (CII); and Landscape categories. Table 8.1 provides a list of the old BMPs and a mapping of the new BMPs; Table 8.2 provides a list of new BMP categories and UWMP Demand Measurement Measures (DMM). Current CUWCC coverage reports are not available at this time, for clarity purposes, EMWD has included the completed DWR DMM review form.

Table 8.1 - BMP Revisions

BMP Number	BMP Description	Applied to		New BMP Category
		Retail	Wholesale	
1	Residential Water Surveys	Yes	No	Programmatic: Residential
2	Residential Plumbing Retrofits	Yes	No	Programmatic: Residential
3	System Water Audits, Leak Detection	Yes	Yes	Foundational: Utility Operations – Water Loss Control
4	Metering and Commodity Rates	Yes	No	Foundational: Utility Operations – Metering
5	Large Landscape Audits	Yes	No	Programmatic: Landscape
6	High Efficiency Washing Machines	Yes	No	Programmatic: Residential
7	Public Information	Yes	Yes	Foundational: Education – Public Information Programs
8	School Information	Yes	Yes	Foundational: Education – School Education Programs
9	Commercial, Industrial, Institutional	Yes	No	Programmatic: Commercial, Industrial, Institutional
10	Wholesale Agency Assistance	No	Yes	Foundational: Utility Operations – Operations
11	Conservation pricing	Yes	Yes	Foundational: Utility Operations – Pricing
12	Conservation Coordinator	Yes	Yes	Foundational: Utility Operations – Operations
13	Water Waste Prohibition	Yes	No	Foundational: Utility Operations – Operations
14	Residential ULFT Replacement	Yes	No	Programmatic: Residential

Table 8.2 - Best Management Practices and Demand Management Measures

CUWCC BMP Organization and Names (2009 MOU)				UWMP DMMs	
Type	**Category**	**BMP #**	**BMP Name**	**DMM**	**DMM Name**
Foundational	Utility Operations Program	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 retrofits 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 information programs
Programmatic	Residential	3.1	Residential Assistance Program	A	Water survey programs for single-family residential and multi-family residential customers[1]
				B	Residential plumbing retrofit
		3.2	Landscape Water Survey	A	Water survey programs for single-family residential and multi-family residential customers[1]
		3.3	High Efficiency Clothes Washers	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 multi-family residential customers) applies to both BMP 3.1 (Residential assistance program) and BMP 3.2 (Landscape water survey)

8.2 Foundational BMPs

Foundational BMPs are considered to be essential water conservation activities by any utility and are adopted for implementation by all signatories to the MOU as ongoing practices with no time limits. Foundational BMPs are comprised of Utility Operations Programs and Education Programs. This section will describe the coverage requirements and EMWDs method of compliance for the Foundational BMPs.

8.2.1 Utility Operations Programs

Water utilities throughout California are implementing water conservation programs and providing services to the customers they serve. There are four subcategories that comprise signatory utility operation program responsibilities.

The Utility Operations Programs Foundational BMP encompasses old BMPs 3, 4, 10, 11, 12 and 13.

Operations Practices

This practice will outline several key actions that utilities shall take to better enable the implementation of conservation programs, to supplement conservation incentives with regulations where appropriate, and to assist one another through the wholesaler-retailer relationship.

Conservation Coordinator (DMM L)

Coverage requirements: Staff maintains the position of trained conservation coordinator, or equivalent consulting support, and provides that function with the necessary resources to implement BMPs.

Compliance method: EMWD has met the coverage requirements for this practice; full time Conservation staff consists of one conservation analyst, one conservation program supervisor, one conservation program specialist, and three conservation program assistants.

The **conservation analyst** serves as a liaison between EMWD and other public agencies, community and industry groups, and the media; recommends, develops and coordinates implementation of EMWD conservation programs; assists in analyzing program goals, performance measures, and sources of funding. The **conservation program supervisor** participates in the implementation of conservation programs; develops and implements programs to inform, educate and assist with efficient water use and conservation; represents EMWD with customers, in community events and meetings regarding conservation issues; develops and implements methods to measure improvements in water use efficiency and customer satisfaction. The **conservation program specialist** assists in the development and implementation of conservation programs; conducts water leak investigations; issues citations to enforce mandatory water conservation ordinances during times of water shortage; and represents EMWD with customers and community events and meetings on conservation issues. The **conservation program assistants** performs a variety of customer service functions related to water conservation; assist with residential, landscape and CII water surveys; measure landscape area for water budgets; send out water waste notices; research problems; and related duties assigned.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

Water Waste Prevention (DMM M)

Coverage requirements: Water agency shall do one or more of the following: (a) enact and enforce an ordinance or establish terms of service that prohibit water waste; (b) enact and enforce an ordinance or establish terms of service for water efficient design in new development; (c) support legislation or regulations that prohibit water waste; (d) enact an ordinance or establish terms of service to facilitate implementation of water shortages response measures; (e) support local ordinances that prohibit water waste; and/or (f) support local ordinances that establish permit requirements for water efficient design in new development.

Compliance method: EMWD has met the coverage requirements in the following ways:

- Ordinance 72.25 – Water Use Efficiency Ordinance, implemented January 1991 with the most recent revision effective January 2011. This ordinance prohibits water waste, imposes penalties for runoff, and requires efficient design in new development. This Ordinance is enforced in two ways, (1) through EMWD's allocation based tiered rate structure for single-family, multi-family and landscape accounts utilizing the domestic water system; and (2) though penalties for runoff.

- Ordinance 117.2 – Water Shortage Contingency Plan, implemented July 2005 with the most recent revision effective April 2009. This Ordinance is designed for the purpose of protecting the integrity of water supply facilities (infrastructure), and implementing a contingency plan in times of drought, supply reductions, failure of water distribution systems or emergencies.

- EMWD supports legislation and local ordinances that prohibit water waste, and supports local ordinances that establish requirements for water efficient design in new development. As a member of the Riverside County Water Task Force, EMWD participated in updating Riverside County's Water Efficient Landscape Requirements Ordinance 859.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

Wholesale Agency Programs (DMM J)

Coverage requirements: (a) Wholesale agency programs include financial investments and building partnerships, when mutually agreeable and beneficial to a wholesaler and its retail agencies cost effectiveness assessments, including avoided cost per acre-foot, for each BMP the wholesale agency is potentially obligated to support. (b) When requested, the wholesale agency will provide technical support, incentives, staff or consultant support, and equivalent resources to retail members to assist or otherwise support the implementation of BMPs. (c) When mutually beneficial to a wholesaler and its retail agencies, a wholesaler may offer program management and BMP reporting assistance to its retailers. Wholesale agencies have limited control over retail agencies, thus wholesale agencies cannot be held responsible for levels of implementation by individual retailers in their wholesale service area. (d) Water shortage allocation plans or policies will encourage and reward investment in long-term conservation. (e) Wholesale water agencies will report on non-signatory BMP implementation, when possible. (f) Wholesale agency will encourage CUWCC membership and offer recruitment assistance.

Compliance method: EMWD has met the coverage requirements in the following ways:

(a) Financial incentives provided for by MWD for a variety of water efficient devices are administered through two regional rebate programs; (1) Save-a-Buck for commercial customers; and (2) SoCal Water$mart for residential customers. Both residential and commercial customers of EMWD's sub-agencies are eligible to participate in the regional rebate programs.

(b) EMWD has hosted and/or conducted workshops for landscape professionals, including personnel and customers of EMWD's sub-agencies, providing certification opportunities for smart irrigation controller technologies. EMWD's Board members hold Director Advisory Committee meetings with stakeholders throughout the year; and staff members attend/participate at local city councils and planning commissions. EMWD also provides assistance to sub-agencies with various GIS mapping requests.

(c) Staff meets with sub-agencies to discuss conservation related topics. Regional incentive programs are administered though vendors assigned by MWD and sub-agencies are encouraged to participate in these programs. MWD hosts monthly water use efficiency meetings to discuss the implementation of conservation programs, EMWD's sub-agencies are encouraged to participate.

(d) Under the WSCP, supply to wholesale customers will be allocated using the formula and methodology based on MWD's Water Supply Allocation Plan as described in Section 5.This plan take into consideration; the impact on retail customers and the economy; population and growth; changes and/or loss of local supply; reclamation and recycling; conservation; and investment in local resources. EMWD will establish base period demands and then adjust them for growth and changes in local supply. Regional shortages will be phased in 10 stages. At each stage the wholesale customers will not experience shortages on the wholesale level that are greater than one-and-a-half times the percentage shortage of regional water supplies; nor will they face a retail shortage less than the regional shortage. Credits will be given for conservation and investment in local supplies.

(e) EMWD will evaluate the feasibility to provide BMP reports for sub-agencies that are non-signatories with CUWCC.

(f) EMWD has encouraged sub-agencies to become signatories of the CUWCC.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

<u>Water Loss Control (DMM C)</u>

The goals of modern water loss control methods include both an increase in water use efficiency in the utility operations and proper economic valuation of water losses to support water loss control activities. In May 2009 the American Water Works Association (AWWA) published the 3rd Edition M36 Manual "Water Audits and Loss Control Programs." BMP 1.2 incorporates these new water loss management procedures and applies them in California. Agencies are expected to use the AWWA Free Water Audit Software (AWWA Software) to complete their standard water audit and water balance.

Coverage requirements: (1) Compile the standard water audit and balance annually, using the AWWA Software, and beginning in the 2nd year of implementation agencies to test source, import, and production meters annually. (2) During the first four years of implementation, agencies shall improve the data accuracy and data completeness of the standard water balance, and achieve a "Water Audit Data Validity" score of 66 or higher using the AWWA software; and achieve data validity level IV no later than the end of the 5th year of implementation. (3) During the first four years of implementation, seek training in the AWWA water audit method and component analysis process, and complete a component analysis of real losses; and update analysis no less than every four years. (4) During years five through ten of implementation, agencies shall demonstrate progress in water loss control performance as measured my AWWA software real loss performance indicator "gallons per service connection per day;" gallons per mile of mains per day;" or achieving a performance indicator score that is (a) less than the agency's score the previous year; (b) less than the average of the agency's scores for the previous three years; (c) in the top 20% of all signatory agencies reporting with a Data Validity Level IV or (d) in year six and beyond, reducing real losses to or below the benchmark value determined by the Council's process. (5) Repair all reported leaks and breaks to the extent cost effective, establish and maintain a record keeping system for the repair of reported leaks by the end of year two, and include estimated leakage volume and repair cost to report by the end of year four. (6) Locate and repair unreported leaks to the extent cost effective.

Compliance method: EMWD has met the coverage requirements in the following ways:

(1) EMWD has compiled the standard water audit report to be submitted to CUWCC in February 2011. The following methods are used to test source, import and production meters:

Source Meters: Well meters are recalibrated annually. Filtration Plant and Desalter system supply meters are monitored against the raw water supply meters and serviced as needed. A program for scheduled meter maintenance is being developed.

Import Meters: MWD tests their connection meters bi-annually. EMWD's system meters are recalibrated annually and flows are monitored daily. Significant differences with MWD deliveries are addressed jointly between EMWD and MWD.

Production Meters: Production meters are bench tested by a certified independent laboratory. A plan to do volumetric testing at the sites is being developed.

(2) EMWD has contracted with a qualified water loss control consultant, Water System Optimization, Inc. (WSO) to do an audit and balance; evaluate existing data, methods and procedures, and recommend a phased program of improvements to data accuracy and completeness. EMWD will pursue phased implementation of recommended improvements based on justification and cost effectiveness. EMWD currently has a Water Audit Data Validity score of 70.

(3) Staff has attended AWWA sponsored training and a large cross section of staff attended a kick-off meeting to explain objectives and methodology

(4) WSO will assist EMWD in completing a component analysis of real losses by December 2011.

(5) EMWD repairs reported leaks and breaks to the extent that are cost effective. Currently, a work order tracking system is used to track pipeline and service leaks by type and completed repairs. This system is effective on a general scale; however, a more detailed system is needed to identify and track leaks more accurately. WSO will assist EMWD in developing a detailed tracking system.

(6) EMWD is currently in the process of soliciting a vendor, through a competitive bid process, to develop a leak detection program in order to identify unreported leaks.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections (DMM D)

For consistency with California Water Code (Section 525b), this BMP refers to potable water systems. A water meter is defined as a device that measures the actual volume of water delivered to an account in conformance with the guidelines of the American Water Works Association.

Coverage requirements: (1) Metering for all new service connections; (2) Establish a retrofit program for existing unmetered service connections; (3) Read meters and bill customers by volume of use; (4) Prepare a written plan, policy or program for meters that includes (census, testing, repair and replacement); (5) Identify barriers to retrofitting mixed use commercial accounts with dedicated landscape meters and conduct feasibility study(s) to assess the merits of providing incentives to switch mixed use accounts to dedicated landscape meters.

Compliance method: EMWD has met the coverage requirements for this measure; (1) meters are required on all new service connections; (2) all service connections in EMWD's service area are metered; (3) meters are read on a monthly basis and billed monthly in hundred-cubic feet (ccf); (4) EMWD's program for meter testing and replacement is referenced in Table 3 below; (5) EMWD is in the process of identifying commercial customers with mixed use meters. Upon completion of this process should be able to better identify barriers associated with retrofitting mixed use commercial meters with dedicated landscape meters.

Table 8.3 - Meter Testing and Replacement

Meter Type	Meter Size	Monthly (CCF) Consumption	Meter Testing Frequency	Meter Replacement Frequency
Residential	5/8" – 2"	N/A	Customer Request	Upon Failure
Commercial	3" and Larger	1001 – Above	6 Months	Upon Failure
Commercial	3" and Larger	401 – 1000	12 Months	Upon Failure
Commercial	3" and Larger	201 – 400	24 Months	Upon Failure
Commercial	3" and Larger	0 – 200	36 Months	Upon Failure
Sample	N/A	N/A	Bi-Annually[1]	Upon Failure

[1]. Based on age segment (1960's, 1961 – 1969, 1970 – 1979, etc.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

Retail Conservation Pricing (DMM K)

Retail Water Services Rates

Definition: Conservation pricing provides economic incentives (a price signal) to customers to use waster efficiently. Because conservation pricing requires a volumetric rate, metered water service is a necessary condition of conservation pricing.

This BMP is intended to reinforce the need for water agencies to establish a strong nexus between volume-related systems costs and volumetric commodity rates. Conservation pricing requires volumetric rates. The goal of this BMP is to recover the maximum amount of water sales revenue from volumetric rates that is consistent with utility costs (which may include utility long-run marginal costs), financial stability, revenue sufficiency, and customer equity. In addition to volumetric rates, conservation pricing may also include service connection charges, meter service charges and/or special rates and charges for temporary service, fire protection service and other irregular services provided by the utility.

The following volumetric rate designs are potentially consistent with the above definition:

(1) **Uniform rate** in which the volumetric rate is constant regardless of the quantity consumed

(2) **Seasonal rates** in which the volumetric rate reflects seasonal variation in water delivery costs

(3) **Tiered rates** in which the volumetric rate increases as the quantity used increases

(4) **Allocation-based rates** in which the consumption tiers and respective volumetric rates are based on water use norms and water delivery costs established by the utility

Coverage requirements: Maintain a rate structure that satisfies at least one of the two options listed in the CUWCC's Memorandum of Understanding. Conformance will be assessed by using (1) most recent year data or (2) average revenue from three most recent years when most recent year data does not satisfy the option.

Compliance method: EMWD has met the coverage requirements in the following ways:

In February 2009, EMWD implemented an allocation based tired rate structure for single-family residential, multi-family residential and landscape accounts. The rate structure was instituted to promote the efficient use of water, and is designed to provide customers a significant economic incentive to use the proper amount of water required to serve indoor and outdoor (landscape) demands. This is accomplished by setting a customized "allocation" for each customer account based on a variety of factors such as: irrigated area, daily weather characteristics, size of household, and other more unique characteristics such as the presence of a pool, livestock or medical needs. Water is then sold to customers under a four tier structure based upon their monthly allocation which varies for landscape use relating to daily weather patterns. Customers using water within their allocation purchase water in the lower two tiers. Customers using in excess of their allocation also purchase water in the remaining two tiers that generally will result in relatively high water bills which can send a strong pricing signal for excessive use. The Tiered rate structure was also designed to so that 70 percent of the rate is variable.

Retail Wastewater Rates

Conservation pricing of sewer service provides incentives to reduce average or peak use, or both. Such pricing includes: (a) rates designed to recover the cost of providing service, and (b) billing for sewer service based on metered water use.

The following characterizes conservation pricing of sewer services:

(1) **Uniform rates** in which the unit rate is the same across all units of service

(2) **Increasing block rates** in which the unit rate increases as the quantity of units purchased increases

(3) Rates in which the unit rate is based upon the long-run marginal cost or the cost of adding the next unit of capacity to the sewer system

Rates that charge customers a fixed amount per billing cycle for sewer service regardless of the unit of service consumed; and/or rates in which the typical bill is determined by high fixed charges and low commodity charges do not satisfy the definition of conservation pricing of sewer services.

Coverage requirements: Maintain a rate structure for sewer service consistent with the characteristics of conservation pricing for services.

Compliance method: EMWD has met the coverage requirements in the following ways:

EMWD uses a uniform rate for sewer charges.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

8.3 Education Programs

California water agencies have played a major role in stressing the need for their customers to conserve water through both public information and school education programs.

8.3.1 Public Information Programs (DMM G)

Public information programs can be an effective tool to inform customers about the need for water conservation and ways they can conserve, and to influence customer behavior to conserve. The following actions are necessary to implement a public information program to promote water conservation and related benefits:

- **Public speakers** to employees, community groups and the media
- **Advertising** using paid and public service
- **Customer communication** using bill inserts and on bill comparison charts for multi-year usage
- **Coordination** with government agencies, industry groups, public interest groups and media

- **Marketing** designed to change attitudes and influence behavior

Coverage requirements: Maintain an active public information program to promote and educate customers about water conservation. Minimum program components consist of: (1) providing public speakers to employees, community groups and the media; using paid and public service advertising; using bill inserts; providing information on customers' bills; providing public information to promote water conservation measures and coordinating with other government agencies, industry groups, public interest groups and the media; (2) social marketing elements which are designed to change attitudes and influence behavior. This includes seeking input for the public to shape the water conservation message, training stakeholders outside the utility staff in water conservation priorities and techniques; and developing partnerships with stakeholders who carry the conservation message to their target markets; and (3) wholesale agency or another lead regional agency may operate all or part of the education program.

Compliance method: EMWD has met the coverage requirements in the following ways:

(1) EMWD provides public speakers at new employee orientation which is conducted twice each year; provides information to employees via intranet updates on a regular basis, and occasionally provides employees with fact sheets or talking points on typical issues that may be topics of discussion with individuals outside of EMWD. Public speakers are also provided to community groups, in a variety of settings such as rotary clubs, homeowners associations, religious organizations, mobile home parks, etc. On the average EMWD provides speakers to multiple groups/events each month. EMWD maintains a liaison with reporters by phone, email and direct contact regarding topical issues relating the need to encourage water use efficiency throughout the service area. EMWD utilizes a number of means for paid advertising such as the Riverside County Fair program, various Chambers of Commerce programs and newsletters, and Community Council newsletters. Monthly cable slides are used for public service advertising. Customer communication includes bill inserts, bill messaging, monthly usage comparisons on the water bills and bi-monthly newsletters.

(2) EMWD provides public information to promote water conservation measures. In an effort to affect changes in attitude and influence behavior, the "Water Use It Wisely" (WUIW) conservation campaign was adopted as a theme; EMWD has active pages on common social marketing sites that are updated daily; and a conservation website that is updated on a regular basis. Addressing the subject of training stakeholders, EMWD has hosted and/or conducted workshops for landscape professionals, providing certification opportunities for smart irrigation controller technologies. EMWD's Board members hold Director Advisory Committee meetings with stakeholders throughout the year; and staff members attend/participate at local city councils and planning commissions.

(3) As a wholesale agency, EMWD takes the lead in an annual landscaping competition with customers from EMWD, WMWD, and Inland Empire Utilities Agency (IEUA) and the respective sub-agencies. EMWD also provides support to Valley Beautiful, a local community group, with their garden tours. EMWD provides support to other water agencies during Community Water Conservation Festivals and other related functions.

    EMWD participates in MWD's regional rebate programs administered through Save-a-Buck for commercial customers and SoCal Water$mart for residential customers.

8.3.2 School Education Programs (DMM H)

School education programs have been implemented to reach the youngest water users at an early age and enforce the need to engage in water conservation as a life-long behavior. The following actions are necessary to implement school education program to promote water conservation and related benefits:

(1) Provide instructional assistance to school districts and private schools within service area
(2) Provide educational materials and classroom presentations that identify urban, agricultural and environmental issues and conditions in the local watershed
(3) Develop and/or provide grade appropriate educational materials that meet the state education framework requirements

Coverage requirements: Maintain an active school education program to educate students in the agency's service area about water conservation and efficient water use. Minimum program components consist of: (1) implement a school education program to promote water conservation and related benefits; (2) work with school districts and private schools in service area to provide instruction assistance, educational materials and classroom presentations that identify urban, agricultural, and environmental issues and conditions in the local watershed. Educational materials must meet the state education framework requirements; and (3) wholesale agency or another lead regional agency may operate all or part of the education program.

Compliance method: EMWD has met the coverage requirements in the following ways:

(1) EMWD has a very robust school education program that promotes water conservation and all aspects of environmental education. Additionally, EMWD works very closely with public and private schools within both its retail and wholesale service areas to provide educational materials which are in alignment with the California content standards for grades K-12.

(2) EMWD provides classroom presentations covering water conservation, potable water treatment, wastewater treatment, and all aspects of environmental education. EMWD sponsors weekly field trips, for students in ten school districts throughout EMWD's service area to tour one of EMWD's wastewater treatment facilities and wetlands project. EMWD provides materials developed by the MWD and Channing Bete for K-12 students. EMWD has also developed a variety of curriculum for K-5 students including:

- Wastewater Treatment for All Curious Beings – activity book
- Dewie the Dragon – curriculum packet
- Gobi's Adventure – curriculum packet
- Otis the Turtle gets Water Wise – curriculum packet

The following contests are also promoted by EMWD on a quarterly basis:

- Grades K-5 Students – Poster contest "Water Use it Wisely"
- Grades 6-8 Students – Language Arts contest (resulted in a published book, written & illustrated by 6-8 students)
- Grades 9-12 Students – Solar Cup event (MWD provides boat hull for students to assemble and EMWD provides financial support for students to outfit the boat with a motor and solar panels)

EMWD participates in the following school and community activities:

- Environmental, science, health, and community fairs – provide activities and materials
- Annual environmental youth conference – provided in partnership with other agencies
- Environmental assembly program for schools in EMWD's service area

EMWD offers the following assistance for teachers in the service area:

- Financial assistance to take the online college-level course "Teaching the Water Story"[1]
- Training programs offered by EMWD and MWD
- Training workshops offered by EMWD in partnership with other agencies to spotlight programs
- Training for Project WET offered

1. EMWD, in partnership with other local agencies, developed an online college-level course, "Teaching the Water Story." This course is offered to students worldwide through Fresno Pacific University

(3) As a wholesale agency, EMWD has created the language arts program "Write Off" for middle school students, and is the lead agency in partnership with Rancho California Water District (RCWD), a sub-agency of EMWD. Two programs, which include complete curriculum packets, have resulted from this program, and agencies throughout California have either duplicated the program or have requested materials to add to their current education programs.

EMWD is one of MWD's member agencies, as such MWD has taken the lead as the wholesale agency in the Student Art Program and the Annual Solar Cup Event. MWD has also provided curriculum for K-12 students.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

8.4 Programmatic BMPs

Programmatic BMPs are designed to achieve quantifiable water savings. Compliance with these BMPs can be achieved by two approaches; traditional implementation as prescribed by the components of the BMP category or by the Flex Track Menu Alternatives option, included in each programmatic BMP. Requirements for compliance are determined by base year data from single-family residential (SFR) customers, multi-family residential (MFR) units, and commercial, industrial and institutional (CII) customers.

EMWD has chosen to use the Flex Track approach for Programmatic BMP compliance. This section will identify the traditional coverage requirements and EMWD's approach to be in compliance with the Programmatic BMPs.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

8.4.1 Residential

Residential water users throughout California depend on a reliable and safe supply of water for their homes. This BMP will define the best and most proven water conservation methods and measures that single-family residential (SFR) and multi-family residential (MFR) customers, working in conjunction with water agencies, can implement to increase water use efficiency and reliability.

The Residential Programmatic BMP encompasses old BMPs 1, 2, 6 and 14. Compliance with this category can be achieved by two approaches; traditional implementation as prescribed by the components of the BMP category or by the Flex Track Menu Alternatives option.

The traditional approach includes completing the coverage requirements, as defined in the BMP category for residential water surveys, residential plumbing retrofits, high efficiency washing machines and toilet replacements.

The Flex Track menu alternative allows an agency to achieve water savings by implementing alternative programs that are able to tack water savings and/or focusing on one or more of the prescribed components of the BMP category.

Residential Assistance Program (DMM A and B)

Traditional coverage requirements: Determine the current number of SFR accounts and MFR units in EMWD's service area. Provide site specific leak detection assistance that may include, (a) water conservation surveys; (b) water efficiency suggestions; and/or (c) inspection, to an average of 1.5% per year of current SFR accounts and 1.5% per year of MFR units during the 10-year period covering fiscal years (FY) 2009/10 – 2018/19. After meeting the 15% target, program maintenance will continue at a level of high-bill complaints with a minimum of 0.75% per year for SFR accounts and 0.75% per year MFR units. WaterSense Specified (WSS) showerheads and faucet aerators may be provided to customers as needed.

Approach: In 1997 EMWD's Conservation staff began performing Residential surveys on a limited basis; during FY 2007/08 and a portion of FY 2008/09 these surveys were outsourced to a third party; in early 2009 the number of Conservation staff members increased, and in April 2009 the function of performing residential surveys was resumed by internal staff. More than 2,700 surveys have been completed since 1997. Components of the indoor water survey include checking the water meter leak detector and testing the water meter for accuracy; testing flow rates for kitchen faucet, bathroom faucet(s) and showerhead(s) to determine gallons per minute (gpm); verify toilet(s) gallons per flush (gpf) and perform a leak detection dye test on each toilet; verify use of dishwasher, hot water heater setting and clothes washer type. Upon completion of each survey, the customer is provided with a report that includes survey results and water efficient recommendations, along with information on incentives for eligible water saving devices when available. Showerheads, aerators and toilet flappers are distributed with surveys as needed.

In addition to surveys EMWD provides leak detection assistance to customers through the distribution of conservation packets. On the average, staff members also distribute more than 250 conservation packets to residential customers each month. These packets are available in both English and Spanish to accommodate the needs of a majority of EMWD's residential retail customers. Conservation packets provide the customer with information on how to read their water meter, leak detection dye tablets for toilets, and instructions on how to identify leaks in the home.

EMWD also provided 1,900 WaterWise residential indoor conservation kits though public schools within EMWD's service area during fiscal year 2008/09, which included shower heads and aerators. Since 1990 EMWD has maintained a program to provide residential customers with water efficient showerheads and faucet aerators, nearly 60,000 devices have been distributed to SFR and MFR customers. These devices continue to be distributed when needed and are made available to customers at EMWD's office, as part of the residential survey program and at various outreach events.

EMWD has determined that the current number of SFR accounts for FY 2009/10 amount to 124,527 and MFR units amount to 4,249.

This BMP will continue to be met through the flex track option using various methods listed above.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

Landscape Water Survey (DMM A)

Traditional coverage requirements: Determine the current number of SFR accounts in EMWD's service area. Perform site specific landscape water surveys to an average of 1.5% per year of current SFR accounts during the first 10 years. After completing the 15% target, program maintenance will continue at a level of high-bill complaints with a minimum of 0.75% per year for SFR accounts.

Approach: EMWD has determined that the current number of SFR accounts for FY 2009/10 amount to 124,527. The landscape water survey requirement is being met through the implementation of tiered rates. A water budget for efficient landscape irrigation was developed for all residential customers. The water budget is enforced monthly through a tiered billing system. For those who exceed budget targets, residential surveys. Staff members perform on-site landscape surveys as part the complete residential survey. Components of the outdoor water survey for SFR accounts include checking the water meter leak detector and testing the water meter for accuracy; check irrigation timer programming; run a one minute test for each irrigation station obtain gpm data and check for system leaks; check system pressure; obtain plant and soil type(s) for reporting and measure irrigated landscape area. Upon completion of each survey, the customer is provided with a report that includes survey results and a watering schedule, water efficient recommendations, and information on incentives for eligible water saving devices when available. EMWD has also developed a cost share program for the direct installation of residential smart irrigation controllers, and on-site landscape surveys are a component of this program.

This BMP will be met through the flex track option as described above.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

High Efficiency Clothes Washers (DMM F)

Traditional coverage requirements: Provide financial incentives or institute ordinance requiring the purchase of High Efficiency Clothes Washers (HECW) to meet an average water factor value of 5.0. Financial incentives shall be provided for the purchase of HECWs to 0.9% of current SFR accounts during the first reporting period and 1.0% per year for the remainder of the 10 year period. An alternative method is to demonstrate 1.4% per year of the market penetration during the first ten years.

Approach: EMWD has determined that the current number of SFR accounts for FY 2009/10 amount to 124,527 and MFR units amount to 4,249. EMWD has provided incentives for HECWs since 2001 and to date an estimated 6,624 HECWs have received financial incentives, of which approximately 5,572 have an average water factor of 5.0 or less. In late 2010, EMWD established partnerships with the U.S Bureau of Reclamation (USBR) through grant funding, and Southern California Gas Company (SoCal Gas), for the direct installation of 1,700 HEWs with a water factor of 4.0 or less.

This BMP will be met through the flex track option with EMWD's incentive program and direct install program.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

WaterSense Specification Toilets (DMM N)

Traditional coverage requirements: Provide incentives or ordinance requiring the replacement of toilets using 3.5 or more gpf (gallons per flush) with toilets meeting WSS. Compliance will entail demonstrating a number of toilet replacements of 3.5 gpf or greater toilets at or above the level achieved through a retrofit on resale ordinance until 2014, or a market saturation of 75% is demonstrated, whichever is sooner.

Approach: EMWD began offering incentives for toilet retrofits in 1992, beginning with Ultra Low-Flush Toilets (ULFT). Incentives included customer rebates and free distribution events. Incentives for High Efficiency Toilets (HET) were added in 2005. HET incentive programs included customer rebates, free distribution events and a direct installation program which began in 2008. Since the program's beginning in 1992, EMWD has provided incentives for approximately 17,371 ULFTs and approximately 22,613 HETs. EMWD is currently in the process of developing a share of cost, direct install program for WSS stealth toilets, designed to achieve a greater savings than HETs.

This BMP will be met through the flex track option with EMWD's direct installation programs conducted during fiscal years 2008/09, 2009/10 and 2010/11.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

8.4.2 Commercial, Industrial, and Institutional (DMMI)

Commercial, Industrial, and Institutional (CII) water demands make up a large percentage of total demand for California. CII water use varies dramatically between business sectors as well as within a given water agency's territory. The goal of this BMP is to implement comprehensive yet flexible BMPs, allowing each water agency to tailor the implementation of each practice to fit local needs and opportunities. The end result is a practice that is successful and will produce the greatest amount of cost-effective water savings.

Traditional coverage requirements: Implement measures to achieve the water savings goal for CII accounts of 10% of the 2008 baseline water use over a 10-year period. To remain on track to meet the annual water savings goal, estimated savings for the first two-year reporting period may be up to 0.5% followed by 2.4% by the end of year four; 4.3% by the end of year six; 6.4% by the end of year eight and 9% by the end of year 10. EMWD uses fiscal year data and reporting periods are as follows:

(1) 2008/09 – 2009/10 (first two-year reporting period)
(2) 2010/11 – 2011/12 (end of year four)
(3) 2012/13 – 2013/14 (end of year six)
(4) 2014/15 – 2015/16 (end of year eight)
(5) 2016/17 – 2017/18 (end of year ten)

Compliance method for CII Programmatic BMP: Baseline water use for EMWD's CII customers in 2008 was a total of 7,763 acre feet (AF). Credit for prior activities, as reported through the BMP database, will be given for up to 50% of the goal. EMWD has been in compliance with this BMP for CII customers and should receive credit for past efforts, which will be applied when the revised BMP reporting database is complete. Savings goals for the new 10-year period will be determined after credit is applied. EMWD may be required to achieve a reduction in CII usage up to 38.8 AFY by the end of 2010/11.

Financial incentives provided for by MWD for a variety of water efficient devices used in the CII sector are administered through the Save-a-Buck regional rebate program. In 2008 EMWD implemented the Public School Retrofit program; providing surveys and direct installation of both indoor and outdoor devices for more than 40 school sites with EMWD's retail service area. In 2009, conservation staff developed a program to identify CII accounts with mixed used meters, accounts with the highest water use are contacted first and offered CII water use surveys; to date an estimated 560 accounts have been contacted and 50 surveys have been completed. Components of the CII water use survey include checking the water meter leak detector and testing the water meter for accuracy; check irrigation timer programming; run a one minute test for each irrigation station obtain gpm data and check for system leaks; check system pressure; obtain plant and soil type(s) for reporting and measure irrigated landscape area. Upon completion of each survey, the customer is provided with a report that includes survey results and a watering schedule, water efficient recommendations, and information on incentives for eligible water saving devices when available.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

8.4.3 Landscape (DMM E)

Irrigation accounts for a large portion of the urban water use in California. Irrigation water use varies dramatically depending on water pricing and availability, plant choice, geographic locations, seasonal conditions, and the level of commitment to sound water efficiency practices. The goal of this BMP is that irrigators, with assistance from signatories, will achieve a higher level of water use efficiency consistent with the actual irrigation needs of the plant materials. Reaching this goal would reduce overall demands for water, reduce demands during the peak summer months, and still result in a healthy and vibrant landscape in California.

Agencies shall provide non-residential customers with support and incentives to improve their landscape water use efficiency. Credit will be given for documented water savings for prior activities through 2008.

Accounts with Dedicated Irrigation Meters

Traditional coverage requirements: (1) Identify accounts with dedicated irrigation meters and assign ETo-based water budgets equal to no more than an average of 70% ETo (reference Evapotranspiration) of annual average local ETo per square foot of landscape area. (2) Provide notices each billing cycle showing the relationship between the budget and actual consumption. (3) Offer site-specific technical assistance to reduce water use to those accounts that are 20% over budget at a rate of 9% per year with a 90% over 10 years. (4) Implement and maintain a customer incentive program for irrigation equipment retrofits.

The California Model Water Efficient Landscape Ordinance currently requires 70% ETo; should this ordinance be revised to reduce water allowance, this BMP will be revised automatically to reflect that change.

Recreational areas (portions of parks, playgrounds, sports fields, golf courses, or school yards in public and private projects where turf provides a playing surface or serves other high-use recreational purposes) and areas permanently and solely dedicated to edible plants, such as orchards and vegetable gardens, may require water in addition to the water use budget, these designated areas may not exceed 100% ETo on an annual basis.

Approach: (1) Through the tiered rate process, EMWD has developed water budgets for 100% of dedicated landscape accounts; (2) Water bills for these accounts include data that reflect the relationship between the water budgets 70% ETo and actual usage; (3) Each water bill for dedicated landscape meters, provides a contact number with an offer for assistance. An audit program and technical assistance are made available to customers that make a request; and (4) EMWD has offered financial incentive programs for landscape since 1992, including large landscape audits, soil moisture sensors, WBIC rebate and distribution, large rotary nozzle rebates, rotating nozzle and synthetic turf rebates. In 2006 EMWD implemented a program to supplement the cost of high efficiency nozzles, including labor for installation, for large landscape accounts. In 2008 EMWD also implemented a public school retrofit program that includes the direct installation of WBICs and high efficiency nozzles. EMWD is currently in the process of developing an assistance program for large landscape accounts that will include incentives for efficient irrigation equipment.

Commercial, Industrial, Institutional (CII) Accounts without Meters or with Mixed-Use Meters

Traditional coverage requirements: (1) Develop and implement a strategy, targeting and marketing large landscape water use surveys to CII accounts with mixed-use meters. (2) Complete irrigation water use surveys for not less than 15% of all CII accounts with mixed-use meters within 10 years at an average rate of 1.5% per year. (3) Implement and maintain a customer incentive program for irrigation equipment retrofits.

Approach: (1) EMWD's retail service area includes an estimated 3,000 CII accounts. (2) In July 2009, Conservation staff developed a program to identify CII accounts with mixed use meters and offer on-site surveys, to date an estimated 560 accounts have been contacted and 50 surveys have been completed. (3) EMWD has offered financial incentive programs for landscape since 1992, including large landscape audits, soil moisture sensors, WBIC rebate and distribution, large rotary nozzle rebates, rotating nozzle and synthetic turf rebates.

Evaluation of Effectiveness: Effectiveness is measured through compliance with the CUWCC MOU.

8.5 Effect of BMP Implementation

In 2010, EMWD estimates that 12,300 AF of potable water was saved through the implementation for conservation programs including the implementation of the BMPs. Water saving was due to ordinances in place, the implementation of tiered rates and through active conservation. As discussed in Section 2.4, EMWD will continue to improve water efficiency through a budget based tiered rate, requirements for water efficiency in new construction and an active conservation program. Water use reduction will be focused on outdoor demand reduction by all customer types. Maintaining the target GPCD of 184 will save up to 30,900 AFY in 2035. Even meeting the efficiency target, EMWD estimates that there is the potential for an additional 6,400 AFY of conservation saving in 2035 as discussed in Section 4.4.

8.6 Demand Management Measure Review Checklist

DMM REVIEW FOR Eastern Municipal Water District

DMM A – Water Survey Programs for Single-Family and Multi-Family Residential Customers (10631 (f)(1)(A))

Implementation

[X] Describe the **residential water survey program** currently being implemented or scheduled for implementation (10631) (f) (1)(2)) — 8.4.1 pg. 88/89 — Reference & Page Number

Description may include:

- [X] Year program implemented or scheduled for implementation — 1997 — Year
- [X] Description of components of the indoor water survey for SFR and MFR
- [X] Description of components of the outdoor water survey for SFR and MFR
- [X] Description of information / items provided to customer upon completion of the survey
- [X] Quantification of surveys, if available **(Data for full residential surveys included below)**

Table A1

Actual	2006	2007	2008	2009	2010
Number of single family surveys	43	27	266	782	310
Number of multifamily surveys	0	0	0	0	394
Actual water savings - AFY	1.0	0.6	6.3	18.4	11.2

Table A2

Planned	2011	2012	2013	2014	2015
Number of single family surveys	480	480	480	480	480
Number of multifamily surveys	20	20	20	20	20
Projected water savings - AFY	11.5	11.5	11.5	11.5	11.5

COMMENT

[X] Describe steps necessary to implement measure — 8.4.1 pg. 89 — Reference & Page Number

Description may include:

- [ ] Marketing / targeting strategy for SFR and MFR water use surveys
- [ ] Methods of tracking numbers of surveys requested or completed

[x] Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not evaluated, please provide an explanation — 8.4.1 pg. 89 — Reference & Page Number

[x] Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation — 8.5 pg 93 — Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) — Not applicable — Reference & Page Number

Evaluation shall take into account:

- [ ] Economic and non-economic factors (10631(g)(1))
- [ ] Environmental, social, health and technological factors (10631 (g)(1))
- [ ] Customer impact (10631 (g)(1))
- [ ] Legal authority (10631 (g)(4))

Table A3 – 10631 (g)(2) Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

☐ Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(4)). ______ Reference & Page Number

☐ No planned water supply projects at a high unit cost than cost of DMM ______ Reference & Page Number

☐ If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(3) &(h)). ______ Reference & Page Number

If Another Agency Implementing

☐ If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM B – Residential Plumbing Retrofit (10631(f)(1)(B))

Implementation

X Describe the **residential plumbing retrofit program** currently being offered or scheduled to be offered (10631) (f) (1)(2)) 8.4.1 pg 87 Reference & Page Number

Description may include:

- X Year program implemented or scheduled for implementation 1997 Year
- X Description of devices provided to customer
- ☐ Whether there is an enforceable ordinance in your service area requiring replacement of high-flow water fixtures
- ☐ Quantification of devices distributed, if available **(Included Below)**

Table B1

Actual	2006	2007	2008	2009	2010
Number of single family devices	43	27	266	782	310
Number of multifamily devices		0	0	0	394
Actual water savings - AFY	0.3	0.2	1.6	4.8	4.3

Table B2

Planned	2011	2012	2013	2014	2015
Number of single family devices	480	480	480	480	480
Number of multifamily devices	20	20	20	20	20
Projected water savings - AFY	3	3	3	3	3

COMMENT

X Describe steps necessary to implement measure 8.4.1 pg. 89 Reference & Page Number

Description may include:

- ☐ Marketing / targeting strategy for retrofit program
- ☐ Methods of tracking numbers of surveys requested or completed

x Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not evaluated, please provide an explanation 8.4.1 pg. 89 Reference & Page Number

x Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation 8.5 pg 93 Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) Not Applicable Reference & Page Number

Evaluation shall take into account:

☐ Economic and non-economic factors (10631(g)(1))

☐ Environmental, social, health and technological factors (10631 (g)(1))

☐ Customer impact (10631 (g)(1))

☐ Legal authority (10631 (g)(4))

Table B3 – 10631 (g)(2)	
Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

☐ Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). ________ Reference & Page Number

☐ No planned water supply projects at a high unit cost than cost of DMM ________ Reference & Page Number

☐ If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). ________ Reference & Page Number

If Another Agency Implementing

☐ If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM C – System Water Audits, Leak Detection and Repair (10631(f)(1)(C))

Implementation

X Describe the **system water audit and leak detection and repair program** currently being implemented or scheduled for implementation (10631) (f) (1)(2)) 8.2.1 pg 81,82 Reference & Page Number

X Describe steps necessary to implement measure 8.2.1 pg. 81,82 Reference & Page Number

Description may include:

- X Year program implemented or scheduled for implementation 2011 Year
- ☐ Whether a water audit is performed to determine unaccounted-for water loss; year last audit performed
- ☐ The percentage of unaccounted-for water
- ☐ Whether your agency has an active leak detection program (as opposed to only fixing leaks when found)
- ☐ Description of the leak detection program
- ☐ An estimate of water savings from repair of leaks

COMMENT

x Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not evaluated, please provide an explanation 8.2.1 pg. 82 Reference & Page Number

x Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation 8.5 pg 93 Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) Not Applicable Reference & Page Number

Evaluation shall take into account:

☐ Economic and non-economic factors (10631(g)(1))

☐ Environmental, social, health and technological factors (10631 (g)(1))

☐ Customer impact (10631 (g)(1))

Table C1 – 10631 (g)(2)	
Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	

☐ Legal authority (10631 (g)(4)) | Water Savings AFY |

☐ Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). ______ Reference & Page Number

☐ No planned water supply projects at a high unit cost than cost of DMM ______ Reference & Page Number

☐ If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). ______ Reference & Page Number

If Another Agency Implementing

☐ If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM D – Metering with Commodity Rates (10631(f)(1)(D))

☒ **SYSTEM FULLY METERED** 8.2.1 pg 82 Reference & Page Number

Implementation Not Applicable

☐ Describe the **residential meter installation retrofit program** currently being implemented or scheduled for implementation (10631) (f) (1)(2)) Reference & Page Number

Description may include:

- ☐ Year program implemented or scheduled for implementation Not Applicable Year
- ☐ The current number of connections and number of unmetered connection
- ☐ The current rate of meter retrofit for unmetered connections
- ☐ The expected year of completion to meet A306 (2003-04), which requires all connections be metered by 2025 (WC527(a)(1)).
- ☐ The number of connections billed by volume-of-use
- ☐ Quantification of meters installed, if available

Table D1

Actual	2006	2007	2008	2009	2010
Number of unmetered accounts					
Number of retrofit meters installed					
Number accts w/o commodity rates					
Actual water savings - AFY					

Table D2

Planned	2011	2012	2013	2014	2015
Number of unmetered accounts					
Number of retrofit meters installed					
Number accts w/o commodity rates					
Projected water savings - AFY					

COMMENT

☐ Describe steps necessary to implement measure Not Applicable Reference & Page Number

Description may include:

- ☐ Marketing / targeting strategy for conversion to metered deliveries
- ☐ Methods of tracking numbers of meters installed

☒ Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not evaluated, please provide an explanation 8.2.1 pg 83 Reference & Page Number

[x] Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation — 8.5 pg 93 — Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) — Not Applicable — Reference & Page Number

Evaluation shall take into account:

[ ] Economic and non-economic factors (10631(g)(1))

[ ] Environmental, social, health and technological factors (10631 (g)(1))

[ ] Customer impact (10631 (g)(1))

[ ] Legal authority (10631 (g)(4))

Table D3 – 10631 (g)(2)	
Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

[ ] Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). — Reference & Page Number

[ ] No planned water supply projects at a high unit cost than cost of DMM — Reference & Page Number

[ ] If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). — Reference & Page Number

If Another Agency Implementing

[ ] If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM E –Large Landscape Conservation Programs and Incentives (10631(f)(1)(E))

Implementation

[X] Describe the **large landscape conservation program** currently being implemented or scheduled for implementation (10631) (f) (1)(2)) — 8.4.3 pg 92,93 — Reference & Page Number

Description may include:

- [X] Year program implemented or scheduled for implementation — 1992 — Year
- [X] Number of dedicated irrigation meters, CII accounts with landscape meters and/or surveys
- [X] Elements of the landscape that are surveyed (e.g. irrigation efficiency, area of landscape, area of turf, distribution uniformity, etc)
- [X] Information on evaluation provided to the customer
- [X] Whether a budget is developed for surveyed area
- [X] Quantification of surveys and budgets completed, if available **(See Below. Water savings estimated based on budget based tiered rate implementation.)**

Table E1

Actual	2006	2007	2008	2009	2010
Number of surveys completed	10	3	6	21	13
Number of budgets developed	855	1087	1,253	2,112	2,138
Number of follow-up visits	00	0	0	0	0
Actual water savings - AFY				900	900

Table E2

Planned	2011	2012	2013	2014	2015
Number of surveys completed	0	0	0	0	0
Number of budgets developed	2,300	2,500	2,700	3,000	3,300
Number of follow-up visits	0	0	0	0	0
Projected water savings - AFY	950	1,000	1,150	1,300	1500

COMMENT

[X] Describe steps necessary to implement measure — 8.4.3 pg 92,93 — Reference & Page Number

Description may include:

- [ ] Marketing / targeting strategy for landscape surveys
- [ ] Methods of tracking numbers of surveys performed and budgets developed
- [ ] Methods of calculating water savings after survey performed

[x] Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not evaluated, please provide an explanation — 8.4.3 pg 93 — Reference & Page Number

[x] Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation — 8.5 pg. 93 — Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) — Not Applicable — Reference & Page Number

Evaluation shall take into account:

- [ ] Economic and non-economic factors (10631(g)(1))
- [ ] Environmental, social, health and technological factors (10631 (g)(1))
- [ ] Customer impact (10631 (g)(1))
- [ ] Legal authority (10631 (g)(4))

Table E3 – 10631 (g)(2) Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

[ ] Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). — Reference & Page Number

[ ] No planned water supply projects at a high unit cost than cost of DMM — Reference & Page Number

[ ] If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). — Reference & Page Number

If Another Agency Implementing

[ ] If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM F –High Efficiency Washing Machine Rebate Programs (10631(f)(1)(F))

Implementation

[X] Describe the **high efficiency washing machine rebate program** currently being implemented or scheduled for implementation (10631) (f) (1)(2)) — 8.4.1 pg 90 — Reference & Page Number

Description may include:

- [X] Year program implemented or scheduled for implementation — 2001 — Year
- [X] Whether your agency or any other agency provides rebates
- [x] Quantification of rebates paid, if available (Saving estimated based on average water factor of 5)

Table F1

Actual	2006	2007	2008	2009	2010
$ per rebate		$175	$175	$175	$140
Number of rebates paid	537	578	1,131	1,403	589
Actual water savings - AFY	16.7	17.8	35.2	43.6	18.3

Table F2

Planned	2011	2012	2013	2014	2015
$ per rebate	$140	$140	$140	$140	$140
Number of rebates paid	1,300	1,500	1,500	1,200	1,200
Projected water savings - AFY	40.4	46.7	46.7	37.3	37.3

COMMENT

[X] Describe steps necessary to implement measure — 8.4.1 pg. 90 — Reference & Page Number

Description may include:

- [ ] Marketing / targeting strategy for rebates
- [ ] Methods of tracking numbers of rebates awarded
- [ ] Methods of calculating water savings after rebate

[x] Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not evaluated, please provide an explanation — 8.4.1 pg. 90 — Reference & Page Number

[x] Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation — 8.5 pg. 93 — Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) — Not Applicable — Reference & Page Number

Evaluation shall take into account:

- [ ] Economic and non-economic factors (10631(g)(1))
- [ ] Environmental, social, health and technological factors (10631 (g)(1))
- [ ] Customer impact (10631 (g)(1))
- [ ] Legal authority (10631 (g)(4))

Table F3 – 10631 (g)(2) Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

[ ] Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). — Reference & Page Number

- [ ] No planned water supply projects at a high unit cost than cost of DMM — Reference & Page Number

[ ] If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). — Reference & Page Number

If Another Agency Implementing

☐ If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM G –Public Information Program (10631(f)(1)(G))

Implementation

☒ Describe the **public information program** currently being implemented or scheduled for implementation (10631) (f) (1)(2)) — 8.3.1 pg 84,85 — Reference & Page Number

Description may include:

- ☐ Year program implemented or scheduled for implementation — ______ Year
- ☒ Description of publications, venues, demonstration garden, or other public information programs
- ☐ Quantification of rebates paid, if available

Table G1					
Actual	2006	2007	2008	2009	2010
Paid Advertising	7	10	11	14	22
Public Service Announcement	2			2	4
Bill Inserts / Newsletters / Brochures	27	12	15	16	16
Bill comparing previous water usage				3	12
Demonstration Gardens			1	1	1
Special Events, Media Events	4	6	8	8	8
Speakers Bureau	24	15	20	20	20
Program to coordinate with other govt agencies, industry and public interest groups and media	Yes	Yes	Yes	Yes	Yes

COMMENT

Table G2					
Planned	2011	2012	2013	2014	2015
Paid Advertising	20	20	20	20	20
Public Service Announcement	4	4	4	4	4
Bill Inserts / Newsletters / Brochures	16	16	16	16	16
Bill comparing previous water usage	12	12	12	12	12
Demonstration Gardens	1	1	1	1	1
Special Events, Media Events	8	8	8	8	8
Speakers Bureau	20	20	20	20	20
Program to coordinate with other govt agencies, industry and public interest groups and media	Yes	Yes	Yes	Yes	Yes

☒ Describe steps necessary to implement measure — 8.3.1 pg. 854 — Reference & Page Number

Description may include:

- ☐ Methods for publicizing public information activities
- ☐ Whether attendance to public activities is tracked

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) — Not Applicable — Reference & Page Number

Evaluation shall take into account:

☐ Economic and non-economic factors (10631(g)(1))

☐ Environmental, social, health and technological factors (10631 (g)(1))

☐ Customer impact (10631 (g)(1))

☐ Legal authority (10631 (g)(4))

Table G3 – 10631 (g)(2)	
Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

☐ Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). ______ Reference & Page Number

☐ No planned water supply projects at a high unit cost than cost of DMM ______ Reference & Page Number

☐ If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). ______ Reference & Page Number

If Another Agency Implementing

☐ If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM H –School Education Program (10631(f)(1)(H))

Implementation

☒ Describe the **school education program** currently being implemented or scheduled for implementation (10631) (f) (1)(2)) 8.3.2 pg 86 Reference & Page Number

Description may include:

- ☐ Year program implemented or scheduled for implementation ______ Year
- ☒ Description of program activities and grades addressed
- ☒ Whether material provided meet the state education framework requirements
- ☐ Quantification of classroom presentations, if available

Table H1	Number of class presentations				
Actual	2006	2007	2008	2009	2010
Grades K-3rd	85	100	102	125	150
Grades 4th-6th	70	100	110	135	155
Grades 7th-8th	2	3	2	5	5
High School	15	15	18	20	21
Unspecified					

Table H1	Number of class presentations				
Planned	2011	2012	2013	2014	2015
Grades K-3rd	170	170	170	170	170
Grades 4th-6th	175	175	175	175	175
Grades 7th-8th	7	7	7	7	7
High School	21	21	21	21	21
Unspecified					

COMMENT

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) Not Applicable Reference & Page Number

Evaluation shall take into account:

☐ Economic and non-economic factors (10631(g)(1))

☐ Environmental, social, health and technological factors (10631 (g)(1))

☐ Customer impact (10631 (g)(1))

☐ Legal authority (10631 (g)(4))

Table H3 – 10631 (g)(2)	
Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

☐ Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). ______ Reference & Page Number

☐ No planned water supply projects at a high unit cost than cost of DMM ______ Reference & Page Number

☐ If applicable, describe the efforts to work with other relevant agencies to ensure ______ Reference & Page implementation of the measure and to share the cost of implementation (10631 (g)(4)). ____________ Number

If Another Agency Implementing

☐ If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM I –Conservation Programs for Commercial, Industrial and Institutional (10631(f)(1)(I))

Implementation

☒ Describe the **CII conservation programs** currently being implemented or scheduled for implementation (10631) (f) (1)(2) — 8.4.2 pg 91 — Reference & Page Number

Description may include:

- ☐ Year program implemented or scheduled for implementation ____________ Year
- ☒ Identification of highest CII water users
- ☒ Description of components of the CII water use survey
- ☐ Evaluation of water using apparatus and processes
- ☒ Description of information / items provided to customer upon completion of the survey
- ☐ Quantification of surveys completed (**Water saving below is estimated for all CII conservation programs)**

Table I1

Actual	2006	2007	2008	2009	2010
Number of surveys completed					44
Were incentives provided?	Yes	Yes	Yes	Yes	Yes
Number of follow-up visits	0	0	0	0	0
Actual water savings - AFY	969	1,170	1,474	1,308	1,194

Table I2

Planned	2011	2012	2013	2014	2015
Number of surveys completed	32	32	40	40	50
Were incentives provided?	Yes	Yes	Yes	Yes	Yes
Number of follow-up visits	0	0	0	0	0
Projected water savings - AFY	1,200	1,200	1,200	1,200	1,200

COMMENT

☒ Describe steps necessary to implement measure — 8.4.2 pg. 89 — Reference & Page Number

Description may include:

- ☐ Marketing / targeting strategy for CII conservation programs
- ☐ Methods of tracking numbers of surveys performed or completed
- ☐ Methods of follow-up of previous surveys

☒ Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not evaluated, please provide an explanation — 8.4.2 pg. 91 — Reference & Page Number

☒ Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation — 8.5 pg 93 — Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) — Not Applicable — Reference & Page Number

Evaluation shall take into account:

☐ Economic and non-economic factors (10631(g)(1))

☐ Environmental, social, health and technological factors (10631 (g)(1))

☐ Customer impact (10631 (g)(1))

Table I3 – 10631 (g)(2) Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	

☐ Legal authority (10631 (g)(4))

Cost of Water $/AF	
Water Savings AFY	

☐ Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). ____________ Reference & Page Number

☐ No planned water supply projects at a high unit cost than cost of DMM ____________ Reference & Page Number

☐ If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). ____________ Reference & Page Number

If Another Agency Implementing

☐ If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM J –Wholesale Agency Programs (10631(f)(1)(J))

☐ **NOT A WHOLESALE WATER AGENCY**

Implementation

X Describe the **conservation programs provided to your retailers** currently being implemented or scheduled for implementation (10631) (f) (1)(2) 8.2.1 pg 79 Reference & Page Number

Description may include:

- ☐ Year program(s) implemented or scheduled for implementation ____________ Year
- ☐ Describe the program your agency provides to your retailers for each DMM (may include financial, technical and staff provided)
- ☐ Identify agencies you assist
- ☐ Quantification activities by program, if available

Table J1	Number of agencies assisted				
Program activities	2006	2007	2008	2009	2010
DMM A (1): Water Surveys					
DMM B (2): Residential Retrofit	2	2	6	6	6
DMM C (3): System Audits					
DMM D (4): Meter/Commodity Rates					
DMM E (5): Landscape Programs	2	2	6	6	6
DMM F (6): Washing Machines	2	2	6	6	6
DMM G (7): Public Information	6	6	6	6	6
DMM H (8): School Education	6	6	6	6	6
DMM I (9): CII Conservation Programs	6	6	6	6	6
DMM L (12): WC Coordinator	6	6	6	6	6
DMM M (14): ULFT Replacement	2	2	6	6	0

COMMENT

Table J2	Number of agencies to be assisted				
Program activities	2011	2012	2013	2014	2015
DMM A (1): Water Surveys					
DMM B (2): Residential Retrofit					
DMM C (3): System Audits					
DMM D (4): Meter/Commodity Rates					
DMM E (5): Landscape Programs	6	6	6	6	6
DMM F (6): Washing Machines	6	6	6	6	6
DMM G (7): Public Information	6	6	6	6	6
DMM H (8): School Education	6	6	6	6	6
DMM I (9): CII Conservation Programs	6	6	6	6	6
DMM L (12): WC Coordinator					
DMM M (14): ULFT Replacement					

X Describe steps necessary to implement measure 8.2.1 pg 79,80 Reference & Page Number

Description may include:

- ☐ Marketing / targeting strategy for retailer participation

☐ ☐ • Methods of tracking in which each retailer participates

Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not evaluated, please provide an explanation — 8.2.1 pg 79,80 — Reference & Page Number

☐ Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation — 8.5 pg. 93 — Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) — Not Applicable — Reference & Page Number

Evaluation shall take into account:

☐ Economic and non-economic factors (10631(g)(1))

☐ Environmental, social, health and technological factors (10631 (g)(1))

☐ Customer impact (10631 (g)(1))

☐ Legal authority (10631 (g)(4))

Table J3 – 10631 (g)(2)	
Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

☐ If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). — Reference & Page Number

DMM K –Conservation Pricing (10631(f)(1)(K))

Implementation

X Describe the **conservation pricing structure** currently being implemented or scheduled for implementation (10631) (f) (1)(2) — 8.2.1 pg 842 — Reference & Page Number

Description may include:

☐ • Year program implemented or scheduled for implementation — Year

☐ • Identification of water rate structure for each sector and effective date of rate

Table K1 – Retailers	Water Rate Structure
Residential	Allocation-based Rate
Commercial	Uniform Rate
Industrial	Uniform Rate
Institutional/Government	Uniform Rate
Irrigation	Allocation-based Rate
Other	

Table K2 – Wholesalers	Water Rate Structure
To retailers	Uniform Rate
Other	
Other	

COMMENT

x Describe steps necessary to implement measure — 8.4.1 pg. 84 — Reference & Page Number

Description may include:

☐ • If no conservation pricing at this time, provide timeline for implementing

x Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not evaluated, please provide an explanation — 8.4.1 pg. 84 — Reference & Page Number

☐ Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation — 8.5 pg. 93 — Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) ______________ Reference & Page Number

Evaluation shall take into account:

- [ ] Economic and non-economic factors (10631(g)(1))
- [ ] Environmental, social, health and technological factors (10631 (g)(1))
- [ ] Customer impact (10631 (g)(1))
- [ ] Legal authority (10631 (g)(4))

Table K3 – 10631 (g)(2)	
Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

- [ ] Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). ______________ Reference & Page Number

- [ ] No planned water supply projects at a high unit cost than cost of DMM ______________ Reference & Page Number

- [ ] If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). ______________ Reference & Page Number

If Another Agency Implementing

- [ ] If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM L –Water Conservation Coordinator (10631(f)(1)(L))

Implementation

- [X] Describe the **staff that perform the functions of the water conservation coordinator** currently being implemented or scheduled for implementation (10631) (f) (1)(2) 8.2.1 pg 78 Reference & Page Number

Description may include:

- [ ] Year program implemented or scheduled for implementation ______________ Year
- [X] Number of full time and part time staff that perform conservation coordinator activities
- [X] The responsibilities of the staff and activities performed
- [X] The approximate number of hours spent on conservation activities
- [X] Description of events in which the conservation coordinator participates

Table L1					
Actual	2006	2007	2008	2009	2010
Number of full-time positions	4	4	4	6	6
Number of full/part-time staff	4	4	3	6	6

Table L2					
Planned	2011	2012	2013	2014	2015
Number of full-time positions	6	6	6	6	6
Number of full/part-time staff	6	6	6	6	6

COMMENT

- [ ] Describe steps necessary to implement measure 8.2.1 pg 78 Reference & Page Number

- [x] Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not evaluated, please provide an explanation 8.2.1 pg 79 Reference & Page Number

- [x] Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation 8.5 pg. 93 Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) Not Applicable Reference & Page Number

Evaluation shall take into account:

☐ Economic and non-economic factors (10631(g)(1))

☐ Environmental, social, health and technological factors (10631 (g)(1))

☐ Customer impact (10631 (g)(1))

☐ Legal authority (10631 (g)(4))

Table L3 – 10631 (g)(2)	
Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

☐ Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). Reference & Page Number

☐ No planned water supply projects at a high unit cost than cost of DMM Reference & Page Number

☐ If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). Reference & Page Number

If Another Agency Implementing

☐ If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM M –Water Waste Prohibition (10631(f)(1)(M))

Implementation

X Describe the **water waste prohibitions** currently being implemented or scheduled for implementation (10631) (f) (1)(2) 8.2.1 pg 79 Reference & Page Number

Description may include:

- X Year program implemented or scheduled for implementation 1991 Year
- X Does your agency have a water waste prohibition
- X Whether this water waste prohibition is enforced at all times or only during water shortage
- ☐ Provide a list o prohibited water uses
- ☐ Provide a copy of the ordinance

Table M1					
Actual	2006	2007	2008	2009	2010
Waste ordinance in effect	Yes	Yes	Yes	Yes	Yes
Number of on-site visits					

Table M2					
Planned	2011	2012	2013	2014	2015
Waste ordinance in effect	Yes	Yes	Yes	Yes	Yes
Number of on-site visits					

COMMENT

X Describe steps necessary to implement measure 8.2.1 pg. 78 Reference & Page Number

Description may include:

- ☐ Targeting strategy for water waster
- ☐ Methods for receiving information regarding water waste (e.g. phone line, website, etc)
- ☐ Methods for tracking numbers of warnings issued
- ☐ Methods for follow-up to warnings to assure compliance

☐ Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not 8.2.1 pg. 79 Reference & Page Number evaluated, please provide an explanation ______

[x] Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation — 8.5 pg. 93 — Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) — Not Applicable — Reference & Page Number

Evaluation shall take into account:

[ ] Economic and non-economic factors (10631(g)(1))

[ ] Environmental, social, health and technological factors (10631 (g)(1))

[ ] Customer impact (10631 (g)(1))

[ ] Legal authority (10631 (g)(4))

Table M3 – 10631 (g)(2)	
Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

[ ] Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). ______ Reference & Page Number

[ ] No planned water supply projects at a high unit cost than cost of DMM ______ Reference & Page Number

[ ] If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). ______ Reference & Page Number

If Another Agency Implementing

[ ] If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

DMM N –Residential Ultra-Low Flush Toilet Replacement Programs (10631(f)(1)(N))

Implementation

[X] Describe the **residential ultra-low flush toilet replacement program** currently being implemented or scheduled for implementation (10631) (f) (1)(2) — 8.4.1 pg 90 — Reference & Page Number

Description may include:

- [X] Year program implemented or scheduled for implementation — 1992 — Year
- [X] Description of your agencies toilet replacement program for SFR and MFR
- [ ] The rebate value
- [ ] Whether there is a toilet retrofit upon resale ordinance

Table N1	Rebates disbursed				
Actual	2006	2007	2008	2009	2010
Number of ULFT rebates	1,516	4,757	2,470	12,022	2,796
Actual water savings - AFY	56	176	91	444	103

Table N2	Rebates to be disbursed				
Planned	2011	2012	2013	2014	2015
Number of ULFT rebates	0	0	0	0	0
Projected water savings - AFY	0	0	0	0	0

COMMENT

[X] Describe steps necessary to implement measure — 8.4.1 pg.90 — Reference & Page Number

Description may include:

- [ ] Marketing strategy for SFR and MFR
- [ ] Targeting strategy for SFR and MFR
- [ ] Methods for tracking numbers of rebates

- [ ] Methods for calculating water savings

- [x] Describe methods, if any, used to evaluate the effectiveness of this demand management measure (10631 (f)(3)). If the effectiveness of the program is not evaluated, please provide an explanation — 8.4.1 pg.90 — Reference & Page Number

- [ ] Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631 (f)(4)). If no estimates are available, please provide an explanation — 8.5 pg. 93 — Reference & Page Number

Provide an evaluation for this DMM if it is not implemented (Section 10631(g)) — Not Applicable — Reference & Page Number

Evaluation shall take into account:

- [ ] Economic and non-economic factors (10631(g)(1))
- [ ] Environmental, social, health and technological factors (10631 (g)(1))
- [ ] Customer impact (10631 (g)(1))
- [ ] Legal authority (10631 (g)(4))

Table N3 – 10631 (g)(2) Cost Effectiveness Summary	
Total Costs	
Total Benefits	
B/C Ratio	
Cost of Water $/AF	
Water Savings AFY	

- [ ] Describe funding available to implement any planned water supply project that would provide water at higher unit cost (10631 (g)(3) &(h)). — Reference & Page Number

- [ ] No planned water supply projects at a high unit cost than cost of DMM — Reference & Page Number

- [ ] If applicable, describe the efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4)). — Reference & Page Number

If Another Agency Implementing

- [ ] If another agency is implementing this DMM in your service area, include a description of the program (10631 (f)(1) & (g)(4))

Agency Name

Appendix A

Adoption Order

I.C.
R-5023

June 15, 2011

TO: Board of Directors

FROM: General Manager

SUBJECT: Adopt Proposed Resolution No. 5023, Approving the 2010 Urban Water Management Plan

RECOMMENDATION

That the Board adopt proposed Resolution No. 5023 approving the 2010 Urban Water Management Plan, including the implementation plan and targets for water use required by the Conservation Act of 2009 for Eastern Municipal Water District, and direct staff to transmit the required copies of the said Plan to the State Department of Water Resources.

Concur:

Anthony J. Pack
General Manager

Submitted by:

Behrooz Mortazavi
Assistant General Manager
Resource Development

Directors: All
Divisions: All

BACKGROUND

As required by the California Water Code, Sections 10610 through 10657, the Urban Water Management Planning Act mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare an Urban Water Management Plan (UWMP). These plans are required to assist in the development and understanding of the urban water management within the service areas. The Water Conservation Act of 2009 (Act) also requires the 2010 UWMPs to include a water use baseline, a target per capita water use for 2020, and an implementation plan on how to meet the 2020 target.

In accordance with the provisions of the Act, staff has prepared the District's updated 2010 Urban Water Management Plan for the District, and the Public Hearing was duly noticed in accordance with the provisions of the Act and held on June 15, 2011. All public comments on the Plan and responses to said comments received as part of the public hearing will be included in the Plan.

The adoption of the Urban Water Management Plan supports the Strategic Plan Objective I (Community Relations) to, "Promote and sustain effective communication between the District and its stakeholders." This Plan communicates information about the District's supply reliability and availability to the general public, the development community, District's sub-agencies, and government agencies within its jurisdiction.

Attachments: UWMP
UWMPAppendixA
UWMPAppendixA1
UWMPAppendixB
UWMPAppendixC
UWMPAppendixD
R-5023 UWMP 2010
Public Notice

Finance n/a

Purchasing/Contracts n/a

Author: Elizabeth Lovsted

MWG: EL:tm

UWMPResBrdLtr_061511

RESOLUTION NO. 5023

RESOLUTION OF THE BOARD OF DIRECTORS OF EASTERN MUNICIPAL WATER DISTRICT PROVIDING FOR THE IMPLEMENTATION AND CARRYING OUT OF WATER CODE SECTIONS 10610 THROUGH 10657: ADOPTING, DIRECTING, FILING, AND IMPLEMENTING THE EASTERN MUNICIPAL WATER DISTRICT 2010 URBAN WATER MANAGEMENT PLAN

WHEREAS, the California Legislature enacted Assembly Bills 797 (1983), 2661 (1990), IIX (1991), 1869 (1991), 892 (1991), 2853 (1994), 184509952552 (2000), 901 (2001), 105 (2003),1367 (2007), 1420 (2007), 1465 (2010) and Senate Bills 1017 (1994), 1011 (1995), 610 (2001), 672 (2001), 1348 (2002), 1384 (2002), 1518 (2002), 318 (2004), 1087 (2005), x3 27 (2009), x7 7 (2009) amending Water Code Sections 10610 through 10657; 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 (UWMP), the primary objective of which is to plan a reliable supply of water. Included in the UWMP is the baseline per capita water use data, urban water use target, interim urban water use targets, the method used to determine targets, and an implementation plan to meet per capita targets by 2020.

WHEREAS, the Eastern Municipal Water District did prepare and will file said Plan with the California Department of Water Resources by August 1, 2011; and

WHEREAS, the Eastern Municipal Water District is an urban supplier of water providing water to about 133,300 customers and has therefore, prepared and circulated for public review, a Draft 2010 Urban Water Management Plan, in compliance with the requirements of Section 10610 through 10657 of the California Water Code, and properly noticed a public hearing regarding this Plan held by the Board of Directors on June 15, 2011, and will include all public comments on the Plan and responses to said comments as part of the Plan.

NOW, THEREFORE, BE IT RESOLVED, by the Board of Directors of the Eastern Municipal Water District as follows:

I. The Urban Water Management Plan is hereby adopted and ordered filed with the Secretary to the Board of Directors.

II. The General Manager is hereby authorized and directed to file the Plan with the California Department of Water Resources in accordance with the California Urban Water Management Planning Act.

III. The General Manager is hereby authorized and directed to implement the District's 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.

IV. The President of the Board of Directors is hereby authorized to sign the transmittal letter on behalf of the Board of Directors.

V. The Resolution is effective this 15th day of June 2011.

ADOPTED, SIGNED, AND APPROVED this 15th day of June 2011.

Joseph J. Kuebler, President

ATTEST:

Rosemarie V. Howard

Rosemarie V. Howard, Secretary

(SEAL)

EASTERN MUNICIPAL
WATER DISTRICT
SINCE 1950

NOTICE OF PUBLIC HEARING TO ADOPT THE 2010 URBAN WATER MANAGEMENT PLAN AND THE IMPLEMENTATION PLAN TO MEET THE REQUIREMENTS OF THE WATER CONSERVATION ACT OF 2009

Eastern Municipal Water District (EMWD) has prepared a Draft 2010 Urban Water Management Plan (UWMP) in compliance with the requirements established by the Urban Water Management Planning Act (California Water Code Division 6, Part 2.6 Sections 10610-10656). In addition, the Water Conservation Act of 2009 requires that every Urban Water Management Plan includes: baseline per capita water use data, urban water use target, interim urban water use targets and an implementation plan for meeting the identified targets. This information is included in the Draft 2010 UWMP.

This Public Notice officially notifies the general public that the Draft Urban Water Management Plan is available for public review at District headquarters or on EMWD's website at www.emwd.org. E-mail or written comments on the Draft UMWP or requests for more information should be sent to:

Eastern Municipal Water District
Attention: M. Elizabeth Lovsted
lovstede@emwd.org
P.O. Box 8300
Perris, CA 92572-8300

Public input is encouraged. E-mail or written comments are due by June 15, 2011 and will be considered during finalization of the 2010 Urban Water Management Plan.

A public hearing of the EMWD Board of Directors to take action on the 2010 Urban Water Management Plan and allow community input regarding the Implementation Plan to meet the requirements of the Water Conservation Act of 2009 will be held at 1:00 pm on June 15, 2011, at the District headquarters:

Eastern Municipal Water District
2270 Trumble Road
Perris, CA 92570

Appendix A.1

DWR Checklist

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		Section 2.3
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	Section 2.4 and Appendix B
3	Report progress in meeting urban water use targets using the standardized form.	10608.40	Not applicable	Standardized form not yet available	NA
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		Appendix B
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 . . .		Sections 3.3,3.4,3.5 and 4.0
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		Appendix B
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		Appendix A and B

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		Section 1.4
9	(Describe the service area) climate	10631(a)	System Description		Section 1.5
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.	Section 1.6
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.	Section 1.6.1 Table 1.3
12	Describe . . . other demographic factors affecting the supplier's water management planning	10631(a)	System Description		Section 1.7
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.	Section 3, Table 3.2
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.	Yes, Section 3.3

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		Appendix C
16	(Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater.	10631(b)(2)	System Supplies		Section 3.3.1
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		NA
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		Section 3.3.2
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)	System Supplies		Section 3.3
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		Table 3.1
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.	Section3.3.1 and Table 3.8

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 . . .		Table 3.2 to 3.4
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 . . .		NA
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)	System Supplies		Section 4.5
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.	Table 2.10

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.	Section 8
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		Section 8
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		Section 8

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.	NA
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		Section 4
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		Sections 3.4 and 4.3

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.	CUWCC Reports not available
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.	Section 3.2 Tables 3.2,3.3 and 3.4
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		Section 2.6
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 . . .		Section 5
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 . . .		Table 5.5
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 . . .		Section 5.5

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 . . .		Section 5.3.1
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 . . .		Section 5.3.1
40	(Indicated) penalties or charges for excessive use, where applicable.	10632(f)	Water Supply Reliability . . .		Section 5.3.1
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 . . .		Section 5.6
42	(Provide) a draft water shortage contingency resolution or ordinance.	10632(h)	Water Supply Reliability . . .		Appendix D
43	(Indicate) a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)	Water Supply Reliability . . .		Section 5.3
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		Table 3.9,3.14 and 3.15
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		Table 3.15
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		Table 3.15

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		Section 3.5
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		Table 3.14
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		Tables 3.15 and 3.13
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		Section 3.5.4
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		Section 3.5.3
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	Table 3.2

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 . . .		Tables 3.2, 3.3and 3.4
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		Appendix 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	Plan Preparation		Appendix B
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		Appendix B
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.

Appendix B

Public Review and Coordination

B.1 Coordination

EMWD coordinated preparation of the UWMP MWD, our wholesale water supplier, water agencies that receive wholesale water from EMWD and local cities and counties. Table B.1 summarizes the participation in the development of the UWMP.

Prior to the preparation of the UWMP, EMWD provide information on projected demand and local supplies to MWD. This information was used in the MWD 2010 RUWMP. EMWD relied on the 2010 RUWMP to prepare the UWMP. EMWD also exchanged demand and supply information with wholesale customers and local land agencies.

Table B.1 Coordination with Appropriate Agencies

Coordinating Agencies	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 Water District	x			x			
Lake Hemet Municipal Water District	x			x	X	x	
City of Hemet				x	X	x	
City of Temecula	x			x	X	x	
City of Murrieta	x			x	X	x	
City of San Jacinto	x			x	X	x	
City of Perris	x			x	X	x	
Rancho California Water District	x			x	X	x	
Nuevo Water Company				x	X	x	
City of Menifee	x			x	X	x	
County of Riverside	x			x	X	x	
General public					On request	On request	

B.2 Notices to the Cities and County

Attached are copies of letters sent to the cities and county EMWD provides water supplies to, notifying them that the UWMP was under review sent on March 30, 2011. Each city, the County of Riverside also received a draft copy of the plan to review and will receive a final copy of the 2010 UWMP within 30 day of adoption.

EASTERN MUNICIPAL WATER DISTRICT
SINCE 1950

March 30, 2011

Mary Lanier
Director of Planning/Community Dev. Director
City of Murrieta
26442 Beckman Ct.
Murrieta, CA 92562

SUBJECT: Urban Water Management Plan

Dear Mary Lanier,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

Eastern Municipal Water District (EMWD) is in the process of preparing its 2010 UWMP. Over the next several months, EMWD will be documenting its projections on how to provide reliable, quality water supply to its retail and wholesale customers. EMWD's UWMP will discuss the sources of available water and the demand for water in its service area.

The draft of the EMWD 2010 UWMP is scheduled to be available in early May 2011 for public review, with EMWD Board of Directors adoption planned in June of 2011. Input and comments on the 2010 UWMP will be accepted any time prior to or at the public hearing that will be scheduled in June of 2011. If you have any questions or concerns, please contact Elizabeth Lovsted at 951-928-3777 Ext. 4307 or by e-mail at lovstede@emwd.org.

Sincerely

Anthony J. Pack
General Manager

AJP:EL:tm

Mailing Address: Post Office Box 8300 Perris, CA 92572-8300 Telephone: (951) 928-3777 Fax: (951) 928-6177
Location: 2270 Trumble Road Perris, CA 92570 Internet : www.emwd.org

EASTERN MUNICIPAL WATER DISTRICT

SINCE 1950

March 30, 2011

Rene Avila
Assistant Director of Dev. Services
City of Perris
101 N. "D" St.
Perris, CA 92572

SUBJECT: Urban Water Management Plan

Dear Rene Avila,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Sincerely

Anthony J. Pack
General Manager

AJP:EL:tm

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Location: 2270 Trumble Road Perris, CA 92570 Internet : www.emwd.org

March 30, 2011

Deanna Elliano
Community Development Director
City of Hemet
445 E. Florida Ave.
Hemet, CA 92543

SUBJECT: Urban Water Management Plan

Dear Deanna Elliano,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Sincerely

A J Pack

Anthony J. Pack
General Manager

AJP:EL:tm

EASTERN MUNICIPAL
WATER DISTRICT
SINCE 1950

March 30, 2011

Asher Hartel
Planning Director
City of San Jacinto, Bldg. A
595 S. San Jacinto Ave.
San Jacinto, CA 92583

SUBJECT: Urban Water Management Plan

Dear Asher Hartel,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Sincerely

Anthony J. Pack
General Manager

AJP:EL:tm

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EASTERN MUNICIPAL WATER DISTRICT
SINCE 1950

March 30, 2011

Linda Nixon
Mgm't Assistant, Public Works-Engineering
City of Hemet
510 E. Florida Ave.
Hemet, CA 92543

SUBJECT: Urban Water Management Plan

Dear Linda Nixon,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Sincerely

Anthony J. Pack
General Manager

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EASTERN MUNICIPAL
WATER DISTRICT
SINCE 1950

March 30, 2011

Mr. John Terell
Planning Official
City of Moreno Valley
14177 Frederick Blvd.
Moreno Valley, CA 92555

SUBJECT: Urban Water Management Plan

Dear Mr. John Terell,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Sincerely

AJ Pack

Anthony J. Pack
General Manager

AJP:EL:tm

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Location: 2270 Trumble Road Perris, CA 92570 Internet : www.emwd.org

EASTERN MUNICIPAL WATER DISTRICT
SINCE 1950

March 30, 2011

Patrick Richardson
Director of Planning
City of Temecula
43174 Business Park Dr.
Temecula, CA 92591

SUBJECT: Urban Water Management Plan

Dear Patrick Richardson,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Sincerely

Anthony J. Pack
General Manager

AJP:EL:tm

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Location: 2270 Trumble Road Perris, CA 92570 Internet : www.emwd.org

EASTERN MUNICIPAL
WATER DISTRICT
SINCE 1950

March 30, 2011

Carolyn Syms Luna
Planning Director, Planning Dept.
County of Riverside
P.O. Box 1409
Riverside, CA 92502-1409

SUBJECT: Urban Water Management Plan

Dear Carolyn Syms Luna,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Sincerely

Anthony J. Pack
General Manager

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EASTERN MUNICIPAL
WATER DISTRICT
SINCE 1950

March 30, 2011

Adam Rush
Principal Planner, Planning Dept.
County of Riverside
P.O. Box 1409
Riverside, CA 92502-1409

SUBJECT: Urban Water Management Plan

Dear Adam Rush,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Anthony J. Pack
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Location: 2270 Trumble Road Perris, CA 92570 Internet : www.emwd.org

March 30, 2011

Daryl Hartwill
Public Works Manager
City of Perris
1015 S. "G" St.
Perris, CA 92570-2410

SUBJECT: Urban Water Management Plan

Dear Daryl Hartwill,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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The draft of the EMWD 2010 UWMP is scheduled to be available in early May 2011 for public review, with EMWD Board of Directors adoption planned in June of 2011. Input and comments on the 2010 UWMP will be accepted any time prior to or at the public hearing that will be scheduled in June of 2011. If you have any questions or concerns, please contact Elizabeth Lovsted at 951-928-3777 Ext. 4307 or by e-mail at lovstede@emwd.org.

Sincerely

Anthony J. Pack
General Manager

AJP:EL:tm

EASTERN MUNICIPAL WATER DISTRICT
SINCE 1950

March 30, 2011

Ed Piester
Operations Manager
Nuevo Water Company
30427 11th St.
Nuevo, CA 92567-9528

SUBJECT: Urban Water Management Plan

Dear Ed Piester,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Sincerely

Anthony J. Pack
General Manager

AJP:EL:tm

Mailing Address: Post Office Box 8300 Perris, CA 92572-8300 Telephone: (951) 928-3777 Fax: (951) 928-6177
Location: 2270 Trumble Road Perris, CA 92570 Internet : www.emwd.org

EASTERN MUNICIPAL WATER DISTRICT
SINCE 1950

March 30, 2011

Mike Gow
Assistant General Manager
Lake Hemet Municipal Water District
PO Box 5039
Hemet, CA 92544-0039

SUBJECT: Urban Water Management Plan

Dear Mike Gow,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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EASTERN MUNICIPAL
WATER DISTRICT
SINCE 1950

March 30, 2011

Carmen Cave
Community Dev. Director
City of Menifee
29714 Haun Rd.
Menifee, CA 92586

SUBJECT: Urban Water Management Plan

Dear Carmen Cave,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Sincerely

Anthony J. Pack
General Manager

AJP:EL:tm

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Location: 2270 Trumble Road Perris, CA 92570 Internet : www.emwd.org

EASTERN MUNICIPAL
WATER DISTRICT
SINCE 1950

March 30, 2011

Perry R. Louck
Director of Planning
Rancho Calif. Water Dist.
42135 Winchester Rd.
Temecula, CA 92590

SUBJECT: Urban Water Management Plan

Dear Perry R. Louck,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Anthony J. Pack
General Manager

AJP:EL:tm

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Location: 2270 Trumble Road Perris, CA 92570 Internet : www.emwd.org

EASTERN MUNICIPAL
WATER DISTRICT
SINCE 1950

March 30, 2011

Denise Landstedt
Water Resource Planner, Planning Dept.
Rancho Calif. Water Dist.
42135 Winchester Rd.
Temecula, CA 92590

SUBJECT: Urban Water Management Plan

Dear Denise Landstedt,

The Urban Water Management Planning Act (Act) requires urban water suppliers providing water to 3,000 or more customers, or providing over 3,000 acre-feet per year of water, to prepare an Urban Water Management Plan (UWMP). These plans are prepared every five years and are submitted to California Department of Water Resources (DWR). UWMP's are required for an agency to be eligible to receive grant funding, and provide the basis for water supply assessments and verifications. The 2010 UWMP's for retail water purveyors are due by July 1, 2011.

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Sincerely

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Location: 2270 Trumble Road Perris, CA 92570 Internet : www.emwd.org

B.3 Encouraging Public Involvement

In addition to informing and coordinating with the agencies listed in Table B.1, EMWD made an effort to inform the public about the plan and encourage comment on the plan. Efforts include:

- A presentation to the EMWD Board Planning Committee on October 25, 2010
- A presentation to the EMWD Board Planning Committee on May 16, 2011
- A presentation was made to the Director Advisory Committee for Direct Sullivan on June 2, 2011. The DAC includes community leader from throughout EMWD's service area.
- A presentation to the Consultant, Attorneys and Managers Group for the Hemet/San Jacinto Water Management Plan on June 13, 2011.

The Draft Urban Water Management Plan was made available on EMWD's web site on May 16, 2011 for comment and review and the public notice was published in the Press Enterprise on May 22 and May 27, 2011 and a public hearing was held June 15, 2011. A copy of the public notice is included.

A copy of the final plan will be available for public review within 30 days of submittal to DWR.

NOTICE OF PUBLIC HEARING TO ADOPT THE 2010 URBAN WATER MANAGEMENT PLAN AND THE IMPLEMENTATION PLAN TO MEET THE REQUIREMENTS OF THE WATER CONSERVATION ACT OF 2009

Eastern Municipal Water District (EMWD) has prepared a Draft 2010 Urban Water Management Plan (UWMP) in compliance with the requirements established by the Urban Water Management Planning Act (California Water Code Division 6, Part 2.6 Sections 10610-10656). In addition, the Water Conservation Act of 2009 requires that every Urban Water Management Plan includes: baseline per capita water use data, urban water use target, interim urban water use targets and an implementation plan for meeting the identified targets. This information is included in the Draft 2010 UWMP.

This Public Notice officially notifies the general public that the Draft Urban Water Management Plan is available for public review at District headquarters or on EMWD's website at www.emwd.org. E-mail or written comments on the Draft UMWP or requests for more information should be sent to:

Eastern Municipal Water District
Attention: M. Elizabeth Lovsted
lovstede@emwd.org
P.O. Box 8300
Perris, CA 92572-8300

Public input is encouraged. E-mail or written comments are due by June 15, 2011 and will be considered during finalization of the 2010 Urban Water Management Plan.

A public hearing of the EMWD Board of Directors to take action on the 2010 Urban Water Management Plan and allow community input regarding the Implementation Plan to meet the requirements of the Water Conservation Act of 2009 will be held at 1:00 pm on June 15, 2011, at the District headquarters:

Eastern Municipal Water District
2270 Trumble Road
Perris, CA 92570

B.4 Public Hearing

On June 15, 2011 EMWD held a public hearing to consider the adoption of the 2010 UWMP and meet the requirements of the Water Conservation Act of 2009. Attached is a copy of the presentation made at the public hearing. Information presented included the proposed implementation plan, method and targets for water use required, and the economic impact of the implementation plan for the Conservation Act of 2009.

2010 Urban Water Management Plan Public Hearing

June 15, 2011

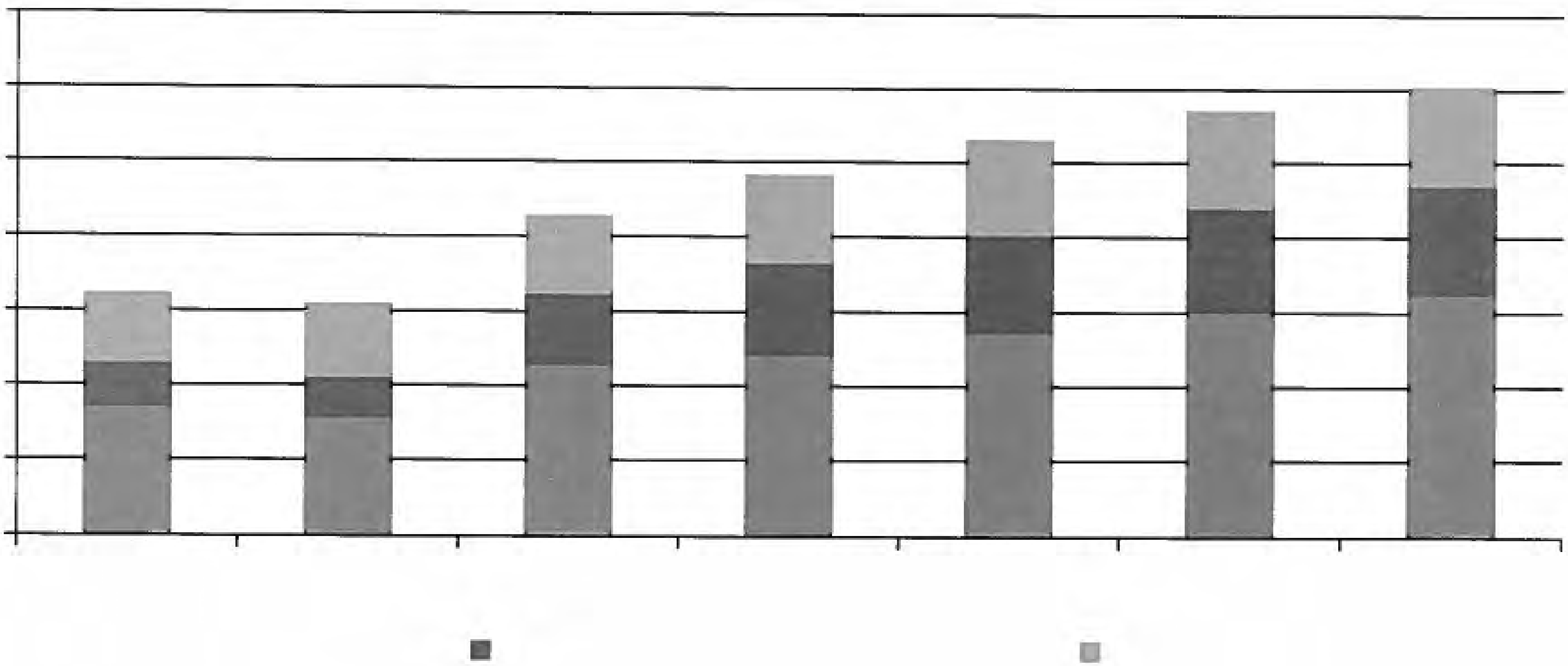
Overview

- Introduction
- Demand
- The Water Conservation Act of 2009, Senate Bill (SB x 7-7)
  - Compliance Method
  - Baseline and Targets
  - Implementation Plan
- Supply
  - Existing
  - Potential Local Resources
- Supply and Demand Comparison
- Water Supply Challenges
- Addressing Challenges
- Conclusion

UWMP Act

- California Water Code Division 6, Part 2.6 Sections 10610-10656
- Requires:
  - Evaluation of demand
  - Evaluation of supply reliability
  - Description of conservation measures implemented
  - Water shortage response plan
  - Comparison of demand and supply projections

UWMP 2005 -2035
EMWD Water Demand (AFY)



Note: Based on regional projections, wholesale agency information and includes compliance with the Water Conservation Act of 2009, SB x7-7 for EMWD retail demand

The Water Conservation Act of 2009, SB x7-7

- Reduce urban per capita water demand in California 20 % by 2020
- Urban water suppliers must:
  - Adopt one of four methods for compliance target
  - Set baseline and compliance targets
  - Develop an implementation plan
  - Consider the economic impact of the implementation plan

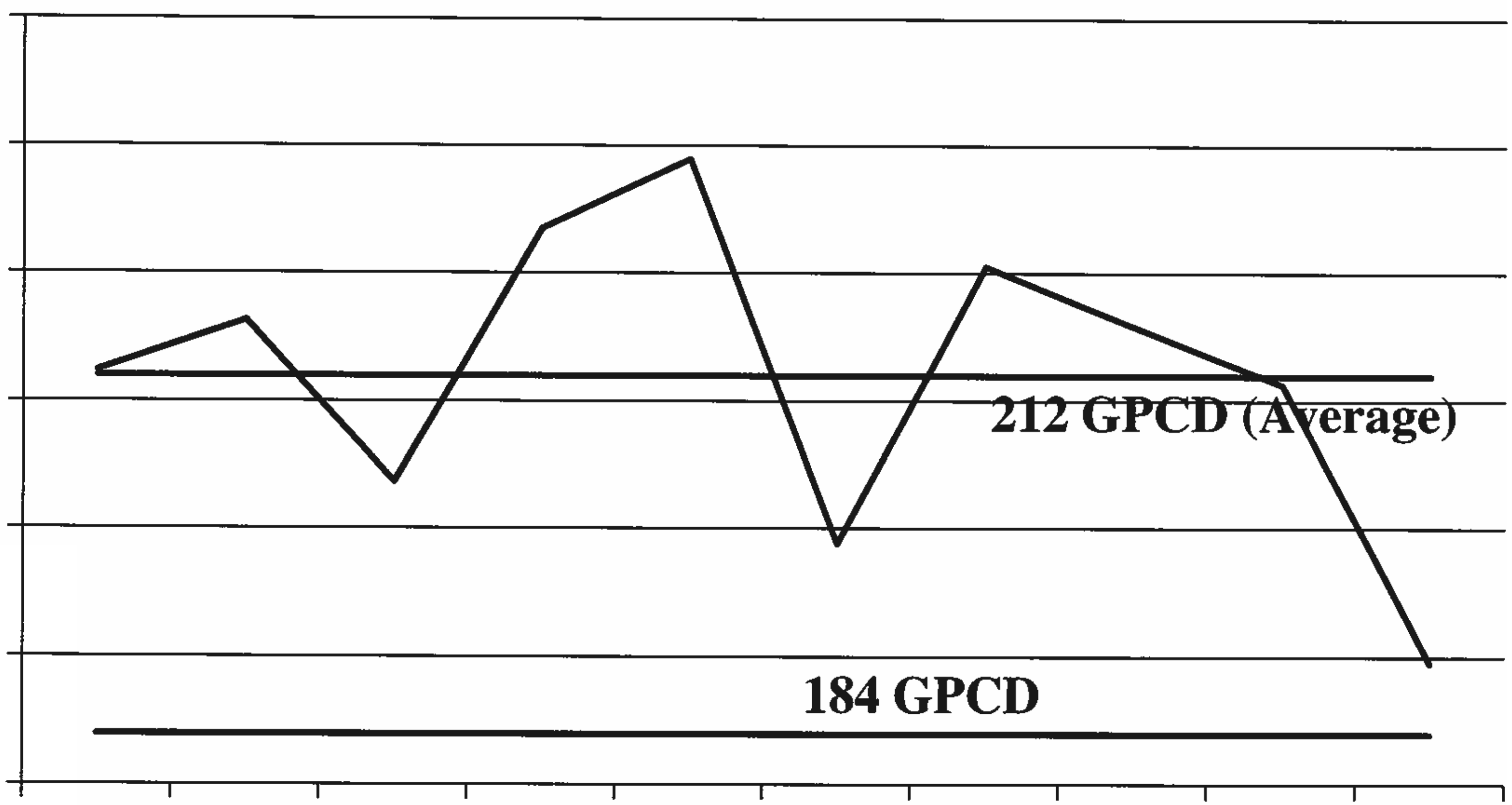
EMWD Efficiency Targets for Retail Water Use

Compliance Daily Per Capita Water Use (GPCD)

Type of Target	Target
Residential Indoor	55
Irrigated Landscape	96.8
Commercial, Industrial and Institutional	17.0
Agricultural	15.16
2020 Compliance Target	**183.96**

Note: Calculated using method 2 described in SB x7-7

Baseline and Target Gallons Per Capita Per Day (GPCD) for EMWD Retail



Implementation Plan

- Recycled Water Use
  - Offset potable water use in landscape
  - Commercial, industrial, institutional and residential

  Economic Impact –
  - Uses sustainable supply and generates revenue
  - Defers cost of new potable supply
- Active Conservation
  - Programs and incentives aimed at all customer types
  - Includes rebates, education programs and direct install programs.

  Economic Impact –
  - Defers cost of new potable supply

Implementation Plan, cont.

- Tiered Rates – Existing Customers
  - Applies an indoor and out water budget to residential customers
  - Applies an outdoor landscape budget to commercial, industrial and institutional customer

  Economic Impact –
  - Implemented in 2009
  - Designed to promote revenue stability
- New Construction Requirements
  - Applies a reduced outdoor water budget to new accounts

  Economic Impact –
  - Defers cost of new potable supply and facilities

Water Savings to Meet SB x7-7 Target (AFY)

Saving Type	2015	2020	2025	2030	2035
Recycled Water	5,000	6,300	11,500	13,900	14,300
Active Conservation	6,500	9,500	10,700	11,700	12,600
Tiered Rate	8,700	8,700	8,700	8,700	8,700
New Construction Requirements	2,000	4,100	6,100	8,000	9,600
Total	**22,200**	**28,600**	**37,000**	**42,300**	**45,200**

UWMP Supplies

- Existing
  - Metropolitan Water District (MWD) Imported
  - Groundwater
  - Recycled Water (existing system)
  - Two Desalters
- Potential Local Supply Projects
  - Full Utilization of Recycled
  - Third Desalter
  - Additional Conservation

2015-2035 Water Supply and Demand Average Year Hydrology (AFY)

	2015	2020	2025	2030	2035
Metropolitan Water District	149,200	170,700	190,700	210,000	226,200
Recycled	43,900	50,000	53,900	54,900	55,300
Groundwater	13,200	13,200	13,200	13,200	13,200
Existing Desalter	7,500	7,500	7,500	7,500	7,500
Total Existing Supplies	213,800	241,400	265,300	285,600	302,200
Total Projected Demands	213,800	241,400	265,300	285,600	302,200
Shortfall/Surplus	0	0	0	0	0

Based on a average of 2004-2009 conditions

2015-2035 Water Supply and Demand Dry Year Hydrology (AFY)

	2015	2020	2025	2030	2035
Metropolitan Water District	155,300	177,600	198,300	218,300	235,100
Recycled	45,500	51,800	55,800	56,900	57,300
Groundwater	13,200	13,200	13,200	13,200	13,200
Existing Desalter	7,500	7,500	7,500	7,500	7,500
Total Existing Supplies	**221,500**	**250,100**	**274,900**	**295,900**	**313,100**
Total Projected Demands	**221,500**	**250,100**	**274,900**	**295,900**	**313,100**
Shortfall/Surplus	**0**	**0**	**0**	**0**	**0**

Based on a repeat of 1977 conditions

2015-2035 Water Supply and Demand Multi-Dry Year Hydrology (AFY)

	2015	2020	2025	2030	2035
Metropolitan Water District	156,600	179,000	199,800	219,900	236,900
Recycled	45,800	52,200	56,200	57,300	57,700
Groundwater	13,200	13,200	13,200	13,200	13,200
Existing Desalter	7,500	7,500	7,500	7,500	7,500
Total Existing Supplies	**223,000**	**251,800**	**276,800**	**297,900**	**315,300**
Total Projected Demands	**223,000**	**251,800**	**276,800**	**297,900**	**315,300**
Shortfall/Surplus	**0**	**0**	**0**	**0**	**0**

Based on a repeat of 1990-1992 conditions

Potential Supply/Demand Challenges

- Limitation on Imported Water
  - Supply allocation may be required to preserve storage
- Climate change
  - Higher demand
  - Local supply limitations
  - Imported water limitations
- Demand Fluctuation
  - Higher per capita demand
  - Rapid new development
  - Imported water limitations

Addressing Challenges

- Maximize Local Resources
  - Increases reliability
  - Provide buffer against uncertainty of imported water
  - Improves ability to meet higher demands
- Implement Cost Effective Conservation
  - Reduces demand on imported supplies
  - Defers supply development
  - Extends existing resources

UWMP Report Conclusion

- **EMWD relies on MWD to meet its projected demand with imported water in normal, dry and multi- dry years**
  - **MWD has assured reliability in the 2010 Regional Urban Water Management Plan**
- **Per capita demand will be reduced through the tiered rate, restrictions on new development and conservation programs to meet SB x 7-7 Targets in 2015 and 2020**
- **Development of potential local supply projects will improve reliability and help meet supply challenges**

Appendix C

Ground Water Management Plans

GROUNDWATER MANAGEMENT PLAN
WEST SAN JACINTO GROUNDWATER BASIN

EASTERN MUNICIPAL WATER DISTRICT

JUNE 8, 1995

ADDENDUM

GROUNDWATER MANAGEMENT PLAN
WEST SAN JACINTO GROUNDWATER BASIN
Draft September 1994

MAY 1995

Eastern Municipal Water District

GROUNDWATER MANAGEMENT PLAN
WEST SAN JACINTO GROUNDWATER BASIN
September 1994 Draft

ADDENDUM - May 1995

(~~Strikeout~~ indicates deletion and
underline indicates insertion.)

Table of Contents

Page iii — Last item under Section 7: ~~TRANSFER~~ **EXCHANGE OF AGRICULTURAL AND OTHER NON-POTABLE** ~~USERS~~ **USES FROM GROUNDWATER TO RECLAIMED WATER.**

Section 1 - Executive Summary

Page 1-1 — 1st ¶, 3rd bullet item: • ~~structural adequacy~~ capacity of the delivery system is limited;

Last ¶, last sentence: One such action that could adversely affect EMWD's local water resources is a claim recently filed by a neighboring water district ~~Orange County Water District,~~ which underscored the urgent need for action by EMWD to protect the water resources within its service area for use by EMWD consumers.

Page 1-3 — 2nd ¶, last line: ... ~~Edgemont Gardens~~ Moreno Valley Mutual Water Company ...

Page 1-4 — 2nd ¶, 2nd and 3rd sentences: Water requirements by these subagencies ~~varies~~ vary depending on development and the availability of local supplies. These entities and public agencies include the Brownlands Mutual Water Company, ~~city~~ City of Perris, ~~Edgemont Gardens~~ Moreno Valley Mutual Water Company and Nuevo Water Company.

Page 1-5 — 2nd ¶: **Local Planning and Regulatory Agencies.** Other local agencies that may have a significant influence on groundwater management include:

> Riverside County Flood Control and Water Conservation Agency. This agency plans, constructs and operates flood control and water

conservation facilities in Riverside County. The construction of ... significant impact. This agency issues the following permits:

a. Separate Application for Flood Plain Management (County Ordinance No. 458)

b. Encroachment Permits

Same ¶, last section: ~~Riverside County Health Department.~~ County of Riverside Department of Environmental Health. The County of Riverside Department of Environmental Health will review NPDES and solid waste facility permits and compatibility of well construction policies and well abandonment and destruction programs with County Ordinance No. 682. EMWD fully intends to coordinate with the County when development of well construction policies and development of a well abandonment and destruction program are developed as part of Plan implemeniation. ~~The Riverside County Health Department will review water supply and wastewater plans that could be embodied in the groundwater management plan.~~

Page 1-6 4th ¶: Groundwater production estimates for 1993 were estimated from annual reports of groundwater production on file at the State Water Resources Control Board and from Southern California Association of Governments (SCAG) ~~SCAG~~ land use.

Page 1-7 1st ¶, add to end of ¶: Non-irrigated, vacant land will accommodate most of the urbanization growth in the area.

Page 1-8 2nd ¶, 12th line: ... such as SWP water~~.~~ and demineralization.

3rd ¶, 1st line: ... water distribution ~~plan~~ system ...

Page 1-9 1st ¶, 5th line: 3,360 acre-ft/yr of potable water.

Page 1-14 3rd ¶, **Ultimate Plan Description.** The groundwater management plan consists of a series of elements that, when implemented, will achieve the management plan goal stated above within the constraints of this plan. Involuntary groundwater production assessments and groundwater pumping restrictions are not authorized as part of this management plan except as necessary to prevent unauthorized production of water stored by EMWD.

Page 1-15 2nd ¶, **Monitoring of Groundwater Level and Quality**, 3rd sentence: EMWD will measure groundwater levels and quality from select private wells. EMWD's measurements will not interfere with the well owners' use of the wells. EMWD's measurements will be provided to participating well owners free of charge upon request.

3rd ¶, **Development of Well Construction Policies**, last sentence: These policies will be related to water quality and health protection only and will not limit, or suspend, or unreasonably increase the cost of current or future groundwater production by ~~existing groundwater producers~~ private landowners for use within the plan boundary.

Page 1-16 2nd ¶, **Exchange of Agricultural and Other Non-potable Groundwater Production to Municipal Use**, 1st sentence: The intent of this element is to increase the groundwater yield available for municipal use by either ~~retiring~~ voluntary retirement of agricultural and non-potable demands or by voluntarily substituting reclaimed water for groundwater used for agricultural and other non-potable uses.

Page 1-17 Top of page, 4th bullet item: • Administration and Monitoring of Well Construction, Abandonment and Destruction

Page 1-20 2nd ¶, **Financing the Groundwater Management Plan**: The cost of implementing and operating the West San Jacinto Groundwater Basin management plan ~~should~~ shall be borne by municipal water users in the management area... There could be some cost to local groundwater producers if groundwater replenishment is necessary due to groundwater overdraft and groundwater producers choose to participate in the groundwater replenishment program in order to access supplemental water supplies instead of curtailing their own groundwater production or enjoining the groundwater production of others in the affected subbasin. In the event of continued overdraft, an equitable cost sharing plan should be developed to allocate costs among EMWD, other benefitted municipal water suppliers, and participating groundwater producers to correct the overdraft.

Page 1-21 1st ¶, last line: The following tasks will be completed in Phase ~~I~~ 1.

2nd ¶, last 2 sentences under **Phase 2 Refine the Ultimate Groundwater Management Plan**: ... management plan. The complexity and ...

Page 1-22 Last ¶, Schedule and Cost. The cost to complete Phases 1 and 2 is estimated to range between 3 to 5 million dollars. The cost to complete Phase 3 cannot be estimated until the ultimate plan is described at the conclusion of Phase 2. The cost to implement and operate the Groundwater Management Plan is estimated to be between $50 million and $70 Million. Estimates at this time are very rough and they will be refined when the specific projects are identified and designed.

Section 2 - Introduction

Page 2-1 — 1st ¶, 3rd bullet item: • ~~structural adequacy~~ capacity of the delivery system is limited;

Last ¶, last sentence: One such action that could adversely affect EMWD's local water resources is a claim recently filed by a neighboring water district ~~Orange County Water District,~~ which underscored the urgent need for action by EMWD to protect the water resources within its service area for use by EMWD consumers.

Page 2-4 — 2nd ¶ under **Approach to Development of Groundwater Management Plan**, second sentence: These goals can be modified during the plan development process within the constraints of this plan. These goals will determine the magnitude of the plan, beneficiaries of the plan, and will guide the technical work that shapes the plan. Involuntary groundwater production assessments and groundwater pumping restrictions are not authorized as part of this management plan except as necessary to prevent unauthorized production of water stored by EMWD.

Page 2-5 — Mid-page, 3rd bullet item: ... plan goals; ~~and~~

Page 2-6 — Last ¶, last line: ~~Dr.~~ Mr. P. Ravishanker.

Section 3 - Existing Water Resources Framework

Page 3-2 — 2nd ¶, 5th line: ... ~~Edgemont Gardens~~ Moreno Valley Mutual Water Company, ...

5th ¶, 1st line: ~~Edgemont Gardens~~ Moreno Valley Mutual Water Company.

Page 3-3 — Substitute section titled "**Colorado River Water**" with the following:
MWD has water delivery contracts for Colorado River water with the U.S. Department of the Interior for 1.212 million acre-feet per year (MAF/Y) and an additional 180,000 acre-feet per year (AF/Y) of surplus water. The capacity of MWD's Colorado River Aqueduct is 1,800 cubic feet per second or 1.3 MAF/Y. However, as a result of the 1964 U.S. Supreme Court decree in Arizona v. California, MWD's dependable supply of Colorado River water was reduced to less than 550,000 AF/Y. This reduction in dependable supply occurred with the commencement of Colorado River deliveries by the Central Arizona Project.
MWD has a priority to divert 550,000 AF/Y of California's 4.4 MAF/Y basic apportionment under its water delivery contract with the Secretary of the

Interior. In addition, MWD has entered into agreements with other agencies serving Colorado River Water for agricultural purposes in the California desert to increase its dependable supplies. Water use by holders of present perfected rights (Indian reservations, towns, and other individuals along the Colorado River that predate MWD's rights) is estimated to reduce dependable diversions by about 30,000 AF/Y. Conveyance losses along the Colorado River Aqueduct of 10,000 AF/Y further reduce the amount of Colorado River water received in the coastal plain. MWD's dependable Colorado River supplies are projected to total 626,000 acre-feet upon completion of a cooperative water conservation program with Imperial Irrigation District.

Based on an annual determination, the Secretary of the Interior has allowed MWD in recent years to divert Colorado River water apportioned to, but unused, by Arizona and Nevada. Arizona and Nevada are not expected to use their full apportionments until the years 2036 and 2005, respectively. MWD is pursuing several projects to increase the reliability of its Colorado River supplies.

Page 3-4 Substitute the section titled **"State Project Water"** with the following:

SWP water comes from Northern California, is transported through the Sacramento-San Joaquin Delta, and is delivered to MWD through the California Aqueduct. MWD, one of 29 agencies that have contracted with the State for SWP supplies, holds a contract for entitlement to 2.01 MAF/Y, or nearly half of the total contracted entitlement of 4.23 MAF/Y. Initial SWP facilities completed in the early 1970s have produced yields adequate to meet just over half of the total contracted entitlement on a dependable basis. While it was intended that addition SWP facilities would be constructed to meet contractor demands as they increased, this has not occurred. In addition, constraints placed on SWP operations in the Delta under State and federal Endangered Species acts have reduced available SWP supplies. However, the December 1994 consensus agreement on interim standards for Delta flows and water quality brings more certainty to SWP supply availability during the next three years, and is the foundation for immediate initiation of a process for identifying a long-term solution to water supply and fishery problems in the Delta. In the future, if additional facilities are not completed, availability of water from the SWP is expected to decrease due to increased use of water in Northern California, and increasing allocations of water for environmental needs in the Bay-Delta.

Page 3-9 1st ¶, 3rd line: The proposed regulations are included in Appendix A-2 ~~A-1~~.

Page 3-10 4th ¶, 1st line: A summary of existing and proposed water quality standards is presented in Appendix A-3 ~~A-2~~.

Last ¶, 1st section: **Riverside County Flood Control and Water Conservation Agency.** This agency ... Riverside County. The construction of ... significant impact. This agency issues the following permits:

a. Separate Application for Flood Plain Management (County Ordinance No. 458)

b. Encroachment Permits

Last ¶, last section: ~~Riverside County Health Department.~~ County of Riverside Department of Environmental Health. The County of Riverside Department of Environmental Health will review NPDES and solid waste facility permits and compatibility of well construction policies and well abandonment and destruction programs with County Ordinance No. 682. EMWD fully intends to coordinate with the Department when development of well construction policies and development of a well abandonment and destruction program are developed as part of Plan implementation. ~~The Riverside County Health Department will review water supply and wastewater plans that could be embodied in the groundwater management plan.~~

Section 4 - Groundwater Resources in the West San Jacinto Basin

Page 4-5 — 1st ¶, insert after 1st sentence: ... on the north. The San Jacinto River flows through this subbasin include tributary flows from Potrero Creek and Laborde Canyon.

2nd ¶, 3rd line: San Jacinto ~~Creek~~ River

Table 4-2 — 10th line of data is a duplicate: ~~0 0 0 0 800 1,200 2,000~~

Page 4-9 — 5th ¶: The total outflow in the basin, from all sources, ranges from a low of zero ~~1,300~~ acre-ft/yr from the Menifee ~~San Jacinto Lower Pressure~~ subbasin, to a high of 4,000 ~~4,600~~ acre-ft/yr for the Lakeview ~~Menifee~~ subbasin. The total outflow for the management area is about 10,200 ~~14,800~~ acre-ft/yr.

Page 4-10 — 3rd ¶, 5th line: San Jacinto ~~Creek~~ River

Page 4-14 — 2nd ¶, 1st sentence: The principle sources of groundwater in this basin are underflow from the San Jacinto Lower Pressure, Perris South I, Perris South II subbasins, storm flow percolation in the San Jacinto River ~~Creek~~ which includes flow from Potrero Creek and Laborde Canyon tributaries, and runoff from the Lakeview Mountains and Bernasconi Hills.

2nd ¶, insert: Most of the groundwater in the basin is sodium chloride in character. Potentially contaminated surface water flows from Potrero Creek and Laborde Canyon may impact groundwater quality in the basin. The Casa Loma fault ...

Page 4-16 1st ¶, last sentence under **Future Groundwater Quality**: ... These estimates, however, are based on a model that:

- has not been calibrated for TDS or nitrate;
- has each subbasin ~~is~~ represented by only one node and thus the resolution of the analysis is crude; and
- has future water supply and wastewater plans ~~that were~~ used in these studies that are not representative of ~~the~~ future plans.

Last ¶, last sentence: The planning tool would consist of groundwater flow and simulation models similar to those models ~~that were~~ developed and ~~that are~~ in current use in other basins. ~~to develop the Chino Basin Water Resources Management Plan (Montgomery Watson & Wildermuth, Mark J., 1992; Montgomery Watson & Wildermuth, Mark J., 1993).~~

Section 5 - Future Water Supply and Wastewater Flows

Page 5-1 1st ¶, Reclamation Plant List: ~~Temescal~~ Temecula Valley

1st ¶, add following last sentence: Non-irrigated, vacant land will accommodate most of the urbanization growth in the area.

Last ¶, 1st line: seasonal discount are~~:~~ to: achieve ...

Page 5-5 2nd ¶, 2nd sentence: ~~All agricultural demands would be satisfied with reclaimed water by the year 2010.~~

Section 6 - Groundwater Management Goals

Page 6-1 3rd ¶, 2nd sentence: Much of the r~~R~~emaining agricultural water demand will be converted to reclaimed water.

Page 6-2 2nd sentence: The negative impacts, if any, of a groundwater management plan on these users must be minimized; and the ability of these groundwater producers to continue producing groundwater for beneficial use must be preserved~~ or equitably replaced~~.

Section 7 - Elements of Groundwater Management Plan

Page 7-2 2nd ¶, 2nd sentence: The monitoring of groundwater quality includes the collection and review of groundwater quality data that can be used to assess current and future trends in groundwater quality, and to evaluate groundwater quality response to groundwater management activities and climate. <u>EMWD's monitoring activities will not interfere with the well owners' use of the wells. EMWD's monitoring data will be provided to participating well owners free of charge upon request.</u>

Page 7-3 Insert new ¶ following 3rd bullet item: <u>EMWD will coordinate with the County of Riverside Department of Environmental Health when development of well construction policies and development of a well abandonment and destruction program are developed as part of the Groundwater Management Plan implementation.</u>

Page 7-8 3rd ¶, last sentence: ... Reclaimed water can be recharged in the San Jacinto Lower Pressure, Menifee and Winchester subbasins by injection. <u>Recharge of reclaimed water will be implemented in a manner that avoids adverse impacts to construction, operation and use of wells by private landowners. Where reclaimed water recharge interferes with such construction, operation, or use of a well, suitable arrangements will by made for EMWD to provide alternative water supplies to meet both the short-term and long-term needs of the impacted landowner, or for EMWD to provide monetary compensation for the interference caused by EMWD's reclaimed water recharge activities.</u>

Page 7-9 Last bullet item: Water harvesting in the Lakeview subbasin. Storm water captured in ~~EMWD's~~ Mystic Lake ~~project~~ could be ~~captured and~~ conveyed to test recharge basins in the Lakeview subbasin.

1st ¶ under **Recovery of Contaminated Groundwater**: ... Other treatment technologies may be required if water quality conditions change or new types of contamination are discovered. <u>Recovery of contaminated groundwater will be implemented in a manner that avoids adverse impacts to construction, operation and use of wells by private landowners. Where groundwater recovery activities interfere with such construction, operation or use of a well, suitable arrangements will be made for EMWD to provide alternative water supplies to meet both the short-term and long-term needs of the impacted landowner, or for EMWD to provide monetary compensation for the interference caused by EMWD's groundwater recovery activities.</u>

Page 7-14 3rd ¶: ... Limited conjunctive use in these subbasins could be done in conjunction with groundwater treatment.
<u>Conjunctive use activities will be implemented in a manner that avoids adverse impacts to construction, operation and use of wells by private landowners. Where conjunctive use activities interfere with such construction, operation, or use of a well, suitable arrangements will be made for EMWD to provide alternative water supplies to meet both the short-term and long-term needs of the impacted landowner, or for EMWD to provide monetary compensation for the interference caused by EMWD's conjunctive use activities.</u>

Page 7-15 2nd ¶, **EXCHANGE OF AGRICULTURAL AND OTHER NON-POTABLE ~~USERS~~ <u>USES</u> FROM GROUNDWATER TO RECLAIMED WATER.** The exchange of agricultural and other non-potable groundwater production to municipal uses can occur through

- <u>Voluntary</u> retirement of agricultural lands, that is, the conversion of agricultural lands to non-agricultural uses; and
- by <u>voluntarily</u> substituting other supplies such as reclaimed water.

Section 8 - Groundwater Management Plan

Page 8-3 4th ¶, 3rd line: ... ~~city~~ <u>City</u> of Perris ...

4th ¶, 4th line: ... ~~Edgemont Gardens~~ <u>Moreno Valley</u> Mutual Water Company, ...

2nd ¶, **ULTIMATE PLAN DESCRIPTION**, 1st sentence: The groundwater management plan consists of a series of elements that, when implemented, will achieve the management plan goal stated above within the constraints <u>of this plan: Involuntary groundwater production assessments and groundwater pumping restrictions are not authorized as part of this management plan except as necessary to prevent unauthorized production of water stored by EMWD.</u>

Page 8-4 2nd ¶, **Monitoring of Groundwater Level and Quality**, beginning with 3rd sentence: EMWD will measure groundwater levels and quality from select private wells. <u>EMWD's measurements will not interfere with the well owners' use of the wells. EMWD's measurements will be provided to participating well owners free of charge upon request.</u>

3rd ¶, 2nd line: ... Riverside County ~~Health Department~~ <u>Department of Environmental Health</u> ...

Last ¶, 2nd line: ... Riverside County ~~Health Department~~ Department of Environmental Health ...

Last ¶, last sentence: These policies will be related to water quality and health protection only and will not limit, or suspend, or unreasonably increase the cost of current or future groundwater production by ~~existing groundwater producers~~ private landowners for use within the plan boundary.

Page 8-5 1st ¶, 5th line: ... Riverside County ~~Health Department~~ Department of Environmental Health ... (Riverside Co. Dept. Environmental Health)

3rd ¶, **Exchange of Agricultural and Other Non-Potable Groundwater Production to Municipal Use,** 1st sentence: The intent of this element is to increase the groundwater yield available for municipal use by either ~~retiring~~ voluntary retirement of agricultural and non-potable demands or by voluntarily substituting reclaimed water for groundwater used for agricultural and other non-potable uses.

Page 8-11/12 2nd ¶ of **Financing the Groundwater Management Plan**: The cost of implementing and operating the West San Jacinto Groundwater Basin management plan ~~should~~ shall be borne by municipal water users in the management area... There could be some cost to local groundwater producers if groundwater replenishment is necessary due to groundwater overdraft and groundwater producers choose to participate in the groundwater replenishment program in order to access supplemental water supplies instead of curtailing their own groundwater production or enjoining the groundwater production of others in the affected subbasin. In the event of continued overdraft, an equitable cost sharing plan should be developed to allocate costs among EMWD, other benefitted municipal water suppliers, and participating groundwater producers to correct the overdraft.

Page 8-12 3rd ¶: The benefits and costs associated with the groundwater management plan should be accounted for locally, that is, by subbasin or some other geographic unit, to insure the benefits and costs are equitably distributed among municipal water users and other voluntary participants.

Page 8-15 2nd ¶, 3rd line: Prepare Project Specific Environmental ~~Impact Report~~ Reviews.

3rd ¶: **Task 2-2 Prepare Project Specific Environmental ~~Impact Reports (EIR)~~ Reviews**. ~~EIR's will be prepared~~ CEQA reviews will be performed for the implementation of specific groundwater management ~~elements~~ projects that are developed in Phase 1. This Task consists of the following subtasks.

~~Prepare and Distribute Notice of Preparation (NOP). The NOP will be prepared based on the results of initial environmental study prepared in Task 1-5 and the facility and operational plans developed in Task 2-1. The final scope of work for the EIR studies will be based on the NOP and comments received on the NOP.~~

Initial Study. CEQA reviews will be done on each project proposed under the Groundwater Management Plan. An Initial Study will be done such that the need for either a Negative Declaration or an EIR can be determined, based on project-specific design parameters and project site characteristics.

Estimate Environmental Impacts and Develop Mitigation Plans. This work ~~will~~ could include: biological assessments, archaeological assessments, impact assessments and development of mitigation plans as needed on a project-specific basis.

Page 8-16 3rd line: Prepare and Distribute ~~Draft EIR(s)~~ CEQA Documents and Notices.

4th line: ~~Conduct Meetings, Public Hearings and Respond to Comments.~~

5th line: ~~Finalize EIR(s).~~

Page 8-19 Last ¶: The cost to complete Phases 1 and 2 is estimated to range between 2 to 3 million dollars. The cost to complete Phase 3 cannot be estimated until the ultimate plan is described at the conclusion of Phase 2. The cost to implement and operate the Groundwater Management Plan is estimated to be between $50 million and $70 million. Estimates at this time are very rough and they will be refined when the specific projects are identified and designed.

References

~~Montgomery Watson, Wildermuth, Mark J., "Final Task 4 Memorandum, New Planning Model Implementation Plan", prepared for Santa Anna Watershed Project Authority, May 1992~~

~~Montgomery Watson, Wildermuth Mark J., "Draft task 6 Memorandum, Develop Three Dimensional Groundwater Model, prepared for Santa Anna Watershed Project Authority, November 1993~~

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DRAFT
GROUNDWATER MANAGEMENT PLAN
WEST SAN JACINTO GROUNDWATER BASIN

Prepared for

EASTERN MUNICIPAL WATER DISTRICT

SEPTEMBER 1994

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SECTION 1

SECTION 1
EXECUTIVE SUMMARY

THE NEED FOR GROUNDWATER MANAGEMENT

EMWD, together with the majority of water purveyors in Southern California, have been heavily relying on imported supplies from Metropolitan Water District of Southern California (Metropolitan). Recently, Metropolitan's ability to supply the ever-growing needs of Southern California has become increasingly unreliable due to the following reasons:

- demand for water is continuing to increase;
- environmental constraints at the point of origin may limit the water available for export;
- structural adequacy of the delivery system is limited;
- climatological uncertainties can limit delivery; and
- inadequate local storage facilities.

EMWD could purchase imported water from Metropolitan to meet these projected municipal demands. Metropolitan's sources, however, are not reliable and will be very expensive in the future. Metropolitan, with its current planning and future projects, will experience shortages in four of five years, with shortages reaching as high as 30 percent. The cost of imported water from Metropolitan is currently (July 1994) $412 per acre-ft for treated water and is projected to reach about $1,100 per acre-ft by 2010. These rising costs and lack of water to meet all of the demands has encouraged some local agencies in Southern California to claim water rights in the service areas of other agencies. One such action that could adversely affect EMWD's local water resources is a claim recently filed by Orange County Water District, which underscores the urgent need for action by EMWD to protect the water resources within its service area for use by EMWD consumers.

The West San Jacinto Groundwater Basin underlies a large portion of the Eastern Municipal Water District (EMWD). The West San Jacinto Groundwater Basin includes the Perris North, Perris South, Menifee, Winchester, Lakeview and the San Jacinto Lower Pressure subbasins. The location of these subbasins is shown in Figure 1-1. This area is experiencing rapid land use conversion from agriculture to urban uses. Total municipal water demands are expected to increase from 47,000 acre-ft/yr in 1995, to 112,000 acre-ft/yr in 2010.

Three sources of water supply for these demands can be considered: groundwater, imported water and reclaimed water. Groundwater in the West San Jacinto Groundwater Basin, for the most part, is of poor quality due to natural causes and irrigated agriculture. Most of the groundwater resources cannot be used as municipal supply due to poor quality - the groundwater quality either violates drinking water standards or is too high in total dissolved solids (TDS) or other water quality constituents to be discharged after municipal use. To meet increasing demands, EMWD could purchase imported water from Metropolitan. However, availability and costs might limit this alternative. EMWD has reclaimed water resources that could be used to meet agricultural demands and non-potable municipal demands. Reclaimed water cannot be directly used for potable demand unless, after groundwater recharge and dilution, it meets Title 22 requirements (State Department of Health Services Reclaimed Water Regulations). Additionally, groundwater treatment practices can convert non-potable water supplies to potable supplies.

The availability and reliability of the total water supply can be improved through the joint, optimized (conjunctive) management of all the water supply sources. It is the intent of Assembly Bill AB 3030, which was incorporated into the Water Code in 1992 (Part 2.75 commencing with Section 10750 of Division 6) with amendments by AB 1152 of 1993, to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions. Authorization to adopt and implement a plan is contained in the following section of AB 3030:

> "§10753 (a) 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 order, judgment, or decree, may, by ordinance, or by resolution if the local agency is not authorized to act by ordinance, adopt and implement a groundwater management plan pursuant to this part within all or a portion of its service area."

The components of a groundwater management plan may include the following:

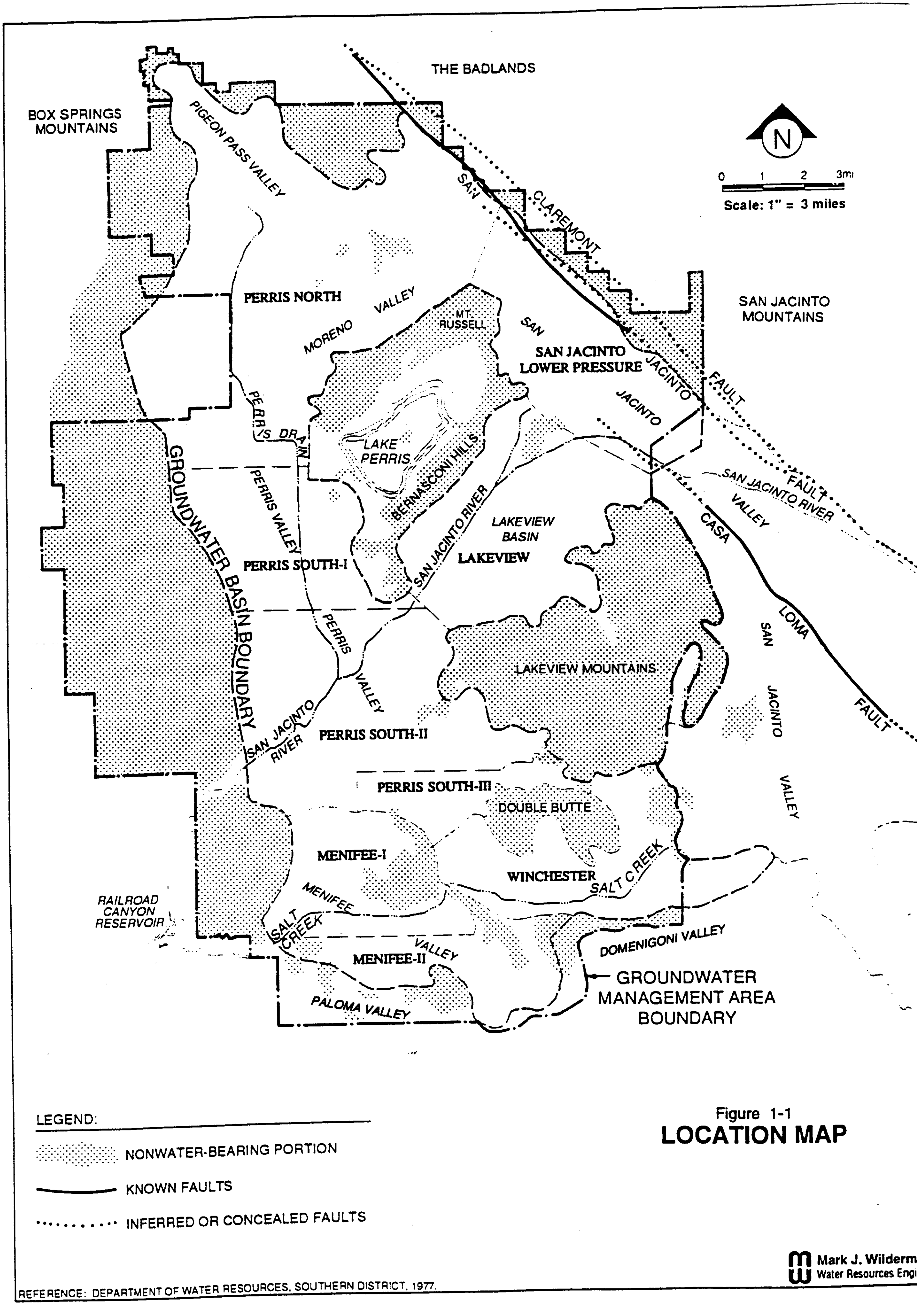


Figure 1-1
LOCATION MAP

Mark J. Wildermu
Water Resources Engine

"§10753.7 (a) The control of saline water intrusion.
(b) Identification and management of wellhead protection areas and recharge areas.
(c) Regulation of the migration of contaminated groundwater.
(d) The administration of a well abandonment and well destruction program.
(e) Mitigation of conditions of overdraft.
(f) Replenishment of groundwater extracted by water producers.
(g) Monitoring of groundwater levels and storage.
(h) Facilitating conjunctive use operations.
(i) Identification of well construction policies.
(j) The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects.
(k) The development of relationships with state and federal regulatory agencies.
(l) The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination."

EMWD's Board of Directors adopted resolution No. 3039 to develop a Groundwater Management Plan for the West San Jacinto Groundwater Basin and published a Notice of Intent on August 25, 1993. The groundwater management plan for the West San Jacinto Groundwater Basin is being developed under the authority of Assembly Bill 3030 (AB 3030), which allows a local water agency to take the lead in development of a plan. Up to two years can be taken for development of a plan. Local water purveyors, both public and private, have been involved in development of the plan. There are approximately forty-five (45) pumpers in the area. Public meetings, workshops and hearings were held during the preparation of the draft plan. Cooperative agreements with EMWD have already been signed by Nuevo Water Company, Edgemont Gardens Mutual Water District and the City of Perris.

EXISTING WATER RESOURCES FRAMEWORK

Eastern Municipal Water District

EMWD encompasses over 540 square miles in the western portion of Riverside County as shown on Figure 1-2. It is bounded on the west by Western Municipal Water District, on the north by mountains which approximately parallel the San Bernardino County boundary, on the east by the San Jacinto Mountains, and on the south by mountains which parallel the San Diego County line. Only about half of the area within EMWD's boundary receives water service at this time. EMWD is the only wastewater treatment entity in the West San Jacinto groundwater management area.

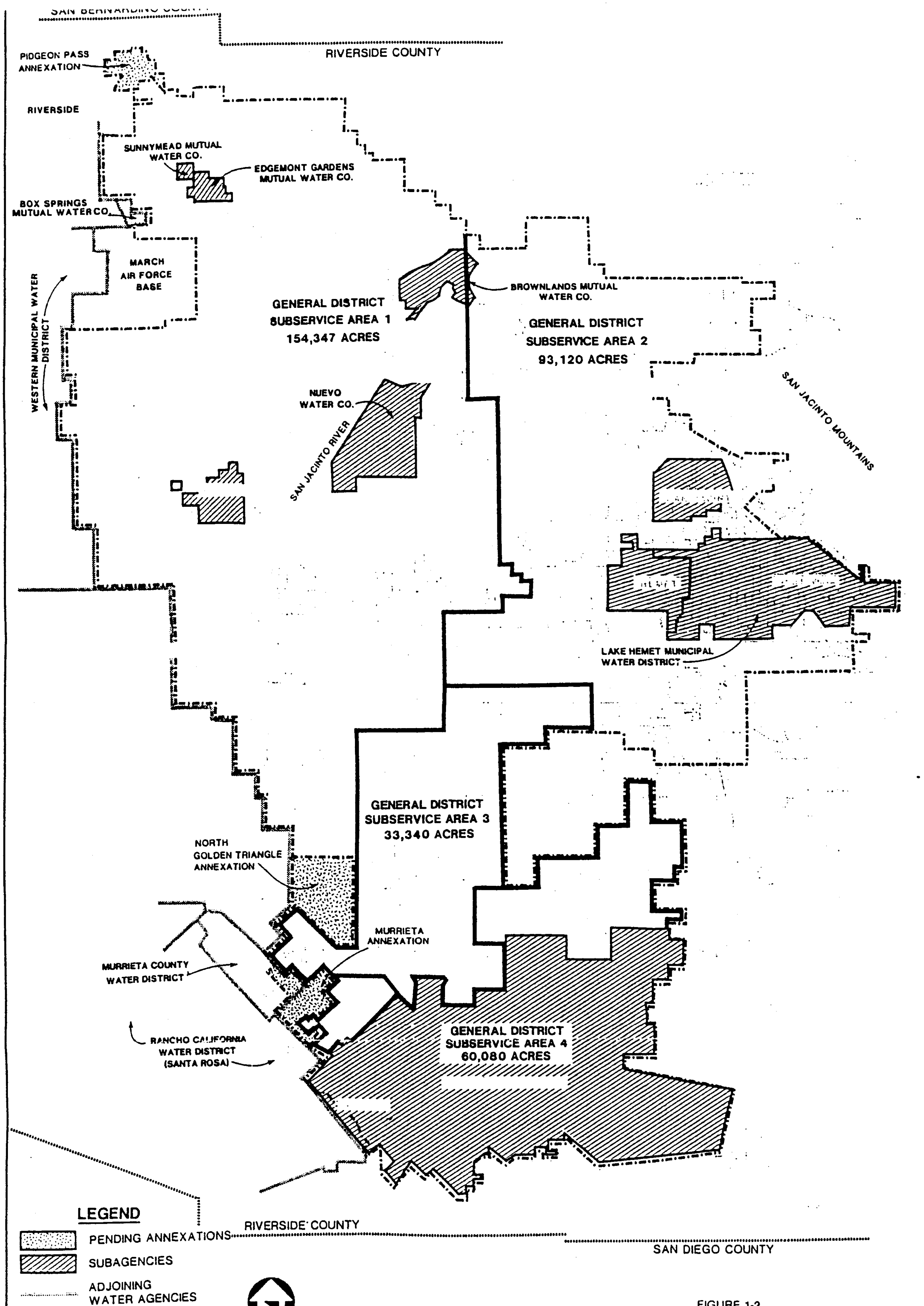


FIGURE 1-2
DISTRICT BOUNDARY MAP
EASTERN MUNICIPAL WATER DISTRICT

SOURCE: VOL. II, EMWD WATER FACILITIES MASTER PLAN; BLACK & VEATCH, JMM; OCT. 1990

EMWD has divided its service area into four subservice areas for the distribution of water as shown on Figure 1-2. The boundary of the groundwater management area is approximately the same as EMWD Service Area 41, which is supplied by Metropolitan's Mills and Skinner treatment plants. The management area includes the cities of Moreno Valley and Perris, and the unincorporated areas in western Riverside County such as the communities of Lakeview, Nuevo, Sun City and Winchester.

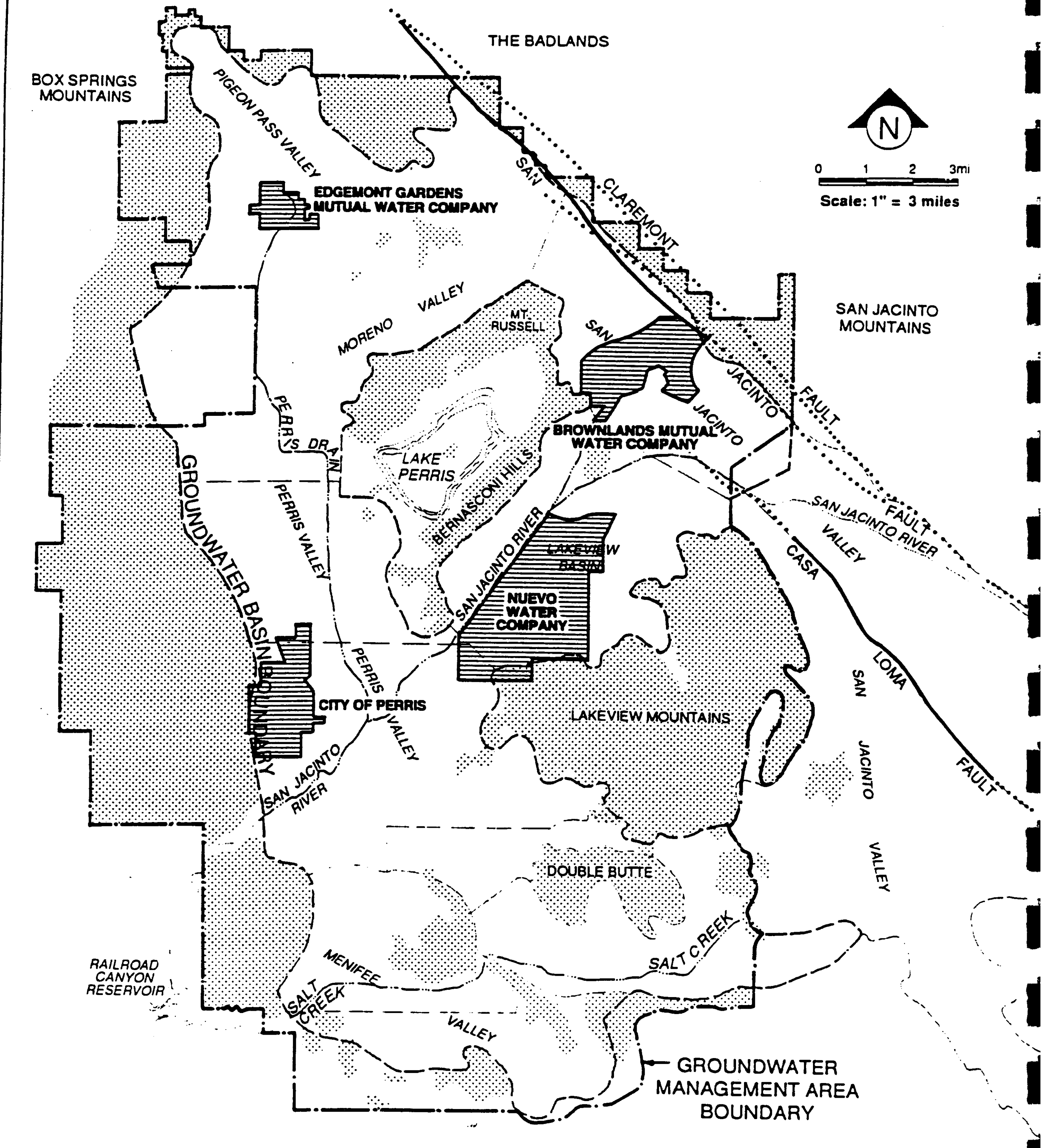
EMWD has agreed to supply water on a wholesale basis to eight public entities and companies, four of which are in the West San Jacinto Groundwater Management area. Water requirements by these subagencies varies depending on development and the availability of local supplies. These entities and public agencies include the Brownlands Mutual Water Company, city of Perris, Edgemont Gardens Mutual Water Company and Nuevo Water Company. The location of these entities within the West San Jacinto Groundwater Management area are shown in Figure 1-3.

Metropolitan Water District of Southern California

Metropolitan Water District of Southern California (Metropolitan) is a wholesale water agency serving supplemental imported water to 27 member cities and water agencies in portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura counties. This service area has a current population of about 15 million people. Approximately one-half of the total water used throughout the entire Metropolitan service area is imported water purchased from Metropolitan to supplement the local water supplies of the study area. Metropolitan obtains imported supplies from the Colorado River and the State Water Project (SWP). Figure 1-4 shows the locations of Metropolitan's, state and EMWD imported water facilities.

Regulation of Wastewater

The West San Jacinto Groundwater Management plan will be influenced by the plans and policies of the Federal Environmental Protection Agency, State Water Resources Control Board, California Regional Water Quality Control Board, Santa Ana Region as well as the state and local health departments.



LEGEND:

NONWATER-BEARING PORTION

KNOWN FAULTS

INFERRED OR CONCEALED FAULTS

Figure 1-3
SUBAGENCIES

REFERENCE: VOL. II, EMWD WATER FACILITIES MASTER PLAN; BLACK & VEATCH, JMM; OCT, 1990.

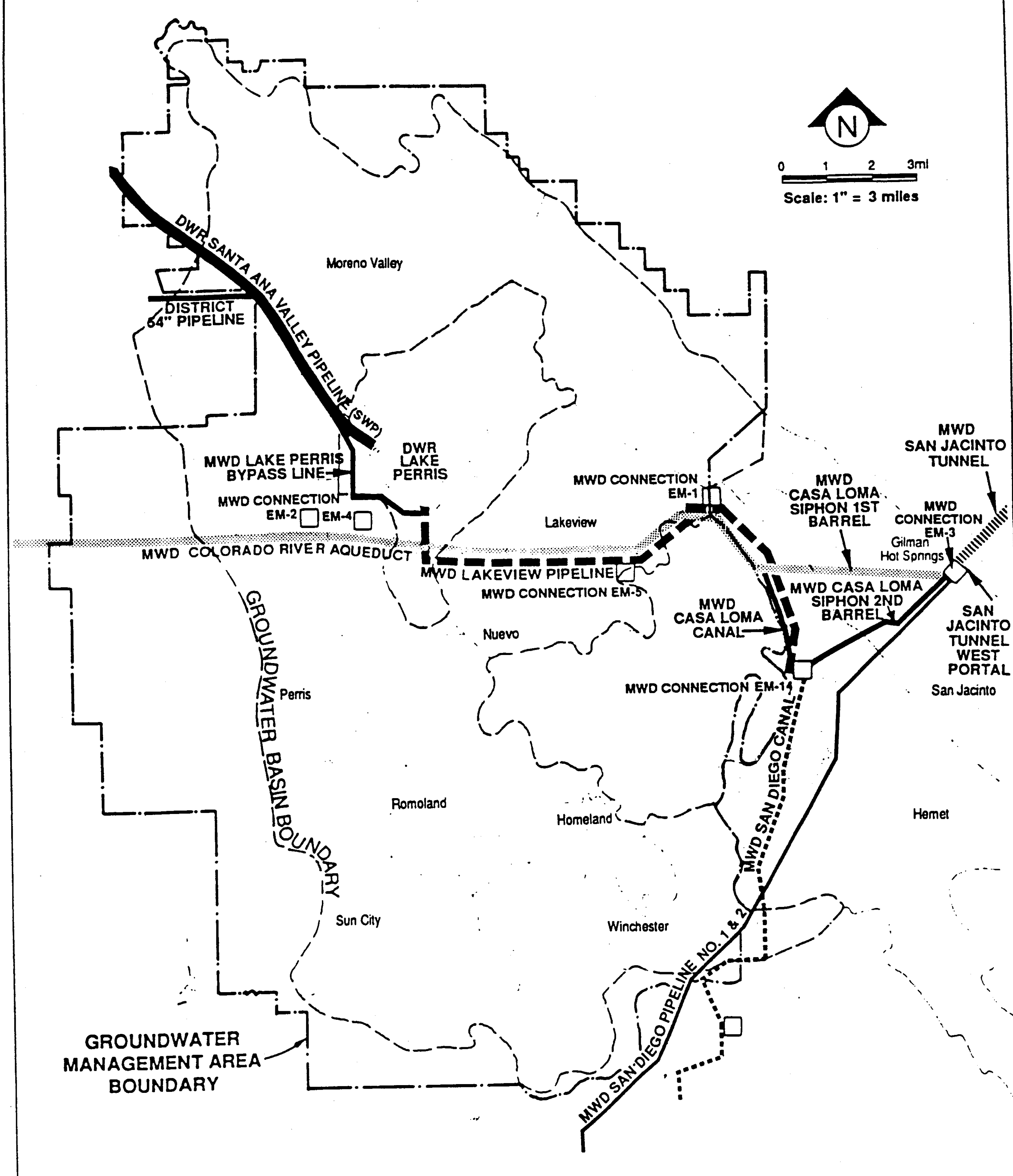


Figure 1-4
IMPORTED WATER FACILITIES

Mark J. Wildermuth
Water Resources Engineer

REFERENCE: EMWD WATER FACILITIES MASTER PLAN, *FIG. 4-3: SOURCES OF SUPPLY MAP*, OCTOBER, 1990.

Regulation of Drinking Water

Drinking water quality standards are enforced in California by California Department of Health Services (DHS). Groundwater developed in the groundwater management plan for municipal uses must satisfy the standards described in Title 22 of California Code of Regulations.

Local Planning and Regulatory Agencies

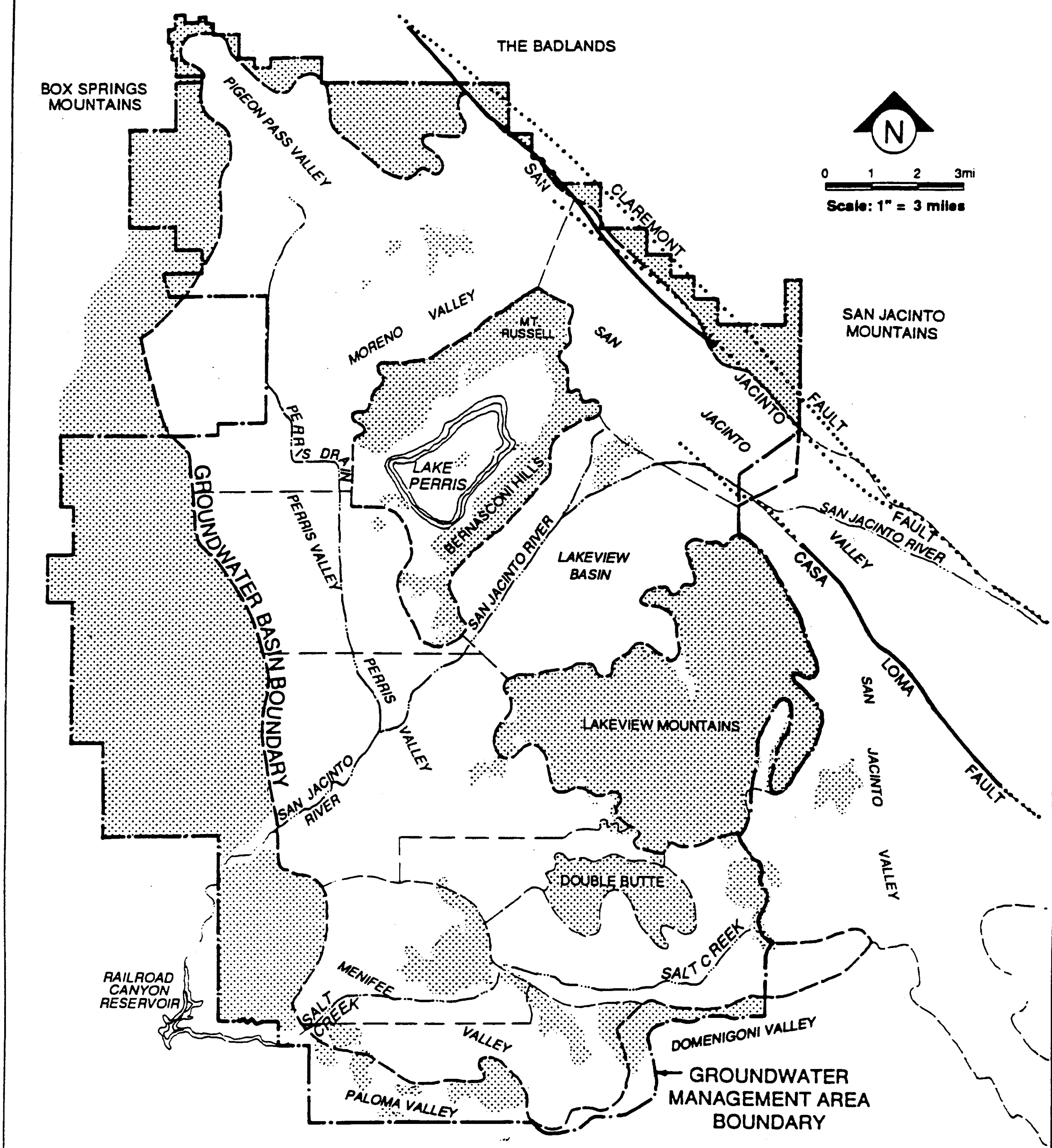
Other local agencies that may have a significant influence on groundwater management include:

> Riverside County Flood Control and Water Conservation District. This agency plans, constructs and operates flood control and water conservation facilities in Riverside County. The construction of flood control and water conservation facilities affects the volume of recharge to groundwater and thus, has a potentially significant impact.
>
> Riverside County Planning Department. Riverside County Planning Department develops and reviews general plans for all unincorporated areas in the county. Thus, this agency will review the groundwater management plan for consistency with general plans under their jurisdiction.
>
> Riverside County Health Department. The Riverside County Health Department will review water supply and wastewater plans that could be embodied in the groundwater management plan.

GROUNDWATER RESOURCES IN THE WEST SAN JACINTO BASIN

Figure 1-5 shows the major physical features, waterbearing and non-waterbearing areas of the groundwater management area. The major physical features in the study area include the San Jacinto mountains, the Badlands, the San Jacinto River, Salt Creek, Perris Valley Drain, the San Jacinto and Casa Loma faults, the Lakeview mountains, the Bernasconi Hills, and Double Butte. The management area groundwater basins are shown in Figure 1-6 and include Perris South I, II and III, Menifee I and II, Lakeview, the San Jacinto Lower-Pressure and portions of Perris North and Winchester subbasins.

The safe yield, volume of groundwater in storage, storage capacity, and water quality characteristics in the subbasins are summarized in Table 1-1. The safe yield of the individual subbasins ranges from about 1,600 for the Winchester subbasin to about 13,700 acre-ft/yr for the Perris North subbasin. The total safe yield of the West San Jacinto Groundwater Basin is about 36,200 acre-ft/yr. The safe yield increases if the volume of other planned groundwater recharge



LEGEND:

NONWATER-BEARING PORTION

KNOWN FAULTS

INFERRED OR CONCEALED FAULTS

Figure 1-5
MAJOR PHYSICAL FEATURES

Mark J. Wildermuth
Water Resources Engineer

REFERENCE: DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1977.

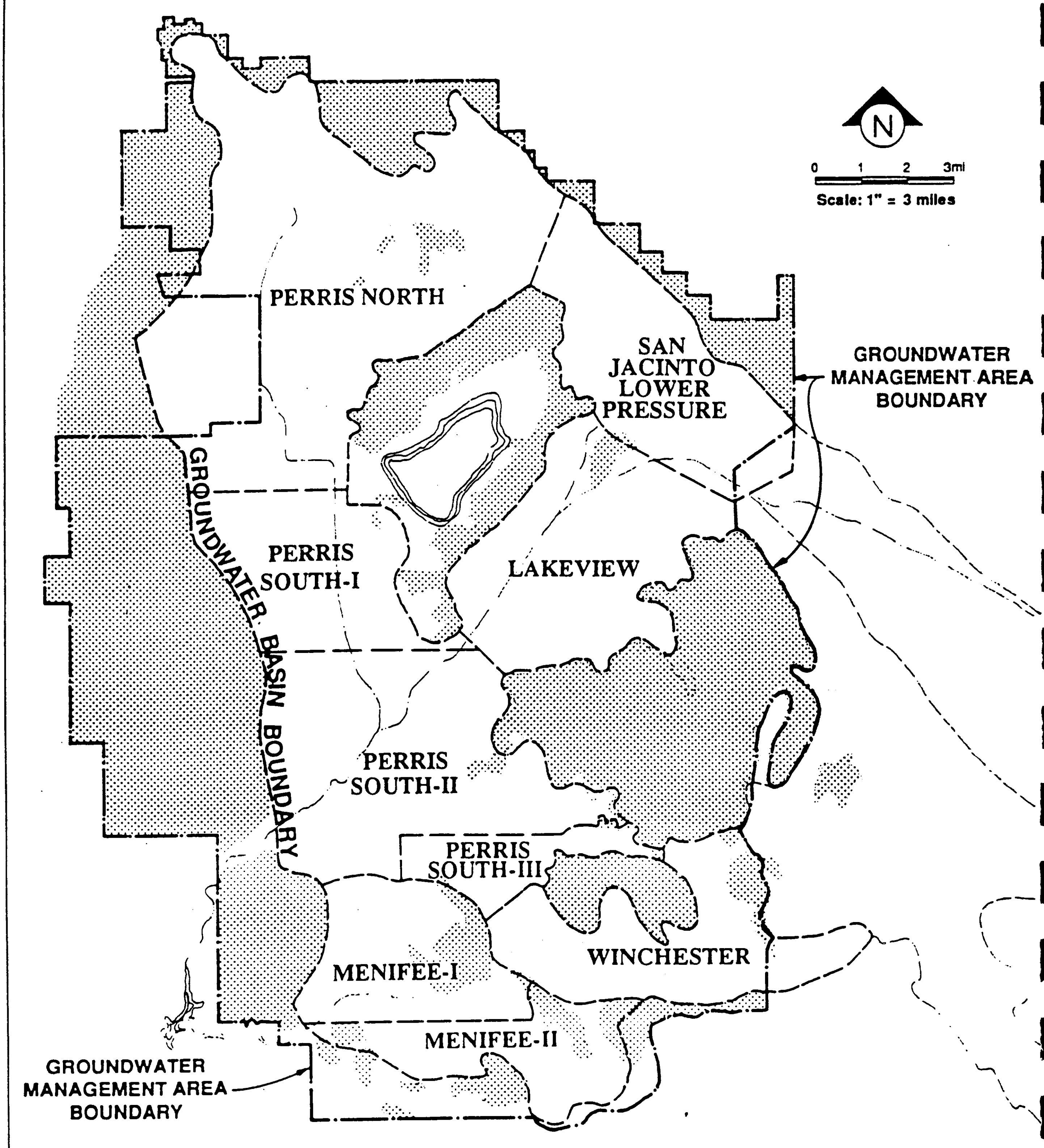


Figure 1-6
GROUNDWATER SUBBASINS

Mark J. Wildermuth
Water Resources Engineer

TABLE 1-1
AVAILABILITY OF GROUNDWATER IN THE WEST SAN JACINTO BASIN

Subbasin	Volume in Storage (acre-ft)	Storage Capacity (acre-ft)	Fraction of Groundwater in West San Jacinto Basin	Natural Safe Yield (acre-ft/yr)	Safe Yield with Wastewater Recharge (acre-ft/yr)	Fraction of Yield in West San Jacinto Basin	Average TDS Concentration (mg/L)	Average Nitrate Concentration (as Nitrogen) (mg/L)
Perris North	123,000	347,000	11%	13,700	19,500	41%	450	7
Lakeview	283,000	515,000	25%	6,800	6,800	14%	500	3
Perris South	248,000	402,000	22%	8,300	12,800	27%	920	5
San Jacinto Lower Pressure	382,000	391,000	34%	2,500	2,500	5%	1,000	4
Winchester	36,000	41,000	3%	1,600	1,800	4%	2,000	8
Menifee	56,000	101,000	5%	3,300	4,700	10%	2,250	6
Totals	1,128,000	1,797,000	100%	36,200	48,100	100%		
Average							891	5

water is included in the safe yield estimate. The safe yield, including reclaimed water percolation for the West San Jacinto Groundwater Basin, is about 48,100 acre-ft/yr.

The volume of groundwater in storage ranges from about 36,000 acre-ft for the Winchester subbasin to about 382,000 acre-ft for the San Jacinto Lower Pressure subbasin. The total volume of groundwater in storage in West San Jacinto Groundwater Basin is about 1,128,000 acre-ft. The volume of existing groundwater in storage that can economically be extracted is less than half the current volume in storage. On the other hand, all the water that is added to groundwater storage above the existing levels of groundwater storage can be recovered

Groundwater storage capacity ranges from about 41,000 acre-ft for the Winchester subbasin to about 515,000 acre-ft for the Lakeview subbasin. The total storage capacity for West San Jacinto Groundwater Basin is about 1,797,000 acre-ft.

Groundwater production estimates for 1993 were estimated from annual reports of groundwater production on file at the State Water Resources Control Board and from SCAG land use. Using reported groundwater production data, the total groundwater production from the West San Jacinto Groundwater Basin is about 8,200 acre-ft/yr. Combining reported groundwater production from municipal agencies, groundwater production estimates based on agricultural land uses and deducting agricultural use of reclaimed water yields a basin wide production estimate of about 26,100 acre-ft/yr.

Groundwater quality in most areas renders the groundwater marginal to unacceptable for direct use as a municipal supply. Groundwater from the Lakeview, Perris North, and parts of Perris South I can be used directly for municipal supply. Groundwater from parts of the Perris South I, Perris South II and Perris South III, and San Jacinto Lower Pressure subbasins could be blended with state project water and then used directly. Groundwater from Menifee, parts of Perris South II and Perris III, and the Winchester subbasins will need to be demineralized before use as a municipal supply.

FUTURE WATER DEMANDS AND WASTEWATER FLOWS

Projected Municipal Water demands for the West San Jacinto Groundwater Management area are listed in Table 1-2 and shown graphically in Figure 1-7. These estimates are based on land use and population projections and projected water use rates. Municipal demands in the West

TABLE 1-2
PROJECTIONS OF MUNICIPAL AND AGRICULTURAL DEMANDS
WEST SAN JACINTO GROUNDWATER BASIN

Year	Municipal Demands(1) (acre-ft/yr)	Agricultural Demands (acre-ft/yr)
1995	47,000	33,000
2000	63,000	32,000
2005	84,000	31,000
2010	112,000	31,000

Sources: (1) EMWD Projections 8/94

FIGURE 1-7 WATER DEMAND PROJECTIONS FOR THE WEST SAN JACINTO GROUNDWATER MANAGEMENT AREA

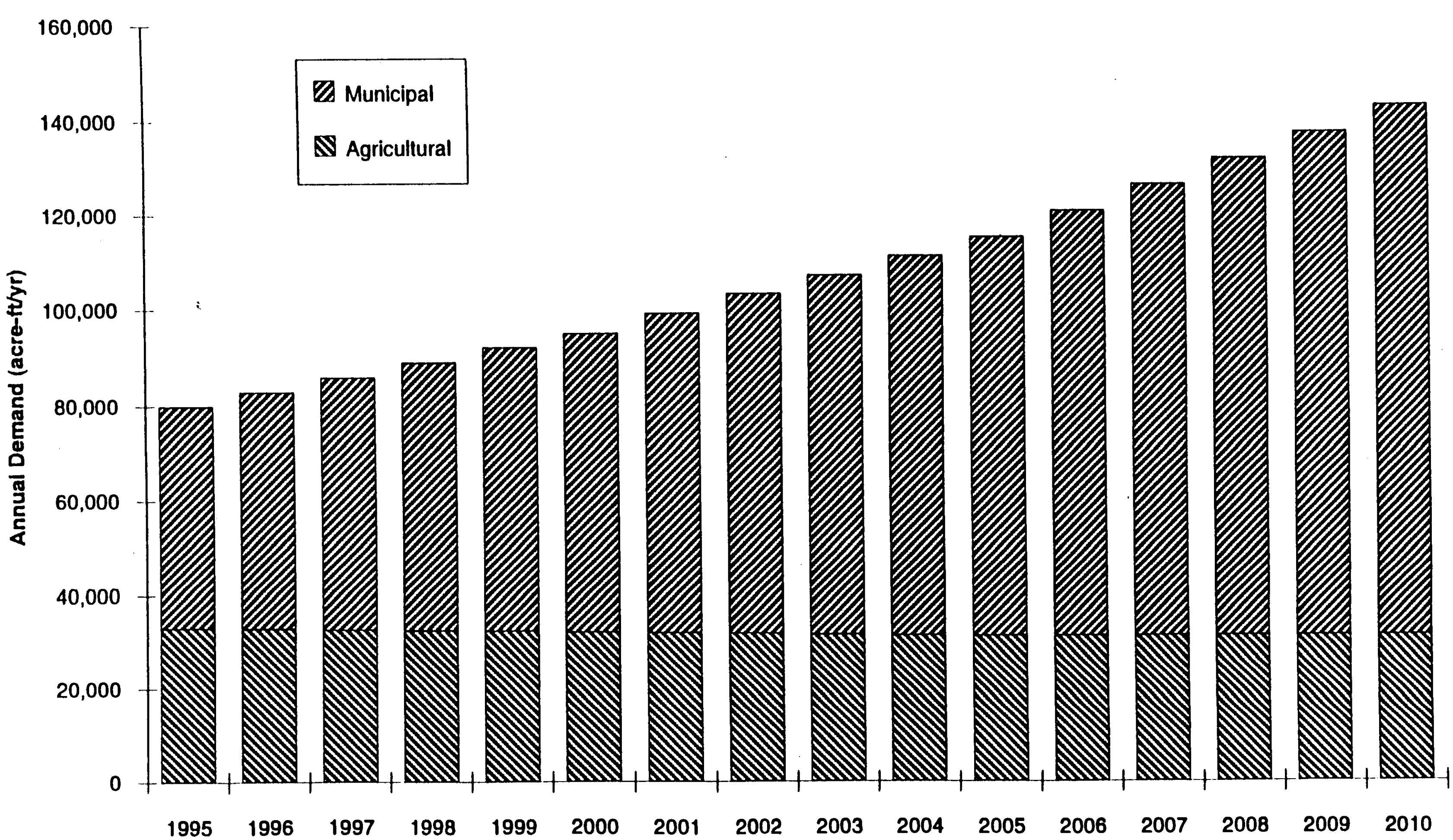


fig 1-7 Water Demands

Mark J. Wildermuth

San Jacinto Groundwater Management Area range from 47,000 acre-ft/yr in 1995, to 112,000 acre-ft/yr in 2010. Agricultural demands are projected to decline from about 33,200 acre-ft/yr in 1995, to 31,000 acre-ft/yr in 2010.

The sources of supply to the West San Jacinto Groundwater Management area include imported water from Metropolitan, groundwater, and reclaimed water.

Imported Water from Metropolitan. The quality of treated imported water is generally excellent and meets all drinking water regulations. Metropolitan adopted a schedule of projected water rate increases in 1991. The water rates established included:

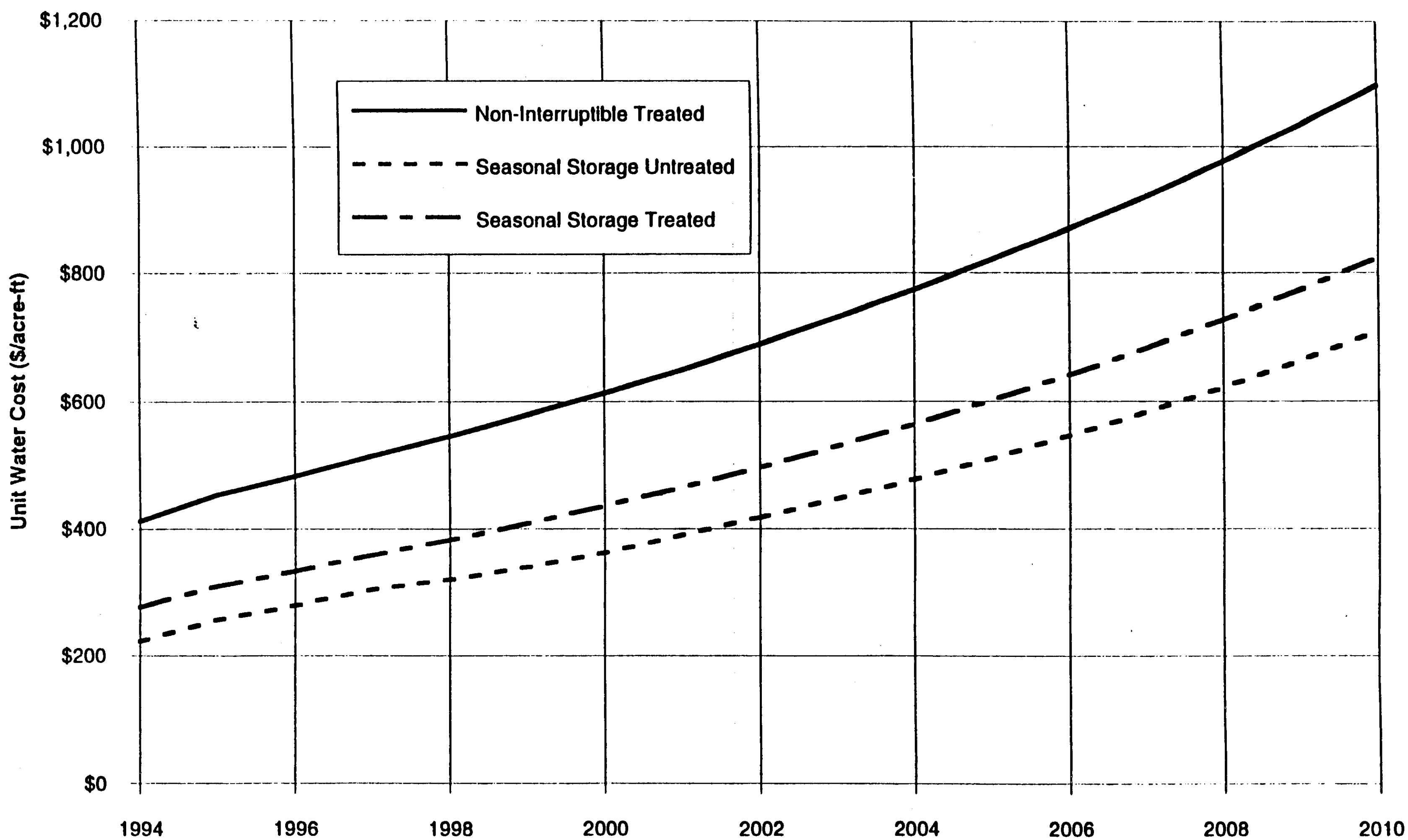
- a base (non-interruptible) rate;
- a treatment surcharge to be added to the base rate for purchases of treated water; and
- a seasonal discount for water produced from October 1 through April 30, to be subtracted from the base rate.

The goals of the seasonal discount are: to achieve greater conjunctive use of imported supplies and local supplies; encourage the construction of additional local production facilities; and reduce member agencies' dependence on Metropolitan deliveries during the summer months. Recently, Metropolitan announced water prices for 1993 and forecasted rates for the following ten years. The projected cost of imported water purchased from Metropolitan is shown graphically in Figure 1-8.

Metropolitan is currently evaluating supply reliability for its service area (Metropolitan Water District of Southern California, 1994). Metropolitan is projecting that with year 2000 demands, shortages in retail supplies will occur at least four out of five years, with shortages up to 30 percent. By the year 2020, shortages will occur on average once in five years, with shortages up to 20 percent. The frequency and magnitude of retail shortages will be comparable to Metropolitan shortages for areas that depend heavily on Metropolitan.

Groundwater. Groundwater is available throughout the management area in that most of the management area overlies the West San Jacinto Basin. However, the quality of groundwater precludes the use of some of the management area groundwater for municipal supply. TDS and nitrate are the water quality constituents that limit the use of groundwater. TDS is regulated as a secondary standard. Secondary standards are for those substances that are not hazardous to

FIGURE 1-8 COST OF IMPORTED WATER



health, but may cause taste, order, color, staining or other conditions that adversely affect the aesthetics of drinking water. The maximum contaminant level (MCL) for TDS is expressed as follows:

> *Recommended MCL* - 500 mg/L. TDS concentrations less than or equal to the *Recommended MCL* are desirable for a higher level of consumer acceptance.
>
> *Upper MCL* - 1,000 mg/L. TDS concentrations ranging up to the *Upper MCL* are acceptable if it is neither reasonable nor feasible to provide more suitable waters.
>
> *Short Term MCL* - 1,500 mg/L. TDS concentrations ranging up to the *Short Term MCL* are acceptable only for existing systems on a temporary basis, pending the construction of treatment facilities or the development of acceptable new water sources.

Nitrate is regulated under primary standards. The MCL for nitrate is 10 mg/L (as nitrogen). Table 1-1 lists the average TDS and nitrate concentrations for each groundwater subbasin in the management area. The subbasins are ranked in Table 1-1 from lowest to highest in TDS. From a drinking water perspective, approximately 36 percent of the yield of the West San Jacinto Basin could be developed from the Lakeview and Perris North subbasins for direct use, without additional treatment for TDS and nitrate. Some groundwater in the Perris South-I subbasin could also be used without treatment and San Jacinto Lower Pressure, Perris South-II and Perris South-III groundwater could be used if blended with SWP water. Groundwater from the Menifee-I, Menifee-II, Winchester and parts of the Perris South-II and Perris South-III subbasins will require treatment if groundwater from these subbasins is to be used as a municipal drinking water supply. The treatment processes that would make these basins useful as a water supply source are blending with low TDS supplies such as SWP water, and demineralization. The cost to produce groundwater, exclusive of treatment, is estimated at about $68 per acre-ft.

Reclaimed Water. EMWD is constructing a reclaimed water distribution plan that will make reclaimed water available throughout the management area. The reclaimed water system consists of five reclamation plants and about 79 miles of backbone distribution pipelines. The use of reclaimed water replaces non-potable demand on groundwater and imported supplies.

Water Supply Plan without a Groundwater Management Plan

The water supply plan for the management area, in the absence of a groundwater management plan, consists of the use of imported water for all new municipal uses and a combination of groundwater and reclaimed water for agricultural uses. All agricultural demands would be satisfied with groundwater and reclaimed water. The Menifee desalter would be operational in 1997, producing about 3,360 acre-ft/yr. The water supply plan for the management area is listed in Table 1-3.

The cost of this water supply plan is described in Table 5-6 in Section 5 of this report. Table 5-6 shows the annual demand, supplies by source and cost of each source in terms of annual cost, total annual cost and present value of all cost over the 1995 to 2010 planning period. The fractions of total supply and total supply cost by source are listed below.

Source	Fraction of Total Supply	Fraction of Total Supply Cost
Imported Water	64%	91%
Reclaimed Water	10%	2%
Menifee Desalter	3%	4%
Groundwater	23%	3%

The present value cost of future water supplies in the management area for the period 1995 to 2010 is about $557,000,000.

GROUNDWATER MANAGEMENT GOALS

The mission statement of EMWD is:

> ***The mission of the Eastern Municipal Water District is to deliver a dependable supply of safe, quality water and provide sewage collection services to its customers in an economical, efficient and publicly responsible manner.***

The water supply part of EMWD's mission statement is a goal shared by all purveyors of water in the West San Jacinto Groundwater Basin management area. The safe yield of the West San

TABLE 1-3
WATER SUPPLY PLAN IN THE ABSENCE OF A GROUNDWATER MANAGEMENT PLAN
(acre-ft/yr)

Year	1995		2000		2005		2010	
	Volume	Fraction	Volume	Fraction	Volume	Fraction	Volume	Fraction
Municipal Demand	47,000	100%	63,000	100%	84,000	100%	112,000	100%
Imported Water	44,500	95%	56,140	89%	76,140	91%	103,140	92%
Menifee Desalter	0	0%	3,360	5%	3,360	4%	3,360	3%
Reclaimed Water	0	0%	1,000	2%	2,000	2%	3,000	3%
Groundwater	2,500	5%	2,500	4%	2,500	3%	2,500	2%
Agricultural Demand	33,000	100%	32,000	100%	31,000	100%	31,000	100%
Reclaimed Water	8,900	27%	8,900	28%	8,900	29%	8,900	29%
Groundwater	24,100	73%	23,100	72%	22,100	71%	22,100	71%
Total Demand	80,000	100%	95,000	100%	115,000	100%	143,000	100%
Imported Water	44,500	56%	56,140	59%	76,140	66%	103,140	72%
Menifee Desalter (1	0	0%	3,360	4%	3,360	3%	3,360	2%
Reclaimed Water	8,900	11%	9,900	10%	10,900	9%	11,900	8%
Groundwater (2)	26,600	33%	25,600	27%	24,600	21%	24,600	17%

Jacinto Basin is about 36,200 acre-ft/yr. Projections of groundwater usage in the management area range from about 26,600 acre-ft/yr in 1995, to 24,600 acre-ft/yr in 2010.

Agricultural groundwater use will decrease slightly in the future, from about 24,100 acre-ft/yr to 22,100 acre-ft/yr, as agricultural lands are converted to urban uses. The majority of this agricultural water demand will be satisfied by reclaimed water. The need for potable water will increase dramatically in the future. Potable water demands in the management area will range from 47,000 acre-ft/yr in 1995, to 112,000 acre-ft/yr by 2010.

In the absence of a groundwater management plan, most of the new potable demand will be met from treated imported water purchased from Metropolitan. Metropolitan's supplies are projected to increase in cost about 142 percent over the 1995 to 2010 planning period, from $454 per acre-ft in 1995, to about $1,100 per acre-ft in 2010. Metropolitan's supply is also not entirely reliable. For year 2000 demands, Metropolitan has projected shortages in four years out of five years, ranging from 10 to 30 percent.

There are many private groundwater producers in the management area that do not rely on EMWD for water supply. The negative impacts, if any, of a groundwater management plan on these users must be minimized; and the ability of these groundwater producers to continue producing groundwater for beneficial use must be preserved.

The goal of the groundwater management plan is to

> ***maximize the use of groundwater for potable demands in such a way as to lower the cost of water supply and to improve the reliability of the <u>total</u> water supply for <u>all water users in the West San Jacinto Groundwater Basin Management area</u>.***

ELEMENTS OF A GROUNDWATER MANAGEMENT PLAN

The groundwater management plan consists of four elements that include adoption of groundwater management policies, development of groundwater yield enhancement programs, conjunctive use with imported supplies and the exchange of groundwater from agricultural and other non-potable uses with reclaimed water.

Groundwater Management Policies

Management policy elements consist of developing and implementing policies, regulations and coordinated activities among the groundwater producers. Currently, there is no routine monitoring of groundwater production, groundwater level and groundwater quality in the management area. There are no programs or institutions that routinely collect and review these data. There are no management tools available to forecast the impact of existing and future groundwater management practices. There is no coordination or oversight of well construction in the management area. There is no systematic plan to manage unused and obsolete wells. The management plan needs to include policies to manage well construction and to ensure their destruction when wells become obsolete. The following management policy elements should be included in the groundwater management plan.

- ❑ Establishment of Groundwater Basin Manager
- ❑ Groundwater Production Monitoring
- ❑ Groundwater Level and Quality Monitoring
- ❑ Development of Well Construction Policies.
- ❑ Development of Well Abandonment and Destruction Policies
- ❑ Monitoring of Well Construction, Abandonment and Destruction
- ❑ Groundwater Quality Protection

Yield Enhancement Elements

Yield enhancement refers to increasing the useful yield of the groundwater resource. In the West San Jacinto Groundwater Management area there are two yield enhancement elements that could be incorporated in the groundwater management plan -- artificial recharge and recovery of contaminated groundwater.

Artificial recharge can be done in spreading basins, injection wells and exchange. Groundwater storage capacity and favorable hydrogeologic conditions favor artificial recharge in the Lakeview, Perris North and parts of Perris South I and Perris South II subbasins. The other subbasins are full and have poor hydrogeologic characteristics for recharge. The source water for artificial recharge would consist of small quantities of local runoff and significantly larger quantities of state project water from Metropolitan and reclaimed water from EMWD.

Recovery of contaminated groundwater consists of the pumping and treatment of contaminated groundwater. The types of treatment that are included in this element include demineralization and blending; although other types of treatment may be required depending on water quality conditions. Demineralization will be necessary to remove salt accumulating in groundwater and to develop municipal supplies from parts of the Perris South II and Perris South III, and the Winchester subbasins. Blending could be used to recover degraded groundwater from parts of the Perris South I, Perris South II and Perris South III, and San Jacinto Lower Pressure subbasins. This assessment is based on limited water quality data and therefore the type of treatment necessary to recover contaminated groundwater may change when better data becomes available.

Conjunctive Use

Conjunctive use is an operational strategy that combines the operations of multiple sources of water and storage resources in such a way that the combined yield is greater than the yield that would occur from the sum of independent, uncoordinated operations of the sources. The same definition would apply if other objectives could be achieved by coordinated operation and the yield remained at an acceptable level. Other objectives might include reduced cost, more reliable supply, and the attainment of environmental objectives. In most cases, conjunctive use results in increased yield and lower cost. Conjunctive use is commonly associated with storing of imported water in groundwater basins for use during periods of shortage. The more general definition could involve EMWD reclamation and municipal distribution facilities, Metropolitan facilities and resources, state project facilities and resources, groundwater basins within EMWD, and, potentially, groundwater basins outside of EMWD. Conjunctive use can operate seasonally, over-year, or both. Seasonal conjunctive use would bank water during seasonal period(s) of over-supply or abundance for use during dry times of the year. Over-year conjunctive use would bank water during years of over-supply or abundance for use during drought periods and imported water shortages.

Based on current knowledge of groundwater conditions, EMWD could bank local runoff, imported water purchased from Metropolitan and reclaimed water in the Lakeview, Perris North and Perris South subbasins during the period of October 1 through April 30, for use either during the summer, during periods of imported water shortages, or both. The unused storage capacity of the Lakeview, Perris North and Perris South subbasins is about 600,000 acre-ft. EMWD could use up to half (and possibly more) of this unused storage capacity for seasonal and over-year storage, thereby reducing the cost of imported water purchases and providing an additional source of water during periods of imported supply shortage. Recharge would be accomplished with a combination of new spreading basins and injection wells. Recovery of recharge will be through existing and new production wells. Reclaimed water could be a source of recharge in a conjunctive use program for augmentation of potable supplies. EMWD should be able to shift about 30,000 to 50,000 acre-ft year of non-interruptible rate purchases to off-peak with conjunctive use projects in the Lakeview, Perris North and Perris South subbasins. The reduction in cost would be much more substantial if a blend of reclaimed water and imported water were recharged during the winter.

Based on current knowledge of groundwater conditions, conjunctive use with imported supplies and local runoff in the San Jacinto Lower Pressure, Menifee and Winchester subbasins appears to be more difficult to implement and of less benefit. Limited conjunctive use in these subbasins could be done in conjunction with groundwater treatment.

GROUNDWATER MANAGEMENT PLAN

Contents of the Management Plan

The management plan described herein is a program to achieve the management plan goals and includes conceptual descriptions of elements of the plan, and a description of the process to define and implement these elements consistent with the management plan goal. The groundwater management program includes: the development and implementation of policies, engineering investigations, facilities construction and operation, and other management activities. There are significant deficiencies in the knowledge of the groundwater resources of the West San Jacinto Groundwater Basin management area. These deficiencies preclude the definitive descriptions for some of the physical and institutional elements of the groundwater management plan. The groundwater management program includes studies to obtain additional information that is necessary to develop all the institutional and physical elements described in the plan.

The goal of the management plan is:

> ***maximize the use of groundwater for potable demands in such a way as to lower the cost of water supply and to improve the reliability of the total water supply for all water users in the West San Jacinto Groundwater Basin management area***

This goal extends to all groundwater users. Groundwater users that are not dependent on EMWD should benefit from the groundwater management plan. Adverse impacts, if any, from the groundwater plan will be minimized or mitigated. The rights of private groundwater producers will be protected. Groundwater producers who extract 10 acre-ft/yr or less would be exempt from the operation and implementation of the groundwater management plan.

Ultimate Plan Description

The groundwater management plan consists of a series of elements that, when implemented, will achieve the management plan goal stated above within the constraints. The management plan includes implementation of new policies, institutional arrangements, and physical projects. EMWD will be the agency responsible for implementation of the groundwater management plan. Based on the information developed in this study and presented in the previous sections, the ultimate groundwater management plan should include the following elements.

> **Establishment of a Groundwater Basin Manager.** EMWD will implement the groundwater management plan. EMWD Board of Directors will be the decision-making body responsible for directing the implementation of the groundwater management plan. EMWD staff will serve as the staff to assist the EMWD Board of Directors in implementing the plan.
>
> Upon adoption of the groundwater management plan, EMWD Board of Directors will appoint an Advisory Committee. The Advisory Committee will be composed of seven members, with one member each from city of Moreno Valley, city of Perris, Nuevo Mutual Water Company, Edgemont Gardens Mutual Water Company, and EMWD; and two members representing agricultural producers. The Advisory Committee will study, review and provide comments on all groundwater management plan activities directly to the EMWD Board of Directors.
>
> EMWD staff, will prepare an annual engineering report describing the operation of the management plan for review by the EMWD board of directors, Advisory Committee and groundwater producers. EMWD, in consultation with the Advisory Committee and participating groundwater producers, will develop a coordinated operating strategy on an annual basis, based on the management plan and the findings of the annual report.

Monitoring of Groundwater Production. EMWD, in cooperation with the Advisory Committee, will implement a groundwater production monitoring program. Detailed estimates of the safe yield will be developed during the first year of the program. Groundwater production estimates will be developed by EMWD based on totalizing meters, energy usage and land use. EMWD will produce a groundwater production report and estimates of overdraft (if any). These data will be included in the annual report provided to the management committee. The production monitoring program will not limit or suspend groundwater production by existing groundwater producers.

Monitoring of Groundwater Level and Quality. EMWD, in cooperation with the Advisory Committee, will implement a groundwater level and quality monitoring program. Groundwater level and quality data will be collected from well owners. EMWD will measure groundwater levels and quality from select private wells. Groundwater levels and quality data from agencies' wells will be provided to EMWD by the agencies. EMWD will compile these data and develop estimates of the groundwater in storage, change in storage, overdraft and groundwater quality conditions. These data will be included in the annual report provided to the management committee.

Development of Well Construction Policies. EMWD, in cooperation with the Advisory Committee, the Department of Health Services and the Riverside County Health Department, will develop well construction policies that are specific to the West San Jacinto Groundwater Basin management area. These policies will be updated continuously based on new regulatory requirements and data. These policies will not limit or suspend groundwater production by existing groundwater producers.

Monitoring of Well Construction. EMWD has compiled and digitized most, if not all the well construction information that is available for existing wells. EMWD, in cooperation with other groundwater producers, will collect well construction data for new wells. EMWD will provide comments and suggestions to supplement design criteria that will be required by other agencies, including the Department of Health Services and the Riverside County Health Department.

Development of a Well Abandonment and Destruction Program. EMWD, in cooperation with the Advisory Committee, the Department of Health Services and the Riverside County Health Department, should develop well abandonment and destruction policies that are specific to the West San Jacinto Groundwater Basin management area. These policies should be updated continuously based upon new regulatory requirements and data.

Groundwater Quality Protection. EMWD, in cooperation with the Advisory Committee and parties responsible for groundwater quality degradation, should develop cooperative plans to prevent further degradation of groundwater and to integrate the solution of existing water quality problems to maximize the beneficial use of groundwater. The known areas of concern are the high TDS groundwater in the Perris South II (Ski Land area) and Winchester subbasins, and the groundwater contamination associated with March Air Force Base. The existing efforts undertaken by EMWD to rehabilitate the Menifee subbasins (the Menifee desalter project) will be completed independent of the groundwater management plan. Additional degraded groundwater areas could be discovered through groundwater monitoring.

Exchange of Agricultural and Other Non-potable Groundwater Production to Municipal Use. The intent of this element is to increase the groundwater yield available for municipal use by either retiring agricultural and non potable demands or by substituting reclaimed water for groundwater used for agricultural and other non-potable uses. Incentives should be developed to encourage the exchange of agricultural groundwater production to municipal use.

Maximize Yield Augmentation with Local Resources - Local Runoff and Reclaimed Water. Yield augmentation through the recharge of runoff (water harvesting) and through the recharge of reclaimed water should be implemented where consistent with water quality objectives and other elements of the groundwater management plan. The Lakeview, Perris North and Perris South subbasins appear to be the most feasible areas for this element.

Maximize Conjunctive Use. Conjunctive use should be implemented in the West San Jacinto Groundwater Basin management area. The unused storage capacity in the West San Jacinto Groundwater Basin management area is about 670,000 acre-ft, with about 600,000 acre-ft or 90 percent in the Lakeview, Perris North and Perris South subbasins. The yield from conjunctive use, exclusive of safe yield, could range from 30,000 to 50,000 acre-ft, or perhaps larger. Conjunctive use will improve overall water supply reliability, groundwater quality, and will lower water supply cost. These benefits will be realized by all groundwater users.

The specifics of recharge, extraction, conveyance and treatment facilities will be developed after a thorough groundwater resources evaluation is performed and planning studies are done to develop and evaluate conjunctive use alternatives.

Groundwater Treatment. Groundwater treatment in the form of blending and demineralization should be done in the West San Jacinto Groundwater Basin management area to recover contaminated groundwater for municipal use. The specifics of treatment facilities will be developed after a thorough groundwater resources evaluation is performed and planning studies are done to evaluate groundwater treatment feasibility.

Groundwater Management Plan Alternatives

Four groundwater management alternatives were developed to evaluate the economic benefits to all water users in the groundwater management area from increasingly complex and capital-intensive groundwater management plans. All four of these alternatives include the following management elements:

- ❑ Establishment of a Groundwater Basin Manager
- ❑ Monitoring of Groundwater Production

- Monitoring of Groundwater Level and Quality
- Development of Well Construction Policies
- Development of Well Abandonment and Destruction Policies
- Monitoring of Well Construction, Abandonment and Destruction.
- Groundwater Quality Protection

Alternative 1 - Agricultural Exchange and Blending. Alternative 1 consists of the above-mentioned common elements plus the exchange of agricultural groundwater production, of which 2,000 acre-ft/yr are permanent transfers from land use conversions and about 17,500 acre-ft/yr of exchange of groundwater production for reclaimed water. Seven thousand one hundred acre-ft/yr of poor quality groundwater will be pumped from the San Jacinto Lower Pressure and Perris South subbasins and blended with imported water for municipal use.

Alternative 2 - Agricultural Exchange, Blending and Demineralization. Alternative 2 consists of the above-mentioned common elements plus the exchange of agricultural groundwater production, of which 2,000 acre-ft/yr are permanent transfers from land use conversions and about 21,700 acre-ft/yr of exchange of groundwater production for reclaimed water. Seven thousand one hundred acre-ft/yr of poor quality groundwater will be pumped from the San Jacinto Lower Pressure and Perris South subbasins and blended with imported water for municipal use. Five thousand three hundred acre-ft/yr of highly mineralized groundwater from the Perris South and Winchester subbasins will be pumped and demineralized to produce about 4,200 acre-ft of drinking water.

Alternative 3 - Agricultural Exchange, Blending, Demineralization and 30,000 acre-ft/yr Conjunctive Use. Alternative 3 includes all the elements of Alternative 2, plus conjunctive use. Conjunctive use will be implemented in the Perris North, Perris South I, Perris South II and Lakeview subbasins. Recharge would occur in spreading basins. Source water is state project water and reclaimed water. Average annual increase in recharge and extraction from conjunctive use will be about 30,000 acre-ft/yr.

Alternative 4 - Agricultural Exchange, Blending, Demineralization and 50,000 acre-ft/yr Conjunctive Use.. Alternative 4 is identical to Alternative 3 except that the conjunctive use element has been expanded to 50,000 acre-ft/yr.

Economic Evaluation of the Groundwater Management Plan Alternatives

Tables 8-1 through 8-4 in Section 8 illustrate the economic benefits that water users in the West San Jacinto Groundwater Basin management area would realize if a groundwater management plan were implemented. Each table lists the projected total demand for water and shows how that demand would be satisfied with each groundwater management plan alternative. For economic evaluation purposes, the plan elements are assumed on line in 1999, that is, all elements would be implemented in five years. Actual implementation could take place over a longer period of time ranging from five to fifteen years. The groundwater management plan alternatives are compared to the *no groundwater management plan case* in Table 1-4. The difference in costs between the *with management plan* cases and *without management plan* case occurs in years 1999 through 2010.

Alternative 1 - Agricultural Exchange and Blending groundwater management plan case has a present value savings of about $108,000,000 over the no groundwater management plan case. The saving comes from the exchange of up to 17,500 acre-ft/yr of agricultural groundwater production to municipal uses and the reduction in the use of a like amount of imported water.

Alternative 2 - Agricultural Exchange, Blending and Demineralization groundwater management plan is identical to Alternative 1 except that the agricultural exchange of groundwater production to municipal uses has been expanded to about 21,700 acre-ft/yr and municipal groundwater production has been expanded by about 4,200 acre-ft/yr through construction of a demineralization facility. Alternative 2 has a present value savings of about $104,000,000 over the *no groundwater management plan case* and is comparable to the cost of Alternative 1. The cost savings over the *no groundwater management plan case* come from the exchange of up to 21,600 acre-ft/yr of agricultural groundwater production to municipal uses and the reduction in the use of a like amount of imported water. The cost of Alternative 2 is slightly higher than Alternative 1 because the demineralization costs are higher than the cost of imported water prior to 2010. After 2010 demineralization costs will be less than imported water. Alternative 2 would have costs savings greater than Alternative 1 if the economic analysis were extended beyond 2010.

Alternative 3 - Agricultural Exchange, Blending, Demineralization and 30,000 acre-ft/yr Conjunctive Use management plan has all the elements contained in Alternative 2 plus the incorporation of 30,000 acre-ft/yr of conjunctive use. The source water for conjunctive use is 20,000 acre-ft of state project water and 10,000 acre-ft/yr of reclaimed water. The demand for treated non-interruptible water from Metropolitan has dropped from 64 percent for the *no management plan case* to 26 percent. The demand for untreated seasonal water has risen to 14 percent. Treated non-interruptible and seasonal untreated imported water make up 40 percent of municipal supplies. Alternative 3 has a present value savings of about $172,000,000 over the *no groundwater management plan case* illustrated in Table 5-6 and about $66,000,000 over Alternatives 1 and 2. About 62 percent of the cost savings comes from the agricultural exchange,

TABLE 1-4 (revised 9/7/94)
COMPARISON OF GROUNDWATER MANAGEMENT PLAN ALTERNATIVES

Alternative	Percentage of Total Supply: Non Interruptible Treated Imported Water	Percentage of Total Supply: Seasonal Treated Imported Water	Percentage of Total Supply: Seasonal Untreated Imported Water	Size of Groundwater Management Plan Elements: Agricultural Exchange (acre-ft/yr)	Size of Groundwater Management Plan Elements: Blending (acre-ft/yr)	Size of Groundwater Management Plan Elements: Demineralization (acre-ft/yr)	Size of Groundwater Management Plan Elements: Conjunctive Use (acre-ft/yr)	Present Value Cost of Supply	Reduction in Present Value Cost of Supply from Groundwater Management Plan
No Groundwater Management Plan	64%	0%	0%	0	0	0	0	$557,000,000	na
1 Agricultural Exchange and Blending	49%	0%	0%	17,510	7,100	0	0	$449,000,000	$108,000,000
2 Agricultural Exchange, Blending and Demineralization	46%	0%	0%	21,690	7,100	4,180	0	$453,000,000	$104,000,000
3 Agricultural Exchange, Blending, Demineralization and 30,000 acre-ft/yr Conjunctive Use (all recharge through spreading)	26%	0%	14%	21,690	7,100	4,180	30,000	$385,000,000	$172,000,000
4 Agricultural Exchange, Blending, Demineralization and 50,000 acre-ft/yr Conjunctive Use (80 recharge through spreading, 20 % through injection)	18%	4%	18%	21,690	7,100	4,180	50,000	$371,000,000	$186,000,000

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Water Resources Engineer

blending and demineralization elements included in Alternatives 1 and 2; the remaining cost savings are due to conjunctive use.

Alternative 4 - Agricultural Exchange, Blending, Demineralization and 50,000 acre-ft/yr Conjunctive Use management plan has all the elements contained in Alternative 3 except that conjunctive use has been expanded from 30,000 to 50,000 acre-ft. The source water for conjunctive use is 40,000 acre-ft of state project water and 10,000 acre-ft/yr of reclaimed water. The demand for treated non-interruptible water from Metropolitan has dropped from 64 percent for the no management plan case to 18 percent. Untreated seasonal water has risen to 18 percent and treated seasonal water to 4 percent. Treated non-interruptible, treated seasonal and seasonal untreated imported water make up 40 percent of municipal supplies. Treated seasonal water would be used for recharge by injection. Alternative 4 has a present value savings of about $186,000,000 over the *no groundwater management plan case* illustrated in Table 5-6 and about $80,000,000 over Alternatives 1 and 2. About 57 percent of the cost savings comes from the agricultural exchange, blending and demineralization elements included in Alternatives 1 and 2; the remaining cost savings are due conjunctive use.

The groundwater management plan development costs and the costs of recharge of basins and blending facilities have not been included in these analyses. These costs could have a present value ranging from $50,000,000 to $70,000,000. The cost savings from implementation of any of these alternatives far exceed the cost of implementation. The projected cost savings from the groundwater management plan illustrated in Tables 8-1 through 8-4 are for the 15-year period of 1999 to 2010 in which the capital-intensive facilities, such as spreading basins, have been in operation (and amortized) for 11 years. If these analyses were extended to the period of time over which capital-intensive facilities were to be financed, say 20 years, the cost saving would be significantly greater.

There are two additional significant benefits from a groundwater management plan. First, imported water for direct use has been reduced by half, which will improve overall water supply reliability. The volumetric impact of water shortages in the imported water supply <u>could be reduced by half</u>. Second, the recharge of state project water into the Lakeview, Perris North and Perris South subbasins will improve the quality of the groundwater in these subbasins.

Financing the Groundwater Management Plan

The primary beneficiaries of the plan are municipal water users in the West San Jacinto Groundwater Basin management area. Private groundwater producers such as farmers, dairy operators and individuals with small domestic wells will either be beneficially impacted or have no impacts. It is the intent of the plan to mitigate all significant adverse groundwater impacts to private groundwater producers. The types of beneficial impacts that private well owners could experience will be stabilized or increased groundwater levels where overdraft is occurring, such as the Lakeview subbasin, and reduced supply cost for those groundwater producers that can use reclaimed water in lieu of groundwater.

The cost of implementing and operating the West San Jacinto Groundwater Basin management plan should be born by municipal water users in the management area. The cost savings experienced by the local private groundwater users should be their incentive to participate in the groundwater management plan. There could be some cost to local groundwater producers if groundwater replenishment is necessary due to groundwater overdraft. In the event of overdraft, an equitable cost sharing plan should be developed to correct the overdraft.

Some of the elements of the management plan are capital intensive such as recharge facilities, wells, treatment plants, pipelines, etc. EMWD will need to develop a plan to finance these elements of the groundwater management plan with cost recovery based on the sale of water developed by the plan, or some other method as appropriate. Economic analyses show that the management plan should easily pay for itself.

Implementation of the Groundwater Management Plan

Upon adoption of the groundwater management plan, EMWD will form the Advisory Committee and begin implementation of the policy and physical elements of the management plan. The implementation of the groundwater management plan will occur in a phased process and consist of the following:

Phase 1	Short Term Implementation
Phase 2	Refine the Ultimate Groundwater Management Plan
Phase 3	Ultimate Groundwater Management Plan Implementation

Phase 1 Short Term Implementation. The goals of the short term implementation phase are to: implement those elements of the groundwater management plan that are easy to implement; where existing information is adequate for implementation; and to develop and implement demonstration projects that will provide engineering information necessary for design of management elements in the ultimate plan. The following tasks will be completed in Phase I.

- Groundwater Resources Evaluation
- Develop Groundwater Management Policies
- Construct and Operate Demonstration Projects for Blending, Demineralization and Conjunctive Use
- Develop Water Resources Planning Model
- Develop and Evaluate Feasibility Level Plans for physical elements of the Management Plan

Phase 2 Refine the Ultimate Groundwater Management Plan. *Phase 1 Short Term Implementation* will develop policies and data necessary for defining the ultimate groundwater management plan. Phase 2 consists of the detailed engineering, environmental and financial work to describe and implement the ultimate management plan The complexity and cost for the tasks listed below are dependent on the management plan elements included in the management plan.

- Prepare Facility and Operation Plans
- Prepare Financial Plan
- Prepare Project Specific Environmental Impact Reports
- Prepare Engineering Report for a Planned Recharge Project
- Institutional Planning

Phase 3 Ultimate Groundwater Management Plan Implementation. The facility plans, environmental documentation and draft agreements developed in Phase 2 will be converted to construction documents, project-specific environmental documentation and final agreements. These projects will then be constructed and operated. The sequencing and sizing of the management elements will depend on actual future water demands and the availability of funds for construction. It is premature to speculate on the magnitude of the effort required by most of these tasks because of uncertainties in what facilities and operating plans will be included in the groundwater management plan and the timing of the tasks.

Management and Monitoring

The management and monitoring of the groundwater management plan will occur while the elements of the ultimate groundwater management plan are being implemented. The management and monitoring activities developed in Phase 1 will be adopted by EMWD board action. Future modifications to management and monitoring programs will be incorporated as warranted by changing conditions.

Schedule and Cost

The Phase 1 work should take about two years to complete. Phase 2 will take about two years to complete and will overlap Phase 1 by about one year. The cumulative time required to complete phases 1 and 2 will be about three to four years. Phase 3 could take up to 10 years to complete with some projects (e.g., blending) coming on line within a couple of years and other projects (e.g., large scale surface recharge) taking 5 years to implement.

The cost to complete Phases 1 and 2 is estimated to range between 3 to 5 million dollars. The cost to complete Phase 3 cannot be estimated until the ultimate plan is described at the conclusion of Phase 2.

SECTION 2

SECTION 2
INTRODUCTION

THE NEED FOR GROUNDWATER MANAGEMENT

EMWD, together with the majority of water purveyors in Southern California, have been heavily relying on imported supplies from Metropolitan Water District of Southern California (Metropolitan). Recently, Metropolitan's ability to supply the ever-growing needs of Southern California has become increasingly unreliable due to the following reasons:

- demand for water is continuing to increase;
- environmental constraints at the point of origin may limit the water available for export;
- structural adequacy of the delivery system is limited;
- climatological uncertainties can limit delivery; and
- inadequate local storage facilities.

EMWD could purchase imported water from Metropolitan to meet these projected municipal demands. Metropolitan's sources, however, are not reliable and will be very expensive in the future. Metropolitan, with its current planning and future projects, will experience shortages in four of five years, with shortages reaching as high as 30 percent. The cost of imported water from Metropolitan is currently (July 1994) $412 per acre-ft for treated water and is projected to reach about $1,100 per acre-ft by 2010. These rising costs and lack of water to meet all of the demands has encouraged some local agencies in Southern California to claim water rights in the service areas of other agencies. One such action that could adversely affect EMWD's local water resources is a claim recently filed by Orange County Water District, which underscores the urgent need for action by EMWD to protect the water resources within its service area for use by EMWD consumers.

The West San Jacinto Groundwater Basin underlies a large portion of the Eastern Municipal Water District (EMWD). The West San Jacinto Groundwater Basin includes the Perris North, Perris South, Menifee, Winchester, Lakeview and the San Jacinto Lower Pressure subbasins. The location of these subbasins is shown in Figure 2-1. This area is experiencing rapid land use conversion from agriculture to urban uses. Total municipal water demands are expected to increase from 47,000 acre-ft/yr in 1995, to 112,000 acre-ft/yr in 2010.

Three sources of water supply for these demands can be considered: groundwater, imported water and reclaimed water. Groundwater in the West San Jacinto Groundwater Basin, for the most part, is of poor quality due to natural causes and irrigated agriculture. Most of the groundwater resources cannot be used as municipal supply due to poor quality - the groundwater quality either violates drinking water standards or is too high in total dissolved solids (TDS) or other water quality constituents to be discharged after municipal use. To meet increasing demands, EMWD could purchase imported water from Metropolitan. However, availability and costs might limit this alternative. EMWD has reclaimed water resources that could be used to meet agricultural demands and non-potable municipal demands. Reclaimed water cannot be directly used for potable demand unless, after groundwater recharge and dilution, it meets Title 22 requirements (State Department of Health Services Reclaimed Water Regulations). Additionally, groundwater treatment practices can convert non-potable water supplies to potable supplies.

The availability and reliability of the total water supply can be improved through the joint, optimized (conjunctive) management of all the water supply sources. It is the intent of Assembly Bill AB 3030, which was incorporated into the Water Code in 1992 (Part 2.75 commencing with Section 10750 of Division 6) with amendments by AB 1152 of 1993, to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions. Authorization to adopt and implement a plan is contained in the following section of AB 3030:

> "§10753 (a) 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 order, judgment, or decree, may, by ordinance, or by resolution if the local agency is not authorized to act by ordinance, adopt and implement a groundwater management plan pursuant to this part within all or a portion of its service area."

The components of a groundwater management plan may include the following:

> "§10753.7 (a) The control of saline water intrusion.
> (b) Identification and management of wellhead protection areas and recharge areas.
> (c) Regulation of the migration of contaminated groundwater.
> (d) The administration of a well abandonment and well destruction program.
> (e) Mitigation of conditions of overdraft.
> (f) Replenishment of groundwater extracted by water producers.
> (g) Monitoring of groundwater levels and storage.
> (h) Facilitating conjunctive use operations.
> (i) Identification of well construction policies.
> (j) The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects.
> (k) The development of relationships with state and federal regulatory agencies.
> (l) The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination."

EMWD's Board of Directors adopted resolution No. 3039 to develop a Groundwater Management Plan for the West San Jacinto Groundwater Basin and published a Notice of Intent on August 25, 1993. The groundwater management plan for the West San Jacinto Groundwater Basin is being developed under the authority of Assembly Bill 3030 (AB 3030), which allows a local water agency to take the lead in development of a plan. Up to two years can be taken for development of a plan. Local water purveyors, both public and private, have been involved in development of the plan. There are approximately forty-five (45) pumpers in the area. Public meetings, workshops and hearings were held during the preparation of the draft plan. Cooperative agreements with EMWD have already been signed by Nuevo Water Company, Edgemont Gardens Mutual Water District and the City of Perris.

APPROACH TO DEVELOPMENT OF GROUNDWATER MANAGEMENT PLAN

EMWD's approach to developing a groundwater management plan consists of the following elements:

- Establishing a clear set of management goals;
- Resolving major uncertainties in the knowledge of the groundwater resources;
- Integration of the planning activities and goals of all interested entities;
- Evaluation of the benefits, costs and impacts to interested entities; and
- Providing an environment that obtains consensus at key decision points in the plan development.

A set of management goals must be established early in the plan development process. These goals can be modified during the plan development process. These goals will determine the magnitude of the plan, beneficiaries of the plan, and will guide the technical work that shapes the plan.

There are many uncertainties regarding hydrogeology, hydrology and water quality of the West San Jacinto Groundwater Basin (management area). The entities having an interest in the groundwater management plan have different interpretations of the management area groundwater resources and management issues affecting these resources. Therefore, one of the first steps in the planning process is to develop a complete description of groundwater resources that is understood and accepted by the entities having an interest in the plan.

The water development and wastewater management activities of the entities having an interest in the management area must be integrated into the groundwater management plan. This does not mean that these activities will be included in the plan; rather, these activities will be accommodated in the plan. The plan development process must identify and describe all relevant water development and wastewater planning activities in the management area.

The benefits, costs and other impacts must be evaluated for entities having an interest in the management area. Equity among these entities must be incorporated into the plan in order for the plan to be accepted and implemented. Therefore, the plan development process must include steps to identify and evaluate the benefits, costs and other impacts to the interested entities.

The plan development process will succeed only if there is consensus among the interested entities. Therefore, the process must provide an environment conducive to consensus. The first step to gaining consensus is to invite all the potentially interested entities in the management area to participate in the plan development process. Workshops and meetings were held to inform interested parties during the plan development process. EMWD took the leadership role in the plan development and in disseminating information regarding the plan to all interested parties.

PURPOSE OF THIS REPORT

The purpose of this report is to:

- ❑ document what is known about the groundwater resources and water supply needs;
- ❑ develop management goals;
- ❑ describe the elements of a groundwater management plan consistent with plan goals; and
- ❑ describe the management plan; and
- ❑ describe what additional information will be required to develop and implement the groundwater management plan.

This report describes the types of groundwater management practices that are being used in other groundwater basins and their applicability to the West San Jacinto Groundwater Basin. The types of information necessary to implement these groundwater management elements are also described. This report presents groundwater management practices in the context of the future water demands and the water resources of the management area. Finally, this report describes a groundwater management plan for the West San Jacinto Groundwater Basin and a program to implement the management plan.

Implementation of the groundwater management plan will occur over the next 20 to 40 years. As mentioned above, information describing the groundwater basins is inadequate to definitively describe the groundwater management plan. New information will need to be developed during plan implementation. Over the course of the next 20 to 40 years, new technologies, water quality standards and operating concepts will be developed. Therefore the management plan must have alternatives to achieve the management plan goals and be flexible to accommodate future changes.

ORGANIZATION OF THIS REPORT

This report consists of eight sections and two appendices. The remaining seven sections of this report are:

Section 1 Executive Summary

Section 3 Existing Water Resources Management Framework

Section 4 Groundwater Resources in the West San Jacinto Basin

Section 5 Future Water Demands and Wastewater Flows

Section 6 Groundwater Management Goals

Section 7 Elements of the Groundwater Management Plan

Section 8 Description of the Groundwater Management Plan

ACKNOWLEDGMENTS

A great deal of research and data gathering went into the preparation of this study and report. Assistance in research, data gathering and plan formulation was provided by the staff of EMWD, in particular Dr. Behrooz Mortazavi and Dr. P. Ravishanker. Their help was greatly appreciated.

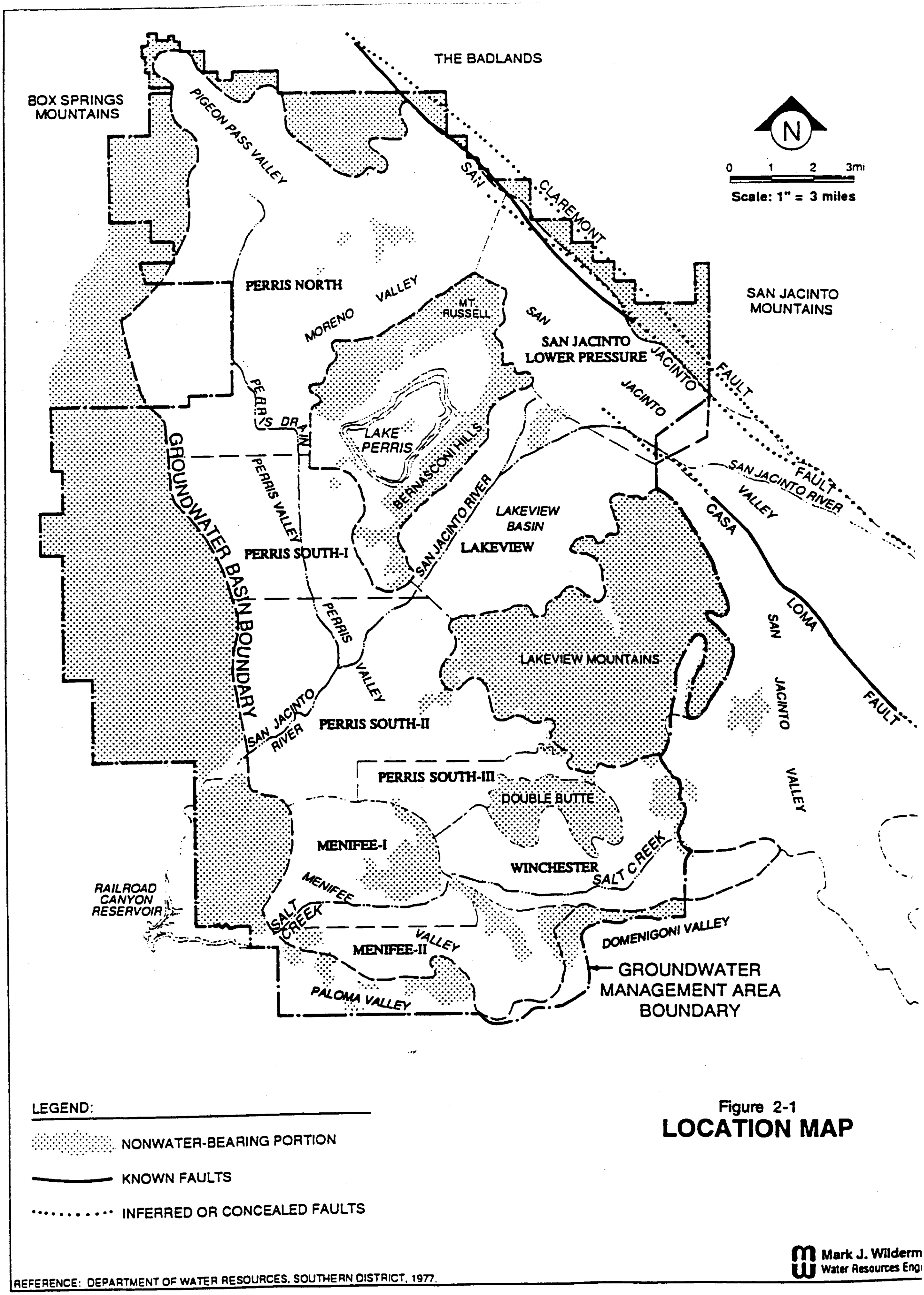

Figure 2-1
LOCATION MAP

SECTION 3

SECTION 3
EXISTING WATER RESOURCES FRAMEWORK

This section describes the existing institutional and regulatory framework for the groundwater management plan. First, the agencies that sell, import and otherwise provide water for the management area are listed and described. The regulatory constraints for the management of wastewater and drinking water are also described.

WATER SUPPLY AND WASTEWATER AGENCIES

Eastern Municipal Water District

EMWD encompasses over 540 square miles in the western portion of Riverside County as shown on Figure 3-1. It is bounded on the west by Western Municipal Water District, on the north by mountains which approximately parallel the San Bernardino County boundary, on the east by the San Jacinto Mountains, and on the south by mountains which parallel the San Diego County line. Only about half of the area within EMWD's boundary receives water service at this time. Other areas will receive service by EMWD as they develop. EMWD is the only wastewater treatment entity in the West San Jacinto groundwater management area. EMWD's sphere of influence extends easterly to the San Jacinto and Santa Margarita watershed boundaries.

EMWD has divided its service area into four subservice areas for the distribution of water as shown on Figure 3-2. The divisions are based on location, local water resources, existing water deliveries, and proximity to sources of imported water. Water can be transferred from one subservice area to another. Each subservice area encompasses a specific section of EMWD. Service Area 41, which is mainly supplied by MWD's Mills Filtration Plant, includes Moreno Valley, Perris and the community of Sun City. The area including the cities of Hemet and San Jacinto and unincorporated Winchester is supplied mainly by well water and is in Subservice Area 42. Subservice Area 43 encompasses the Antelope-French-Domenigoni Valley and the

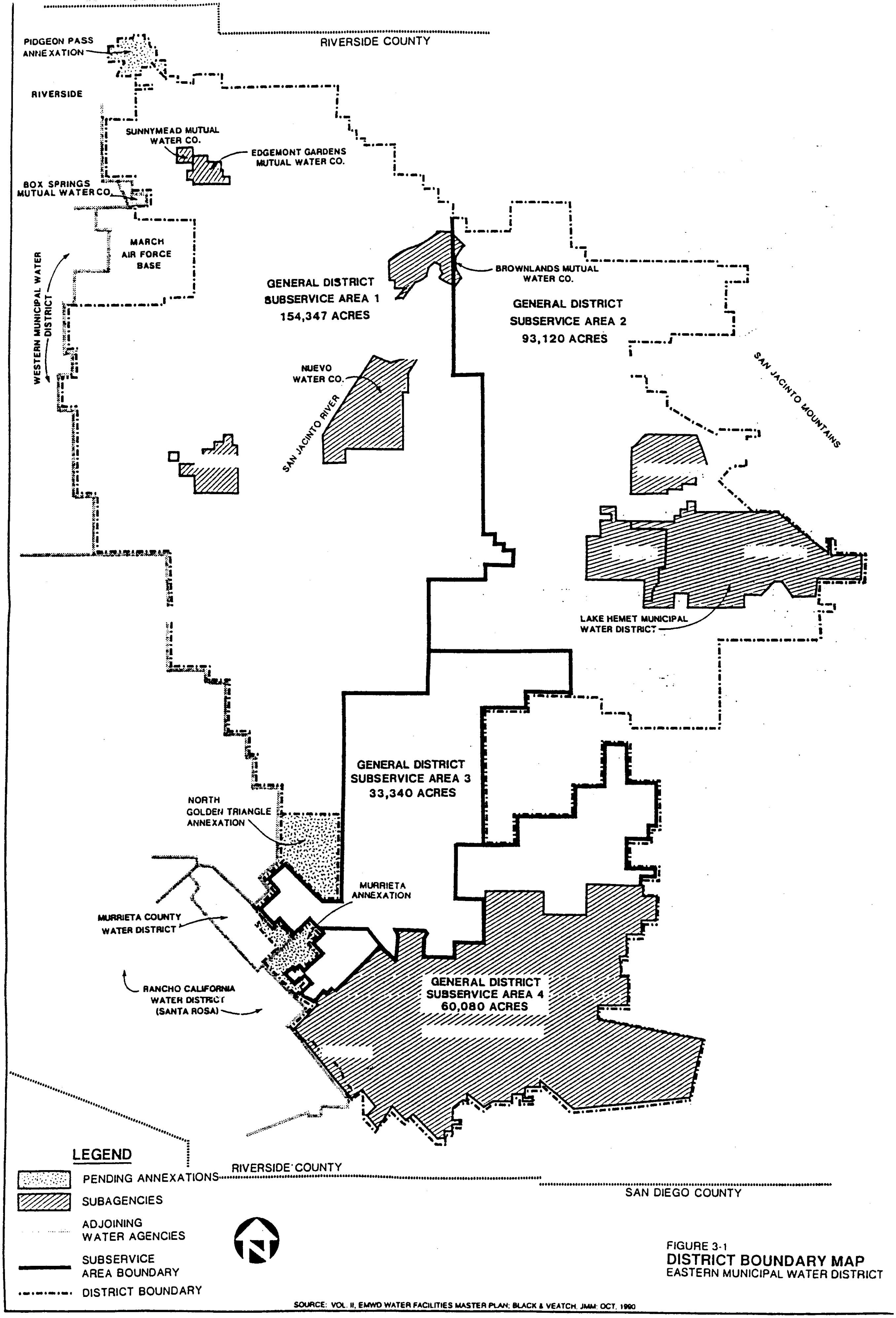

FIGURE 3-1
DISTRICT BOUNDARY MAP
EASTERN MUNICIPAL WATER DISTRICT

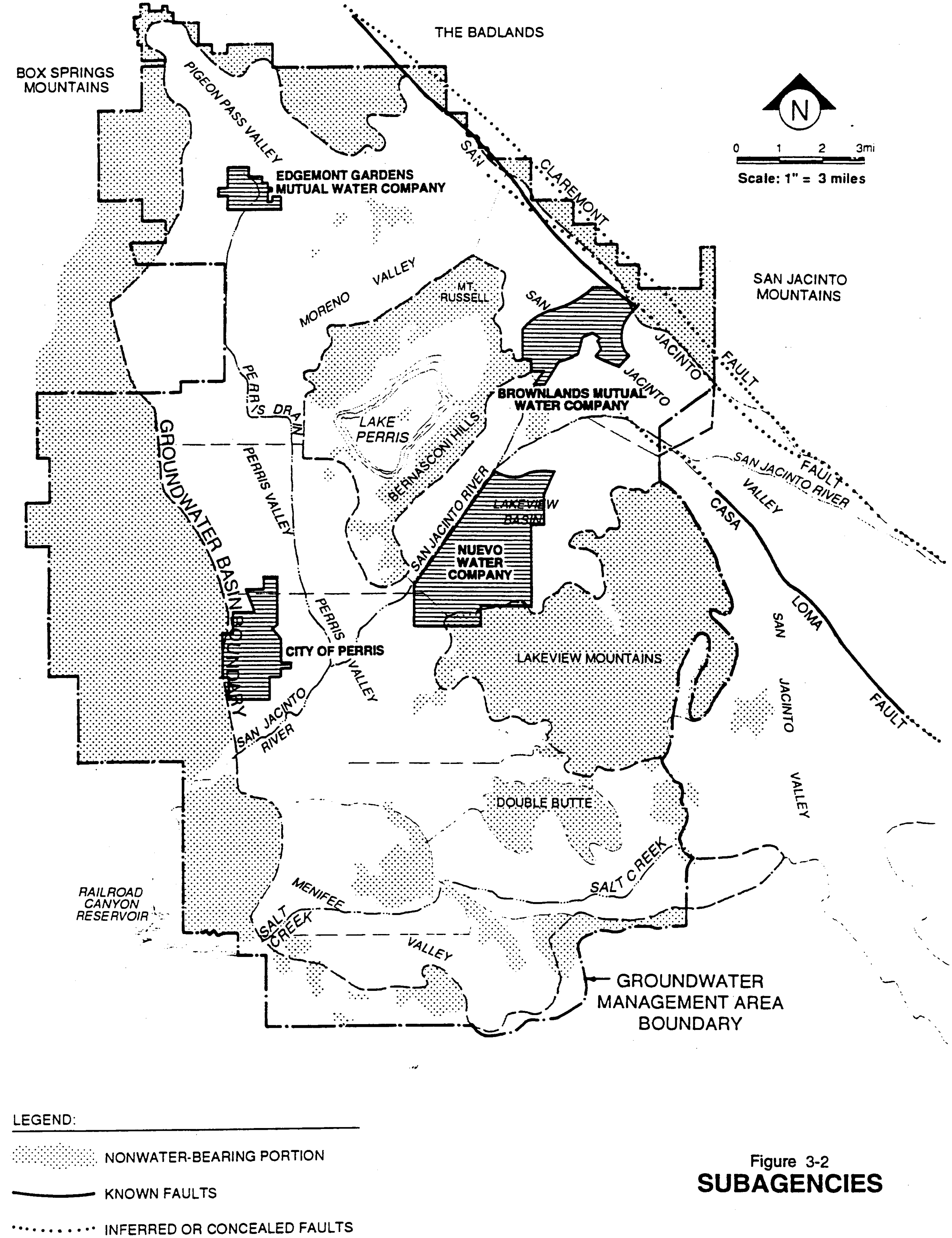

Figure 3-2
SUBAGENCIES

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Water Resources Engineer

REFERENCE: VOL. II, EMWD WATER FACILITIES MASTER PLAN; BLACK & VEATCH, JMM; OCT, 1990.

Murrieta Hot Springs Region of EMWD. The Golden Triangle and Dutch Village developments are also located in this subservice area and will eventually receive almost their entire supply from MWD's Skinner Filtration Plant. At the extreme southern end of EMWD is the historic town of Temecula and surrounding Rancho California which is a rapidly developing, planned 87,500 acre, agricultural, industrial, commercial and residential community which is bisected by Interstate 15. Temecula and the eastern 41,000 acres of Rancho California are located in Subservice Area 44. The water supply to this area is from the Rancho California Water District, which is a subagency of EMWD. The supply for the area is well water supplemented with water from MWD's Skinner Filtration Plant.

EMWD has agreed to supply water on a wholesale basis to eight public entities and companies, four of which are in the West San Jacinto Groundwater Management area. Water requirements by these subagencies varies depending on development and the availability of local supplies. These entities and public agencies include the Brownlands Mutual Water Company, city of Hemet, city of Perris, city of San Jacinto, Edgemont Gardens Mutual Water Company, Lake Hemet Municipal Water District, Nuevo Water Company, and Rancho California Water District. EMWD also supplies water, wholesale, to Elsinore Valley Municipal Water District and March Air Force Base, in accordance with contracts with Western Municipal Water District. The entities and public agencies within the West San Jacinto Groundwater Management area are shown in Figure 3-2 and are described below.

City of Perris. The city of Perris relies entirely on EMWD for its supply since local well water is high in TDS and chlorides. Water is supplied directly through three connections to EMWD's 1627 (Perris) pressure zone, and is provided on a demand basis. The city has water storage facilities consisting of a 1.0 MG and a 1.25 MG steel tank which have high water elevations of 1,595 feet.

Nuevo Water Company. Nuevo Water Company encompasses approximately 4,064 acres and supplies approximately 1,260 connections. The company has two wells with capacities of 1.01 mgd (700 gpm) and 0.58 mgd (400 gpm) and a 12-inch connection to EMWD's system. District water is used only as a supplemental supply to meet total maximum day summer demands of approximately 2.3 mgd.

Edgemont Gardens Mutual Water Company. Edgemont Gardens Mutual Water Company serves 661 acres and approximately 950 connections in the city of Moreno Valley. Their supply is provided by two 350-gpm wells and three connections to EMWD. Water from EMWD is used to supplement their normal supply and to provide fire protection since their system does not have water storage facilities.

Brownlands Mutual Water Company. Brownlands Mutual Water Company encompasses 2,042 acres east of Lake Perris near the Badlands. The company does not have a water system and consequently, does not provide water service. A connection to EMWD's system has never been constructed for this subagency. In the future these areas will probably be supplied directly by EMWD.

Metropolitan Water District of Southern California

Metropolitan Water District of Southern California (Metropolitan) is a wholesale water agency serving supplemental imported water to 27 member cities and water agencies in portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura counties. This service area has a current population of about 15 million people. Approximately one-half of the total water used throughout the entire Metropolitan service area is imported water purchased from Metropolitan to supplement the local water supplies of the study area. Metropolitan obtains imported supplies from the Colorado River and the State Water Project (SWP). Figure 3-3 shows the locations of Metropolitan's, state and EMWD imported water facilities.

<u>Colorado River Water.</u> The Colorado River Aqueduct, owned and operated by Metropolitan, transports water from Lake Havasu on the Colorado River, 242 miles to its terminus at Lake Matthews in Riverside County. Construction of the Colorado River Aqueduct began in 1931 and the first deliveries of water to member agencies took place in 1941.

Metropolitan's total entitlement to Colorado River water is approximately 1.39 million acre-ft/yr. This entitlement consists of a fourth priority right to 550,000 acre-ft/yr, a fifth priority right of 662,000 acre-ft/yr and surplus contract rights of 180,000 acre-ft/yr. Several irrigation districts hold higher priority rights to 3.85 million acre-ft/yr. Certain Indian reservations, towns and individuals also hold present perfected rights that predate Metropolitan's rights. In 1964, the United States Supreme Court limited California's diversions on a dependable basis to 4.4 million acre-ft/yr in the case *Arizona v. California*. As such, Metropolitan's diversions from the Colorado River on a dependable basis were limited to less than 550,000 acre-ft/yr. During declarations of surplus, Metropolitan has the highest priority of any California contractor to divert these surplus waters.

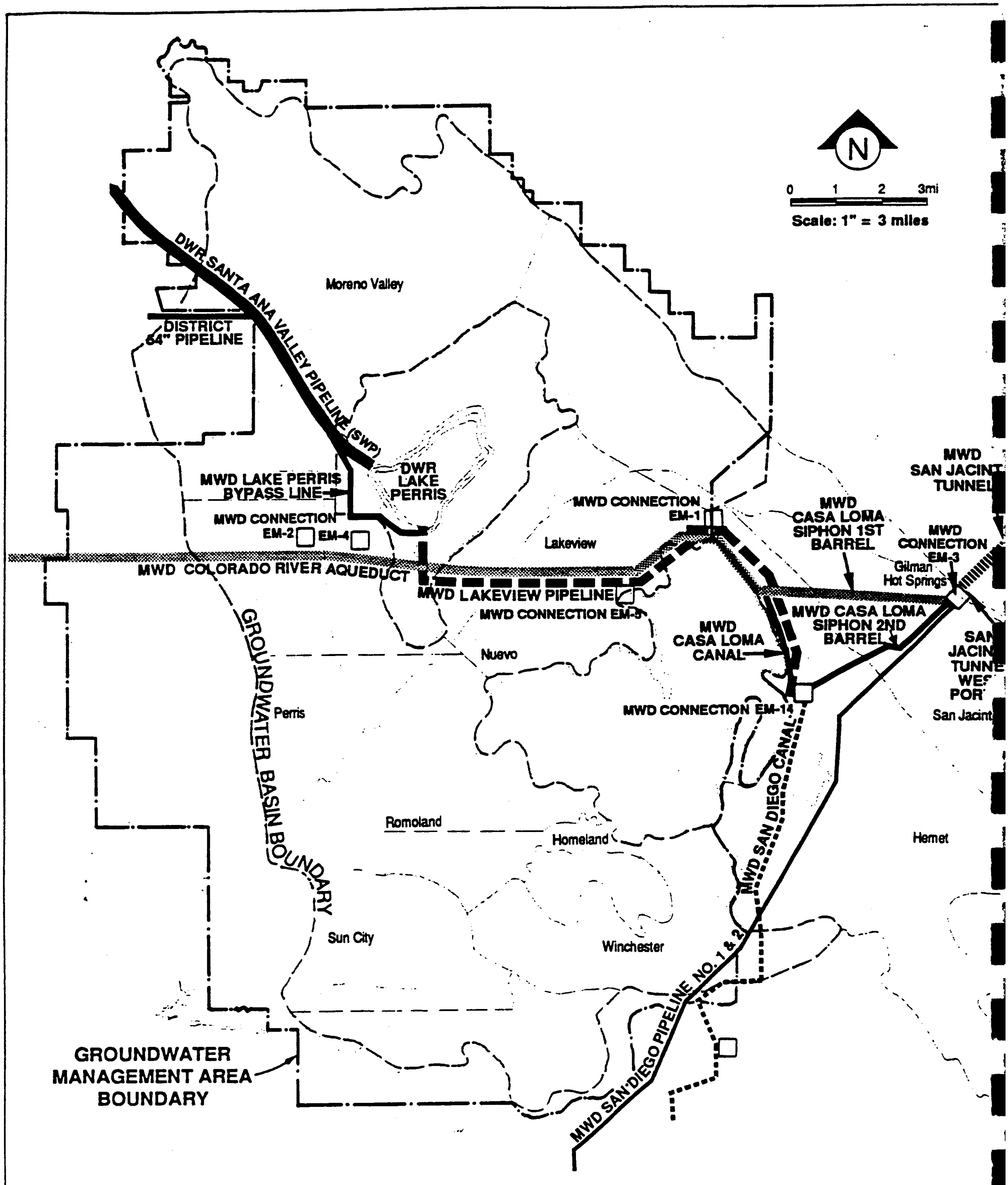

Figure 3-3
IMPORTED WATER FACILITIES

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Water Resources Eng

REFERENCE: EMWD WATER FACILITIES MASTER PLAN, *FIG. 4-3: SOURCES OF SUPPLY MAP*, OCTOBER, 1990.

The Secretary of the Interior has the discretion to allow California to use any water that Arizona and Nevada have available from the Colorado River, but do not use. It is difficult to predict the criteria the Secretary will use in determining whether to release unused water to California. If the agricultural agencies in California do not use the entire supply available to them, Metropolitan has the right to divert the unused portion. Although agricultural use was less than 3.85 million acre-ft/yr throughout much of the mid 1980's, there was no unused agricultural priority water available in 1989.

Metropolitan is actively seeking additional water supplies from the Colorado River. Metropolitan recently signed a long-term agreement with the Imperial Irrigation District that will yield 106,110 acre-ft/yr of Colorado River water from implementation of specific water-saving measures. Metropolitan is pursuing several other projects to obtain increased Colorado River supplies including:

- ❑ Additional water conservation measures with Imperial Irrigation District
- ❑ Lining of the All-American and Coachella Canals to stop water seepage losses
- ❑ Groundwater storage project on the East Mesa of Imperial County
- ❑ Land fallowing program with Palo Verde Irrigation District

If all of these projects are implemented, Metropolitan's total Colorado River supplies could be about 1,000,000 acre-ft/yr by the year 2000 (Montgomery Watson, 1993).

State Project Water. Metropolitan's second source of water is the State Water Project (SWP). The SWP is owned by the State of California and operated by the California Department of Water Resources (DWR). This project transports water from the Sacramento-San Joaquin Delta via the California Aqueduct to thirty contract agencies in the state. The total length of the California Aqueduct is 444 miles.

Metropolitan has an entitlement to SWP water of 2,011,500 acre-ft/yr out of a total maximum contractual entitlement of 4.23 million acre-ft/yr for the 30 contractors. As currently developed, and under current Delta water quality standards, the SWP has an average yield during extended dry periods of approximately 2.4 million acre-ft/yr. Requested deliveries for 1993 totaled 3.6 million acre-ft/yr (agricultural contractors have had a 100 percent deficiency applied against them). Initial deliveries were estimated to be ten percent of the requests before the recent wet period. Demands for SWP water are expected to increase to 4.15 million acre-ft/yr by the year 2010.

Metropolitan's water supply from the SWP also faces potential limitations in the future. The current firm yield of the SWP can currently supply only about one-half of the contract entitlements due to capacity limitations of existing facilities. The State Department of Water Resources is developing a program to increase the firm yield of the SWP through a combination of additional pumping facilities at the Delta, improved water management in the Delta, new surface reservoirs, and groundwater storage. These projects are expected to increase the dry period yield to 3.2 million acre-ft/yr by the year 2010 [DWR, Bulletin 132-89]. Metropolitan is pursuing its own program of groundwater storage and water transfers from other SWP contractors to increase its firm supplies.

The State Water Resources Control Board (SWRCB) has been conducting hearings and other proceedings in an on-going process to review the water quality objectives for the San Francisco Bay/Sacramento-San Joaquin Delta estuary. The SWRCB recently proposed more stringent water quality requirements for the Delta through its draft Decision D-1630. If adopted in its current form, D-1630 is expected to reduce deliveries to the SWP, the Central Valley Project and other Delta diverters by as much as 1.2 million acre-ft/yr depending on water supply conditions in the Delta. The impact of this decision on Metropolitan is still under study; however, preliminary estimates indicate a reduction on the order of 200,000 acre-ft/yr (Montgomery Watson, 1993).

REGULATION OF WASTEWATER

The West San Jacinto Groundwater Management plan will be influenced by the plans and policies of the Federal Environmental Protection Agency, State Water Resources Control Board, California Regional Water Quality Control Board, Santa Ana Region as well as the state and local health departments. A summary of the more important regulations of these agencies is presented in the following paragraphs.

Federal Environmental Protection Agency

On October 18, 1972, Congress passed the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500). Those amendments have been acclaimed as "one of the most significant, most comprehensive, most thoroughly debated pieces of environmental legislation ever to be considered by the Congress." The 1972 Act has been amended several times. The 1977 Amendments included a change in name to the Clean Water Act; however, the Act's goals and policy remain the same. Section 101(a) of the Act states:

> The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. In order to achieve this objective it is hereby declared that, consistent with the provisions of this Act--
>
> (1) it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985;
>
> (2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection of and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;
>
> (3) it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited;
>
> (4) it is the national policy that Federal financial assistance be provided to construct publicly owned waste treatment works;
>
> (5) it is the national policy that area wide waste treatment management planning processes be developed and implemented to assure adequate control of sources of pollutants in each State; and
>
> (6) it is the national policy that a major research and demonstration effort be made to develop technology necessary to eliminate the discharge of pollutants into the navigable waters, waters of the contiguous zone, and the oceans.

To reach these goals, the Act requires that a discharge of waste or waste-containing water be of a specified, improved quality before its release from a point source to the receiving water, or in some cases, that the discharge be prohibited. To assure that the improved quality is attained, the Act provides a new authority to the Federal and State governments to continue and fully develop a basin plan program as well as a national permit system. These two programs are discussed later in this Section under the California Regional Water Quality Control Board, Santa Ana Region.

State Water Resources Control Board

California's Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) establishes the responsibilities and authorities of the State Water Resources Control Board and the nine Regional Water Quality Control Boards. That Act names the Boards "...the principal state agencies with primary responsibility for the coordination and control of water quality."

In carrying out this responsibility, the State Water Resources Control Board coordinates a oversees the activities of the nine Regional Boards. It has also adopted several statewide poli controlling specific aspects of water quality. These policies which apply to the San Jacin Water Reclamation Program include:

Nondegradation Policy (1968). This is the single most important statewide water qua control policy (CRWQCB, SAR, 1984). It was adopted as SWRCB Resolution No. 68-1 "Statement of Policy with Respect to Maintaining High Quality Waters in California". T policy requires that high quality water be maintained and protected unless: (1) allowing so degradation is clearly in the best interests of the people of California as a whole, (2) that s allowable degradation does not preclude an identified (present or future) beneficial use, and that the applicable Basin Plan or some statewide policy takes note of the change in question a concedes that it is appropriate.

Reclamation Policy (1977). The "Policy and Action Plan for Water Reclamation in Califor recognizes the present and future need for increased amounts of water in California, primarily support growth. This policy commits both the State Board and the nine Regional Board support reclamation and reclamation projects which are consistent with sound principles a demonstrated needs.

California Regional Water Quality Control Board, Santa Ana Region

The California Regional Water Quality Control Board, Santa Ana Region, controls water quali within its region by adoption and implementation of a basinwide water quality control p (Basin Plan) and waste discharge requirements for individual dischargers within its regio These two programs, as they relate to the West San Jacinto Groundwater Management Plan, discussed in the following paragraphs.

Basin Plan. The Porter-Cologne Act directs each Regional Board to "...formulate and ad water quality control plans for all areas within the region." A water quality control pla defined as having three components: beneficial uses which are to be protected, water qua objectives which protect those uses, and an implementation plan which accomplishes tho objectives. For the Santa Ana Region, the original basin plan was adopted in 1975 and amen in 1983. As required, that plan is again being reviewed and updated where necessary.

The objective of that plan entitled: "Water Quality Control Plan for the Santa Ana River Basin (8)" is to show how the quality of the surface and ground waters in the Santa Ana Region should be controlled to provide the maximum benefit possible. As stated in that plan:

> The uses made of water and the benefits derived from it are varied, and the quality of the water is an important factor. For example, drinking water has to be of higher quality than water used to irrigate pastures. Both are legitimate uses, but the quality requirements for irrigation are different from those for domestic use. The plan recognizes such variations. First, it lists the uses to which the various waters are put (Beneficial Uses, Chapter 3). Second, it describes the water quality which must be maintained to allow those uses (Water Quality Objectives, Chapter 4). Federal terminology is somewhat different, in that beneficial uses and water quality objectives are combined and the combination is called Water Quality Standards. Chapter 5, the Implementation Plan, then describes the programs, projects and other actions which are necessary to achieve the goals of this plan. Chapter 6, Monitoring and Assessment, discusses the impacts the plan will have.

Applicable sections of the 1994 Basin Plan are summarized in the following paragraphs.

Beneficial uses. Beneficial uses that are to be protected in the West San Jacinto Groundwater Management Plan are shown in Tables 3-1 and 3-2.

Water Quality Objectives. The narrative objectives below apply to all inland surface waters, including bays and estuaries, and to groundwaters, as noted within the region. In addition, specific numerical objectives are listed in Tables 3-3 and 3-4. Where more than one objective is applicable, the stricter shall apply.

Trace constituents. The concentrations of trace constituents in groundwaters designated MUN shall not exceed the values listed immediately below.

Arsenic	0.05 mg/l	Iron	0.3 mg/l
Barium	1.0 mg/l	Lead	0.05 mg/l
Cadmium	0.01 mg/l	Manganese	0.05 mg/l
Chromium	0.05 mg/l	Mercury	0.002 mg/l
Cobalt	0.2 mg/l	Selenium	0.01 mg/l
Cyanide	0.2 mg/l	Silver	0.05 mg/l
Fluoride	1.0 mg/l		

California Department of Health Services

Recharge of reclaimed water can occur through surface spreading, direct injection and by over irrigation. Recharge by percolation and injection is subject to regulatory approval. The Department of Health Services (DHS) has released proposed regulations for planned recharge projects that recharge reclaimed water. If the proposed regulations are adopted, strict criteria

TABLE 3-1
BENEFICIAL USES OF SURFACE WATERS

Water Body	Municipal and Domestic Supply	Industrial Service Supply	Agricultural Supply	Groundwater Recharge	Water Contact Recreation	Non-contact Water Recreation	Warm Freshwater Habitat	Wildlife Habitat	Cold Freshwater Habitat
San Jacinto River					I		I		
Reach 3	I		I	I	I	I	I	I	
Reach 4	I		I	I	I	I	I	I	
Canyon Lake *	X	X	X	X	X	X	X	X	X
Lake Elsinore					X	X	X	X	

I = Intermittent Beneficial Use
X = Present or Potential Beneficial Use
*Note - Canyon Lake is Reach 2

TABLE 3-2
GROUNDWATER BENEFICIAL USES

Groundwater Subbasin	Municipal and Domestic Supply	Agricultural Supply	Industrial Service Supply	Industrial Process Supply
San Jacinto - Lower Pressure	X	X	X	
Lakeview	X	X	X	X
Perris North	X	X	X	X
Perris South I	X	X		
Perris South II	X	X		
Perris South III		X		
Winchester	X	X		
Menifee I	X	X	X	
Menifee II	X	X	X	

I = Intermittent Beneficial Use
X = Present or Potential Beneficial Use

TABLE 3-3
SURFACE WATER QUALITY OBJECTIVES
(mg/l)

Water body	Total Dissolved Solids	Total Hardness	Sodium	Chloride	Total Inorganic Nitrogen	Sulfate	Filtered Biochemical Oxygen Demand	Chemical Oxygen Demand
San Jacinto River								
Reach 3	820	400		250	6		7	15
Reach 4	500	220	75	125	5	65		
Canyon Lake*	700	325	100	90	8	290		

Note - Canyon Lake is Reach 2

TABLE 3-4
GROUNDWATER QUALITY OBJECTIVES
(mg/l)

Groundwater Subbasin	Total Dissolved Solids	Total Hardness	Sodium	Chloride	NItrate as NItrogen	Sulfate
San Jacinto - Lower Pressure	800	380	120	100	3	330
Lakeview	500	190	80	160	2	25
Perris North	300	100	70	90	3	15
Perris South I	1000					
Perris South II	2000					
Perris South III	1500					
Winchester	1200					
Menifee I	2000					
Menifee II	1500					

must be satisfied for a planned recharge project using reclaimed water. In the interim, the Regional Board and the DHS are requiring agencies interested in recharge of reclaimed water to follow the proposed regulations. The proposed regulations are included in Appendix A-1.

The proposed regulations define four categories of recharge projects:

> Project Category I - Surface spreading project that uses reclaimed water that has been oxidized (secondary treatment), filtered (tertiary treatment), disinfected and subjected to organics removal.
>
> Project Category II - Surface spreading project that uses reclaimed water that has been oxidized (secondary treatment), filtered (tertiary treatment) and disinfected.
>
> Project Category III - Surface spreading project that uses reclaimed water that has been oxidized (secondary treatment) and disinfected.
>
> Project Category IV - Direct injection project that uses reclaimed water that has been oxidized (secondary treatment), filtered (tertiary treatment), disinfected and subjected to organics removal.

For project categories I and IV, the maximum amount of reclaimed water that can be captured by any well is a function of the total organic carbon (TOC) in the reclaimed water. The maximum contribution of reclaimed water at a well for categories I and IV is 50 percent. Table 3-5 shows the maximum allowable contributions of reclaimed water in a well as a function of the TOC in the reclaimed water after organics removal. Table 3-6 summarizes other important operational criteria from the proposed recharge guidelines. The maximum allowable reclaimed water contributions in any well for categories II and III is 20 percent. With the exception of nitrogen compounds, reclaimed water quality used for planned recharge projects must meet Title 22 standards for drinking water quality (Title 22, Division 4, Chapter 15, Sections 64435, 64443, 64444.5 and 64473). The total nitrogen concentration of reclaimed water used in recharge projects shall not exceed 10 mg/L as nitrogen, unless the project sponsor can demonstrate that the standard can be consistently met prior to reaching the groundwater level. The minimum retention time in the groundwater prior to production shall be six months for categories I and II, and twelve months for categories III and IV. The minimum horizontal separation between the recharge facility and a producing domestic well is 500 feet for categories I and II; 1000 feet for category III and 2,000 feet for category IV. The project sponsor must have the authority to prevent the use of groundwater for drinking water within the area required to achieve the minimum retention time and minimum horizontal separation. The proposed regulations require rigorous groundwater and reclaimed water monitoring.

TABLE 3-5
MAXIMUM ALLOWABLE TOC AFTER ORGANICS REMOVAL IN RECLAIMED WATER

	Maximum TOC Concentration (mg/L)	
Reclaimed water Contribution (%)	Surface Spreading Category I	Direct Injection Category IV
0 - 20	20	5
21 - 25	16	4
26 - 30	12	3
31 - 35	10	3
36 - 45	8	2
46 - 50	6	2

TABLE 3-6
KEY CRITERIA FOR RECLAIMED WATER RECHARGE PROJECT

Criterion	Category I	Category II	Category III	Category IV
Maximum Contribution of Reclaimed Water in Water at Domestic Wells (1)	50%	20%	20%	50%
Minimum Horizontal Separation Between Point of Recharge and Domestic Wells (feet)	500	500	1,000	2,000
Minimum Retention Time in Groundwater (months)	6	6	12	12

note - (1) see Table 7-1 for categories I and IV

Direct Discharge into a Water System. A plan that involves direct discharge into a domestic water supply system or storage unit for the near future (within the next decade) is not acceptable because of the uncertain health implications. DHS will recommend against the element of a basin plan which contains such a proposal.

Where a plan requiring a near-term decision involves options or alternatives for the use or disposal of the wastewater, DHS will reject the domestic water reuse alternative and consider the remaining options as the proposals for evaluation.

Direct discharge into a water system may be presented in a plan as a future option which may be appraised as additional information becomes available and future needs and attitudes are clearer.

REGULATION OF DRINKING WATER

A summary of existing and proposed water quality standards is presented in Appendix A-2. Both primary Maximum contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs) are shown as proposed, promulgated, and implemented by EPA and DHS. The more rigorous of the two standard MCLs for any contaminant must be satisfied.

LOCAL PLANNING AND REGULATORY AGENCIES

Other local agencies that may have a significant influence on groundwater management include:

Riverside County Flood Control and Water Conservation District. This agency plans, constructs and operates flood control and water conservation facilities in Riverside County. The construction of flood control and water conservation facilities affects the volume of recharge to groundwater and thus has a potentially significant impact.

Riverside County Planning. Riverside County Planning Department develops and reviews general plans for all unincorporated areas in the county. Thus this agency will review the groundwater management plan for consistency with general plans under their jurisdiction.

Riverside County Health Department. The Riverside County Health Department will review water supply and wastewater plans that could be embodied in the groundwater management plan.

SECTION 4

SECTION 4
GROUNDWATER RESOURCES IN THE WEST SAN JACINTO BASIN

PHYSICAL FEATURES

Figure 4-1 shows the major physical features, waterbearing and non-waterbearing areas of the groundwater management area. The major physical features in the study area include the San Jacinto mountains, the Badlands, the San Jacinto River, Salt Creek, Perris Valley Drain, the San Jacinto and Casa Loma faults, the Lakeview mountains, the Bernasconi Hills, and Double Butte. The management area groundwater basins are shown in Figure 4-2 and include the Perris North, Perris South I, II and III, Menifee I and II, Winchester, Lakeview and the San Jacinto Lower-Pressure subbasins.

The San Jacinto mountain range, which dominates the area, was formed about 130 million years ago when subsurface activity thrust the igneous (formed under extreme heat) rock upward. Continued erosion reduced the mountain range and its adjacent area, and the resulting sediments were deposited in the valleys of the management area. These are called alluviated valleys and the deposited sediments are termed alluvium (California Department of Water Resources, 1978). The aquifers in the management area consist of interbedded gravels, sands, silts, and clays. In general, coarser alluvium occurs near the sources of the alluvium and the finer alluvium occurs further away from the sources. The sources of alluvium include the mountains, hills and badland areas that border the management area. Coarser alluvium also occurs in the vicinity of significant streambeds grading to finer alluvium away from the streambeds.

The Perris Subbasins

The Perris Basin has been subdivided into Perris North, Perris South-I, Perris South-II and Perris South-III subbasins. This division is based on water quality variations and has no hydrologic

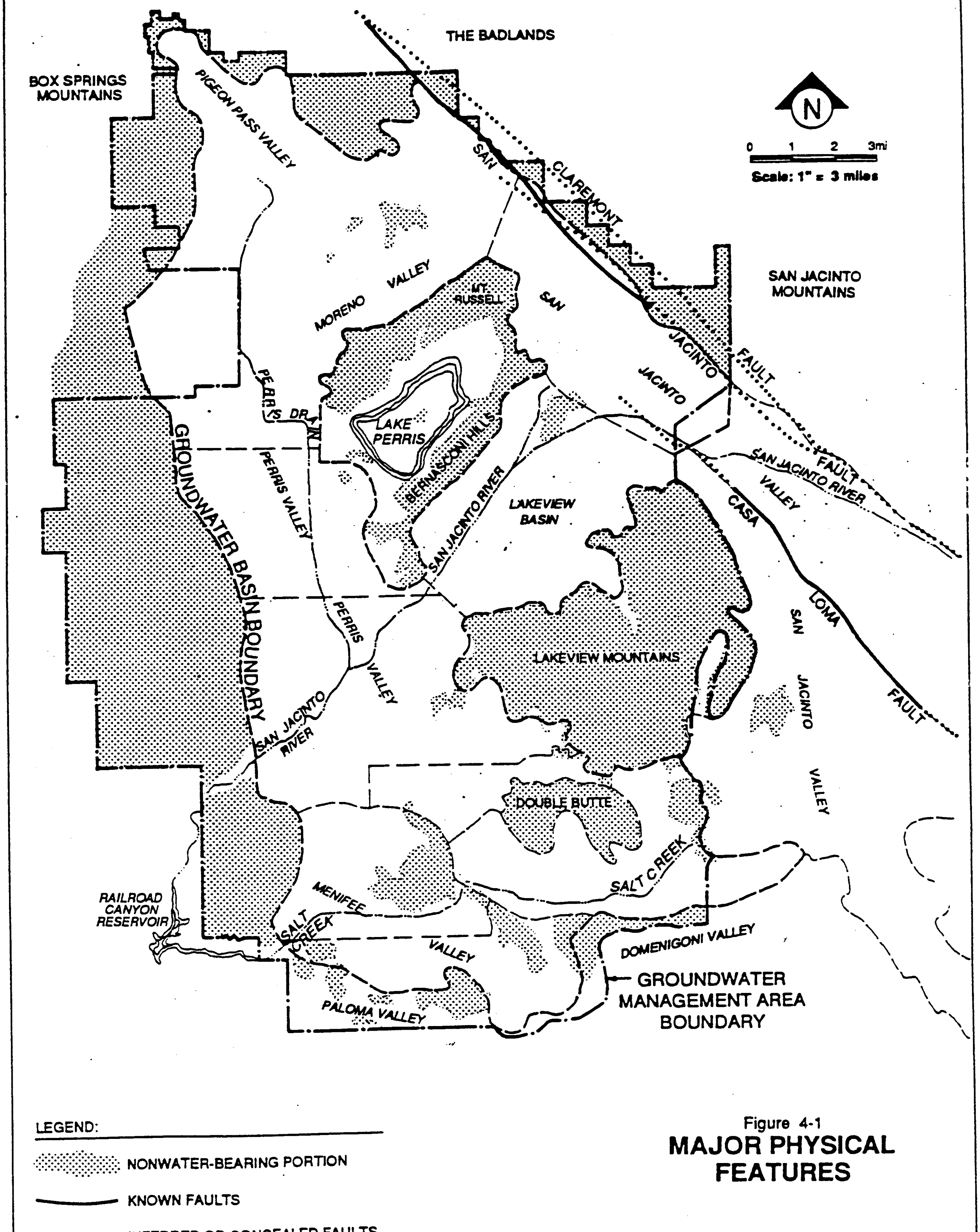


Figure 4-1
MAJOR PHYSICAL FEATURES

Mark J. Wildermuth
Water Resources Engineer

REFERENCE: DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1977.

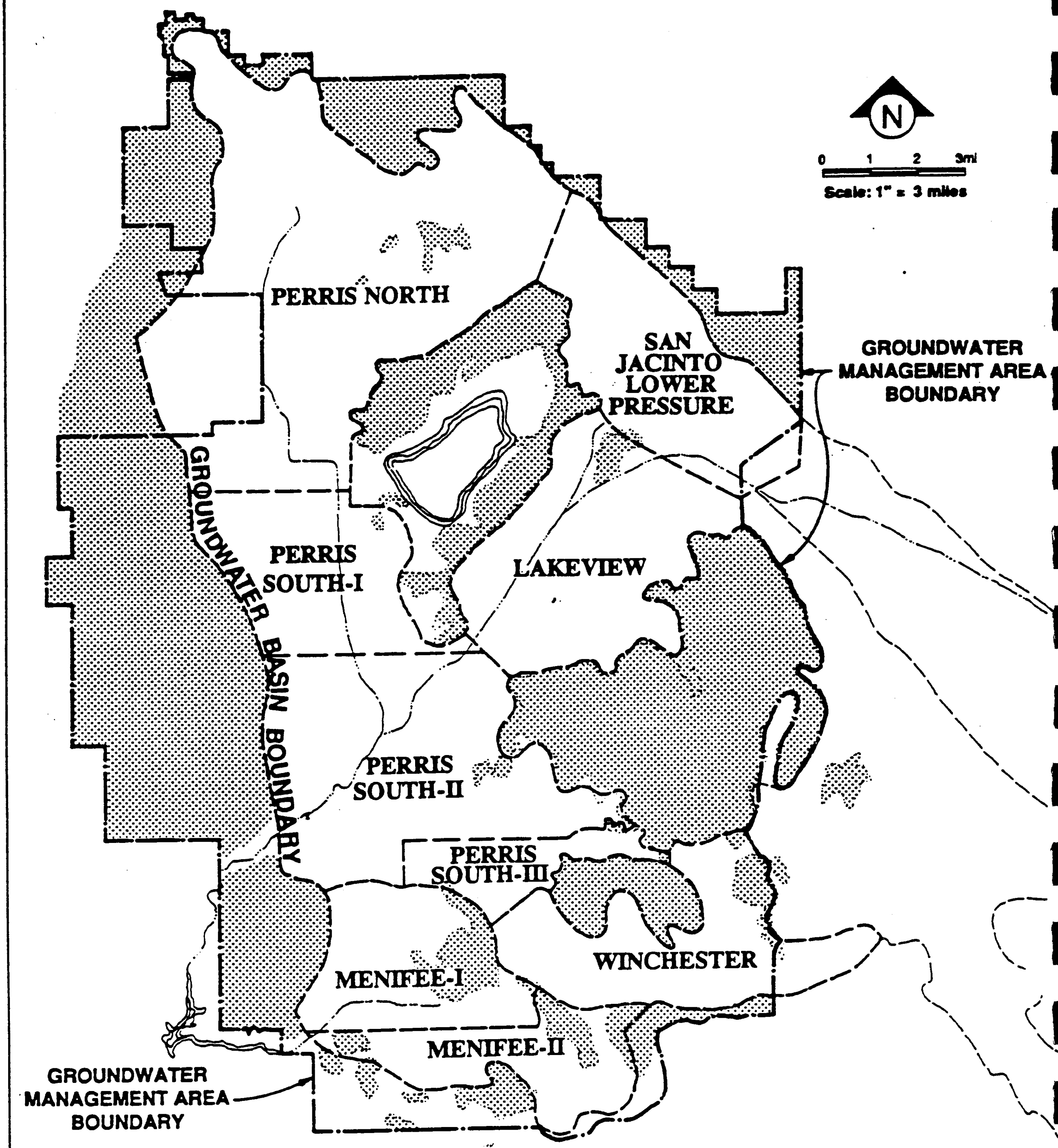


Figure 4-2
GROUNDWATER SUBBASINS

Mark J. Wildermuth
Water Resources Engineers

significance. The Perris North subbasin is bounded on the north by Box Springs Mountains and the Badlands; on the east by San Jacinto Lower-Pressure subbasin and unnamed hills north of Lake Perris; on the south by the Perris South-I subbasin and on the west by a series of extensive non-waterbearing hills and plateaus.

The Perris South-I subbasin is bounded on the north by the Perris North subbasin; on the east by the southerly extension of the Bernasconi Hills; on the south by the Perris South-II subbasin and on the west by a series of extensive non-waterbearing hills and plateaus.

Perris South-II is bounded on the North by the Perris South-I subbasin, on the east by the Lakeview subbasins and the Lakeview mountains; on the south by the Menifee-I and Perris South-III subbasins; and on the west by a series of extensive non-waterbearing hills and plateaus.

The Perris South-III subbasin is bounded on the north and west sides by the Perris South-II subbasin; on the east by the Lakeview mountains and the Winchester subbasin; and on the south by the Double Butte hills, the Winchester subbasin and the Menifee-I subbasin.

The Perris subbasins are considered one hydrologic basin. The Perris North subbasin consists of tonalite and granodiorite mountains surrounding alluvium and older alluvium to 600 feet in depth, over tonalite and granodiorite basement rocks. The northeasterly section near Moreno consists of alluvium up to about 850 feet in depth, over undifferentiated granitic basement rocks.

The Perris South I and Perris South II subbasins consist of alluvium at depths ranging from a few hundred to 1,000 feet, extending southerly, through the mid Perris Valley and into the Menifee subbasin to the south. The base of the aquifer consists of tonalite and granodiorite basement rocks. Mountains composed of tonalite and granodiorite basement rocks bound the southwestern and southeastern area. Clays and gravels are in the central and southern sections, with waterbearing sediments beginning at a depth of 100 feet.

Table 4-1 summarizes available well test data and aquifer characteristics (California Department of Water Resources, 1978). The depth of wells in the Perris North and South subbasins is reported to range from 200 to 800 feet below ground surface (ft-bgs), with production rates ranging from 90 to about 1,000 gallons per minute (gpm). Based on interpretation of well efficiency tests, the transmissivity of these subbasins is estimated to range between 3,600 to 64,800 gallons per day, per foot (g/d/ft). Transmissivity is a measure of how well the aquifer

TABLE 4-1
AVAILABLE PUMP TEST DATA
WELL CHARACTERISTICS AND AQUIFER PROPERTIES

Basin	Number of wells	------ Depth of Wells ------ (ft-bgs)			------ Production ------ (gpm)			---------- Transmissivity ---------- (gpm/ft/day)			----- Specific Yield -----		
		Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg
Perris	42	200	800	440	90	1,000	400	3,600	64,800	16,200	0.04	0.14	0.08
Lakeview	31	300	1,000	450	100	2,000	690	1,800	90,000	34,200	0.04	0.16	0.12
Winchester	9	200	600	450	100	850	300	3,600	14,400	10,800	0.04	0.11	0.09
Menifee	7	100	600	500	10	1,000	330	1,800	108,000	23,400	0.06	0.11	0.08

Source: Water Resources Evaluation of the San Jacinto Area, DWR, 1978; Plate 2, TIR 1335-11-A-2 Preliminary Evaluation of Storage Capacity and Specific Yield of Groundwater Basins in the San Jacinto Study by Area.

transmits water. Transmissivities for large municipal wells usually exceed 30,000 g/d/ft, with larger values being better. Specific yield is a measure of the aquifer's ability to store water. Specific yield is numerically equal to the fraction of the water that, after saturation, can be drained by gravity from the unit volume of the aquifer. Larger values of specific yield imply greater storage capacity and less regional drawdown. Based on well construction logs, the specific yield in the Perris subbasins is estimated to range from .04 to .14.

The Menifee Subbasins

The Menifee basin has been subdivided into the Menifee-I and Menifee-II subbasins. As with the Perris subbasins, this division is based on water quality variations and has no hydrologic significance. The Menifee-I subbasin is bounded on the North by the Perris South-II and Perris South-III subbasins; on the east by unnamed hills and the Winchester subbasin; on the south by Menifee-II subbasin and on the west by a series of extensive non-waterbearing hills and plateaus.

The Menifee-II subbasin is bounded on the north by the Menifee-I and Winchester subbasins and unnamed hills; on the east by Domenigoni Valley; and on the south by a saddle-shaped feature consisting of unnamed hills and Paloma Valley.

Alluvium, up to 900 feet in the north, extends into the Railroad Canyon area in the west and toward the east and southeast boundaries. The base of the aquifer consists of tonalite and granodiorite basement rocks. Waterbearing sediments consist of coarse gravel and sandy disintegrated coarse granite. The base of the aquifer occurs at a depth of 800 feet in the center of the valley and reaches 1,200 feet in the northern and eastern portions of the valley.

Table 4-1 summarizes available well test data and aquifer characteristics. The depth of wells in the Menifee subbasins is reported to range from 100 to 600 ft-bgs, with production rates ranging from 10 to about 1,000 gpm. The transmissivity is estimated to range between 1,800 to 108,000 g/d/ft. The specific yield is estimated to range from .06 to .11.

Winchester Subbasin

The Winchester subbasin is bounded on the north by the Double Butte hills and Lakeview mountains; on the east by the Hemet subbasin; on the south by a line of unnamed hills that separate the Winchester subbasin from Domenigoni and Menifee valleys; and on the west by Perris South-III.

The western and southern sections mainly consist of alluvium from depths of a few hundred to 1,000 feet. The base of the aquifer consists of tonalite and granodiorite along the western, southern and northern boundaries and to the north are tonalite and granodiorite basement rocks and the underlying basement tonalite and granodiorites of the surrounding mountains. Clay and gravel with uniform stratification prevail except for fine sands in the northern and southern borders. Salt Creek, a San Jacinto River tributary, crosses the subbasin from east to west, providing surface drainage.

Table 4-1 summarizes available well test data and aquifer characteristics. The depth of wells in the Winchester subbasin is reported to range from 200 to 600 ft-bgs with production rates ranging from 100 to about 850 gpm. The transmissivity is estimated to range between 3,600 to 14,400 g/d/ft. The specific yield is estimated to range from .04 to .11.

Lakeview Subbasin

The Lakeview subbasin is bounded on the northwest by the Bernasconi hills; on the northeast by the San Jacinto Lower Pressure subbasin; on the southeast by the Lakeview Mountains; and on the southwest by the Perris South-I and Perris South-II subbasins. The subsurface geology consists mainly of alluvium reaching over 1000 feet in depth.

In the northeast section near the base of the Badlands, waterbearing sediments are at about 100 feet in sandy shales. Elsewhere, in the north and northeast sections, waterbearing sediments are at depths over 150 feet or more, in relatively thin strata, with clay predominating. The central and southern sections are clays and gravels with waterbearing sediments occurring at 100-foot depths or more.

Table 4-1 summarizes available well test data and aquifer characteristics. The depth of wells in the Lakeview subbasin is reported to range from 300 to 1,000 ft-bgs with production rates ranging from 100 to about 2,000 gpm. The transmissivity is estimated to range between 1,800 to 90,000 g/d/ft. The specific yield is estimated to range from .04 to .16.

San Jacinto Lower Pressure Subbasin

The San Jacinto Lower Pressure subbasin is bounded by the San Jacinto Mountains on the east, Bridge Street on the south, the Casa Loma fault on the west, and the westerly line of Range 2 West on the north. This subbasin has alluvium to about 1,200 feet deep, is comprised mostly of clays and silt and produces little water. The transmissivity of the subbasin has not been characterized.

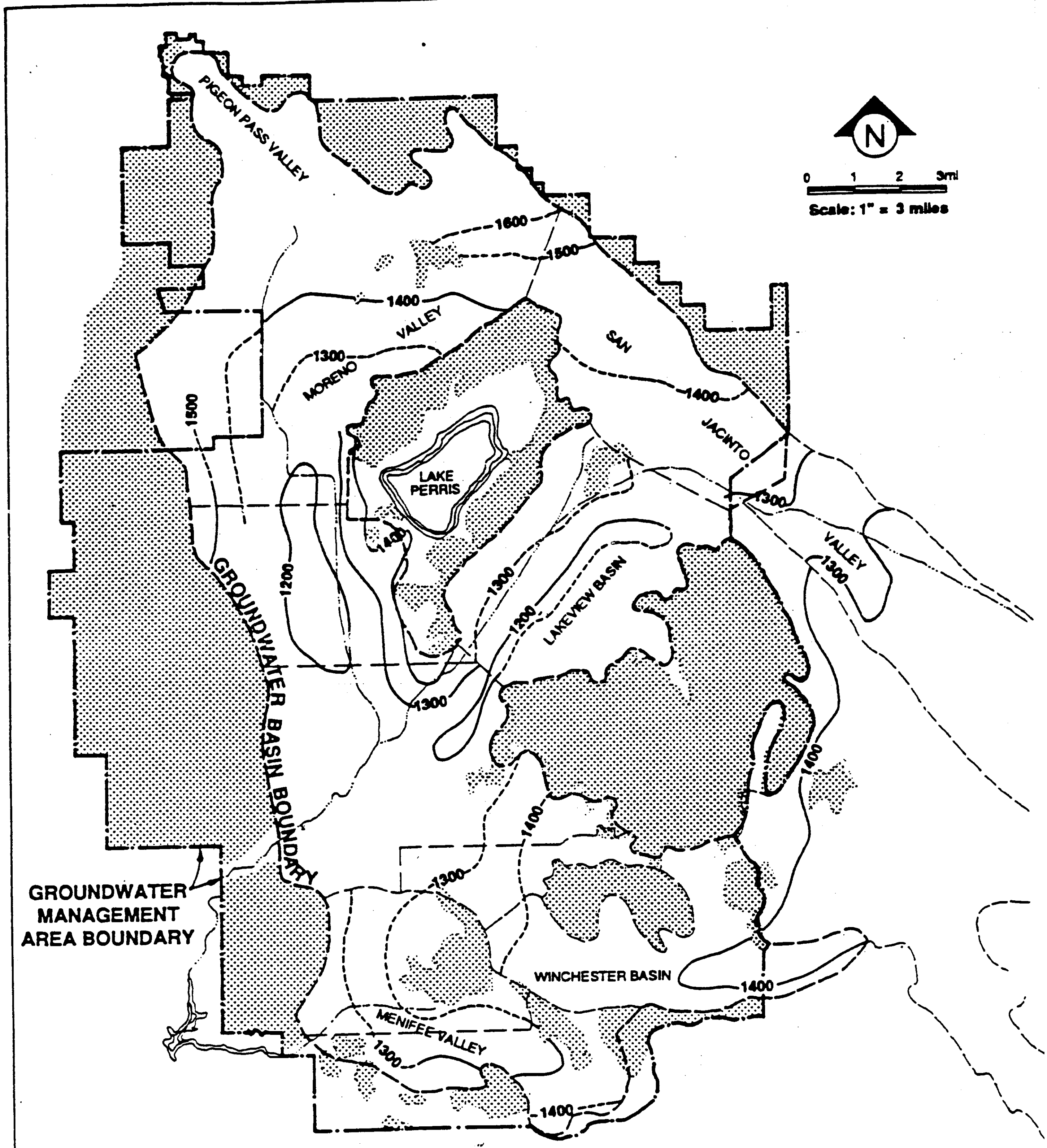
GROUNDWATER HYDROLOGY OF THE WEST SAN JACINTO BASIN

Groundwater Levels and Movement

Historically, the movement of groundwater generally followed the land surface profile toward and along the San Jacinto River and Salt Creek. Groundwater intersected the ground surface in San Jacinto Creek as the creek left the Perris South-II subbasin, and where Salt Creek exited the Menifee-I subbasin. The natural groundwater flow pattern has been altered by groundwater production.

Figure 4-3 is a groundwater elevation map for the West San Jacinto Groundwater basin area that corresponds to Spring 1974 conditions (California Department of Water Resources, 1978). Figure 4-4 is a comparable map for 1993. In 1974 there was subsurface flow from the San Jacinto Lower Pressure and Perris South I subbasins into Lakeview subbasin indicating that groundwater production in the Lakeview subbasin was large enough to reverse the historical groundwater flow direction from Lakeview to Perris South II subbasins. Groundwater originating in Perris North subbasin flowed into the San Jacinto Lower Pressure and Perris South subbasins. Groundwater in Perris South I flowed south to Perris South II. Groundwater in the Menifee subbasins and Winchester subbasin flowed north into Perris South II and Perris South III respectively. The groundwater from the Hemet subbasin flowed west into the Winchester subbasin.

Flow patterns have changed slightly in the intervening period of 1974 to 1993. Currently, groundwater continues to flow from the San Jacinto Lower Pressure and Perris South II subbasins into Lakeview subbasin; and from the Perris North subbasin into the Perris South I subbasin and continuing to Perris South II. The differences are as follows: there is a groundwater divide in the Menifee subbasin with some groundwater flowing north into Perris



LEGEND:

NONWATER-BEARING PORTION

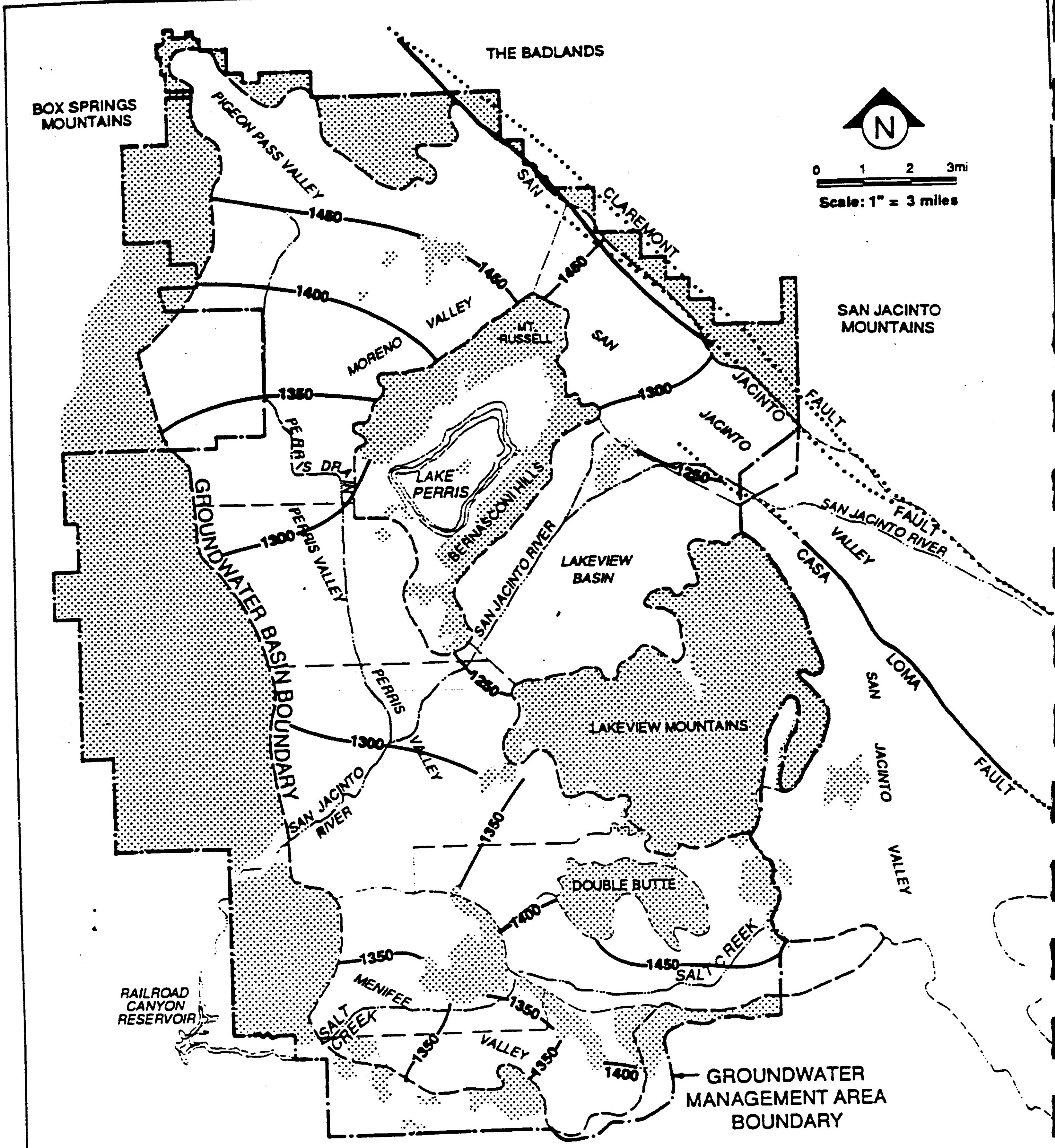
—1200— CONTOURS IN FEET BASED ON NEARBY DATA

-- - -- - -- INFERRED CONTOURS

Figure 4-3
GROUNDWATER ELEVATION MAP, 1974

Mark J. Wildermut
Water Resources Enginee

REFERENCE: DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1977.



LEGEND:

NONWATER-BEARING PORTION

KNOWN FAULTS

INFERRED OR CONCEALED FAULTS

—1450— CONTOURS IN FEET BASED ON NEARBY DATA

Figure 4-4
GROUNDWATER ELEVATION MAP, 1993

Mark J. Wildermut
Water Resources Engin

South II subbasin, the remainder to a pumping depression in the Menifee II subbasin; groundwater in the Winchester subbasin flows northwest into the Perris South III subbasin and to the east into the Hemet subbasin.

The groundwater elevation changes between 1974 and 1993 are as follows:

San Jacinto Lower Pressure	-50 to -100 feet
Perris North	generally unchanged
Perris South I	+50 to +100 feet
Perris South II	+50 to +100 feet
Perris South III	+25 to +50 feet
Menifee I	+50 feet
Menifee II	+50 feet
Winchester	+25 to +50 feet
Lakeview	slightly less

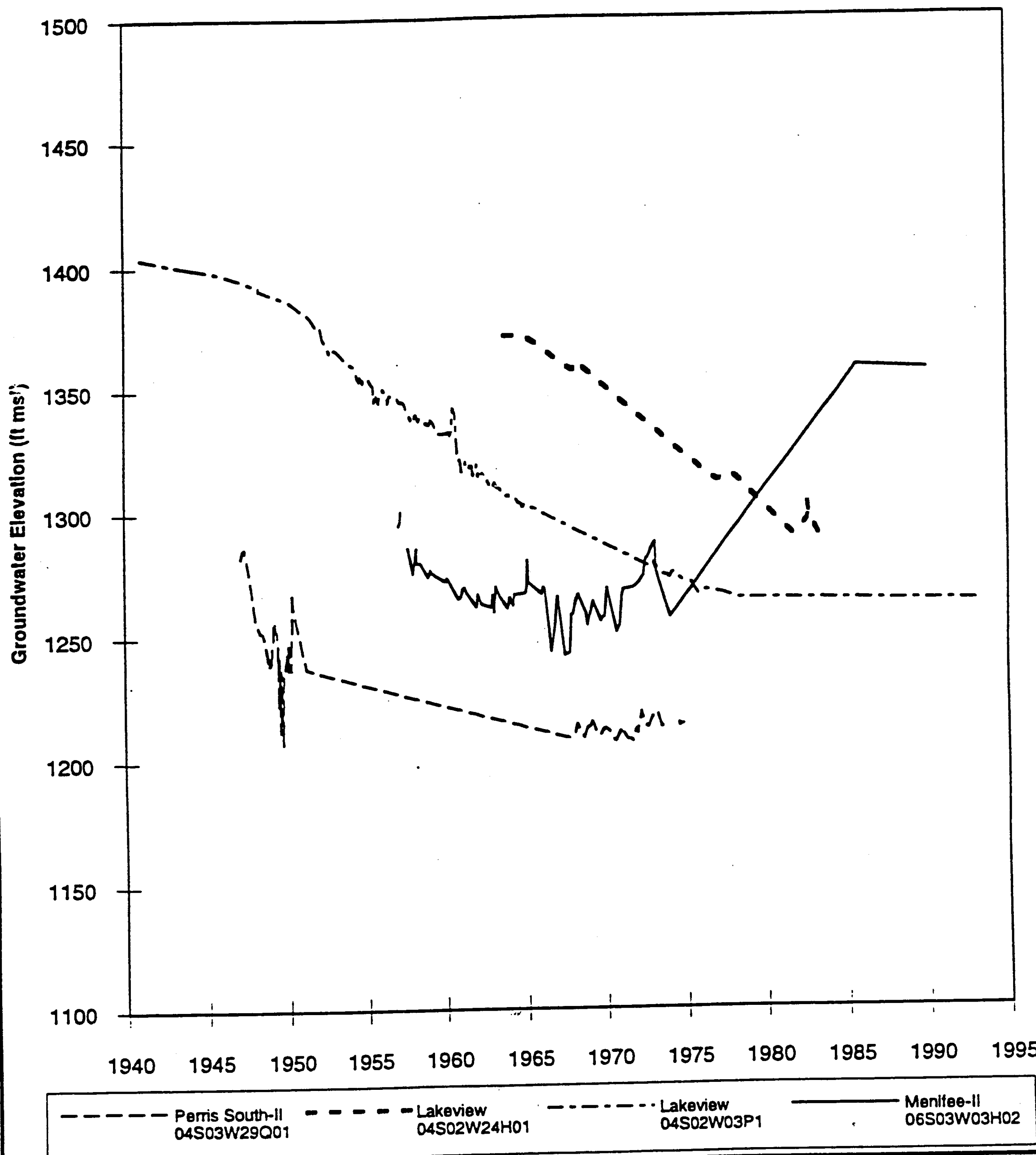
Generally, water levels will fluctuate both seasonally and on a long-term basis. Records of water levels in wells for the last 45 years generally indicate that the water table declined during the period of 1945 to the mid-seventies and recovered somewhat from the mid-1970's to the present. This long term trend was caused by a drought period that occurred from the mid 1940's to 1977, which was followed by an extremely wet period from 1978 to 1983. Agricultural use of groundwater has declined over the last twenty years without a concurrent increase in domestic groundwater usage.

Water levels are usually higher in the winter and spring months, when precipitation is greatest and there is less pumping than in the summer and fall months. When water levels in an area are declining from year to year, this indicates that more ground water is being removed from the area than is being replenished. Water levels were declining on a yearly basis through the mid 1970's. Groundwater elevation time-histories for selected wells are shown in Figure 4-5 for the Perris, Lakeview and Menifee subbasins; and Figure 4-6 for the Winchester and San Jacinto Lower Pressure subbasins. These hydrographs indicate the degree of groundwater level fluctuations that can occur in groundwater levels over the long term and seasonally.

Groundwater Hydrology

The occurrence and quality of groundwater in the West San Jacinto Basin groundwater management area are directly affected by the volume and quality of the water that recharges the area.

FIGURE 4-5 GROUNDWATER ELEVATION IN PERRIS, LAKEVIEW AND MENIFEE SUBBASINS



B&W Chart A
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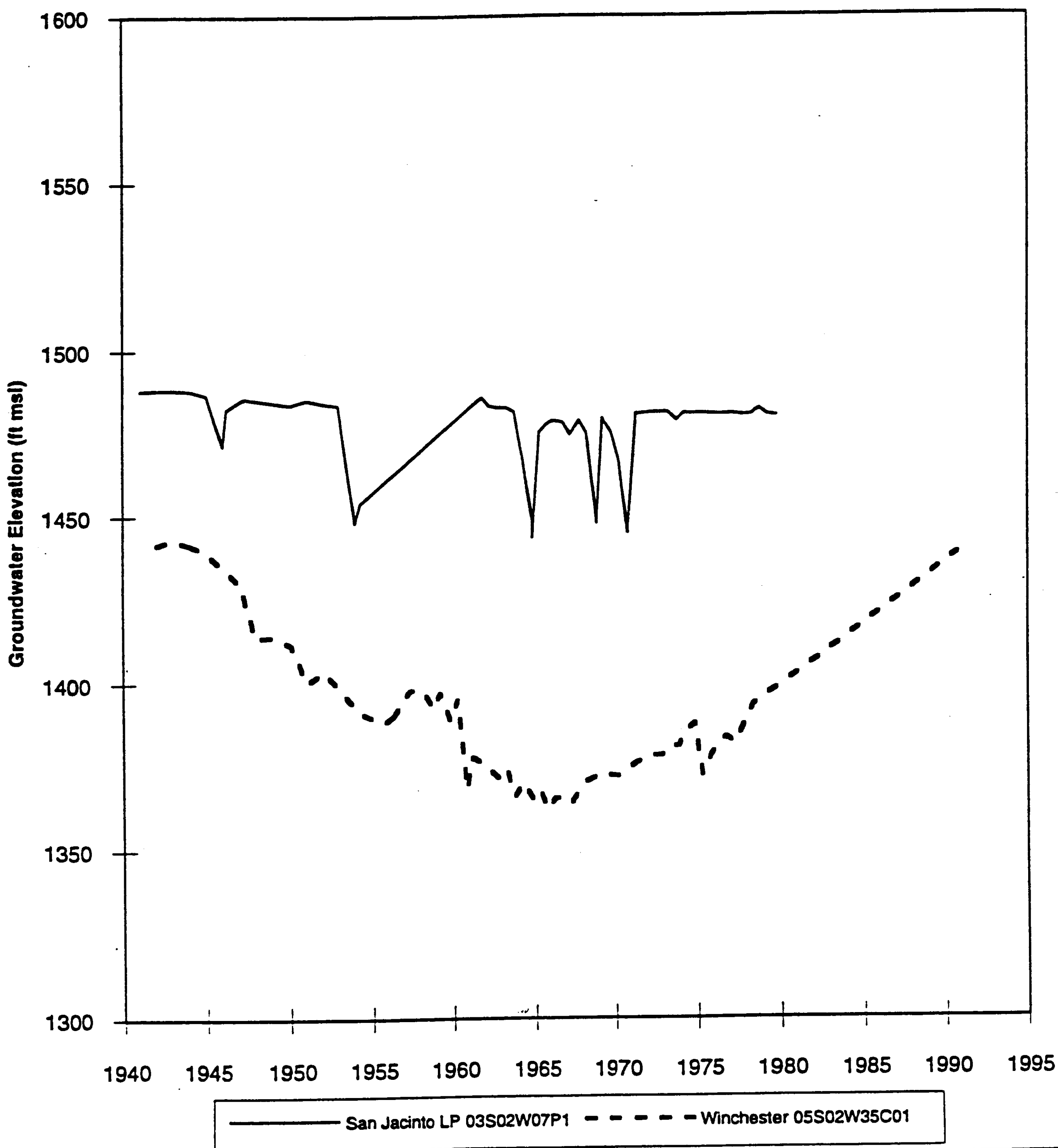
Mark J. Wildermuth
Water Resources Engineer

FIGURE 4-6 GROUNDWATER ELEVATION IN SAN JACINTO AND WINCHESTER SUBBASINS



B&W Chart B
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Mark J. Wildermuth
Water Resources Engineer

Recharge Components. Recharge in the management area consists of the following hydrologic components:

- deep percolation of stormflows
- deep percolation of precipitation
- deep percolation of applied water
- artificial recharge of imported water
- subsurface inflow from adjacent groundwater basins; and
- subsurface inflow from adjacent non-groundwater areas.

Estimates of these components were made by Water Resources Engineers in 1973 (Water Resources Engineers, 1973) and were updated in 1988 (Camp, Dresser & McKee, 1988). Table 4-2 lists the average annual value for each of these recharge components for year 2000 land use conditions for each subbasin. Values for Perris South-I, Perris South-II and Perris South-III are aggregated into Perris South. The Menifee subbasins have also been aggregated into one subbasin. These data were used in the 1994 Water Quality Control Plan (Basin Plan) developed by the Santa Ana Regional Water Quality Control Board (Regional Board). These components are described below.

Streambed Percolation. Stormflow percolation consists of percolation of stormflow in unlined channels and spreading grounds. The major unlined streams in the management area are the San Jacinto River, Perris Valley drain and Salt Creek. Table 4-2 contains estimates of stormflow percolation for each subbasin. Long term average stormflow percolation varies from about 300 acre-ft/yr for the Menifee subbasin, to a high of about 3,500 acre-ft/yr for the Perris North subbasin. The total stormflow percolation for the management area averages about 8,700 acre-ft/yr.

Percolation of Precipitation. Deep percolation of precipitation occurs when precipitation exceeds soil moisture demand. Soil moisture demand is the total water necessary to fully wet the soil and satisfy consumptive requirements of local vegetation. In most years, precipitation will not directly recharge groundwater unless the soil is kept wet from high precipitation and irrigation. Figure 4-7 shows the average annual precipitation in the management area. The average annual

TABLE 4-2
HYDROLOGIC COMPONENTS OF THE WEST SAN JACINTO BASINS
YEAR 2000 CONDITIONS PER BASIN PLAN
(acre-ft/yr)

Hydrologic Components	Subbasin Lakeview	Menifee	Perris North	Perris South	San Jacinto Lower Pressure	Winchester	Total for West San Jacinto Basin
Inflow Components							
Stream Bed Percolation	1,200	300	3,500	1,600	1,000	1,100	8,700
Percolation of Precipitation	1,600	1,200	1,100	1,200	900	400	6,400
Imported Water Recharge	0	0	0	0	0	0	0
Local Stream Flow Diverted for Recharge	0	0	0	0	0	0	0
Subsurface Inflows from Mountain Boundaries	1,500	0	1,300	0	0	0	2,800
Deep Percolation of Applied Water	2,500	3,200	13,600	10,000	1,400	1,500	32,200
Municipal Wastewater	0	1,400	5,800	4,500	0	200	11,900
Irrigation	2,500	1,800	7,800	5,500	1,400	1,300	20,300
Subtotal Inflow	6,800	4,700	19,500	12,800	3,300	3,000	50,100
Outflow Components							
Subsurface Outflows to	0	0	0	0	800	1,200	2,000
Outside of WSJ Area	0	0	0	0	800	1,200	2,000
Groundwater Production(1)	4,000	0	2,300	1,400	500	0	8,200
Subtotal Outflow	4,000	0	2,300	1,400	1,300	1,200	10,200
Summary Statistics							
Approximate Net Inflow (natural safe yield)	6,800	3,300	13,700	8,300	2,500	1,600	36,200
Approximate Net Inflow plus Intentional Wastewater Recharge	6,800	4,700	19,500	12,800	2,500	1,800	48,100
Volume of Groundwater in Storage	283,000	56,000	123,000	248,000	382,000	36,000	1,128,000
Storage Capacity	515,000	101,000	347,000	402,000	391,000	41,000	1,797,000

Source - All hydrologic components from Basin Planning Model projections (JMM, 1991) except for groundwater production which was estimated from data in Table 4-3 and EMWD; and intentional wastewater recharge which came from EMWD (EMWD,1993).

(1) Excludes groundwater production from individual residences where production is less than 25 acre-ft/yr; groundwater production estimates based on land use are much higher and are projected to be about 26,600 acre-f/yr.

(2) Subtotal excludes subsurface flows between subbasins within the West San Jacinto Basin.

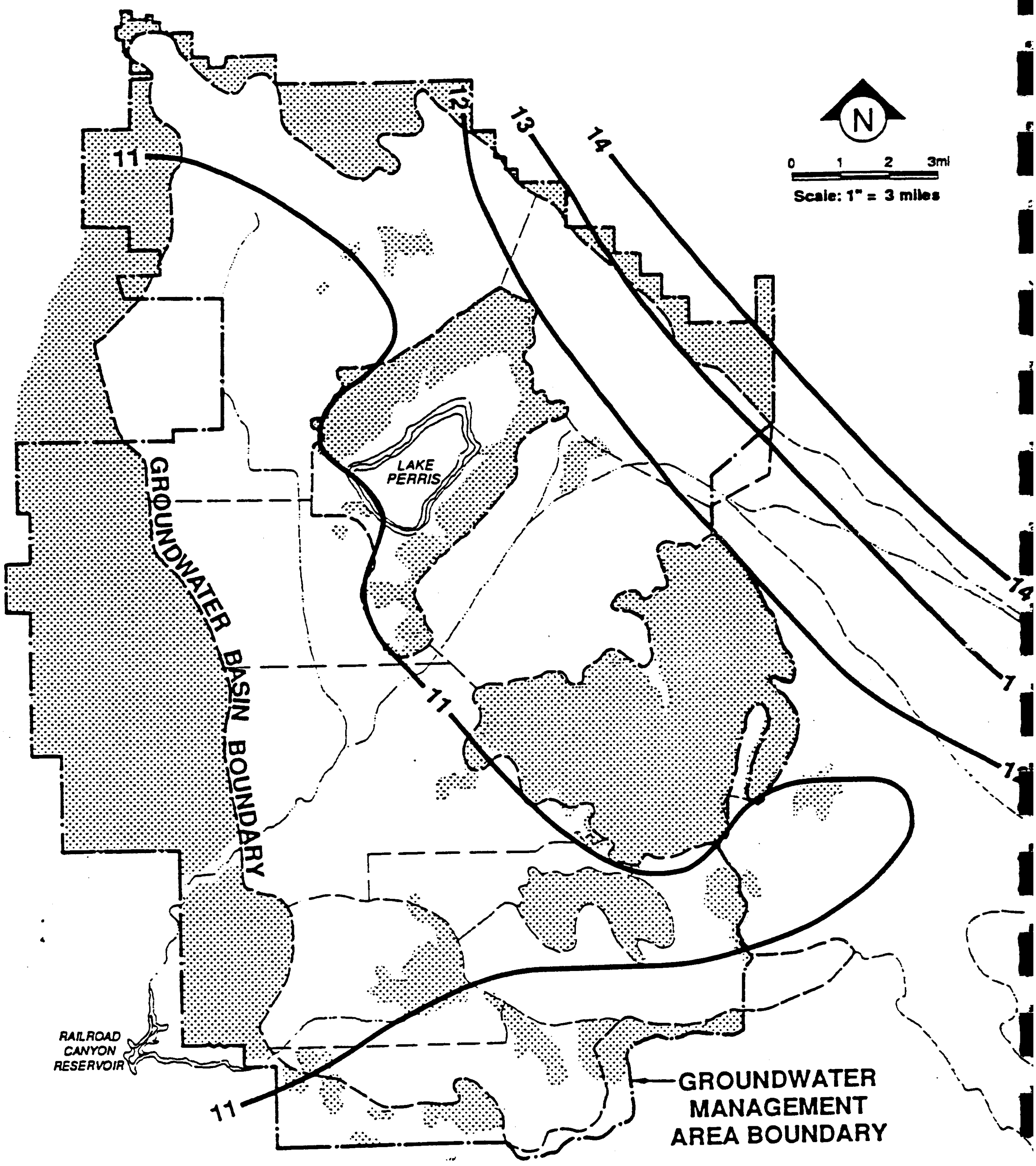


Figure 4-7
AVERAGE ANNUAL PRECIPITATION I
GROUNDWATER MANAGEMENT ARE

LEGEND:

NONWATER-BEARING PORTION

—11— EQUAL PRECIPITATION IN INCHES (Snowfall Converted to Equivalent Rainfall)

Mark J. Wilderm
Water Resources Engi

REFERENCE: DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1977.

precipitation in the management area ranges between 10 to 12 inches per year. By contrast, the potential evapotranspiration in the management area is about 50 inches (California Department of Water Resources, 1978). Deep percolation of precipitation will occur in wet years, during periods of very high precipitation. In the management area, deep percolation of precipitation varies from about 400 acre-ft/yr in the Winchester subbasin, to a high of about 1,600 acre-ft year in the Lakeview subbasin. The long term deep percolation of precipitation for the management area is about 6,400 acre-ft/yr.

Deep Percolation of Applied Water. The deep percolation of applied water includes recharge from percolation ponds at municipal water plants, septic and irrigation return flows. Recharge from municipal wastewater plants, in order of magnitude, occurs in Perris South (from the Sun City and Perris reclamation plants), Perris North (from the Moreno Valley reclamation plant), and Winchester subbasins (from the Rancho Temecula reclamation plant). The annual recharge of reclaimed water in the management area is projected to be about 11,900 acre-ft/yr (Eastern Municipal Water District, 1993).

The deep percolation of irrigation ranges from about 1,300 acre-ft/yr in the Winchester subbasin, to 7,800 acre-ft/yr in the Perris North subbasin. The long term deep percolation of irrigation and septic tank returns for the management area is about 20,300 acre-ft/yr.

The deep percolation of applied water from reclamation plants, irrigation returns and septic tank disposal ranges from about 1,400 acre-ft/yr for the San Jacinto Lower Pressure subbasin, to about 13,600 acre-ft/yr for the Perris South subbasin.

Subsurface Inflow . Subsurface inflow along mountain boundaries is defined as the sum of subsurface inflows from the mountain boundaries plus runoff that percolates to groundwater along the mountain - aquifer contact. Subsurface inflow is projected to be about 2,800 acre-ft/yr.

Subtotal Inflow. The total inflow or recharge to the management area ranges from a low of 3,000 acre-ft/yr for the Winchester subbasin, to a high of about 19,500 acre-ft/yr for the Perris South subbasin. The total of all recharge into the management area is about 50,200 acre-ft/yr.

Outflow Components. Outflow from the management area consists of the following hydrologic components:

- ❑ subsurface outflow to areas outside the management area;
- ❑ groundwater production; and
- ❑ consumptive use from riparian vegetation.

Table 4-2 lists the average value for each of these recharge components for year 2000 land use conditions for each subbasin. These components are described below.

Subsurface Outflow. Subsurface outflow to areas outside the management area ranges from a low of zero for the Lakeview Menifee, Perris North and Perris South subbasins, to a high of about 1,200 acre-ft/yr for the Winchester subbasin. The total water lost to subsurface outflow is about 2,000 acre-ft/yr in the management area.

Groundwater Production. Groundwater production data was obtained for the period 1987 through 1991, the last five year period for which the State Water Resources Control Board (SWRCB) had compiled records of reported groundwater production. These data are listed in Table 4-3. Actual groundwater production is significantly larger because some groundwater producers do not report their groundwater production to the SWRCB. Groundwater production, while a hydrologic component, is omitted from the table because it is unknown. The safe yield estimate shown in Table 4-2 is based on total inflows minus non pumping outflows.

Losses to Riparian Vegetation. Losses to riparian vegetation are negligible. In the predevelopment past, uptake of groundwater by riparian vegetation was probably large, but has dropped to insignificance because of agricultural land development and lower groundwater levels.

Subtotal Outflow. The total outflow in the basin, from all sources, ranges from a low of 1,300 acre-ft/yr for the San Jacinto Lower Pressure subbasin, to a high of 4,600 acre-ft/yr for the Menifee subbasin. The total outflow for the management area is about 14,800 acre-ft/yr.

Volume of Groundwater in Storage. The volume of groundwater in storage was estimated from the Basin Planning Model simulations used in the 1993 Basin Plan. These estimates are listed in Table 4-2 and correspond to the year 2000. The volume of groundwater in storage is estimated as the product of the thickness of saturated sediments, times the specific yield, times the area of saturated sediments. The volume of groundwater in storage ranges from about 36,000

TABLE 4-3
HISTORICAL GROUNDWATER PRODUCTION

User	State Well ID	Reported Groundwater Production (acre-ft/yr) 1987	1988	1989	1990	1991
		Lakeview Subbasin Production				
Hammerschmidt	4S/2W 07J	750	750	750		
Motte	4S/2W 10C		600.3	792	653.4	428.1
Motte	4S/2W 09A	579	600.4	201	507.2	26.8
Nuevo Water Co.	4S/2W 18A	527	580.5	780.6	720	382.7
Nuevo Water Co.	4S/2W 18B	522.6	568.3	520	407	777.5
Nutrilite	4S/2W 08Q	83	100.1	102.4	124.8	70
Nutrilite	4S/2W 08K	53.7	120.6	102.8	120	130
Nutrilite	4S/2W 08	361.6	1199.2	1166.9	1132.1	980
Verger	4S/2W 10B	724		620	600	510
Verger	4S/02W 10A	440		430	420	350
Total Annual Production for Lakeview Subbasin		4,041	4,519	5,466	4,685	3,655
		Perris North Subbasin Production				
E.G.M.W.C.	3S/3W 06N	13.8	12.5	77.6	1.1	0.3
EMWD	3S/3W 6D	6176	763	613.8	601.5	231.3
Knox	3S/3W 30Q	200				3.6
Schori	3S/3W 31Q			750		
UCR	3S/3W 21C	39.9	56.5	71.5	34.1	61.8
UCR	3S/3W 22D	266.5	325.5	181.4	276.3	266.8
UCR	3S/3W 21A	35.9	71.4	30.9	42.3	46
Warmington	3S/3W 21 F1		847		845	
Total Annual Production for Perris North Subbasin		6,732	2,076	1,725	1,800	610
		Perris South-I Subbasin Production				
Smith	4S/3W 16N	94.8				
Total Annual Production for Perris South-I Subbasin		95	0	0	0	0
		Perris South-II Subbasin Production				
Motte	5S/3W 11M	556	558	716	318	421.2
Underwood Farms	5S/3W 14P	375	365	365	365	350
Total Annual Production for Perris South-II Subbasin		931	923	1,081	683	771
		Perris South-III Subbasin Production				
Agri-Empire	5S/3W 13A	455	442	496	441	381
Agri-Empire	5S/3W 13Q	205	168	170	164	148
Agri-Empire	5S/3W 13A1					165
Total Annual Production for Perris South-III Subbasin		660	610	666	605	694
		San Jacinto Lower Pressure Subbasin Production				
Agri-Empire	4S/2W 35D1	576		638	293	204
H. Welch	3S/2W 33R1	20.2				
Hill & Sooy	3S/2W 28Q	166	208	214	211	172
Total Annual Production for San Jacinto Lower Pressure Subbasin		762	208	852	504	376
Total Reported Groundwater Production West San Jacinto Groundwater Basin		13,221	8,336	9,790	8,277	6,106

acre-ft for the Winchester subbasin, to about 380,000 acre-ft in the San Jacinto Lower Pressure subbasin. The total groundwater in storage in the management area is about 1,130,000 acre-ft.

The storage capacity of these subbasins is also shown in Table 4-2. The storage capacity is equal to the volume of groundwater that could be stored in the basin with a minimum 50 feet depth to water. The storage capacity of groundwater in storage ranges from about 41,000 acre-ft for the Winchester subbasin, to about 515,000 acre-ft for the Lakeview subbasin. The total storage capacity in the management area is about 1,800,000 acre-ft

Safe Yield. Two estimates of the safe yield are presented in Table 4-2. The natural safe yield of the groundwater basins is assumed equal to the net inflow and is numerically equal to the long term average inflow, minus subsurface outflow from the management area, minus the average annual percolation of reclaimed water. The natural safe yield ranges from a low of 1,600 acre-ft/yr for the Winchester subbasin, to a high of about 13,700 acre-ft/yr for the Perris North subbasin. The natural safe yield for the management area is about 36,200 acre-ft. If the percolation of reclaimed water is included in the yield, then the safe yield will range from 1,800 acre-ft/yr for Winchester subbasin, to 19,500 acre-ft/yr for the Perris North subbasin. The safe yield of the management area is about 48,100 acre-ft/yr.

GROUNDWATER QUALITY

The water quality trends in the West San Jacinto Groundwater Basin are typical of the arid southwest. There are three principle sources of water quality degradation in operation in the management area. Naturally occurring brackish groundwater occurs in the vicinity of Salt Creek in the Menifee and Winchester subbasins; and in the Perris South-II subbasin in the vicinity of San Jacinto Creek. Groundwater production patterns in these areas have caused the brackish groundwater to spread out and thus affect larger areas.

The second principle cause of water quality degradation is irrigated agriculture. The mineral content in irrigation return flows to groundwater is three to four times the mineral content of the irrigation source. The irrigation returns degrade the groundwater. If the groundwater is subsequently reused, the mineral content of the irrigation returns are further increased causing additional groundwater degradation. Groundwater will continuously degrade unless additional sources of high quality recharge are introduced to the basin.

Finally, elevated boron and fluoride levels in groundwater have been observed near faults, in particular near the Casa Loma and San Jacinto faults. Boron, fluoride and elevated groundwater temperatures are common near faults. The area degraded by these contaminants is near the Casa Loma and San Jacinto faults.

Groundwater quality descriptions are presented below for each subbasin. These descriptions are based on all groundwater quality data currently available for the management area. Most of the discussion is based on the groundwater quality descriptions developed by the DWR in *Water Resources Evaluation of the San Jacinto Area* (California Department of Water Resources, 1978). With the exception of the Menifee-I, Menifee-II and Winchester subbasins, very little new water quality data has been collected since the DWR prepared the above-mentioned report. Data collected after 1978, including a recent round of water quality sampling by the United States Geological Survey (USGS), were reviewed in detail and, where appropriate, modifications to the DWR's descriptions were developed and included herein.

The water quality discussion presented herein is limited to general minerals, nitrate and chloride due to the lack of data on heavy metals, organics and radionuclides. An inventory of the available water quality data at wells is included in Appendix B. The available water quality data base contains water quality data for about 300 wells. The average period of record for these wells is about 5 years, with 62 percent of the wells having only one water quality sample. On the average, about half of the water quality data is from before 1980 and about 72 percent before 1990. Most of the recent data was obtained from wells in the Menifee subbasins as part of EMWD's Menifee desalter studies, and groundwater quality sampling surveys by the USGS. It should be emphasized that there is practically no information on heavy metals, organics or radionuclides.

New groundwater quality data will need to be collected and a new water quality characterization of the West San Jacinto Groundwater Basin will need to be prepared in the implementation of the groundwater management plan. The need for new data will become obvious in the discussion of Sections 7 and 8. A plan to obtain these data has been incorporated into the management plan described in Section 8.

Perris North Subbasin

Figure 4-8 shows the distribution of TDS in the management area as interpreted by the DWR (DWR 1978). TDS, nitrate and the general inorganic chemistry for the Perris North subbasin is shown in Figure 4-9. Figure 4-9 is based on all available data and corresponds approximately to 1993 conditions. In the Perris North subbasin, TDS concentrations generally range from about 300 mg/L to 600 mg/L with some wells exceeding 800 mg/L. The chemical character of its water is mostly sodium chloride, probably because of the extensive irrigated agriculture. Evapotranspiration and the frequent application of irrigation water produce changes in the relative concentrations of the mineral constituents that leave more sodium and chloride in solution. Recycling of this water further concentrates these ions. The only source of dilution is the deep percolation of precipitation and stormflow which are small compared to total recharge in the subbasin (see Table 4-2).

Nitrate concentrations range from about 1 to 12 mg/L (as nitrogen) with most values between 4 mg/L to 9 mg/L. Nitrate concentrations have increased over the years as a result of fertilization practices in the valley. Figures 4-10, 4-11, and 4-12 show TDS, nitrate and chloride trends in the Perris North subbasin. Figure 4-11 suggests an increasing trend of nitrate concentration.

Most of the water ranges from soft to moderately hard. Fluoride and boron concentrations are relatively high in certain wells in the area, possibly indicating the presence of unmapped faults. For human consumption, water from some wells in the area may not meet Department of Health Services standards for nitrate and fluoride concentrations.

Perris South Subbasins

Figure 4-13 illustrates the TDS, nitrate and general inorganic chemistry of the Perris South I and Lakeview subbasins and Figure 4-14 shows the same interpretation for the Perris South II and Perris South III subbasins. Figures 4-13 and 4-14 are based on all available data and correspond approximately to 1993 conditions. The variations in TDS and nitrate concentrations in the Perris South subbasins are listed below (mg/L).

Subbasin	TDS	Nitrate (as N)
Perris South-I	500 to 1300	0.0 to 7.2
Perris South-II	640 to 14,000	0.0 to 9.0
Perris South-III	400 to 3,300	5.0 to 31

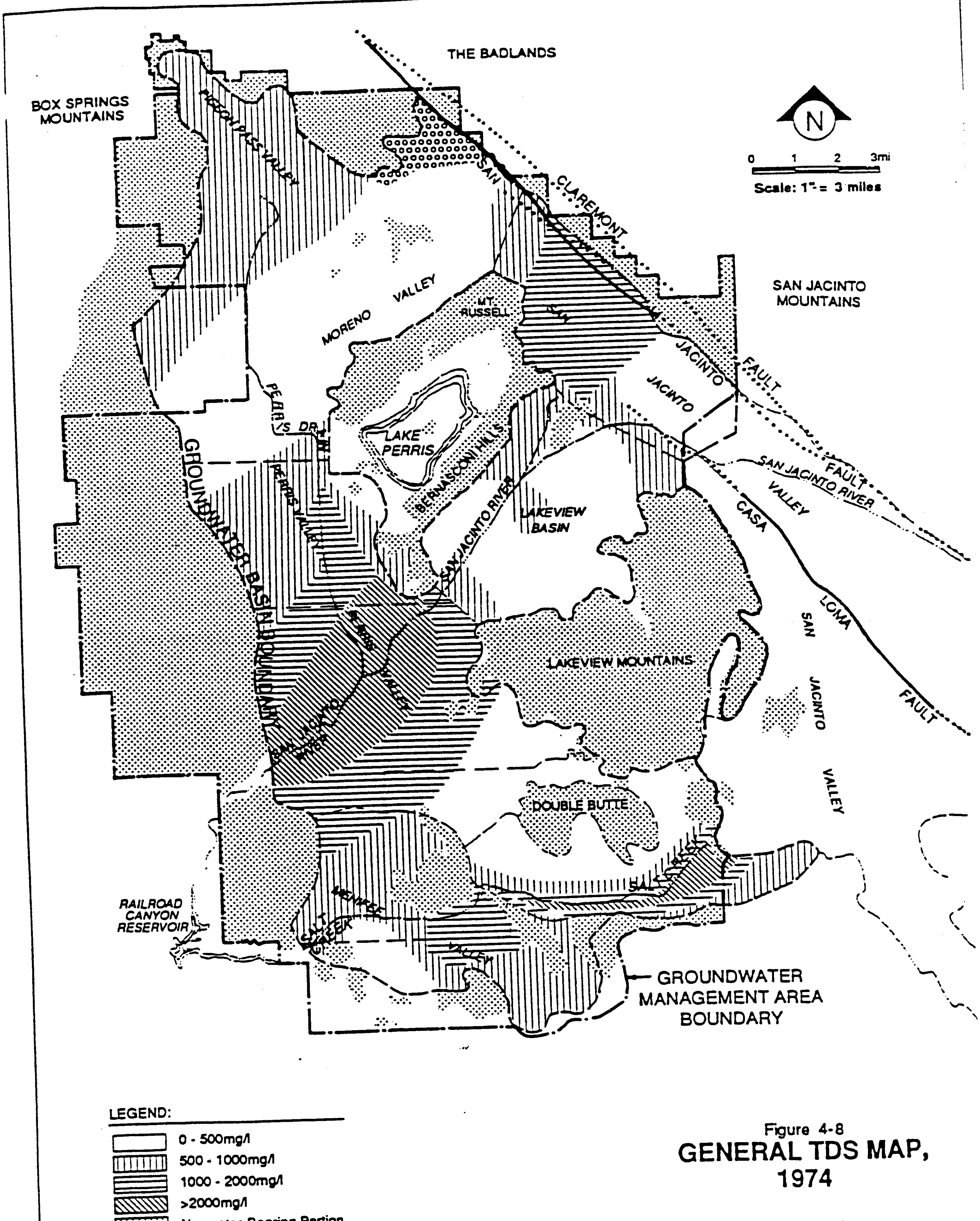


Figure 4-8
GENERAL TDS MAP, 1974

REFERENCE: DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1977.

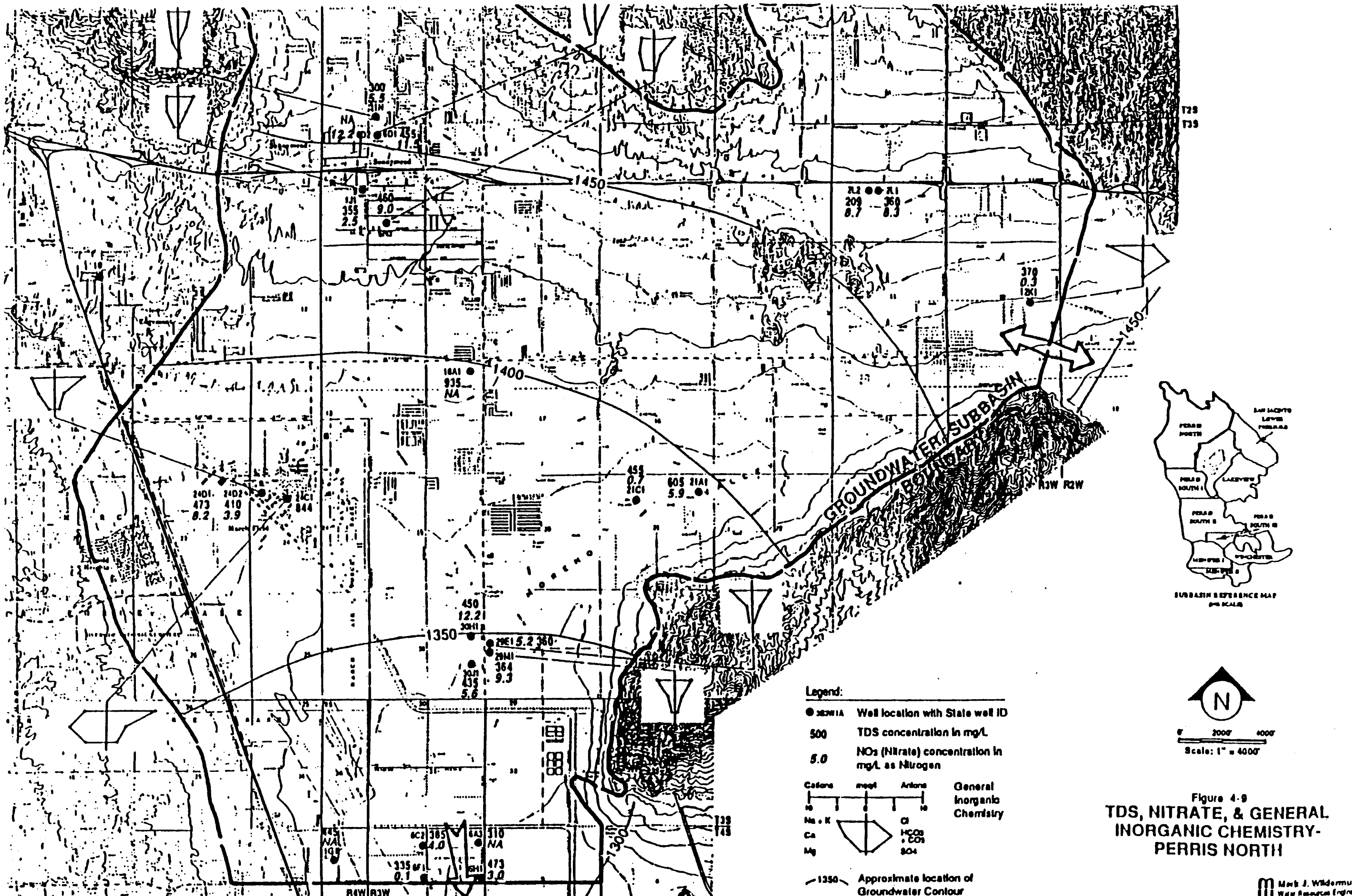
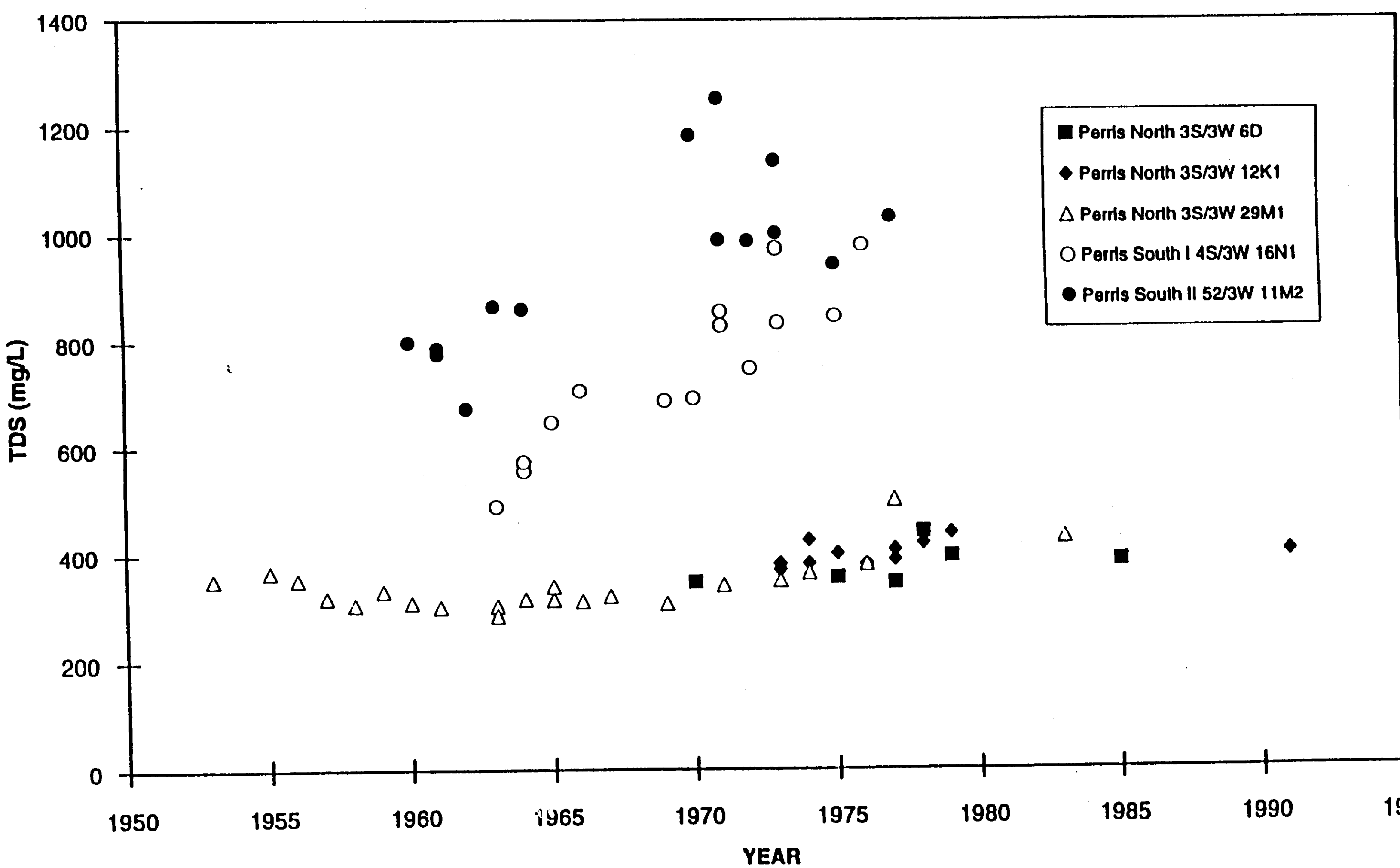


Figure 4-9
TDS, NITRATE, & GENERAL INORGANIC CHEMISTRY-PERRIS NORTH

Mark J. Wildermuth
Water Resources Engineer

FIGURE 4-10 TDS CONCENTRATION IN PERRIS NORTH AND SOUTH BASINS



TDS Plot Perris N&S
9/2/94
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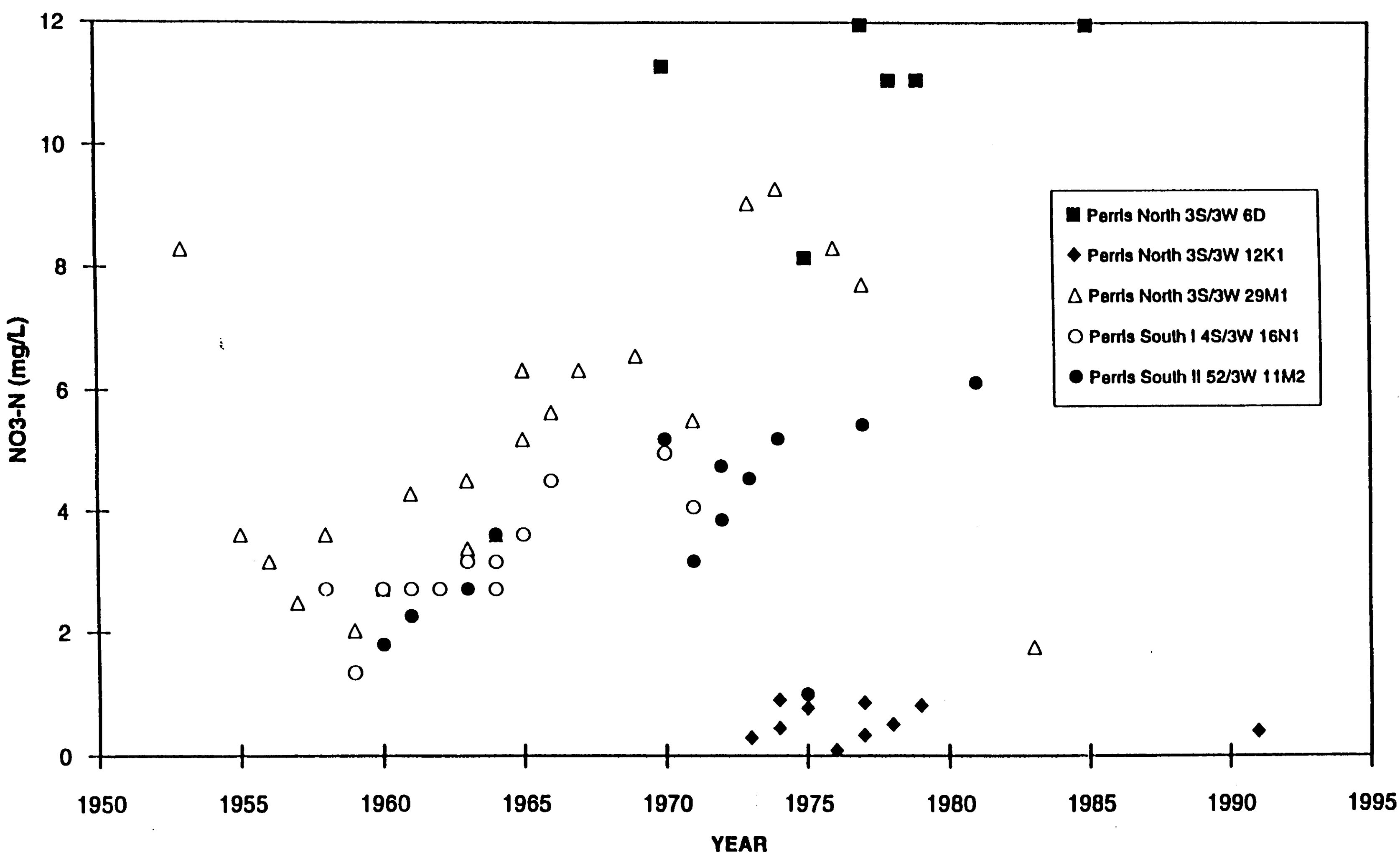
Mark J. Wildermuth
Water Resources Engineer

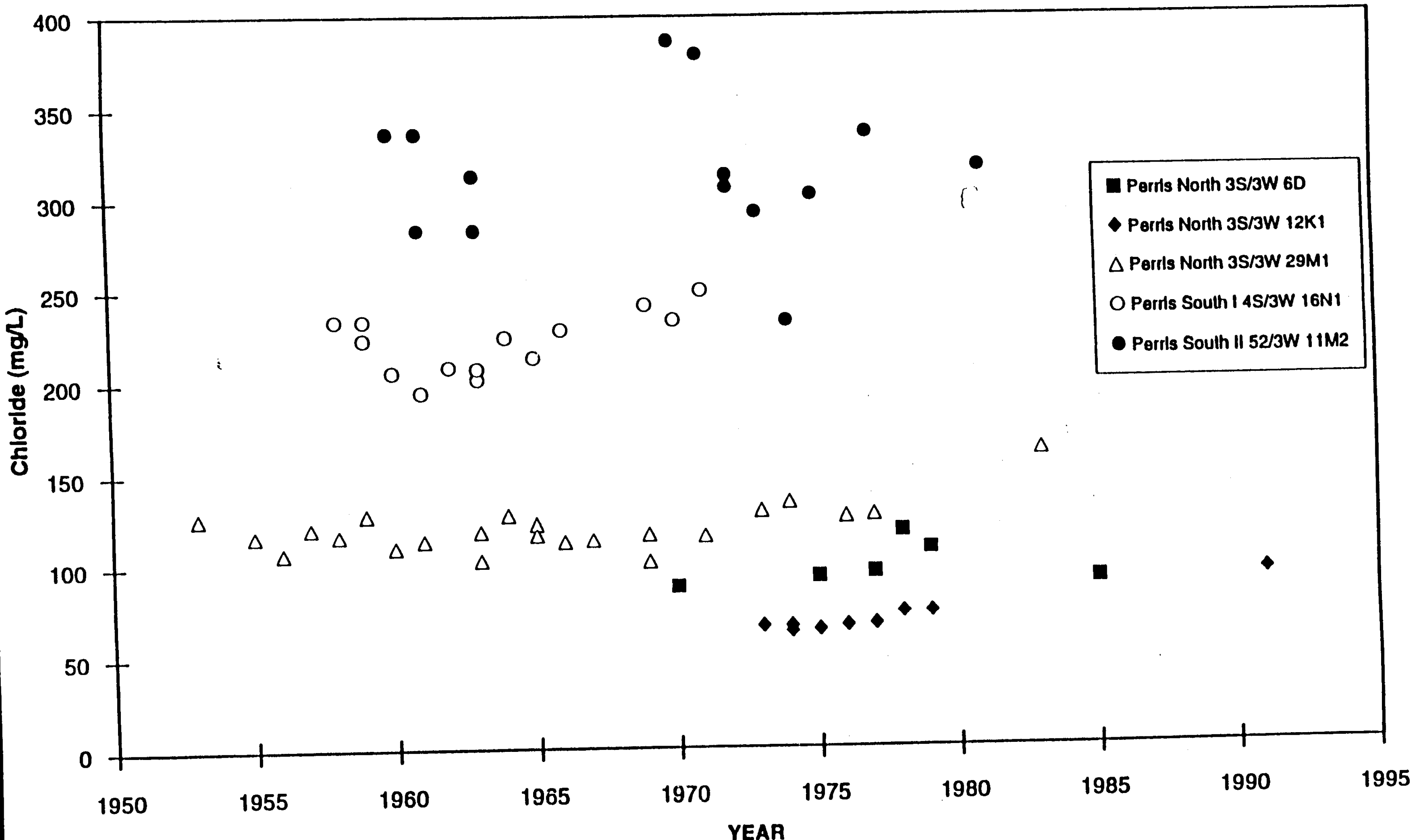
FIGURE 4-11 NITRATE-N CONCENTRATION PERRIS NORTH AND SOUTH BASINS



NO3 Plot Perris N&S
9/2/94
7:

Mark J. Wildermuth
Water Resources E eer

FIGURE 4-12 CHLORIDE CONCENTRATION PERRIS NORTH AND SOUTH BASINS



Chloride Plot Perris N&S
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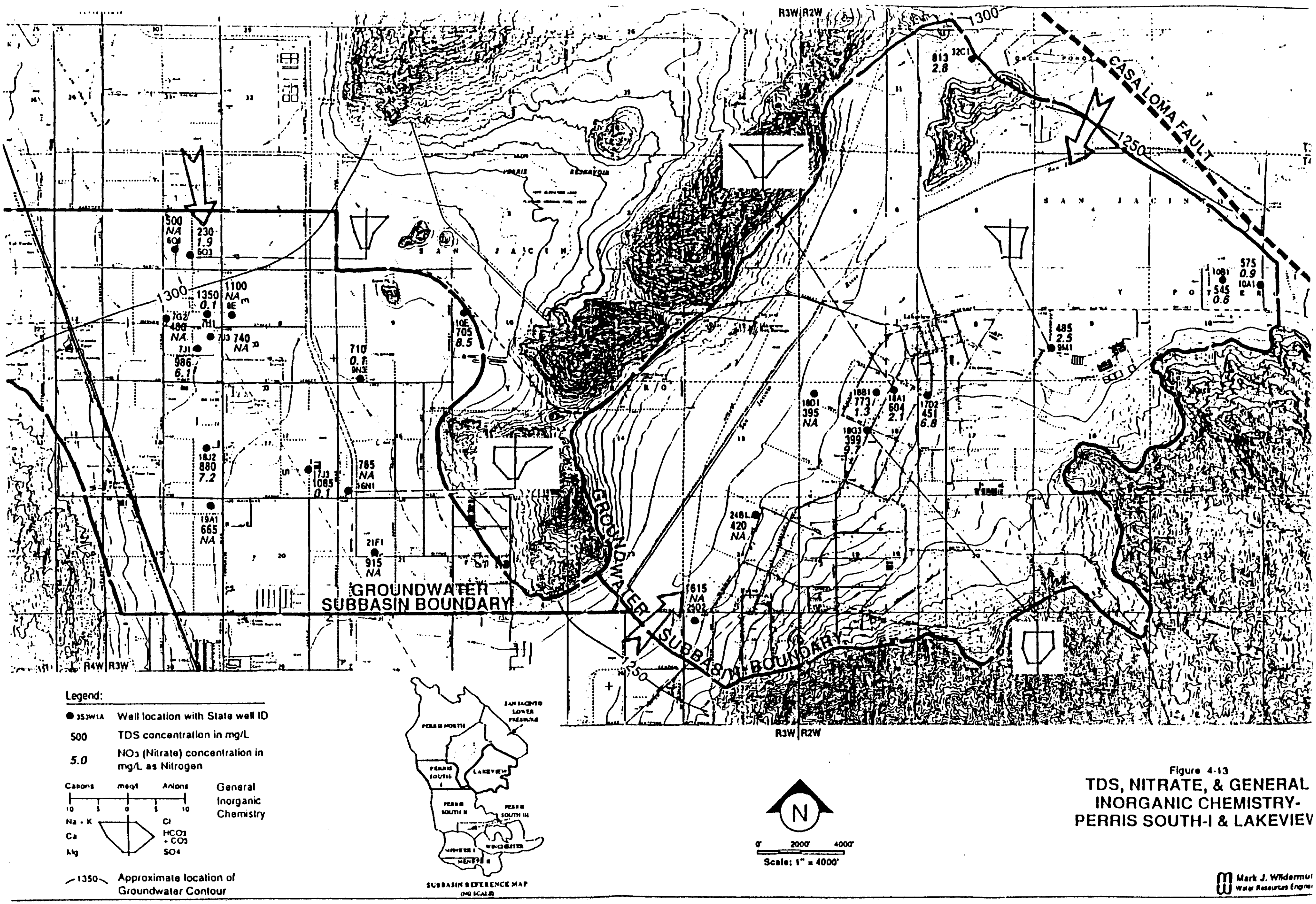
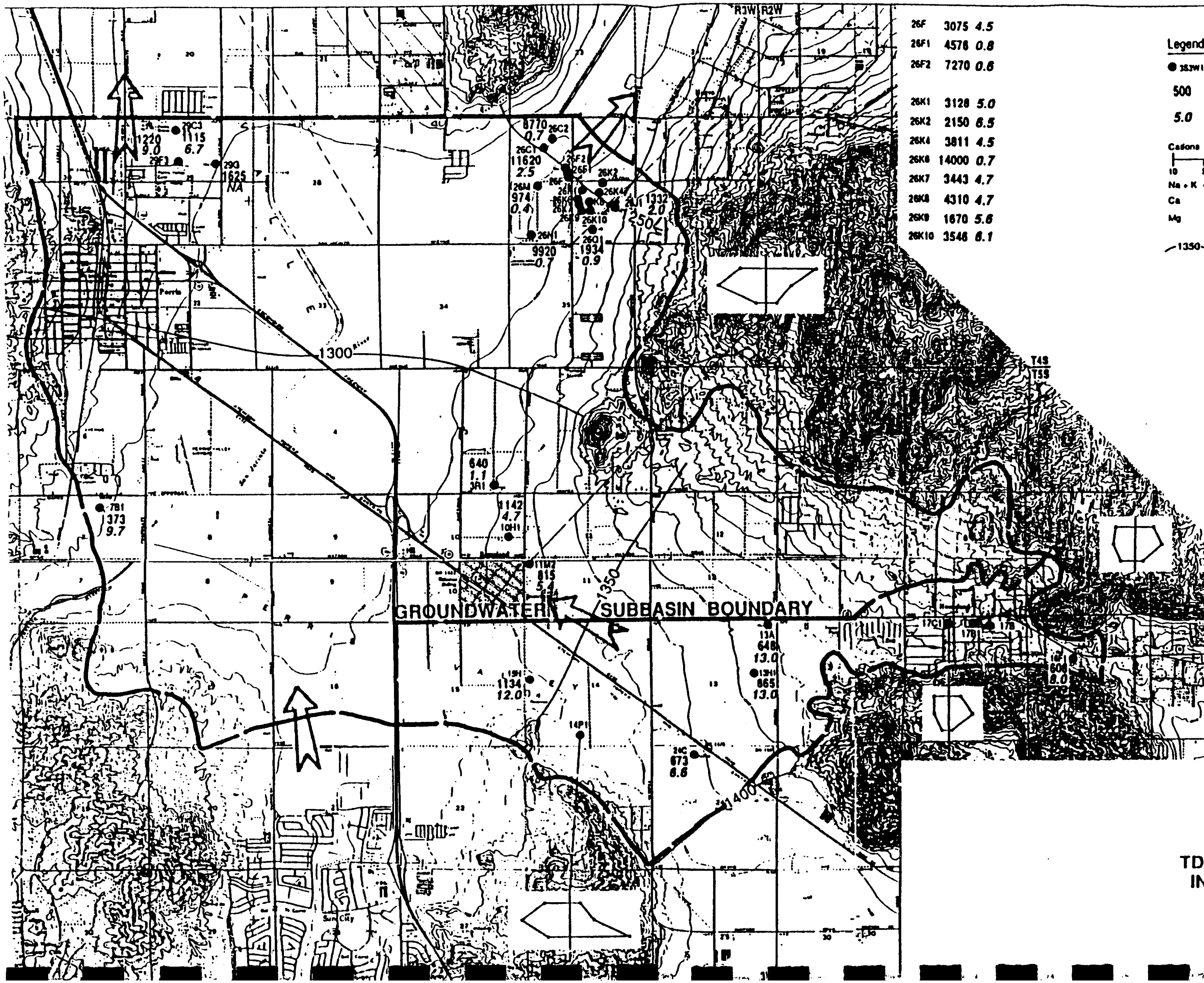


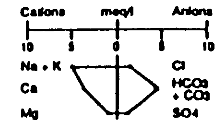
Figure 4-13
TDS, NITRATE, & GENERAL INORGANIC CHEMISTRY-PERRIS SOUTH-I & LAKEVIEW



26F	3075	4.5
26F1	4578	0.8
26F2	7270	0.6
26K1	3128	5.0
26K2	2150	6.5
26K4	3811	4.5
26K6	14000	0.7
26K7	3443	4.7
26K8	4310	4.7
26K9	1670	5.6
26K10	3546	6.1

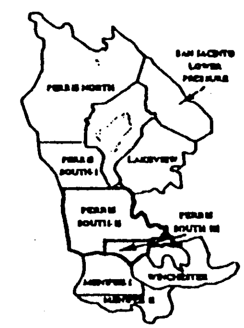
Legend:

- ● 3S3W1A Well location with State well ID
- 500 TDS concentration in mg/L
- *5.0* NO_3 (Nitrate) concentration in mg/L as Nitrogen



General Inorganic Chemistry

—1350— Approximate location of Groundwater Contour



SUBBASIN REFERENCE MAP
(NO SCALE)

N

0' 2000' 4000'

Scale: 1" = 4000'

Figure 4-14

TDS, NITRATE, & GENERAL INORGANIC CHEMISTRY-PERRIS SOUTH-II & PERRIS SOUTH-III

Mark J. Wildermuth

The poorest quality water is found near the San Jacinto River in the Perris South-II subbasin. This brackish water is believed to be the result of the large evapotranspiration losses incurred because of the high water table that existed in the past. As wells were abandoned because of this brackish water, pumping increased in the areas of better quality to the north and south. As a result, brackish water has spread out toward these areas. Thus, the TDS concentration of the groundwater has increased as water levels have declined in the areas north and south of the river. Figures 4-10, 4-11, and 4-12 illustrate TDS, nitrate and chloride trends in the Perris South subbasins. Figure 4-10 shows this increase in TDS concentration. The Ski Land area has anomalously high TDS concentrations ranging from 1,700 mg/L to 14,000 mg/L.

Menifee Subbasins

Figure 4-15 illustrates the TDS, nitrate and general inorganic chemistry of the Menifee-I and Menifee-II subbasins. Figure 4-15 is based on all available data and corresponds approximately to 1993 conditions.

Groundwater flow between Menifee and the adjacent subbasins is negligible. The volume of groundwater in storage for Menifee-I and Menifee-II is relatively small and is estimated at about 56,000 acre-ft (Table 4-2). Groundwater produced in these subbasins was, and is, used for agriculture and landscape irrigation. Returns from irrigation have contributed to increased mineral concentrations in these subbasins.

Under natural conditions, groundwater flowed toward Salt Creek from all directions and from Salt Creek westward, where high groundwater caused large evapotranspiration losses and concurrent salt buildup. In time, brackish water developed in these areas and, under normal conditions, remained close to the creek. TDS concentrations throughout the basin ranged from 300 to 1,500 mg/L in 1974, and have increased to range from 800 to 3,700 mg/L.

Most groundwater in the Menifee-I and Menifee-II subbasins cannot be used for domestic supply without demineralization or blending with imported water. Agricultural usage is somewhat limited due to high chloride and sodium concentrations.

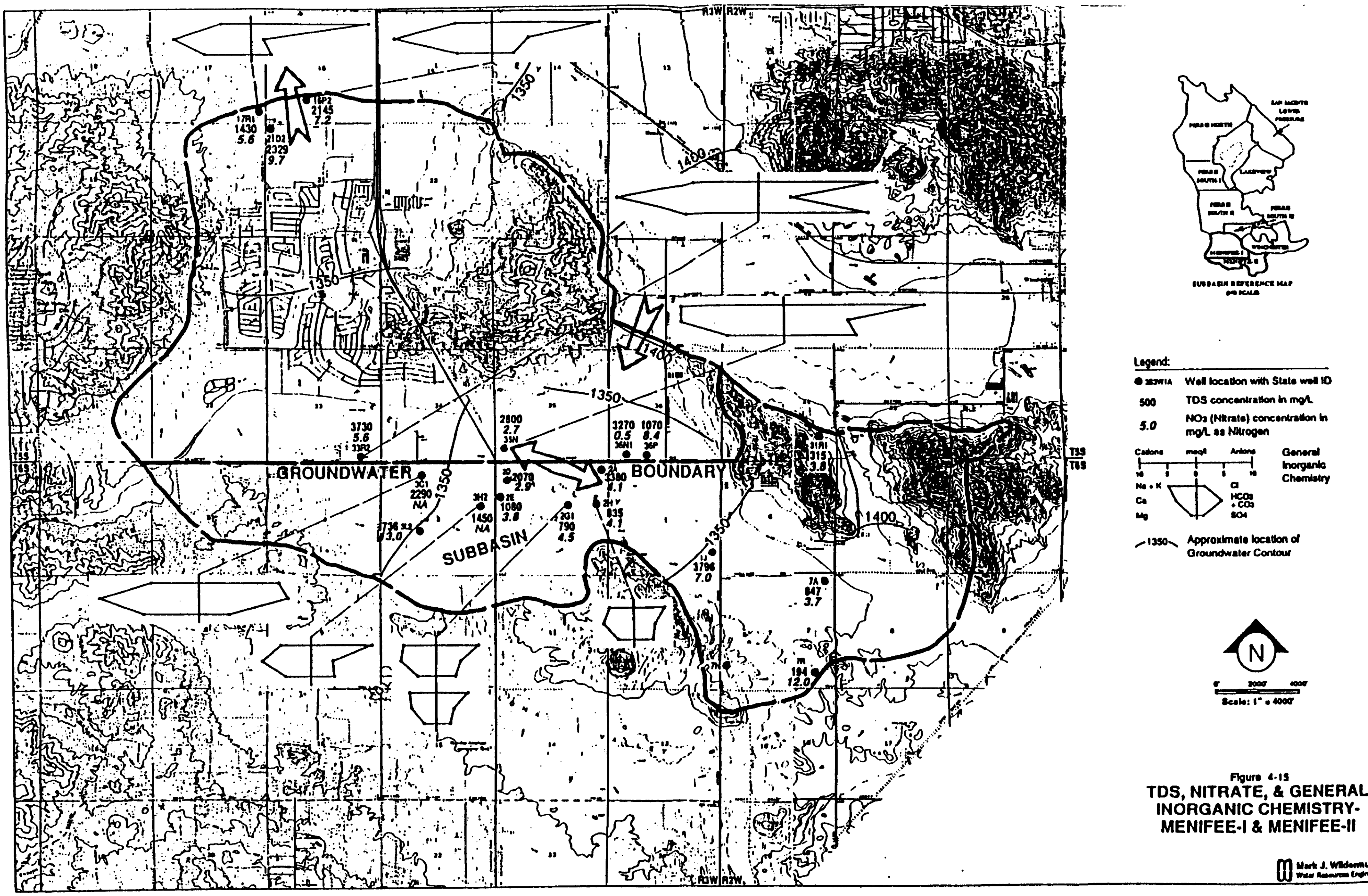


Figure 4-15
TDS, NITRATE, & GENERAL INORGANIC CHEMISTRY-MENIFEE-I & MENIFEE-II

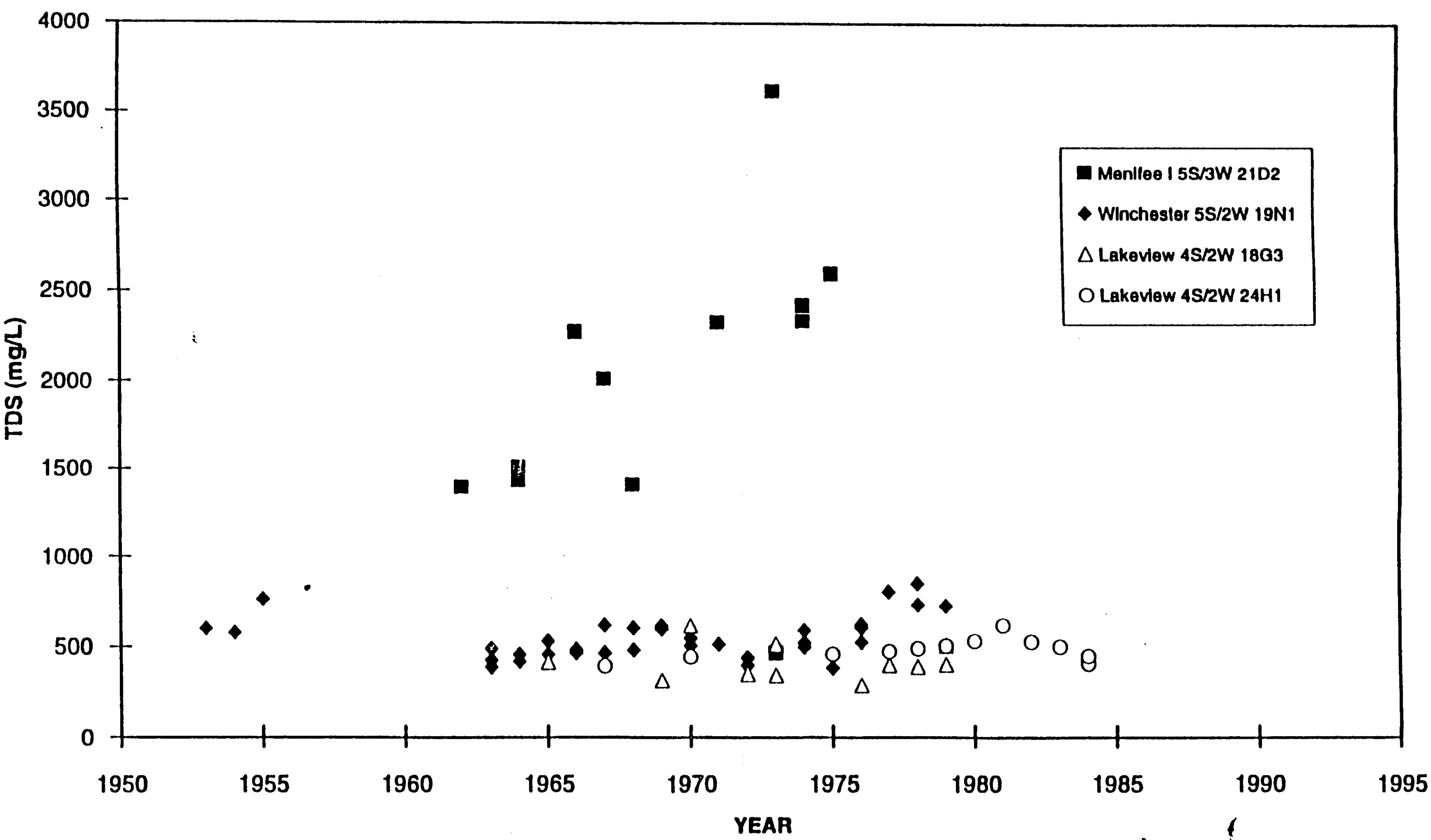
Lakeview Subbasin

Figure 4-13 illustrates the TDS, nitrate and general inorganic chemistry of the Lakeview subbasin. Figure 4-13 is based on all available data and corresponds approximately to 1993 conditions. Figures 4-16, 4-17 and 4-18 contain time histories for two wells in the Lakeview subbasin covering the period of 1957 to 1989.

The principle sources of groundwater in this basin are underflow from the San Jacinto Lower Pressure, Perris South I, Perris South II subbasins, stormflow percolation in San Jacinto Creek, and runoff from the Lakeview Mountains and Bernasconi Hills. Groundwater quality under natural conditions has been altered by a groundwater level drop of about 200 feet that has changed the direction of flow of groundwater. Groundwater flows toward Lakeview from all sides. Groundwater on the northwest and southeast sides of the basin has TDS concentrations of below 500 mg/L as a direct result of the recharge of the Bernasconi Hills and Lakeview Mountains, respectively. Brackish groundwater is entering from the Perris South-II subbasin because of lowered groundwater levels near Lakeview. The most conspicuous constituents of the brackish water are sodium and chloride. TDS concentrations range from 400 to 1,600 mg/L, with more typical values ranging from 400 to 600 mg/L. Nitrates range from 1 to 9 mg/L as nitrogen, with typical values less than 6 mg/L. Most of the groundwater in the basin is sodium chloride in character. The Casa Loma fault, which forms the eastern boundary of the basin, affects the quality of water in that area. Both boron and fluoride concentrations are relatively high near the fault and in a few other specific areas of the basin. Chloride is generally high and most of the groundwater is moderately hard.

With the exception of some instances of elevated fluoride, groundwater in the Lakeview subbasin is suitable for domestic and municipal supply. Agricultural usage is somewhat limited due to high boron and chloride concentrations.

FIGURE 4-16 TDS CONCENTRATION IN MENIFEE, WINCHESTER, LAKEVIEW BASINS



TDS Plot Men-Win-Lak
9/2/94
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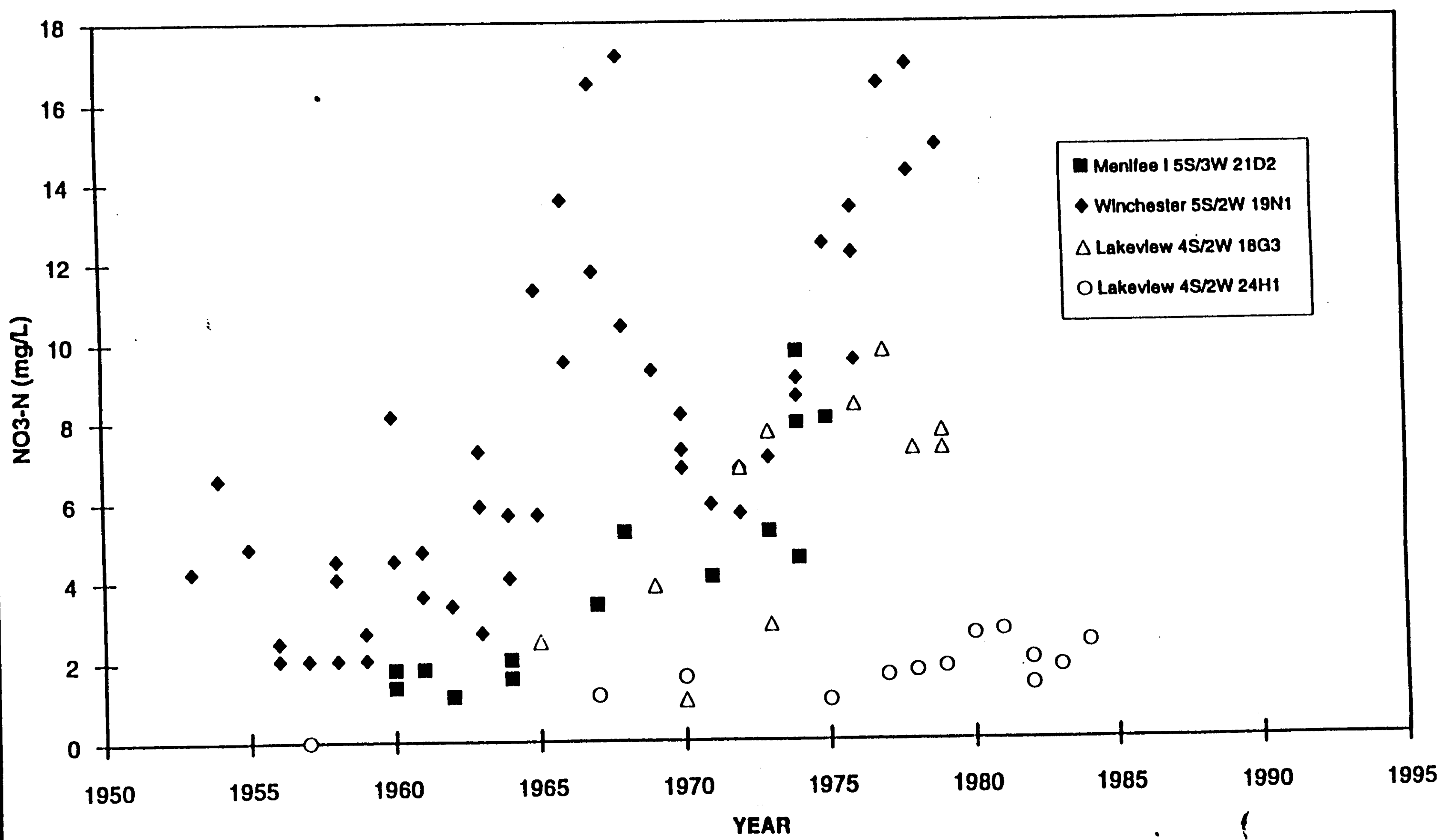
Mark J. Wildermuth
Water Resources Engineer

FIGURE 4-17 NITRATE-N CONCENTRATION MENIFEE I, WINCHESTER, AND LAKEVIEW BASINS



NO3 Plot Men-Win-Lak
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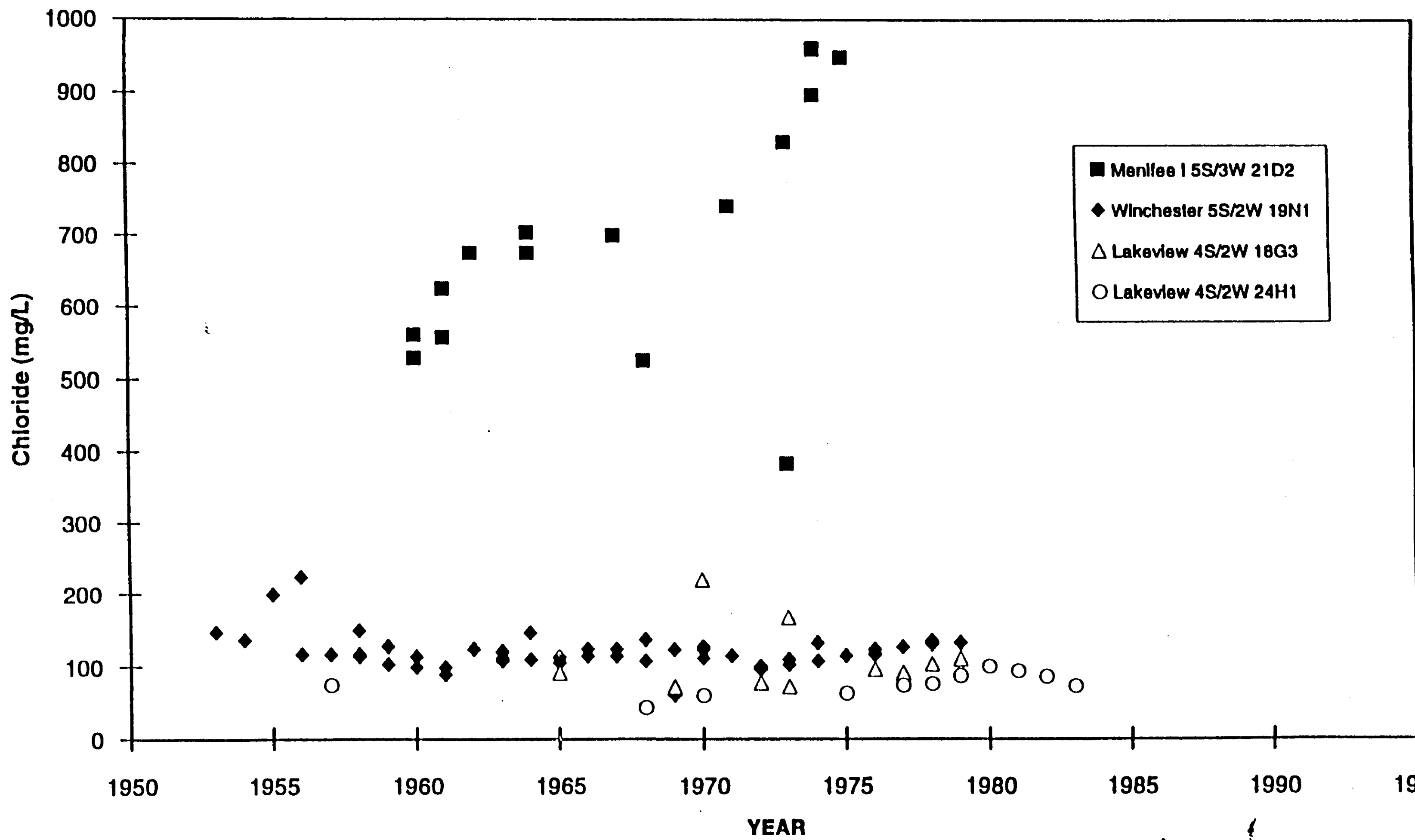
Mark J. Wildermuth
Water Resources Fngineer

FIGURE 4-18 CHLORIDE CONCENTRATION IN MENIFEE, WINCHESTER, AND LAKEVIEW BASINS



Chloride Plot Men-Win-Lak
9/2/94
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Mark J. Wildermuth
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Winchester Subbasin

Figure 4-19 illustrates the TDS, nitrate and general inorganic chemistry of the Winchester subbasin. Figure 4-19 is based on all available data and corresponds approximately to 1993 conditions. Winchester is the smallest of the groundwater basins, with about 36,000 acre-ft in storage and capacity of about 41,000 acre-ft. TDS concentrations range from 700 to 6,400 mg/L, with more typical values ranging from 1,000 to 3,000 mg/L. Nitrates range from 1 to 51 mg/L as nitrogen, with typical values ranging from 2 to 12 mg/L. TDS mapping in Figure 4-8 (California Department of Water Resources, 1978) indicates that brackish groundwater occurs in a half-mile-wide strip along the entire length of Salt Creek. This high TDS water is probably the result of evaporite deposits caused by past high-water-table conditions.

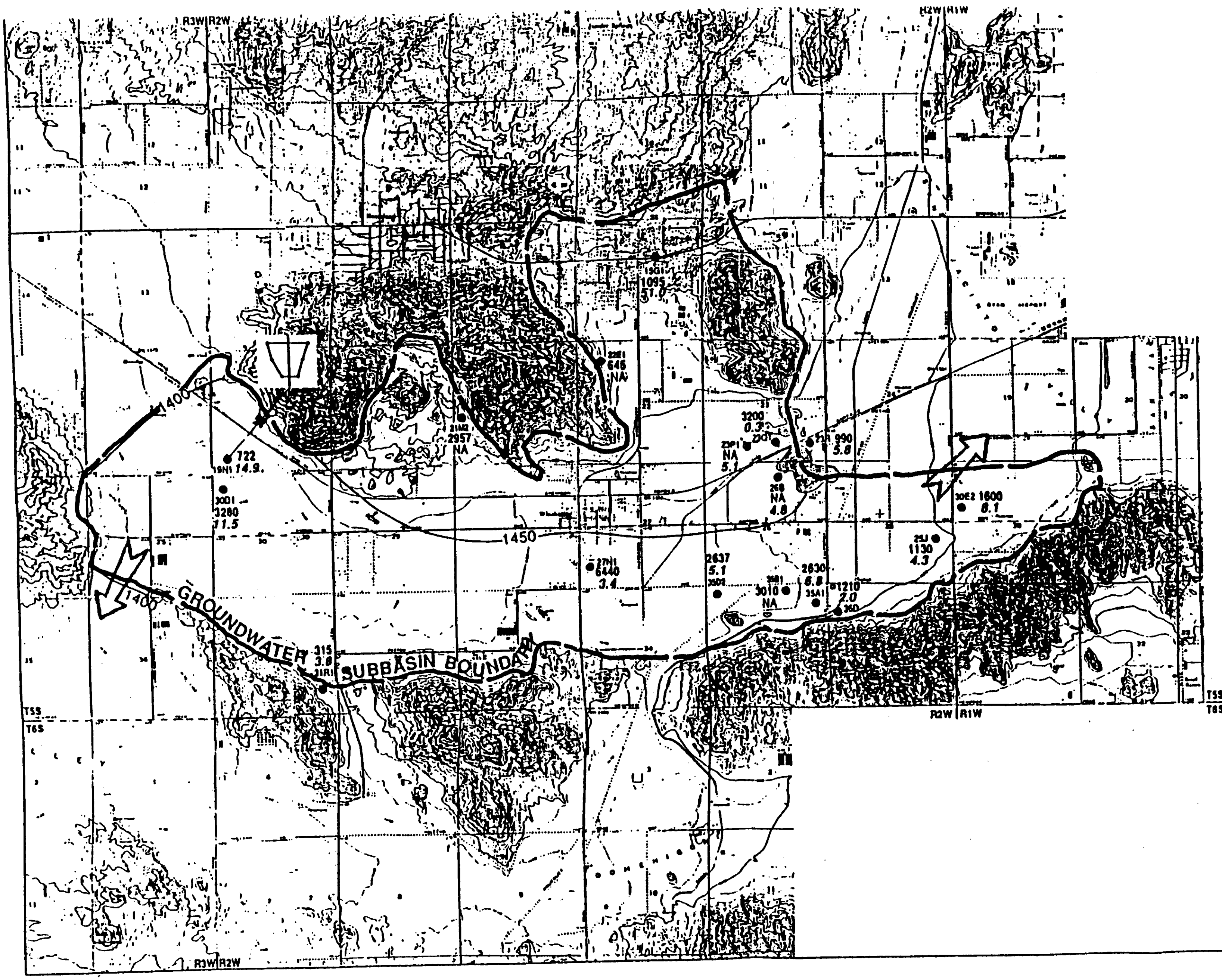
Under natural conditions, the primary source of recharge in the Winchester subbasin was subsurface inflow from the Hemet subbasin. The TDS in the subsurface inflow from the Hemet subbasin ranged from 500 to 1,000 mg/L. Currently, the Winchester subbasin flows into the Hemet subbasin causing groundwater degradation in that basin.

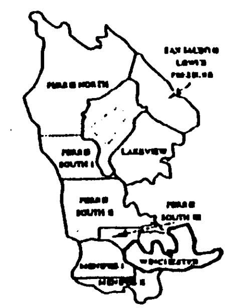
TDS, hardness and, occasionally, nitrate limit the use of Winchester groundwater for domestic purposes. Some groundwater in the Winchester subbasin cannot be used for municipal supply without demineralization. Agricultural usage is somewhat limited due to high boron and chloride concentrations.

San Jacinto Lower Pressure Subbasin

Figure 4-20 illustrates the TDS, nitrate and general inorganic chemistry of the San Jacinto Lower Pressure subbasin. Figure 4-20 is based on all available data and corresponds approximately to 1993 conditions. Water quality time histories could not be developed for this subbasin due to lack of data.

TDS concentrations in groundwater typically range from 500 to 1,500 mg/L. Nitrates range from near zero to 33 mg/L as nitrogen, with typical values less than 3 mg/L. Although data in the northwestern part of the subbasin are limited, the faults in the area appear to affect nearby groundwater because high boron and fluoride concentrations are found there.





SUBBASIN REFERENCE MAP
(NO SCALE)

Legend:

● 3E3W1A Well location with State well ID

500 TDS concentration in mg/L

5.0 NO₃ (Nitrate) concentration in mg/L as Nitrogen

Cations meq/l Anions — General Inorganic Chemistry
Na + K — Cl
Ca — HCO3 + CO3
Mg — SO4

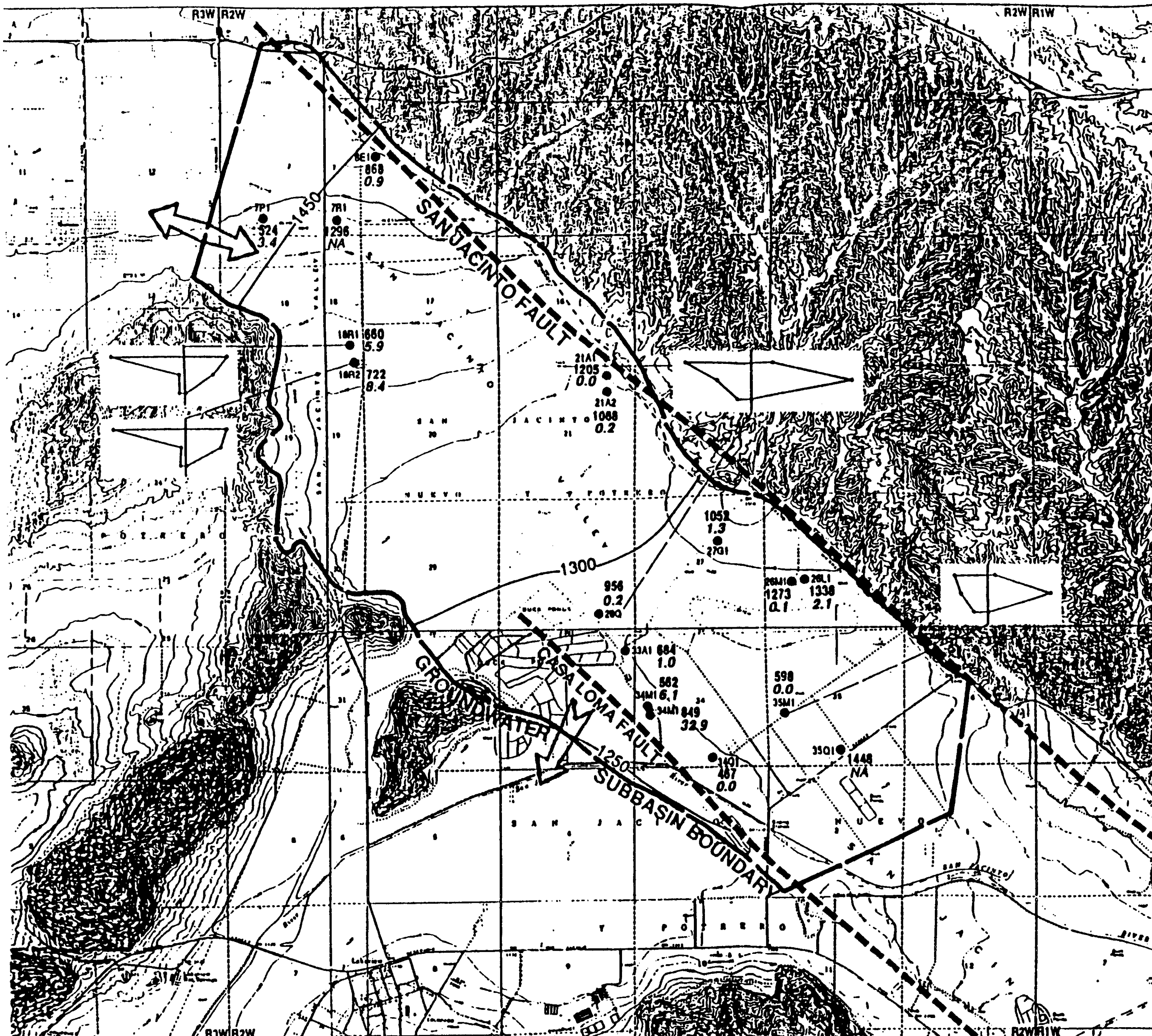
—1350— Approximate location of Groundwater Contour

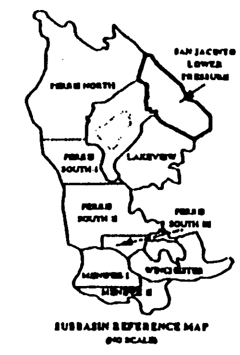
N

0' 2000' 4000'
Scale: 1" = 4000'

Figure 4-19
TDS, NITRATE, & GENERAL INORGANIC CHEMISTRY-WINCHESTER

Mark J. Wildermuth
Water Resources Engineer





Legend:

● 3S3W1A Well location with State well ID

500 TDS concentration in mg/L

5.0 NO_3 (Nitrate) concentration in mg/L as Nitrogen

Cations meq/l Anions — General Inorganic Chemistry

10 5 0 5 10

Na + K — Cl

Ca — HCO_3 + CO_3

Mg — SO_4

—1350— Approximate location of Groundwater Contour

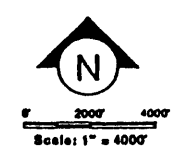


Figure 4-20

TDS, NITRATE, & GENERAL INORGANIC CHEMISTRY- SAN JACINTO LOWER PRESSURE

Mark J. Wildermuth Water Resources Engineer

FUTURE GROUNDWATER QUALITY

Future projections of groundwater quality in the West San Jacinto Groundwater basin were prepared by SAWPA as part of the *Nitrogen and TDS Studies, Santa Ana River Watershed* (James M. Montgomery, 1989). These studies developed future projections of TDS and nitrate by subbasin for the period 1990 through 2005. These estimates, however, are based on a model that:

- ❑ has not been calibrated for TDS or nitrate;
- ❑ each subbasin is represented by only one node and thus the resolution of the analysis is crude; and
- ❑ future water supply and wastewater plans that were used in these studies are not representative of the future.

Therefore, the results are questionable and not of much value as a management tool for the West San Jacinto Groundwater Basin.

There is a need for a planning tool to estimate the groundwater level and quality response to groundwater management practices. The planning tool would consist of groundwater flow and simulation models similar to those models that were developed and that are in current use to develop the Chino Basin Water Resources Management Plan (Montgomery Watson & Wildermuth, Mark J., 1992; Montgomery Watson & Wildermuth, Mark J., 1993).

SECTION 5

SECTION 5
FUTURE WATER DEMANDS AND WASTEWATER FLOWS

WATER DEMANDS AND SOURCES OF SUPPLY

Projected Demands

Projected Municipal Water demands for the West San Jacinto Groundwater Management area are listed in Table 5-1 and shown graphically in Figure 5-1. These estimates are based on land use and population projections and projected water use rates. The projections in Table 5-1 were developed by the planning staff of EMWD and represent an update of the water demand projections developed for the 1990 Water Facilities Master Plan (Black & Veatch, James M. Montgomery, Inc., 1990). Municipal demands in the West San Jacinto Groundwater Management Area range from 47,000 acre-ft/yr in 1995 (58 percent of total demand), to 112,000 acre-ft/yr in 2010.

Agricultural demands are based on land use and are projected to decline from about 33,200 acre-ft/yr in 1995, to 31,000 acre-ft/yr in 2010. In 1990, about eight percent of the imported water served by EMWD was delivered to agricultural users. Throughout the planning period we assumed that agricultural demands would be satisfied with groundwater and reclaimed water.

Sources of Supply

The sources of supply to the West San Jacinto Groundwater Management area include imported water from Metropolitan, groundwater, and reclaimed water.

Imported Water from Metropolitan. The quality of treated imported water is generally excellent and meets all drinking water regulations. TDS in Colorado River water and, occasionally, SWP water, causes TDS concentration in wastewater to exceed the TDS limit specified for wastewater plants. The TDS concentrations in water will increase from 200 to 300

TABLE 5-1
PROJECTIONS OF MUNICIPAL AND AGRICULTURAL DEMANDS
WEST SAN JACINTO GROUNDWATER BASIN

Year	Municipal Demands(1) (acre-ft/yr)	Agricultural Demands (acre-ft/yr)
1995	47,000	33,000
2000	63,000	32,000
2005	84,000	31,000
2010	112,000	31,000

Sources: (1) EMWD Projections 8/94

FIGURE 5-1 WATER DEMAND PROJECTIONS FOR THE WEST SAN JACINTO GROUNDWATER MANAGEMENT AREA

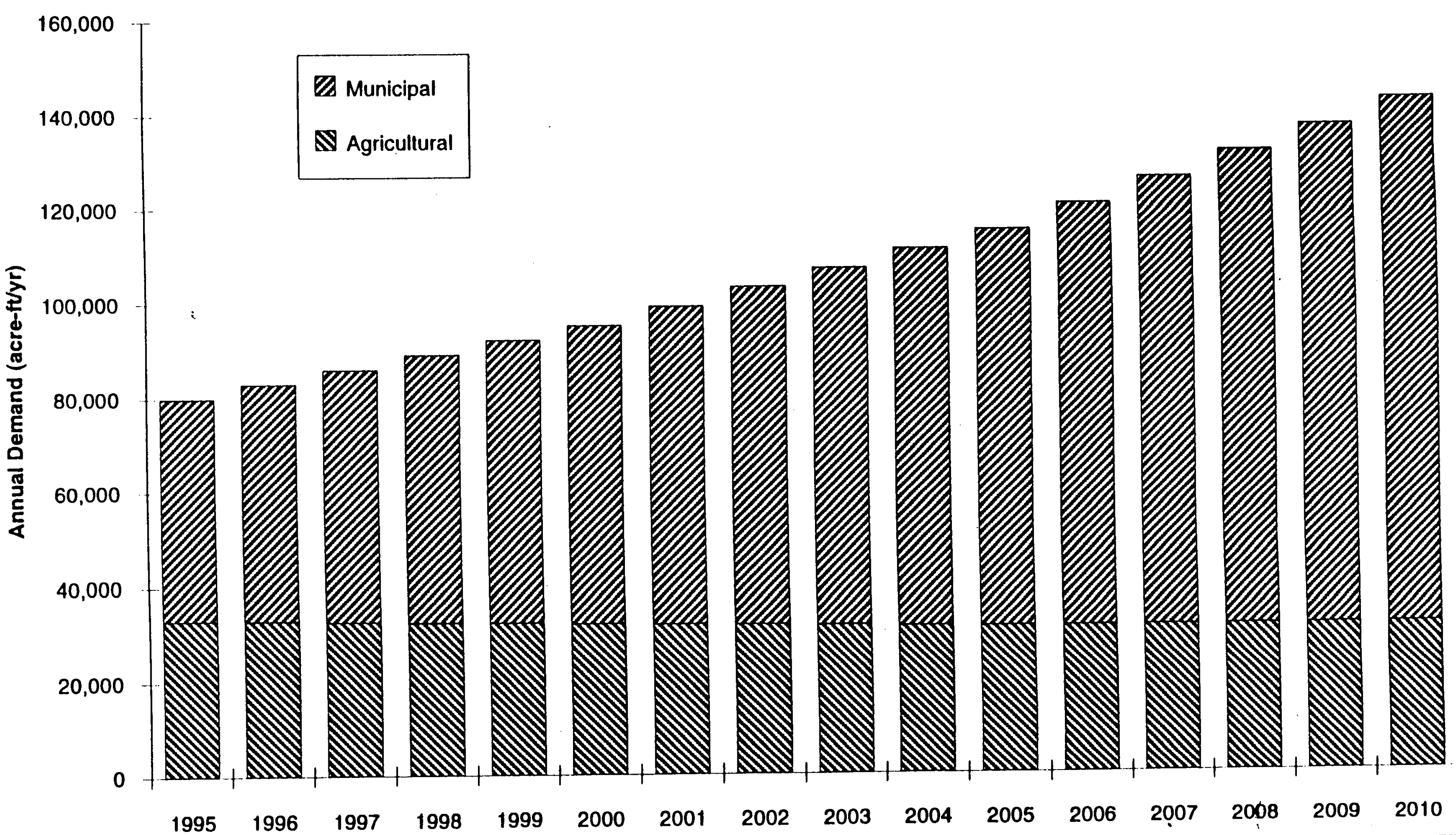


fig 5-1 Water Demands
9/2/94

Mark J. Wildermuth
Water Resources Engineer

mg/L through typical municipal use. Thus, if the average TDS concentration in a water supply is 400 mg/L, the TDS concentration in the resulting wastewater will be about 600 to 700 mg/L. The TDS limits for EMWD's reclamation plants and the TDS required in the water supply to meet the TDS limits are listed below.

Reclamation Plant	TDS Limit (mg/L)	Water Supply TDS in the Tributary Area (mg/L)
Hemet-San Jacinto	575	325
Moreno Valley	550	300
Perris Valley	825	575
Sun City	950	700
Temescal	700	450

Figure 5-2 shows the TDS concentration of SWP water and Colorado River water available from Metropolitan in the management area. The average TDS concentration for SWP water is about 250 mg/L for the period shown in Figure 5-2. The comparable average for Colorado River water is about 660 mg/L. SWP water can be used in the areas tributary to all five reclamation plants listed above without causing violations, with the exception of the Moreno Valley plant that would have TDS concentrations in excess of the TDS limitations about 29 percent of the time. The use of Colorado River water or other sources with high TDS could cause TDS violations to occur at all five plants.

Metropolitan adopted a schedule of projected water rate increases in 1991. The water rates established included:

- a base rate;
- a treatment surcharge, to be added to the base rate for purchases of treated water; and
- a seasonal discount for water produced from October 1 through April 30, to be subtracted from the base rate.

The goals of the seasonal discount are: to achieve greater conjunctive use of imported supplies and local supplies; encourage the construction of additional local production facilities; and reduce member agencies' dependence on Metropolitan deliveries during the summer months. Recently, Metropolitan announced water prices for 1993 and forecasted rates for the following ten years. The projected cost of imported water purchased from Metropolitan is listed in Table 5-2 and is shown graphically in Figure 5-3. Imported water costs after 2002 are assumed to increase 6 percent per year.

FIGURE 5-2 TDS OF IMPORTED SUPPLIES

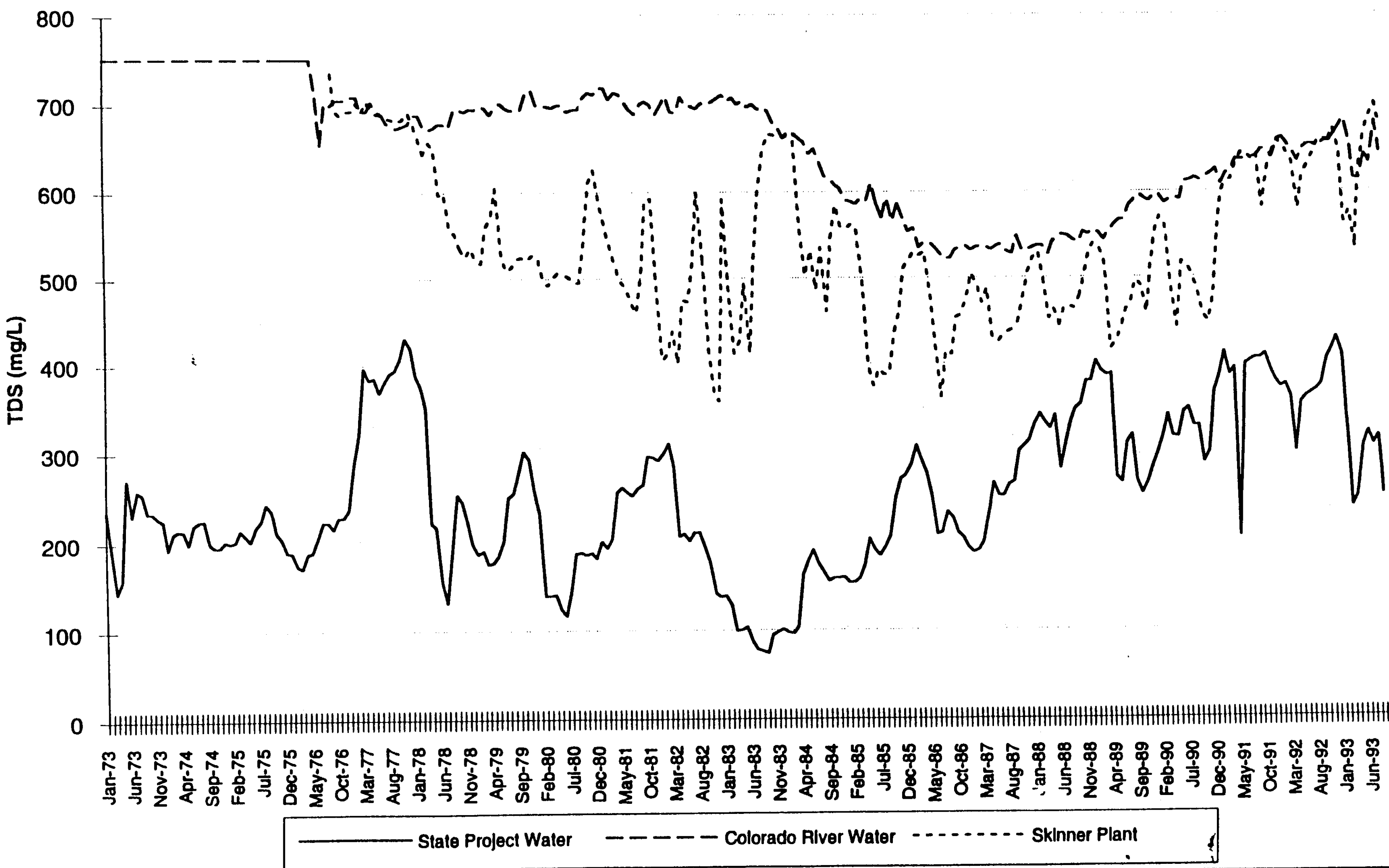


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TABLE 5-2
METROPOLITAN WATER RATE PROJECTIONS

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Year	Treatment Surcharge	Base Rate	Base Treated	Seasonal Storage (1) Untreated	Seasonal Storage (1) Treated
1994	$77	$335	$412	$222	$275
1995	$77	$377	$454	$256	$256
1996	$78	$405	$483	$278	$279
1997	$78	$437	$515	$304	$304
1998	$89	$456	$545	$319	$328
1999	$98	$480	$578	$338	$345
2000	$104	$509	$613	$361	$366
2001	$105	$544	$649	$389	$390
2002	$109	$579	$688	$417	$420
2003	$114	$616	$730	$447	$451
2004	$119	$654	$773	$477	$481
2005	$124	$696	$820	$511	$515
2006	$130	$739	$869	$545	$550
2007	$136	$785	$921	$582	$587
2008	$142	$834	$976	$621	$626
2009	$148	$887	$1,035	$664	$669
2010	$154	$943	$1,097	$708	$713

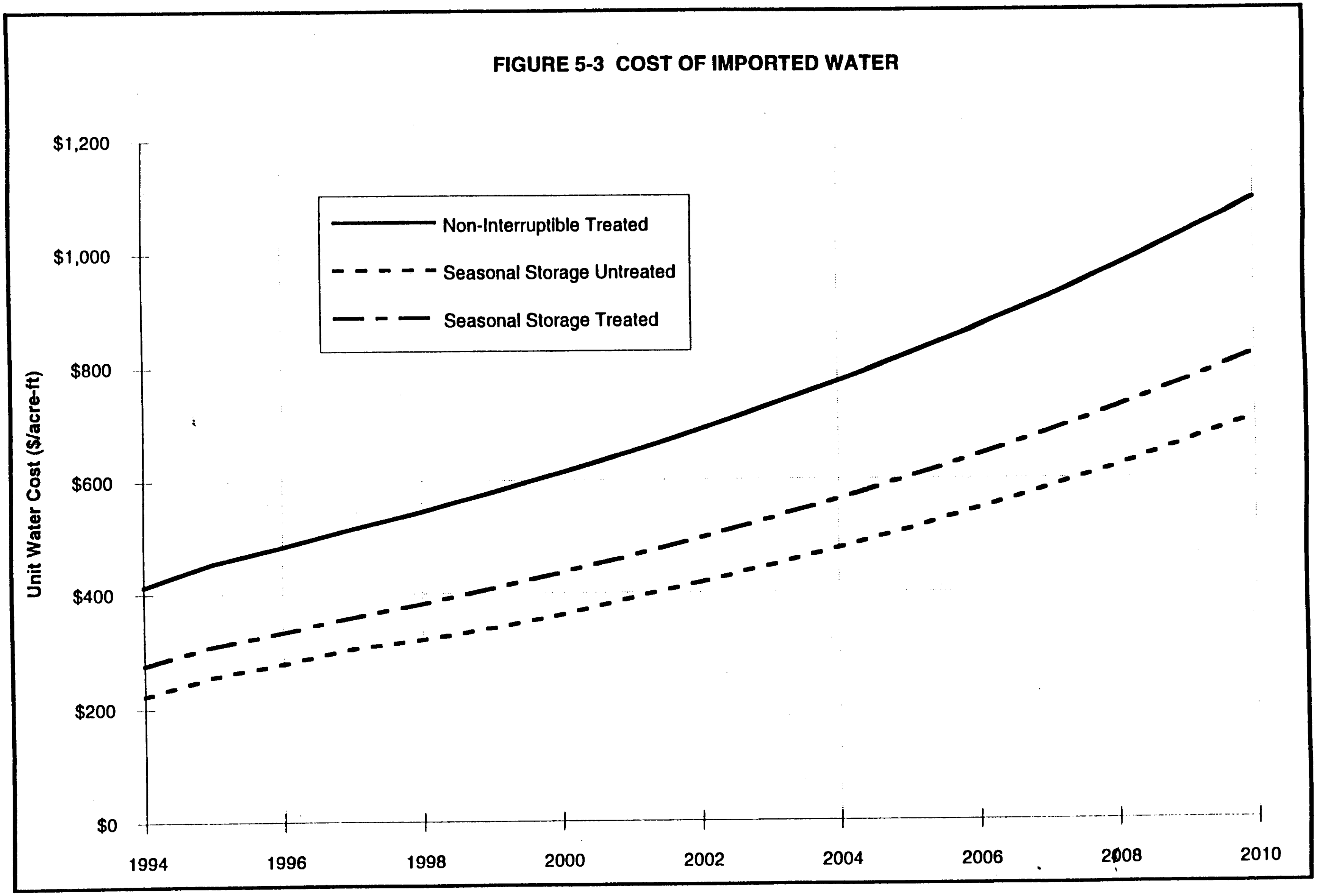
FIGURE 5-3 COST OF IMPORTED WATER
Non-Interruptible Treated
Seasonal Storage Untreated
Seasonal Storage Treated
Unit Water Cost ($/acre-ft)
$1,200
$1,000
$800
$600
$400
$200
$0
1994
1996
1998
2000
2002
2004
2006
2008
2010

Metropolitan is currently evaluating supply reliability for its service area (Metropolitan Water District of Southern California, 1994). Metropolitan is projecting that with year 2000 demands, shortages in retail supplies will occur at least four out of five years, with shortages up to 30 percent. By the year 2020, shortages will occur on average once in five years, with shortages up to 20 percent. The frequency and magnitude of retail shortages will be comparable for areas that depend heavily on Metropolitan.

Groundwater. Groundwater is available throughout the management area in that most of the management area overlies the West San Jacinto Basin. However, the quality of groundwater precludes the use of some of the management area groundwater for municipal supply. TDS and nitrate are the water quality constituents that limit the use of groundwater. TDS is regulated as a secondary standard. Secondary standards are for those substances that are not hazardous to health, but may cause taste, order, color, staining or other conditions that adversely affect the aesthetics of drinking water. The maximum contaminant level (MCL) for TDS is expressed as follows:

> *Recommended MCL* - 500 mg/L. TDS concentrations less than or equal to the *Recommended MCL* are desirable for a higher level of consumer acceptance.
>
> *Upper MCL* - 1,000 mg/L. TDS concentrations ranging up to the *Upper MCL* are acceptable if it is neither reasonable nor feasible to provide more suitable waters.
>
> *Short Term MCL* - 1,500 mg/L. TDS concentrations ranging up to the *Short Term MCL* are acceptable only for existing systems on a temporary basis, pending the construction of treatment facilities or the development of acceptable new water sources.

Nitrate is regulated under primary standards. The MCL for nitrate is 10 mg/L (as nitrogen). Table 5-3 lists the groundwater in storage, storage capacity, safe yield, and average TDS and nitrate concentrations for each groundwater subbasin in the management area. The subbasins are ranked in Table 5-3 from lowest to highest in TDS. From a drinking water perspective, approximately 36 percent of the yield of the West San Jacinto Basin could be developed from the Lakeview and Perris North subbasins for direct use, without additional treatment for TDS and nitrate. Some groundwater in the Perris South-I subbasin could also be used without treatment and San Jacinto Lower Pressure, Perris South-II and Perris South-III groundwater could be used

TABLE 5-3
AVAILABILITY OF GROUNDWATER IN THE WEST SAN JACINTO BASIN
YEAR 2000 CONDITIONS

Subbasin	Volume in Storage (acre-ft)	Storage Capacity (acre-ft)	Fraction of Groundwater in West San Jacinto Basin	Natural Safe Yield (acre-ft/yr)	Safe Yield with Wastewater Recharge (acre-ft/yr)	Fraction of Yield in West San Jacinto Basin	Average TDS Concentration (mg/L)	Average Nitrate Concentration (as Nitrogen) (mg/L)
Perris North	123,000	347,000	11%	13,700	19,500	41%	450	7
Lakeview	283,000	515,000	25%	6,800	6,800	14%	500	3
Perris South	248,000	402,000	22%	8,300	12,800	27%	920	5
San Jacinto Lower Pressure	382,000	391,000	34%	2,500	2,500	5%	1,000	4
Winchester	36,000	41,000	3%	1,600	1,800	4%	2,000	8
Menifee	56,000	101,000	5%	3,300	4,700	10%	2,250	6
Totals	1,128,000	1,797,000	100%	36,200	48,100	100%		
Average							891	5

if blended with SWP water. Groundwater from the Menifee-I, Menifee-II, Winchester and parts of the Perris South-II subbasins will require treatment if groundwater from these subbasins is to be used as a municipal drinking water supply. The treatment processes that would make these basins useful as a water supply source are blending with low TDS supplies such as SWP water, and demineralization. From a wastewater perspective, most of the groundwater in the West San Jacinto Basin would have to be treated prior to use as a municipal supply.

EMWD is currently designing a groundwater demineralization facility in the Menifee area. This facility will produce about 3 mgd (3,360 acre-ft/yr) of potable water for municipal use. The source water to the desalter will have a TDS of about 2,400 mg/L. The product water will have a TDS concentration of about 400 mg/L. This project will develop the full yield of the Menifee-I and Menifee-II subbasins for municipal use.

The cost to use groundwater, exclusive of treatment, includes capital cost and operations and maintenance costs. The capital cost for new municipal wells ranges from about $400,000 to $500,000. This is equivalent to about $32 per acre-ft, assuming a 1,500 gpm well (2,420 acre-ft/yr), six percent amortization rate, 20-year amortization period and 50% usage. Fixed operating and maintenance costs are about $6 per acre-ft. Power costs vary according to lift and pumping plant efficiency. The cost for a pumping lift of 200 feet and overall plant efficiency of 60 percent is about $30 per acre-ft. Thus, the total cost to produce groundwater for a 1,500-gpm well, operating year round with a total lift of 200 feet would be about $68 per acre-ft.

Reclaimed Water. Currently, EMWD is in a phased process of implementing a reclaimed water distribution plan that will make reclaimed water available throughout the management area. The reclaimed water system consists of five reclamation plants and about 79 miles of backbone distribution pipelines. Figure 5-4 shows the layout of the pipelines and the location of reclamation plants. Table 5-4 shows the projections of the availability of reclaimed water during the planning period. Reclaimed water sources include the discharge of up to 30 mgd or 33,600 acre-ft/yr of reclaimed water from the city of San Bernardino. The TDS of reclaimed water from San Bernardino is projected to range between 480 mg/L to 500 mg/L, which is lower than any of the reclaimed water generated in EMWD. The use of reclaimed water replaces non-potable demand on groundwater and imported supplies.

For this study, we have assumed the cost of producing and distributing reclaimed water in the EMWD service area to be a sunk cost. EMWD must treat and dispose of reclaimed water. The

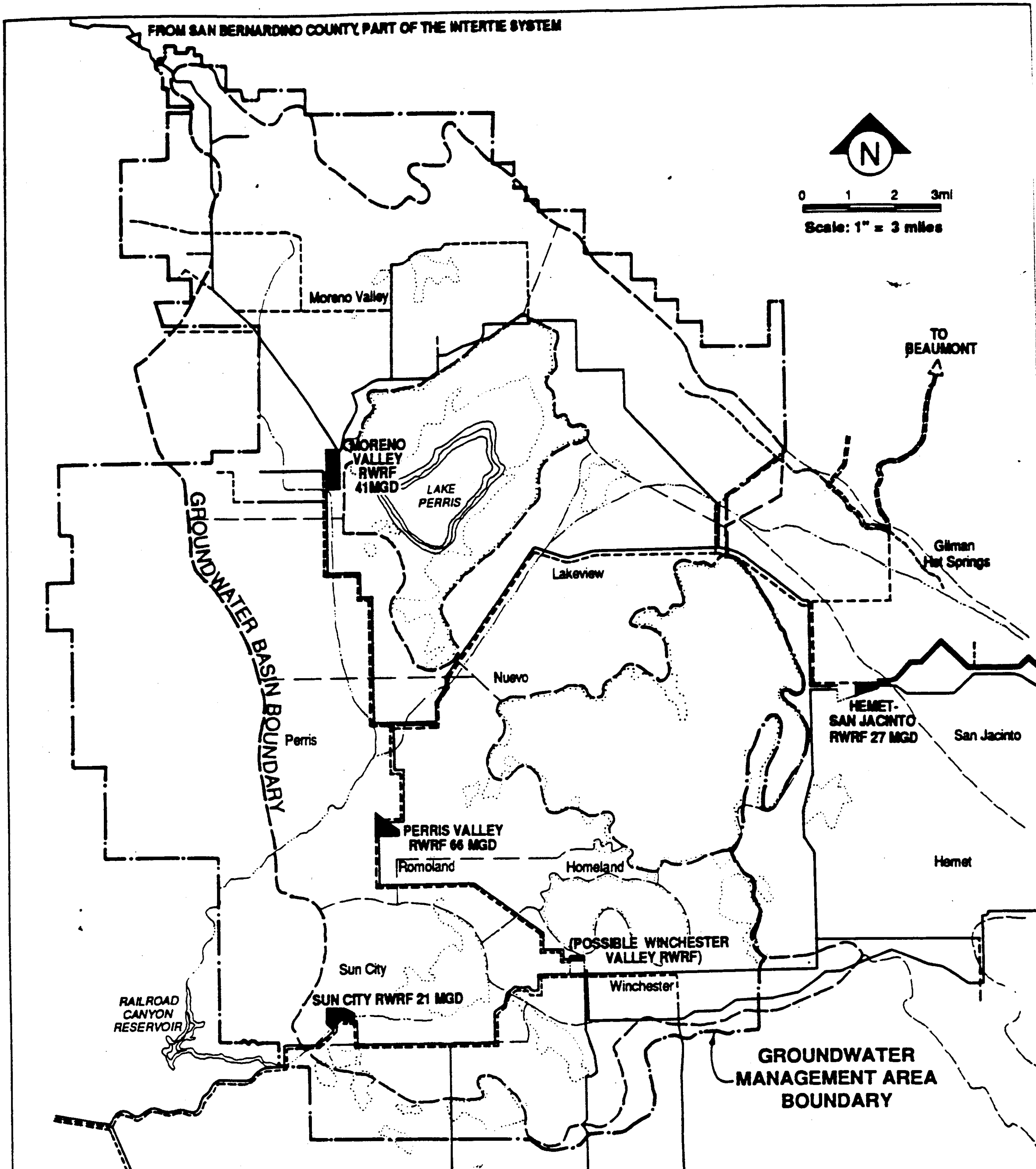

Figure 5-4

ULTIMATE RECLAIMED WATER SYSTEM

LEGEND:

—— EXISTING RECLAIMED WATER SYSTEM (CONSTRUCTED OR DESIGNED)

- - - - ULTIMATE RECLAIMED WATER SYSTEM

■ RWRF LOCATION, WITH ULTIMATE CAPACITY

REFERENCE: EMWD RECLAIMED WATER FACILITIES MASTER PLAN, 1993. (DOCUMENT FILE NAME: DFILEOIN.DGN, REV. 8/93)

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TABLE 5-4
PROJECTED RECLAIMED WATER FLOWS
(acre-ft/yr)

Reclamation Plant	1995	2000	2005	2010
Moreno Valley	10,328	15,274	20,435	25,597
Perris Valley	8,110	11,994	16,041	20,089
Sun city	2,532	3,750	5,013	6,275
Temecula Valley (1)	5,332	7,897	10,558	13,219
Hemet-San Jacinto (1)	5,646	8,343	11,165	13,987
Subtotal	31,947	47,258	63,213	79,167
San Bernardino (2)	0	11,201	12,322	20,723
Totals	31,947	58,459	75,534	99,890

Sources: Wastewater Facilities Master Plan Black & Veatch and James M. Montgomery, 1990; Projected Water Demands and Planned Storage for the Years 1995 to 2005, Eastern Municipal Water District, 1993.

Note - (1) Reclaimed water from outside of West San Jacinto Groundwater Basin management area.
(2) Reclaimed water pumped to EMWD from city of San Bernardino.

cost of the reclaimed water distribution system is the cost of disposal. The value of the reclaimed water as a resource to non-potable water users is equal to their next least costly source of water. For a farmer, the value of the reclaimed water is approximately the same as the cost to produce groundwater. A typical 1,000 gpm agricultural well cost would be about $250,000. Assuming the well is operated half the year, the amortization cost is about $27 per acre-ft. Total operation and maintenance costs would be about $36 per acre-ft for a total lift of 200 feet. The total cost of operating a well for an agricultural supply is about $63 per acre-ft. These costs would be about the same for industrial and large urban landscape users. These costs vary with depth to groundwater and location in the study area.

WATER SUPPLY PLAN WITHOUT GROUNDWATER MANAGEMENT PLAN

The water supply plan for the management area, in the absence of a groundwater management plan, consists of the use of imported water for all municipal uses and a combination of groundwater and reclaimed water for agricultural uses. All agricultural demands would be satisfied with reclaimed water by the year 2010. The Menifee desalter would be operational in 1997, producing about 3,360 acre-ft/yr. The water supply plan for the management area is listed in Table 5-5. Groundwater usage in 1995 is estimated to range from 26,600 acre-ft/yr (33 percent of total supply) in 1995, to 28,000 acre-ft/yr by 2010 (19 percent of total supply). The Menifee desalter will require about 4,200 acre-ft/yr of groundwater to produce 3,360 acre-ft/yr of product water.

Imported water use in the management area is projected to range from about 44,500 acre-ft/yr (56 percent of total supply) in 1995, to 103,000 acre-ft/yr (72 percent of total supply) by the year 2010. Imported water is used for municipal purposes only. Reclaimed water use in the management area is projected to range from about 8,900 acre-ft/yr (11 percent of total supply) in 1995, to 11,900 acre-ft/yr (8 percent of total supply) by the year 2010. Reclaimed water would be used for agricultural and non-potable municipal purposes.

The cost of this water supply plan, exclusive of the distribution costs, is summarized in Table 5-6. Table 5-6 shows the annual demand, supplies by source and cost of each source in terms of annual cost, total annual cost and present value of all cost over the 1995 to 2010 planning period. The fractions of total supply and total supply cost by source are listed below.

TABLE 5-5
WATER SUPPLY PLAN IN THE ABSENCE OF A GROUNDWATER MANAGEMENT PLAN
(acre-ft/yr)

Year	1995		2000		2005		2010	
	Volume	Fraction	Volume	Fraction	Volume	Fraction	Volume	Fraction
Municipal Demand	47,000	100%	63,000	100%	84,000	100%	112,000	100%
Imported Water	44,500	95%	56,140	89%	76,140	91%	103,140	92%
Menifee Desalter	0	0%	3,360	5%	3,360	4%	3,360	3%
Reclaimed Water	0	0%	1,000	2%	2,000	2%	3,000	3%
Groundwater	2,500	5%	2,500	4%	2,500	3%	2,500	2%
Agricultural Demand	33,000	100%	32,000	100%	31,000	100%	31,000	100%
Reclaimed Water	8,900	27%	8,900	28%	8,900	29%	8,900	29%
Groundwater	24,100	73%	23,100	72%	22,100	71%	22,100	71%
Total Demand	80,000	100%	95,000	100%	115,000	100%	143,000	100%
Imported Water	44,500	56%	56,140	59%	76,140	66%	103,140	72%
Menifee Desalter (1	0	0%	3,360	4%	3,360	3%	3,360	2%
Reclaimed Water	8,900	11%	9,900	10%	10,900	9%	11,900	8%
Groundwater (2)	26,600	33%	25,600	27%	24,600	21%	24,600	17%

note - (1) actual groundwater production for the Menifee desalter will be about 4,200 acre-ft/yr with 3,360 acre-ft/yr of potable water and 1,840 acre-ft/yr.

TABLE 5-6
COST OF WATER SUPPLY FOR THE WEST SAN JACINTO GROUNDWATER BASIN MANAGEMENT AREA
WITHOUT A GROUNDWATER MANAGMENT PLAN

Year	Demand	Imported Water			Reclaimed Water			Groundwater: Menifee Desalter			Groundwater: Agricultural Use			Groundwater: Municipal Use			Total Cost of Groundwater Production	Total Cost	Composite Unit Cost of Supply
		Volume	Rate	Cost	Volume	Rate	Cost	Volume	Rate	Cost	Volume	Rate	Cost	Volume	Rate	Cost			
	(acre-ft/yr)	(acre-ft/yr)	($/acre-ft)	($)	(acre-ft/yr)	($/acre-ft)	($)	(acre-ft/yr)	($/acre-ft)	($)	(acre-ft/yr)	($/acre-ft)	($)	(acre-ft/yr)	($/acre-ft)	($)	($)	($)	($/acre-ft)
1995	80,000	44,500	$454	$20,203,000	8,900	$63	$560,700	0	$501	$0	24,100	$63	$1,518,300	2,500	$68	$170,000	$1,688,300	$22,452,000	$281
1996	83,000	47,500	$483	$22,942,500	9,100	$66	$596,232	0	$516	$0	23,900	$66	$1,565,928	2,500	$71	$176,800	$1,742,728	$25,281,460	$305
1997	86,000	47,140	$515	$24,277,100	9,300	$68	$633,709	3,360	$532	$1,787,520	23,700	$68	$1,614,937	2,500	$74	$183,872	$3,586,329	$28,497,138	$331
1998	89,000	50,140	$545	$27,326,300	9,500	$71	$673,231	3,360	$549	$1,844,640	23,500	$71	$1,665,361	2,500	$76	$191,227	$3,701,228	$31,700,759	$356
1999	92,000	53,140	$578	$30,714,920	9,700	$74	$714,901	3,360	$578	$1,942,080	23,300	$74	$1,717,235	2,500	$80	$198,876	$3,858,191	$35,288,012	$384
2000	95,000	56,140	$613	$34,413,748	9,900	$77	$758,826	3,360	$613	$2,059,752	23,100	$77	$1,770,595	2,500	$83	$206,831	$4,037,178	$39,209,752	$413
2001	99,000	60,140	$649	$39,030,784	10,100	$80	$805,122	3,360	$649	$2,180,716	22,900	$80	$1,825,476	2,500	$86	$215,104	$4,221,296	$44,057,202	$445
2002	103,000	64,140	$688	$44,128,240	10,300	$83	$853,908	3,360	$688	$2,311,760	22,700	$83	$1,881,914	2,500	$89	$223,708	$4,417,383	$49,399,531	$480
2003	107,000	68,140	$730	$49,742,115	10,500	$86	$905,308	3,360	$730	$2,452,885	22,500	$86	$1,939,947	2,500	$93	$232,657	$4,625,489	$55,272,912	$517
2004	111,000	72,140	$773	$55,764,130	10,700	$90	$959,454	3,360	$773	$2,597,370	22,300	$90	$1,999,611	2,500	$97	$241,963	$4,838,944	$61,562,528	$555
2005	115,000	76,140	$820	$62,434,704	10,900	$93	$1,016,484	3,360	$820	$2,755,296	22,100	$93	$2,060,944	2,500	$101	$251,642	$5,067,882	$68,519,069	$596
2006	120,600	81,540	$869	$70,858,158	11,100	$97	$1,076,540	3,360	$869	$2,919,942	22,100	$97	$2,143,382	2,500	$105	$261,707	$5,325,031	$77,259,729	$641
2007	126,200	86,940	$921	$80,071,632	11,300	$101	$1,139,775	3,360	$921	$3,094,668	22,100	$101	$2,229,117	2,500	$109	$272,175	$5,595,960	$86,807,367	$688
2008	131,800	92,340	$976	$90,123,726	11,500	$105	$1,206,346	3,360	$976	$3,279,474	22,100	$105	$2,318,282	2,500	$113	$283,062	$5,880,819	$97,210,890	$738
2009	137,400	97,740	$1,035	$101,160,779	11,700	$109	$1,276,419	3,360	$1,017	$3,417,239	22,100	$109	$2,411,013	2,500	$118	$294,385	$6,122,637	$108,559,835	$790
2010	143,000	103,140	$1,097	$113,144,452	11,900	$113	$1,350,167	3,360	$1,041	$3,497,882	22,100	$113	$2,507,454	2,500	$122	$306,160	$6,311,496	$120,806,115	$845
Total Volume	1,719,000	1,100,959			166,400			47,041			364,600			40,000					
Fraction of Total	100%	64%			10%			3%			21%			. 2%					
Total Cost				$866,336,287			$14,527,124			$36,141,224			$31,169,495					$951,884,301	
Fraction of Total				91%			2%			4%			3%						
Present Value																		$556,663,649.25	

Table 5-6
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Mark J. Wildern
Water Resources Engr

Source	Fraction of Total Supply	Fraction of Total Supply Cost
Imported Water	64%	91%
Reclaimed Water	10%	2%
Menifee Desalter	3%	4%
Groundwater	23%	3%

The most expensive water in the supply plan is Menifee desalter water, ranging from $532 to $1,041 per acre-ft over the planning period. The second most expensive water in the supply plan is imported water, ranging from $454 to $1097 per acre-ft over the planning period. The cost of reclaimed water and groundwater are about one-tenth that of imported water, ranging from about $63 to $122 per acre-ft over the planning period. From a purely economic viewpoint, the cost of future supplies could be reduced if more groundwater and reclaimed water can be used for municipal supplies. The present value cost of future water supplies in the management area, exclusive of new pipelines, pump stations and reservoirs, is about $557,000,000 for the period of 1995 to 2010.

SECTION 6

SECTION 6
GROUNDWATER MANAGEMENT GOALS

The mission statement of EMWD is:

> ***The mission of the Eastern Municipal Water District is to deliver a dependable supply of safe, quality water and provide sewage collection services to its customers in an economical, efficient and publicly responsible manner.***

The water supply part of EMWD's mission statement is a goal shared by all purveyors of water in the West San Jacinto Groundwater Basin management area. Groundwater, as a potentially important part of the water supply in the management area, should be incorporated into the water supply plans of the management area. The safe yield of the West San Jacinto Basin is about 32,000 acre-ft/yr. Projections of groundwater usage in the management area range from about 30,000 acre-ft/yr in 1995, to 28,000 acre-ft/yr in 2010.

Agricultural groundwater use will decrease slightly in the future, from about 24,100 acre-ft/yr to 22,100 acre-ft/yr, as agricultural lands are converted to urban uses. Remaining agricultural water demand will be converted to reclaimed water. The need for potable water will increase dramatically in the future. Potable water demands in the management area will range from 69,600 acre-ft/yr in 1995, to 167,000 acre-ft/yr by 2010.

Most of the new potable demand will be met from treated imported water purchased from Metropolitan. Metropolitan's supplies are projected to increase in cost about 142 percent over the 1995 to 2010 planning period, from $454 per acre-ft in 1995, to $1097 per acre-ft in 2010. Metropolitan's supply is also not entirely reliable. For year 2000 demands, Metropolitan has projected shortages in four years out of five years, ranging from 10 to 30 percent.

There are many private groundwater producers in the management area that do not rely on EMWD for water supply. The negative impacts, if any, of a groundwater management plan on these users must be minimized; and the ability of these groundwater producers to continue producing groundwater for beneficial use must be preserved or equitably replaced.

Based on the above comments, the goal of the groundwater management plan is to

> ***maximize the use of groundwater for potable demands in such a way as to lower the cost of water supply and to improve the reliability of the total water supply for all water users in the West San Jacinto Groundwater Basin Management area.***

There are several elements that could go into the management plan to achieve this goal. The next section describes these elements.

SECTION 7

SECTION 7
ELEMENTS OF GROUNDWATER MANAGEMENT PLAN

This section describes the features or elements that can be used to build a groundwater management plan that is consistent with the management plan goal described in Section 6 and A.B. 3030. These elements include: new management policies, yield enhancement programs, conjunctive use, and the exchange of agricultural and other non-potable water users from groundwater to reclaimed water. These elements are described below.

MANAGEMENT POLICY ELEMENTS

Management policy elements consist of developing and implementing policies, regulations and coordinated activities among the groundwater producers. Currently, there is no routine monitoring of groundwater production, groundwater level and groundwater quality in the management area. There are no programs or institutions that routinely collect and review these data. There are no management tools available to forecast the impact of existing and future groundwater management practices. Consequently, there is little information available to site new groundwater recharge and extraction facilities.

Currently, there is no coordination or oversight of well construction in the management area. There is no systematic plan to manage unused and obsolete wells. The management plan needs to include policies to manage well construction and to ensure their destruction when wells become obsolete.

Monitoring of Groundwater Production, Groundwater Levels and Groundwater Quality

Groundwater Production. There is very little reported groundwater production data in the management area. The reported groundwater production volumes for the period ranged from 6,000 to 13,000 acre-ft/yr during the five-year period of 1987 to 1991 (see table 4-3). The 1991 estimate of agricultural demand in the management area, based on land use, is about 33,200 acre-ft/yr, of which about 27,000 acre-ft is estimated to be satisfied with groundwater. Groundwater production needs to be limited to the long term safe-yield of the management area and, locally, to the safe yield of the individual subbasins in the management area. Temporary overdraft could be allowed and, occasionally, encouraged during periods of imported supply shortages, as long as there is a way to replenish the overdraft. Uncontrolled overdraft, similar to that which occurred prior to the mid 1970's, will cause groundwater levels to drop, some wells to dry up, increase the cost of producing groundwater and lead to groundwater quality degradation. Therefore, it is important to obtain accurate information on groundwater production volume and to make a determination of the hydrologic balance for each subbasin in the management area.

Groundwater Level and Quality Monitoring. The monitoring of groundwater level (or storage) data includes the routine collection and review of groundwater level data to determine the hydraulic and volumetric response of the groundwater basin to groundwater management activities and climate. The monitoring of groundwater quality includes the collection and review of groundwater quality data that can be used to assess current and future trends in groundwater quality, and to evaluate groundwater quality response to groundwater management activities and climate.

Administration and Monitoring of Well Construction

Monitoring of Well Construction. The monitoring of well construction and location is extremely important to the understanding of current groundwater conditions and for future groundwater development. Well construction information includes the size and design of the well, lithology and aquifer test data. These data are necessary for the interpretation of groundwater production, level and quality data; and the evaluation of the aquifer as a source of supply. For the management plan, all these data should be collected, digitized and placed into a data base for future use. EMWD is in the process of completion of this data base for most of the existing wells in the management area. These data would be made available to all groundwater producers so that the producers can more reliably construct and operate new wells. These data would be used in future groundwater studies.

Administration of Well Construction Policies. Poor well construction can lead to groundwater contamination and excessive drawdown. Contamination can occur from inadequate sanitary seals, location of wells in, or near, contaminated groundwater, and cross contamination.

Excessive drawdown could be caused by over-extraction, interference from other adjacent wells or poor aquifer properties. Policies need to be developed that:

- Specify criteria that will be used to locate wells. Well location criteria would be established to ensure that new wells do not contribute to groundwater quality degradation. The intent of this policy is to minimize the redirection and acceleration of known contaminated groundwater to areas of potable supply.

- Develop minimum well construction standards. Minimum well construction standards would be developed based on existing state and county standards and additional standards that will be unique to the management area.

- Review and approval of proposed new well locations and well designs. The intent of the policy is to protect groundwater quality consistents with well siting criteria and construction standards.

Administration of Well Abandonment and Destruction Program

There are many obsolete and unused wells in the management area that are potentially useful for future production and monitoring of groundwater levels and quality. Unused wells could also be a source of contamination. Illegal disposal of wastes sometimes occurs in unused wells. Cross contamination between aquifers can occur through wells when contaminated groundwater in one aquifer flows into a well, vertically, through the casing and out of the well into an uncontaminated aquifer. The management plan should contain policies and regulations that will locate all obsolete and unused wells, and make a determination as to the most beneficial fate of each such well. Obsolete and unused wells that do not present a water quality contamination threat and have a potential use should be preserved. Otherwise, these wells should be properly destroyed.

Groundwater Quality Protection

Groundwater quality protection will maintain existing yield and reduce the future cost of water treatment. There are two parallel tracks to follow:

- prevention of pollution

- control and mitigation of existing groundwater quality problems.

EMWD should develop an aggressive groundwater pollution prevention program that, at a minimum, embodies the Basin Plan. Groundwater quality should be constantly monitored to assess spatial and time trends in groundwater quality in the groundwater management area. At a minimum, these efforts should include the monitoring of water quality data from municipal and agricultural wells, landfills, chemical and industrial operations, underground storage tanks, areas undergoing groundwater remediation such as March Air Force Base, sludge disposal areas and reclaimed water recharge areas. EMWD should consider obtaining authority to act proactively to prevent pollution and to take immediate action on new pollution threats when they occur.

The control and mitigation of existing groundwater quality problems consists of the containment and, potentially, the remediation of existing water quality problems, such that adjacent high quality groundwater resources are not degraded. Three major areas of concern in the West San Jacinto Groundwater Management Plan area are high TDS groundwater in the Perris South II subbasin (Ski Land area), migration of high TDS groundwater from the Winchester subbasin into the Hemet subbasin, and the organics contamination at March Air Force Base. The groundwater management plan should contain elements that will ensure that these three problems are controlled and mitigated.

EMWD has initiated a pollution prevention program in the Menifee subbasin. This program will intercept and treat saline groundwater that would otherwise migrate to areas with high quality groundwater and cause the abandonment of wells. This program will lead to the eventual recovery of the entire Menifee subbasin.

YIELD ENHANCEMENT ELEMENTS

Artificial Recharge

Artificial recharge is the recharge of water from sources that are not normally tributary to groundwater. There are three sources of water for artificial recharge in the West San Jacinto Groundwater Basin management area: local runoff, imported water and reclaimed water.

Artificial recharge with local runoff. There are several ways local runoff can be captured and recharged. The most common approach is to divert storm flows into spreading basins where the captured water can percolate into the underlying groundwater basin. Spreading basins can have multiple uses including flood peak attenuation, water treatment, recharge of imported water and reclaimed water, wildlife habitat enhancement and recreational use.

Several factors must be considered for the development of a spreading basin. They include:

- Water rights
- Availability of recharge water
- Surface flow and flood hazard impacts
- Percolation rates
- Subsurface permeability and the presence of barriers or aquitards that hinder percolation
- Depth to groundwater
- Underlying groundwater quality
- Recharge water quality
- Proximity to major areas of groundwater production
- Creation of undesirable conditions such as high groundwater levels or vector problems
- Economic feasibility

Runoff generated on individual lots can be retained and recharged on individual lots. This would require special grading and drainage specifications on individual lots and is only practical for new development. The same considerations for spreading basins apply to artificial recharge through local retention and recharge.

Most of the precipitation for frequently occurring precipitation events that falls on undeveloped land is lost to evapotranspiration. Groundwater recharge occurred only during periods of heavy rainfall prior to the development of the land. About 60 to 80 percent of the land becomes impervious as land is developed for urban uses. The remaining land is irrigated and has relatively high soil moisture. Consequently, precipitation that falls on developed land is either:

- converted to runoff; or
- recharges the groundwater basin through presaturated soils.

New runoff due to developed land can be collected and recharged, a process referred to as water harvesting. EMWD has conducted studies of water harvesting in the San Jacinto and Hemet subbasins, but has not yet conducted such studies in the West San Jacinto Groundwater Management Area. EMWD is currently evaluating these studies and proceeding to implement water harvesting in these subbasins. EMWD has stated a goal of reaching 10,000 acre-ft/yr of additional yield in its service area using water harvesting.

Artificial recharge of runoff can occur anywhere in the management area where suitable recharge facilities can be sited. The DWR published a draft report in 1975, *TIR 1335-11-A-3 Preliminary Evaluation of Potential Artificial Recharge sites and Sink Sites in the San Jacinto Study Area* (California Department of Water Resources, 1975) that concluded that conditions conducive to artificial recharge through spreading basins exist in the Lakeview, Perris North and Perris South subbasins. In the Lakeview subbasin, there is a one mile-wide band of tight surface sediments along the San Jacinto River. The rest of the subbasin appears to have good recharge characteristics. Water quality in this subbasin is generally good and the unused storage capacity is about 230,000 acre-ft (see Table 5-3). Recharge in the Perris North subbasin could occur along a small creek that drains the Pigeon Pass Valley, in spreading basins located at the base of the hills on the south side of the subbasin and near major drainage features such as the Perris Valley drain. There may be other areas suitable for spreading basins. Water quality in the Perris North subbasin is good. The unused storage capacity in the Perris North subbasin is about 220,000 acre-ft.

Groundwater quality in the Perris South subbasins ranges from acceptable to poor. The soils and geology appear to favor recharge in spreading basins. However, due to existing groundwater quality conditions, it may not be possible to recover additional potable groundwater without groundwater treatment. The unused storage capacity in the Perris South subbasins is about 120,000 acre-ft. The San Jacinto Lower Pressure, Menifee I, Menifee II and Winchester subbasins have soil and geologic conditions that appear non-suitable for surface spreading.

Imported Water. Recharge of imported water can occur through surface spreading, direct injection and by in-lieu recharge. Surface spreading is done by conveying imported water to spreading basins for percolation. Untreated water can be used for surface spreading. Untreated off-peak water can be purchased at substantially lower rates if spreading is done between October 1 to April 30.

Conventional injection of imported water is accomplished by conveying treated water to wells and injecting the water into the saturated part of the groundwater basin. Imported water is discharged into the well below the standing water level in the well. The pressure in the well forces the water into the aquifer. Water used for injection into the saturated zone must be treated to drinking water standards prior to injection. Treatment consists of filtration and disinfection and can be obtained by either purchasing treated water from Metropolitan or by purchasing untreated water from Metropolitan and using other treatment facilities. Treated off-peak water can be purchased at substantially lower rates if injection is done between October 1 to April 30.

In-lieu recharge occurs when imported water is used in lieu of groundwater, allowing groundwater to accumulate in the groundwater basin. The basic premise is that imported water would be used when there is an abundance of imported water, allowing groundwater to accumulate. Groundwater production in excess of the normal extraction rates could occur when imported water is scarce due to drought or shortages in the imported water system.

The areas that are suitable for artificial recharge of imported water in spreading basins are identical to the areas described in *artificial recharge of runoff* above. Artificial recharge of imported water by injection can occur almost anywhere in the management area where groundwater production is practical. Considerations in siting injection facilities include favorable hydrogeologic conditions, proximity to source water facilities, proximity of recovery wells, and unused groundwater storage capacity. Unlike spreading basins that create a veneer of imported water on top of ambient groundwater, injection wells create a zone of imported water around the injection well. The injected water within this zone drifts slowly away from the injection well with the regional groundwater flow. The water quality in wells that tap into the injected water zone will have a water quality that is similar to the imported water.

Reclaimed water. Recharge of reclaimed water can occur through surface spreading, direct injection and by over irrigation. Recharge by percolation and injection is subject to regulatory approval. The DHS proposed regulations for planned recharge projects that recharge reclaimed water were described in Section 3 and are contained in Appendix A.

Reclaimed water can be used to augment potable supplies through groundwater recharge. The volume of natural recharge is small in the West San Jacinto Groundwater Basin management area. The dilution of reclaimed water that can be obtained in the groundwater basin could be small and insufficient to achieve the dilution requirements in the proposed guidelines. Therefore, reclaimed water may have to be blended with other non-reclaimed water prior to recharge. The most probable source of blending water will be imported water purchased from Metropolitan.

The groundwater basins can also be used for seasonal storage of reclaimed water. Reclaimed water can be stored in the groundwater basins during the winter when demand for reclaimed water is low and recovered in the spring, summer and fall when reclaimed water demands exceed supply.

The subbasins in the management area that are conducive to recharge of reclaimed water, either by spreading or injection, include the Perris North, Lakeview and Perris South subbasins. Reclaimed water can be recharged in the San Jacinto Lower Pressure, Menifee and Winchester subbasins by injection.

Increase in Yield. The increase in yield from artificial recharge is approximately equal to the long term average annual volume of artificial recharge. That is, if the annual volume of artificial recharge is 30,000 acre-ft, then the increase in groundwater yield would be about 30,000 acre-ft. The Lakeview, Perris North and Perris South subbasins are the most promising subbasins for artificial recharge that can increase potable supplies to the West San Jacinto Groundwater Basin management area. These basins have a combined unused storage capacity of about 600,000 acre-ft, good water quality and reasonably good aquifer properties. The natural replenishment in these subbasins is small, averaging about 29,000 acre-ft/yr (Table 4-1). Hydrogeologic conditions and economics control the size of artificial recharge projects in these subbasins. Based on current information, it seems reasonable to expect that the combined increase in groundwater yield from artificial recharge could range from 30,000 to 50,000 acre-ft/yr.

Information Needs. New information and engineering studies are required to develop definitive estimates of the size and benefits of potential artificial recharge projects. The types of new information and studies that are required include:

- ❑ geophysical studies to determine aquifer boundaries and geometry
- ❑ hydrogeologic studies to determine aquifer hydraulic properties
- ❑ geochemical studies to establish ambient groundwater quality, trends, and compatibility of ambient groundwater with recharge water

- facility studies to site and evaluate engineering and facility requirements
- economic studies
- environmental studies

Part of these investigations should include demonstration or pilot projects. Demonstration-level artificial recharge projects should be done to test the technical and institutional feasibility of artificial recharge. Demonstration projects should include the following:

- Surface spreading in The Perris North, Perris South and Lakeview subbasins. Small recharge basins, observation wells and pipelines would be constructed and operated to develop data and design criteria for full scale projects. The source water would be imported water from Metropolitan and reclaimed water from EMWD.
- Groundwater Injection in The Perris North, Perris South and Lakeview subbasins. Injection of imported water could be done in the winter time using EMWD's existing wells in these subbasins. Small observation wells may need to be constructed.
- Water Harvesting in the Lakeview subbasin. Storm water captured in EMWD's Mystic Lake project could be captured and conveyed to test recharge basins in the Lakeview subbasin.

Recovery of Contaminated Groundwater

Some of the groundwater in the West San Jacinto Groundwater Management area is contaminated and cannot be put to beneficial use without treatment. Currently, production of contaminated groundwater is avoided. Contaminated groundwater takes up storage in the aquifer and reduces the useful storage capacity in the groundwater basins. Contaminated groundwater can be put to beneficial use through treatment. The types of treatment that are appropriate depend on the nature of contamination and the intended water use. The types of treatment that appear appropriate in the West San Jacinto Management area are blending, demineralization and nitrate removal through ion exchange. Other treatment technologies may be required if water quality conditions change or new types of contamination are discovered.

Blending. Blending is a very simple form of treatment and consists of mixing a poor quality supply with a suitable amount of high quality water such that the blend is of adequate quality for its intended use. Table 7-1 lists the groundwater subbasins, the reclamation plants that receive water from these subbasins, reclamation plant TDS regulatory limitations, estimated average

TABLE 7-1
BLENDING WATER REQUIREMENTS TO MEET TITLE 22 DRINKING WATER REGULATIONS AND WASTE DISCHARGE REQUIREMENTS AT RECLAMATION PLANTS

Subbasin	Supply Tributary to EMWD Reclamation Plant (1)	Reclamation Plant TDS Objective (mg/L)	Estimated Average TDS in Subbasin (2) (mg/L)	Required Water Supply TDS (mg/L)	Blending Ratio of SWP Water to Groundwater for SWP Water TDS (in mg/L) of 250	300
Perris North	Morreno Valley	550	450	300	3.0	Infeasible
Lakeview	Perris Valley	825	500	575	No Blending Required	No Blending Required
Perris South-I	Perris Valley	825	700	575	0.4	0.5
Perris South-II	Perris Valley	825	1,100	575	1.6	1.9
Perris South-III	Sun City	950	1,100	700	0.9	1.0
Menifee-I	Sun City	950	3,000	700	5.1	5.8
Menifee-II	Sun City	950	2,200	700	3.3	3.8
Winchester	(3)	na	2,000	na	na	na
San Jacinto Lower Pressure	Perris Valley	825	1,000	575	1.3	1.5

note - (1) based on Figure 3-1 Existing Wastewater Service Areas, Wastewater Facilities Master Plan, (Black & Veatch, James M. Montgomery, 1990); revised by EMWD 1993.

(2) Subbasin averages based on available data, and in most cases, old data. Average for Perris South-II excludes Ski Land area.

(3) Winchester subbasin is currently unsewered. In the future, the Winchester subbasin area will either be sewered to a new reclamation plant in Winchester area or sewered to an existing reclamation plant.

TDS concentration for each subbasin, the water supply TDS requirement and the blending ratios for SWP water to groundwater. Based on existing groundwater quality information, blending SWP water with groundwater from the San Jacinto Lower Pressure, Perris North, Perris South-I, parts of Perris South-II, and parts of Perris South-III, could provide potable water that is also within the waste discharge requirements of EMWD reclamation plants. Generally, blending ratios around one are considered economically feasible and blending ratios of two could be feasible. Lakeview groundwater will not need to be blended. Perris North groundwater will need three parts of SWP water if it is to be used in the area tributary to the Moreno Valley reclamation plant. Groundwater from Perris South-I, Perris South-II, Perris South-III, and the San Jacinto Lower Pressure subbasins can easily be blended with SWP water. Menifee-I, Menifee-II and Winchester cannot be economically blended.

Demineralization. Demineralization is a treatment process that reduces the mineral content of groundwater to a specified level that is established for the use of the product water. Demineralization facilities, often called desalters, have been constructed in the Arlington subbasin, near Riverside, and are in design for the Chino Basin and the Menifee area.

The proposed Menifee desalter will convert 4,200 acre-ft/yr of groundwater pumped from the Menifee I and II subbasins with a TDS concentration of 2,400 mg/L to 3,360 acre-ft of potable water, with a TDS concentration of 400 mg/L (Black & Veatch, 1993). Product water from the Menifee desalter will be served in EMWD service area.

Demineralization could be used to recover the yield of the San Jacinto Lower Pressure, Perris South-I, Perris South-II, Perris South-III, and Winchester subbasins. These basins are excessively mineralized, partly from irrigated agriculture and partly from natural sources. The proposed Menifee desalter will recover the yield of the Menifee-I and Menifee-II subbasins. EMWD is considering treating groundwater from the Perris South II, Perris South III and Winchester subbasins at the Menifee desalter site in a future expansion of that facility.

Other Treatment Technologies. Other treatment technologies can be used to recover groundwater when other contaminants render groundwater unusable. Selective ion exchange can be used to remove specific ions such as nitrate or uranium. Granulated activated carbon (GAC), air stripping and advanced oxidation can be used individually, or in combination, to remove organic compounds. The need for these treatment technologies is unknown at this time due to the lack of water quality data.

Increase In Supply. Currently, contaminated groundwater is either avoided, or is used for non-potable demands such as agricultural or landscape irrigation. These non potable demands, whenever possible, could be supplied with reclaimed water, allowing the contaminated groundwater to be treated and supplied for municipal use. The volume of contaminated groundwater that can be recovered and used through blending will cause an equal reduction in the demand for imported water. The volume of contaminated groundwater that can be recovered through demineralization varies between 70 and 85 percent of the water produced for demineralization; the remaining water is a brine which must be exported. The volume of potable water produced by the demineralization will cause an equal reduction in the demand for imported water. The increase in supply from the recovery of contaminated groundwater is equal to the safe yield of the subbasins where the recovery projects will occur, minus the existing level of groundwater pumping in those subbasins. Table 7-2 summarizes considerations for blending and demineralization of elements and presents an estimate of the groundwater production that could be used for blending or demineralization. The volume of groundwater available for blending or demineralization is estimated as the safe yield of the subbasin, minus reported groundwater production. The safe yield used in this estimate includes the recharge of EMWD reclaimed water. The estimates of groundwater available for blending and demineralization shown in Table 7-2 are slightly higher than would be implemented because actual groundwater production by local producers is higher than reported production. Estimates of actual groundwater production will need to be developed prior to implementing blending or demineralization elements.

Cost. The cost of blending consists of the capital and operations and maintenance costs associated with wells, pipelines and reservoirs required to implement blending. The costs of these types of facilities are highly sensitive to location of wells, blending water sources and the design flow rates (e.g., base load or peaking). The development of these costs is beyond the scope of this investigation. Most of the facilities that will be required for blending will be required even if blending were not used. Thus, the incremental cost associated with blending facilities will be small, relative to the cost of future water distribution facilities. The volume of groundwater used with blending would offset the need for an equal amount of imported water. The SWP water used for blending is not a new imported water demand. The blending water would come from SWP water that would have been used if there were no blending with groundwater. Therefore, blending will cause a net decrease in imported water demands.

The cost of demineralization varies depending on source water quality, product water quality, well field(s), distribution system and the treatment technology. The Menifee desalter is a three

TABLE 7-2
CONSIDERATIONS FOR BLENDING AND DEMINERALIZATION ELEMENTS

Conjunctive Use Characteristics	Subbasin: Lakeview	Menifee	Perris North	Perris South (1)	San Jacinto Lower Pressure	Winchester
Groundwater Quality (2)	Good	Poor	Good	Poor	Poor	Poor
Range in Capacity of Producing Wells (gpm)	100-2,000	10-1,000	90-1,000	90-1,000	Unknown	100-850
Safe Yield						
Natural Safe Yield	6,800	3,300	13,700	8,300	2,500	1,600
Natural Safe Yield plus Reclaimed Water Recharge (acre-ft/yr)	6,800	4,700	19,500	12,800	2,500	1,800
Average Reported Groundwater Production 1987 to 1991 (2) (acre-ft/yr)	4,000	0	2,300	1,400	500	0
Potential Groundwater Production That could Be Used for Blending and Demineralization (acre-ft/yr)	Not Applicable	4,700	Not Applicable	12,100	700	1,800

note - (1) part of Perris South-I and -II have good quality water
(2) Production values shown in Table 4-3 and excludes small producers (<25 acre-ft/yr).

mgd treatment plant with a capital cost estimated to range from $14,000,000 to $17,000,000. Table 7-3 lists the capital and operations and maintenance cost opinions for the Menifee desalter (Black & Veatch, 1993). The 1995 cost to produce water from the Menifee desalter is about $501 per acre-ft, which is slightly higher than comparable water imported from Metropolitan. By 2001, the unit cost of water from the Menifee desalter will be equal to water from Metropolitan.

Metropolitan has instituted a Groundwater Recovery (GWR) program that will subsidize the cost of these desalters up to $250 per acre-ft. In the GWR program, Metropolitan will purchase the product water from the desalter for up to $250 over Metropolitan's base treated rate and sell the water back to EMWD at the base treated rate. Metropolitan instituted this program to encourage the recovery of contaminated groundwater. Table 7-3 shows how the GWR program will work for the Menifee desalter.

Information Needs. New information and engineering studies are required to develop definitive estimates of the size and benefits of projects to recover contaminated groundwater. The types of new information and studies that are required include:

- geophysical studies to determine aquifer boundaries and geometry
- hydrogeologic studies to determine aquifer hydraulic properties
- geochemical studies to establish ambient groundwater quality, and trends
- facility studies to site and evaluate engineering and facility requirements
- economic studies
- environmental studies

Part of these investigations should include demonstration or pilot projects. Demonstration-level projects for the recovery of contaminated water should be done to test the technical and institutional feasibility of full scale projects. Demonstration projects should include the following:

- Pilot scale demineralization projects in Winchester, Perris South and San Jacinto Lower Pressure subbasins. These tests would provide design data for large scale projects.

- Well scale blending projects. Poor quality groundwater from out-of-service EMWD wells could be injected into EMWD's distribution system. This could be done with EMWD's Falico well in the Perris South subbasin

TABLE 7-3
MENIFEE DESALTER COSTS AND METROPOLITAN'S GROUNDWATER RECOVER PROGRAM

Year	---------------- Menifee Desalter Cost ----------------				Metropolitan Treated Base Rate	Metropolitan GWR Subsidy	Purchase Price to Metropolitan	Remaining Unsubsidized Cost	Unit Cost to EMWD
	Amortized Capital cost ($)	Annual O & M Cost ($)	Total Annual Cost (1) ($)	Unit Cost (2) ($/acre-ft)	($/acre-ft)	($/acre-ft)	($/acre-ft)	($/acre-ft)	($/acre-ft)
1995	$919,652	$1,748,734	$2,668,386	$794	$454	$250	$704	$90	$544
1996	$919,652	$1,801,196	$2,720,848	$810	$483	$250	$733	$77	$560
1997	$919,652	$1,855,232	$2,774,884	$826	$515	$250	$765	$61	$576
1998	$919,652	$1,910,889	$2,830,541	$842	$545	$250	$795	$47	$592
1999	$919,652	$1,968,216	$2,887,868	$859	$578	$250	$828	$31	$609
2000	$919,652	$2,027,262	$2,946,914	$877	$613	$250	$863	$14	$627
2001	$919,652	$2,088,080	$3,007,732	$895	$649	$246	$895	$0	$649
2002	$919,652	$2,150,722	$3,070,374	$914	$688	$226	$914	$0	$688
2003	$919,652	$2,215,244	$3,134,896	$933	$730	$203	$933	$0	$730
2004	$919,652	$2,281,701	$3,201,353	$953	$773	$180	$953	$0	$773
2005	$919,652	$2,350,152	$3,269,804	$973	$820	$153	$973	$0	$820
2006	$919,652	$2,420,657	$3,340,309	$994	$869	$125	$994	$0	$869
2007	$919,652	$2,493,277	$3,412,929	$1,016	$921	$95	$1,016	$0	$921
2008	$919,652	$2,568,075	$3,487,727	$1,038	$976	$62	$1,038	$0	$976
2009	$919,652	$2,645,117	$3,564,769	$1,061	$1,035	$26	$1,061	$0	$1,035
2010	$919,652	$2,724,471	$3,644,123	$1,085	$1,097	$0	$1,085	$0	$1,097

note (1) annual O & M cost escalate at three percent per year
(2) desalter produces 3,360 acre-ft/yr

and other wells in Winchester and the Lower San Jacinto subbasins, as appropriate.

CONJUNCTIVE USE

Conjunctive use is an operational strategy that combines the operations of multiple sources of water and storage resources in such a way that the combined yield is greater than the yield that would occur from the sum of independent, uncoordinated operations of the sources. The same definition would apply if other goals could be achieved by coordinated operation and the yield remained at an acceptable level. Other goals might include reduced cost, more reliable supply, and the attainment of environmental objectives. In most cases, conjunctive use results in increased yield and lower cost. Conjunctive use is commonly associated with storing of imported water in groundwater basins for use during periods of shortage. The more general definition could involve EMWD reclamation and municipal distribution facilities, Metropolitan facilities and resources, state project facilities and resources, groundwater basins within EMWD, and, potentially, groundwater basins outside of EMWD. Conjunctive use can operate seasonally, over-year or both. Seasonal conjunctive use would bank water during seasonal period(s) of over-supply or abundance for use during dry times of the year. Over-year conjunctive use would bank water during years of over-supply or abundance for use during drought periods and imported water shortages.

Table 7-4 summarizes the considerations for conjunctive use projects by subbasin. Based on current knowledge of groundwater conditions, EMWD could bank local runoff, imported water purchased from Metropolitan and reclaimed water in the Lakeview, Perris North and Perris South subbasins during the period of October 1 through April 30, for use either during the summer, during periods of imported water shortages, or both. The unused storage capacity of the Lakeview, Perris North and Perris South subbasins is about 600,000 acre-ft. EMWD could use up to half (and possibly more) of this unused storage capacity for seasonal and over-year storage, thereby reducing the cost of imported water purchases and providing an additional source of water during periods of imported supply shortage.

Recharge would be accomplished with a combination of new spreading basins and injection wells. Recovery of recharge will be through existing and new production wells. Where practical, injection and production will occur at the same well. That is, injection will take place

TABLE 7-4
CONSIDERATIONS FOR CONJUNCTIVE USE PROJECTS

Conjunctive Use Characteristics	Subbasin					
	Lakeview	Menifee	Perris North	Perris South(1)	San Jacinto Lower Pressure	Winchester
Unused Groundwater Storage Capacity (acre-ft)	230,000	40,000	220,000	150,000	9,000	5,000
Groundwater Quality (2)	Good	Poor	Good	Poor	Poor	Poor
Range in Capacity of Producing Wells (gpm)	100-2,000	10-1,000	90-1,000	90-1,000	Unknown	100-850
Recharge Methods	Spreading Basins In-Lieu Injection	Injection In-Lieu	Spreading Basins In-Lieu Injection	Spreading Basins In-Lieu Injection	Injection In-Lieu	Injection In-Lieu
Spreading Basin Potential	Yes	No	Yes	Yes	No	No
Proximity to Imported Water Facilities	State Project Water Colorado River Water		State Project Water	State Project Water Colorado River Water		State Project Water Colorado River Water
Proximity to Reclaimed Water Facilities	Yes	Yes	Yes	Yes	Yes	Yes
Proximity to Major Drainage Facilities	San Jacinto River	Salt Creek	Perris Valley Drain	San Jacinto River Salt Creek	San Jacinto River	Salt Creek

note - (1) part of Perris South-I and -II have good quality water
(2) good quality water has a TDS less than 500 mg/L; poor quality water has TDS greater than 500 mg/L and generally greater than 1,000 mg/L

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during the recharge period of October 1 through April 30, followed by groundwater production at the same well during the period of May 1 to September 30. This type of aquifer storage and recovery scheme is ideal for areas where spreading is infeasible due to land use, low recharge rates or groundwater quality limitations.

Reclaimed water could be a source of recharge in a conjunctive use program for augmentation of potable supplies. Parts of groundwater subbasins could be used for the seasonal storage of reclaimed water.

Based on current knowledge of groundwater conditions, conjunctive use with imported supplies and local runoff in the San Jacinto Lower Pressure, Menifee and Winchester subbasins appears to be more difficult to implement and of less benefit. Limited conjunctive use in these subbasins could be done in conjunction with groundwater treatment.

Increase in Supply. The increase in supply from conjunctive use could not be determined at this level of study. Under a worst case scenario, conjunctive use would reduce shortages that EMWD customers would face during imported water shortages and would reduce the cost of imported water use through the purchase of off-peak supplies and use of reclaimed water for recharge. EMWD should be able to shift about 30,000 to 50,000 acre-ft year of base rate purchases to off-peak, with large conjunctive use projects in the Lakeview, Perris North and Perris South subbasins. The reduction in cost would be much more substantial if a blend of reclaimed water and imported water were recharged during the winter.

Information Needs. New information and engineering studies are required to develop definitive estimates of the size and benefits of potential artificial recharge projects. The types of new information and studies that are required include:

- geophysical studies to determine aquifer boundaries and geometry
- hydrogeologic studies to determine aquifer hydraulic properties
- geochemical studies to establish ambient groundwater quality, trends, and compatibility of ambient groundwater with imported water
- facility studies to site and evaluate engineering and facility requirements
- economic studies
- environmental studies

Demonstration projects should be developed to test injection of treated imported water in the Lakeview, Perris North and Perris South subbasins. These demonstration projects would test the feasibility of well injection for groundwater recharge and aquifer storage and recovery for conjunctive use. Demonstration level injection well tests should be done for blends of treated imported water and reclaimed water.

EXCHANGE OF AGRICULTURAL AND OTHER NON-POTABLE WATER USERS FROM GROUNDWATER TO RECLAIMED WATER

The exchange of agricultural and other non-potable groundwater production to municipal uses can occur through:

- retirement of agricultural lands, that is, the conversion of agricultural lands to non-agricultural uses; and
- by substituting other supplies such as reclaimed water.

Agricultural demands are projected to range from 33,000 acre-ft/yr in 1995 to 31,000 acre-ft/yr in 2010. The average agricultural demand during this period is approximately equal to the total yield of the West San Jacinto Basin. The substitution of reclaimed water for agriculture groundwater production and other non-potable uses is a prerequisite to developing municipal supplies from the West San Jacinto Groundwater Basin. There are some agricultural demands that cannot be satisfied with reclaimed water, such as dairy cow washing and processing of produce for market.

Increase in Supply. The increase in municipal supply that will occur from the exchange of agricultural and other non-potable groundwater production to municipal production is approximately one acre-ft for each acre-ft of exchange. Agricultural groundwater production is projected to range from about 24,100 acre-ft/yr in 1995, to 22,100 acre-ft/yr in 2010. A reasonable goal would be to exchange between 10,000 to 20,000 acre-ft of agricultural and other non-potable groundwater production to municipal production.

Demonstration-level projects for the exchange of agricultural and other non-potable users from groundwater to reclaimed water should be done to test the technical and institutional feasibility of full scale projects. Long term use of reclaimed water for irrigation may impact the drainage characteristics of the soil. Demonstration projects should be done to investigate the impacts from irrigation with reclaimed water on soils and evaluate appropriate soil and irrigation management practices. EMWD is currently in the process of completing exchange agreements similar to that described above with Moreno Valley Ranch Golf Course and University of California, Riverside, in the Perris North subbasin and Mr. John D. Mott in Lakeview Subbasin.

Cost. The cost associated with supplying reclaimed water to agricultural users is the capital, operations and maintenance cost associated with the conveyance of reclaimed water to the agricultural and other non-potable water users. This cost is a sunk cost as EMWD must treat and dispose of reclaimed water whether any water exchange occurs or doesn't occur. The water supply cost associated with the exchange of agricultural groundwater production to municipal production with the retirement of agricultural lands is assumed to be zero.

SECTION 8

SECTION 8
GROUNDWATER MANAGEMENT PLAN

CONTENTS OF THE MANAGEMENT PLAN

The management plan described herein is a program to achieve the management plan goals and includes conceptual descriptions of elements of the plan, and a description of the process to define and implement these elements consistent with the management plan goal. This plan, when adopted, will be the groundwater management program for the West San Jacinto Groundwater Basin management area. The groundwater management program will include: the development and implementation of policies, engineering investigations, facilities construction and operation, and other management activities. There are significant deficiencies in the knowledge of the groundwater resources of the West San Jacinto Groundwater Basin management area. These deficiencies preclude the definitive descriptions for some of the physical and institutional elements of the groundwater management plan. The groundwater management program includes studies to develop additional information that is necessary to develop all the institutional and physical elements described in the plan.

MANAGEMENT PLAN CRITERIA

The goal of the management plan stated in Section 6 is:

> ***maximize the use of groundwater for potable demands in such a way as to lower the cost of water supply and to improve the reliability of the <u>total</u> water supply for <u>all water users in the West San Jacinto Groundwater Basin management area</u>***

This goal extends to all groundwater users. Groundwater users that are not dependent on EMWD should benefit from the groundwater management plan. Adverse impacts, if any, from the groundwater plan will be minimized or mitigated. The rights of private groundwater producers will be protected. Groundwater producers who extract 10 acre-ft/yr or less shall be exempt from the operation and implementation of the groundwater management plan.

The implementation of this goal and its attendant constraints requires a set of criteria from which to test the various elements of the Management Plan. These criteria include:

- meet future water demands
- minimize dependence on imported water
- adequate (safe) water supply quality
- minimum cost
- ease of implementation

The groundwater management plan must be an integral part of satisfying the water demands in the West San Jacinto Groundwater Basin management area. Each element of the plan must, on its own, either add to the water supply or, by complementary action, cause the yield of another element to increase.

Minimizing the dependence on imported water is driven by the need for reliability and cost. The management area will, for the foreseeable future, be heavily dependent on imported water. Imported water is expensive and prone to shortage. Groundwater, properly managed, can be used to minimize peak seasonal demand on imported supplies and can provide carry-over storage for use when shortages occur in the imported supply.

The yield developed by the management program should, when delivered to water users, be of suitable quality. For municipal users this will be potable quality. For private groundwater producers, groundwater quality should be improved or the same as if the groundwater management plan did not exist.

The cost of municipal water supplies should be less with the management plan. The water supply cost for private water users should be less or unchanged. The yield of the management plan is part of the mix of water sources available in the management area. The groundwater management elements incorporated in the groundwater management plan will be such as to minimize the cost of the total water supply and will not be based on the individual element cost.

The groundwater management plan should be implementable. The benefits, cost and institutional complexity should be such that it will be feasible to implement the groundwater management plan.

ULTIMATE PLAN DESCRIPTION

The groundwater management plan consists of a series of elements that, when implemented, will achieve the management plan goal stated above within the constraints. The management plan includes implementation of new policies, institutional arrangements, and physical projects. EMWD will be the agency responsible for implementation of the groundwater management plan. Based on the information developed in this study and presented in the previous sections, the ultimate groundwater management plan should include the following elements.

Establishment of a Groundwater Basin Manager

EMWD will implement the groundwater management plan. EMWD Board of Directors will be the decision-making body responsible for directing the implementation of the groundwater management plan. EMWD staff will serve as the staff to assist the EMWD Board of Directors in implementing the plan.

Upon adoption of the groundwater management plan, EMWD Board of Directors will appoint an Advisory Committee. The Advisory Committee will be composed of seven members, with one member each from city of Moreno Valley, city of Perris, Nuevo Mutual Water Company, Edgemont Gardens Mutual Water Company, and EMWD; and two members representing agricultural producers. The Advisory Committee shall study, review and provide comments on all groundwater management plan activities directly to the EMWD Board of Directors.

EMWD staff will prepare an annual engineering report describing the operation of the management plan for review by the EMWD Board of Directors, Advisory Committee and groundwater producers. EMWD, in consultation with the Advisory Committee and participating groundwater producers, will develop a coordinated operating strategy on an annual basis, based on the management plan and the findings of the annual report.

Monitoring of Groundwater Production

EMWD, in cooperation with the Advisory Committee, will implement a groundwater production monitoring program. Detailed estimates of the safe yield will be developed in the first year of the groundwater production monitoring. Groundwater production estimates will be developed by EMWD based on totalizing meters, energy usage and land use. EMWD will produce a groundwater production report and estimates of overdraft (if any). These data will be included in the annual report provided to the Advisory Committee. The production monitoring program will not limit or suspend groundwater production by existing groundwater producers.

Monitoring of Groundwater Level and Quality

EMWD, in cooperation with the Advisory Committee, will implement a groundwater level and quality monitoring program. Groundwater level and quality data will be collected from well owners. EMWD will measure groundwater levels and quality from select private wells. Groundwater levels and quality data from agencies' wells will be provided to EMWD by the agencies. EMWD will compile these data and develop estimates of the groundwater in storage, change in storage, overdraft and groundwater quality conditions. These data will be included in the annual report provided to the management committee.

Development of Well Construction Policies

EMWD, in cooperation with the Advisory Committee, the Department of Health Services and the Riverside County Health Department, will develop well construction policies that are specific to the West San Jacinto Groundwater Basin management area. These policies will be updated continuously based on new regulatory requirements and data. These polices will not limit or suspend groundwater production by existing groundwater producers.

Development of a Well Abandonment and Destruction Program

EMWD, in cooperation with the Advisory Committee, the Department of Health Services and the Riverside County Health Department, should develop well abandonment and destruction policies that are specific to the West San Jacinto Groundwater Basin management area. These policies should be updated continuously based upon new regulatory requirements and data.

Monitoring of Well Construction, Abandonment and Destruction

EMWD has compiled and digitized most, if not all the well construction information that is available for existing wells. EMWD, in cooperation with other groundwater producers, will collect well construction data for new wells. EMWD will provide comments and suggestions to supplement design criteria that will be required by other agencies, including the Department of Health Services and the Riverside County Health Department. EMWD, through the monitoring of groundwater production, will determine wells that are inactive and make recommendations to well owners regarding the fate of these wells.

Groundwater Quality Protection

EMWD, in cooperation with the Advisory Committee and parties responsible for groundwater quality degradation, should develop cooperative plans to prevent further degradation of groundwater and to integrate the solution of existing water quality problems to maximize the beneficial use of groundwater. The known areas of concern are the high TDS groundwater in the Perris South II (Ski Land area) and Winchester subbasins, and the groundwater contamination associated with March Air Force Base. The existing efforts undertaken by EMWD to rehabilitate the Menifee subbasins (the Menifee desalter project) will be completed independent of the groundwater management plan. Additional degraded groundwater areas could be discovered through groundwater monitoring.

Exchange of Agricultural and Other Non-potable Groundwater Production to Municipal Use

The intent of this element is to increase the groundwater yield available for municipal use by either retiring agricultural and non potable demands or by substituting reclaimed water for groundwater used for agricultural and other non-potable uses. It is the goal of this element to maximize the exchange of groundwater production from non-potable uses to municipal uses. Incentives should be developed to encourage the exchange of agricultural groundwater production to municipal use. From an agricultural perspective, the cost of using reclaimed water should be equal to, or less than, the cost of groundwater.

EMWD should consider providing reliable reclaimed water service to individual farms and other non-potable users by constructing pipelines from EMWD reclamation facilities to logical points in the farm irrigation systems. The farmer would pay for the reclaimed water at a rate that would make the farmer indifferent to either groundwater or reclaimed water; or at a rate slightly less than his groundwater production cost. The rate should be based on the actual cost of groundwater production and the usefulness of the farmer's well to EMWD. The farmer would pay for reclaimed water based on the operation and maintenance cost of his well. The farmer would produce only enough groundwater for potable uses on the farm, and future potable demands, when the land is developed, would be served by EMWD.

If the agricultural well were suitable for municipal use, then the farmer's well and necessary easements could be purchased by EMWD. The purchase price would be reflected in the cost of reclaimed water. In this case, the farmer would pay for reclaimed water based on the operation and maintenance cost of his well, less the amortized purchase price of the farmer's well. In either case, the reclaimed water rate may have to be discounted slightly to cause the exchange to occur.

Use of reclaimed water on some soils may reduce the drainage rate of soil and lead to water logged and other undesirable soil conditions. Each site where reclaimed water could be applied in lieu of groundwater needs to be evaluated to ensure that the reclaimed water can safely be applied to the soil. This evaluation will be completed prior to formalizing agreements to exchange groundwater for reclaimed water.

Maximize Yield Augmentation with Local Resources - Local Runoff and Reclaimed Water

Yield augmentation through the recharge of runoff (water harvesting) and through the recharge of reclaimed water should be implemented where consistent with water quality objectives and other elements of the groundwater management plan. The Lakeview, Perris North and Perris South subbasins appear to be the most feasible areas for this element. The cost associated with the recharge of runoff and reclaimed water are the capital and operation costs for the facilities to capture and recharge runoff and reclaimed water.

The specifics of recharge and conveyance facilities will be developed after a thorough groundwater resources evaluation is performed and planning studies are done to develop and evaluate yield augmentation alternatives.

Maximize Conjunctive Use

Conjunctive use should be implemented in the West San Jacinto Groundwater Basin management area. The unused storage capacity in the West San Jacinto Groundwater Basin management area is about 670,000 acre-ft, with about 600,000 acre-ft or 90 percent in the Lakeview, Perris North and Perris South subbasins. The yield from conjunctive use, exclusive of safe yield, could range from 30,000 to 50,000 acre-ft, or perhaps larger. Conjunctive use will improve overall water supply reliability, groundwater quality, and will lower water supply cost. These benefits will be realized by all groundwater users.

The specifics of recharge, extraction, conveyance and treatment facilities will be developed after a thorough groundwater resources evaluation is performed and planning studies are done to develop and evaluate conjunctive use alternatives.

Groundwater Treatment

Groundwater treatment in the form of blending and demineralization should be done in the West San Jacinto Groundwater Basin management area to recover contaminated groundwater for municipal use. The specifics of treatment facilities will be developed after a thorough groundwater resources evaluation is performed and planning studies are done to evaluate groundwater treatment feasibility.

Groundwater Management Plan Alternatives

Four groundwater management alternatives were developed to evaluate the economic benefits to all water users in the groundwater management area. All four of these alternatives include the following management elements:

- ❑ Establishment of Groundwater Basin Manager
- ❑ Monitoring of Groundwater Production
- ❑ Monitoring of Groundwater Level and Quality
- ❑ Development of Well Construction Policies
- ❑ Development of a Well Abandonment and Destruction Program
- ❑ Monitoring of Well Construction, Abandonment and Destruction
- ❑ Groundwater Quality Protection

Alternative 1 - Agricultural Exchange and Blending. Alternative 1 consists of the above-mentioned common elements plus the exchange of agricultural groundwater production, of which 2,000 acre-ft/yr are permanent transfers from land use conversions and about 17,500 acre-ft/yr of exchange of groundwater production for reclaimed water. Seven thousand one hundred acre-ft/yr of poor quality groundwater will be pumped from the San Jacinto Lower Pressure and Perris South subbasins and blended with imported water for municipal use.

Alternative 2 - Agricultural Exchange, Blending and Demineralization. Alternative 2 consists of the above-mentioned common elements plus the exchange of agricultural groundwater production, of which 2,000 acre-ft/yr are permanent transfers from land use conversions and about 21,700 acre-ft/yr of exchange of groundwater production for reclaimed water. Seven thousand one hundred acre-ft/yr of poor quality groundwater will be pumped from the San Jacinto Lower Pressure and Perris South subbasins and blended with imported water for municipal use. Five thousand three hundred acre-ft/yr of highly mineralized groundwater from the Perris South and Winchester subbasins will be pumped and demineralized to produce about 4,200 acre-ft of drinking water.

Alternative 3 - Agricultural Exchange, Blending, Demineralization and 30,000 acre-ft/yr Conjunctive Use. Alternative 3 includes all the elements of Alternative 2, plus conjunctive use. Conjunctive use will be implemented in the Perris North, Perris South I, Perris South II and Lakeview subbasins. Recharge would occur in spreading basins. Source water is state project water and reclaimed water. Average annual increase in recharge and extraction from conjunctive use will be about 30,000 acre-ft/yr.

Alternative 4 - Agricultural Exchange, Blending, Demineralization and 50,000 acre-ft/yr Conjunctive Use.. Alternative 4 is identical to Alternative 3 except that the conjunctive use element has been expanded to 50,000 acre-ft/yr.

Economic Evaluation of the Groundwater Management Plan Alternatives

Tables 8-1 through 8-4 illustrate the economic benefits that water users in the West San Jacinto Groundwater Basin management area would realize if a groundwater management plan were implemented. Each table lists the projected total demand for water and shows how that demand would be satisfied with each groundwater management plan alternative. For economic

TABLE 8-1
PRELIMINARY ESTIMATE OF C⁽ST OF WATER SUPPLY PLAN FOR THE WEST SAN JACINTO GROUNDWATER BASIN MANAGEMENT AREA
ALTERNATIVE 1 - AGRICULTURAL EXCHANGE AND BLENDING

Year	Demand	Imported Water – Treated Base Water – Direct Use	Imported Water – Treated Base Water – Blending	Imported Water – Rate	Imported Water – Total – Imported Volume	Imported Water – Total – Imported Cost	Reclaimed Water – Direct Use	Reclaimed Water – Rate	Reclaimed Water – Total Recl. Water Use	Reclaimed Water – Cost	Agricultural Groundwater – Volume	Agricultural Groundwater – Rate	Agricultural Groundwater – Cost	Municipal Use of Groundwater – Demineralization – Volume	Municipal Use of Groundwater – Demineralization – Rate	Municipal Use of Groundwater – Direct Municipal Use – Volume	Municipal Use of Groundwater – Direct Municipal Use – Rate	Municipal Use of Groundwater – Blending – Volume	Municipal Use of Groundwater – Blending – Rate	Municipal Use of Groundwater – Cost	Total Mun. Use of Groundwater	Total Groundwater Usage	Total Cost	Composite Unit Cost
	(acre-ft/yr)	(acre-ft/yr)	(acre-ft/yr)	($/acre-ft)		($)	(acre-ft/yr)	($/acre-ft)	(acre-ft/yr)	($)	(acre-ft/yr)	($/acre-ft)	($)	(acre-ft/yr)	($/acre-ft)	(acre-ft/yr)	($/acre-ft)	(acre-ft/yr)	($/acre-ft)		(acre-ft/yr)	(acre-ft/yr)	($)	($/acre-ft)
1995	80,000	44,500	0	$454	44,500	$20,203,000	8,900	$63	8,900	$560,700	24,100	$63	$1,518,300	0	$0	2,500	$68	0	$68	$170,000	2,500	26,600	$22,452,000	$281
1996	83,000	47,300	0	$483	47,300	$22,845,900	10,849	$66	10,849	$710,826	22,351	$66	$1,464,438	0	$0	2,500	$71	0	$71	$176,800	2,500	24,851	$25,197,964	$304
1997	86,000	46,740	0	$515	46,740	$24,071,100	12,798	$68	12,798	$872,066	20,602	$68	$1,403,837	3,360	$576	2,500	$74	0	$74	$2,119,232	5,860	26,462	$28,466,235	$331
1998	89,000	49,540	0	$545	49,540	$26,999,300	14,747	$71	14,747	$1,045,067	18,853	$71	$1,336,045	3,360	$592	2,500	$76	0	$76	$2,180,347	5,860	24,713	$31,560,759	$355
1999	92,000	33,604	5,500	$578	39,104	$22,602,112	16,696	$74	16,696	$1,230,513	17,104	$74	$1,260,583	3,360	$609	8,636	$80	7,100	$80	$3,298,045	19,096	36,200	$28,391,254	$309
2000	95,000	34,655	5,500	$613	40,155	$24,615,015	18,645	$77	18,645	$1,429,123	15,355	$77	$1,176,947	3,360	$627	10,385	$83	7,100	$83	$3,553,296	20,845	36,200	$30,774,381	$324
2001	99,000	36,706	5,500	$649	42,206	$27,391,694	20,594	$80	20,594	$1,641,653	13,606	$80	$1,084,604	3,360	$649	12,134	$86	7,100	$86	$3,835,566	22,594	36,200	$33,953,516	$343
2002	103,000	38,757	5,500	$688	44,257	$30,448,816	22,543	$83	22,543	$1,868,898	11,857	$83	$982,989	3,360	$688	13,883	$89	7,100	$89	$4,189,309	24,343	36,200	$37,490,013	$364
2003	107,000	40,808	5,500	$730	46,308	$33,804,840	24,492	$86	24,492	$2,111,697	10,108	$86	$871,510	3,360	$730	15,632	$93	7,100	$93	$4,568,301	26,092	36,200	$41,356,348	$387
2004	111,000	42,859	5,500	$773	48,359	$37,381,507	26,441	$90	26,441	$2,370,929	8,359	$90	$749,540	3,360	$773	17,381	$97	7,100	$97	$4,966,679	27,841	36,200	$45,468,654	$410
2005	115,000	44,910	5,500	$820	50,410	$41,336,200	28,390	$93	28,390	$2,647,521	6,610	$93	$616,418	3,360	$820	19,130	$101	7,100	$101	$5,395,423	29,590	36,200	$49,995,562	$435
2006	120,600	50,310	5,500	$869	55,810	$48,498,890	28,590	$97	28,590	$2,772,818	6,610	$97	$641,075	3,360	$869	19,130	$105	7,100	$105	$5,665,672	29,590	36,200	$57,578,455	$477
2007	126,200	55,710	5,500	$921	61,210	$56,374,410	28,790	$101	28,790	$2,903,904	6,610	$101	$666,718	3,360	$921	19,130	$109	7,100	$109	$5,950,225	29,590	36,200	$65,895,257	$522
2008	131,800	61,110	5,500	$976	66,610	$65,011,360	28,990	$105	28,990	$3,041,040	6,610	$105	$693,387	3,360	$976	19,130	$113	7,100	$113	$6,249,252	29,590	36,200	$74,995,039	$569
2009	137,400	66,510	5,500	$1,035	72,010	$74,530,350	29,190	$109	29,190	$3,184,501	6,610	$109	$721,122	3,360	$1,035	19,130	$118	7,100	$118	$6,566,287	29,590	36,200	$85,002,260	$619
2010	143,000	71,910	5,500	$1,097	77,410	$84,918,770	29,390	$113	29,390	$3,334,573	6,610	$113	$749,967	3,360	$1,085	19,130	$122	7,100	$122	$6,857,835	29,590	36,200	$95,861,145	$670
Total Volume	1,719,000	765,929	66,000		831,929		350,045				201,955			47,040		202,831		85,200			335,071	537,026		
Fraction of Total		45%	4%				20%				12%			3%		12%		5%						
Total Cost						$641,033,264				$31,725,830			$15,937,480							$45,742,269			$754,438,842	
Fraction of Total						85%				4%			2%							9%				
Present Value																							$449,025,139	

TABLE 8-2
PRELIMINARY ESTIMATE OF COST OF WATER SUPPLY PLAN FOR THE WEST SAN JACINTO GROUNDWATER BASIN MANAGEMENT AREA
ALTERNATIVE 2 - AGRICULTURAL EXCHANGE, BLENDING AND DEMINERALIZATION

Year	Demand	Imported Water — Treated Base Water — Direct Use	Blending	Rate	Imported Water — Total — Imported Volume	Imported Cost	Reclaimed Water — Direct Use	Rate	Total Recl. Water Use	Cost	Agricultural Groundwater — Volume	Rate	Cost	Municipal Use of Groundwater — Demineralization — Volume	Rate	Direct Municipal Use — Volume	Rate	Blending — Volume	Rate	Municipal Cost	Total Mun. Use of Groundwater	Total Groundwater Usage	Total Cost	Composite Unit Cost
	(acre-ft/yr)	(acre-ft/yr)	(acre-ft/yr)	($/acre-ft)		($)	(acre-ft/yr)	($/acre-ft)	(acre-ft/yr)	($)	(acre-ft/yr)	($/acre-ft)	($)	(acre-ft/yr)	($/acre-ft)	(acre-ft/yr)	($/acre-ft)	(acre-ft/yr)	($/acre-ft)		(acre-ft/yr)	(acre-ft/yr)	($)	($/acre-ft)
1995	80,000	44,500	0	$454	44,500	$20,203,000	8,900	$63	8,900	$560,700	24,100	$63	$1,518,300	0	$0	2,500	$68	0	$68	$170,000	2,500	26,600	$22,452,000	$281
1996	83,000	47,300	0	$483	47,300	$22,845,900	11,269	$66	11,269	$738,345	21,931	$66	$1,436,919	0	$0	2,500	$71	0	$71	$176,800	2,500	24,431	$25,197,964	$304
1997	86,000	46,740	0	$515	46,740	$24,071,100	13,638	$68	13,638	$929,304	19,762	$68	$1,346,598	3,360	$576	2,500	$74	0	$74	$2,119,232	5,860	25,622	$28,466,235	$331
1998	89,000	49,540	0	$545	49,540	$26,999,300	16,007	$71	16,007	$1,134,359	17,593	$71	$1,246,753	3,360	$592	2,500	$76	0	$76	$2,180,347	5,860	23,453	$31,560,759	$355
1999	92,000	31,924	5,500	$578	37,424	$21,631,072	18,376	$74	18,376	$1,354,331	15,424	$74	$1,136,766	7,540	$609	6,136	$80	7,100	$80	$5,644,789	20,776	36,200	$29,766,958	$324
2000	95,000	32,555	5,500	$613	38,055	$23,327,715	20,745	$77	20,745	$1,590,086	13,255	$77	$1,015,984	7,540	$627	8,305	$83	7,100	$83	$6,002,073	22,945	36,200	$31,935,858	$336
2001	99,000	34,186	5,500	$649	39,686	$25,756,214	23,114	$80	23,114	$1,842,535	11,086	$80	$883,722	7,540	$649	10,474	$86	7,100	$86	$6,405,557	25,114	36,200	$34,888,027	$352
2002	103,000	35,817	5,500	$688	41,317	$38,426,096	25,483	$83	25,483	$2,112,635	8,917	$83	$739,252	7,540	$688	12,643	$89	7,100	$89	$6,954,190	27,283	36,200	$38,232,173	$371
2003	107,000	37,448	5,500	$730	42,948	$31,352,040	27,852	$86	27,852	$2,401,395	6,748	$86	$581,812	7,540	$730	14,812	$93	7,100	$93	$7,543,390	29,452	36,200	$41,878,637	$391
2004	111,000	39,079	5,500	$773	44,579	$34,459,567	30,221	$90	30,221	$2,709,876	4,579	$90	$410,593	7,540	$773	16,981	$97	7,100	$97	$8,159,104	31,621	36,200	$45,739,140	$412
2005	115,000	40,710	5,500	$820	46,210	$37,892,200	32,590	$93	32,590	$3,039,193	2,410	$93	$224,745	7,540	$820	19,150	$101	7,100	$101	$8,825,036	33,790	36,200	$49,981,175	$435
2006	120,600	46,110	5,500	$869	51,610	$44,849,090	32,790	$97	32,790	$3,180,158	2,410	$97	$233,735	7,540	$869	19,150	$105	7,100	$105	$9,300,185	33,790	36,200	$57,563,169	$477
2007	126,200	51,510	5,500	$921	57,010	$52,506,210	32,990	$101	32,990	$3,327,537	2,410	$101	$243,085	7,540	$921	19,150	$109	7,100	$109	$9,802,183	33,790	36,200	$65,879,015	$522
2008	131,800	56,910	5,500	$976	62,410	$60,912,160	33,190	$105	33,190	$3,481,619	2,410	$105	$252,808	7,540	$976	19,150	$113	7,100	$113	$10,331,196	33,790	36,200	$74,977,783	$569
2009	137,400	62,310	5,500	$1,035	67,810	$70,183,350	33,390	$109	33,390	$3,642,703	2,410	$109	$262,920	7,540	$1,035	19,150	$118	7,100	$118	$10,894,942	33,790	36,200	$84,983,916	$619
2010	143,000	67,710	5,500	$1,097	73,210	$80,311,370	33,590	$113	33,590	$3,811,103	2,410	$113	$273,437	7,540	$1,085	19,150	$122	7,100	$122	$11,395,584	33,790	36,200	$95,791,494	$670
Total Volume	1,719,000	724,149	66,000		790,349		394,145				157,855			97,200		194,251		85,200			376,651	534,506		
Fraction of Total		43%	4%		46%		23%				9%			6%		11%		5%						
Total Cost						$605,726,384				$35,855,879			$11,807,430							$105,904,608			$759,294,301	
Fraction of Total						80%				5%			2%							14%				
Present Value																							$452,553,506	

TABLE 8-3 (revised 9/7/94)
PRELIMINARY ESTIMATE OF COST OF WATER SUPPLY PLAN FOR THE WEST SAN JACINTO GROUNDWATER BASIN MANAGEMENT AREA
ALTERNATIVE 3 - AGRICULTURAL EXCHANGE, BLENDING, DEMINERALIZATION AND 30,000 ACRE-FT CONJUNCTIVE USE (ALL RECHARGE THROUGH SPREADING)

Year	Demand	Imported Water: Treated Base Water Direct Use	Imported Water: Treated Base Water Blending	Imported Water: Treated Base Water Rate	Imported Water: Untr. Seasonal Water Conj Use	Imported Water: Untr. Seasonal Water Rate	Imported Water: Total Imported Volume	Imported Water: Total Imported Cost	Reclaimed Water Direct Use	Reclaimed Water Rate	Reclaimed Water Conj. Use	Reclaimed Water Rate	Total Recl. Water Use
	(acre-ft/yr)	(acre-ft/yr)	(acre-ft/yr)	($/acre-ft)	(acre-ft/yr)	($/acre-ft)		($)	(acre-ft/yr)	($/acre-ft)	(acre-ft/yr)	($/acre-ft)	(acre-ft/yr)
1995	80,000	44,500	0	$454	0	$256	44,500	$20,203,000	8,900	$63	0	$0	8,900
1996	83,000	47,500	0	$483	0	$278	47,500	$22,942,500	11,069	$66	0	$0	11,069
1997	86,000	47,140	0	$515	0	$304	47,140	$24,277,100	13,238	$68	0	$0	13,238
1998	89,000	50,140	0	$545	0	$319	50,140	$27,326,300	15,407	$71	0	$0	15,407
1999	92,000	2,724	5,500	$578	20,000	$338	28,224	$11,513,472	17,576	$74	10,000	$0	27,576
2000	95,000	3,555	5,500	$613	20,000	$361	29,055	$12,774,715	19,745	$77	10,000	$0	29,745
2001	99,000	5,386	5,500	$649	20,000	$389	30,886	$14,849,014	21,914	$80	10,000	$0	31,914
2002	103,000	7,217	5,500	$688	20,000	$417	32,717	$17,093,296	24,083	$83	10,000	$0	34,083
2003	107,000	9,048	5,500	$730	20,000	$447	34,548	$19,557,320	26,252	$86	10,000	$0	36,252
2004	111,000	10,879	5,500	$773	20,000	$477	36,379	$22,204,378	28,421	$90	10,000	$0	38,421
2005	115,000	12,710	5,500	$820	20,000	$511	38,210	$25,142,468	30,590	$93	10,000	$0	40,590
2006	120,600	18,110	5,500	$869	20,000	$545	43,610	$31,422,808	30,790	$97	10,000	$0	40,790
2007	126,200	23,510	5,500	$921	20,000	$582	49,010	$38,363,837	30,990	$101	10,000	$0	40,990
2008	131,800	28,910	5,500	$976	20,000	$621	54,410	$46,014,012	31,190	$105	10,000	$0	41,190
2009	137,400	34,310	5,500	$1,035	20,000	$664	59,810	$54,477,596	31,390	$109	10,000	$0	41,390
2010	143,000	39,710	5,500	$1,097	20,000	$708	65,210	$63,758,026	31,590	$113	10,000	$0	41,590
Total Volume	1,719,000	385,349	66,000		240,000		691,349		373,145				
Fraction of Total		22%	4%		14%		40%		22%				
Total Cost								$451,919,843					
Fraction of Total								71%					
Present Value													

Year	Reclaimed Water Cost	Agricultural Groundwater Volume	Agricultural Groundwater Rate	Agricultural Groundwater Cost	Municipal Use of Groundwater: Demineralization Volume	Demineralization Rate	Direct + Conj. Use Volume	Direct + Conj. Use Rate	Blending Volume	Blending Rate	Cost	Total Mun. Use of Groundwater	Total Groundwater Usage	Total Cost	Composite Unit Cost
	($)	(acre-ft/yr)	($/acre-ft)	($)	(acre-ft/yr)	($/acre-ft)	(acre-ft/yr)	($/acre-ft)	(acre-ft/yr)	($/acre-ft)		(acre-ft/yr)	(acre-ft/yr)	($)	($/acre-ft)
1995	$560,700	24,100	$63	$1,518,300	0	$0	2,500	$68	0	$68	$170,000	2,500	26,600	$22,452,000	$281
1996	$725,241	21,931	$66	$1,436,919	0	$0	2,500	$71	0	$71	$176,800	2,500	24,431	$25,281,460	$305
1997	$902,048	19,762	$68	$1,346,598	3,360	$576	2,500	$74	0	$74	$2,119,232	5,860	25,622	$28,644,978	$333
1998	$1,091,839	17,593	$71	$1,246,753	3,360	$592	2,500	$76	0	$76	$2,180,547	5,860	23,453	$31,845,239	$358
1999	$1,295,370	15,424	$74	$1,136,766	7,540	$609	36,136	$80	7,100	$80	$8,031,300	50,776	66,200	$21,976,908	$239
2000	$1,513,437	13,255	$77	$1,015,984	7,540	$627	38,305	$83	7,100	$83	$8,484,045	52,945	66,200	$23,788,181	$250
2001	$1,746,877	11,086	$80	$883,722	7,540	$649	40,474	$86	7,100	$86	$8,986,808	55,114	66,200	$26,466,420	$267
2002	$1,996,570	8,917	$83	$739,252	7,540	$688	42,643	$89	7,100	$89	$9,638,691	57,283	66,200	$29,467,809	$286
2003	$2,263,444	6,748	$86	$581,812	7,540	$730	44,812	$93	7,100	$93	$10,333,271	59,452	66,200	$32,737,846	$306
2004	$2,548,473	4,579	$90	$410,593	7,540	$773	46,981	$97	7,100	$97	$11,062,661	61,621	66,200	$36,226,104	$326
2005	$2,852,682	2,410	$93	$224,745	7,540	$820	49,150	$101	7,100	$101	$11,844,734	63,790	66,200	$40,064,630	$348
2006	$2,986,187	2,410	$97	$233,733	7,540	$869	49,150	$105	7,100	$105	$12,440,672	63,790	66,200	$47,083,402	$390
2007	$3,125,807	2,410	$101	$243,085	7,540	$921	49,150	$109	7,100	$109	$13,068,288	63,790	66,200	$54,801,017	$434
2008	$3,271,819	2,410	$105	$252,808	7,540	$976	49,150	$113	7,100	$113	$13,727,946	63,790	66,200	$63,266,586	$480
2009	$3,424,511	2,410	$109	$262,920	7,540	$1,035	49,150	$118	7,100	$118	$14,427,562	63,790	66,200	$72,592,590	$528
2010	$3,584,184	2,410	$113	$273,437	7,540	$1,085	49,150	$122	7,100	$122	$15,069,509	63,790	66,200	$82,685,156	$578
Total Volume		157,855			97,200		554,251		85,200			736,651	894,506		
Fraction of Total		9%			6%		32%		5%						
Total Cost	$33,889,189			$11,807,430							$141,763,865			$639,380,327	
Fraction of Total	5%			2%							22%				
Present Value														$384,636,284	

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Water Resources Engi

TABLE 8-4 (revised 9/7/94)

PRELIMINARY ESTIMATE OF COST OF WATER SUPPLY PLAN FOR THE WEST SAN JACINTO GROUNDWATER BASIN MANAGEMENT AREA

ALTERNATIVE 4 - AGRICULTURAL EXCHANGE, BLENDING, DEMINERALIZATION AND

50,000 ACRE-FT CONJUNCTIVE USE (80% RECHARGE THROUGH SPREADING, 20% RECHARGE THROUGH INJECTION)

Year	Demand (acre-ft/yr)	Imported Water: Treated Base Water Direct Use (acre-ft/yr)	Treated Base Water Blending (acre-ft/yr)	Treated Base Water Rate ($/acre-ft)	Untr Seasonal Water Conj Use (acre-ft/yr)	Untr Seasonal Water Rate ($/acre-ft)	Treated Seasonal Water Conj. Use (acre-ft/yr)	Treated Seasonal Water Rate ($/acre-ft)	Total Imported Volume	Total Imported Cost ($)	Reclaimed Water Direct Use (acre-ft/yr)	Reclaimed Rate ($/acre-ft)	Reclaimed Conj. Use (acre-ft/yr)	Reclaimed Rate ($/acre-ft)	Total Recl Water Use (acre-ft/yr)	Reclaimed Cost ($)
1995	80,000	44,500	0	$454	0	$256		$309	44,500	$20,307,000	8,900	$63	0	$0	8,900	$560,700
1996	83,000	47,500	0	$483	0	$278		$332	47,500	$22,942,500	11,069	$66	0	$0	11,069	$725,241
1997	86,000	47,140	0	$515	0	$304		$357	47,140	$24,277,100	13,238	$68	0	$0	13,238	$902,048
1998	89,000	50,140	0	$545	0	$319		$381	50,140	$27,326,300	15,407	$71	0	$0	15,407	$1,091,839
1999	92,000	0	5,500	$578	21,362	$338	1,362	$408	28,224	$10,954,780	17,576	$74	10,000	$0	27,576	$1,295,370
2000	95,000	0	5,500	$613	21,777	$361	1,778	$436	29,055	$12,012,205	19,745	$77	10,000	$0	29,745	$1,513,437
2001	99,000	0	5,500	$649	22,693	$389	2,693	$465	30,886	$13,652,783	21,914	$80	10,000	$0	31,914	$1,746,877
2002	103,000	0	5,500	$688	23,609	$417	3,609	$496	32,717	$15,422,561	24,083	$83	10,000	$0	34,083	$1,996,570
2003	107,000	0	5,500	$730	24,524	$447	4,524	$529	34,548	$17,368,898	26,252	$86	10,000	$0	36,252	$2,263,444
2004	111,000	0	5,500	$773	25,439	$477	5,440	$564	36,379	$19,457,314	28,421	$90	10,000	$0	38,421	$2,548,473
2005	115,000	0	5,500	$820	26,355	$511	6,355	$601	38,210	$21,786,477	30,590	$93	10,000	$0	40,590	$2,852,642
2006	120,600	0	5,500	$869	29,055	$545	9,055	$641	43,610	$26,423,415	30,790	$97	10,000	$0	40,790	$2,966,187
2007	126,200	3,510	5,500	$921	30,000	$582	10,000	$682	49,010	$32,588,631	30,990	$101	10,000	$0	40,990	$3,125,807
2008	131,800	8,910	5,500	$976	30,000	$621	10,000	$726	54,410	$39,970,938	31,190	$105	10,000	$0	41,190	$3,271,819
2009	137,400	14,310	5,500	$1,035	30,000	$664	10,000	$773	59,810	$48,148,719	31,390	$109	10,000	$0	41,390	$3,424,511
2010	143,000	19,710	5,500	$1,097	30,000	$708	10,000	$823	65,210	$57,129,354	31,590	$113	10,000	$0	41,390	$3,584,184
Total Volume	1,719,000	235,720	66,000		314,814		74,816		691,349		373,145					
Fraction of Total		14%	4%		18%		4%		40%		22%					
Total Cost										$409,664,995						$33,849,189
Fraction of Total										67%						6%
Present Value																

Year	Agricultural Groundwater Volume (acre-ft/yr)	Ag. GW Rate ($/acre-ft)	Ag. GW Cost ($)	Municipal Use of Groundwater: Demineralization Volume (acre-ft/yr)	Demineralization Rate ($/acre-ft)	Direct + Conj Use Volume (acre-ft/yr)	Direct + Conj Use Rate ($/acre-ft)	Blending Volume (acre-ft/yr)	Blending Rate ($/acre-ft)	Cost	Total Mun. Use of Groundwater (acre-ft/yr)	Total Groundwater Usage (acre-ft/yr)	Total Cost ($)	Composite Unit Cost ($/acre-ft)
1995	24,100	$63	$1,518,300	0	$0	2,500	$68	0	$68	$170,000	2,500	26,600	$22,452,000	$281
1996	21,931	$66	$1,436,919	0	$0	2,500	$71	0	$71	$176,800	2,500	24,431	$25,281,460	$305
1997	19,762	$68	$1,346,398	3,360	$576	2,500	$74	0	$74	$2,119,232	5,860	25,622	$28,644,978	$333
1998	17,593	$71	$1,246,753	3,360	$592	2,500	$76	0	$76	$2,180,347	5,860	23,453	$31,845,239	$358
1999	15,424	$74	$1,136,766	7,540	$609	38,860	$80	7,100	$80	$4,247,996	53,500	68,924	$21,634,911	$235
2000	13,255	$77	$1,015,984	7,540	$627	41,860	$83	7,100	$83	$4,778,158	56,500	69,755	$23,319,784	$245
2001	11,086	$80	$883,722	7,540	$649	45,860	$86	7,100	$86	$9,450,228	60,500	71,586	$25,733,610	$260
2002	8,917	$83	$739,251	7,540	$688	49,860	$89	7,100	$89	$10,284,492	64,500	73,417	$28,442,875	$276
2003	6,748	$86	$581,812	7,540	$730	53,860	$93	7,100	$93	$11,177,302	68,500	75,248	$31,391,435	$293
2004	4,579	$90	$410,593	7,540	$773	57,860	$97	7,100	$97	$12,115,587	72,500	77,079	$34,531,966	$311
2005	2,410	$93	$224,745	7,540	$820	61,860	$101	7,100	$101	$13,124,060	76,500	78,910	$37,987,985	$330
2006	2,410	$97	$233,735	7,540	$869	67,260	$105	7,100	$105	$14,334,479	81,900	84,310	$43,979,816	$345
2007	2,410	$101	$243,085	7,540	$921	69,150	$109	7,100	$109	$15,245,692	83,790	84,200	$51,203,235	$406
2008	2,410	$105	$252,806	7,540	$976	69,150	$113	7,100	$113	$15,992,446	83,790	84,200	$59,448,012	$451
2009	2,410	$109	$262,920	7,540	$1,035	69,150	$118	7,100	$118	$16,782,642	85,790	84,200	$68,618,794	$499
2010	2,410	$113	$273,437	7,540	$1,085	69,150	$122	7,100	$122	$17,518,792	83,790	86,200	$78,505,767	$549
Total Volume	137,855			97,200		703,880		85,200			866,280	1,044,135		
Fraction of Total	9%			6%		41%		5%						
Total Cost			$11,807,430							$157,700,273			$613,061,887	
Fraction of Total			2%							26%				
Present Value													$371,114,039	

evaluation purposes, all the plan elements are assumed on line in 1999, that is, all elements would be implemented in five years. Actual implementation could take place over a longer period of time ranging from five to fifteen years. This analysis assumes an amortization period of 20 years, amortization rate of six percent and an inflation rate of four percent. Capital, operations and maintenance costs for recharge facilities, and blending facilities are not included. Salvage costs are not included for the wells and desalters.

Tables 8-1 through 8-4 list the annual cost of water supply and the total present value cost of the water supply plan with the implementation of a groundwater management plan. Similar costs are presented in Table 5-6 for a case without a groundwater management plan. The groundwater management plan alternatives are compared to the *no groundwater management plan case* in Table 8-5. The difference in costs between the *with management plan* cases and *without management plan* case occurs in years 1999 through 2010.

Alternative 1 - Agricultural Exchange and Blending groundwater management plan case has a present value savings of about $108,000,000 over the no groundwater management plan case illustrated in Table 5-6. The saving comes from the exchange of up to 17,500 acre-ft/yr of agricultural groundwater production to municipal uses and the reduction in the use of a like amount of imported water.

Alternative 2 - Agricultural Exchange, Blending and Demineralization groundwater management plan is identical to Alternative 1 except that the agricultural exchange of groundwater production to municipal uses has been expanded to about 21,700 acre-ft/yr and municipal groundwater production has been expanded by about 4,200 acre-ft/yr through construction of a demineralization facility. Alternative 2 has a present value savings of about $104,000,000 over the *no groundwater management plan case* illustrated in Table 5-6 and is comparable to the cost of Alternative 1. The cost savings over the *no groundwater management plan case* come from the exchange of up to 21,600 acre-ft/yr of agricultural groundwater production to municipal uses and the reduction in the use of a like amount of imported water. The cost of Alternative 2 is slightly higher than Alternative 1 because the demineralization costs are higher than the cost of imported water prior to 2010. After 2010 demineralization costs will be less than imported water. Alternative 2 would have costs savings greater than Alternative 1 if the economic analysis were extended beyond 2010.

TABLE 8-5 (revised 9/7/94)
COMPARISON OF GROUNDWATER MANAGEMENT PLAN ALTERNATIVES

Alternative	---------- Percentage of Total Supply ----------			----- Size of Groundwater Management Plan Elements -----				Present Value Cost of Supply	Reduction in Present Value Cost of Supply from Groundwater Management Plan
	Non Interruptible Treated Imported Water	Seasonal Treated Imported Water	Seasonal Untreated Imported Water	Agricultural Exchange (acre-ft/yr)	Blending (acre-ft/yr)	Demineralization (acre-ft/yr)	Conjunctive Use (acre-ft/yr)		
No Groundwater Management Plan	64%	0%	0%	0	0	0	0	$557,000,000	na
1 Agricultural Exchange and Blending	49%	0%	0%	17,510	7,100	0	0	$449,000,000	$108,000,000
2 Agricultural Exchange, Blending and Demineralization	46%	0%	0%	21,690	7,100	4,180	0	$453,000,000	$104,000,000
3 Agricultural Exchange, Blending, Demineralization and 30,000 acre-ft/yr Conjunctive Use (all recharge through spreading)	26%	0%	14%	21,690	7,100	4,180	30,000	$385,000,000	$172,000,000
4 Agricultural Exchange, Blending, Demineralization and 50,000 acre-ft/yr Conjunctive Use (80 recharge through spreading, 20 % through injection)	18%	4%	18%	21,690	7,100	4,180	50,000	$371,000,000	$186,000,000

Alternative 3 - Agricultural Exchange, Blending, Demineralization and 30,000 acre-ft/yr Conjunctive Use management plan has all the elements contained in Alternative 2 plus the incorporation of 30,000 acre-ft/yr of conjunctive use. The source water for conjunctive use is 20,000 acre-ft of state project water and 10,000 acre-ft/yr of reclaimed water. The demand for treated non-interruptible water from Metropolitan has dropped from 64 percent for the *no management plan case* to 26 percent. The demand for untreated seasonal water has risen to 14 percent. Treated non-interruptible and seasonal untreated imported water make up 40 percent of municipal supplies. Alternative 3 has a present value savings of about $172,000,000 over the *no groundwater management plan case* illustrated in Table 5-6 and about $66,000,000 over Alternatives 1 and 2. About 62 percent of the cost savings comes from the agricultural exchange, blending and demineralization elements included in Alternatives 1 and 2; the remaining cost savings are due to conjunctive use.

Alternative 4 - Agricultural Exchange, Blending, Demineralization and 50,000 acre-ft/yr Conjunctive Use management plan has all the elements contained in Alternative 3 except that conjunctive use has been expanded from 30,000 to 50,000 acre-ft. The source water for conjunctive use is 40,000 acre-ft of state project water and 10,000 acre-ft/yr of reclaimed water. The demand for treated non-interruptible water from Metropolitan has dropped from 64 percent for the no management plan case to 18 percent. Untreated seasonal water has risen to 18 percent and treated seasonal water to 4 percent. Treated non-interruptible, treated seasonal and seasonal untreated imported water make up 40 percent of municipal supplies. Treated seasonal water would be used for recharge by injection. Alternative 4 has a present value savings of about $186,000,000 over the *no groundwater management plan case* illustrated in Table 5-6 and about $80,000,000 over Alternatives 1 and 2. About 57 percent of the cost savings comes from the agricultural exchange, blending and demineralization elements included in Alternatives 1 and 2; the remaining cost savings are due conjunctive use.

The groundwater management plan development costs and the costs of recharge of basins and blending facilities are not included in Tables 8-1 through 8-4. These costs could have a present value ranging from $50,000,000 to $70,000,000. The cost savings from implementation of any of these alternatives far exceed the cost of implementation. The projected cost savings from the groundwater management plan illustrated in Tables 8-1 through 8-4 are for the 15-year period of 1999 to 2010 in which the capital-intensive facilities, such as spreading basins, have been in operation (and amortized) for 11 years. If these analyses were extended to the period of time over which capital-intensive facilities were to be financed, say 20 years, the cost saving would be significantly greater.

There are two additional significant benefits from a groundwater management plan. First, imported water for direct use has been reduced by half, which will improve overall water supply reliability. The volumetric impact of water shortages in the imported water supply could be reduced by half. Second, the recharge of state project water into the Lakeview, Perris North and Perris South subbasins will improve the quality of the groundwater in these subbasins.

The groundwater management alternatives illustrated in Tables 8-1 through 8-4 clearly show that the economic benefits, water supply reliability benefits and water quality benefits of a groundwater management plan are very significant. Tables 8-1 through 8-4 assume that the conjunctive use elements are operational in 1999. As mentioned above, it could take an additional five years (till 2004) to implement the large scale conjunctive use projects described in these examples. Other management elements, yield augmentation in particular, should also be included in the management plan. Cooperative efforts among the water users in the management area, and results of future engineering and economic studies will define which elements will ultimately be used in the management plan.

FINANCING THE GROUNDWATER MANAGEMENT PLAN

The primary beneficiaries of the plan are municipal water users in the West San Jacinto Groundwater Basin management area. Private groundwater producers such as farmers, dairy operators and individuals with small domestic wells will either be beneficially impacted or have no impacts. It is the intent of the plan to mitigate all significant adverse groundwater impacts to private groundwater producers. The types of beneficial impacts that private well owners could experience will be stabilized or increased groundwater levels where overdraft is currently occurring, such as the Lakeview subbasin, and reduced supply cost for those groundwater producers that can use reclaimed water in lieu of groundwater.

The cost of implementing and operating the West San Jacinto Groundwater Basin management plan should be born by municipal water users in the management area. The cost savings experienced by the local private groundwater users should be their incentive to participate in the groundwater management plan. There could be some cost to local groundwater producers if groundwater replenishment is necessary due to groundwater overdraft. In the event of continued overdraft, an equitable cost sharing plan should be developed to correct the overdraft.

EMWD, acting as manager of the West San Jacinto Basin Groundwater Basin, will not levy and/or collect any rate, fee or charge from any groundwater producer unless authorized by law or contract with the producer, or in the event a producer extracts water stored in a basin by entities participating in the management plan. The plan will not require financial participation by any producer unless there is a consideration provided to such producer in the form of a quantifiable benefit to the producer.

The benefits and costs associated with the groundwater management plan should be accounted for locally, that is, by subbasin or some other geographic unit, to insure the benefits and costs are equitably distributed. The benefits to municipal users in the management area are essentially uniform throughout the management area and thus, the costs associated with those benefits should be distributed uniformly to all municipal water users in the management area. Localized benefits or costs to the Nuevo Water Company and the Edgemont Gardens Mutual Water Company should be estimated when the projects implemented by the groundwater management plan are better defined. EMWD and these agencies may need to develop adjustments in the cost of water supplied to these agencies by EMWD to compensate for localized benefits and costs to these agencies that are caused by the management plan.

Some of the elements of the management plan are capital intensive such as recharge facilities, wells, treatment plants, pipelines, etc. EMWD will need to develop a plan to finance these elements of the groundwater management plan with cost recovery based on the sale of water developed by the plan, or some other method as appropriate. The economic analysis presented previously in this section show that the management plan should easily pay for itself.

IMPLEMENTATION OF THE GROUNDWATER MANAGEMENT PLAN

Upon adoption of the groundwater management plan, EMWD will form the Advisory Committee and implement the groundwater management plan. The implementation of the groundwater management plan will occur in phases and consist of the following:

Phase 1 Short Term Implementation

Phase 2	Refine the Ultimate Groundwater Management Plan
Phase 3	Ultimate Groundwater Management Plan Implementation

Phase 1 Short Term Implementation

The goals of the short term implementation phase are to: implement those elements of the groundwater management plan that are easy to implement, where existing information is adequate for implementation; and to develop and implement demonstration projects that will provide engineering information necessary for design of management elements in the ultimate plan. This phase consists of five tasks that are described below.

Task 1-1 Groundwater Resources Evaluation. Section 4 described what is currently known about the groundwater resources in the management area, based on available reports and data. Most of the water quality data and groundwater elevation data is fifteen to twenty years old. There are no definitive studies evaluating the feasibility of surface water recharge. A complete groundwater resource evaluation should be done to define the groundwater resources in the management area. This effort will include the following sub tasks.

Define the Hydrogeologic Characteristics of the basin including: geology; flow controlling features such as faults, barriers, aquicludes, effective base of the aquifer, and hydraulic conductivity. This will involve: review of existing well logs, new aquifer tests, drilling new test holes, and geophysical studies.

Describe Groundwater Quality Conditions Historical groundwater quality data will be mapped and reviewed. EMWD has recently collected and entered these data into a data base, which will greatly facilitate this effort. A completely new groundwater quality monitoring program will be conducted evaluating the groundwater quality for constituents described in Title 22, plus other constituents that could be regulated and constituents that can be used to understand the groundwater hydrology, such as isotopes of oxygen and hydrogen.

Describe the Occurrence of Groundwater including: groundwater levels, groundwater hydrology, volume of groundwater in storage, unused groundwater storage, and groundwater production and use. This will involve an extensive groundwater level survey, and review/estimation of historical and future groundwater production.

Task 1-2 Develop Groundwater Management Policies. In this task EMWD, in cooperation with the Advisory Committee and participating groundwater producers, will develop policies for monitoring of groundwater production, monitoring groundwater level and quality, monitoring of well construction, well construction, well abandonment and destruction. Policies for the exchange of agricultural and other non-potable groundwater production to municipal use will be developed in this Task.

Task 1-3 Construct and Operate Demonstration Projects for Blending, Demineralization and Conjunctive Use. EMWD will evaluate the technical feasibility of blending, demineralization, irrigation with reclaimed water, and conjunctive use through small scale demonstration projects. The experience and data developed in this task will be used in subsequent tasks for design of large scale projects. The demonstration projects described in Section 7, or similar projects, will be constructed and operated. The feasibility of water harvesting will be evaluated.

Task 1-4 Develop Water Resources Planning Model. A water resources planning model will be used to evaluate the groundwater level response, groundwater quality response, water supply reliability, water supply quality and wastewater quality responses of the management plan. This model will be used to evaluate management plan alternatives in Phase 1 and in subsequent phases.

Task 1-5 Develop and Evaluate Feasibility Level Plans for the Management Plan Elements. The management elements and new management elements that arise from Tasks 1-1 and 1-2 efforts, will be combined and developed into alternatives. The capacity, size and operational characteristics of the management elements will be defined and analyzed using the data from Tasks 1-1, 1-3 and 1-4. An initial environmental study will be done to assess probable environmental impacts and help develop the scope of work for environmental studies in Phase 2.

Phase 2 Refine the Ultimate Groundwater Management Plan

Phase 1 Short Term Implementation will develop policies and data necessary for defining the ultimate groundwater management plan. Phase 2 consists of the detailed engineering, environmental and financial work to describe and implement the ultimate management plan. The complexity and cost for the analyses described below are dependent on the management plan elements included in the management plan. Phase 2 consists of four tasks that are described below.

Task 2-1 Prepare Facility and Operation Plans. This task will produce an initial set of facility and operational plans. The initial plans will be based on the results of Phase 1 and will be used in *Task 2-2 Prepare Project Specific Environmental Impact Report.* The initial facility and operational plans will include plans and cost opinions. The facility and operational plans will be modified in this task, based on the Task 2-2 effort to minimize undesirable environmental impacts and to include mitigation measures. The facility and operational plan will be finalized with the EIR prepared in Task 2-2. An optimum management plan will be developed that is consistent with the management plan goal and its constraints.

Task 2-2 Prepare Project Specific Environmental Impact Reports (EIR). EIR's will be prepared for the implementation of specific groundwater management elements that are developed in Phase 1. This Task consists of the following sub tasks.

<u>Prepare and Distribute Notice of Preparation (NOP).</u> The NOP will be prepared based on the results of the initial environmental study prepared in Task 1-5 and the facility and operational plans developed in Task 2-1. The final scope of work for the EIR studies will be based on the NOP and comments received on the NOP.

<u>Estimate Environmental Impacts and Develop Mitigation Plans.</u> This work will include: biological assessments, archaeological assessments, impact assessments and development of mitigation plans. This Task includes the evaluation of other environmental impacts such as construction related impacts, growth inducing impacts and cumulative impacts. Alternative facility and operational plans and mitigation measures will be developed in coordination with *Task 2-1 Prepare*

Facility and Operation Plans. This task includes the development of mitigation and mitigation monitoring plans.

Prepare and Distribute Draft EIR(s).

Conduct Meetings, Public Hearings and Respond to Comments.

Finalize EIR(s).

Task 2-3 Prepare Engineering Report for a Planned Recharge Project. California Department of Health Services is requiring that new projects that involve planned recharge of reclaimed water follow the proposed regulations for planned recharge projects. This has recently occurred in the Los Angeles Central Basin, the Chino Basin and in the Riverside-Colton Basins. The data and models developed in Phase 1 will be used to evaluate the hydraulic and water quality response from reclaimed water recharge. This task consists of the following subtasks.

Describe the Impacts from Reclaimed Water Recharge. This subtask includes estimating the impacts of wastewater recharge at the regional and local levels. The data and models developed in Phase I will be used to estimate the regional and local impacts. If warranted, the facility and operational plans will be revised and the impact analysis repeated.

Develop a Groundwater Production Management and Monitoring Plan. A groundwater production management and monitoring plan will be developed consistent with proposed DHS regulations. The implementation of this plan will be included in the EIR's developed in Task 2-2 and the institutional plan developed in Task 2-4.

Prepare Engineering Report.

Task 2-4 Institutional Planning. This task consists of institutional planning necessary for implementation of the groundwater management plan. The work will be iterative with the institutional plans and agreements evolving throughout Phase 2. This task consists of the following subtasks.

Describe Powers and Limitations of Entities Involved in Groundwater Management Plan. This subtask consists of identifying and describing the statutory responsibilities, powers and limitations of participants, regulatory agencies and third party interests.

Describe Regulatory and Water Rights Implications of Groundwater Management Plan. This task consists of describing the existing and proposed regulatory limits and water rights implications of the groundwater management plan; and the development of institutional arrangements and agreements necessary for implementation of plan elements.

Conduct Economic Analysis of Groundwater Management Plan. The capital and operating costs of the groundwater management plan will be evaluated and updated throughout Phase 2. Using Task 2-1 results, the economic benefits and costs for participating entities and third parties will be evaluated. The results of the economic analysis will feed back to Task 2-1, providing the opportunity to optimize the groundwater management plan.

Develop Preliminary Financing Plan. Financing alternatives will be developed throughout the Phase 2 effort that will be consistent with the facilities described in Task 2-1 and the financing capabilities of the participating agencies.

Describe Institutional Arrangements Necessary to Implement Groundwater Management Plan. This subtask consists of finalizing alternative institutional arrangements for participation, facility construction, ownership and management, payment and collection of fees, etc..

Develop Agreements. This subtask consists of preparing draft agreements for all the agreements that will be necessary to implement the ultimate groundwater management plan.

Phase 3 Ultimate Groundwater Management Plan Implementation

The facility plans, environmental documentation and draft agreements developed in Phase 2 will be converted to construction documents, project-specific environmental documentation and final agreements. These projects will then be constructed and operated. The sequencing and sizing of the management elements will depend on actual future water demands and the availability of funds for construction. It is premature to speculate on the magnitude of the effort required by most of these tasks because of uncertainties in what facilities and operating plans will be included in the groundwater management plan and the timing of the tasks.

Task 3-1 Prepare Final Design and Bid Documents. This task consists of final engineering, design and preparation of bid documents. The types of facilities that will be included are wells, pipelines, reservoirs, treatment facilities, and spreading basins.

Task 3-2 Prepare Project Specific Supplemental EIR's and Negative Declarations. This task consists of the preparation of supplemental project-specific EIR's and negative declarations (if applicable). These documents will be for specific elements in groundwater management plan projects that will include wells, pipelines and recharge facilities.

Task 3-3 Prepare Final Agreements. This task consists of developing and finalizing the agreements that allow the groundwater management plan to be constructed and operated.

Construction and Operation. Several series of tasks will need to be developed to describe the construction and operational process for the groundwater management plan elements that will actually be constructed.

MANAGEMENT AND MONITORING

The management and monitoring of the groundwater management plan will occur while the elements of ultimate groundwater management plan are being implemented. The management and monitoring activities developed in Phase 1 will be adopted by EMWD board action. Future modifications to management and monitoring programs will be incorporated as warranted by change conditions.

SCHEDULE AND COST

The Phase 1 work should take about two years to complete. Phase 2 will take about two years to complete and will overlap Phase 1 by about one year. The cumulative time required to complete phases 1 and 2 will be about three years. Phase 3 could take up to 10 years to complete with some projects (e.g., blending) coming on line within a couple of years and other projects (e.g., large scale surface recharge) taking 10 years to implement.

The cost to complete Phases 1 and 2 is estimated to range between 2 to 3 million dollars. The cost to complete Phase 3 cannot be estimated until the ultimate plan is described at the conclusion of Phase 2.

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REFERENCES

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APPENDIX A

A - 1

AB 3030 with AB 1152 Amendments

PART 2.75

GROUNDWATER MANAGEMENT

Part 2.75 was added by Stats.1992, c. 947 (A.B.3030), § 2.

Former Part 2.75, Groundwater Resources, consisting of §§ 10750 to 10767, was added by Stats.1991, c. 903 (A.B.255), § 1, and repealed by Stats.1992, c. 947 (A.B.3030), § 1.

CHAPTER 1

GENERAL PROVISIONS

Chapter 1 was added by Stats.1992, c. 947 (A.B.3030), § 2.

§ 10750. Legislative findings, declarations and intent

The Legislature finds and declares that groundwater is a valuable natural resource in California, an(should be managed to ensure both its safe production and its quality. It is the intent of the Legislatur(to encourage local agencies to work cooperatively to manage groundwater resources within thei: jurisdictions.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

§ 10750.2. Application of part

(a) Subject to subdivision (b), this part applies to all groundwater basins in the state.

(b) This part does not apply to any portion of a groundwater basin that is subject to groundwater management by a local agency or a watermaster pursuant to other provisions of law or a court order, judgment, or decree, unless the local agency or watermaster agrees to the application of this part.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

Historical and Statutory Notes

Derivation: Former § 10750, added by Stats.1991, c. 903 (A.B.255), § 1.

§ 10750.4. Adoption of groundwater management plan or program not required

Nothing in this part requires a local agency overlying a groundwater basin to adopt or implement a groundwater management plan or groundwater management program pursuant to this part.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

§ 10750.6. Authority of local agencies or watermaster to manage groundwater not affected

Nothing in this part affects the authority of a local agency or a watermaster to manage groundwater pursuant to other provisions of law or a court order, judgment, or decree.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

§ 10750.7. Management by local agencies within service area of another agency, water corporation or mutual water company without agreement prohibited; application of section

(a) A local agency may not manage groundwater pursuant to this part within the service area of another local agency, a water corporation regulated by the Public Utilities Commission, or a mutual water company without the agreement of that other entity.

(b) This section applies only to groundwater basins that are not critically overdrafted.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

Historical and Statutory Notes

Derivation: Former § 10762, added by Stats.1991, c. 903 (A.B.255), § 1.

§ 10750.8. Management by local agencies within service area of another agency without agreement prohibited; application of section

(a) A local agency may not manage groundwater pursuant to this part within the service area of another local agency without the agreement of that other entity.

(b) This section applies only to groundwater basins that are critically overdrafted.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

Historical and Statutory Notes

Derivation: Former § 10762, added by Stats.1991, c. 903 (A.B.255), § 1.

§ 10750.9. Groundwater management program; procedures to establish commenced prior to January 1, 1993; completion; amendment

(a) A local agency that commences procedures, prior to January 1, 1993, to adopt an ordinance or resolution to establish a program for the management of groundwater pursuant to Part 2.75 (commencing with Section 10750), as added by Chapter 903 of the Statutes of 1991, may proceed to adopt the ordinance or resolution pursuant to * * * Part 2.75, and the completion of those procedures is deemed to meet the requirements of this part.

(b) A local agency that has adopted an ordinance or resolution pursuant to Part 2.75 (commencing with Section 10750), as added by Chapter 903 of the Statutes of 1991, may amend its groundwater management program by ordinance or resolution of the governing body of the local agency to include any of the plan components set forth in Section 10753.7.

(Added by Stats.1992, c. 947 (A.B.3030), § 2. Amended by Stats.1993, c. 320 (A.B.1152), § 1.)

§ 10750.10. Other powers

This part is in addition to, and not a limitation on, the authority granted to a local agency pursuant to other provisions of law.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

Historical and Statutory Notes

Derivation: Former § 10766, added by Stats.1991, c. 903 (A.B.255), § 1.

§ 10751. Repealed by Stats.1992, c. 947 (A.B.3030), § 1

Historical and Statutory Notes

The repealed section, added by Stats.1991, c. 903 (A.B. 255), § 1, set forth definitions. See, now, § 10752.

CHAPTER 2

DEFINITIONS

Chapter 2 was added by Stats.1992, c. 947 (A.B.3030), § 2.

§ 10752. Definitions

Unless the context otherwise requires, the following definitions govern the construction of this part:

(a) "Groundwater" means all water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but does not include water which flows in known and definite channels.

(b) "Groundwater basin" means any basin identified in the department's Bulletin No. 118, dated September 1975, and any amendments to that bulletin, but does not include a basin in which the average well yield is less than 100 gallons per minute.

(c) "Groundwater extraction facility" means any device or method for the extraction of groundwater within a groundwater basin.

(d) "Groundwater management plan" or "plan" means a document that describes the activities intended to be included in a groundwater management program.

(e) "Groundwater management program" or "program" means a coordinated and ongoing activity undertaken for the benefit of a groundwater basin, or a portion of a groundwater basin, pursuant to a groundwater management plan adopted pursuant to this part.

(f) "Groundwater recharge" means the augmentation of groundwater, by natural or artificial means, with surface water or recycled water.

(g) "Local agency" means any local public agency that provides water service to all or a portion of its service area, and includes a joint powers authority formed by local public agencies that provide water service.

(h) "Recharge area" means the area that supplies water to an aquifer in a groundwater basin and includes multiple wellhead protection areas.

(i) "Watermaster" means a watermaster appointed by a court or pursuant to other provisions of law.

(j) "Wellhead protection area" means the surface and subsurface area surrounding a water well or well field that supplies a public water system through which contaminants are reasonably likely to migrate toward the water well or well field.

(Added by Stats.1992, c. 947 (A.B.3030), § 2. Amended by Stats.1993, c. 320 (A.B.1152), § 2.)

Historical and Statutory Notes

1992 Legislation

Former § 10752 was repealed by Stats.1992, c. 947 (A.B.3030), § 1. See, now, § 10753.

Derivation: Former § 10751, added by Stats.1991, c. 903 (A.B.255) § 1.

CHAPTER 3. GROUNDWATER MANAGEMENT PLANS

Chapter 3 was added by Stats.1992, c. 947 (A.B.3030), § 2.

§ 10753. Adoption or implementation of plan

(a) 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 order, judgment, or decree, may, by ordinance, or by resolution if the local agency is not authorized to act by ordinance, adopt and implement a groundwater management plan pursuant to this part within all or a portion of its service area.

(b) Notwithstanding subdivision (a), a local public agency, other than an agency defined in subdivision (g) of Section 10752, that provides flood control, groundwater management, or groundwater replenishment, or a local agency formed pursuant to this code for the principal purpose of providing water service that has not yet provided that service, may exercise the authority of this part within a groundwater basin * * * that is located within its boundaries within areas that are either of the following:

(1) * * * Not served by a local agency.

(2) * * * Served by a local * * * agency * * * whose governing body, by a majority vote, declines to exercise the authority of this part and enters into an agreement with the local public agency pursuant to Section 10750.7 or 10750.8.

(Added by Stats.1992, c. 947 (A.B.3030), § 2. Amended by Stats.1993, c. 320 (A.B.1152), § 3.)

Historical and Statutory Notes

1992 Legislation

Former § 10753 was repealed by Stats.1992, c. 947 (A.B.3030), § 1. See, now, § 10753.2.

Derivation: Former § 10752, added by Stats.1991, c. 903 (A.B.255), § 1.

§ 10753.2. Hearing; notice; resolution of intention to adopt plan

(a) Prior to adopting a resolution of intention to draft a groundwater management plan, a local agency shall hold a hearing, after publication of notice pursuant to Section 6066 of the Government Code, on whether or not to adopt a resolution of intention to draft a groundwater management plan pursuant to this part for the purposes of implementing the plan and establishing a groundwater management program.

(b) At the conclusion of the hearing, the local agency may draft a resolution of intention to adopt a groundwater management plan pursuant to this part for the purposes of implementing the plan and establishing a groundwater management program.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

Historical and Statutory Notes

Derivation: Former § 10753, added by Stats.1991, c. 903 (A.B.255), § 1.

§ 10753.3. Publication of resolution of intention

(a) After the conclusion of the hearing, and if the local agency adopts a resolution of intention, the local agency shall publish the resolution of intention in the same manner that notice for the hearing held under Section 10753.2 was published.

(b) Upon written request, the local agency shall provide any interested person with a copy of the resolution of intention.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

Historical and Statutory Notes

Derivation: Former § 10754, added by Stats.1991, c. 903 (A.B.255), § 1.

§ 10753.4. Preparation of plan; adoption; expiration of resolution of intention

The local agency shall prepare a groundwater management plan within two years of the date of the adoption of the resolution of intention. If the plan is not adopted within two years, the resolution of intention expires, and no plan may be adopted except pursuant to a new resolution of intention adopted in accordance with this chapter.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

§ 10753.5. Second hearing; notice; protests to adoption of plan

(a) After a groundwater management plan is prepared, the local agency shall hold a second hearing to determine whether to adopt the plan. Notice of the hearing shall be given pursuant to Section 6066 of the Government Code. The notice shall include a summary of the plan and shall state that copies of the plan may be obtained for the cost of reproduction at the office of the local agency.

(b) At the second hearing, the local agency shall consider protests to the adoption of the plan. At any time prior to the conclusion of the second hearing, any landowner within the local agency may file a written protest or withdraw a protest previously filed.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

Historical and Statutory Notes

Derivation: Former § 10755, added by Stats.1991, c. 903 (A.B.255), § 1.

§ 10753.6. Written protest; contents; majority protest

(a) A written protest filed by a landowner shall include the landowner's signature and a description of the land owned sufficient to identify the land. A public agency owning land is deemed to be a landowner for the purpose of making a written protest.

(b) The secretary of the local agency shall compare the names and property descriptions on the protest against the property ownership records of the county assessors.

(c) (1) A majority protest shall be determined to exist if the governing board of the local agency finds that the protests filed and not withdrawn prior to the conclusion of the second hearing represent more than 50 percent of the assessed value of the land within the local agency subject to groundwater management pursuant to this part.

(2) If the local agency determines that a majority protest exists, the groundwater plan may not be adopted and the local agency shall not consider adopting a plan for the area proposed to be included within the program for a period of one year after the date of the second hearing.

(3) If a majority protest has not been filed, the local agency, within 35 days after the conclusion of the second hearing, may adopt the groundwater management plan.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

Historical and Statutory Notes

Derivation: Former §§ 10756, 10757, added by Stats. 1991, c. 903 (A.B.255), § 1.

§ 10753.7. Plan components

A groundwater management plan may include components relating to all of the following:

(a) The control of saline water intrusion.

(b) Identification and management of wellhead protection areas and recharge areas.

(c) Regulation of the migration of contaminated groundwater.

(d) The administration of a well abandonment and well destruction program.

(e) Mitigation of conditions of overdraft.

(f) Replenishment of groundwater extracted by water producers.

(g) Monitoring of groundwater levels and storage.

(h) Facilitating conjunctive use operations.

(i) Identification of well construction policies.

(j) The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects.

(k) The development of relationships with state and federal regulatory agencies.

(*l*) The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

§ 10753.8. Rules and regulations to implement and enforce plan

(a) A local agency shall adopt rules and regulations to implement and enforce a groundwater management plan adopted pursuant to this part.

(b) Nothing in this part shall be construed as authorizing the local agency to make a binding determination of the water rights of any person or entity.

(c) Nothing in this part shall be construed as authorizing the local agency to limit or suspend extractions unless the local agency has determined through study and investigation that groundwater replenishment programs or other alternative sources of water supply have proved insufficient or infeasible to lessen the demand for groundwater.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

§ 10753.9. Potential impact of rules and regulations on business activities; consideration

In adopting rules and regulations pursuant to Section 10753.8, the local agency shall consider the potential impact of those rules and regulations on business activities, including agricultural operations, and to the extent practicable and consistent with the protection of the groundwater resources, minimize any adverse impacts on those business activities.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

CHAPTER 4

FINANCES

Chapter 4 was added by Stats.1992, c. 947 (A.B.3030), § 2.

§ 10754. Local agencies; water replenishment district powers; fees and assessments

For purposes of groundwater management, a local agency that adopts a groundwater management plan pursuant to this part has the authority of a water replenishment district pursuant to Part 4 (commencing with Section 60220) of Division 18 and may fix and collect fees and assessments for groundwater management in accordance with Part 6 (commencing with Section 60300) of Division 18.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

Historical and Statutory Notes

1992 Legislation

Former § 10754 was repealed by Stats.1992, c. 947 (A.B.3030), § 1. See, now, § 10753.3.

Derivation: Former §§ 10759, 10760 added by Stats. 1991, c. 903 (A.B.255), § 1.

§ 10754.2. Annual fees and assessments based on amount of groundwater extracted; payment of costs; remediation program excluded

(a) Subject to Section 10754.3, except as specified in subdivision (b), a local agency that adopts a groundwater management plan pursuant to this part, may impose equitable annual fees and assessments for groundwater management based on the amount of groundwater extracted from the groundwater basin within the area included in the groundwater management plan to pay for costs incurred by the local agency for groundwater management, including, but not limited to, the costs associated with the acquisition of replenishment water, administrative and operating costs, and costs of construction of capital facilities necessary to implement the groundwater management plan.

(b) The local agency may not impose fees or assessments on the extraction and replacement of groundwater pursuant to a groundwater remediation program required by other provisions of law or a groundwater storage contract with the local agency.

(Added by Stats.1992, c. 947 (A.B.3030), § 2. Amended by Stats.1993, c. 320 (A.B.1152), § 4.)

Historical and Statutory Notes

Derivation: Former §§ 10759, 10760 added by Stats. 1991, c. 903 (A.B.255), § 1.

§ 10754.3. Elections to authorize assessments or fees

Before a local agency may levy a water management assessment pursuant to Section 10754.2 or otherwise fix and collect fees for the replenishment or extraction of groundwater pursuant to this part, the local agency shall hold an election on the proposition of whether or not the local agency shall be authorized to levy a groundwater management assessment or fix and collect fees for the replenishment or extraction of groundwater. The local agency shall be so authorized if a majority of the votes cast at the election is in favor of the proposition. The election shall be conducted in the manner prescribed by the laws applicable to the local agency or, if there are no laws so applicable, then as prescribed by laws relating to local elections. The election shall be conducted only within the portion of the jurisdiction of the local agency subject to groundwater management pursuant to this part.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

Historical and Statutory Notes

Derivation: Former § 10761, added by Stats.1991, c. 903 (A.B.255), § 1.

CHAPTER 5

MISCELLANEOUS

Chapter 5 was added by Stats.1992, c. 947 (A.B.3030), § 2.

§ 10755. Annexed land; compliance with plan

(a) If a local agency annexes land subject to a groundwater management plan adopted pursuant to this part, the local agency annexing the land shall comply with the groundwater management plan for the annexed property.

(b) If a local agency subject to a groundwater management plan adopted pursuant to this part annexes land not subject to a groundwater management plan adopted pursuant to this part at the time of annexation, the annexed territory shall be subject to the groundwater management plan of the local agency annexing the land.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

Historical and Statutory Notes

1992 Legislation

Former § 10755 was repealed by Stats.1992, c. 947 (A.B.3030), § 1. See, now, § 10753.5.

Derivation: Former § 10764, added by Stats.1991, c. 903 (A.B.255), § 1.

§ 10755.2. Coordinated plans for local agencies within same groundwater basin; joint powers agreements; agreements with public entities or private parties

(a) It is the intent of the Legislature to encourage local agencies, within the same groundwater basin, that are authorized to adopt groundwater management plans pursuant to this part, to adopt and implement a coordinated groundwater management plan.

(b) For the purpose of adopting and implementing a coordinated groundwater management program pursuant to this part, a local agency may enter into a joint powers agreement pursuant to Chapter 5 (commencing with Section 6500) of Division 7 of Title 1 of the Government Code with public agencies, or a memorandum of understanding with public or private entities providing water service.

(c) A local agency may enter into agreements with public entities or private parties for the purpose of implementing a coordinated groundwater management plan.

(Added by Stats.1992, c. 947 (A.B.3030), § 2. Amended by Stats.1993, c. 320 (A.B.1152), §5.)

Historical and Statutory Notes

Derivation: Former §§ 10758, 10763 added by Stats. 1991, c. 903 (A.B.255), § 1.

§ 10755.3. Meetings to coordinate plans

Local agencies within the same groundwater basin that conduct groundwater management programs within that basin pursuant to this part shall, at least annually, meet to coordinate those programs.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

§ 10755.4. Limitation on application of part

Except in those groundwater basins that are subject to critical conditions of groundwater overdraft, as identified in the department's Bulletin 118–80, revised on December 24, 1982, the requirements of a groundwater management plan that is implemented pursuant to this part do not apply to the extraction of groundwater by means of a groundwater extraction facility that is used to provide water for domestic purposes to a single-unit residence and, if applicable, any dwelling unit authorized to be constructed pursuant to Section 65852.1 or 65852.2 of the Government Code.

(Added by Stats.1992, c. 947 (A.B.3030), § 2.)

§§ 10756 to 10767. Repealed by Stats.1992, c. 947 (A.B.3030), § 1

Historical and Statutory Notes

Sections 10756 and 10757, see, now, § 10753.6.

Section 10758, see, now, § 10755.2.

Sections 10759 and 10760, see, now, §§ 10754 and 10754.2.

Section 10761, see, now, § 10754.3.

Section 10762, see, now, §§ 10750.7 and 10750.8.

Section 10763, see, now, § 10755.2.

Section 10764, see, now, § 10755.

Section 10766, see, now, § 10750.10.

A-2

Proposed Regulation: Title 22, California Code of Regulations
Division 4. Environmental Health, Chapter 3 Reclamation Criteria

PROPOSED REGULATION:

Title 22, CALIFORNIA CODE OF REGULATIONS

DIVISION 4. ENVIRONMENTAL HEALTH

CHAPTER 3. RECLAMATION CRITERIA

ARTICLE 1. DEFINITIONS

Section 60301. Definitions.

(a) **Reclaimed Water.** Reclaimed water means water which, as a result of treatment of domestic wastewater, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.

(b) **Reclamation Plant.** Reclamation plant means an arrangement of devices, structures, equipment, processes and controls which produce a reclaimed water suitable for the intended reuse.

(c) **Regulatory Agency.** Regulatory agency means the California Regional Water Quality Control Board in whose jurisdiction the reclamation plant is located.

(d) **Direct Beneficial Use.** Direct beneficial use means the use of reclaimed water which has been transported from the point of production to the point of use without an intervening discharge to waters of the State.

(e) **Food Crops.** Food crops mean any crops intended for human consumption.

(f) **Spray Irrigation.** Spray irrigation means application of reclaimed water to crops by spraying it from orifices in piping.

(g) **Surface Irrigation.** Surface irrigation means application of reclaimed water by means other than spraying such that contact between the edible portion of any food crop and reclaimed water is prevented.

(h) **Restricted Recreational Impoundment.** A restricted recreational impoundment is a body of reclaimed water in which recreation is limited to fishing, boating, and other non-body-contact water recreation activities.

(i) **Nonrestricted Recreational Impoundment.** A nonrestricted recreational impoundment is an impoundment of reclaimed water in which no limitations are imposed on body-contact water sport activities.

(j) **Landscape Impoundment.** A landscape impoundment is a body of reclaimed water which is used for aesthetic enjoyment or which otherwise serves a function not intended to include public contact.

(k) **Approved Laboratory Methods.** Approved laboratory methods are those specified in the latest edition of "Standard Methods for the Examination of Water and Wastewater," prepared and published jointly by the American Public Health Association, the American Water Works Association, and the Water Pollution Control

Federation and which are conducted in laboratories approved by the State Department of Health.

(l) **Unit Process.** Unit process means an individual stage in the wastewater treatment sequence which performs a major single treatment.

(m) **Primary Effluent.** Primary effluent is the effluent from a wastewater treatment process which provides removal of sewage solids so that it contains not more than 0.5 milliliter per liter per hour of settleable solids as determined by an approved laboratory method.

(n) **Oxidized Wastewater.** Oxidized wastewater means wastewater in which the organic matter has been stabilized, is nonputrescible, and contains dissolved oxygen.

(o) **Biological Treatment.** Biological treatment means methods of wastewater treatment in which bacterial or biochemical action is intensified as a means of producing an oxidized wastewater.

(p) **Secondary Sedimentation.** Secondary sedimentation means the removal by gravity of settleable solids remaining in the effluent after the biological treatment process.

(q) **Coagulated Wastewater.** Coagulated wastewater means oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated by the addition of suitable floc-forming chemicals or by an equally effective method.

(r) **Filtered Wastewater**. Filtered wastewater means an oxidized, coagulated, clarified wastewater which has been passed through natural undisturbed soils or filter media, such as sand or diatomaceous earth, so that the turbidity as determined by an approved laboratory method does not exceed an average operating turbidity of 2 turbidity units and does not exceed 5 turbidity units more than 5 percent of the time during any 24-hour period.

(s) **Disinfected Wastewater.** Disinfected wastewater means wastewater in which the pathogenic organisms have been destroyed by chemical, physical or biological means.

(t) **Multiple Units.** Multiple units means two or more units of a treatment process which operate in parallel and serve the same function.

(u) **Standby Unit Process.** A standby unit process is an alternate unit process or an equivalent alternative process which is maintained in operable condition and which is capable of providing comparable treatment for the entire design flow of the unit for which it is a substitute.

(v) **Power Source.** Power source means a source of supplying energy to operate unit processes.

(w) **Standby Power Source.** Standby power source means an automatically actuated self-starting alternate energy source maintained in immediately operable condition and of sufficient capacity to provide necessary service during failure of the normal power supply.

(x) **Standby Replacement Equipment.** Standby replacement equipment means reserve parts and equipment to replace broken-down or worn-out units which can be placed in operation within a 24-hour period.

(y) **Standby Chlorinator.** A standby chlorinator means a duplicate chlorinator for reclamation plants having one chlorinator and a duplicate of the largest unit for plants having multiple chlorinator units.

(z) **Multiple Point Chlorination.** Multiple point chlorination means that chlorine will be applied simultaneously at the reclamation plant and at subsequent chlorination stations located at the use area and/or some intermediate point. It does not include chlorine application for odor control purposes.

(aa) **Alarm.** Alarm means an instrument or device which continuously monitors a specific function of a treatment process and automatically gives warning of an unsafe or undesirable condition by means of visual and audible signals.

(bb) **Person.** Person also includes any private entity, city, county, district, the State or any department or agency thereof.

(cc) **Direct Injection.** The controlled subsurface addition of water directly into the groundwater basin that results in the replenishment of groundwater used or suitable for use as a source of domestic water supply.

(dd) **General Mineral.** Water analyses for bicarbonate, carbonate, and hydroxide alkalinity, calcium, chloride, copper, foaming agents, iron, magnesium, manganese, pH, sodium, sulfate, specific conductance, total dissolved solids, total hardness, and zinc.

(ee) **General Physical.** Water analyses for color and odor.

(ff) **Initial Percolative Capacity.** The rate (unit volume per unit area per unit time or unit length per unit time) at which water moves through the soil prior to recharge conditions.

(gg) **Organics Removal.** Granular activated carbon adsorption or reverse osmosis treatment designed to remove organic compounds from the reclaimed water.

(hh) **Planned Groundwater Recharge Project.** Any water reclamation project designed for the purpose of recharging groundwater suitable for use as a source of domestic water supply.

(ii) **Project Category I.** A surface spreading recharge project which uses reclaimed water that has been oxidized, filtered, disinfected, and subjected to organics removal.

(jj) **Project Category II.** A surface spreading recharge project which uses reclaimed water that has been oxidized, filtered, and disinfected.

(kk) **Project Category III.** A surface spreading recharge project which uses reclaimed water that has been oxidized and disinfected.

(ll) **Project Category IV.** A direct injection recharge project which uses reclaimed water that has been oxidized, filtered, disinfected, and subjected to organics removal.

(mm) **Project Sponsor.** An agency or agencies that receives from a Regional Water Quality Control Board water reclamation requirements for a planned groundwater recharge project.

(nn) **Surface Spreading.** The controlled application of water to the ground surface for the purpose of replenishing groundwater used or suitable for use as a source of domestic water supply.

(oo) **Total Organic Carbon (TOC).** The oxidizable organic carbon present in the reclaimed water measured by the methods prepared and published jointly by the American Public Health Association, the American Water Works Association, and the Water Pollution Control Federation in Section 5310 of the 17th edition of Standard Methods for the Examination of Water and Wastewater and which are conducted in laboratories approved by the State Department of Health Services.

NOTE: Authority cited: Section 208, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

ARTICLE 5.1. GROUNDWATER RECHARGE

~~Section 60320. Groundwater Recharge.~~

~~(a) Reclaimed water used for groundwater recharge of domestic water supply aquifers by surface spreading shall be at all times of a quality that fully protects public health. The State Department of Health Services' recommendations to the Regional Water Quality Control Boards for proposed groundwater recharge projects and for expansion of existing projects will be made on an individual case basis where the use of reclaimed water involves a potential risk to public health.~~

~~(b) The State Department of Health Services' recommendations will be based on all relevant aspects of each project, including the following factors: treatment provided; effluent quality and quantity; spreading area operations; soil characteristics; hydrogeology; residence time; and distance to withdrawal.~~

~~(c) The State Department of Health Services will hold a public hearing prior to making the final determination regarding the public health aspects of each groundwater recharge project. Final recommendations will be submitted to the Regional Water Quality Control Board in an expeditious manner.~~

<u>Section 60320.01. Planned Groundwater Recharge Projects.</u>

<u>(a) This article shall apply only to planned groundwater recharge projects using reclaimed water. The creation or operation of recharge facilities to cause the infiltration or</u>

injection of reclaimed water into a groundwater basin is evidence of a planned groundwater recharge project.

(b) A wastewater disposal project which is not designed for groundwater recharge, but which incidentally results in portions of the treated wastewater reaching groundwater or discharging to an ephemeral stream, is not covered by this article.

NOTE: Authority cited: Section 208, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.02. Source Control.

All reclaimed water used for planned groundwater recharge projects shall be from a wastewater collection system operating under a comprehensive program for the control of discharge of toxic wastes from point sources, which is approved by the Regional Water Quality Control Board.

NOTE: Authority cited: Section 208, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.03. Treatment Requirements and Performance Standards.

(a) Reclaimed water used for planned groundwater recharge projects shall comply with the following treatment requirements and treatment performance standards. Monitoring requirements and the basis for determining compliance with treatment performance standards are specified in Section 60320.06.

(1) Oxidized Wastewater.

Oxidized wastewater is required for all project categories. The oxidized wastewater prior to recharge shall not exceed 20 milligrams per liter (mg/L) total organic carbon (TOC), 30 mg/L suspended solids (SS), and 30 mg/L biochemical oxygen demand (BOD).

(2) Filtered Wastewater.

(A) Filtered wastewater is required for project categories I, II, and IV.

(B) The turbidity of the filtered wastewater prior to recharge shall not exceed an average of 2 turbidity units.

(C) The turbidity of the filtered wastewater prior to recharge shall not exceed 5 turbidity units more than 5 percent of the time during any 24-hour period.

(3) Disinfected Wastewater.

(A) Disinfected wastewater is required for all project categories.

(B) For project categories I, II, and IV, the median number of total coliform organisms in the disinfected wastewater shall not exceed 2.2 per 100 milliliters (mL). The number of total coliform organisms shall not exceed 23 per 100 mL in more than one sample within any 30-day period.

(C) For project category III, the median number of total coliform organisms in the disinfected wastewater shall not exceed 23 per 100 mL. The number of total coliform organisms shall not exceed 240 per 100 mL in more than one sample within any 30-day period.

(4) Organics Removal.

Reclaimed water used for project categories I and IV shall be subjected to organics removal. The TOC in the wastewater prior to recharge shall be reduced to the concentration specified in Table 1 as identified by the reclaimed water contribution to any affected domestic water supply well and by project category. The entire reclaimed water stream used for project category IV shall be subjected to organics removal.

Table 1. Maximum Allowable TOC after Organics Removal

Reclaimed Water Contribution (%)	Maximum TOC (mg/L)	
	Surface Spreading (Category I)	Direct Injection (Category IV)
0-20	20	5
21-25	16	4
26-30	12	3
31-35	10	3
36-45	8	2
46-50	6	2

NOTE: Authority cited: Section 208, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.04. Reclaimed Water Quality Requirements.

(a) The level of general physical characteristics, radioactivity, and the concentration of general mineral, inorganic chemicals (except nitrogen compounds), and organic chemicals in the reclaimed water prior to recharge shall not exceed the maximum contaminant levels specified in Chapter 15, Sections 64435, 64443, 64444.5, and 64473.

(b) The total nitrogen concentration of the reclaimed water shall not exceed a standard of 10 mg/L as nitrogen unless the project sponsor demonstrates that the standard can be consistently met prior to reaching the groundwater level.

NOTE: Authority cited: Section 208, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.05. Recharge Site Requirements.

(a) Maximum Reclaimed Water Contribution.

(1) For project categories II and III, all the water of reclaimed water origin extracted from any domestic water supply well shall not exceed 20 percent of the total flow.

(2) For project categories I and IV, all the water of reclaimed water origin extracted from any domestic water supply well shall not exceed 50 percent of the total flow.

(3) Calculation of the percent in section 60320.05(a)(1 and 2) shall be based upon the reclaimed water contribution of all planned groundwater recharge projects affecting the basin.

(b) Minimum Depth-To-Groundwater Requirement.

(1) Planned groundwater recharge projects using surface spreading shall meet the minimum depth-to-groundwater requirements specified in Table 2 by project category and initial percolative capacity.

(2) Planned groundwater recharge projects shall not be allowed where the initial percolative capacity exceeds 0.3 in/min.

(3) The initial percolative capacity shall be determined once by representative testing of the spreading area prior to the start of groundwater recharge and shall reflect conditions throughout the required depth to groundwater. The testing procedure and results shall be described in the engineering report submitted pursuant to Section 60320.07.

(A) For existing surface spreading basins using reclaimed water or other waters, the initial percolative capacity shall be determined at least 14 days after the basins which make up a spreading area have been drained and at least 24 hours after pre-recharge conditions have been restored in the bottom of the basin.

(B) For proposed surface spreading basins, the initial percolative capacity shall be determined in a prototype basin or basins.

Table 2. Minimum Required Depth-to-Groundwater for Surface Spreading Groundwater Recharge Projects

	Minimum Depth-to-Groundwater (ft)		
Initial Percolative Capacity (in/min)	Project Category		
	I	II	III
≤0.2	10	10	20
≤0.3	20	20	50

(c) **Minimum Retention Time Underground and Horizontal Separation Requirements.**

(1) Reclaimed water shall be retained underground a minimum of 6 months prior to being withdrawn at a domestic water supply well for project categories I and II.

(2) Reclaimed water shall be retained underground a minimum of 12 months prior to being withdrawn at a domestic water supply well for project categories III and IV.

(3) The minimum horizontal separation between an area where reclaimed water is applied by surface spreading and a domestic

water supply well shall be 500 feet for project categories I and II.

(4) The minimum horizontal separation between an area where reclaimed water is applied by surface spreading and a domestic water supply well shall be 1000 feet for project category III.

(5) The minimum horizontal separation between the point where reclaimed water is applied by direct injection and a domestic water supply well shall be 2000 feet for project category IV.

(6) The project sponsor shall prevent the use of groundwater for drinking water within the area required to achieve the minimum retention time and minimum horizontal separation pursuant to Section 60320.05 (c)(1-5).

(d) Monitoring Wells.

Monitoring wells shall be provided to detect the influence of the recharge operation. As a minimum, monitoring wells shall be located at points one-quarter and one-half of the distance (plus or minus 10%) from the recharge area to the nearest domestic water supply well. The number and location of the proposed monitoring wells shall be described in the engineering report submitted pursuant to Section 60320.07.

NOTE: Authority cited: Section 208, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.06. Monitoring and Compliance.

(a) Treatment Performance Standards.

(1) Oxidized Wastewater. For all project categories, the BOD, SS, and TOC concentration of the oxidized wastewater shall be determined from 24-hour composite samples. Compliance with Section 60320.03(a)(1) shall be determined monthly for each constituent by averaging the results of all samples collected during the month and comparing the average to the standard in Section 60320.03(a)(1).

(A) The BOD samples for all project categories shall be collected at least weekly.

(B) The SS samples for all project categories shall be collected at least daily.

(C) The TOC samples for project categories II and III shall be collected at least daily.

(D) The TOC samples for project categories I and IV shall be collected at least weekly.

(2) Filtered Wastewater. For project categories I, II, and IV, the turbidity of the filtered wastewater shall be continuously measured and recorded.

(A) Turbidity measurements shall be read at least once every 4 hours. Compliance with the average operating turbidity pursuant to Section 60320.03(a)(2)(B) shall be determined monthly by averaging the results of all turbidity samples read during the month and comparing the average to the turbidity standard in Section 60320.03(a)(2)(B).

(B) The turbidity record shall be read daily. Compliance with the high turbidity duration standard pursuant to Section 60320.03(a)(2)(C) shall be determined monthly by determining the highest percent of a day during the month that the filtered wastewater exceeded 5 turbidity units and comparing that percent to the standard in Section 60320.03(a)(2)(C).

(3) **Disinfected Wastewater.** For all project categories, bacteriological samples shall be collected and tested for coliform to monitor the performance of the disinfection process each day reclaimed water is produced for planned groundwater recharge projects. Compliance with the disinfected wastewater requirements pursuant to Section 60320.03(a)(3) shall be determined daily by determining the median coliform result of the last 7 days for which analyses have been completed and comparing that median to the appropriate coliform standard in Section 60320.03(a)(3).

(4) **Organics Removal.** For project categories I and IV the TOC concentration in the wastewater after the organics removal process shall be determined daily from 24-hour composite samples. Compliance with the organics removal requirement pursuant to Section 60320.03(a)(4) shall be determined daily

by averaging daily TOC concentrations for the last 90 days of operation and comparing that average to the appropriate maximum TOC concentration in Section 60320.03(a)(4).

(b) Reclaimed Water Quality.

(1) On a quarterly basis, grab or 24-hour composite samples of reclaimed water shall be collected and analyzed for the general mineral and general physical constituents listed in subsections 64433(1) and (2), for the inorganic chemicals (except nitrogen compounds) listed in Section 64435 (Table 2), and for gross alpha and gross beta. Compliance with Section 60320.04(a) shall be determined annually by averaging the results of all samples collected during the previous 12 months and comparing the average to the standards in Section 64473 (Table 6), Section 64435 (Table 2), and Section 64443 (Table 4).

(2) On a quarterly basis, grab samples of reclaimed water shall be collected and analyzed for the organic chemicals in Table 5, Section 64444.5. Compliance with Section 60320.04(a) shall be determined annually by averaging the results of all samples collected during the previous 12 months and comparing the average to the standards in Section 64444.5 (Table 5).

(3) On a weekly basis, grab or 24-hour composite samples shall be collected and analyzed for total nitrogen. Compliance with Section 60320.04(b) shall be determined annually by averaging the results of all samples collected

during the previous 12 months and comparing the average to the total nitrogen standard in Section 60320.04(b).

(c) **Recharge Site Requirements.**

(1) **Maximum Reclaimed Water Contribution.**

(A) The reclaimed water contribution, pursuant to Sections 60320.03(a)(4) and 60320.05(a), shall be determined annually and at the domestic water supply well which receives the highest percentage of reclaimed water. The method used for the annual determination shall be described in the engineering report pursuant to Section 60320.07. Compliance with the maximum reclaimed water contribution shall be determined by averaging the last five annual determinations of reclaimed water contribution and comparing that average to the appropriate maximum percent contribution in Section 60320.05(a).

(B) The project sponsor shall demonstrate and document, once every five years, in a complete engineering report to the Regional Water Quality Control Board and the Department of Health Services that the maximum reclaimed water contribution pursuant to Section 60320.05(a) will not be exceeded.

(2) **Minimum Depth-to-Groundwater Requirement.**

(A) The depth-to-groundwater shall be measured every day reclaimed water is present in the spreading basin.

Compliance with Section 60320.05(b) shall be determined daily by averaging the previous 30 daily depth-to-groundwater measurements taken when reclaimed water was present in the spreading basin and comparing the result to the appropriate standard in Table 2.

(B) When the average depth-to-groundwater is less than the depth-to-groundwater requirement pursuant to Section 60320.05(b), the discharge of reclaimed water onto the spreading basin shall be halted until the depth-to-groundwater measurement exceeds the required depth-to-groundwater pursuant to Section 60320.05(b).

(C) The depth-to-groundwater shall be measured at at least one monitoring well located at each spreading basin. The location of this well shall be specified in the engineering report pursuant to Section 60320.07. The monitoring well shall be sited so that the groundwater level is measured at a point where it is closest to the bottom of the spreading basin.

(3) Minimum Retention Time Underground and Horizontal Separation Requirements.

(A) The retention time underground, pursuant to Section 60320.05(c), shall be determined annually and at the domestic water supply well in which the reclaimed water has the shortest retention time underground. The method used for the annual determination shall be described in the engineering report pursuant to Section 60320.07. Compliance with the minimum retention time underground shall be determined by averaging the last five annual determinations of retention time and comparing that average to the appropriate retention time in Section 60320.05(c).

(B) The project sponsor shall demonstrate and document, once every five years, in a complete engineering report to the Regional Water Quality Control Board and Department of Health Services that the minimum retention time underground pursuant to Section 60320.05(c) will not be exceeded.

(C) Compliance with the horizontal separation requirement pursuant to Section 60320.05(c) for surface spreading and direct injection projects shall be determined by taking field measurements of the shortest distance between a point of recharge and a domestic water supply well. In no case shall the distance be less than the horizontal separation requirement pursuant to Section 60320.05(c).

(d) Monitoring Well Requirements.

Samples shall be collected from monitoring wells at least quarterly and analyzed for TOC and total nitrogen.

NOTE: Authority cited: Section 208, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.07. Engineering Report.

(a) Any project sponsor proposing a groundwater recharge project using reclaimed water shall submit an engineering report on the proposed groundwater recharge project to the regulatory agency. The report shall be prepared by an engineer registered in California and experienced in the fields of wastewater treatment and public water supply, in conjunction with a geologist, experienced in hydrogeology and registered in California.

(b) Groundwater recharge projects not in operation by January 1, 1993, shall not recharge reclaimed water until the project sponsor submits a complete engineering report to the Regional Water Quality Control Board and the Department of Health Services. For direct injection projects, the Department will not schedule a hearing pursuant to section 13540, Article 6, until a complete engineering report has been received by the Department.

(c) For existing groundwater recharge projects, project sponsors have five years from January 1, 1993 to submit a completed engineering report to the Regional Water Quality control Boards and Department of Health Services.

(d) For existing and proposed groundwater recharge projects, the engineering report shall consist of a thorough investigation and evaluation of the groundwater recharge project, impacts on the existing and potential uses of the impacted groundwater basin, and proposed means for achieving compliance with Sections

60320.01 to 60320.06. The engineering report shall include, but not be limited to the following:

(1) An engineering plan of the reclamation plant, transmission facilities, spreading basins/direct injections wells, and monitoring wells.

(2) A physical description of the proposed groundwater recharge project.

(3) A hydrogeologic study on the impacted groundwater basin. The study shall describe the impact of the recharge project on domestic groundwater sources. The study shall describe the source, area of recharge, quantity, quality, and groundwater flow patterns of all basin recharge waters. The study shall identify all quantities and sources of water used to determine the percent reclaimed water contribution. The study shall identify the aquifer zone in which the maximum allowed reclaimed water contribution is not met pursuant to Section 60320.05(a). The study shall identify the aquifer zone in which the provided organics removal is not sufficient for the reclaimed water contribution to the groundwater pursuant to Section 60320.03(a)(4). The study shall identify all wells that will be impacted by the proposed project and describe the groundwater quality in the impacted basin. The study shall identify the well(s) subject to the highest reclaimed water contribution and shortest reclaimed water retention time. The study shall also include quantitative

descriptions of the soil, soil layers, infiltration rates, aquifer transmissivity, groundwater movement, historic depth-to-groundwater, safe yield of the basin, and usable storage capacity of the basin.

(4) A description of the operational and management personnel, their qualifications, experience, and responsibilities.

(5) A description of how the project will be operated to comply with the recharge site requirements of maximum reclaimed water contribution, minimum depth-to-groundwater, horizontal separation, and retention time underground pursuant to Section 60320.05 (b and c).

(6) Identification of the agency responsible for preventing the use of groundwater for drinking water within certain areas pursuant to Section 60320.05 (c)(6), and the mechanism that will be used.

(7) A contingency plan for redirection of reclaimed water when treatment performance standards or depth-to-groundwater requirements are not met.

(8) A description of the methods of determination and results for initial percolative capacity, maximum reclaimed water contribution, minimum retention time underground, and horizontal separation.

(9) The number and location of monitoring wells in the spreading basin and groundwater basin.

(10) A plan for the monitoring well network to monitor groundwater flow and water quality in the impacted groundwater basin.

(11) A water quality monitoring plan for the treated wastewater, reclaimed water, and monitoring wells.

NOTE: Authority cited: Section 208, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.08. Alternatives.

(a) Alternatives to the recharge site requirements specified in Section 60320.05 (b) and (c) (2, 4, and 5), or the treatment performance standards specified in Section 60320.03 (a)(1 to 4) may be allowed if the project sponsor demonstrates to the regulating agency that the proposed alternative reliably achieves an equal degree of public health protection. Alternatives may not be used to reduce the retention time below 6 months in Section 60320.05 (c)(2) or the horizontal separation below 500 feet in Section 60320.05 (c)(4 and 5). Alternatives to Sections 60320.01 to 60320.07, inclusive, shall not be allowed, unless the planned groundwater recharge projects meet the requirements of Section 60320.08 (b to e) or 60320.09

(b) Alternatives to achieve a disinfected and filtered wastewater pursuant to Section 60320.03(a)(2) and (a)(3)(B and C) shall be accepted if the project sponsor demonstrates to the regulating agency that the alternatives reliably provide an equal degree of public health protection. Such a demonstration shall be based on the results from a prior equivalency demonstration, pilot-plant testing, or full-scale testing on an installation that is treating a wastewater with similar flow and wastewater quality characteristics as the wastewater proposed for treatment.

(c) Alternatives to the granular activated carbon or reverse osmosis treatment processes shall be accepted if the project sponsor demonstrates to the regulating agency that the organics removal treatment performance standards pursuant to Section 60320.03 (4) can be reliably met. Such a demonstration shall be based on the results from a prior equivalency demonstration, pilot-plant testing, or full-scale testing on an installation that is treating a wastewater with similar flow and wastewater quality characteristics as the wastewater proposed for treatment.

(d) The results of any alternative demonstration shall be presented in a complete report prepared and signed by an engineer registered in California and experienced in the fields of wastewater treatment and public water supply. Such alternatives shall not be accepted until the Regional Water Quality Control Boards and the Department of Health Services have reviewed the reports.

(e) Within 60 days following the first full year of operation of any alternative approved by the regulating agency, the project sponsor shall submit an report, prepared by an engineer registered in California and experienced in the fields of wastewater treatment and public water supply, describing the effectiveness of the plant operation. The report shall include results of all water quality tests performed and shall evaluate compliance with established performance standards under actual operating conditions. It shall also include an assessment of problems experienced, corrective actions needed, and a schedule for providing needed improvements.

NOTE: Authority cited: Section 208, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.09. Research and Demonstration Projects.

The maximum percentage reclaimed water contribution in the total flow extracted from any domestic water supply well pursuant to Section 60320.05(a)(2) shall not apply to a project which the Department has designated as a research and demonstration project for the purpose of conducting special monitoring, treatment, health effects, or other research studies.

NOTE: Authority cited: Section 208, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

A-3

Drinking Water Standards and Health Advisories Table

UNITED STATES ENVIRONMENTALPROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

DRINKING WATER STANDARDS AND HEALTH ADVISORIES TABLE

DECEMBER 1993

DRINKING WATER AND GROUNDWATER PROTECTION BRANCH

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REGION 9 DRINKING WATER STANDARDS AND HEALTH ADVISORIES TABLE

The USEPA Region 9 Drinking Water Standards and Health Advisories Table is a compendium of numerical standards, advisories and related information for chemicals and other contaminants which may be found in ground and surface waters. It provides a comprehensive listing of all current and proposed National Primary Drinking Water Regulations (NPDWRs), specific Maximum Contaminant Levels (MCLs) for California, Arizona and Hawaii, and California Drinking Water Action Levels. Where available, it includes USEPA Integrated Risk Information System (IRIS) cancer risk levels and oral reference dose (RfD) values, and USEPA Office of Ground Water and Drinking Water (OGWDW) Health Advisories for drinking water contaminants.

In order to make this table a manageable size, very few explanations or caveats for the values are included in the body of the table. Because of this, and the fact that background documentation and understanding of the derivation of specific values are critical to the proper use of this information, this table should not be used as a sole source of information for decision making. While the Appendix contains brief explanations of the different standards, criteria and advisories, consideration must be given to the context in which these numbers will be used. The appropriate reference materials should be consulted to determine the applicability of the number being considered. Some references are listed in the Appendix.

The values in this table are current to the publication date, but are subject to change. The user is advised to contact Bruce Macler, Regional Toxicologist, USEPA Region 9, at (415) 744-1884, if questions arise regarding current values.

INFORMATION IN THIS TABLE

The information for specific contaminants in this table is arranged by contaminant type. Inorganic chemicals are listed first, followed by radionuclides, organic chemicals, microbial contaminants and water quality factors.

For each contaminant, any applicable or proposed USEPA National Primary Drinking Water Regulation is listed. These include the enforceable **Maximum Contaminant Levels (MCLs)**, the health-based **Maximum Contaminant Level Goals (MCLGs)**, and the aesthetics-based **Secondary MCLs**. A given contaminant may have both a MCL and a Secondary MCL, as well as a MCLG. The regulatory status of these values is indicated. **Proposed MCLs or MCLGs** have been formally proposed by USEPA, but not promulgated. **Final MCLs or MCLGs** have been promulgated, but are not yet effective as of the publication date. The effective date, if available, is indicated. **Current MCLs or MCLGs** are in effect.

In addition to regulatory information, health risk information is provided in the table. Data from IRIS for cancer and non-cancer health effects associated with drinking water contaminants is listed. The **RfD** is the daily oral intake (on a body weight basis) that is below the level USEPA believes to be without adverse, non-cancer health risks (i.e., zero risk). The IRIS **10^{-6} risk level** is that contaminant concentration (in ug/liter) in drinking water that might yield no greater than an additional risk of one-in-a-million (10^{-6}) after a lifetime of drinking that water. The USEPA OGWDW Health Advisories provide information on acceptably safe levels of exposures to contaminants in drinking water. The **Acute 10-day** values apply specifically to acute toxic effects on children, but should be protective for adults. The **chronic (lifetime)** values for non-cancer health effects should be protective of health even with a lifetime exposure. In most cases, this value will be the same as the MCLG, if one has been established. The chronic (lifetime) values for cancer are set at a level that should yield no greater than an additional 10^{-6} risk over a lifetime exposure. EPA **cancer weight of evidence** determinations are listed to provide additional information on EPA's judgement of carcinogenicity for each chemical. The weight of evidence classifications are as follows:

A known human carcinogen
B1 probable human carcinogen based on human data
B2 probable human carcinogen based on animal data
C possible human carcinogen based on animal data
D insufficient data to classify chemical
E not a human carcinogen

APPLICABILITY AND USES OF THIS TABLE

The different types of standards and advisories contained in this table are based upon approaches and assumptions that are specific to each and consequently may have varying applications depending on their derivation. Use of specific types of information should be guided by the relevant legal requirements and an understanding of the meaning of the information itself.

MCLs and treatment techniques are the only federally enforceable NPDWRs. They are set to be health protective as well as feasible. More stringent state-specific MCLs are enforceable in the indicated state. MCLGs are not enforceable, but provide health-based guidance for decision making. MCLGs for chemicals causing non-carcinogenic health effects are based on the RfD and set at a level believed to be safe. MCLGs for chemicals believed to be carcinogens are set at zero, from the perspective that no level of carcinogen is safe. Feasibility is not considered in setting MCLGs. Secondary MCLs are not enforceable, but provide information on aesthetics and palatability.

Health advisories and criteria are not formally promulgated in regulations and are subject to change as new data and analyses become available. MCLGs, values in IRIS and health advisories are developed by different offices and on different schedules. Therefore, values for similar effects from a given chemical may not be consistent throughout the table. The derivations of MCLGs and chronic (lifetime) health advisories for non-carcinogenic chemicals are based on the same assumptions regarding endpoints of toxicity. In theory, the MCLG and lifetime health advisory should be the same for a specific contaminant. Slight differences in the table are due to rounding of numbers.

When considering a value to use for determining an acceptable level of contaminant in drinking water, the MCL should be selected first. In the absence of existing or proposed MCLs, users may have to decide which criteria are most appropriate. USEPA recommends a priority ranking to first consider any proposed MCLG (if other than zero), followed by the IRIS RfD or cancer risk level, and finally the chronic health advisory values.

Under the **Superfund Program**, remdial actions must comply with the **Applicable or Relevant and Appropriate Requirements (ARARs)**. For actions involving contamination of drinking water supplies, the ARARs under the Safe Drinking Water Act are the MCLs. Where there are no MCLs, or where the MCLs are determined to be insufficiently protective because of multiple contaminants, reference should be made to Superfund guidance documents to determine clean-up policy. For remedial actions impacting aquatic organisms and waters regulated under the Clean Water Act, consult the National Ambient Water Quality Criteria (NAWQC).

SYMBOLS USED IN THE TABLE

mg/l = milligrams per liter, equivalent to parts per million (**ppm**)
ug/l = micrograms per liter, equivalent to parts per billion (ppb)

<u>Note: values in table are in ug/l unless otherwise stated</u>

IRIS = USEPA Integrated Risk Information System
RfD = Reference dose for daily oral ingestion in micrograms per kilogram body weight per day (ug/kg-d)
10^{-6} = one in a million excess lifetime cancer risk
TT = treatment technique, set in lieu of numeric MCL
+ = value from USEPA Final Draft Health Advisory
td = temperature dependent value
LOQ = Limit of quantification
T&O = taste and odor refers to a value based upon organoleptic data for controlling undersirable taste and odor qualities

INORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Aluminum	Secondry	50-200								1000		
Ammonia							30,000		D			
Antimony	Current	6	6	0.4		15	3		D			
Arsenic	Current	50		0.3	0.02			0.02	A	50		50
Asbestos	Current	7E+6 long fi	7E+6 bers						A			
Barium	Current	2,000	2,000	70			2,000+		D	1,000		1000
Beryllium	Current	4	4	5	.008	30,000		0.008	B2			
Boron				90		900	600		D			
admium	Current	5	5	.5		40+	5+		D	10		10
Chloramine				100		1000	2600		D			
Chlorate									D			
Chloride	Secondry	250ppm										
Chlorine									D			
Chlorine Dioxide				3			80		D			

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Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.

INORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Chlorite												
Chromium(Total)	Current	100	100	5		1,000+	100+		D	50		50
Copper	Current Secondry	TT## 1,000	1,300						D			
Cyanide	Current	200	200	22		200+	200+		D			
Fluoride	Current Proposed secondry	4,000 2,000	4,000	120					D	1400-2400td		
Iron	Secondry	300										
Lead	Current	TT#	0						B2	50		
Manganese	Secondry	50		140								
Mercury (inorganic)	Current	2	2	0.3			2+		D	2		
Molybdenum				5		80	35		D			
Nickel	Current	100	100	20		1,000+	100+		D			
Nitrate (as N)	Current	10ppm	10ppm	1600		10,000+***			D	45ppm as NO3		10ppm (as N)
Nitrite (as N)	Current	1,000	1,000	160		1,000+***			D			
Selenium	Current	50	50	5						10		50

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Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.
TT - Treatment technique in lieu of numeric MCL
- Treatment technique triggered at Action Level of 1300 ppb
td - td- temperature dependent value
- Treatment technique and public notification triggered at Action Level of 15 ppb
*** - 10-day HA for nitrate/nitrite for 4kg child (protective of 10kg child & adults); also used for chronic (lifetime)

INORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Silver	Secondry	100		5		200	100		D	50		50
Strontium				600		25,000	17,000		D			
Sulfate	Secondry	250 ppm										
Thalium	Current	2	0.5	0.07		7	0.4					
Vanadium				7					D			
Zinc	Secondry	5,000		300		6,000	2,000		D			5,000
Acrylonitrile					0.06	20+		0.06+	B1			10
RADIONUCLIDES												
ross Alpha, excl. ranium & Radon	Current	15pCi/l						.15pCi/l	A	15pCi/l		
Gross Beta	Current	4mrem per yr						0.04mrem per year	A	50pCi/l		
Radium 226	Current Proposed	5 pCi/l (+228) 20pCi/l	 0					.22-.26 pCi/l	A	5 pCi/l (+Ra 22		
Radium 228	Current Proposed	5 pCi/l (+226) 20pCi/l	 0					.22-.26 pCi/l	A	5 pCi/l (+Ra 22		
Radon	Proposed	300 pCi/l	0					1.5pCi/l	A			
Strontium 90									A	8pCi/l		

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RADIONUCLIDES Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Tritium									A	20nCi/l		
Uranium	Proposed	20 ppb	0					0.7 ppb	A	20pCi/l		35pCi/l
ORGANIC												
Acenaphthylene (acenapthene)				60								
Acephate				4					C			
Acetone				100					D			
Acetophenone				100								
Acifluorfen				13	1.0	2,000+		1.0+	B2			
Acrolein									C			320
Acrylamide	Current	TT	0	0.2	.01	30+		0.01+	B2			
Adipates (di(ethylhexyl)-adipate)	Current	400	400	600	0.03	20,000	400	0.03	C			
Alachlor	Current	2	0	10	0.4	100+		0.4+	B2		LOQ (.2)	0.2
Aldicarb	Final(a)	3	1	1.0			7+		D		10	9
Aldicarb Sulfone	Final(a)	2	1	1.0			7+		D			

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Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.
TT - Treatment technique in lieu of numeric MCL
a - Effective date postponed

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Aldicarb Sulfoxide	Final(a)	4	1	1.0			7+		D			
Aldrin				0.03	.002	0.3		0.002	B2		LOQ (0.05)	
Allyl alcohol				5								
Ametryn				9		9,000+	60+		D			
Ammonium Sulfamate				280		20,000+	2,000+		D			
Anthracene (PAH)				300					D			
Atrazine	Current	3	3	35	0.16	100+	3+		C	3		(HI 3)
Baygon (ropoxur)				4		40+	3+		C		90	
nefin				300								
Bentazon (Basagran)				2.5		300+	20+		D	18		
Benzene	Current	5	0		1	200+		1.0+	A	1		5
Benzene hexachloride α, β isomers (BHC)											0.7 α 0.3 β	
Benz(a)anthracene (PAH)	Proposed	0.1	0						B2			
Benzo(a)pyrene (PAH)	Current	0.2	0						B2			

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Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.
HI - State of Hawaii MCL

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Benzo(b)fluoranthene (PAH)	Proposed	0.2	0						B2			
Bolero (thiobencarb)										70		
Bromacil				130		5,000+	90+		C			
Bromochloromethane				13		1,000	90					
Bromodichloro-methane (THM)	Current	100 a		20	0.6	7,000+		0.6	B2			
Bromoform (THM)	Current	100 a		20	4	2,000		4	B2			
Bromomethane (Methyl Bromide)				1		100+	10+		D			2.5
Butyl benzyl-phthlate (PAE)	Proposed	100	0	200					C			
Butylate				50		2,000+	350+		D			
Captafol				2	4				C			
Captan				130					B2		350	
Carbaryl				100		1,000+	700+		D		60	
Carbofuran	Current	40	40	5		50+	40+		E	18		36
Carbon Disulfide				100								830

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Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.
a - Total Trihalomethanes MCL includes 4 compounds: chloroform, bromodichloromethane, dibromochlormethane, bromoform

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Carbon Tetrachloride	Current	5	0	0.7	0.3	200+		0.3+	B2	0.5		5
Carboxin				100		1,000+	700+		D			
Chloral Hydrate				0.2		1,400	60		D			
Chloramben				15		3,000+	100+		D			
Chlordane	Current	2	0	0.06	0.03	60+		0.03+	B2	0.1		
2,4-Dinitrotoluene				2	50	500		50	B2			
Chlorobenzene (Monochlorobenzene)	Current	100	100	20		2,000+	100+		D	30		
Chlorodibromomethane (THM)	Current	100 @		20		7,000	60		C			
Chloroform (trichloromethane) (THM)	Current	100 @		10	6	4,000		6.0	B2			
bis-2-Chloroiso-propyl ether				40		4,000+	300+		D			
Chloromethane				4		400	3		C			
2-Chlorophenol				5		50	40		D			
Chloropicrin											50(37 T&O)	
Chlorothalonil				15	1.5	200+		1.5+	B2			

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@ - Total Trihalomethanes MCL includes 4 compounds: chloroform, bromodichloromethane, dibromochlormethane, bromoform

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Chlorotoluene(o,p)				20		2,000+	100+		D			
CIPC (Chlorpropham) (isopropylN(3chloro-phenyl) carbamate)				200							350	
Chlorpyrifos				3		30+	20+		D			
Cresol(o,m)				500					C			
Cyanazine				2		100+	1		C			
DDT				0.5	0.1				B2			
Dalapon	Current	200	200	26		3,000+	200+		D			
DCPA (Dacthal)				500		80,000+	4,000+		D			
Di(ethylhexyl)-adipate (Adipates)	Current	400	400	600	0.03	20,000	400+	0.03	C			
Diazinon				0.09		20+	0.6+		E		14	
Dibromochloro-methane (THM)	Current	100 @		20		7,000	60		C			
1,2-Dibromo-3-chloro propane (DBCP)	Current	0.2	0		0.03	50+		0.03	B2	0.2		(HI.04)
Dibutyl phthalate (PAE)				100					D			
Dicamba				30		300+	200+		D			

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Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.
@ - Total Trihalomethanes MCL includes 4 compounds: chloroform, bromodichloromethane, dibromochlormethane, bromoform
HI - State of Hawaii MCL

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Dichloroacetic Acid				8		50,000+			B2			
Dichloroacetonitrile				8		1000+	6+		C			
1,2-Dichlorobenzene (o-Dichlorobenzene)	Current Proposed secondry	600 10	600	90		9,000+	600+		D		130 *** (10T&O)	
1,3-Dichlorobenzene (m-Dichlorobenzene)	Current	600	600	90		9,000+	600+		D		130 *** (20T&O)	
1,4-Dichlorobenzene (p-Dichlorobenzene)	Current Proposed secondry	75 5	75	100		10,000+	75+		C	5		750
Dichlorodifluoro-methane (Freon 12)				200		40,000+	1,000+		D			1.0
1,1-Dichloroethane										5		
1,2-Dichloroethane	Current	5	0		0.4	700+		0.4	B2	0.5		5.0
1-Dichloroethylene	Current	7	7	9		1,000+	7+		C	6		7.0
cis-1,2-Dichloro-ethylene	Current	70	70	10		3,000+	70+		D	6		
trans-1,2-Dichloro-ethylene	Current	100	100	20		2,000+	100+		D	10		
Dichloromethane (Methylene chloride)	Current	5	0	60		2,000+		5+	B2		40	
2,4-Dichlorophenol				3		30+	20+		D			
2,4-Dichlorophenoxy -acetic acid (2,4-D)	Current	70	70	10		300+	70+		D	100		100

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*** - Action Level is for a single isomer or sum isomers

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
1,2-Dichloropropane	Current	5	0		0.5	90+		0.5+	B2	5		
1,3-Dichloropropene				0.3	0.2	30+		0.2+	B2	0.5		
Dieldrin				0.05	.002	0.5+		0.002+	B2		LOQ-(0.05)	
Diethylphthalate (PAE)				800			5000+		D			
Diisopropylmethyl-phosphonate				80		8,000+	600+		D			
Dimethoate				0.2							140	
Dimethrin				300		10,000+	2,000+		D			
Dimethylaniline				20	0.05				C			
2,4-Dimethylphenol				200							400 (T&O)	
2,6-Dinitrotoluene				1.0	50 (tg)	400		50 (tg)	B2 (TG)			
1,3 Dinitrobenzene				0.1		40	1		D			
Dinoseb	Current	7	7	1		300+	7+		D			
1,4-Dioxane (p-Dioxane)					7	400+		7+	B2			
Dioxin (2,3,7,8-TCDD)	Current	3E-5	0	1E-6	2E-7	1E-4		2E-7+	B2			

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tg - technical grade dinitrotoluene only

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Diphenamid(e)				30		300+	200+		D		40	
Di(ethylhexyl)-phthalate (PAE) (Phthalates)	Current	6	0	20	3			3+	B2	4		
Diquat	Current	20	20	2.2			20+		D			
Disulfoton				0.04		10+	0.3+		E			
Diuron				2		1,000+	10+		D			
Endothall	Current	100	100	20		800+	100+		D			
Endrin	Current	2	2	0.3		20+	2+		D	.2		0.2
Epichlorohydrin	Current	TT	0	2	4	100+		4	B2			
hion				0.5							35	
Ethylbenzene	Current Proposed secondry	700 30	700	100		3,000+	700+		D	680		
Ethylene Dibromide (dibromoethane) (EDB)	Current	0.05	0		4E-4	8		0.0004	B2	0.02		(HI.04)
Ethylene Glycol				2,000		6,000+	7,000+		D			
Ethylene Thiourea (ETU)				0.08	0.3	300+		0.3	B2			
Fenamiphos				0.25		9+	2+		D			

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Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.
TT - Treatment technique in lieu of numeric MCL
HI - State of Hawaii MCL

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Fluometuron				13		2,000+	90+		D			
Fluorotrichloro-methane				300		7,000+	2,000+		D			
Folpet				100					B2			
Fonofos				2		20+	10+		D			
Formaldehyde				150		5,000+	1,000+		B1		30	
Glycidaldehyde				4					B2			
Glyphosate	Current	700	700	100		20,000+	700+		D	700		
HMX				50		5,000+	400+		D			
Heptachlor	Current	0.4	0	0.5	.008	10+		0.008+	B2	0.01		
Heptachlor epoxide	Current	0.2	0	0.013	.004			0.004	B2	0.01		
Hexachlorobenzene (Perchlorobenzene) (HCB)	Current	1	0	0.8	0.02	50+		0.02+	B2			
Hexachlorobutadiene				2		300+	1+		C			
Hexachlorocyclo-pentadiene (HEX)	Current Proposed secondry	50 8	50	7					D			
n-Hexane						4,000+			D			

Values are indicated in micro grams per liter (µg/l) [equivalent to parts per billion (ppb)] unless otherwise stated

Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Hexazinone				33		3,000+	200+		D			
Isophorone				200		15,000+	100+		C			
Lindane (gamma-HCCH) (gamma-BHC)	Current	0.2	0.2	0.3		1,000+	0.2+	0.03	C	4		
Linuron				2					C			
MCPA				1.5		100+	11+		E			
Malathion				20		200+	200+		D		160	
Maleic Hydrazide				500		10,000+	4,000+		D			
Cresol(p)				5					C			
erphos				0.3								
Methomyl (Lannate)				25		300+	200+		D			
Methoxychlor	Current	40	40	5		50	40		D	100		
Methylene Chloride (Dichloromethane)	Current	5	0	60	5	2,000+		5+	B2		40	
Methyl ethyl ketone (MEK,2-Butanone)				600					D			
Methyl Parathion				.25		300+	2+		D		30	

Values are indicated in micro grams per liter (µg/l) [equivalent to parts per billion (ppb)] unless otherwise stated

Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Methyl t-butyl ether				5		3,000+	40+		D			
Metolachlor				150		2,000+	100+		C			
Metribuzin				25		5,000+	200+		D			
Mirex				0.2	.02				B2			
Molinate				2						20		
Naphthalene				4		500+	20+		D			
Nitroguanidine				100		10,000+	700+		D			
Oxamyl (Vydate)	Current	200	200	25		200+	200+		E			
Paraquat				4.5		100+	30+		E			
Parathion (Ethyl Parathion)				6					C		30	
Pentachloronitro-benzene (Terrachlor)				3	0.1				C		0.9	
Pentachlorophenol	Current	1	0	30	0.3	300+		0.3	B2		30	
Phenol				600		6,000+	4,000+		D		5(T&O) Cl2Syst	
Phthalates (di(ethylhexyl)-phthalate)	Current	6	0	20	3			3+	B2	4		

Values are indicated in micro grams per liter (µg/l) [equivalent to parts per billion (ppb)] unless otherwise stated

Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Picloram	Current	500	500	70		20,000+	500+		D			
Polychlorinated Biphenyls (PCBs)	Current	0.5	0		.005			0.005	B2			
Polynuclear Aromatic Hydrocarbons (PAHs) (benzo(a)pyrene)	Current	0.2	0						B2			
Prometon				15		200+	100+		D			
Pronamide				75		800+	50+		C			
Propachlor				13		500+	90+		D			
Propazine				20		1,000+	10+		C			
Propham				20		5,000+	100+		D			
[illegible]X				3	0.3	100+	2+	.3	C			
Simazine	Current	4	4	5		70	4+		C	10		
Styrene	Current Proposed secondry	100 10	100	200		2,000+	100+		C			
Tebutiuron				70		3,000+	500+		D			
Terbacil				13		300+	90+		E			
Terbufos				.13		5+	0.9+		D			

Values are indicated in micro grams per liter (µg/l) [equivalent to parts per billion (ppb)] unless otherwise stated

Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
Terrachlor (pentachloro-nitrobenzene)				3	0.1				C		0.9	
1,1,1,2-Tetrachloro-ethane				30	1	2,000+	70+	1+	C			
1,1,2,2-Tetrachloro-ethane									C	1		
Tetrachloroethylene (Perchloroethylene)	Current	5	0	10	0.7	2,000+		0.7+	B2	5		
2,3,7,8-Tetrachloro-dibenzo-p-dioxin (Dioxin)	Current	3E-5	0	1E-6	2E-7	1E-4+		2E-7+	B2			
Thiobencarb										70		
Toluene	Current Proposed secondry	1,000 40	1,000	200		2,000+	1,000+		D		100	
Toxaphene	Current	3	0	100	0.03	40+		0.03+	B2	5		5
Tribromomethane (Bromoform)(THM)	Current	100 @		20	4	2,000+		4	B2			
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)										1200		
Trichloroacetic acid				40		2000	1000		C			
1,2,4-Trichloro-benzene	Current	70	70	10		100+	70		D			
1,3,5-Trichloro-benzene				6		600+	40+		D			
1,1,1-Trichloro-ethane	Current	200	200	35		40,000+	200+		D	200		200

Values are indicated in micro grams per liter (µg/l) [equivalent to parts per billion (ppb)] unless otherwise stated

Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.
@ - Total Trihalomethanes MCL includes 4 compounds: chloroform, bromodichloromethane, dibromochlormethane, bromoform

ORGANIC Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
1,1,2-Trichloro-ethane	Current	5	3	4		400+	3+		C	32		
Trichloroethylene	Current	5	0		3			3	B2	5		5
Trichlorofluoro-methane (Freon 11)				700						150	150	
2,4,6-Trichloro-phenol					3			3	B2			
2,4,5,-Trichloro-phenoxyacetic acid (2,4,5-T)				10		800+	70+		D			
2,4,5 Trichlorphen-oxypropionic acid (2,4,5-TP) (Silvex)	Current	50	50	7.5		200+	50+		D	10		10
1,2,3-Trichloro-propane				6		600+	40+		B2			(HI .8)
Trifluralin				7.5		80+	5+	5+	C			
ihalomethanes (TTHM) (See Chloroform)	Current	100 @							B2	100		
Trinitroglycerol						5	5					
Trinitrotoluene				0.5	1	20	2	1	C			
Trithion											7	
Vinyl Chloride	Current	2	0		.015	3,000+		0.015+	A	0.5		
Xylenes- sum of isomers	Current Proposed secondry	10ppm 20	10ppm	2000		40,000+	10,000+		D	1750		

Values are indicated in micro grams per liter (µg/l) [equivalent to parts per billion (ppb)] unless otherwise stated

Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.
HI - State of Hawaii MCL
@ - Total Trihalomethanes MCL includes 4 compounds: chloroform, bromodichloromethane, dibromochlormethane, bromoform
TT - Treatment technique in lieu of numeric MCL

MICROB.-TURBIDITY Chemicals	Standard	EPA MCL	EPA MCLG	IRIS RfD µg/kg-d	IRIS 10^{-6} Risk	Health Advisories Acute 10 Day	Health Advisories Chronic(lifetime) Non-Cancer	Health Advisories Chronic(lifetime) Cancer	Wt. of Evid.	California MCL	California Action Level	Arizona MCL
MICROB.-TURBIDITY												
Giardia Lamblia	Current	TT	0									
Heterotrophic Plate Count	Current	TT β	NA									
Legionella	Current	TT β	0									
Total Coliforms	Current	P/A ⅁⅁	0									
Turbidity	Current	1/5 NTU	NA									
Viruses	Current	TT β	0									
WATER QLTY.SECONDARY MAX.CONT.LEV												
Color	Secondry	15color units										
Corrosivity	Secondry	Noncorrosive										
Foaming Agents	Secondry	500										
Odor (Odor threshold)	Secondry	3.0 OT#										
Total Dissolved Solids (TDS)	Secondry	500 ppm										
pH	Secondry	6.5-8.5										

Values are indicated in micro grams per liter (µg/l) [equivalent to parts per billion (ppb)] unless otherwise stated

Oral Referenced Doses (RfD) are in micrograms per kilogram per day (µg/kg-d), 10^{-6} risk levels are in micrograms per liter.
TT - Treatment technique in lieu of numeric MCL
β - Surface waters and groundwater under the direct influence of surface water only.
⅁⅁ - P/A - MCL is based on the presence/absence of total coliforms
⅁ - 1 NTU Monthly average, 5 NTU two-day consecutive average
- Odor Threshold Numbers

TABLE 2

PRIORITY LIST OF CONTAMINANTS WHICH MAY REQUIRE REGULATION UNDER THE SDWA (1991 VERSION)

Microorganisms

Cryptosporidium

Inorganics

Aluminum
Boron
Chloramines
Chlorate
Chlorine
Chlorine dioxide
Chlorite
Cyanogen chloride
Hypochlorite ion
Manganese
Molybdenum
Strontium
Vanadium
Zinc

Pesticides

Asulan
Bentazon
Bromacil
Cyanazine
Cyromazine
DCPA (and acid metabolites)
Dicamba
Ethylenethiourea
Fomesafen
Latofen/Acifluorfen
Metalaxyl
Methomyl
Metolachlor
Metribuzin
Parathion degradation product (4-nitrophenol)
Prometon
2,4,5-T
Thiodicarb
Trifluralin

Synthetic Organic Chemicals

Acrylonitrile
Bromobenzene
Bromochloroacetonitrile
Bromodichloromethane
Bromoform
Bromomethane
Chloroethane
Chloroform
Chloromethane
Chloropicrin
o-Chlorotoluene
p-Chlorotoluene
Dibromoacetonitrile
Dibromochloromethane
Dibromomethane
Dichloroacetonitrile
1,3-Dichlorobenzene
Dichlorodifluoromethane
1,1-Dichloroethane
2,2-Dichloropropane
1,3-Dichloropropane
1,1-Dichloropropene
1,3-Dichloropropene
2,4-Dinitrophenol

Synthetic Organic Chemicals (con't)

- 2,4-Dinitrotoluene
- 2,6-Dinitrotoluene
- 1,2-Diphenylhydrazine
- Fluorotrichloromethane
- Hexachlorodutadiene
- Hexachloroethane
- Isophorone
- Methyl ethyl ketone
- Methyl isobutyl ketone
- Methyl t-butyl ether
- Naphthalene
- Nitrobenzene
- 1,1,1,2-Tetrachloroethane
- 1,1,2,2-Tetrachloroethane
- Tetrahydrofuran
- Trichloroacetonitrile
- 1,2,3-Trichloropropane

Chlorination/ chloramination byproducts (misc.): haloacetic acids, haloketones, chloral hydrate, 3-chloro-4-(dichloromethyl)-5-hydroxy-2(5H)-furanone (MX-2), N-organochloramines

Ozonation byproducts: aldehydes, epoxides, peroxides, nitrosamines, bromate, iodate

APPENDIX

DESCRIPTION OF STANDARDS AND ADVISORIES

Authority

Under the authority of the Safe Drinking Water Act (SDWA, Public Law 93-523), the USEPA is mandated to establish National Primary Drinking Water Regulations for contaminants occurring in drinking water. Primary NPDWRs are established and enforced to protect the public from adverse health effects resulting from a drinking water contaminant. Included in these regulations are the drinking water standards which set either 1) treatment techniques to control a contaminant, or 2) the Maximum Contaminant Level (MCL) allowable for the contaminant in drinking water. An MCL is set when an appropriate method of detection for the contaminant exists. A treatment technique approach is used when it is not possible to quantify the contaminant at the level necessary to protect public health. Secondary standards are established based on non-health related aesthetic qualities of appearance, taste and odor. These secondary standards are not federally enforceable.

States may choose to accept responsibility (Primacy Status) for the oversight and enforcement of US drinking water regulations. States which have primacy status from USEPA must adopt State drinking water standards that are at least as stringent as federal standards. A state may choose to enforce secondary standards as well as primary standards.

USEPA Maximum Contaminant Level Goals (MCLGs)

MCLGs are developed by the Office of Science and Technology in the USEPA Office of Water as a required first step toward promulgation of NPDWRs. MCLGs are non-enforceable health goals which are to be set at levels at which no known or anticipated adverse effects on the health of persons occur, and which allow for an adequate margin of safety. Prior to the SDWA Amendments of 1986, these levels were called Recommended Maximum Contaminant Levels (RMCLs). MCLGs are strictly health-based levels and are derived from relevant toxicological data.

For chemicals that produce adverse health effects and are not believed to be carcinogenic (non-carcinogens), the MCLG is based on the Reference Dose (RfD). A RfD is calculated from toxicological data to represent a contaminant level that should be without risk of adverse health effects even with a lifetime exposure. USEPA assumes that a threshold exists for non-cancer health effects from chemical contaminants, below which the effect will not occur. Thus the MCLG will be a non-zero number. The RfD, which is based on the total daily amount of contaminant taken up by a person on a body weight basis, is converted to a Drinking Water Equivalent Level (DWEL) concentration and adjusted for the percentage contribution of other sources (relative source contribution, RSC) of the contaminant besides drinking water (air, food, etc) to arrive at the MCLG. This calculation assumes a lifetime consumption of 2 liters of drinking water per day by a 70 kg adult. Unless otherwise noted, the RSC from drinking water for organic and inorganic compounds is respectively 20% and 10%.

USEPA assumes that no threshold exists for cancer and thus, there is no absolutely safe level of contamination. For chemicals that are known (Group A) or probable (Group B) human carcinogens, USEPA policy directs that the MCLG be set at zero, in accordance with a recommendation by the US Congress. For contaminants believed to be possible human carcinogens (Group C), the MCLG may be derived based on relevant non-cancer health effects as described above. In this case, the RfD is divided by an additional uncertainty factor of 10. In some cases, Group C chemicals will have MCLGs set based on calculated maximum lifetime cancer risks of between 1/10,000 and 1/million.

Maximum Contaminant Levels (MCLs)

MCLs are federally enforceable limits for contaminants in drinking water established as NPDWRs. The MCL for a given contaminant is set as close to the corresponding MCLG as is feasible. "Feasible" is defined in the 1986 SDWA Amendments as "feasible with the use of the best technology, treatment techniques and other means which the Administrator finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available (taking cost into consideration)." To promulgate a MCL for a contaminant requires that a method of detection for that contaminant is available suitable for the level desired and a Best Available Technology is identified that can feasibly remove the contaminant to the desired level.

Secondary Maximum Contaminant Levels

Secondary MCLs are established under the SDWA to protect the public welfare. Such regulations apply to contaminants in drinking water that adversely affect its odor, taste or appearance and consequently cause a substantial number of persons to discontinue its use. Secondary MCLs are not based on direct adverse health effects associated with the contaminant, although some contaminants may have both a MCL and a SMCL. SMCLs are considered as desirable goals and are not fereally enforceable. However, states may choose to promulgate and enforce SMCLs at the state level.

Health Advisories

Health Advisories (HAs) for drinking water contaminants are levels considered to be without appreciable health risk for specific durations of exposure. HAs should be considered guidance and are not enforceable drinking water standards. HAs were previously know as Suggested No Adverse Response Levels (SNARLs).

USEPA HAs are developed and published initially as External Review Drafts, and then as a Final Draft. This designation indicates that the HA will be always subject to change as additional information becomes available. HAs are developed for one-day, 10-day, longer-term (approximately 7 years) and lifetime (70 year) exposures based on data describing non-carcinogenic health effects resulting from the contaminant. One-day and 10-day HAs use parameters which reflect exposures and effects for a 10 kg child consuming 1 liter of water per day. Lifetime HAs consider a 70 kg adult consuming 2 liters of water per day. Longer-term HAs can incorporate either child or adult parameters. A relative source contribution from water is also factored into the lifetime HA calculation to account for exposures from other sources (air, food, soil, etc) of the contaminant.

For known or probably human carcinogens, the lifetime HA level is based on an upper-bound excess lifetime cancer risk of 1/million. This means that **USEPA considers that the risk from a lifetime consumption of water at the given level is unlikely to be greater than 1/million, is most likely substantially less and may be zero.**

Reference Dose (RfD) and Drinking Water Equivalent Level (DWEL)

The RfD is a daily exposure level which is believed to be without appreciable health risk to humans over a lifetime. The RfD is usually derived from an experimental "no observed adverse effect level" (NOAEL), identified as the highest dose in the most relevant study that did not result in a known adverse effect. The NOAEL is divided by various uncertainty factors to derive the RfD. These uncertainty factors account for the variation in human response, extrapolation to human responses if animal experiments were used, data quality and relevance. The RfD takes the form of dose ingested per unit body weight per day (ug/kg-d).

The DWEL is the conversion of the RfD into an equivalen water concentration. It assumes that a 70 kg adult consumes two liters of water per day and that the total dose to a person results solely from drinking water. It is important to remember that actual exposures in the environment may occur through other routes, such as inhalation or dermal contact, or from other sources, such as from food or soil.

California Action Levels

California Department of Health Services Action Levels are health-based criteria derived much in the same way as EPA Health Advisories. Specific approaches to determining cancer risks and exposure assumptions may differ in some ways from those used by USEPA. California Action Levels are not enforceable drinking water standards, but are levels at which CA DOHS strongly urges water purveyors to take corrective action to reduce the level of contamination in the water they supply. Action Levels cease to exist when CA State MCLS are promulgated.

Integrated Risk Information System (IRIS)

IRIS is an EPA catalogue of Agency risk assessment and risk management information for chemical substances. It is available electronically in several formats. The risk assessment information contained in IRIS, unless specifically noted, has been reviewed and agreed upon by intra-agency work groups and represents Agency consensus. Chemical contaminants listed in IRIS may have descriptions of relevant toxicological experiments and risk assessment approaches used in the determination of RfDs, cancer risks and health advisories. Extensive bibliographies are included. Regulations and regulatory status for different media may be presented.

REFERENCES

EPA MCLs: Code of Federal Regulations, Title 40, Part 141.

EPA Final Rule and Proposed Rule, Fluoride: Federal Register Vol. 50, No. 220, November 14, 1985.

EPA Final Rule and Proposed Rule, Volatile Synthetic Organic Chemicals: Federal Register Vol. 50, No. 219, November 13, 1985.

EPA Final Rule, Fluoride National Primary and Secondary Drinking Water Regulations: Federal Register Vol. 51, No. 63, April 2, 1986.

EPA Final Rule, Volatile Organic Chemicals Drinking Water Regulations: Federal Register Vol. 52, No. 130, July 8, 1987.

EPA Proposed Rule, National Primary and Secondary Drinking Water Regulations; Synthetic Organic Chemicals and Inorganc Chemicals Federal Register, Vol. 55, No. 143, July 25, 1990.

EPA Final Rule, National Primary Drinking Water Regulations; Federal Register, Vol. 56, No. 20, January 30, 1991.

EPA Final Rule, Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper; Federal Register, Vol. 56, No. 110, June 7, 1991.

EPA Final Rule, National Primary Drinking Water Regulations; Federal Register, Vol. 56, No. 126, July 1, 1991.

NAS Health Advisories: Drinking Water and Health, National Academy Press, Volumes 1 (1977), 3 (1980), 4 (1982), 5 (1983), 6 (1986), and 7 (1988).

EPA Health Advisories: are from the EPA Office of Drinking Water. These are published and are available from the National Technical Information Service (NTIS).

IRIS, Integrated Risk Information System, EPA, Office of Health and Environmental Assessment, Office of Research and Development, Washington, D.C. 20460.

Arizona Department of Health Services, Office of Risk Assessment and Investigation, 3008 N. 3rd Street, Phoenix, Arizona 85012.

California Department of Health Services, Office of Drinking Water, 2151 Berkeley Way, Berkeley, CA 94704.

APPENDIX B

TABLE B-1
AVAILABILITY OF GROUNDWATER QUALITY DATA FOR WELLS IN THE WEST SAN JACINTO AREA

State Well Number	Period of Record	TDS	NO3	Gen Min	Other	Other Type
		Types of Analysis				
T2S/3W 31N1	1955 - 1983			21	4	metals, organics
31R1	1957 - 1963			12		
_36E1	1949			1		
T2S/4W 36R1	1956 - 1960			2		
T3S/2W 7R	1985 - 1993	1	1	1		
7P1	1953 - 1967			29		
_8E1	1973			1		
18R1	1963 - 1973			3		
18R2	1973 - 1992			2		
21A1	1969			1		
21A2	1973			1		
21B1	1963			1		
21C1	1949			1		
26L1	1973			1		
26M1	1963 - 1973			3		
27G1	1963 - 1993	1	1	4		
28L	1992	1	1			
28Q1	1975 - 1992	1	1	2		
29R1	1952			1		
30C1	1963			1		
32C1	1967			1		
32G1	1959 - 1964			2		
32R1	1963 - 1965			2		
33A	1967			1		
34E	1992	1	1			
34M	1967			2		
34Q	1967			1		
34Q1	1967			1		
35M	1967 - 1992			2		
35M1	1965 - 1967			2		
35Q2	1973			2		
32E	1985			1		
32D1	1985			1		
T3S/3W 2H1						
2L1	1973			1		
2L2	1973 - 1991	2	2	2	2	metals, pesticides
6D	1970 - 1985			6		
6D2	1991			2	2	metals
6M1	1967 - 1970			2		
6N3	1967 - 1983			6	1	metals
7F1	1968			1		
7Q1	1977	1				
12K1	1973 - 1991	1		10		

TABLE B-1 (Continued)
AVAILABILITY OF GROUNDWATER QUALITY DATA FOR WELLS IN THE WEST SAN JACINTO AREA

State Well Number	Period of Record	TDS	NO3	Gen Min	Other	Other Type
		Types of Analysis				
18A1	1977			1		
20A	1958 - 1960			2		
20G2	1977	1				
21A1	1977	1				
21A2	1965 - 1977			3		
21C	1958			1		
21C1	1950 - 1977	1		5		
22D1	1960 - 1976			9		
22D	1977	1				
_29E1	1958 - 1978	1		21		
29M1	1953 - 1983			24		
30H1	1977	1		1		
30J1	1977	1		1		
30Q1	1977	1		1		
31B1	1993	1	1			
32M1	1958 - 1959			1		
T3S/4W1J1	1974 - 1982			5		
4W10	1981 - 1983			3		
4W10	1981 - 1983				3	metals
24C1	1976 - 1982			2		
24D1	1976 - 1983			3		
24D2	1976 - 1983			3	1	pesticides
T4S/2W 2C	1953 - 1973			6		
2D1	1963 - 1967			2		
2D2	1965			1		
2K1	1973			1		
2N2	1949			1		
3P	1967			1		
7J	1991	1	1			
7P	1992	1	1			
7Q	1991	1	1			
8B	1991	1	1			
_8E1	1967			1		
8G	1993	1	1			
8Q	1967			1		
8R	1967 1993		1	1		
8K	1993		1			
8Q	1993		1			
9M1	1973 - 1979			8		
10A	1993	1	1			
10A1	1975 - 1993	1	1	1		
10B1	1975			1		

TABLE B-1 (Continued)
AVAILABILITY OF GROUNDWATER QUALITY DATA FOR WELLS
IN THE WEST SAN JACINTO AREA

State Well Number	Period of Record	Types of Analysis: TDS	NO3	Gen Min	Other	Other Type
10C1	1963 - 1967			2		
10E	1964 - 1993		1	2		
11B1	1964 - 1974			10		
11B2	1972 - 1974			4		
11C1	1963 - 1979			19		
11C2	1993	1	1			
11D1		1	1			
_11E1	1964			1		
_11E2	1963 - 1967			3		
11F	1964			1		
11F1	1972			1		
12N	1967			1		
12N1	1958			1		
17D2	1965 1976			10		
18A1	1965 1989		1	18		
18B1	1965 1989			13		
18D	1990	1	1			
18D1	1977	1				
18G1	1987		1			
18G3	1939 1979			13		
24H1	1957 1984		1	13	2	metals
24J1	1972 1973			2		
27H2	1974 1979			9		
_36E1	1993	1	1			
36J1	1954 1958			7		
36J2	1963			1		
36M	1985			1		
36N	1983 1991				2	bacteriological
T4S/3W 6A3	1975 - 1981	1		3		
6C	1991			3	1	organics
6C1	1994	1	1			
6C2	1975 - 1977	1		2		
6F1	1977	1		1		
6H1	1970 - 1979			6	2	pesticides
6H2	1973 - 1983			5		
6Q1	1954 - 1993	2	1	32	1	organics
6Q2	1986				2	organics
6Q3	1967 - 1988			15	5	organics,metals radiological
7G2	1953 - 1977	1		1		
7H1	1977	1		1		
7J1	1955 - 1977	1		28		

TABLE B-1 (Continued)
AVAILABILITY OF GROUNDWATER QUALITY DATA FOR WELLS IN THE WEST SAN JACINTO AREA

State Well Number	Period of Record	TDS	NO3	Gen Min	Other	Other Type
		Types of Analysis				
7J2	1993	1	1			
_8E1	1969 - 1977	1		2		
8N1	1963			1		
9N2	1966			1		
9N3	1966 - 1977	1		4		
9P	1993	1	1			
10E	1981			2		
_10E1	1980 - 1983			2		
_10E3	1967			1		
13Q1	1955 - 1969			25		
16B				1		
16C	1985 - 1993			1	1	organics & metals
16N1	1958 - 1977	1		22		
17A1	1959 - 1968			18		
17C1	1954 - 1965			24		
17J1	1956 - 1978			11		
17J3	1977	1		1		
18	1970			1		
18J	1972			1		
18J2	1975 - 1988			7	4	organics & metals
19A1	1953 - 1993	2	1	3		
19A3	1977	1				
20P1	1954			1		
21F	1956 - 1976	1		28		
21D	1958 -			1		
24B	1990		1			
24B1	1963 - 1977	1		1		
24N	1969			1		
24P1	1943 - 1976			29		
25D2	1965 - 1977	1		3		
26J1	1958 - 1973			4		
26K	1989 - 1991	3	5	3		
28C1	1954					
28H1	1965 - 1968			13		
29C3	1977			2		
29G2	1970 - 1977	1		5		
29K1	1963 1977	1		2		
29Q	1969			1		
29Q1	1959 1969			2		
32B	1965			1		
4S/4W 1A1	1993	1	1			
4S/4W 1G1	1993	2	1			
T5S/1W 30D	1992			1		

TABLE B-1 (Continued)
AVAILABILITY OF GROUNDWATER QUALITY DATA FOR WELLS IN THE WEST SAN JACINTO AREA

State Well Number	Period of Record	Types of Analysis TDS	NO3	Gen Min	Other	Other Type
30D2	1977			1		
_30E2	1992			1		
30M1	1957 - 1960			8		
T5S/2W 7E	1990		1			
14R	1980 - 1981			2		
15A1	1958 - 1960			6		
_15E1	1953 - 1956			4		
15F1	1963			1		
15G1	1982 - 1985			2		
15H	1982	1	1			
16F	1982			1		
16F1	1993	1	1			
16G	1983			1		
17B	1982 - 1985	2	2	2		
17B	1982			1		
17B1	1969 - 1978			18		
17C	1982			1		
17C1	1953 - 1967			27		
17F	1982 - 1985			2		
19N1	1953 - 1979			49		
21M2	1993	1				
2.20E+03	1993	1				
23J	1972			1		
23P1	1989				4	bacteriological
23P1	1989		2			
23Q	1986			1		
23R	1989				3	bacteriological
23R	1986			1		
23R1	1973			1		
24B	1981			1		
24B1	1993	1	1			
25C	1979			1		
25C1	1965 - 1977			3		
_25E1	1959 - 1963			2		
25J	1991	1	1			
26B	1987			1		
26G1	1968			1		
26G2	1957			1		
26H2	1963			1		
26H3	1964			1		
26L1	1963			2		
27N1	1988		1	1	1	bacteriological
30D	1991			1	1	radiological
30J1	1975			1		
31N1	1975			1		

TABLE B-1 (Continued)
AVAILABILITY OF GROUNDWATER QUALITY DATA FOR WELLS IN THE WEST SAN JACINTO AREA

State Well Number	Period of Record	TDS	NO3	Gen Min	Other	Other Type
		Types of Analysis				
31R	1987			1		
31R	1987				1	metals
33E	1981	1				
35A	1991			1		
35A1	1993	1				
35B1	1969 - 1993	1		1		
35D2	1993	1	1			
36D	1991			3		
36D4	1993		1			
T5S/3W 2Q1	1993	1	1			
3Q2	1975			1		
3R1	1963 - 1968			3		
3R1	1977	1				
3R2	1977	1				
7B1	1975			1		
10H1	1975			1		
11M1	1953			1		
11M2	1955 - 1981			23		
13A	1977 - 1981			2		
13A1	1993	1	1			
13H1	1993	1	1			
14P1	1985			1		
14P1	1977	1				
14P1	1975			1		
15H1	1993	1	1			
16D1	1993	1	1			
16F1	1993	1	1			
16P1	1955 - 1958			6		
16P2	1977 - 1981			2		
17R1	1991			1		
21C1	1975			1		
21C1	1977	1				
21D1	1962 - 1971			17		
21D2	1960 - 1975			16		
21D2	1977	1				
21K	1993	1	1			
24C1	1993	1	1			
27L1	1975			1		
28M1	1993	1	1			
28M2	1993	1	1			
28M3	1993	1	1			
28M4	1993	1	1			
29H1	1955 - 1959			8		
29Q1	1958			1		
32G	1976			1		

TABLE B-1 (Continued)
AVAILABILITY OF GROUNDWATER QUALITY DATA FOR WELLS IN THE WEST SAN JACINTO AREA

State Well Number	Period of Record	TDS	NO3	Gen Min	Other	Other Type
		Types of Analysis				
33R2	1991			1		
33R2	1991				1	organics
35N	1992			1		
35P1	1956 - 1968			4		
35Q	1977 - 1993	2	1			
36D1	1963 - 1968			4		
36K1	1962 - 1963			2		
36N	1977	1				
36N1	1991			1		
36P	1992			5		
36P1	1953 - 1956			3		
36Q1	1958 - 1965			11		
T6S/2W 1A2	1976			1		
2G1	1963			1		
2N1	1963			1		
3R2	1962 - 1970			5		
4R1	1988			1		
4R2	1988		1			
7A	1988		1			
7A1	1993	1	1			
7N	1975			1		
7R2	1993	1	1			
T6S/3W 1	1991			4		
1D1	1965			1		
1D2	1975			1		
_1E1	1977	1				
1J1	1975			1		
1J2	1993	1	1			
2A	1993	1	1			
2F1	1963 - 1968			4		
2C1	1975			1		
2D	1993	1	1			
2E	1993	1	1			
2G	1991	2	2	5	2	organics
2H	1991	1	1	2	2	organics
3C	1967			1		
3C1	1975 - 1991			3		
3C2	1975			1		
3H2	1977 - 1991	1		1		
3L1	1993	1	1			
3L2	1993	1	1			
4K1	1953 - 1963			2		
9B1	1975			1		
Totals		106	79	1015	48	

TABLE B-1 (Continued)
AVAILABILITY OF GROUNDWATER QUALITY DATA FOR WELLS IN THE WEST SAN JACINTO AREA

Statistics

	Total	Average	Maximum	Minimum
Length of Record (years)		5.18	40	1
Number of Samples per Well		4.14	49	1
Samples per Year		1	11	0
Year of Last Sample		1979	1994	1949
Total Number of Wells with Data	301			
Fraction of Wells with Only One Sample	63%			

Hemet/San Jacinto

Groundwater Management Area

Water Management Plan

Prepared for:

Eastern Municipal Water District Since 1950

Lake Hemet Municipal Water District Incorporated 1955

City of Hemet Riverside County, California

San Jacinto

in coordination with:

Department of Water Resources State of California

Prepared by:

WRIME Water Resources & Information Management Engineering, Inc.

in association with Stetson Engineers and Geoscience

November 7, 2007

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<u>Hemet/San Jacinto Groundwater Management Area</u>
<u>Water Management Plan</u>

November 7, 2007

<u>Prepared for:</u>

Eastern Municipal Water District
Lake Hemet Municipal Water District
City of Hemet
City of San Jacinto

in coordination with
California Department of Water Resources

<u>Prepared by:</u>

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*** The Exhibits to the Settlement Agreement Agreement and Appendices C through I to the Water Management Plan are provided on a CD (enclosed) in Adobe Acrobat (.pdf) format.**

LIST OF FIGURES

LIST OF TABLES

SELECTED ACRONYMS, ABBREVIATIONS, AND TERMINOLOGY

Advisor	independent engineering firm or a qualified individual
AF	acre-foot
AFY	acre-feet per year
Agreement	Settlement Agreement
Association	Hemet/San Jacinto Groundwater Association
CAM	Consultants-Attorneys-Managers
CEQA	California Environmental Quality Act
cfs	cubic feet per second
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EMWD	Eastern Municipal Water District
FMWC	Fruitvale Mutual Water Company
GIS	Geographic Information System
Hemet North	Hemet North portion of the Lakeview/Hemet North
IRRP	Integrated Recharge and Recovery Program
JPA	Joint Powers Authority
JUDGMENT	Stipulated Judgment
Legal Counsel	independent attorney or legal firm
LHMWD	Lake Hemet Municipal Water District
Management Area	Hemet/San Jacinto Groundwater Management Area
MGD	million gallons per day
MOU	Memorandum of Understanding
MWD	Metropolitan Water District of Southern California
PC	Policy Committee
Plan	Hemet/San Jacinto Water Management Plan
Plan Participants	EMWD, LHMWD, Private Water Producers, and Cities of Hemet and San Jacinto (collectively)
Principles	Principles for Water Management
Private Water Producers	Property owners who are pumping groundwater pursuant to overlying water rights
Public Agencies	EMWD, LHMWD, and Cities of Hemet and San Jacinto (collectively)
RCFC&WCD	Riverside County Flood Control and Water Conservation District
RWQCB	Santa Ana Regional Water Quality Control Board
RWRD	Regional Water Resources Database
S.A.A.	Settlement Agreement Approval
S.J.A.	Stipulated Judgment Approval
Soboba Tribe	Soboba Band of Luiseno Indians
TC	Technical Committee
TDS	Total Dissolved Solids

TM	Technical Memorandum
TMDL	Total Maximum Daily Load
Upper Pressure	San Jacinto - Upper Pressure Management Zone
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
Watermaster	Watermaster Governing Board
WRIME	Water Resources & Information Management Engineering, Inc.

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BACKGROUND AND GOALS

The stakeholders in the Hemet/San Jacinto Groundwater Management Area (Figure ES.1) have developed the Hemet/San Jacinto Water Management Plan (Plan) to provide a foundation that guides and supports responsible water management into the future. The Participants in the Plan are Eastern Municipal Water District (EMWD), Lake Hemet Municipal Water District (LHMWD), Cities of Hemet and San Jacinto (Public Agencies), and Private Water Producers.

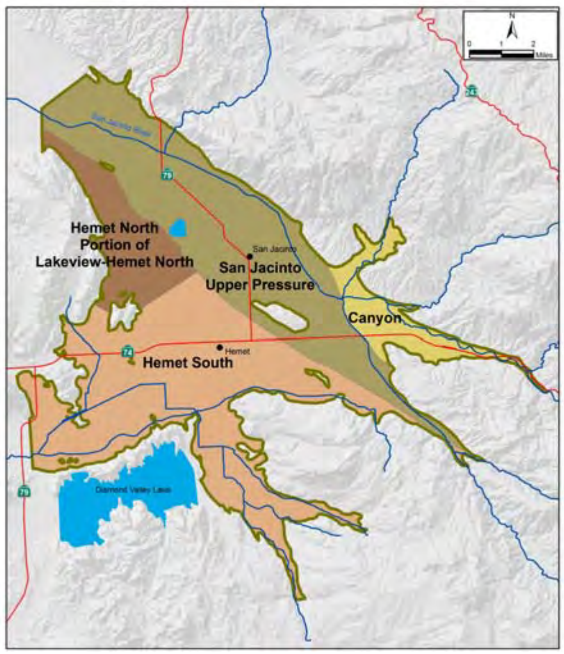

Figure ES.1 Hemet/San Jacinto Groundwater Management Area and Management Zones

Private Water Producers are those property owners who are pumping groundwater pursuant to overlying water rights, typically for agricultural or domestic uses. Private Water Producers may elect two levels of participation in the Plan, with varying levels of benefits and responsibilities, or may elect not to participate. The details on this matter are described in Section 2 of the Plan document.

The Plan, adopted by the governing bodies of the Plan Participants, has eight primary goals:

- Address pumping overdraft and declining groundwater levels,
- Provide for Soboba Tribe prior and paramount water rights,

- Ensure reliable water supply,
- Provide for planned urban growth,
- Protect and enhance water quality,
- Develop cost-effective water supply,
- Provide adequate monitoring for water supply and water quality, and
- Supersede the Fruitvale judgment and agreement.

GROUNDWATER AS A CORNERSTONE FOR WATER MANAGEMENT

The goals of the Plan are interrelated and begin with maintaining groundwater as a high-quality, low-cost, flexible source of water. Efforts are needed to make this happen, as historical groundwater pumping in excess of the Safe Yield of the groundwater basin has resulted in decreasing trends in water levels. In addition, historical land and water use practices for agricultural irrigation and dairy industry waste have raised the levels of nitrates and total dissolved solids in groundwater. Safe Yield, the long-term average quantity of water that can be pumped without causing undesirable results, has been estimated at 40,000 to 45,000 AFY, while average annual production exceeds this amount by approximately 10,000 to 15,000 AFY. The 10,000 to 15,000 AFY difference between the long-term average annual groundwater production and Safe Yield is known as overdraft, which can be responsible for creating undesirable conditions in the basin, including degradation of groundwater quality. The Plan assumes a pragmatic and economic approach in setting the target to reduce overdraft, and assumes an overdraft of 10,000 AFY. This will allow the Plan Participants and the Watermaster to initiate and adopt plans and policies to eliminate overdraft with implementation of economically feasible and cost-effective projects. The Plan intends to stabilize or reverse the decreasing trend in water levels through reducing groundwater production to a level that brings the basin production within the Safe Yield of the Management Area. Higher water levels will increase water in storage, decrease energy costs for pumping, and inhibit the migration of poor quality groundwater from surrounding basins, helping to protect groundwater quality in the Management Area.

INTEGRATION OF GROUNDWATER WITH OTHER WATER SOURCES AND DEMAND MANAGEMENT TO MEET FUTURE WATER NEEDS

The Plan Participants have several options available to increase water supply and reliability in the Management Area. Water used in the Management Area for agricultural and domestic use comes from groundwater, surface water, imports, and recycled water. As shown on Figure ES.2, most of this water has historically been from groundwater, based on 2004 data. This allows significant opportunities for underutilized sources, particularly recycled water and winter-time imported water, to replace or augment groundwater production. The regional cooperation developed over the years is also of importance as the supply mix varies between the different water users in the Management Area; by cooperating, the water users can fully utilize their available water resources.

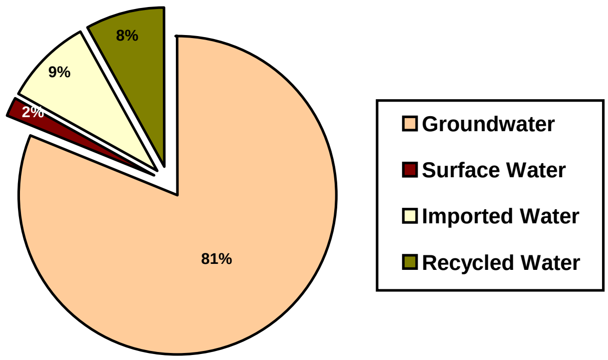

Figure ES.2 Components of Management Area Water Supply

The high-quality groundwater basin also plays an important role in future water availability. Historical declines in groundwater levels are a concern and a major impetus for the development of this Plan. However, even the dewatered portion of the groundwater basin is a significant asset and allows for the full utilization of the available water supplies mentioned above. The new water supplies can be introduced into the system filling the empty portions of the groundwater basin by either substitution for pumping groundwater (in-lieu recharge) or by placing the water in the groundwater system through seepage from specially designed ponds or through injection from wells (direct recharge). Both these methods benefit the Management Area groundwater basin, which is composed of materials that can store large quantities of water and holds high quality groundwater that can be pumped for usage at a later time. A complex system of faults and other geologic features separate the groundwater system into four Management Zones (see Figure ES.1), which require some degree of individual attention in planning and designing recharge and extraction projects, based on each Management Zone's unique attributes.

The numerous water supply opportunities along with water conservation by both the Public Agencies and Private Water Producers will be utilized to meet the current and future water needs of the Management Area. Based on the latest data and information on land and water practices, general plans, urban water management plans, and other specific plans, water demand in the Management Area is projected to increase over the course of next 15-20 years (Figure ES.3). Based on these projections, there will also be a shift from agricultural water use to urban water use, resulting in more stringent water quality requirements to meet drinking water standards.

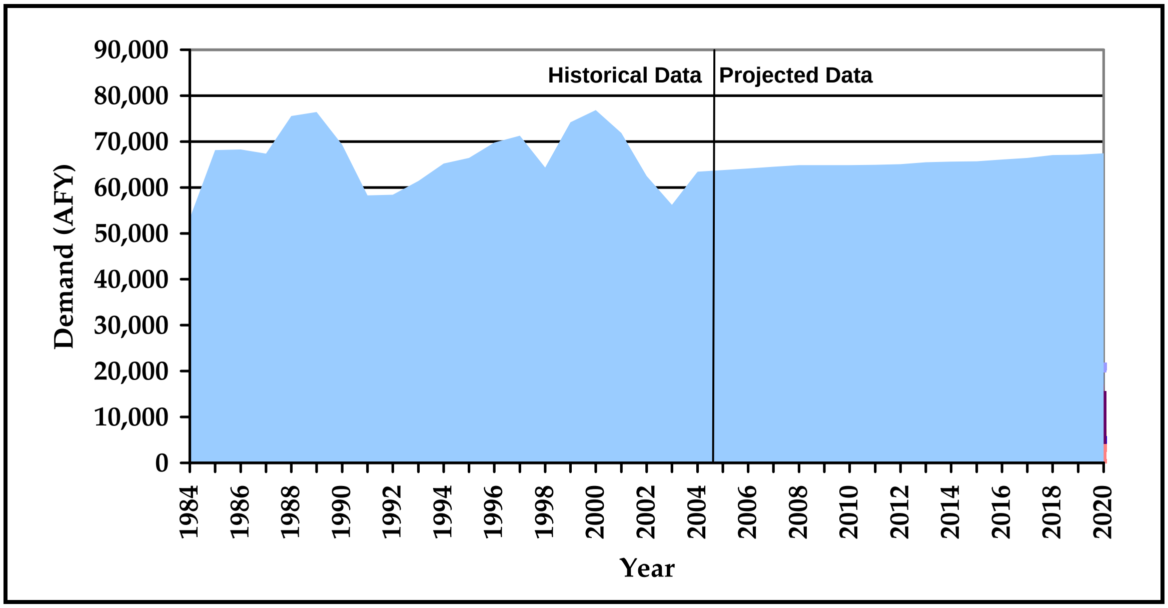

Figure ES.3 Historical and Projected Water Demand

PHYSICAL SOLUTION IS THE BASIS OF WATER SUPPLY PROJECT IN THE MANAGEMENT AREA

As described in the Stipulated Judgment, the Physical Solution is the court decreed method of managing the water supply in the Management Area to maximize the reasonable and beneficial use of the waters, eliminate overdraft, protect the prior rights of the Soboba Tribe, and provide for the substantial enjoyment of all water rights by recognizing their priorities. The Physical Solution consists of numerous water supply and conjunctive use projects, including direct and in-lieu recharge, increased use of recycled water, increased conservation, and improved monitoring. The core project in the Physical Solution is the Hemet/San Jacinto Integrated Recharge and Recovery Program (IRRP). Phase I of the IRRP has been designed, funded, the necessary environmental permits have been acquired, and construction is currently underway. Phase II is in planning stages. The IRRP is a regional recharge and recovery program to meet the following goals:

- Satisfy Prior and Paramount Soboba Tribe water rights;
- Offset the estimated 10,000 AFY overdraft in the Management Area; and
- Provide an additional 15,000 AFY to help meet the projected demand increases.

In addition to IRRP, the Plan identifies other projects that can potentially meet the above goals. These include direct recharge, in-lieu recharge, and recycled water projects.

A FIRM LEGAL AND INSTITUTIONAL ARRANGEMENT

Development of a comprehensive system of water management begins with the legal and institutional framework. To meet the goal of reducing groundwater production to eliminate overdraft, the Public Agencies agreed upon some basic principles as a basis for allocating Base Production rights. Base Production rights establish the initial amount that each Public Agency would be able to pump without the need to replenish the basin. The Base Production rights are calculated on the basis of actual production by Public Agencies during 1995-99 calendar years, and adjusted for specific historical operational activities, such as:

- Recharge Activities;
- MWD San Jacinto Tunnel Seepage;
- Fruitvale Entitlement Water Sold by EMWD to LHMWD, Hemet, and San Jacinto;
- Stream Diversions;
- Conveyance Water Deliveries; and
- Other Considerations.

The Public Agencies have, therefore, agreed to the following Base Production Rights:

Table ES.1 Public Agency Base Production Rights

Public Agency	Base Production Rights (AFY)	Base Production Rights (Percent)
EMWD	10,869	33.7
LHMWD	11,063	34.2
City of Hemet	6,320	19.6
City of San Jacinto	4,031	12.5
Total	**32,283**	**100**

Surface water rights are not impacted and/or changed by the Plan or any other recent agreements. LHMWD diverts water from the San Jacinto River and its tributaries through its pre-1914 water rights to meet their irrigation and municipal water demands, and EMWD has a license to divert water from the San Jacinto River for recharge purposes.

Soboba Tribal water rights are recognized throughout the Plan, and details of the monetary, water quantity, water quality, and property requirements to meet the obligations set forth in the settlement agreement with the Soboba Tribe are discussed in Section 8 of the Plan.

The Institutional Plan, discussed in Section 9 of the document, assigns the administration, implementation, and monitoring of the Plan to a Watermaster. The Watermaster will consist of one elected official representing each of the Public Agencies and one representative selected by the participating Private Water Producers. The Watermaster will utilize the counsel of legal advisor, as well as provide technical oversight through an Advisor and Technical Advisory Committee. The Watermaster will utilize services of EMWD for recharge operations and administration and monitoring of the projects and the Plan. The relationships and basic responsibilities of these entities are summarized in Figure ES.4. The Watermaster will also review, approve, and adopt the annual budget, which will be funded by administrative assessments and replenishment assessments. The details of Watermaster administration are discussed in Section 9 of the Plan document.

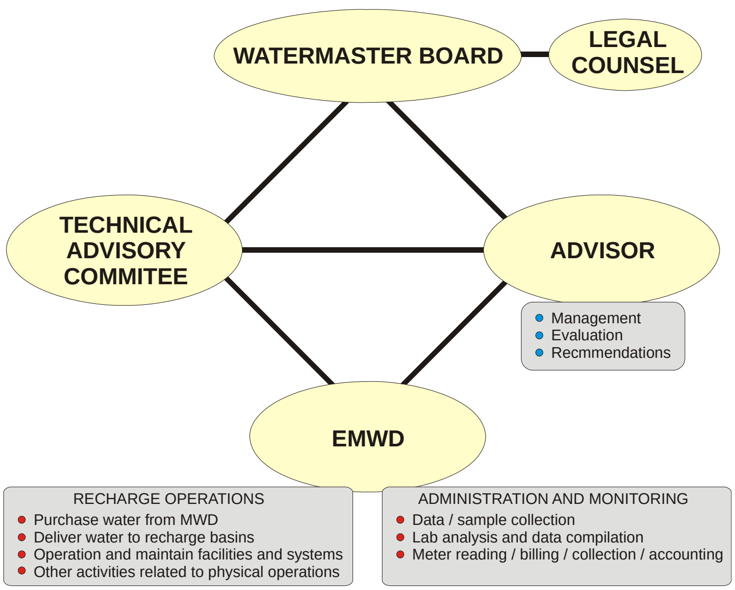

Figure ES.4 Plan Institutional Setup

IMPLEMENTATION AND PLAN EVOLUTION

The implementation of the Plan, along with any additions or modifications as may become appropriate, and all financial matters relating to Plan activities are the responsibility of the Watermaster. The implementation process can be divided into two processes: implementation and ongoing activities. The schedules for these processes are shown in Table ES.2 and Table ES.3.

Table ES.2 Implementation Schedule

Months after Approval of Stipulated Judgment	Implementation Item
Month 1	Determine the method of selection for the Private Pumper representative.
Month 2	Select Public Agency and Private Pumper representatives.
Month 3	Hold first meeting of the Watermaster. Contract with EMWD for Watermaster services.
Month 4	none
Month 5	none
Month 6	Retain legal council and advisor. Prepare and adopt Rules and Regulations for its own operation as well as for the operation of the Water Management Plan and Judgment. Review and reissue agreements and MOUs, as needed.
Upon Settlement Agreement Implementation	Recognize Tribal water rights.

Table ES.3 Ongoing Schedule

Timing	Frequency	Activity	Responsibility
January 1	Annual	Propose Monitoring Program.	EMWD
End of January	Annual	Review Monitoring Program.	Advisor
End of February	Annual	Approve budget for Monitoring Program.	Watermaster
1st Quarter	Annual	Advance payment of Administrative Assessments.	Public Agencies
1st Quarter	Annual	Payment of Replenishment Assessments.	Public Agencies
Four months after completion of calendar year monitoring	Annual	Submit Annual Hemet/San Jacinto Water Management Area Report.	EMWD
As needed	As needed	Revise safe yield.	Advisor
TBD	Annual	Prepare, File, and Distribute Watermaster Annual Report.	Watermaster

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1.1 PROJECT BACKGROUND

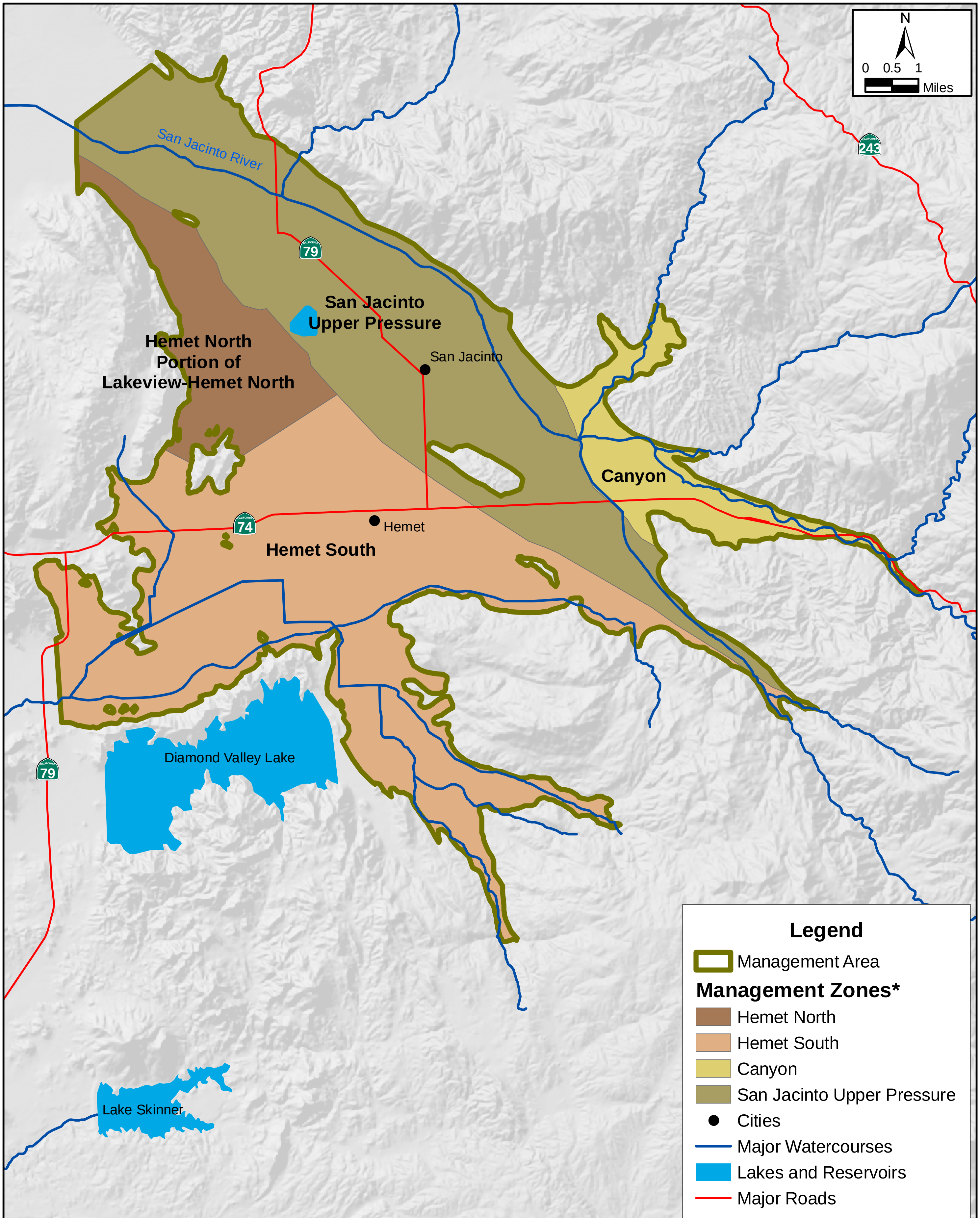
The stakeholders in the Hemet/San Jacinto Groundwater Management Area (Figure 1.1) (Management Area) have developed the Hemet/San Jacinto Water Management Plan (Plan) to provide a foundation that guides and supports responsible water management in the future. The local stakeholders involved in the Plan include Eastern Municipal Water District (EMWD), Lake Hemet Municipal Water District (LHMWD), Cities of Hemet and San Jacinto, and Private Water Producers, collectively referred to as "Plan Participants". EMWD, LHMWD, and the Cities of Hemet and San Jacinto are collectively referred to as "Public Agencies".

A Policy Committee (PC) of the Plan Participants developed and adopted the Principles for Water Management (Principles), which guide the management, development, and governance of local water supplies. The adopted Principles, along with a variety of technical analyses, guided development of the Plan. The PC established the Principles based on the historical data on the operation of the groundwater basin; historical and projected water demands; and existing and potential future facilities. The California Department of Water Resources (DWR) provided financial, facilitation, and technical support to the PC.

A Technical Committee (TC) supported the PC and served as the investigative and review body to ensure that proper technical analyses were conducted to provide a defensible technical foundation for the Plan. The TC provided technical input to support decisions by the Public Agencies, Private Water Producers, and other stakeholders. DWR also provided financial and technical support to the TC.

A Consultants-Attorneys-Managers (CAM) committee served as an interim body to develop and review technical, legal, institutional, and financial documents, plans, and standards. The CAM committee discussed the technical/policy/legal issues in anticipation of evolving documents and recommendations for action by the policy makers for the PC.

EMWD and LHMWD have also worked with the Soboba Band of Luiseño Indians (Soboba Tribe) and the Federal Government to develop a Settlement Agreement (Agreement) (Appendix A) that would resolve past issues with respect to Tribal water rights and the water management practices in the basin. The Agreement will be supported by two stipulated



WRIME

Management Area and Management Zones

Hemet / San Jacinto Water Management Plan

*Source: EMWD

October 2007

Figure 1.1

judgments[1] that will provide the legal and technical basis for future water supplies for the Soboba Tribe.

1.2 WATER MANAGEMENT PLAN

The Plan, adopted by the governing bodies of the Plan Participants, will provide a roadmap for implementation of the Physical Solution, ensure adequate and reliable sources of future water supply for the Management Area, and meet the Prior and Paramount Soboba Tribe water rights requirements. The Plan may be modified and updated in the future based on, among other things, the availability of new data, updated technical analysis, and changes in the institutional/financial structure of the stakeholders.

1.3 PHYSICAL SOLUTION

As described in the Stipulated Judgment (Appendix B), the Physical Solution is the court decreed method of managing the water supply in the Management Area to maximize the reasonable and beneficial use of the waters, eliminate overdraft, protect the prior rights of the Soboba Tribe, and provide for the substantial enjoyment of all water rights by recognizing their priorities. Therefore, the Physical Solution is a group of water supply and conjunctive use projects that would serve this purpose.

The project that is considered to be the core of the Physical Solution is Phase I of the *Hemet/San Jacinto Integrated Recharge and Recovery Program (IRRP)*. Phase I of the IRRP has been designed, funded, and the necessary environmental permits are being acquired. Phase II is in planning stages. The complete project is designed to recharge (replenish) imported water and extract groundwater at a capacity such that the following goals are met:

1. Satisfy Prior and Paramount Soboba Tribe water rights;
2. Offset the estimated 10,000 acre-feet per year (AFY) overdraft in the Management Area; and
3. Provide an additional 15,000 AFY to help meet the projected demand increases.

Major elements of Phase I of the Project are:

- Modifications to Pump Stations (Warren and Commonwealth);
- Construction of Pipelines;

[1] These judgments are in the case of Soboba Tribe v. Metropolitan Water District, et. al.; U.S. District Court in Los Angeles, Case No. 00-04208 GAF, and in a Riverside County Superior Court action, yet to be filed.

- Design and Construction of Recharge Basins;
- Drilling Three Extraction Wells;
- Installation of Pumps and Chlorination Equipment for Three Extraction Wells; and
- Design and Drilling of Three Monitoring Wells.

Additional details on Phase I of the IRRP are presented in Section 3.2.2 of this Plan, and details on Phase II are presented in Section 5.3.1.

In addition to the *San Jacinto River Integrated Recharge and Recovery Project*, there are other projects that the TC has identified as potential projects to be further considered in the future as part of the Physical Solution for the Management Area. These include *direct recharge* and *in-lieu recharge* projects and are described in Section 5.3 of this Plan.

1.4 WATER MANAGEMENT PLAN GOALS

The Principles include eight primary goals for the management of water resources in the Management Area. These are:

- Address pumping overdraft and declining groundwater levels,
- Provide for Soboba Tribe prior and paramount water rights,
- Ensure reliable water supply,
- Provide for planned urban growth,
- Protect and enhance water quality,
- Develop cost-effective water supply,
- Provide adequate monitoring for water supply and water quality, and
- Supersede the Fruitvale judgment and agreement.

This section briefly describes the geographic boundaries of the four divisions, or Management Zones, that make up the Management Area and provides a brief history and background on each of the primary stakeholder organizations. Past agreements and related activities leading to the Plan are discussed below, including the role of the state and public participation.

2.1 MANAGEMENT AREA

The Management Area is divided into four Management Zones: The Canyon, San Jacinto Upper Pressure (Upper Pressure), Hemet South, and the Hemet North portion of the Lakeview/Hemet North (Hemet North). The locations of the Management Zones are shown in Figure 1.1. The delineation of the Management Zones is based on the recent update by the Santa Ana Regional Water Quality Control Board (RWQCB) in the *Water Quality Control Plan - Santa Ana River Basin (RWQCB, as amended 2004)*. The RWQCB defined these boundaries on the basis of hydrogeologic conditions to support implementation of specific water quality criteria. Additional descriptions of the basin hydrogeology are provided in Section 4.

2.2 MANAGEMENT PLAN PARTICIPANTS

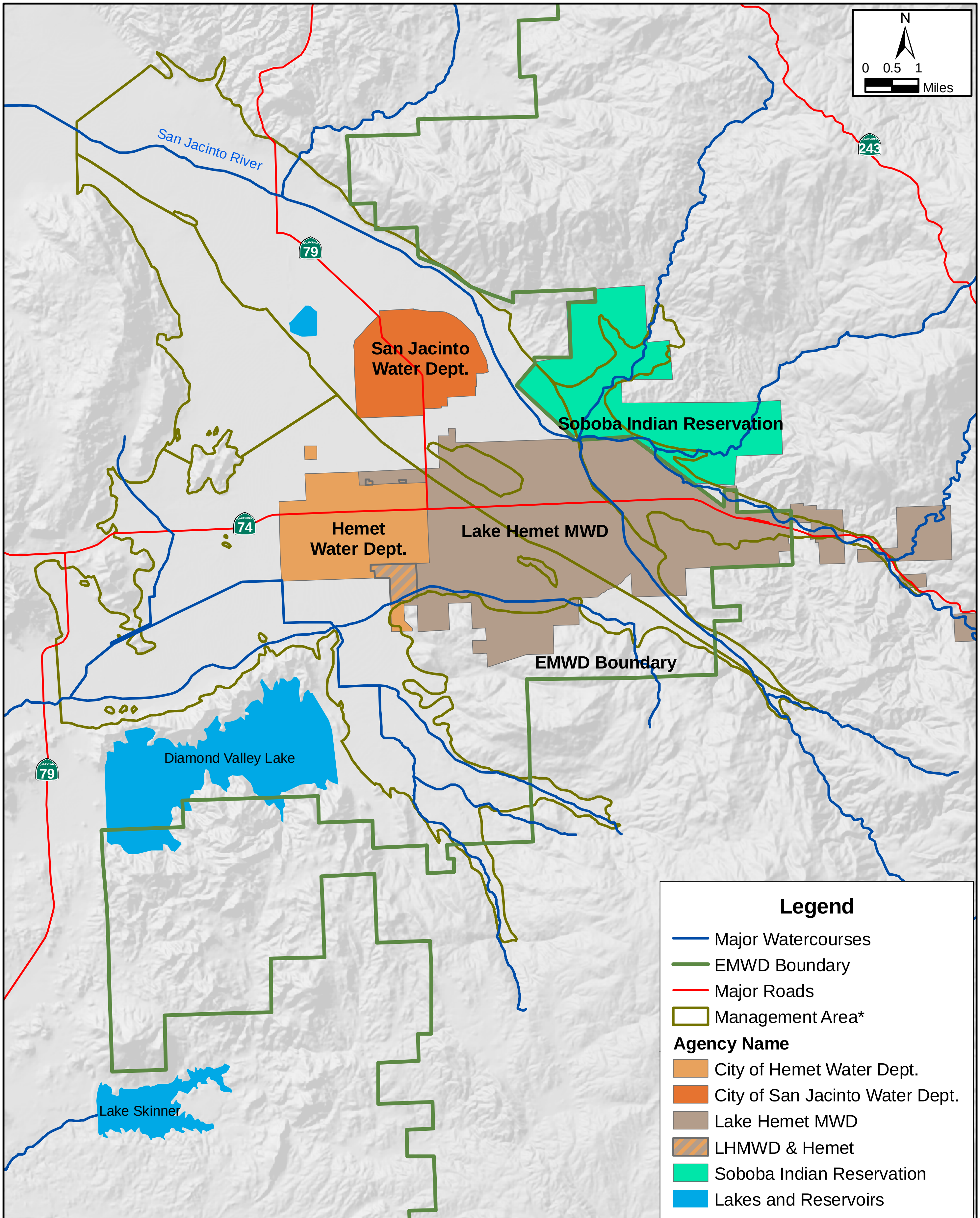
A map of the service areas of the Public Agencies near the Management Area and the Soboba Reservation is provided in Figure 2.1. The Plan Participants are briefly described below.

2.2.1 PUBLIC AGENCIES

EMWD, LHMWD, the City of Hemet, and the City of San Jacinto provide water service in various areas of the Canyon, Upper Pressure, Hemet South, and Hemet North Management Zones. A list of governing bodies is provided in Appendix C. Additionally, there are a number of Private Water Producers extracting groundwater for agricultural and domestic use.

2.2.1.1 Eastern Municipal Water District (EMWD)

Since its formation in 1950, EMWD has matured from a small agency primarily serving agriculture to one whose major demands come from domestic customers. In 1951, EMWD annexed to the Metropolitan Water District of Southern California (MWD). With the purchase of the Fruitvale Mutual Water Company (FMWC) in 1971, EMWD acquired all of Fruitvale's



Public Agencies and Soboba Reservation

Hemet / San Jacinto Water Management Plan

*Source: EMWD

October 2007

Figure 2.1

assets including appropriative, prescriptive, and riparian water rights; water system, wells, well sites, pumps, and storage; real property, easements, rights, and interests; and franchises, permits, and licenses. Over time, the agency has continued to grow. Today, in addition to providing retail service, EMWD provides wholesale water to the seven local water agencies within its service area, including the three remaining Public Agencies in the Management Area.

As of 2005, EMWD serves approximately 113,000 retail connections, including approximately 200 agricultural connections, in a service area with an estimated population of 567,000 within the 555-square-miles, including many areas outside the Management Area. The population within EMWD's boundaries is expected to grow to 830,000 by 2025 (EMWD, 2005a), not including the population of the Rancho California Water District.

In addition to wholesale and retail potable water supply, EMWD's services include wastewater collection and treatment as well as water recycling. The San Jacinto Valley Regional Water Reclamation Facility is an 11 million gallons per day (MGD) plant that provides most of the treatment and water recycling capability for the Management Area.

The five-member Board of Directors comprise the governing body of EMWD and are responsible for setting the policies guiding the operations of the District. Board members are elected to four-year terms by the registered voters from five geographic divisions, which are apportioned on the basis of population distribution. Terms of service are staggered to ensure continuity; public elections are held in at least two divisions every two years. Directors must reside within the division from which they are elected.

The 2004 water use in the portion of the EMWD service area within the Management Area was 13,900 AFY, and it is projected to increase to 21,000 AFY by the year 2020 (EMWD, 2005b).

2.2.1.2 Lake Hemet Municipal Water District (LHMWD)

LHMWD was created in its present form in 1955, but its origins date back to the late 1880s. The service area covers 16,500 acres in the Hemet/San Jacinto Valley area with an additional 2,200 acres in Garner Valley. LHMWD provides water to residential and agricultural customers in its service area. All wastewater collection and treatment within the LHMWD area is performed by EMWD.

LHMWD operates the Hemet Dam and reservoir. The dam, an engineering marvel at the time of its construction in 1895, is a gravity-type, granite dam. LHMWD historically treated a portion of this surface water for domestic use, however since 1998 the surface water treatment plant has been offline and all surface water usage has been for untreated agricultural uses.

LHMWD usually maintains approximately 11.7 million gallons in storage in the Hemet/San Jacinto Valley.

LHMWD customers are represented by a publicly elected board of five directors from five divisions, representing approximately 13,700 domestic and 52 agricultural connections within a 21-square mile service area with a 2005 population of approximately 39,100. The population within the LHMWD service area is expected to grow to approximately 49,500 by 2025 (LHMWD, 2005).

The 2004 water use within the LHMWD service area was estimated to be 16,900 AFY. Due to the expected benefits of more robust conservation efforts, demand is projected to remain fairly constant over the next several years despite an increasing number of service connections. Demand in 2020 is expected to be 16,300 AFY before increasing above the 2004 demand level in years thereafter (LHMWD, 2005).

2.2.1.3 The City of Hemet

The development of Hemet began in 1887 with the formation of the Lake Hemet Water Company and the Hemet Land Company by W. F. Whittier and E. L. Mayberry. The completion of the Hemet Dam in 1895, the formation of Lake Hemet behind the dam, and a water distribution system to and through the valley made future development of the Hemet area possible.

As of 2005, the city had a population of 78,600 with an area of approximately 26 square miles. City of Hemet anticipates a population growth to 154,000 by 2025 (Hemet, 2006).

The City of Hemet was incorporated on January 20, 1910 with a population of 992. The city government is a Council/Manager form of government with seven elected positions, which includes five Council Members, one City Treasurer, and one City Clerk. The Mayor is elected by the Council Members and serves a one-year term. All Council Members serve a four-year term.

The City of Hemet Water Department treats and distributes water to 9,500 connections, covering 5 square miles of the city area. The 2005 population of the Water Department's service area is 20,200 and is projected to grow to 22,300 by 2025. EMWD and LHMWD serve the remaining 21 square miles of the city, with 7,830 and 3,025 connections, respectively. All wastewater collection and treatment within the City of Hemet area is performed by EMWD.

The 2004 water use within the City of Hemet Water service area was estimated to be 6,000 AFY, and is projected to increase to 6,700 AFY by year 2020 (Hemet, 2006).

2.2.1.4 The City of San Jacinto

Incorporated in 1888, San Jacinto is one of the oldest communities in Riverside County. The city has a Council/Manager form of government with a five member Council that includes a Mayor and Vice Mayor. The City of San Jacinto Water/Wastewater Divisions are responsible for the health and safety of the community through the delivery of the potable water supply and the collection of wastewater. The city wastewater collection system is maintained by this Division while wastewater treatment service is provided by EMWD.

The 2005 population of the city was 34,100; it is anticipated the population of the city will grow to 63,600 by 2025 (San Jacinto, 2005). The City of San Jacinto Water Department serves the central portion of the city with approximately 3,700 residential and commercial service connections. The 2005 population of the Water Department's service area is 13,200 and is projected to grow to 24,000 by 2025. The remaining portions of the city are served by EMWD and LHMWD, which have 4,636 and 475 service connections within the city boundaries, respectively.

The 2004 water use within the City of San Jacinto water service area was estimated to be 3,100 AFY, and is projected to increase to 5,100 AFY by year 2020 (San Jacinto, 2005).

2.2.2 Private Water Producers

Private Water Producers are those property owners who are pumping groundwater pursuant to overlying water rights, typically for agricultural or domestic uses. Historically there was no comprehensive metering program in-place to monitor groundwater production and/or water use by the Private Water Producers. EMWD collected groundwater data through an informal, voluntary monitoring program. In 2004 the Hemet/San Jacinto Groundwater Monitoring Program was initiated by the Public Agencies and the DWR to collect, analyze, and compile groundwater-related data (EMWD, 2005).

It is estimated, on the basis of limited data and land use analysis, that the 2004 water use by Private Water Producers was about 22,200 AFY. This annual level of water use is unusually low, compared to a long-term average of 31,000 for 1984-2004 (WRIME, 2003a). Water use is expected to drop to approximately 16,000 AFY by 2020.

The Public Agencies recognize the overlying water rights of Private Water Producers, and the Principles provide several options for voluntary participation in the Plan by the Private Producers. For more details, please see the Principles provided in Appendix D.

There are two classes of participants, Class A and Class B; both agree to have their wells metered and to have those meters read by EMWD personnel at no cost to the participants. The two types of participants are further explained below.

2.2.2.1 Class A Participants

A Private Water Producer can sign an agreement acknowledging the existence of the Plan, while not being required to participate in Plan implementation. Class A participants are allowed to vote for and/or serve as the Private Water Producer representative on the Watermaster board. The Class A participants may continue to pump from their property without assessments by the Watermaster, so long as the water is put to a reasonable and beneficial use as authorized by California law.

The Class A participants have the right to convert to Class B during a grace period that ends 3 years after the entry of the Stipulated Judgment, and upon payment of the total assessments without interest, as if they were Class B participants to begin with.

2.2.2.2 Class B Participants

A Private Water Producer can become a Class B participant by electing to limit annual pumping to their estimated average annual production during the 1995 – 1999 calendar years and by agreeing to pay replenishment assessments on amounts in excess of that average annual production.

Like Class A Participants, Class B Participants can vote for and/or serve as the Private Water Producer's representative on the Plan's governing board. Additional benefits are given to Class B Participants as well. Under certain conditions, the Class B Participant can convey their Adjusted Production Right to the Plan or to a Public Agency. Also, upon conversion from agricultural to urban uses, Class B Participants would receive credits from the Public Agency toward the satisfaction of any requirements then in effect for water supplies and toward any fees associated with water supply that the Public Agency may then have in effect. For more information on production rights, please see Section 6.

2.2.2.3 Non-Participants

A Private Water Producer can elect not to participate in the Plan and not to formally acknowledge its existence. These non-participants will continue to exercise their water rights unaffected by the Plan.

2.2.3 Role of State of California Department of Water Resources

In June 2001, the DWR executed a Memorandum of Understanding (MOU) with EMWD, LHMWD, and the Cities of Hemet and San Jacinto. Initially, DWR worked to bring the group together to establish a mutual understanding of the issues in the Management Area. The goals of the group were determined and included the following: (i) finalizing an approach to groundwater management; (ii) settling on a mechanism to involve the Plan Participants in the water rights claim by the Soboba Tribe; (iii) agreeing on the basic components of a regional conjunctive use program; and (iv) establishing the necessary institutional structures. Major involvement of the DWR to-date include providing technical support to the TC and PC on resolving various technical and data analysis issues, providing facilitation and mediation support to the PC and the CAM committee, providing financial support on a number of studies and projects, including the Plan document.

2.2.4 Public Participation

There have been numerous opportunities for public input into the development of the Plan. Meetings were held for the public at the beginning of the Plan process to provide information and gather input. While the Plan was being developed, more opportunities were provided for public input, including TC and PC meetings and meetings with the Private Water Producers, all of which were open to the public. The public was also given the opportunity to review the draft of the Plan and submit comments.

2.3 PREVIOUS AGREEMENTS AND INSTITUTIONAL BODIES

During the course of history of water supply in the Management Area, there have been other agreements and institutional bodies that have been formed and operated to facilitate the management of water supplies. Following is a brief description of these agreements and institutional bodies, which are no longer active or are superseded by this Plan.

2.3.1 Fruitvale Judgment and Decree

The Fruitvale Judgment and Decree (The City of San Jacinto, et al., v. Fruitvale Mutual Water Company, et al., No. 51546, Riverside County) was entered into Book 72, Page 164 of Judgments, Riverside County, on June 4, 1954. Under the Judgment and Decree, FMWC could extract groundwater from an area which largely corresponds to the Canyon Management Zone without any restrictions as long as a specified criteria regarding static depth to groundwater and production limits were met. After purchase of FMWC, EMWD was subject to the provisions of the Judgment and Decree. The Water Management Plan and related Stipulated Judgment will subsume and supersede the 1954 Fruitvale Judgment and Decree, along with any other agreements between EMWD and other agencies related to the FMWC acquisition, provided that none of the service area agreements included in the Fruitvale documents or those related to mutual aid or system interties are affect by this Plan or the Stipulated Judgment.

In 1971, EMWD purchased all of FMWC's assets and water rights, and FMWC was dissolved. EMWD also agreed to continue to provide to the Cities of Hemet and San Jacinto and LHMWD the amounts of water which they had been entitled to receive as shareholders in FMWC. These deliveries were known as "entitlement water" and the water was provided at a fixed rate, subject to annual adjustments. The amounts of water to be provided were:

- City of Hemet: 6.39% of the greater of FMWC pumping or 9,000 AFY;
- City of San Jacinto: 0.38% of FMWC pumping; and
- LHMWD: 3.74% of FMWC pumping.

The reporting by EMWD since the purchase of FMWC shows that an average of approximately 10,000 AFY was pumped from FMWC wells. Of this total, an average of 61% was from Upper Pressure, 33% was from Canyon, and 6% AFY was from Hemet South.

2.3.2 Hemet/San Jacinto Groundwater Association

The Hemet/San Jacinto Groundwater Association (Association) was formed in 1991 to provide an over-arching organization to proactively address groundwater issues in the Management Area. The Association Board of Directors included representatives from the Private Water Producers, EMWD, LHMWD, and the Cities of Hemet and San Jacinto.

The Mission Statement and Articles of Association were approved on September 9, 1991. The Mission Statement read: *The Hemet/San Jacinto Groundwater Association serves as the regional groundwater management entity for portions of the San Jacinto Valley groundwater basins. The Mission of the Association is to maintain a secure reliable and reasonably priced supply of high quality water for groundwater producers in the basin. The Association will implement its Mission by developing and applying sound groundwater basin management concepts.*

With regard to the area covered by the Association, the Articles of Association state: *The portions of the San Jacinto Valley Groundwater Basins shall include the Canyon area, the Intake area, and the upper pressure area, of the San Jacinto Hydrologic Subarea; the Hemet Hydrologic Subarea; and a portion of the Winchester Hydrologic Subarea. Such also being that portion of the San Jacinto Valley southeasterly of Bridge Street and northeast of one-quarter mile west of California Avenue in the area of Simpson Road, together with tributary basins, streams, and watersheds.*

In May 1994, following receipt of the Soboba Band of Mission Indians water rights settlement claim, requests were submitted to the U.S. Department of the Interior by EMWD, the Association, and the Soboba Tribe, to appoint an Indian Water Rights Settlement team to participate in settlement negotiations. The activities of the Association stopped when the current negotiations took precedence.

2.4 ACTIVE INSTITUTIONAL BODIES

As part of the on-going activities leading to the development and adoption of the Principles, the Stipulated Judgment, and agreement with the Soboba Tribe, the following institutional bodies are formed:

- Hemet/San Jacinto Policy Committee (PC),
- Hemet/San Jacinto Technical Committee (TC), and
- Hemet/San Jacinto Consultant-Attorney-Managers Committee (CAM).

Following is a brief description of each body, their role, and participants.

2.4.1 HEMET/SAN JACINTO POLICY COMMITTEE

The PC is comprised of elected officials representing EMWD, LHMWD, the Cities of Hemet and San Jacinto, and representatives of the Private Water Producers. Each entity, including the Private Water Producers, has three representatives on this committee. In the case of the Public Agencies, the PC representatives are two members of the Board of Directors or City Council and the agency or city manager. Three representatives reflecting the Private Water Producers interests (agricultural, dairy, golf course, etc.) are selected by the Private Water Producers. Each entity participates and votes as a unit in the PC. The decision making process is based on consensus. DWR provides a facilitator, a project manager, and technical experts to support and facilitate the decisions of the PC and TC members. Observers to the PC include other Private Water Producers, attorneys, and/or consultants representing various members, and representatives of the Soboba Tribe.

The list of participants in the PC at the time of adoption of this Plan is presented in Appendix E.

2.4.2 HEMET/SAN JACINTO TECHNICAL COMMITTEE

The PC formed a TC to compile, share, interpret, evaluate, and reach agreement on data; to define problems; and to address the PC's technical issues and make recommendations to the PC. Committee membership consists of representatives assigned by the Public Agencies, the Private

Water Producers, and DWR and an engineering consultant provided by DWR as a neutral third-party participant. The representative from LHMWD served as the TC chairman. Through a collaborative effort, the TC developed the data set (WRIME, 2003a) that provides the basis for understanding the area's hydrology, and has identified potentially feasible initiatives, programs, and projects to enhance the safe yield of the Management Zones.

The list of participants in the TC at the time of adoption of this Plan is presented in Appendix E.

2.4.3 HEMET/SAN JACINTO CONSULTANT-ATTORNEY-MANAGERS COMMITTEE

The PC formed the CAM Committee, consisting of technical, legal, and management representatives of each Public Agency, assisted by the DWR project manager and facilitator. The role of the CAM Committee is to facilitate the preparation of technical and legal documents in support of the Stipulated Judgment, the Agreement, and the Plan. Tasks assigned to the CAM Committee include: the development of contractual agreements and MOUs, and the evaluation of the financial impacts to the community for consideration and action by the PC. The CAM Committee provides administrative or policy recommendations to the PC.

The list of participants in the CAM Committee at the time of adoption of this Plan is presented in Appendix E.

2.5 RELATED GROUNDWATER MANAGEMENT ACTIVITIES

There have been numerous investigations and technical analyses conducted in the Management Area. This section highlights more recent reports that were produced to support the Plan, reviewed by the TC, and used by the PC to make decisions. There has been a significant amount of work completed by the local agencies documented in the form of presentations to the PC and the TC. These include:

- Analysis of EMWD Fruitvale water transfer and use by other agencies;
- Analysis of Conveyance (export) water from the Management Area;
- Reconciliation of the Groundwater Production records amongst the participants;
- Estimation of basin overdraft;
- Review and assessment of the San Jacinto Watershed Groundwater Model; and
- Recycled water use and activities.

A Basin Assessment Study was undertaken in 2003 by the local stakeholders with the support of DWR in order to evaluate the existing conditions of the Management Area, evaluate likely future conditions, and develop and evaluate potential conjunctive use opportunities in the

Management Area. To support the Basin Assessment Study, the following Technical Memoranda (TM) and reports were produced:

- *Operational Yield Study, Hemet/San Jacinto Groundwater Management Area (WRIME, 2003d);*
- *Technical Memorandum No. 1 (TM1), Assessment of Historical and Projected Land and Water Use Data (WRIME, 2003a);*
- *Technical Memorandum No. 2 (TM2) - Description of Preferred Potential Conjunctive Use Projects (WRIME, 2003c);*
- *Basin Assessment Study Executive Summary (ES) (WRIME, 2003b); and*
- *Draft Technical Memorandum No. 3 (TM3) - Analysis of Impacts of Conjunctive Use Projects (January 2004).*

The *Operational Yield Study, Hemet/San Jacinto Groundwater Management Area* presents estimates of the operational yield of the Management Area. Several time periods were used to examine the water budgets of each Management Zone and the Management Area as a whole under various hydrologic conditions. The purpose of the report was to review the previous estimates of hydrologic water budget and reconcile differences in the previously prepared water budgets, and to achieve a consensus on the assumptions, data, methods, and yield of the basin. The long-term period of 1958-2001 was used since it had the best available data at the time and represented a balanced hydrologic period, with wet, dry, and normal periods similar in frequency to the overall historical record.

Hemet/San Jacinto Basin Assessment Study – Basin Assessment Report/Integrated Water Management Plan, Technical Memorandum No. 1 (TM 1), Assessment of Historical and Projected Land and Water Use Data presents background and available data, and analyzes the quality and utility of the data for evaluating basin conditions. The data presented in TM 1 include historical groundwater production, water diversions, water sales, and imported water. The purpose of the report was to obtain agreement on existing conditions, document assumptions, and provide a baseline for purposes of future comparison.

Hemet/San Jacinto Basin Assessment Study – Basin Assessment Report/Integrated Water Management Plan, Technical Memorandum No. 2 (TM 2), Identification and Description of Potential Conjunctive Use Projects presents the process and basis of selection of sites for further evaluation for potential conjunctive use projects. Seven sites were selected from an initial group of 15. The sites were ranked based on screening criteria that included: general site characteristics (size, recharge needs, ownership, etc.), recharge water sources, hydrogeologic suitability, sub-basin interactions, engineering suitability, land use suitability, and environmental impacts. An initial screening was also performed for two potential in-lieu projects.

Hemet/San Jacinto Basin Assessment Study – Executive Summary provides a summary of TM 1 and TM 2.

Draft Hemet/San Jacinto Basin Assessment Study – Basin Assessment Report/Integrated Water Management Plan, Technical Memorandum No. 3 (TM 3), Analysis of Impacts of Conjunctive Use Projects (January 2004) presents a summary of available information on seven potential recharge sites and two potential in-lieu sites for conjunctive use. Draft TM 3 synthesizes information from multiple sources to compare potential recharge sites and proposes preferred sites and documents any additional study or data needs. The TM 3 was presented to the TC in draft form, and comments were received. Due to initiation of the development of the Water Management Plan, the work to finalize TM 3 was re-scoped, which obviated the need to prepare a final TM 3.

Significant other work has been performed and documented by EMWD. These reports include planning documents and feasibility studies with modeling efforts:

- *West San Jacinto Groundwater Basin Management Plan;*
- *Hemet/San Jacinto Water Management Area 2004 Annual Report;*
- *Hemet-San Jacinto Recharge and Recovery Program- Feasibility Study;*
- *Regional Groundwater Model for the San Jacinto Watershed;*
- *Hemet-San Jacinto Integrated Recharge and Recovery Program- Feasibility Study Groundwater Flow Model;*
- *Lake Elsinore and Canyon Lake Nutrient Source Assessment;*
- *Groundwater Infiltration Predictions Using Surface Water Model Output for the San Jacinto Watershed;*
- *Development of the Regional Water Resources Database (RWRD); and*
- *Preliminary Design Report for the San Jacinto Agricultural In-Lieu Water Supply Project.*

West San Jacinto Groundwater Basin Management Plan (EMWD, 1995). This plan was prepared in accordance with Assembly Bill 3030. This groundwater management plan covers the western portion of the EMWD service area in the San Jacinto Watershed. Since the groundwater management in the eastern San Jacinto watershed was being developed under Association in the early 1990s, the Management Area was excluded from the AB3030 planning process. The goal of the West San Jacinto Groundwater Basin Management Plan is "to maximize the use of groundwater for all beneficial uses in such a way as to lower the cost of water supply and to improve the reliability of the total water supply for all water users in the West San Jacinto Groundwater Basin Management Area" (EMWD, 2004). Implementation of the plan included the establishment of an Advisory Committee; Management Zone prioritization; and groundwater resources evaluation including groundwater quality and level monitoring, extraction monitoring, and hydrogeophysical investigations.

Hemet/San Jacinto Water Management Area 2004 Annual Report (EMWD, 2005b). As part of the reporting process to the Management Area stakeholder group, EMWD produces annual reports that summarize groundwater quality, level, and extraction monitoring results, and provide an update on activities and progress toward meeting the previous year's recommendations and goals of the groundwater management plan. The first annual report for the Hemet/San Jacinto Area was produced in June 2005.

Hemet-San Jacinto Recharge and Recovery Program- Feasibility Study (Psomas, 2003). This report documents the feasibility of a proposed recharge project. The proposed Hemet/San Jacinto Integrated Recharge and Recovery Program consists of average annual recharge of 43,750 acre-feet (AF) based on long-term hydrology at a site within the City of Hemet and near the San Jacinto River's confluences with Poppet and Bautista Creeks. This program involves the construction of approximately 15 recharge ponds on a 100-acre site in the San Jacinto River channel, construction of new pipeline facilities, upgrade of existing pump stations, and construction of new extraction wells at various locations within the Management Area. In order to assess the feasibility of the proposed program, a comparative analysis was completed to evaluate potential alternatives to the preferred option of recharging imported water.

Regional Groundwater Model for the San Jacinto Watershed (TechLink Environmental, 2002a). This report documents the development of a regional groundwater flow and transport model for the San Jacinto watershed basin within EMWD's service area, an area that includes the Management Area as well as the areas to the west included in the *West San Jacinto Groundwater Basin Management Plan. Regional Groundwater Model for the San Jacinto Watershed* includes review of available data, development of a conceptual model, setup of a flow and transport model, calibration of the model, and simulation of management scenarios.

Hemet-San Jacinto Integrated Recharge and Recovery Program - Feasibility Study Groundwater Flow Model (TechLink, 2002b). This report documents the application of the regional groundwater model to evaluate the various recharge and recovery activities and alternative water supplies. These model simulations are intended to compare project and no-project alternatives, evaluate the aquifer capability to store large volumes of water, and evaluate the availability of recharged water for extraction.

Lake Elsinore and Canyon Lake Nutrient Source Assessment (TetraTech, 2003). TetraTech developed a watershed model of the San Jacinto watershed for the Lake Elsinore and San Jacinto Watershed Authority and the RWQCB as part of the Lake Elsinore and Canyon Lake Nutrient Source Assessment. The model provided a framework for nutrient source assessment through representation of contributing land uses in a subwatershed network and subsequent determination of required nutrient load reductions and allocations to Total Maximum Daily Load (TMDL) objectives. Relating to the Management Area, the report showed that nutrients from the Management Area only reach the lakes when Mystic Lake overflows.

Groundwater Infiltration Predictions Using Surface Water Model Output for the San Jacinto Watershed (TetraTech, 2004). This report documents the update and modification of the watershed model by TetraTech to support EMWD's development of a groundwater model of the San Jacinto River basin to simulate aquifer storage in the region. The update and modification included extension of the modeling period from January 1984 to March 2003, division of one subwatershed into 4 subwatersheds, and modification of model output. The model was validated and scenarios were run.

Regional Water Resources Database (EMWD, 2005c). A RWRD was developed for EMWD in 2004 to house the existing and future groundwater-related records and to interface Geographic Information System (GIS) maps and aerial photographs. The RWRD contains information for groundwater levels and extraction; streamflow and diversions; well information, construction data, downhole logs, and well/aquifer pump tests; precipitation; temperature; evaporation; imported water usage and quality; conjunctive use; and water quality data from other laboratories and published reports. While no formal document is available to-date describing the full development and implementation of this project, *Regional Water Resources Database* presents a concise summary of the capabilities of this important component of data management in the region.

Preliminary Design Report for the San Jacinto Agricultural In-Lieu Water Supply Project (Engineering Resources of Southern California, 2005). This report details how recycled water could be incorporated into existing irrigation infrastructure and how to be consistent with the regulatory constraints associated with recycled water use. This included study of water demands, pipeline alignment and size, and environmental issues and resulted in the development of a preliminary plan and cost estimate. The preliminary plan included 13,200 feet of 24-inch pipeline serving Rancho Casa Loma and Scott Brothers Dairy Farms. Total irrigation demand from these farms is estimated at 8,640 AFY. Of this amount, the project could deliver 3,215 AFY due to limited availability of recycled water during the summer months. The project is estimated to take 13 months to complete.

The elements of this Plan include water management goals and a set of management strategies that discuss and identify the actions necessary for meeting the goals.

3.1 MANAGEMENT PLAN GOALS

The Plan has eight primary goals derived from the Principles and the Agreement. Each of the goals, listed below, is briefly discussed in subsequent sections:

- Address pumping overdraft and declining groundwater levels,
- Provide for Soboba Tribe prior and paramount water rights,
- Ensure reliable water supply,
- Provide for planned urban growth,
- Protect and enhance water quality,
- Develop cost-effective water supply,
- Provide adequate monitoring for water supply and water quality, and
- Supersede the Fruitvale Judgment and Decree.

3.1.1 ADDRESS PUMPING OVERDRAFT AND DECLINING GROUNDWATER LEVELS

The Principles and the Stipulated Judgment recognize that groundwater levels within the Management Area have generally been declining for a number of years, and that the Management Area is presently in a condition of groundwater overdraft. The amount of groundwater overdraft is estimated to range from 10,000 to 15,000 AFY. This Plan has a goal of reducing the overdraft in the short-term, and completely eliminating the annual overdraft in the long-term. The timeframe will depend on the extent of overdraft, as more knowledge is gained through the years. For example, a six-year period would be needed to eliminate overdraft if there is an annual overdraft of 10,000 AF.

The Principles identify management strategies to be included in the Plan to reduce overdraft and ensure a long-term supply of reliable water for current and future uses. The Plan contains both management (non-structural) and capital facility (structural) elements to reduce demand and/or increase the available supply. The management elements include: reduction in native groundwater production; enhanced recharge with local runoff, imported, and/or recycled water; and water conservation programs. Short-term planned reductions in pumping are part of the Plan while further supplies are obtained through the identified management elements. The management strategies are described in more detail in Section 3.2.

3.1.2 Provide for Soboba Prior and Paramount Water Rights

The Agreement with the Soboba Tribe provides for financial obligations, settlement of all water rights claims, and water purchases from MWD, including infrastructure and groundwater storage. The Plan requires that all parts of the Agreement with the Soboba Tribe be met. The management elements to ensure this include: recognition of 9,000 AFY of Soboba Tribe water rights and up to 4,100 AFY of water use in Canyon and Upper Pressure Management Zones for the first 50 years from the date of Settlement, purchase of replenishment water, and MWD's long-term average delivery of 7,500 AFY of imported water.

3.1.3 Ensure Reliable Water Supply

Reliability is a key component of any water supply system. This goal of the Plan is to ensure that the Public Agencies have a consensus and commitment to develop a comprehensive water supply portfolio that realizes all potential opportunities, and that plans are in place to adapt to changing demands, natural disasters, and drought conditions. Such a portfolio should rely on a range of sources of water supply and include a large component of local supply and storage. These objectives minimize, to the extent possible, reliance on weather patterns, over-stressed aquifers, and over-allocated imported water. The Plan elements that address these goals include imported and recycled water use.

3.1.4 Provide for Planned Urban Growth

The Management Area, like much of the Inland Empire area of Southern California, is experiencing dramatic urbanization. The Principles and the Plan recognize and acknowledge that the Management Area will continue to experience residential, commercial, and industrial growth and development, and that the existing water production and service systems will need to be expanded to meet this growth. This urbanization will affect water supplies in several ways. Urban development on non-irrigated lands will increase water use. Urban development and conversion of irrigated lands may not significantly increase water use, but the urban water use requires a more dependable, higher quality water supply. It is estimated that at least 15,000 AFY incremental water supply capacities over the existing Base Production Rights of Public Agencies must be dedicated to adequately serve this growth. The Plan will help local communities comply with recent changes in state law effective January 2002 (SB 221 and SB 610) requiring municipal suppliers, water districts, and cities or counties to document water availability from all sources in normal, dry, and multiple dry years whenever land use decisions are made. Planned urban growth, as identified in prevailing land use and general plans, or in approved Urban Water Management Plans (UWMP), provided the basis for all demand forecasts and assumptions in the Plan.

3.1.5 Protect and Enhance Water Quality

The Management Area has some of the highest quality groundwater in the San Jacinto Watershed, but it has its own problems and issues. Nitrates and Total Dissolved Solids (TDS) concentrations have historically increased as the area experienced urban and agricultural growth. As noted above, urban uses will replace agricultural uses, resulting in more stringent water quality standards for most constituents, including nitrates. The Plan seeks to meet goals for water quality through preventing degradation of the groundwater due to activities in the Management Area, and as a result of implementation of the Plan. Each of the Public Agencies also seeks to prevent degradation or to improve groundwater quality to avoid high costs for drinking water treatment.

3.1.6 Develop Cost-Effective Water Supply

Equitable distribution of costs and benefits are part of the Plan. It is important that the Plan elements are selected and implemented in a way that keeps costs to a minimum so as to keep water bills as low as possible for customers. Cost management includes purchasing imported water at low rates; utilizing groundwater storage space; fully utilizing existing infrastructure; promoting conservation; efficiently implementing new infrastructure; and maintaining good quality groundwater and surface water to keep treatment costs low. The Public Agencies also seek to cost-effectively reclaim municipal wastewater for beneficial reuse whenever possible.

3.1.7 Provide Adequate Monitoring for Water Supply and Water Quality

Monitoring programs will be implemented to determine if the Plan's goals are being met; to document that anticipated benefits are being achieved; and to predict future needs. Included in the monitoring should be water quality, sampled at sufficient locations to be representative, with analysis for all constituents of concern. In addition, the monitoring program should include monitoring of water levels, well metering, and tracking of imported water and recycled water availability and deliveries. Monitoring can also be used to improve yield estimates and groundwater model performance through the development of better estimates of stream recharge and other components. The results of monitoring will be used to strengthen or relax actions needed to meet Plan goals.

3.1.8 SUPERSEDE THE FRUITVALE JUDGMENT AND DECREE

The Fruitvale Judgment and Decree (The City of San Jacinto, et al., v. Fruitvale Mutual Water Company, et al., No. 51546, Riverside County) was entered into Book 72, Page 164 of Judgments, Riverside County, on June 4, 1954. EMWD, as successor in interest to FMWC, is subject to the provisions of the Judgment and Decree. Provisions in the document are discussed and summarized in Section 2 of this Plan. The Stipulated Judgment and its Water Management Plan are to supersede the Fruitvale Judgment and Agreement subject to certain exceptions in Section 3.5 of the Stipulated Judgment.

3.2 WATER MANAGEMENT PLAN STRATEGIES

To meet the stated goals of the Plan, the stakeholders have adopted the following specific strategies.

3.2.1 REDUCE PUBLIC AGENCY NATIVE GROUNDWATER PRODUCTION

The Public Agencies have agreed to reduce native groundwater production so that total production is within the Safe Yield of the Management Area. The average annual groundwater production in the Management Area for the hydrologic period 1958-2004 is estimated to be 54,800 AFY. The initial estimate of Safe Yield is 45,000 AF. The Public Agencies have also agreed to a 10% reduction from each Base Production Right in the first full year after entry of the Stipulated Judgment. The Public Agencies' share of Safe Yield is calculated based on their Adjusted Production Right, and is discussed further in Section 11. Within the first six years, the Watermaster will make a determination of the Safe Yield of the Management Area. Thereafter, the Safe Yield shall be reviewed and modified, if necessary, upon the recommendation of the TC or as the Watermaster may determine. Until Adjusted Production Rights are consistent with the Public Agencies' share of Safe Yield, the Watermaster will determine the required reductions in Adjusted Production Rights in each subsequent year to achieve Safe Yield within a reasonable period of time as determined by the Watermaster. The Watermaster is to consider the extent of the overdraft, the economic impact on the parties bound by this Judgment, and other relevant factors in determining the total and pro-rata shares of Adjusted Production Rights. The goal is to achieve production at the same level as Safe Yield over a six-year period assuming an annual overdraft of 10,000 acre-feet. In the event the extent of the overdraft is different than assumed, then the period of time reasonably required to reach Safe Yield may be extended or reduced accordingly. However, in no event shall any reduction for any Public Agency be more than 10% of the Adjusted Production Rights of the prior year.

3.2.2 Implement the San Jacinto River Recharge and Recovery Project

The stakeholders have agreed that Phase I of the IRRP is the primary project considered to be the core of the Physical Solution. The stakeholders are working towards an agreement for Phase I of the IRRP project which documents their agreement on the ownership, financing, and operation of the facilities.

The information presented here is based on previously published documents adjusted when appropriate based on the latest knowledge at the time of publication of the Plan.

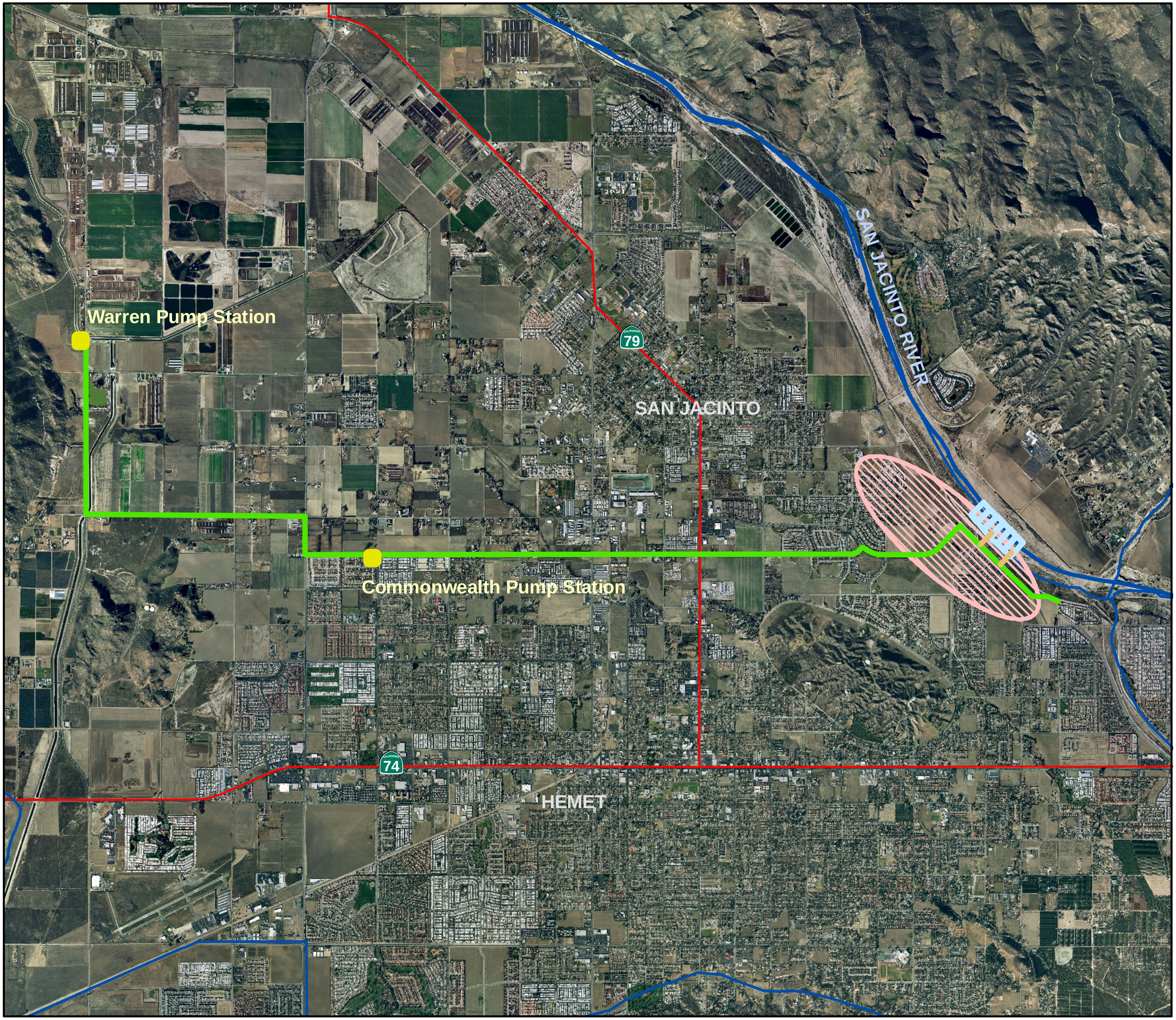
Phases I and II of the IRRP are designed to recharge (replenish) imported water and extract groundwater at a capacity such that the following goals are met:

- Satisfy the Tribe's prior and paramount rights as set forth in the Agreement with the Tribe by providing an average annual supply of 7,500 acre-feet pursuant to the terms of such agreement. The proposed Program would provide the MWD with the right to store up to 40,000 acre-feet of imported water in the Upper Pressure Sub-basin as advance deliveries under its agreement to provide an average annual supply of 7,500 acre-feet.
- Offset the existing overdraft of the Management Area, estimated at approximately 10,000 AFY.
- Provide approximately an additional 15,000 AFY of water storage to help meet projected demand increases.

Major elements of Phase I of the Project are (Figure 3.1):

- Modifications to Pump Stations (Warren and Commonwealth);
- Construction of Pipelines;
- Design and Construction of Recharge Basins;
- Drilling Three (3) Extraction Wells;
- Installation of Pumps and Chlorination Equipment for Three (3) Extraction Well; and
- Design and Installation of Three (3) Monitoring Wells.

The project is designed and implemented in two Phases. While project Phase I activities are defined in detail, Phase II of the project is defined at conceptual level and the detailed design will be developed in the future.



Hemet / San Jacinto
Water Management
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Schematic of Integrated Recharge Recovery Program - Phase I

Figure 3.1

Legend

- Pump Station
- Phase I Pipeline
- Phase I Ponds
- Existing Pipeline
- Phase I Well Field

Source: EMWD

N

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3.2.2.1 Phase I

This phase of the project consists of the construction of the San Jacinto Integrated Recharge and Recovery Project, which will provide up to 42 cubic feet per second (cfs)* of recharge water capacity. Phase I is scheduled to be completed by December 2008*, and will cost approximately $16.2* million. Major activities during Phase I are:

1. **Completion of Environmental Process -** The Environmental Impact Report (EIR) was prepared and adopted in August of 2004. Additional permitting requirements include Section 7 consultation with USFWS and issuance of Biological Opinion by the appropriate federal agency.
2. **Acquisition of Land -** A 100 acre parcel has been purchased by EMWD for required habitat mitigation measures for a 35 acre* parcel that is dedicated to recharge basins. In addition, EMWD is in the process of acquiring approximately one acre of land (in several parcels) for monitoring wells.
3. **Approval, Advertising, and Award of Construction Contract -** The EMWD Board of Directors has approved the bidding process.
4. **Drilling of Extraction Wells No. 1, 2, and 3 -** This includes construction and testing of three 18-inch diameter extraction wells, each to a depth of approximately 1,000 feet.
5. **Installation of Pump and Chlorination Equipment for Wells No. 1, 2, and 3 -** This includes installation of pump and chlorination equipment, appurtenances and site improvements required to complete and operate the new extraction wells.
6. **Modifications to the Pump Station -** This includes modifications to the Warren and Commonwealth Pump Stations. The modifications include upgrades to increase pump station capacity to provide a seasonal maximum of 42 cfs* to the recharge basins.
7. **Construction of Recharge Basins -** This activity includes construction of six recharge ponds within the San Jacinto river bed in two clusters of three ponds each. The footprint of the recharge area will be approximately 35 acres*, along the west side of the San Jacinto River, immediately upstream of the river confluence with the Meridian Channel.
8. **Construction of Pipelines -** This includes design and construction of pipelines and appurtenances to convey, regulate, and meter raw imported water flows into the recharge basins. Pipelines include two (2) 24-inch diameter laterals to convey water from an existing 33-inch diameter transmission main along the proposed Ramona Expressway alignment to the first basin in each of the two basin clusters. There will be appurtenances including regulation valves, meters to record water

* Number has been updated since the publication of the IRRP Feasibility Report.

flow, telemetry-based flow control systems, and discharge piping into the recharge basins.

9. **Design and Construction of Monitoring Wells -** Three monitoring wells will be constructed outside the river bed along the west berm. The wells are designed to monitor the vertical and lateral migration of recharge water into the underlying aquifer zones. These clustered wells will be multi-cased and perforated to monitor the groundwater levels at various depths.

The overall project size may change as a result of negotiations with regulatory agencies.

3.2.3 IMPLEMENT GROUNDWATER REPLENISHMENT PROGRAM

The groundwater aquifers in the Management Area are a valuable resource and provide many advantages to operating a reliable water supply system. For many Private Water Producers, groundwater is their sole source of water. Declining water levels increase costs for pumping water and can also cause wells to go dry, requiring deeper drilling, or can result in the intrusion of poor quality groundwater from neighboring Management Zones, rendering the groundwater unsuitable for many beneficial uses. Also, the replenishment of high quality imported water from the State Water Project or high quality runoff from the surrounding mountains can maintain or improve the quality of the groundwater in the Management Area.

Groundwater replenishment, therefore, is a major part of the water management strategies considered by the stakeholders. Replenishment efforts to increase water supply in the Management Area can be grouped into two categories:

1. Direct replenishment of groundwater to store water for future use; and
2. Augmentation of imported or recycled water supplies to provide immediate increases in water supply and the associated decrease in groundwater pumping. Often, these categories are combined, with increases in imported or recycled water being used to replenish groundwater for future use.

3.2.3.1 Enhancing Natural Replenishment

The Management Area already receives a significant amount of natural recharge, from sources such as direct recharge from precipitation and infiltration from the San Jacinto River and its tributaries. While much of this water is able to infiltrate naturally, natural recharge could be increased by capturing surface flows during storm events, allowing the water to infiltrate over time rather than be swept out of the Management Area. As part of the Basin Assessment Study, the TC has identified and considered several conjunctive use and natural replenishment projects that have the potential to address such a water supply management strategy. These are described in Section 5.3 of the Plan.

3.2.3.2 Additional MWD Replenishment Water

Utilizing replenishment allows for significant cost savings when purchasing imported water from MWD. MWD provides special rates for water used for replenishment purposes. This water is available during the low-demand winter period and currently costs $238/AF for untreated water, while full-service Tier 1 & 2 untreated water currently costs $331/AF and $427/AF, respectively.

3.2.4 EXPAND THE USE OF RECYCLED WATER

Recycled water is available from EMWD's San Jacinto Valley Regional Water Reclamation Facility. Currently, recycled water is used by agricultural users and other large-scale outdoor irrigators such as golf courses and municipal facilities in place of groundwater. The Watermaster will use recycled water as a significant part of its water supply strategy for replenishment of the groundwater basin. The Watermaster will work with EMWD to determine the operational constraints currently facing the availability of recycled water for replenishment of the basin. The recycled water is to follow the State and Federal guidelines. Future phases of the Plan include upgrade of the San Jacinto Valley Regional Water Reclamation Facility to tertiary treatment.

3.2.4.1 Continue and Expand the In-Lieu Replenishment with Recycled and/or Imported Water

In-lieu replenishment with recycled and/or imported water provides many benefits over direct replenishment of the groundwater. In-lieu involves utilizing an alternate source, in this case imported or recycled water, instead of pumping groundwater. Using in-lieu recharge means that there is no cost to pump groundwater, no land is needed for a spreading basin, and there is no constant recharge through a basin to push salts out of the unsaturated zone. Disadvantages include timing of the supplies with demand; that is, most in-lieu customers cannot use the quantity of water available during the off-peak time. To maximize use of water available for in-lieu replenishment, significant infrastructure will be needed to serve the maximum number of customers. This strategy would require the Watermaster to work with EMWD, other agencies, and Private Water Producers to develop specific plans for expanding the use of recycled water for in-lieu replenishment of the basin.

3.2.4.2 Expand and Upgrade the San Jacinto Valley Regional Water Reclamation Facility

The San Jacinto Valley Regional Water Reclamation Facility is currently an 11 MGD plant with capability to treat wastewater to a secondary level of treatment. While this plant is scheduled for upgrade to tertiary treatment, the recycled water discharge beyond the sale to the agricultural customers is currently being disposed of in the basin. The plant is scheduled for expansion in size and upgrade of the treatment level, and the upgraded plant will have the capacity to treat 14 MGD by 2011 and 18 MGD by 2024. The Watermaster shall have the right of first refusal to purchase all recycled water produced from the treatment facilities serving the Management Area that is not subject to then existing contracts. The Watermaster will analyze the need and decide on the amount of recycled water for direct recharge and/or direct delivery.

3.2.5 Provide for Reliable Water Supply to Meet the Future Demand

The Plan is to provide sufficient water supplies to meet future water demands in the Management Area. This strategy is tied directly to the IRRP that is designed to provide 15,000 AFY of additional supplies to meet the projected water demands. As part of this strategy, additional conjunctive use projects, identified in Section 5.3 of this Plan, will augment Phase II of the IRRP. These projects are mostly designed to capture winter run-off for recharge, unlike the IRRP that is designed to recharge imported water.

3.2.6 Implement Additional Water Conservation Measures

The current level of water conservation has significantly helped to reduce the water demand in the Management Area. In addition to the conservation measures implemented by the Public Agencies, additional conservation measures can be designed and implemented by the agricultural and dairy water users. The Watermaster, in coordination with the Agencies, should develop specific strategies for additional water conservation. In addition, they should identify practical steps and means for voluntary implementation by the agricultural and dairy water users that would help water management of the basin.

3.2.7 Implement and Expand Monitoring Program

At the heart of any water management plan is a robust monitoring program capable of assessing the status of the basin and monitoring the responses to future management actions.

EMWD, on a voluntary basis, has compiled historical groundwater elevation and quality data from mid-1950s through the present. In the early data collection efforts, the location and frequency of monitoring were not as consistent as the more recent measurements. This was mostly due to the voluntary nature of participation in the monitoring program, as well as funding availability. This lack of consistency in data collection hampers rigorous and thorough analysis. However, long-term hydrographs as well as contours of groundwater levels have been produced by EMWD to present long-term trends in groundwater conditions over time, and with appropriate geographic extent.

In 2004, the Hemet/San Jacinto Groundwater Monitoring Program was initiated to collect, compile, and analyze groundwater-related data. This program was undertaken by the Public Agencies and DWR. The monitoring program provides the information necessary for a comprehensive view of the Management Area, and contains the following elements:

- Groundwater Level Monitoring;
- Groundwater Quality Monitoring;
- Groundwater Extraction Monitoring; and
- Inactive Well Capping and Sealing.

Finally, the monitoring program utilizes EMWD's RWRD, for assembling and assessing groundwater-related data in the Management Area. All Public Agencies provide data on their wells and assist in communicating with private well owners in their respective jurisdictions to collect their data and information.

This strategy reconfirms that the monitoring program, as established in 2004, should continue and be expanded to new areas. The Stipulated Judgment requires that the Watermaster implement a monitoring program to ensure that Plan activities follow best management and engineering principles to protect Management Area water resources, and to compile and analyze data on groundwater production, water levels, water quality, and groundwater in storage. The Watermaster, in coordination with EMWD and other Public Agencies, will develop plans for expansion of the monitoring program, as well as, specific actions for implementation of the monitoring program in the Management Area. Funding for the monitoring program will come from the Administrative Assessment, as detailed in Section 10.3.1.

3.2.7.1 Groundwater Monitoring

Groundwater level and quality monitoring are valuable, but can be costly and time consuming. A robust network of monitoring wells can be established to develop the optimum amount of data on groundwater. Some criteria to be used in the development or modification of the network may include:

- Monitor the same well for selected seasons over many years to understand trends and variability;
- Develop an unbiased distribution of monitoring wells, aerially and vertically, that account for differences in:
    - Topography,
    - Geology and soils,
    - Climate, and
    - Land Use;
- Maintain supporting data to aid in analysis, including:
    - Meteorological data,
    - Hydrologic data, and
    - Land use data, including pumping and irrigation;
- Monitor at a frequency that captures variability of water level and water quality fluctuations;
- Utilize wells, to the extent possible, intended solely for groundwater monitoring, not production; and
- Maintain high levels of data quality.

The Watermaster is to work cooperatively with the Public Agencies and Private Water Producers to establish an optimum network of monitoring wells for collection and analysis of groundwater trends and variability.

3.2.7.2 Surface Water Monitoring

Surface water monitoring would build on the existing cooperative program between EMWD and the United States Geological Survey (USGS). This program monitors streamflow on the San Jacinto River just upstream of State Street and on Lamb Canyon Creek near Victory Ranch. The USGS also monitors a gage on the San Jacinto River at the Cranston Ranger Station. Continued and additional surface water flow and quality monitoring would include the following criteria:

- Monitor the same location for many years to understand trends and variability;
- Maintain supporting data to aid in analysis, including:
    - Meteorological data,
    - Groundwater data, and
    - Land use data, including pumping and irrigation; and
- Maintain high levels of data quality.

Gaging station should be installed on reaches not currently being monitored, such as:

- San Jacinto River near Main Street;
- San Jacinto River near Highway 74 bridge crossing;
- Bautista Creek near Highway 74 bridge crossing; and
- Salt Creek near State Street.

The Watermaster is to work cooperatively with the Public Agencies to establish specific monitoring locations for collection and analysis of surface water trends and variability.

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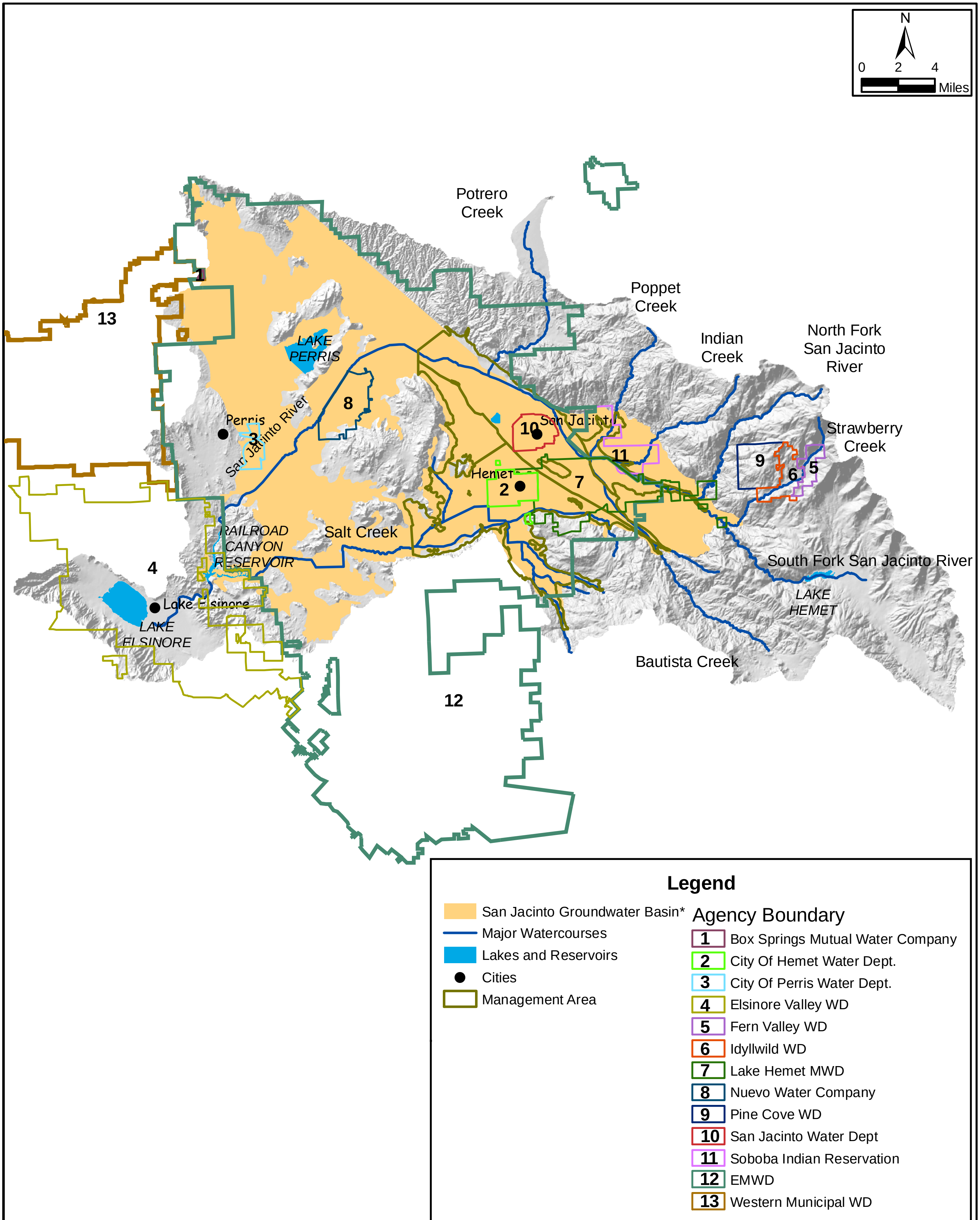
This section discusses the local geologic and hydrologic conditions that provide the foundation for the development of the Plan. The ability to manage available water supplies is to a large degree governed by naturally occurring conditions and the physical environment. This section further describes water supply conditions and sources; historical and current water demands; status of the groundwater basin; and summarizes water quality conditions.

4.1 GEOGRAPHY AND CLIMATE

4.1.1 GEOGRAPHY

The Management Area is located in western Riverside County, approximately 70 miles southeast of the City of Los Angeles. The area encompasses the Cities of Hemet and San Jacinto; unincorporated residential/commercial areas, including Valle Vista; and agricultural lands. State Highway 74 (Florida Avenue) crosses the valley in an east-west direction and State Highway 79 provides a north-south corridor for the region. The San Jacinto mountain range, to the east of the valley, is the dominant geographic feature of the region, rising to a height of 10,805 feet at Mount San Jacinto. Elevations on the valley floor range from approximately 1,400 to 1,800 feet. There are various bedrock outcrops in the area, none of which exceed 2,700 feet.

The San Jacinto Watershed (Figure 4.1) includes the Management Area and surrounding mountains and covers an area of approximately 728 square miles, measured above a point just downstream from Railroad Canyon Dam. All of the streams and rivers in the watershed are ephemeral, flowing only when precipitation occurs and losing much of this flow to groundwater infiltration. The San Jacinto River arises in and drains the western slopes of the San Jacinto Mountains. Waterways tributary to the river include the North and South Forks and Strawberry, Indian, Poppet, and Bautista Creeks. Lake Hemet, located in the mountains on the South Fork of the San Jacinto River, is a 12,775 AF capacity LHMWD-operated reservoir completed in 1895. The San Jacinto River recharges the groundwater basin, primarily in the area southeast of the City of San Jacinto. It then occasionally flows northwest past the Lakeview Mountains, filling Mystic Lake, before turning southwest to flow across the Perris Valley floor. The San Jacinto River ultimately flows into Lake Elsinore via Railroad Canyon and Canyon Lake. Lake Elsinore, when full, overflows into Temescal Wash, which joins the Santa Ana River near Prado Dam.



San Jacinto Watershed

Hemet / San Jacinto Water Management Plan

*Source: DWR, 2003

October 2007

Figure 4.1

4.1.2 CLIMATE

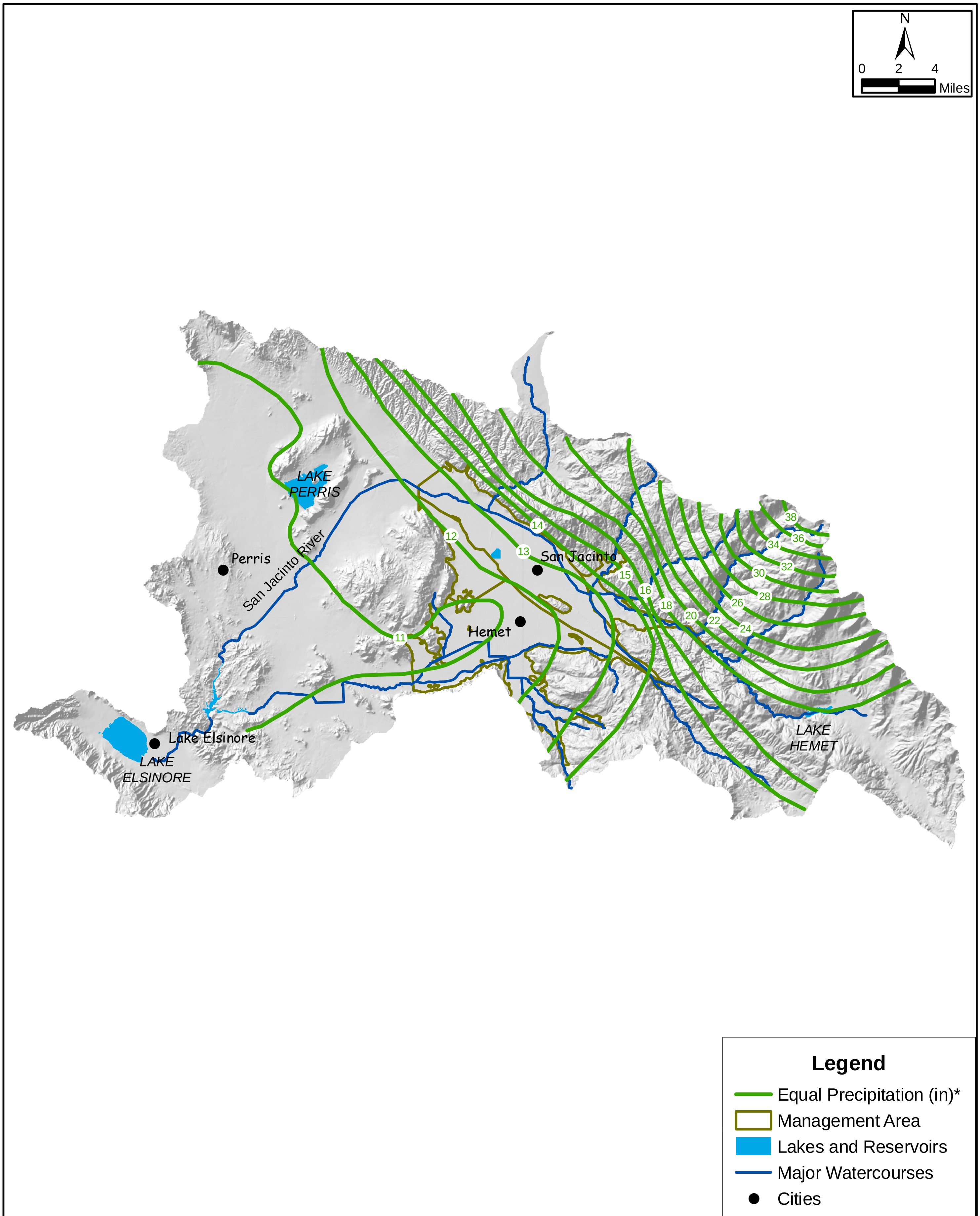
The climate of the area is that of a dry, semi-arid, near-Mediterranean zone, typical of the moderately elevated inland valleys of southern California. The climate is characterized by wet and dry seasons, generally low precipitation, and a large proportion of clear days, moderately high summer temperatures, and mild winter temperatures. The yearly average temperature at the City of San Jacinto is 62°F (25°C). Summer temperatures are often more than 100°F (38°C), and the recorded maximum at San Jacinto is 120°F (49°C). Frost occasionally occurs during the December through February period. The lowest recorded temperature was 7°F (-14°C). The average frost-free period is 247 days long, from March 15 to November 19. These temperatures for the San Jacinto climate station are considered to be generally representative of temperatures throughout the valley area.

Along with the rest of Southern California, the area is subject to the annual Santa Ana winds. Usually occurring in the fall of the year, these winds blow from the northeast, bringing hot, dry desert air with velocities of up to 50 miles per hour. Relative humidity has at times dropped below 5 percent with temperatures of 105°F (40°C) and higher. This phenomenon normally lasts only a few days, but has been known to last for several weeks, thereby greatly increasing the evaporation rate.

As a result of the hot, dry climate, the area has a high rate of evapotranspiration. Evapotranspiration is recorded as reference evapotranspiration (ETo; evapotranspiration from a standardized grass surface) by the DWR's California Irrigation Management Information System. Reference evapotranspiration averages 57 inches per year and is highly seasonal, with an average monthly maximum of 7.9 inches in July and average monthly minimum of 2.0 inches in December (DWR CIMIS, 2006).

Virtually all precipitation falls in the winter months, with some summer thunderstorms. Topography generally controls the relative amounts of precipitation from one location to the next. The average precipitation on the valley floor is about 13 inches, but near Mt. San Jacinto, the average precipitation is approximately 40 inches. Figure 4.2 shows the distribution of precipitation in the watershed.

The Riverside County Flood Control and Water Conservation District (RCFC&WCD) currently maintains precipitation records from the National Weather Service precipitation gauge at the California Division of Forestry Station at 1st Street and San Jacinto Avenue in San Jacinto (Site #186). Annual San Jacinto precipitation totals for the 1850/51 through 2004/05 rain years (July – June) are shown in Figure 4.3. For the 155 years from July 1850 through June 2005, average precipitation equaled 13.12 inches; median precipitation was 12.13 inches; the year with



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Average Annual Precipitation

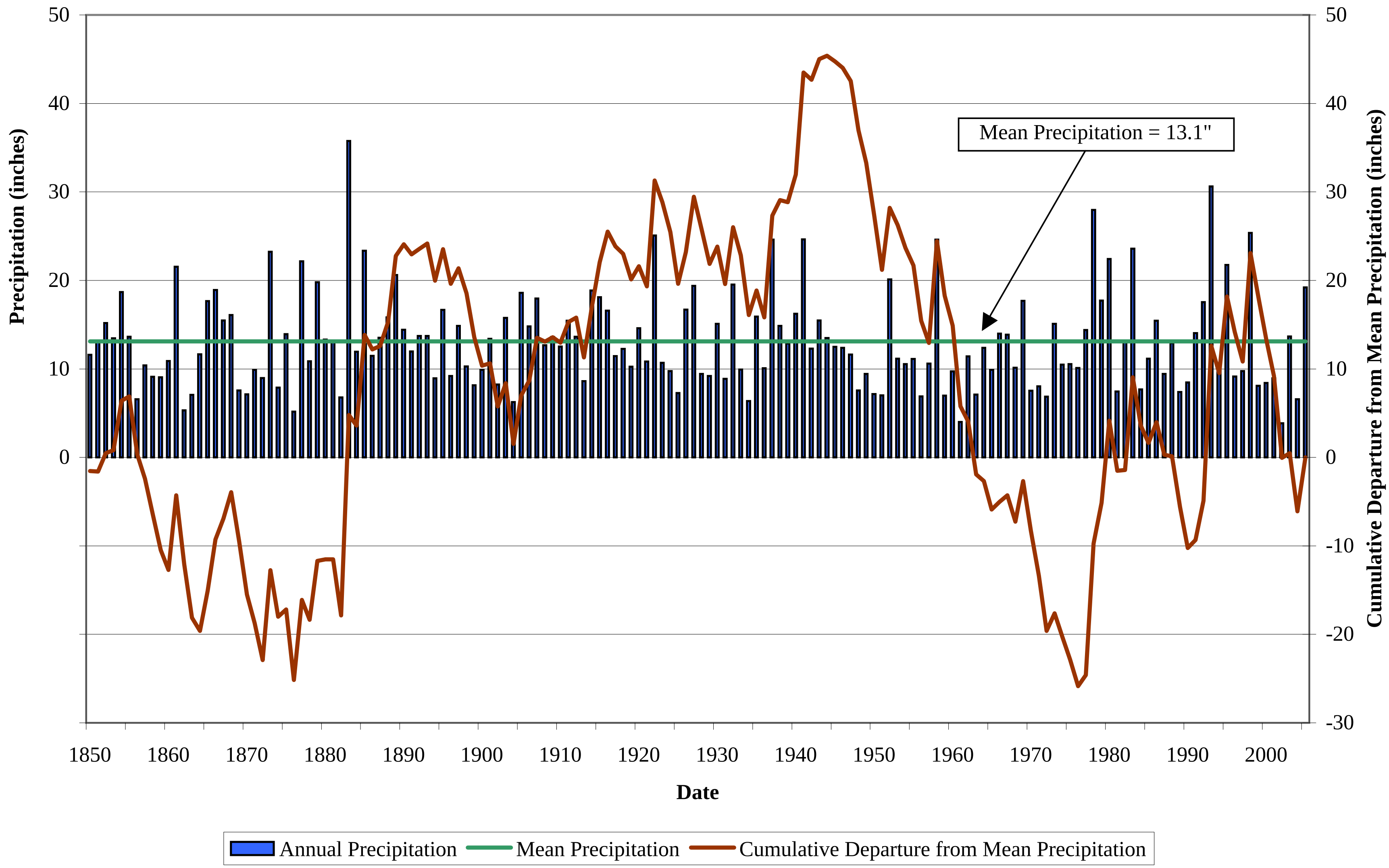
Hemet / San Jacinto Water Management Plan

*Source DWR, 1978
(1932 - 1964 data)

October 2007

Figure 4.2

Figure 4.3 Annual Precipitation and Cumulative Departure from Mean Precipitation



the highest precipitation was 1883/84 with 35.77 inches of rain; and the driest year was 2001/02 with 3.85 inches. Figure 4.3 also shows the cumulative departure from mean precipitation. This chart represents wet periods with increasing values, such as 1882-1890 and 1990-1998; normal periods with near-constant values, such as 1859-1881 and 1980-1988; and dry periods as decreasing values, such as 1944-1976 and 1999-2004.

4.2 SURFACE WATER CONDITIONS

The San Jacinto River and its tributaries are the primary surface water elements in the Management Area. This river and its tributaries provide water for direct use, artificial recharge, as well as for significant natural recharge to the groundwater system through the riverbeds. The San Jacinto River contains high quality water that flows from the mountain watershed and recharges groundwater. The river is a losing stream throughout the Management Area. Artificial and natural recharge of San Jacinto River water improves the overall quality and quantity of groundwater. Groundwater levels have been lowered over the years to the point where additional changes in groundwater levels has little or no impact on surface flows or vice versa, although in predevelopment conditions groundwater contributed to surface flows in swampy areas of the basin floor, particularly upgradient of faults.

EMWD and RCFC&WCD have partnered with USGS to monitor stream flows. USGS gaging stations along the San Jacinto River and its tributaries in the Hemet/San Jacinto and surrounding area are listed in Table 4.1, below.

In 1996, EMWD entered into a Cooperative Water Program Joint Funding Agreement with the USGS for a long-term water budget study in the San Jacinto area. As part of this project, the USGS installed two stream flow gages and three stage gages in the San Jacinto Watershed.

The USGS applied a rainfall-runoff model to estimate the water budgets for groundwater and surface water flows and to determine the hydrological effects of urbanization. The study used historical precipitation data with the model to produce a simulated long-term record of groundwater recharge and surface water runoff for a variety of potential urbanized conditions. The major objectives of the study were to:

1. Estimate groundwater recharge and surface water flows in the Canyon and Upper Pressure Management Zones;
2. Summarize the long-term water budget of the study area upstream of Mystic Lake; and
3. Determine the effects of urbanization in the study area.

Table 4.1 USGS Surface Water Gaging Stations

Station No.	Description:	Lat.; Long.*	Data Type	Time Frame
11069200	Lake Hemet WC up Canyon near San Jacinto	33°44'20"; 116°49'30"	Daily flows	1961-1991
11069300	WF San Jacinto Tributary near Valle Vista	33°43'20"; 116°48'00"	Peak flows Daily flows	1962-1973 1961-1967
11069500	San Jacinto River near San Jacinto (Cranston Ranger Station)	33°44'17"; 11649'59"	Real time Peak flows Daily flows Water Qual.	 1921-present 1920-present 1998
11069501	San Jacinto River near San Jacinto plus Canals	33°44'17"; 116°49'59"	Daily flows	1948-1990
11070000	Bautista Creek Near Hemet	33°41'40"; 116°51'00"	Peak flows Daily flows	1947-1969 1947-1969
11070020	Bautista Creek at head of Flood Channel in Hemet	33°42'42"; 116°52'04"	Peak flows Daily flows	1988-2003 1987-present
11070050	Bautista Creek at Valle Vista	33°44'04"; 116°53'33"	Peak flows Daily flows	1970-1987 1969-1987
11070150	San Jacinto River above State Street near San Jacinto	33°49'17"; 116°58'21"	Peak flows Daily flows	1997-present 1996-present
11070158	Line D Storm Drain at Santa Fe St. near San Jacinto	33°46'44"; 116°57'46"	Peak flows	1997-1999
11070160	Line E Storm Drain at Santa Fe St. near San Jacinto	33°46'41': 116°58'18"	Peak flows	1997-1999
11070185	Lamb Canyon at Victory Ranch near San Jacinto	33°51'31"; 117°00'53"	Peak flows	1997-2004
11070190	Laborde Canyon near San Jacinto	33°51'44"; 117°01'29"	Peak flows	1962-1973
11070210	San Jacinto River at Ramona Expressway near Lakeview	33°50'23"; 117°08'06"	Real time Peak flows Daily flows	 2001-present 2000-present

* The longitude and latitude measurements are published figures, but were estimated by the USGS from maps and, therefore, only have an accuracy of +/- 500 feet.

Five gages were installed upstream of Bridge Street in the San Jacinto basin area. Two stream flow gages were installed in the San Jacinto River, one at the State Street (Highway 79) crossing and the other at the Cranston Ranger Station. Three crest stage gages were installed in Potrero Canyon near San Jacinto, Lamb Canyon near San Jacinto, and at an urban runoff site.

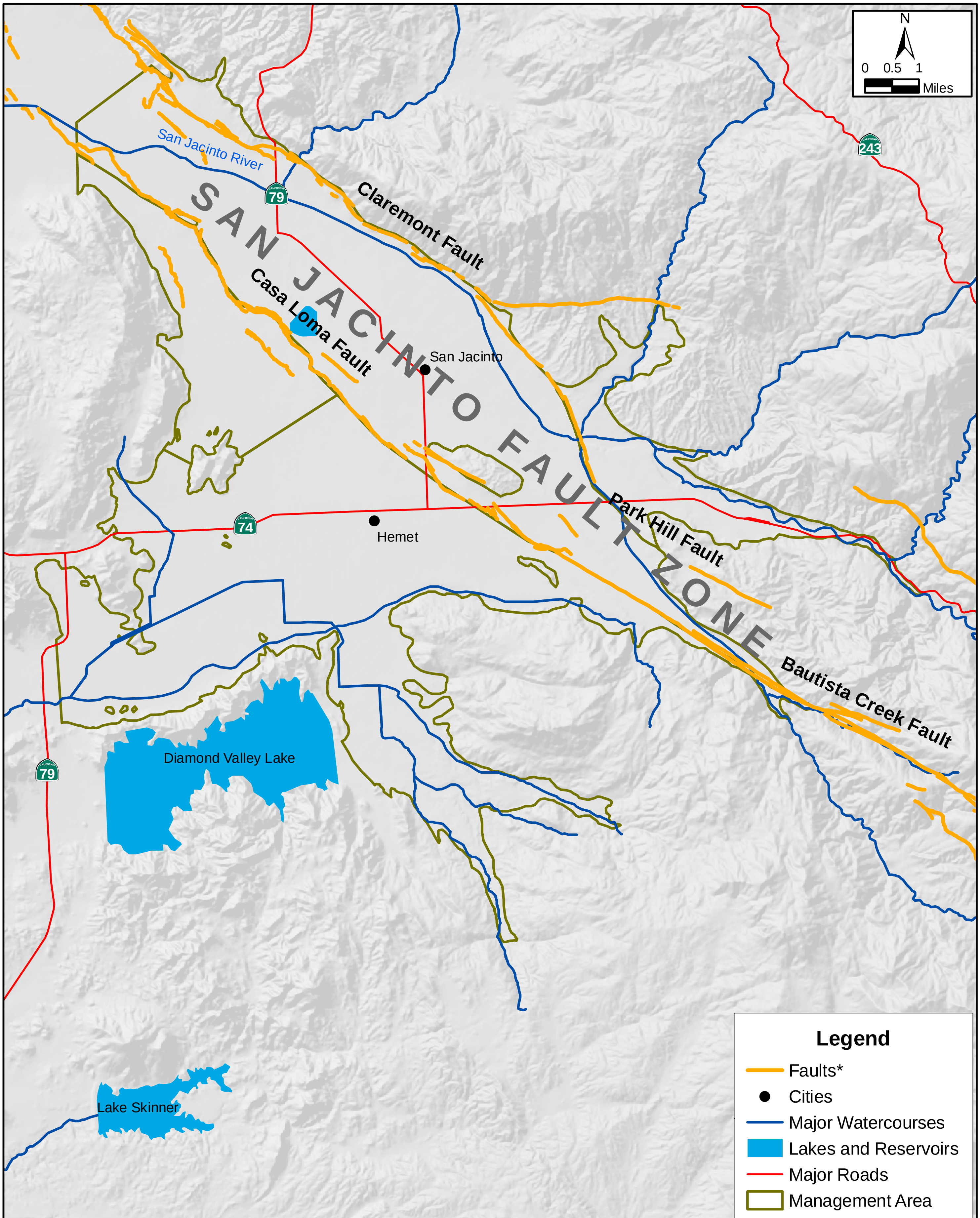
Groundwater recharge in the Canyon and Upper Pressure Management Zones was calculated in addition to the surface runoff leaving the Management Area (including urban runoff) that reaches the Mystic Lake area. The study results are summarized in the USGS Water Resources Investigations Report 02-4090, *Rainfall-Runoff Characteristics and Effects of Increased Urban Density on Streamflow and Infiltration in the Eastern Part of the San Jacinto River Basin*, *Riverside County*, *California*. The report includes all measured, simulated, and statistical data used to support the conclusions of the study.

After the end of the study, some of the crest stage gages were no longer monitored and fell into disrepair. However, EMWD continues to fund, and USGS continues to operate, the stream gage on the San Jacinto River at State Street. The crest stage gage at Lamb Canyon Creek at Victory Ranch is still jointly funded by EMWD and USGS. For the 2005/2006 monitoring, the effort was funded as part of the Hemet/San Jacinto Monitoring Program by EMWD, LHMWD, and the Cities of Hemet and San Jacinto. The stream gage on the San Jacinto River at Cranston Ranger Station is currently funded and maintained by USGS and Riverside County Flood Control District with real-time data available on the USGS website.

4.3 GEOLOGY

The geology of the Hemet/San Jacinto area, relevant to groundwater supplies, has two primary features: a sediment filled graben, and the San Jacinto fault zone. The sediments in the graben provide for the majority of storage and movement of groundwater in the area and the movement of water is altered by the presence of the faults, which provide most of the internal boundaries for the area's Management Zones.

The Management Area partially contains a geomorphic feature known as a graben or fault-graben, along with additional permeable materials in alluvium-filled valleys. A graben is a depressed, trough-like structure in the Earth's crust, filled or partially filled with sediments, and usually formed by faulting and the relative downward movement of block-like geologic structures. The San Jacinto graben is a deep, sediment-filled structure approximately 2.5 miles wide and more than 20 miles long and forms the Upper Pressure Management Zone's boundaries in the Management Area. The Management Area, including the graben, is nearly surrounded by impermeable bedrock mountains and hills. Internally, island-like masses of granite and metamorphic bedrock or older alluvium rise above the valley floor. Surface and near-surface sediments in the graben and alluvium filled valleys are primarily sand and sandy silt with some silt and silty clay. The San Jacinto graben consists of a forebay area in the southeast where surface water recharge primarily occurs and a pressure area in the northwest where deep aquifers exist under confined conditions. The northwest-southeast oriented graben is formed by the right-slipping San Jacinto fault zone, believed to be the most seismically active in southern California. Between 1899 and the present, seven earthquakes of Richter magnitude 6.0 or greater have occurred along the San Jacinto fault between the San Gabriel Mountains and Mexico. This complex zone of faulting and cross faulting has two main branches, the Claremont and the Casa Loma, which form the northeast and southwest borders of the graben, respectively (see Figure 4.4).



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Fault Locations

Hemet / San Jacinto Water Management Plan

*Source: Riverside County

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Figure 4.4

The Claremont fault separates the graben from the Badlands and the San Jacinto Mountains on the northeast. This fault follows Gilman Springs Road from State Highway 60 to the City of San Jacinto, hugging the foothills. It then follows the San Jacinto River before shifting to Bautista Creek south of Valle Vista. To the west, the Casa Loma fault generally parallels the Claremont Fault. The Casa Loma portion of the San Jacinto fault zone forms the southwesterly border of the graben. It runs from Park Hill (also known as Casa Loma) to the northwest toward Reche Canyon. The Bautista Creek fault is an extension of the Casa Loma fault, but is separately named due to differences in fault movement (DWR, 1969). The Bautista Creek fault runs from Bautista Canyon through the intersection of Menlo and San Jacinto Streets, joining the Casa Loma fault on the western side of Park Hill.

The portions of the Management Area outside the graben, to the east of the Claremont Fault and to the west of the Casa Loma and Bautista Creek faults, are sediment filled basins. These sediments are similar in nature to those in the graben, but are much thinner.

The faulting in the Management Area plays an important role in the movement of groundwater and is therefore a key factor in the delineation of Management Zones.

4.4 DELINEATION OF MANAGEMENT ZONES

Groundwater Management Zones (Figure 2.1) were delineated by the RWQCB based on major impermeable boundaries (such as bedrock or faults), flow systems that prevent widespread mixing even without a physical barrier, and water quality. Groundwater flow, whether or not determined by a physical barrier, was the primary characteristic used to define the Management Zones. Water quality data were used to support understanding of the flow regime and to assure that unusually high quality or poor quality waters were distinguished for regulatory purposes. (RWQCB, Resolution No. R8-2004-0001).

The four Management Zones within the Hemet/San Jacinto Management Area are:

1. Canyon;
2. San Jacinto Upper Pressure (Upper Pressure);
3. The Hemet North portion of Lakeview/Hemet North (Hemet North); and
4. Hemet South.

The Canyon Management Zone lies along a northwest to southeast axis in the eastern part of the Management Area. The boundaries of the Canyon Management Zone include the virtually impermeable San Jacinto Mountains to the east and Claremont Fault to the west. The Claremont Fault inhibits flow between Canyon and Upper Pressure Management Zones (DWR, 1969; DWR, 1978; SWRB, 1955).

Like the Canyon Management Zone, the Upper Pressure Management Zone lies along a northwest to southeast axis in the eastern part of the Management Area. The Upper Pressure Management Zone is bounded by the Claremont Fault to the northeast, the Casa Loma and Bautista Creek Faults to the southwest, and the flow system boundary with the San Jacinto Lower Pressure Management Zone to the northwest.

Boundaries of the Hemet North Management Zone include the Casa Loma Fault to the east; the groundwater divide near Esplanade Avenue to the south; the impermeable bedrock of the Lakeview Mountains to the west; and a constricted area of permeable materials between the Lakeview Mountains and the Casa Loma Fault to the northwest. The Casa Loma fault zone is a known barrier to groundwater flow (DWR, 1969; DWR, 1978; SWRB, 1955).

The Hemet South Management Zone boundaries include the Casa Loma and Bautista Creek faults to the east; the groundwater divide near Esplanade Avenue to the north; the groundwater divide in the Winchester area and various crystalline bedrock outcrops to the west. Diamond Valley Lake, a water supply reservoir for the MWD completed in 1999 and filled by 2002, is located southwest of the Hemet South Management Zone. MWD (1991) states that seepage through the permeable materials in the upper 200 feet may take place. The Casa Loma and Bautista Creek faults are known barriers to groundwater (DWR, 1969; DWR, 1978; SWRB, 1955).

For the Management Area as a whole, the mountains (Figure 4.1) form a nearly impermeable boundary such that there are only three pathways for groundwater to migrate to or from other Management Zones outside the Management Area. These locations are:

- Between the Hemet South and Perris South Management Zones, in the southwest;
- Between the Hemet North portion and Lakeview portion of Lakeview/Hemet North Management Zones, in the northwest; and
- Between the Upper Pressure and Lower Pressure Management Zones, in the northwest.

Groundwater flow in and out of the Management Area is important, as water quality is typically better in the Management Area than in the surrounding areas.

4.5 SOILS

The influence of soils on water use and hydrologic processes makes it an important component to consider when estimating changes in water use due to land use change as well as for siting spreading basins for artificial recharge projects.

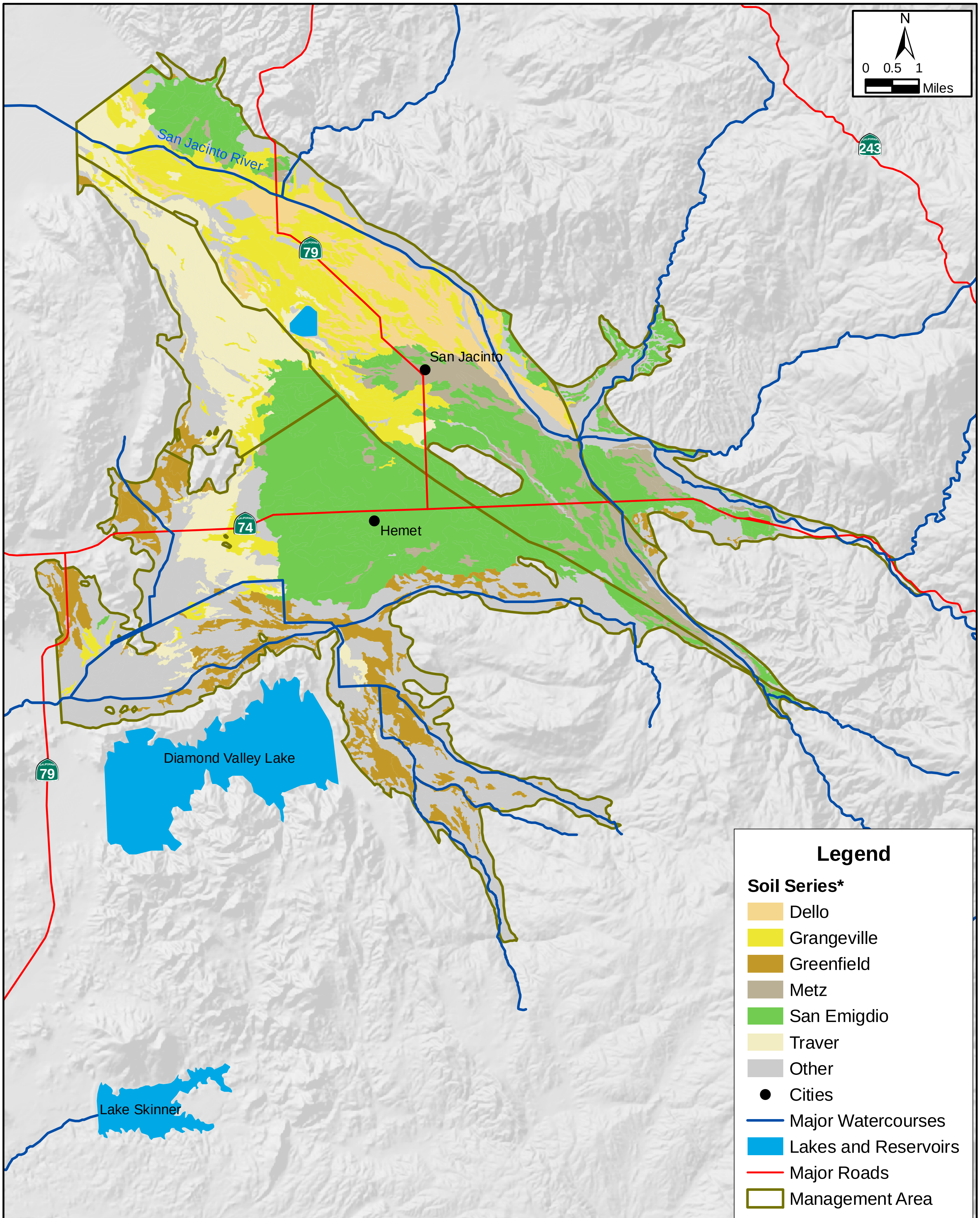
The predominant soils, as defined in the USDA's soil survey (USDA, 1971) at the series level, in the Management Area are shown in Figure 4.5 and are listed below:

- Dello,
- Grangeville,
- Greenfield,
- Metz,
- San Emigdio, and
- Traver.

The remaining soils are classified as "Other" in Figure 4.5 and consist of Chino, Domino, Exeter, Hanford, Pachappa, Ramona, Riverwash, as well as other soil series occurring in less than one square mile of the Management Area.

An important soil classification used by the USDA for hydrology is the hydrologic soils group. The hydrologic soils group can be used to estimate the amount of infiltration that can be expected from a certain soil. This grouping is based on estimates of the intake of water during the latter part of a storm of long duration, after the soil profile is wet and has an opportunity to swell, without the protective effect of any vegetation. Also considered are depths to the seasonal high water table and to a low permeability layer. The classification is useful at a planning level, but detailed studies are required for a thorough understanding of the infiltration capacity of soils. Features such as slope, ground cover, or low permeability materials away from the upper soil profile may impact the soil's capability to infiltrate water.

Under the hydrologic soils group classification system, soils are grouped A to D with "A" having the lowest runoff potential (highest infiltration rates) and "D" having the highest runoff potential (lowest infiltration rates). A map of hydrologic soils groups is provided as Figure 4.6 (USDA-SCS, 1971) and a corresponding table of hydrologic soil groups and soil series is provided in Table 4.2. As can be seen on Figure 4.6, most of the Management Area is classified as "B", soils with a moderate infiltration rate. Of the Management area, nearly 80% are "B" soils, 10% are "A" soils, and the remainder are either "C", "D", or are deemed too variable to be classified. The "A" soils are generally located along the San Jacinto River and Bautista Creek; much of the "variable" soils along these watercourses also have the potential for very high infiltration rates.



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Soil Series

Hemet / San Jacinto Water Management Plan

*Source: USDA, 1971

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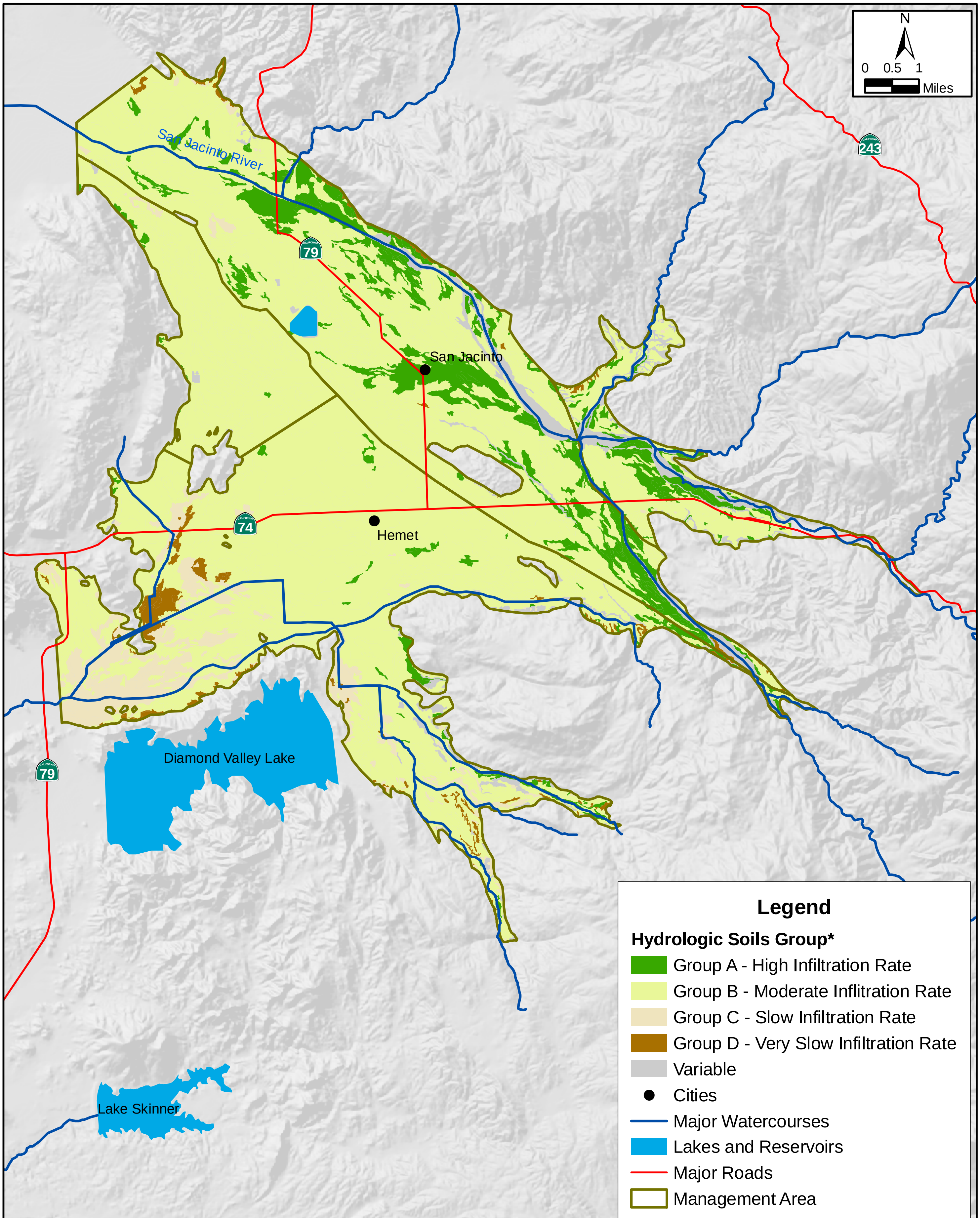
Figure 4.5



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Hydrologic Soils Groups

Hemet / San Jacinto Water Management Plan

*Source: USDA, 1971

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Figure 4.6

Table 4.2 Hydrologic Soils Groups

Common Soil Series	Hydrologic Soils Group	Minor Soil Series	Hydrologic Soils Group
Dello	A-C	Chino	B-C
Grangeville	B-C	Domino	C
Greenfield	B	Exeter	C
Metz	A	Hanford	B
San Emigdio	B	Pachappa	B
Traver	B-C	Ramona	B-C
		Riverwash	variable
		Other	variable

4.6 GROUNDWATER CONDITIONS

As previously stated, groundwater flow between Management Zones is inhibited by geologic faults, (Figure 4.4) notably the Casa Loma Fault, Bautista Creek Fault and Claremont Fault, all strands of the San Jacinto fault zone. The Claremont Fault acts as a barrier to flow between Canyon and Upper Pressure Management Zones, while the Casa Loma Fault is a barrier to flow between the Upper Pressure Management Zone and both the Hemet North and Hemet South Management Zones.

The San Jacinto River enters the basin in the southeast part of the Management Area and flows north and west across the Upper Pressure Management Zone. In most years, all river flow is lost to percolation and limited evapotranspiration in the Canyon and Upper Pressure Management Zones. Recharge from the San Jacinto River and its tributaries forms a large portion of total inflow for the Canyon and Upper Pressure Management Zones.

Groundwater pumping for irrigation and domestic purposes is the principal source of groundwater outflow. Major pumping depressions occur in the Hemet South and Upper Pressure Management Zones.

Historically, extraction in excess of recharge has resulted in lowered groundwater levels and altered directions of groundwater flow.

4.6.1 ARTIFICIAL RECHARGE OPERATIONS

In addition to natural inflows and return flows from agricultural and municipal uses, there has been and continues to be artificial recharge operations in the Management Area. These operations use imported water, when available, typically at lower winter rates, to artificially recharge groundwater through spreading basins. The annual volume of imported water recharged is presented in Figure 4.7. Recharge operations did not begin until 1990. More recently, the Public Agencies have signed memoranda of understanding in 2004 and 2005 to plan for the recharge at two existing recharge facilities in the San Jacinto riverbed.

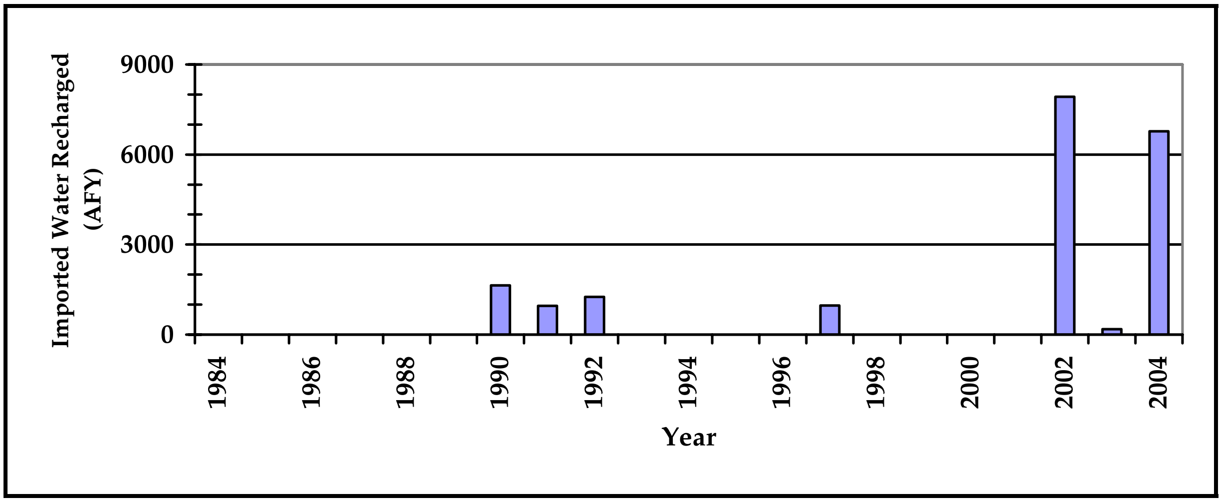
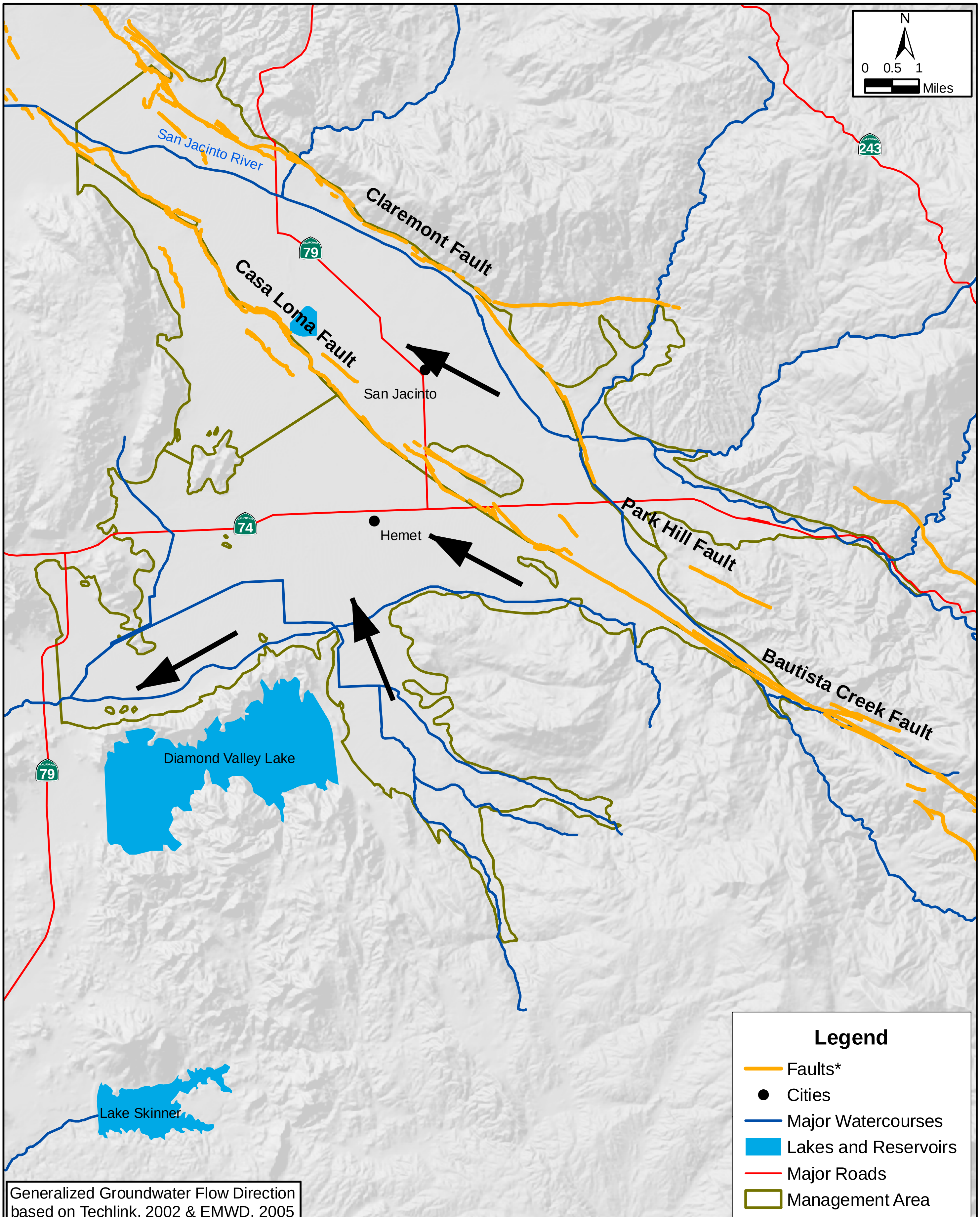


Figure 4.7 Annual Imported Water Recharged

The artificial recharge operations help address the impact of overdraft caused by past groundwater production.

4.6.2 GROUNDWATER LEVELS AND FLOW

Historical groundwater extraction from the Management Area has resulted in a significant drop in groundwater levels. The lowered groundwater levels also changed the direction of flow in parts of the Management Area. Figure 4.8 shows the flow directions in the early 20th Century. Figure 4.9 shows current flow directions. Notable changes over time include the development of a groundwater divide between the Hemet South and Perris South Management Zones (previously flow was out of the Hemet South Management Zone into the Perris South Management Zone and flow from the Hemet North portion to the Lakeview portion of the Lakeview/Hemet North Management Zone due to lower water levels in the Lakeview portion. (TechLink, 2002a)



RIME

Early 20th Century Groundwater Flow Direction

Hemet / San Jacinto Water Management Plan

*Source: Riverside County

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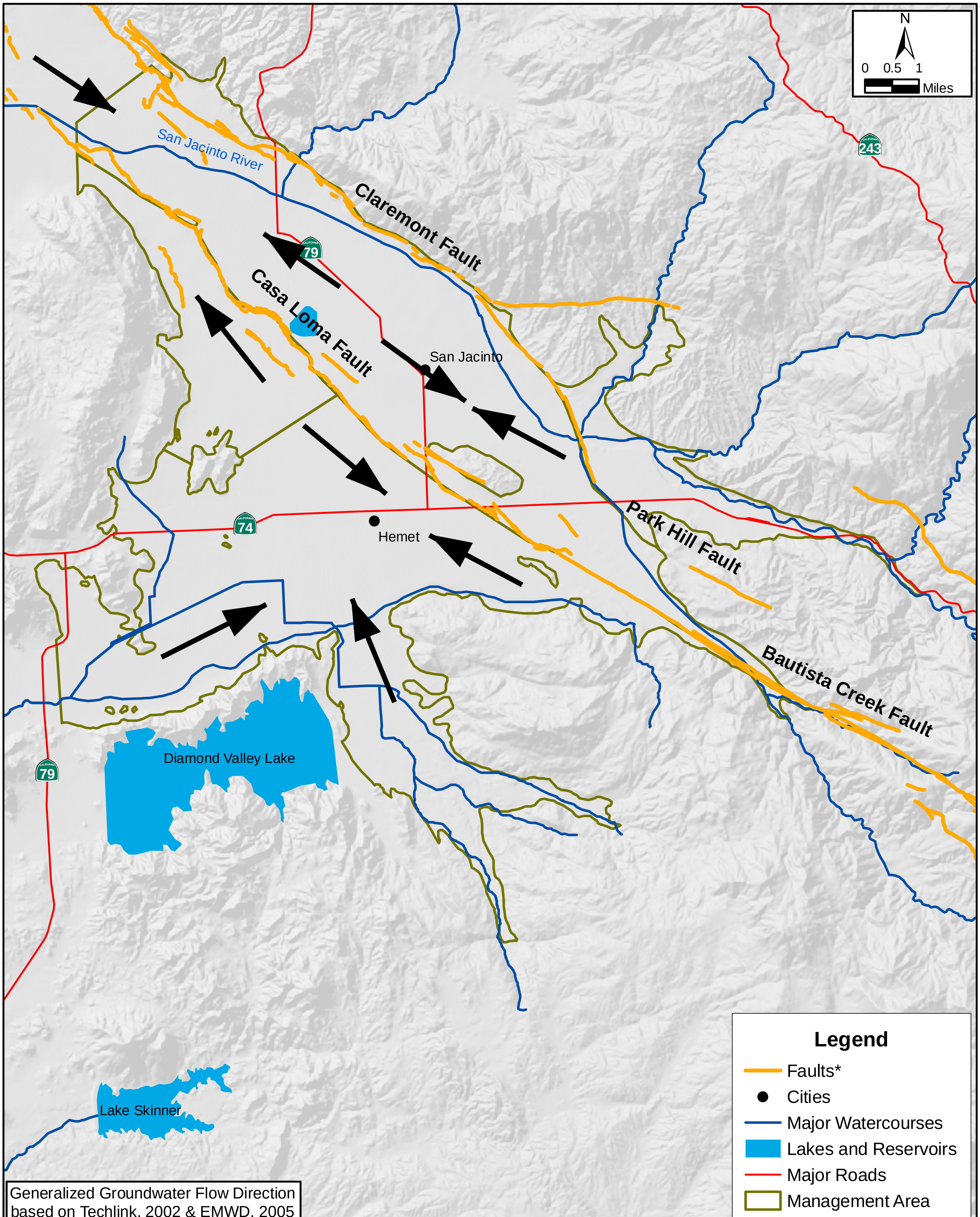
Figure 4.8



RIME

Current Groundwater Flow Direction

Hemet / San Jacinto Water Management Plan

*Source: Riverside County

October 2007

Figure 4.9

Figure 4.10 shows Spring 2004 groundwater levels. The groundwater level contours show pumping depressions in the northeastern part of the Hemet South Management Zone and in the northwestern part of the Upper Pressure Management Zone. These pumping depressions are due to concentrated pumping in those areas in excess of the local recharge capacity.

Historical groundwater levels are affected by both climatic conditions, which impact the amount of recharge, and pumping. Historical conditions in the four Management Zones can be studied in relation to their unique setting by analyzing observed water levels at representative wells with long periods of record. Hydrographs for four selected wells are presented in the following sections. The locations of the wells can be found on Figure 4.11.

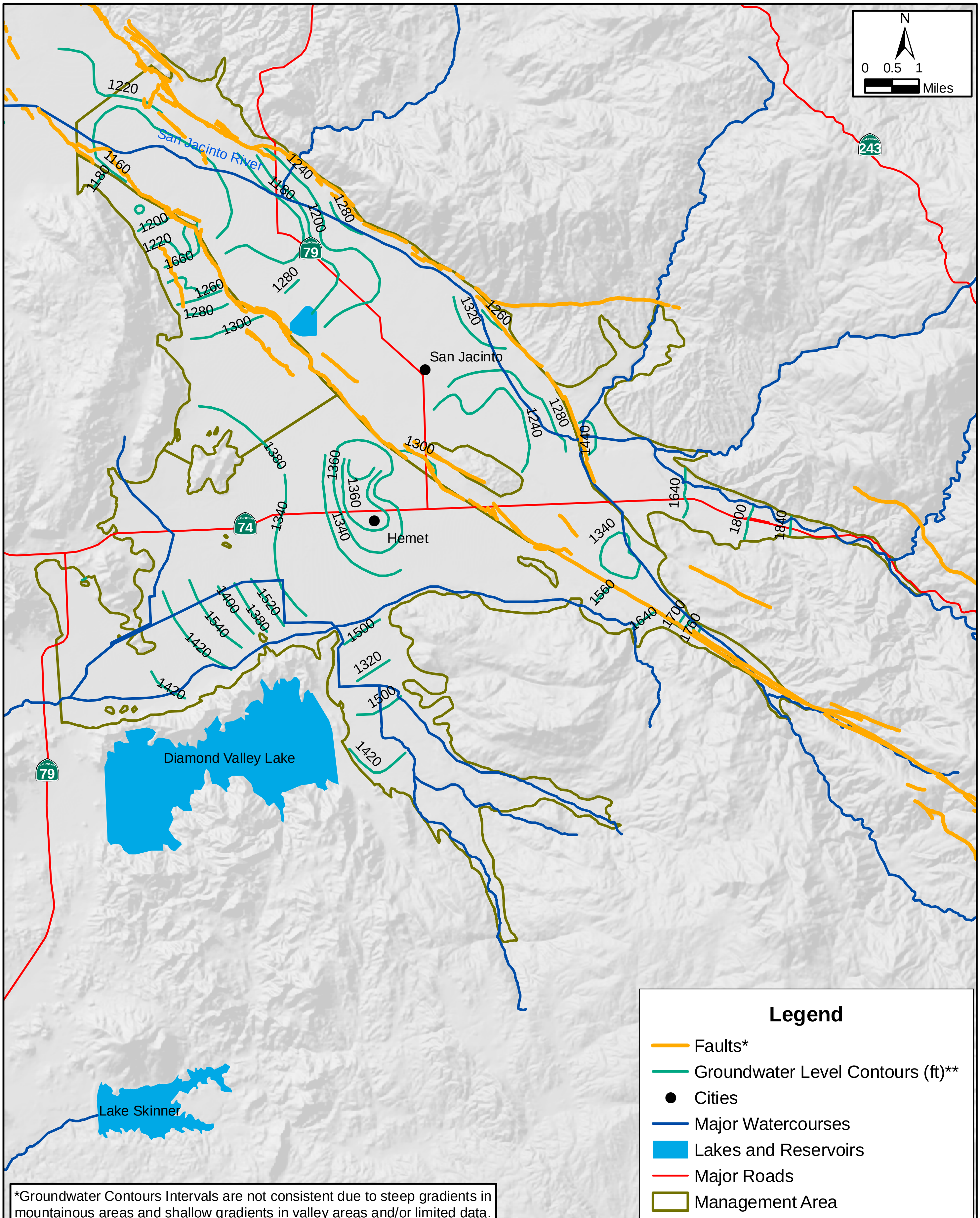
4.6.2.1 Canyon Management Zone

The Canyon Management Zone benefits from significant surface water recharge from the San Jacinto River and its tributaries. This additional recharge reduces the impact of the pumping occurring in the Canyon Management Zone. Figure 4.12 shows groundwater levels from 1948 to 2005 for EMWD's #6 Cienega well. This figure shows the impact of hydrologic variability and pumping in the area. One drought period in the late 1980s resulted in groundwater levels dropping by over 100 feet. Such declines in groundwater levels are likely due to a combination of reduced precipitation, reduced recharge from streamflow, and the effects of pumping. Most of this decline was recovered in the wet period that followed from 1991 to 1993.

Changes are also seen seasonally, with groundwater levels changing by as much as 100 feet from late fall to late spring. These seasonal changes in water levels are also due to a combination of reduced precipitation, reduced recharge from streamflow, and the effects of pumping.

4.6.2.2 Upper Pressure Management Zone

The Upper Pressure Management Zone benefits from surface water recharge from the San Jacinto River and its tributaries and supplies most of the groundwater for the Management Area. However, even with significant recharge from surface water as well as other inflows, wells in the Upper Pressure Management Zone have shown a decline in water levels over time. Figure 4.13 presents water level elevations for EMWD's #9 Hewitt and Evans well, showing a consistent decline through the dry period of the 1950s, 1960s, and 1970s with a drop of more than 200 feet over the 30-year period. The hydrologically wet and normal periods during 1978 to 1986 resulted in a recovery of about half the decline from the previous three decades. Since 1986, groundwater levels have dropped approximately 200 feet. The changes seen in the well



RIME

Spring 2004 Groundwater Elevation

Hemet / San Jacinto Water Management Plan

*Source: Riverside County
**Source: EMWD, 2005

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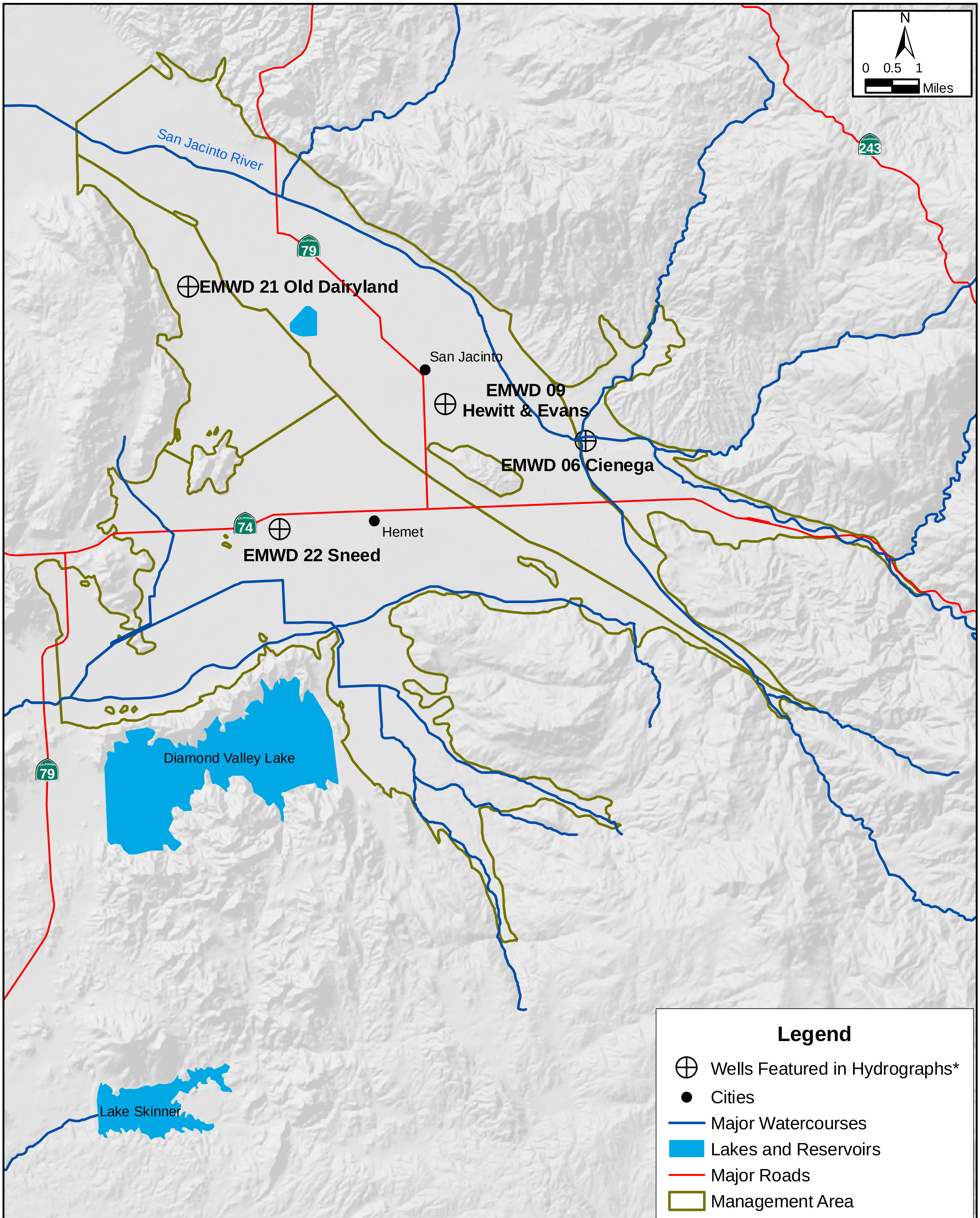
Figure 4.10



RIME

Location of Representative Well Hydrographs

Hemet / San Jacinto Water Management Plan

*Source: EMWD

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Figure 4.11

Figure 4.12 Groundwater Elevation
Canyon Management Zone, EMWD #6 Cienega

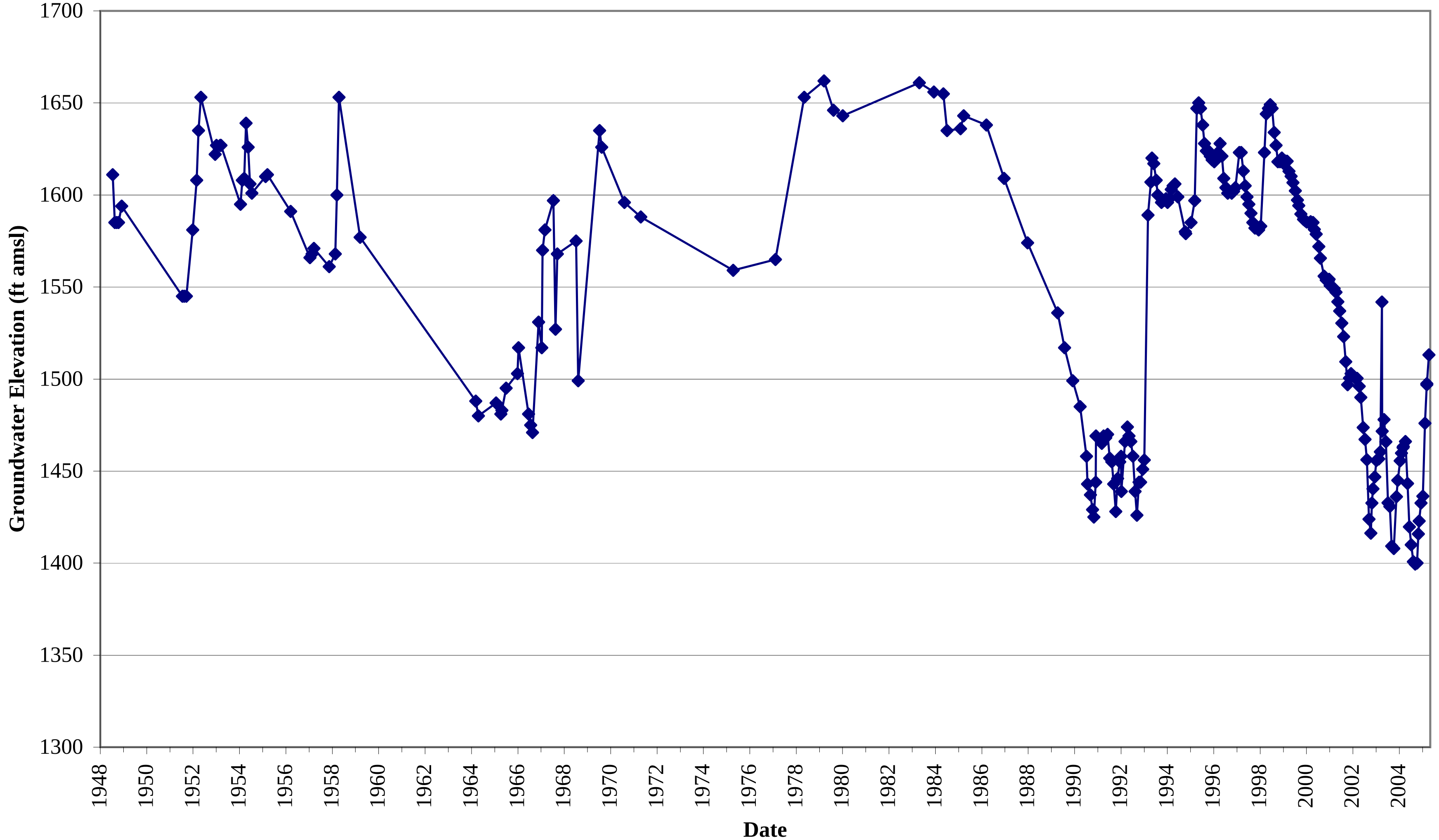
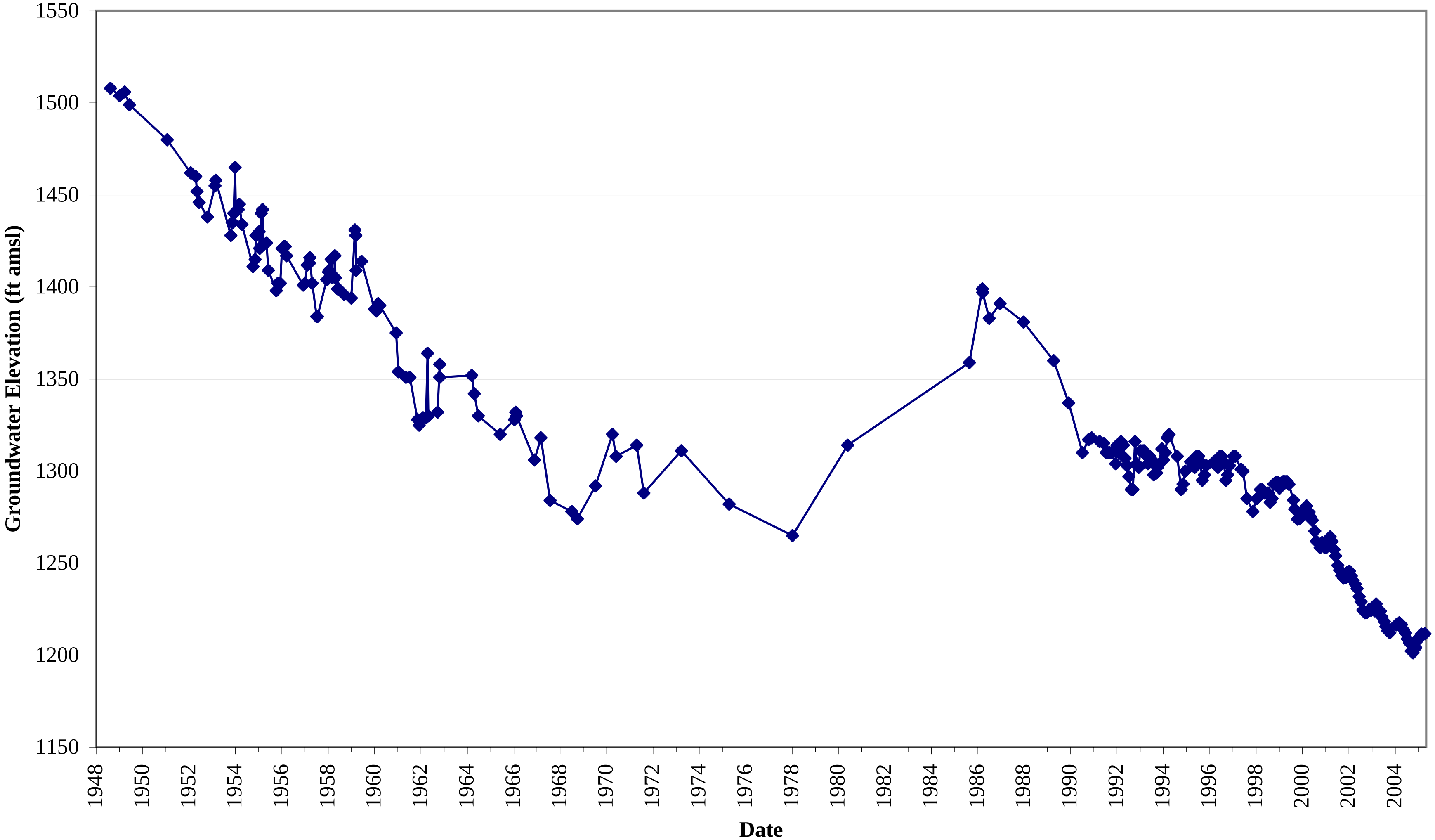


Figure 4.13 Groundwater Elevation
Upper Pressure Management Zone, EMWD #9 Hewitt and Evans



are likely due to a combination of reduced precipitation, reduced recharge from streamflow, and effects of pumping.

4.6.2.3 Hemet North Portion of the Lakeview/Hemet North Management Zone

Groundwater levels in Hemet North portion of the Lakeview/Hemet North Management Zone have shown a steady decline followed by recent stabilization. These declines occur even though significantly less water was pumped from the Hemet North portion than from other Management Zones. The Hemet North portion does not receive as much surface water recharge as Upper Pressure and Canyon Management Zones, thus impacts of pumping are more pronounced than they might be in those Management Zones. Figure 4.14 shows groundwater levels at EMWD's #21 Old Dairyland well. Since the beginning of the record in 1966, groundwater levels have steadily declined, with little variability. After dropping more than 100 feet from the mid-1960s to the mid-1990s, groundwater levels have stabilized at an average of 1,250 feet above mean sea level.

4.6.2.4 Hemet South Management Zone

Groundwater levels in the Hemet South Management Zone have shown a steady decline, although the recent rate of decline has slowed. Figure 4.15 shows groundwater levels at EMWD's #22 Sneed well since the beginning of the record in 1952. While data is limited for the 1952 to 1990 period, groundwater levels declined through the 1952-1990 period, and the increased data available from 1990 to 2005 shows little variability. Groundwater level declines have slowed but have still dropped approximately 20 feet in the past 10 years.

4.6.3 GROUNDWATER BUDGET

The changes in groundwater levels and flow directions are the result of changes in the balance of inflows and outflows from the Management Area. A groundwater budget can identify potential causes of an imbalance. The groundwater budget presented in Table 4.3 shows average annual values for the components of total inflow and total outflow. The values are based on a water balance spreadsheet tool developed for use by the TC. This Excel-based tool allowed the TC members to investigate the impact of inclusion and exclusion of specific water budget components, such as artificial recharge, imported water, and others, as well as the implications of different data sources, such as the calibrated groundwater model and the database or reported values with underflow estimates. This allowed for a more thorough understanding of the potential impacts of definitions of water budget components on the calculated yield and overdraft. The values presented in Table 4.3, as agreed upon by the TC, are the results of the calibrated groundwater model except for groundwater extraction, which is

Figure 4.14 Groundwater Elevation
Hemet North Management Zone, EMWD #21 Old Dairyland

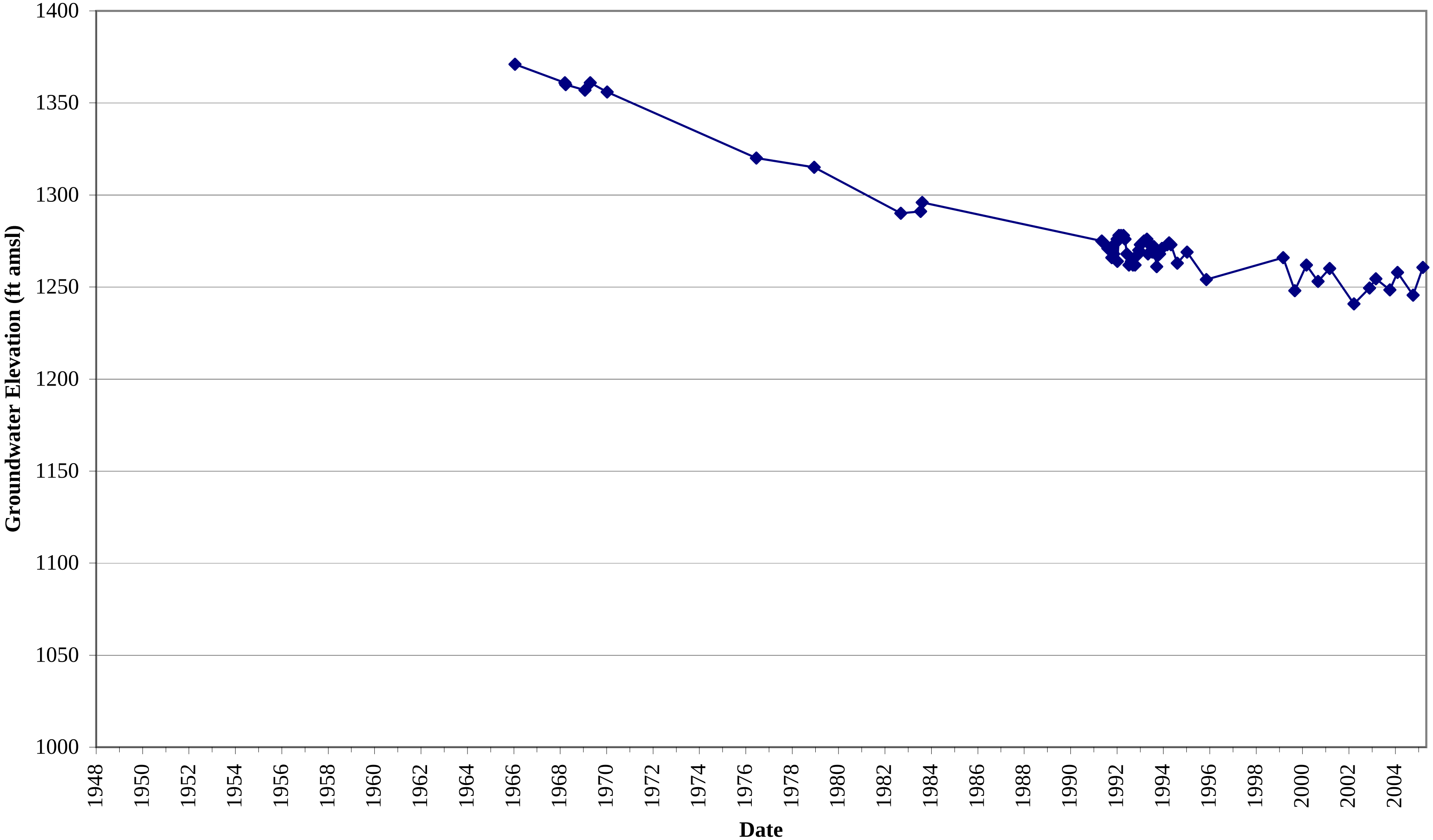
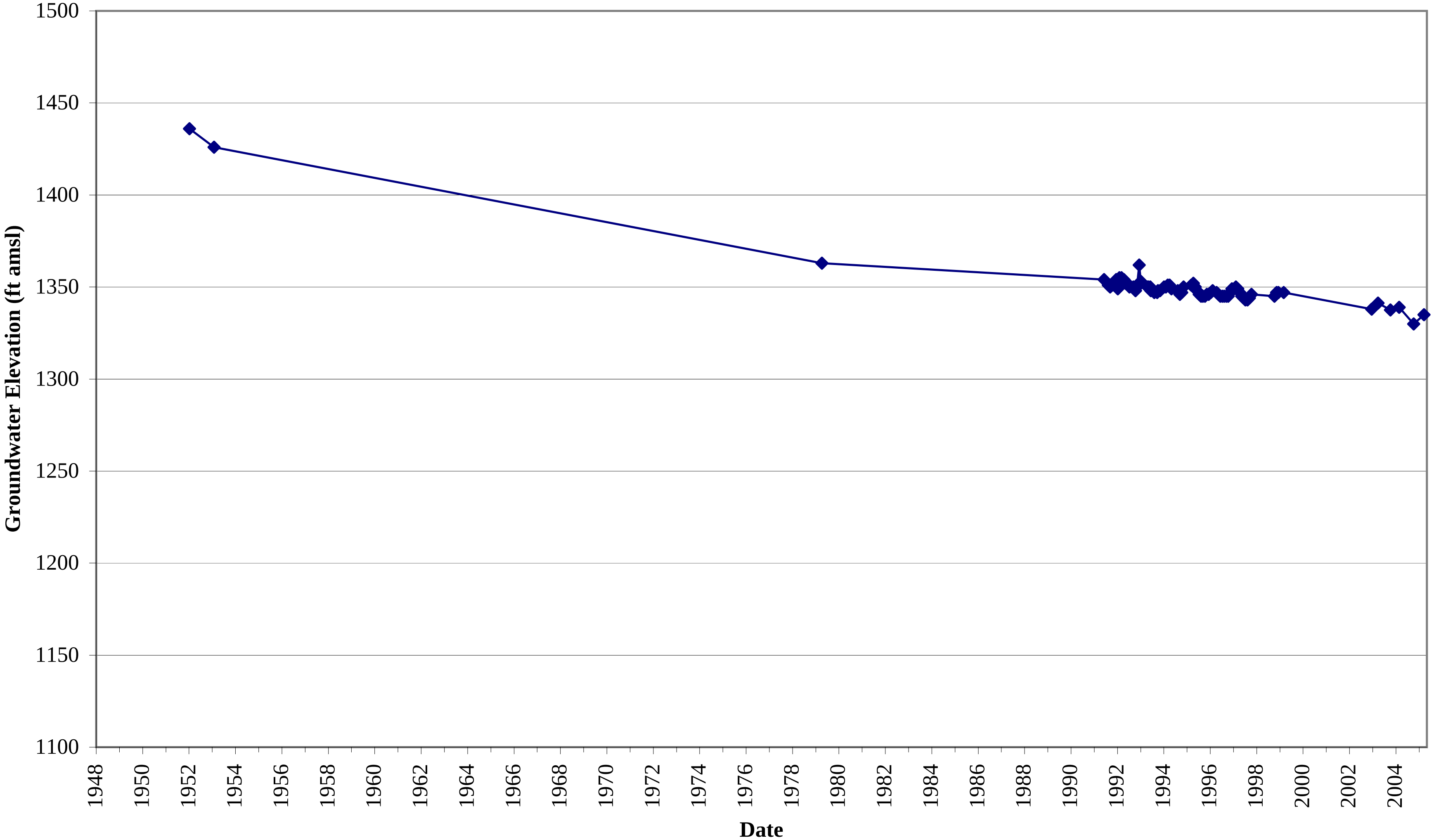


Figure 4.15 Groundwater Elevation
Hemet South Management Zone, EMWD #22 Sneed



obtained from the data tabulated in *Assessment of Historical and Projected Land and Water Use Data* (WRIME, 2003a).

Table 4.3 Groundwater Budget for the Management Area
(Average Annual Volume for Water Years 1984-2004*)

Inflow Component	Volume (AFY)	Outflow Component	Volume (AFY)
Recharge from Rainfall	8,900	Groundwater Production	57,800
San Jacinto River and Bautista Creek Recharge	9,900	Subsurface Outflow from Hemet South to Perris South	300
Recharge from Public Agency Sales	2,900	Subsurface Outflow from Hemet North to Lakeview	1,500
Recharge from Irrigation	9,600		
Conjunctive Use Recharge	800		
Reclaimed Water Recharge	1,500		
Subsurface Inflow from Mountain Fronts	8,000		
Subsurface Inflow from Lower Pressure to Upper Pressure	1,700		
Total	43,300	**Total**	59,600

* Values for Groundwater Production represent 1984-2004 averages, an update from the 1984-2003 values presented in WRIME, 2003a. All other data is taken from the 1984-1999 modeling results (TechLink, 2002a).

The total average annual inflow is 43,300 AFY and the total average annual outflow is 59,600 AFY, resulting in an average annual deficit of 16,300 AFY for the 20-year hydrologic period of 1984 to 2004. Nearly all (97%) outflow is from groundwater extraction while inflow is primarily natural recharge, representing 66% of inflow and the remainder a direct result of recharge from applied water or other human activities. The 1984-2004 hydrologic period presented in Table 4.3 represents the period during which the most consistent and continuous data for the Management Area is available. It should be noted, however, that this period does not necessarily represent the long-term groundwater basin conditions, and as described in Section 4.9 of this document, long-term overdraft is estimated based on longer periods, as well as other methods and criteria.

4.6.4 LAND SUBSIDENCE

In additional to water quantity and quality concerns, there is the potential for further land subsidence in the Management Area, although not at rates to cause significant damage.

Widespread land subsidence has been observed in the San Jacinto basin as the area and its groundwater resources have been developed. Three forms of subsidence have been reported by the U.S. Environmental Protection Agency (Boen, et al., 1971): local or regional tectonic adjustments along the faults in the area; groundwater withdrawals and subsequent artesian head decline; and soil collapse or compaction due to causes other than tectonic or artesian head decline. In the graben, tectonic subsidence has averaged 0.2 in/yr (4.5 mm/year) over the past 40,000 years and subsidence due to groundwater withdrawal and aquifer compaction is 1 - 1.2 in/yr (2.5 - 3 cm/yr) (Morton, 1995). Lofgren (1975, 1976) reported in studies that, through the years, the periods of subsidence tend to correspond to the periods of groundwater production; land surface elevation at the well tends to be lower each year; and subsidence has been greater within the graben than on either side.

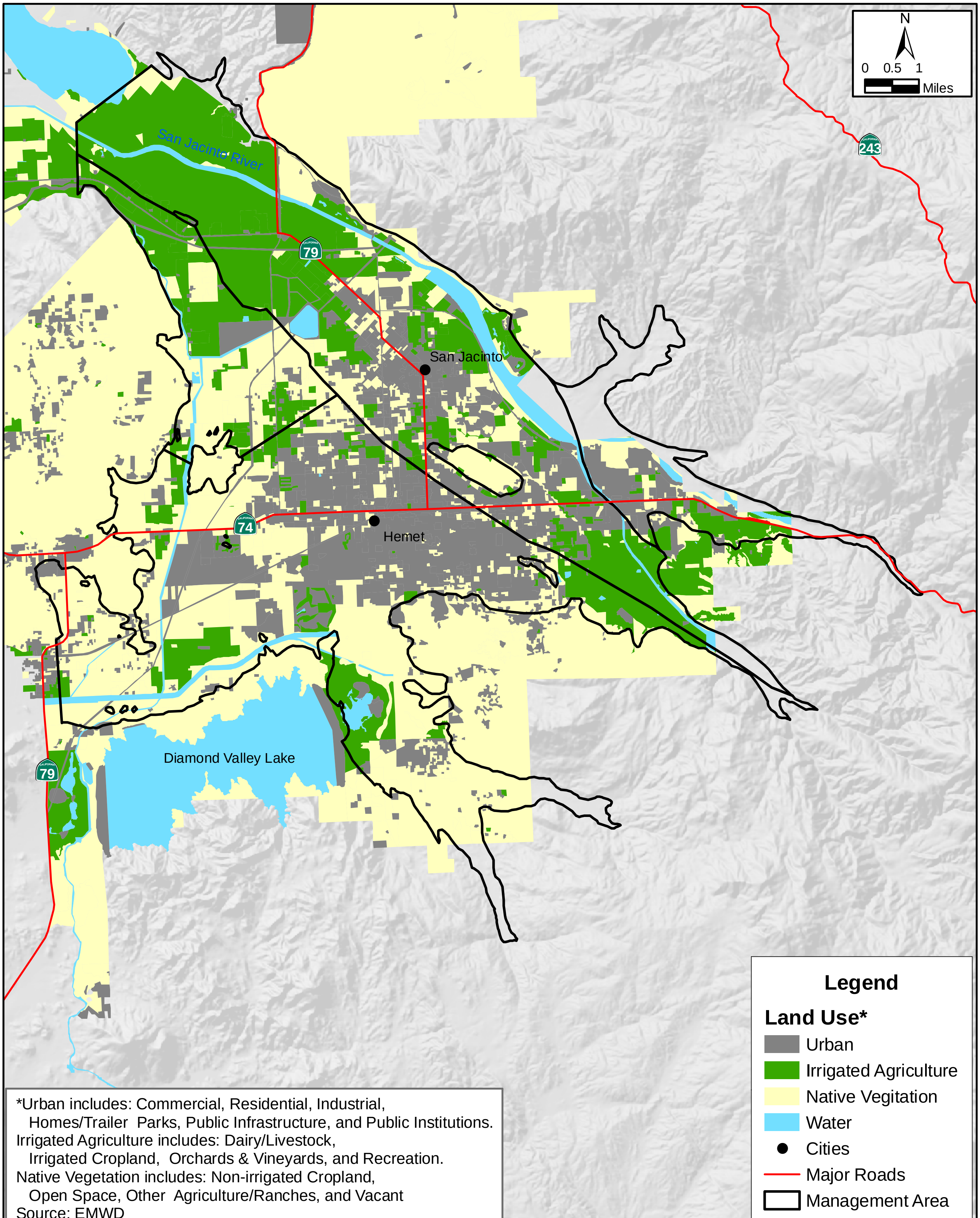
4.7 LAND USE

Land use in the Management Area has experienced changes over the past half-century. The conversion from agricultural or undeveloped lands to urban uses has an impact on basin hydrogeology as well as on water demand. Figure 4.16 and Table 4.4 show land uses in 1998 for most of the project area.

Table 4.4 Land Use Distribution Based on the 1998 Survey

Land Use	Canyon	Upper Pressure	Hemet South	Hemet North	Total
Total Area (acres)	4,400	21,200	25,300	5,600	56,500
% Urban and Suburban	24%	24%	36%	11%	28%
% Irrigated Crops and Recreational	12%	49%	15%	47%	31%
% Non-Irrigated Crops and Native Vegetation	16%	24%	45%	42%	35%
% Unmapped	48%	3%	4%	0%	7%

Much of the urban uses in the area are recent. This is shown by the significant population growth in the area, as highlighted Figure 4.17, which displays population data from the decennial US Census reports and a 2004 US Census estimate for the incorporated areas of Hemet and San Jacinto.



1998 Land Use

Hemet / San Jacinto Water Management Plan

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Figure 4.16

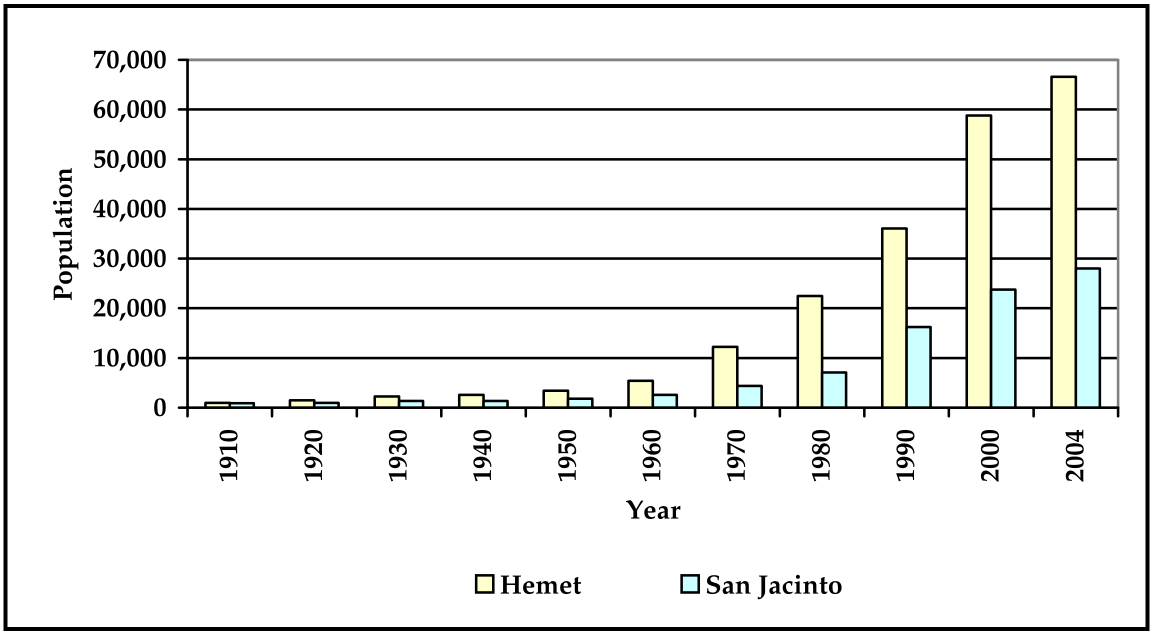


Figure 4.17 Population Growth in Incorporated Hemet and San Jacinto

From 1950 to 2004, the population in Hemet increased twenty-fold and the population in San Jacinto increased sixteen-fold. Such urbanization results in changes in both water demand and hydrologic processes. For newly urbanized areas that were previously non-irrigated, water demands obviously increase significantly. Areas that change from irrigated agricultural uses to urban uses do not typically see major changes in the total annual water demand. However, water demand from urban users is typically less elastic than water demand from agricultural users, making drought contingencies more important. The requirements for water quality are also typically more stringent for urban users. From a hydrologic perspective, urbanization results in an increase in the impervious land area, e.g., more pavement and buildings, with the resulting increased runoff and decreased infiltration. Additionally, the water used indoors by urban users is sent to treatment plants, shifting the potential for recharge of this water from the area of use to the treatment plant area.

The urbanization trend is not unique to the Management Area, but has been pervasive throughout the fringes of urbanized Southern California. While the rate of urbanization may change in the future, the trend of urbanization is likely to continue and to play a significant role in land use and water demand. Further discussion of future land use changes may be found in Section 5.

4.8 CURRENT WATER SUPPLIES

There are four Public Agencies primarily responsible for water supply in the Management Area: EMWD, LHMWD, and Cities of Hemet and San Jacinto. In addition, Private Water Producers produce groundwater and purchase water from the Public Agencies, and the Soboba Tribe pumps groundwater for its respective uses. Each entity pumps groundwater, and some entities also utilize a mix of some of the following sources: surface water diversions, surface water and/or groundwater purchases, surface water imports, and recycled water. The water supply conditions in the Management Area and the interrelationships among the various agencies is a primary factor for future water management in the area. Figure 4.18 shows these interrelationships in a diagram form.

Figure 4.19 shows the makeup of the water supply and how this mix has changed from 1985 to 2004 for the Management Area. Groundwater is the predominant source of water supplies for the Management Area. The remaining sources are smaller, but still important, sources of water. Supplies listed by entity are provided in Appendix F. Note that items such as sales to other agencies are not subtracted in these supply values, resulting in a supply that represents both wholesale and retail supplies. As a result of this definition, supplies will not equal the historical demand. Historical demand for the individual entities is shown in Figures 4.20 – 4.25.

4.8.1 GROUNDWATER

All entities pump groundwater for all or a portion of their water supply. The quantity of groundwater extraction for each Management Zone is shown in Figures 4.26a, 26b, and 4.27.

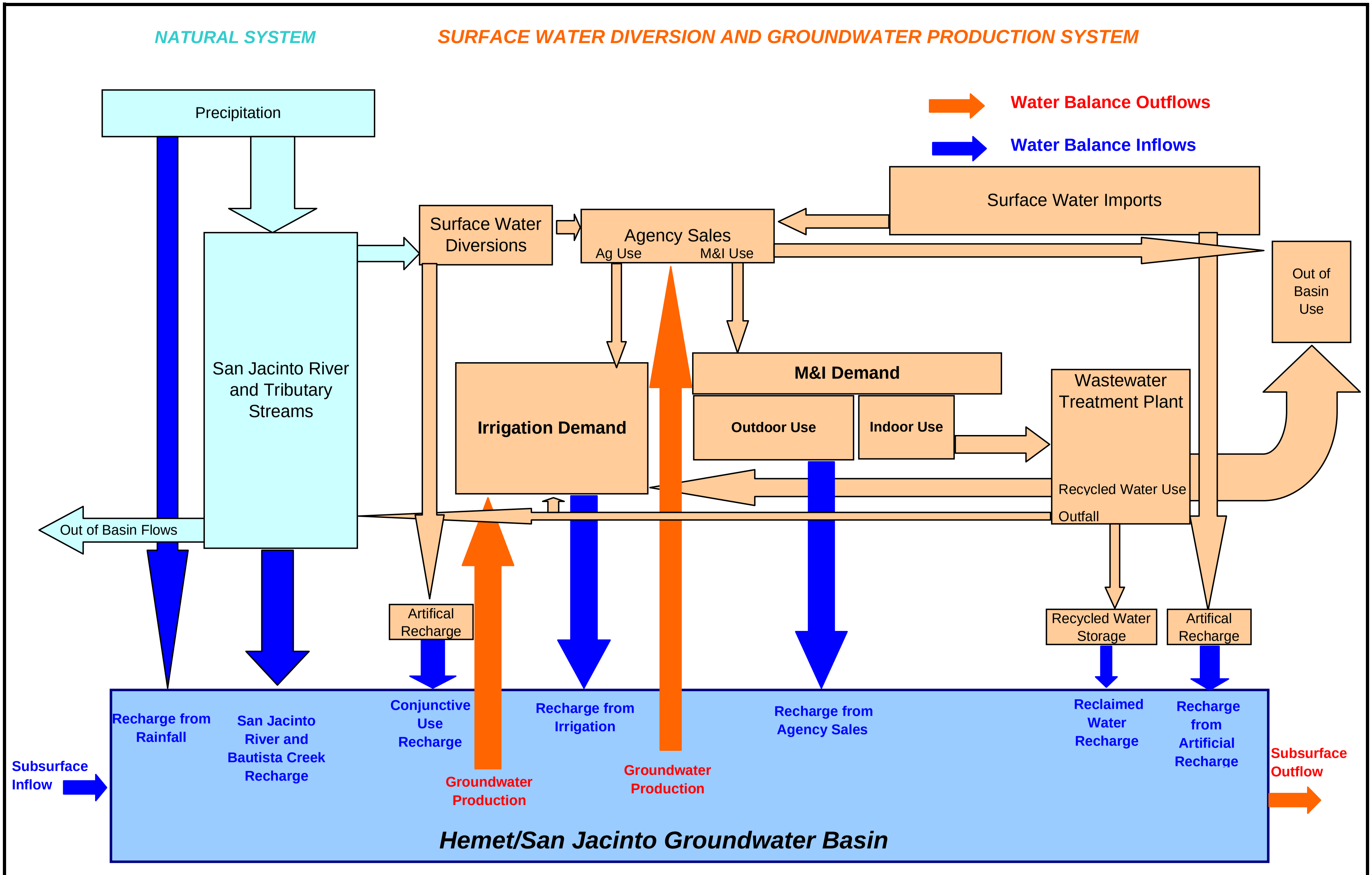


Figure 4.18 Components of Hemet/San Jacinto Groundwater Balance

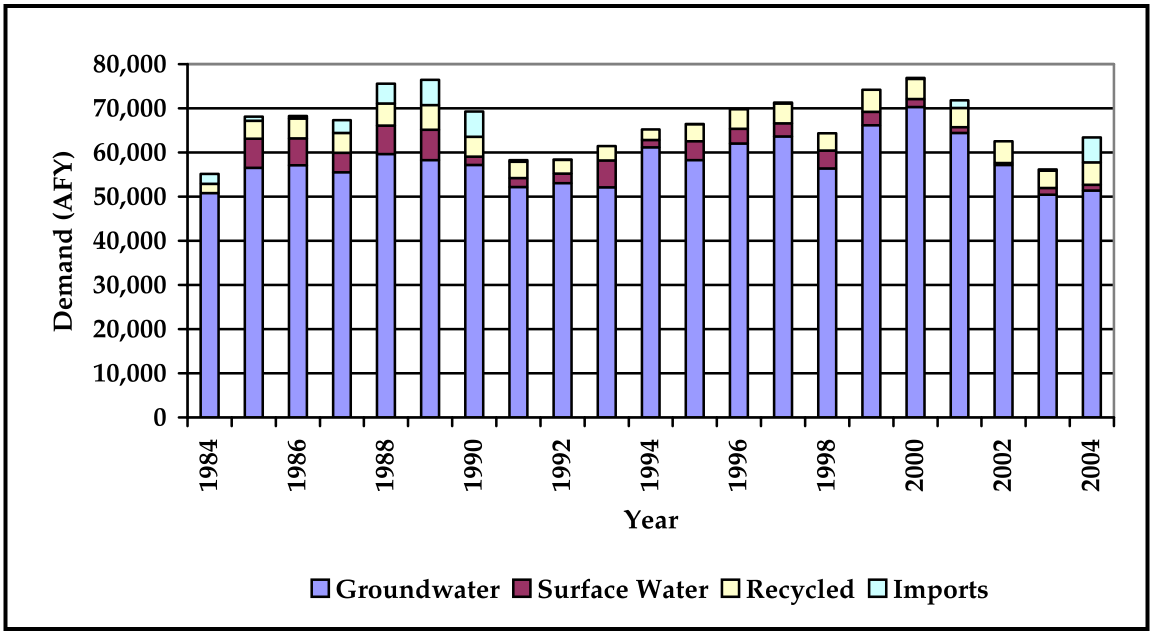


Figure 4.19 Annual Management Area Water Supplies

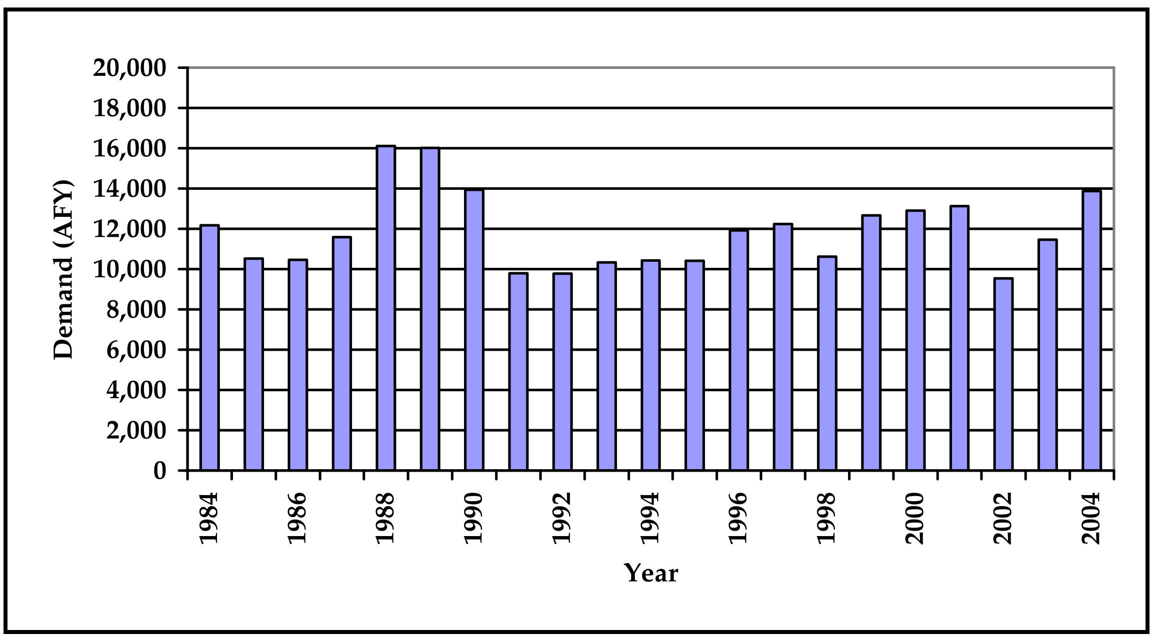


Figure 4.20 EMWD Historical Annual Demand

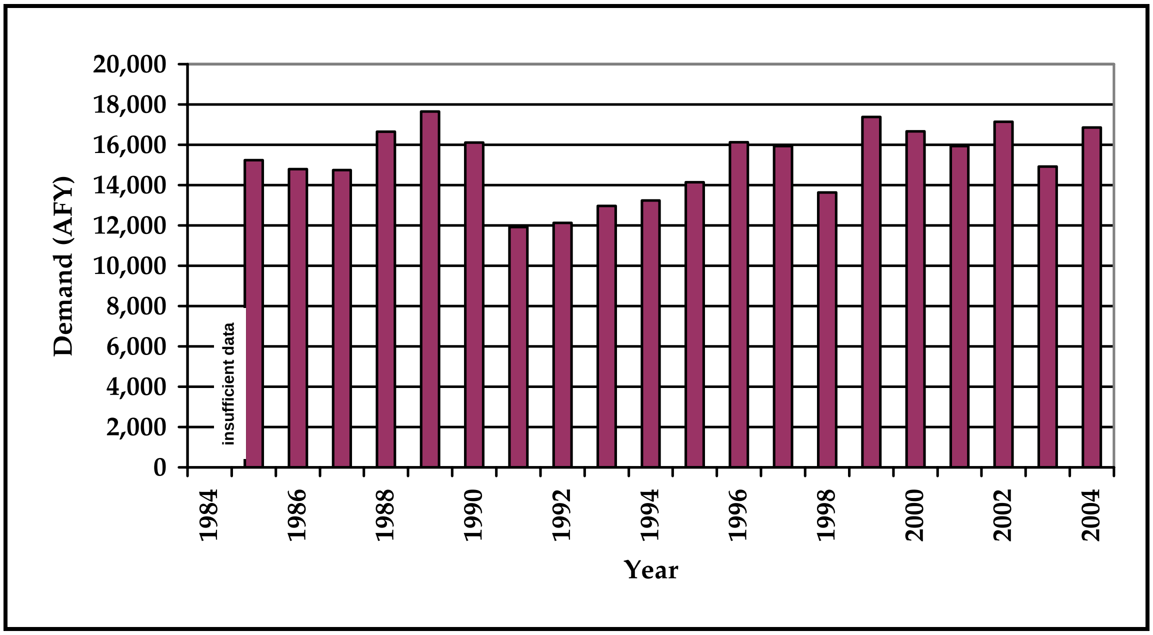


Figure 4.21 LHMWD Historical Annual Demand

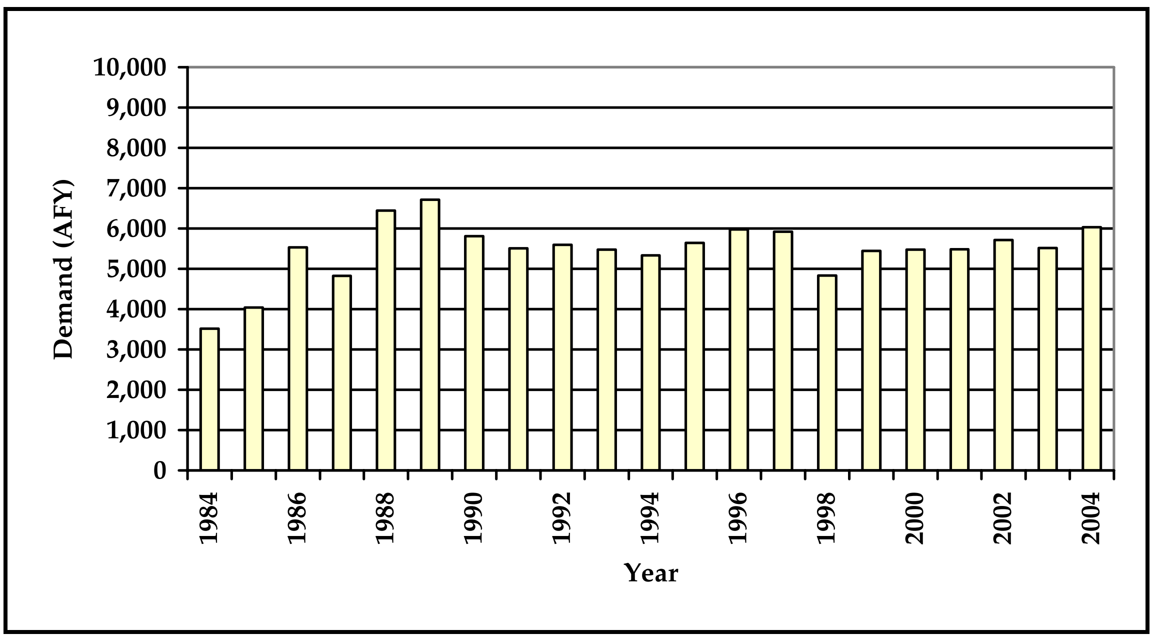


Figure 4.22 City of Hemet Water Service Area Historical Annual Demand

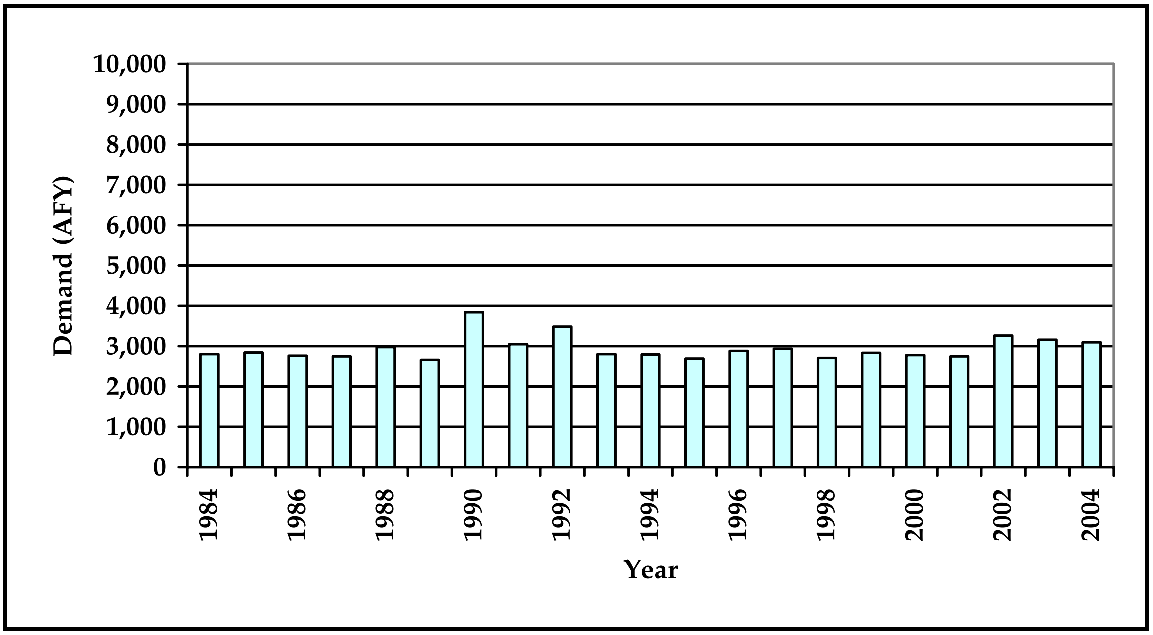


Figure 4.23 City of San Jacinto Water Service Area Historical Annual Demand

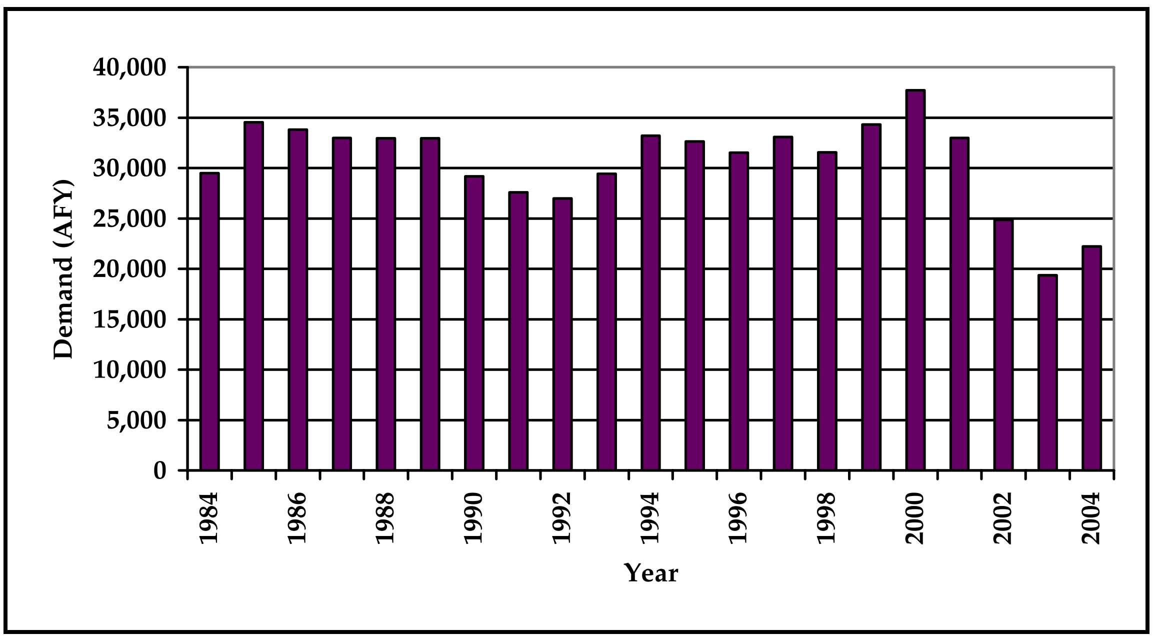


Figure 4.24 Private Water Producers Historical Annual Demand

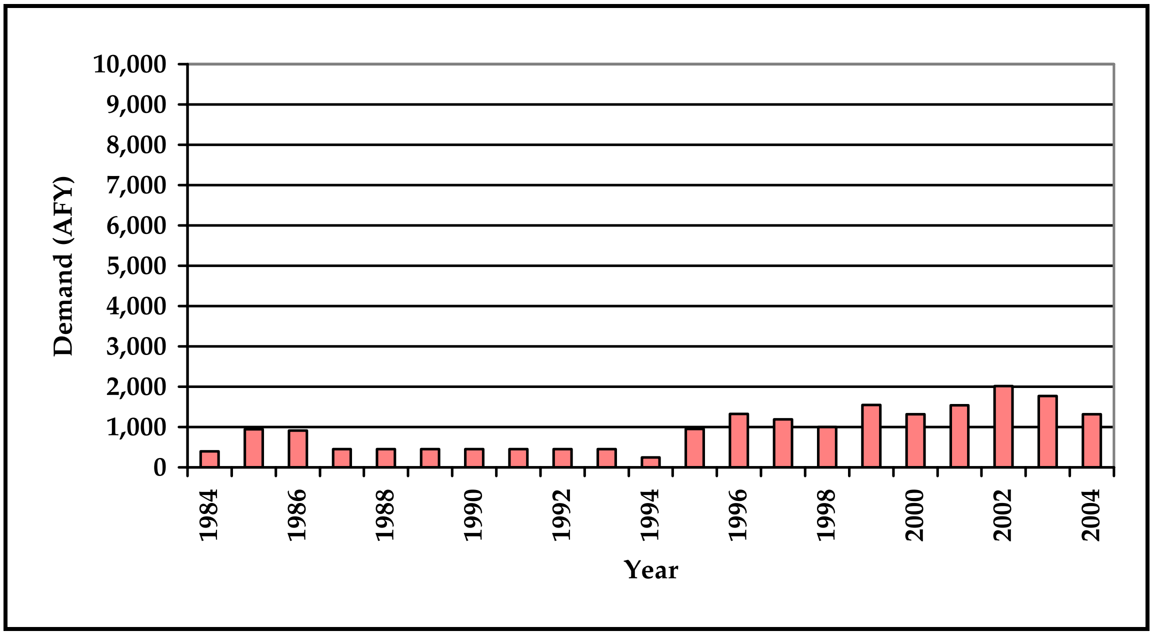


Figure 4.25 Soboba Historical Annual Demand

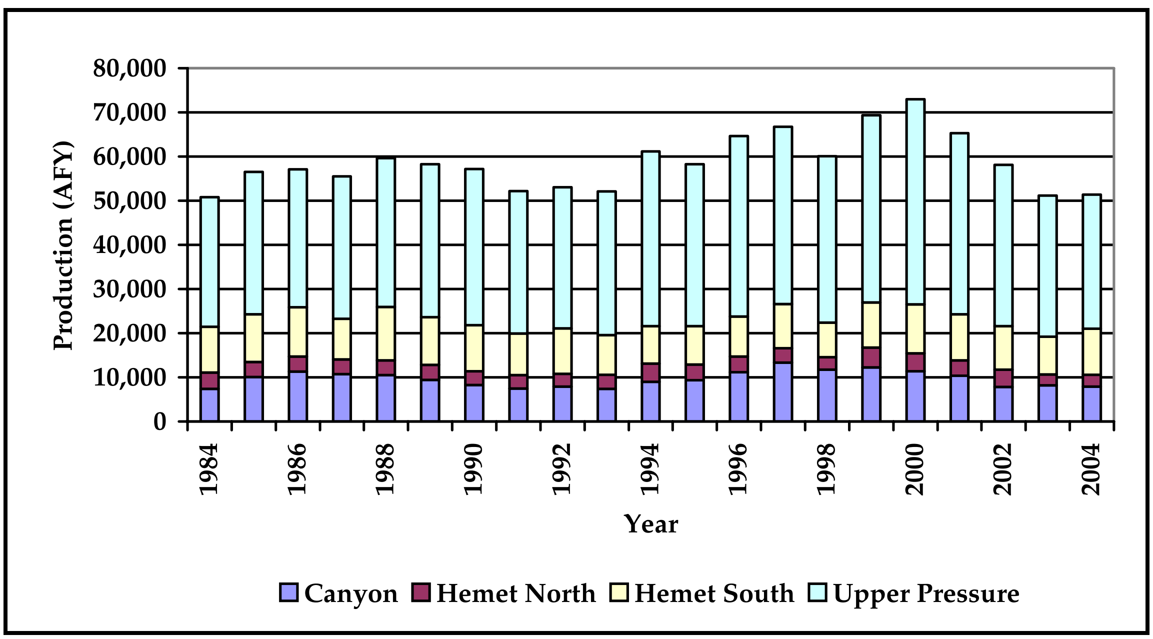


Figure 4.26a Annual Groundwater Production, by Management Zone

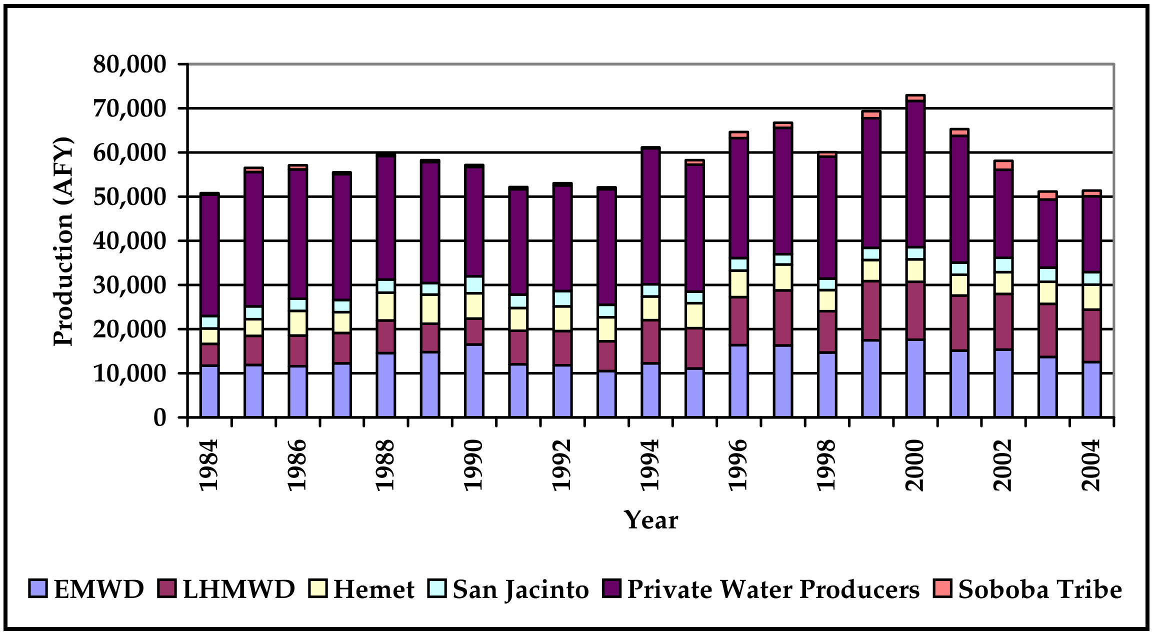


Figure 4.26b Annual Groundwater Production, by Entity

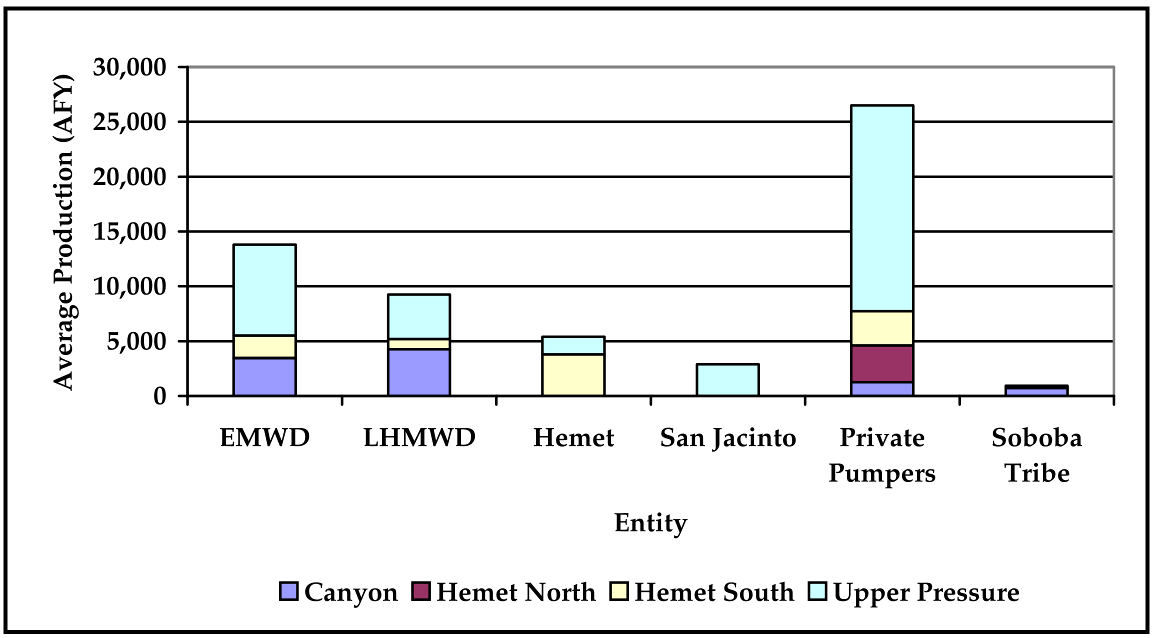


Figure 4.27 Average Annual Entity Groundwater Production, by Management Zone, 1984-2004

Since 1984, each entity except for the City of San Jacinto has pumped groundwater from multiple Management Zones. San Jacinto's pumping during that time period has always been from the Upper Pressure Management Zones. The percentage of the water supply from groundwater for each remaining entity, compared to other components of the water supply, is shown in Figures 4.28a-e as a pie chart breaking down the entity's 2004 groundwater supply by

Management Zone. Additionally, Figure 4.29a-e presents stacked area charts showing the historical annual percentage of groundwater supply from each Management Zone.

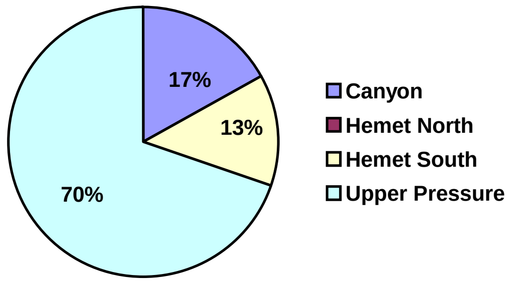


Figure 4.28a EMWD 2004 Groundwater Production, Percentage by Supply Source

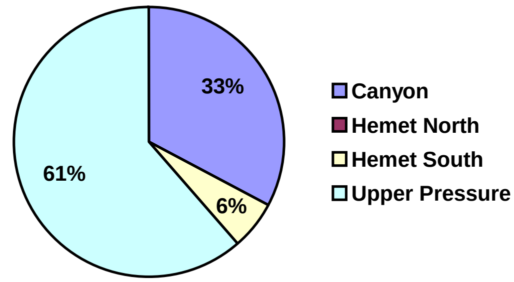


Figure 4.28b LHMWD 2004 Groundwater Production, Percentage by Supply Source

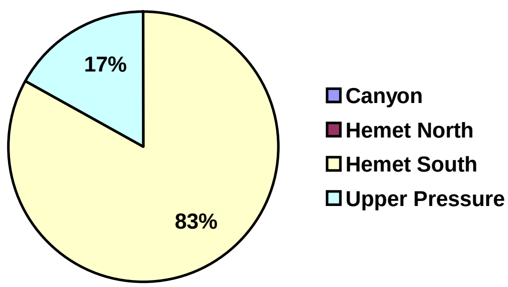


Figure 4.28c City of Hemet Water Service Area 2004 Groundwater Production, Percentage by Supply Source

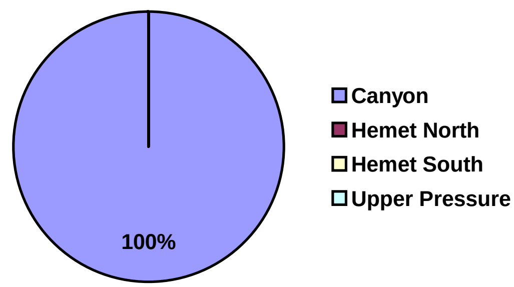


Figure 4.28d Soboba 2004 Groundwater Production, Percentage by Supply Source

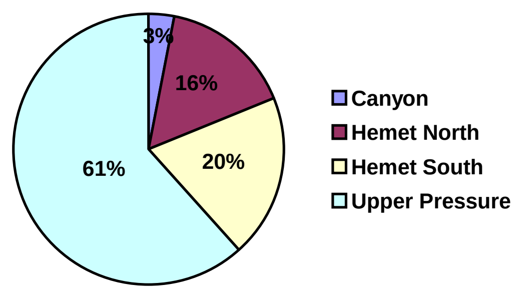


Figure 4.28e Private Water Producers 2004 Groundwater Production, Percentage by Supply Source

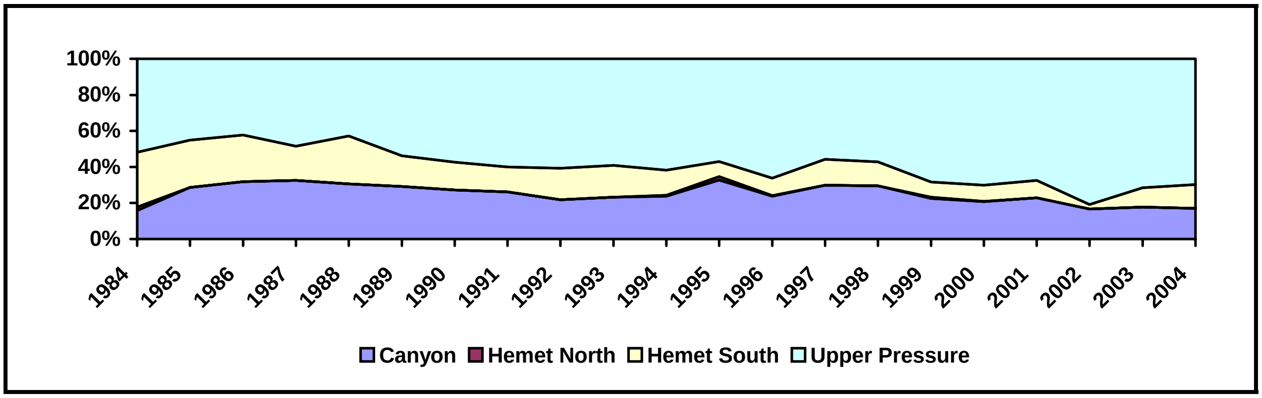


Figure 4.29a EMWD Historical Groundwater Production, Percentage by Supply Source

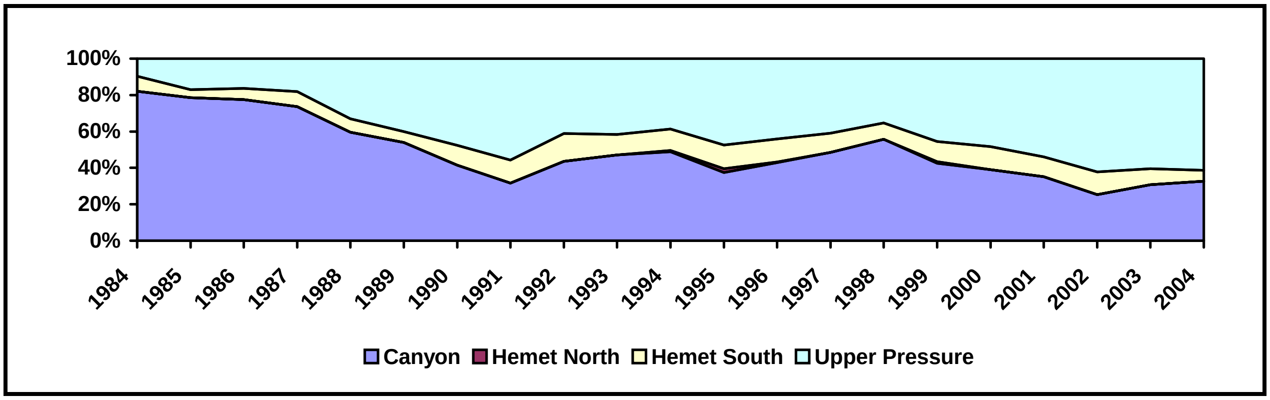


Figure 4.29b LHMWD Historical Groundwater Production, Percentage by Supply Source

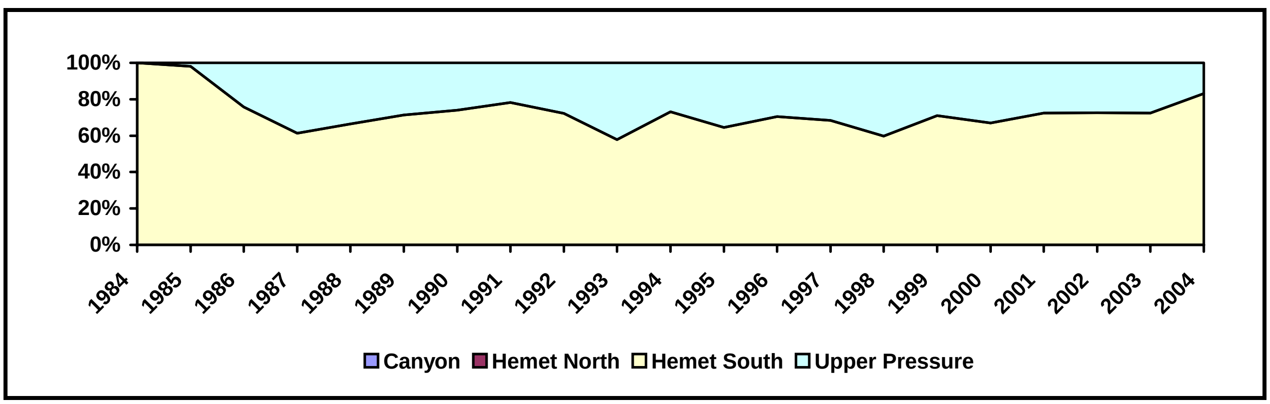


Figure 4.29c City of Hemet Water Service Area Historical Groundwater Production, Percentage by Supply Source

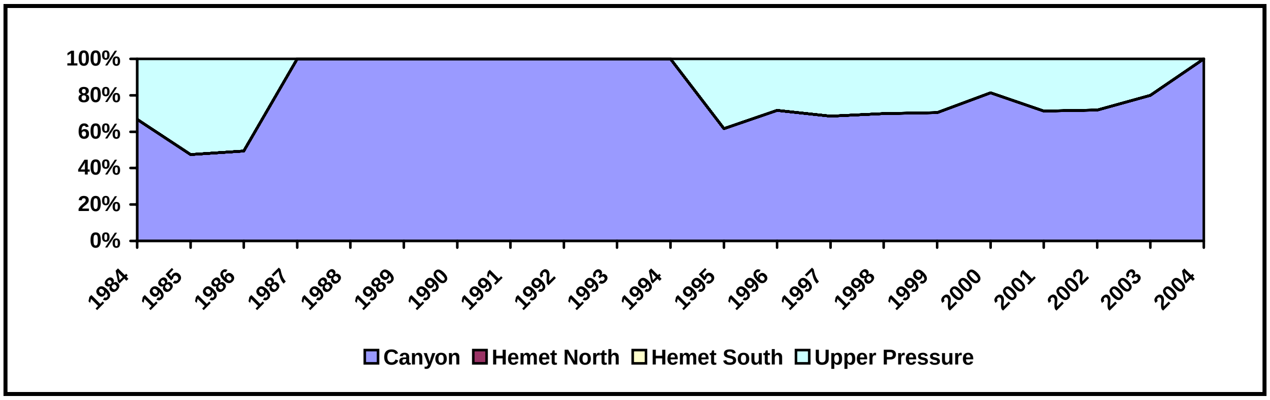


Figure 4.29d Soboba Historical Groundwater Production, Percentage by Supply Source

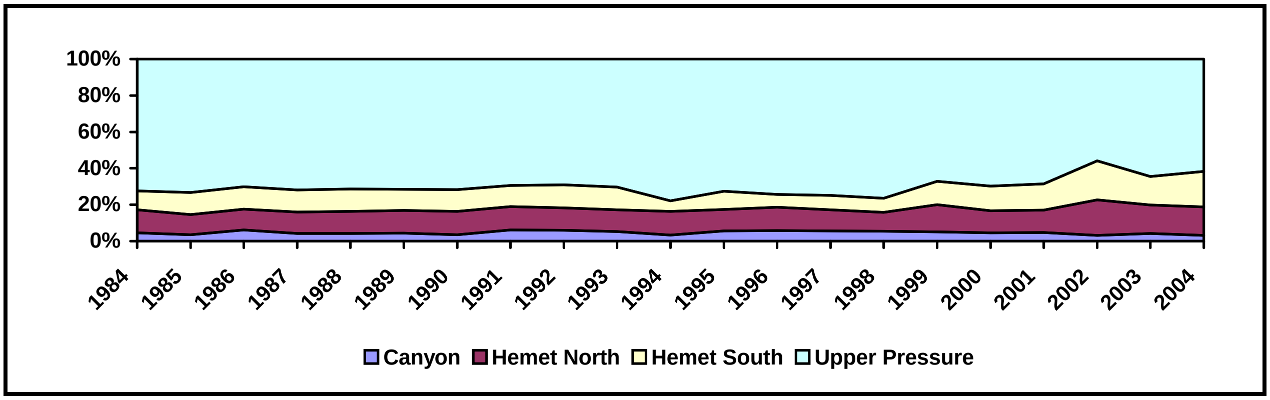


Figure 4.29e Private Water Producers Historical Groundwater Production, Percentage by Supply Source

The pie charts show that in 2004 the Upper Pressure Management Zone provided the majority of groundwater for four of the six entities. The Hemet South Management Zone provided the majority of water to the City of Hemet Water Services Area and The Canyon Management Zone provided all groundwater for the Soboba Tribe.

The only significant trend seen in the 1984 - 2004 historical annual charts is LHMWD's shift in groundwater sources from majority Canyon Management Zone water in the mid-1980s to mostly Upper Pressure Management Zone water recently. These charts also emphasis the importance of the Upper Pressure Management Zone, as it was a component of the groundwater supply for all entities over the 1984 – 2004 time period.

4.8.2 Imported Water

EMWD is a member agency of the MWD, and, as such, is able to import water from Northern California via the State Water Project and from the Colorado River Aqueduct. Imported water is used for supply as well as for groundwater recharge; this section only discusses imported water for supply, imported water for recharge is discussed in Section 4.6.1. District-wide, imported water comprises 80% of EMWD's total potable water supply. However, imported water is a small portion of EMWD's water supply in the Management Area due to the availability of high quality groundwater, which is less common in the rest of the EMWD service area. Over the 1984-2004 period, imported water represented 13% of EMWD's supply and 2% of the total Management Area supply (WRIME, 2003a). In 2004, imported water represented 41% of EMWD's supply and 9% of the total supply for the Management Area (EMWD, 2005a,b).

The usage of imported water for direct use has been variable over the past decades, as shown in Figure 4.30. The volume of water imported was reduced in 1991 as the importation of unfiltered Colorado River water to the Management Area was curtailed to meet the requirements of the Surface Water Treatment Rule, part of the Safe Drinking Water Act.

Imported water usage in recent years has increased, which in turn reduced the stress on groundwater resources in the Management Area.

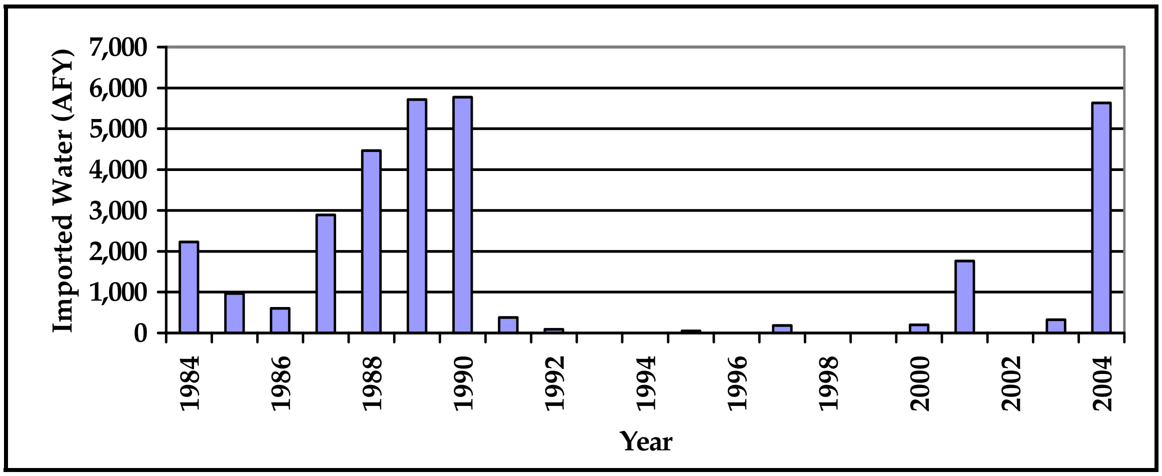


Figure 4.30 Annual Imported Water Supply

4.8.3 RECYCLED WATER

Recycled water is treated at EMWD's San Jacinto Valley Regional Water Reclamation Facility and is currently used primarily for irrigation in the public municipal areas, industrial uses, and agricultural irrigation purposes in the Management Area and for habitat creation at the California Fish and Game San Jacinto Wildlife Area outside the Management Area. Recycled water is a highly reliable source of supply and will increase in availability as the population of the Management Area increases. Most of the recycled water is sold by EMWD to private land owners for agricultural irrigation. Recycled water usage in the Management Area has been fairly stable over the past decades, with approximately 5,000 AF supplied in 2004. Annual amounts of recycled water use are presented in Figure 4.31.

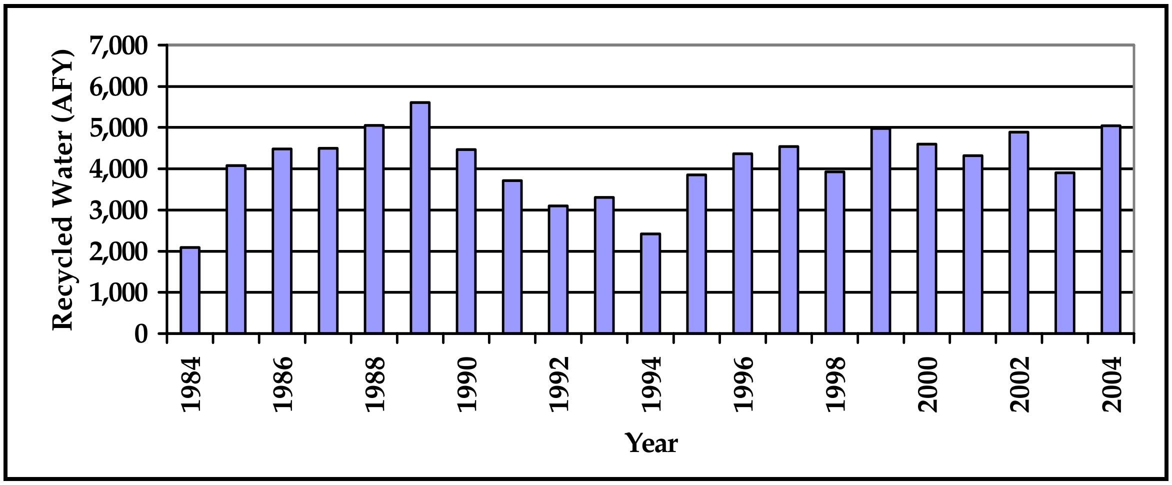


Figure 4.31 Annual Recycled Water Supply

4.8.4 SURFACE WATER

LHMWD has pre-1914 rights for the diversion and storage of surface water from the San Jacinto River and its tributaries. These rights date back to the late 1800s, and the diversion amounts are filed each year with the Division of Water Rights, State Water Resources Control Board on Annual Notices of Groundwater Extraction or Diversion, numbers G330016, G330017, and G330018.

When available, LHMWD diverts surface water for direct use. It should be noted that the San Jacinto River is an ephemeral river. The river may not flow every year and, therefore, there may be occasional years where diversion is not possible. Annual surface water diversions for 1985-2004 are shown in Figure 4.32. Details of the surface water rights are discussed in Section 7.1.

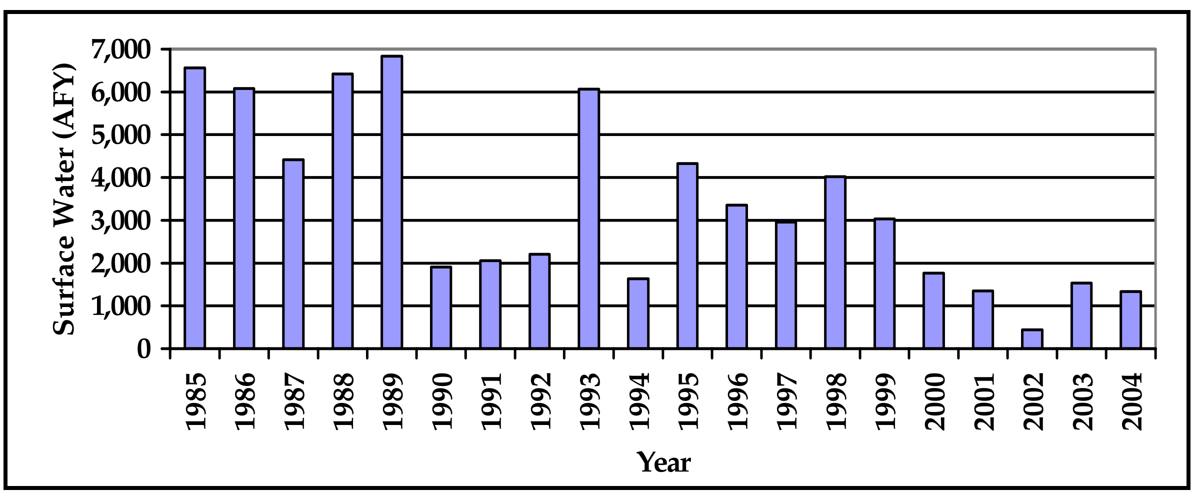


Figure 4.32 Annual Surface Water Supply

EMWD's surface water diversions are not utilized for direct use and are therefore not considered part of the water supply. More information on EMWD's surface water diversions is included in Section 7, Surface Water Rights.

4.8.5 PURCHASES FROM EMWD

LHMWD, City of Hemet, and City of San Jacinto purchase water from EMWD to supplement their water supplies. The annual volume of water sold to the other agencies by EMWD is shown in Figure 4.33. In addition to these sales, EMWD sells recycled water to private land owners for agricultural irrigation.

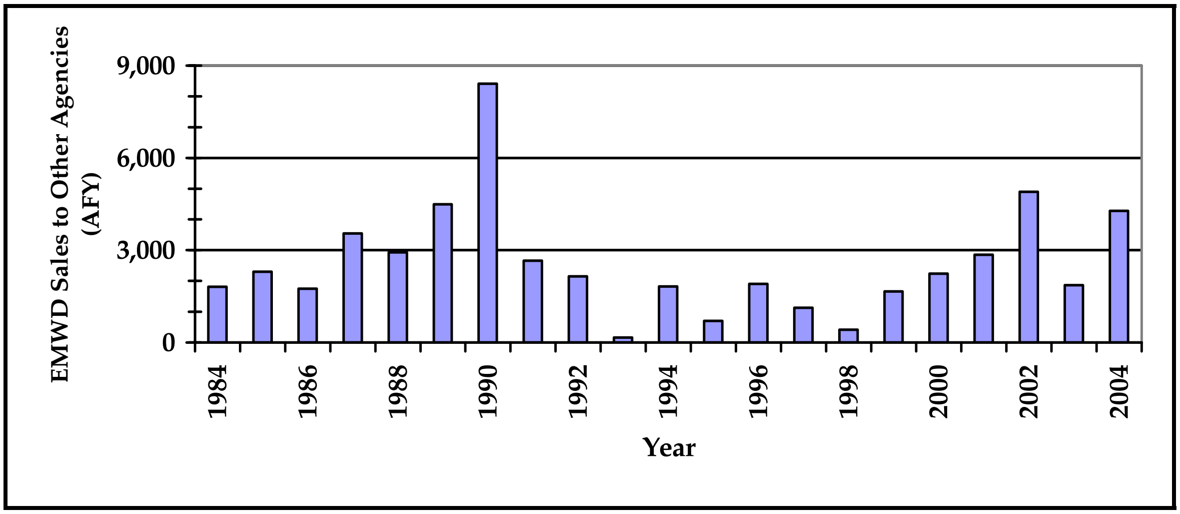


Figure 4.33 Annual Sales by EMWD to Other Agencies within Management Area

4.9 ESTIMATES OF SAFE YIELD AND OVERDRAFT

4.9.1 SAFE YIELD

The Safe Yield of the Management Area is defined in the Stipulated Judgment as the long term, average quantity of water supply in the Management Area that can be pumped without causing undesirable results, including the gradual reduction of natural groundwater in storage over long-term hydrologic cycles.

The following clarifying notes are presented to better define the Safe Yield definition:

- **Period of Record:** Safe Yield is a function of annual variability of the hydrology, but should reflect long-term average conditions, including wet and dry replenishment conditions. Identification of "long term, average" is important, but difficult to determine, as precipitation is highly variable from year to year and subject to long-term climatic changes. As hydrologic data will continue to be collected and a greater understanding of the hydrology will be gained, the period of record for determining the Safe Yield will be subject to change over time.

- **Water Supply Components:** The following components of water supply are considered in the definition of Safe Yield:
  a. Natural recharge from infiltration of precipitation,
  b. Recharge from infiltration of streamflow and other surface water runoff,
  c. Recharge from infiltration of irrigation applied water on agricultural lands,
  d. Recharge from infiltration of outdoor irrigation in the urbanized areas,
  e. Artificial recharge, such as replenishment programs, historically operated, using imported, recycled, and surface water diversions,
  f. Subsurface groundwater inflows, such as from the Lower Pressure Management Zone and the boundaries of the basin, and
  g. Subsurface groundwater outflows, such as to the Lakeview portion of the Lakeview/Hemet North Management Zone.
- **Study Area:** Safe Yield is calculated for the Management Area as one unit, and not by the smaller units of Management Zones.
- **Undesirable Effects:** The definition of Safe Yield emphasizes protection of groundwater in storage. It is assumed that potential undesirable effects on water quality are indirectly addressed, and therefore are not included in the analysis.

The Safe Yield of the Management Area has been estimated in a number of studies in the past. A summary of methods, hydrologic periods, and results from each study is presented in Table 4.5.

Two major methodologies have traditionally been used to estimate the Safe Yield: (1) Water Balance methodology, and (2) Change in storage methodology. These methods are briefly described below.

Table 4.5 Published Estimates of Safe Yield for the Management Area

Yield Study	Method	Time Period	Safe Yield (AFY)	Pumping (AFY)	Overdraft (AFY)
Fritz and Rosell*, 1947	Water Balance (Conventional)	1920-1945	27,400 (35,100 w/o trees/brush)	32,400	4,800
Schwartz*, 1967	Water Balance (Conventional)	1923-1960	26,100	n/a	12,100
EMWD White Paper, 2000	Water Level Recovery Analysis	Variable	50,000	60,600	10,600
GIS Recharge Estimates	Change in Storage (GIS)	1998-2003	39,700	n/a	n/a
WRIME, 2003d	Water Balance (Conventional)	1984-2001	44,700	59,000	14,300
Based on TechLink, 2002a	Water Balance (Model-based)	1984-1999	41,300	58,000	16,700

* Fritz and Rosell (1947) and Schwartz (1967) both used a larger geographic area that roughly included what is today called the San Jacinto-Lower Pressure Management Zone. This additional area is the area northwest of Bridge Street to Redlands Boulevard in Moreno Valley.

4.9.1.1 Method 1 - Water Balance Method

The water balance method utilizes inflows and outflows from the basin to estimate change in storage and the Safe Yield of the basin. The amount of pumping that can be sustained with little or no long-term change in storage is the Safe Yield of the basin. The Safe Yield estimate may be calculated by

Safe Yield = Change in Groundwater Storage + Groundwater Production,

where Change in Groundwater Storage is Inflows less Outflows. The estimate must be over a long-term base period which reflects a number of wet, normal, and dry periods. Groundwater production values are based on historical data as reported by the Public Agencies and estimated for the Private Water Producers. The TC has reviewed and agreed to the data for use in the Water Balance Method. The following inflow and outflow components are used to calculate Change in Groundwater Storage for the Management Area:

__Inflows__

- Recharge from Retail Water Sales,
- Recharge from Irrigation Return Flow,
- Recharge from Precipitation,

- Grant Avenue Ponds Diversion Recharge,
- Reclaimed Ponds Recharge,
- Recharge from Recycled Water Sales,
- Subsurface Inflow from Other Management Zones,
- Bautista Creek Recharge,
- San Jacinto River Recharge, and
- Boundary Inflow.

Outflows

- Subsurface Outflow to Other Management Zones,
- Boundary Outflow, and
- Groundwater Production.

4.9.1.2 Method 2 - Change in Storage Methodology

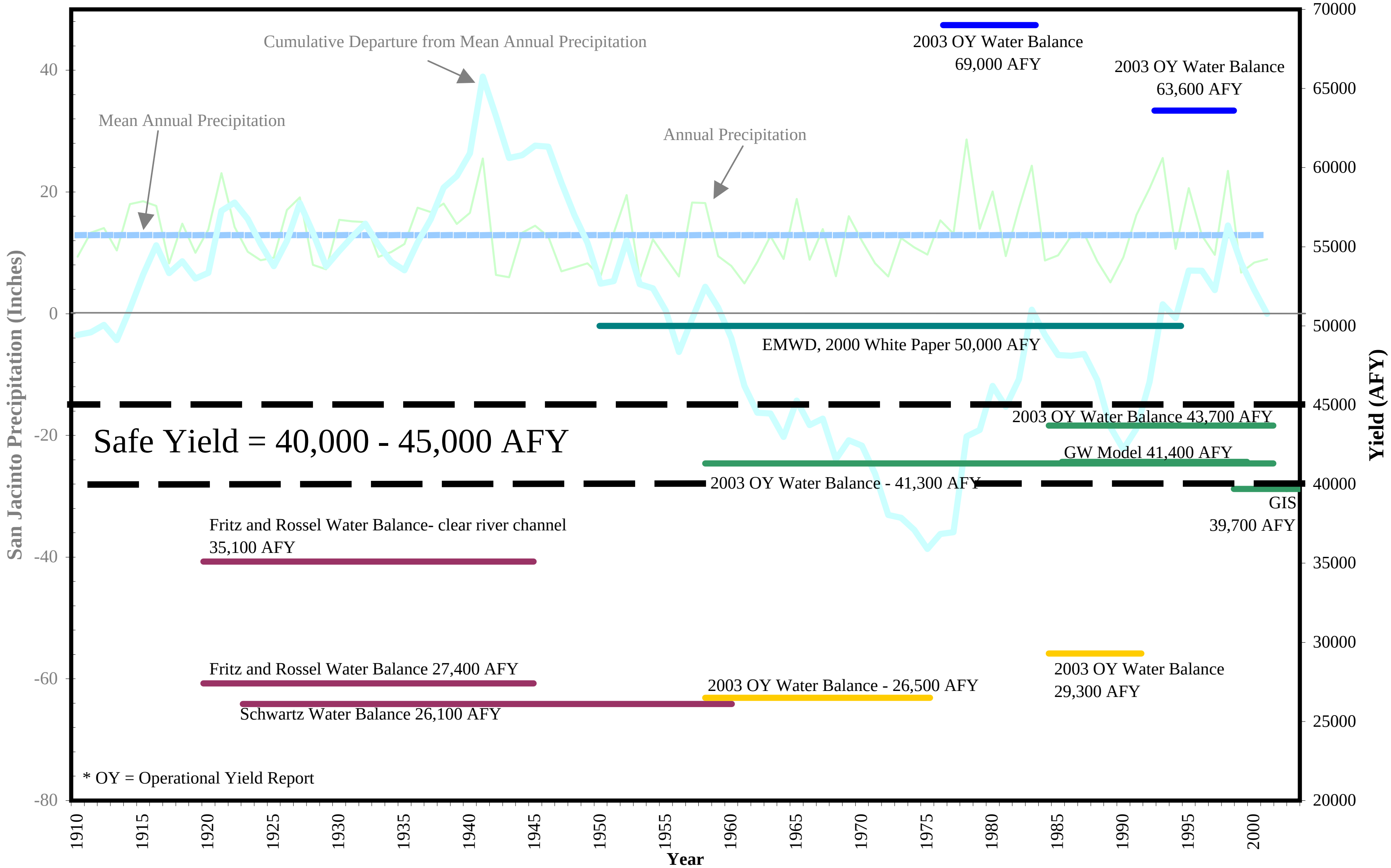
This method uses a GIS database to develop surfaces of groundwater elevations based on observed groundwater levels at multiple control points (i.e., wells) throughout the Management Area for two different time periods. The product of change in volume between the two surfaces at two different times and the specific yield of the aquifer determines the change in storage between those two time points. The Safe Yield is then calculated as the sum of the calculated change in storage and the groundwater production during the same time period. Variations of this method are used based on the spatial distribution, including vertical distribution, of the specific yield in the aquifer system.

4.9.1.3 Summary of Previous Yield Estimates

Calculation of Safe Yield is a function of the hydrologic period used in the analysis. Figure 4.34 presents the long-term hydrologic conditions as precipitation at San Jacinto gaging station (RCFC&WCD Site #186), along with estimates of the Safe Yield. As indicated in the figure, the Safe Yield estimates range from 26,400 to 44,700 AFY. Since the two estimates made by Fritz & Rosell (1947) and Schwartz (1967) are based on much older data sets and short-term hydrologic records, and the geographic area may not be consistent with some of the more recent estimates, the TC decided in its August 25, 2005 meeting not to use these estimates. Instead, the TC concluded that the Safe Yield of the Management Area ranges from approximately 40,000 to 45,000 AFY based on the most recent analyses.

The TC also concluded that the following guidelines for estimation of Safe Yield of the Management Area be considered by the Watermaster when calculating Safe Yield in the future:

Figure 4.34 Safe Yield Estimates



- Review and modify Safe Yield, if necessary, upon the recommendation of the TC or as the Watermaster may determine.
- Use latest available data with consideration for proper spatial, temporal, and vertical characteristics of the aquifer system.
- Consider a long period of record that includes above average, below average, and normal conditions.
- Consider latest methodologies that can provide more flexibility based on the available data and information, as necessary.
- Consider using the San Jacinto Watershed Groundwater Model, with appropriate updates and calibration, for re-estimation of groundwater conditions, as needed.

4.9.2 OVERDRAFT

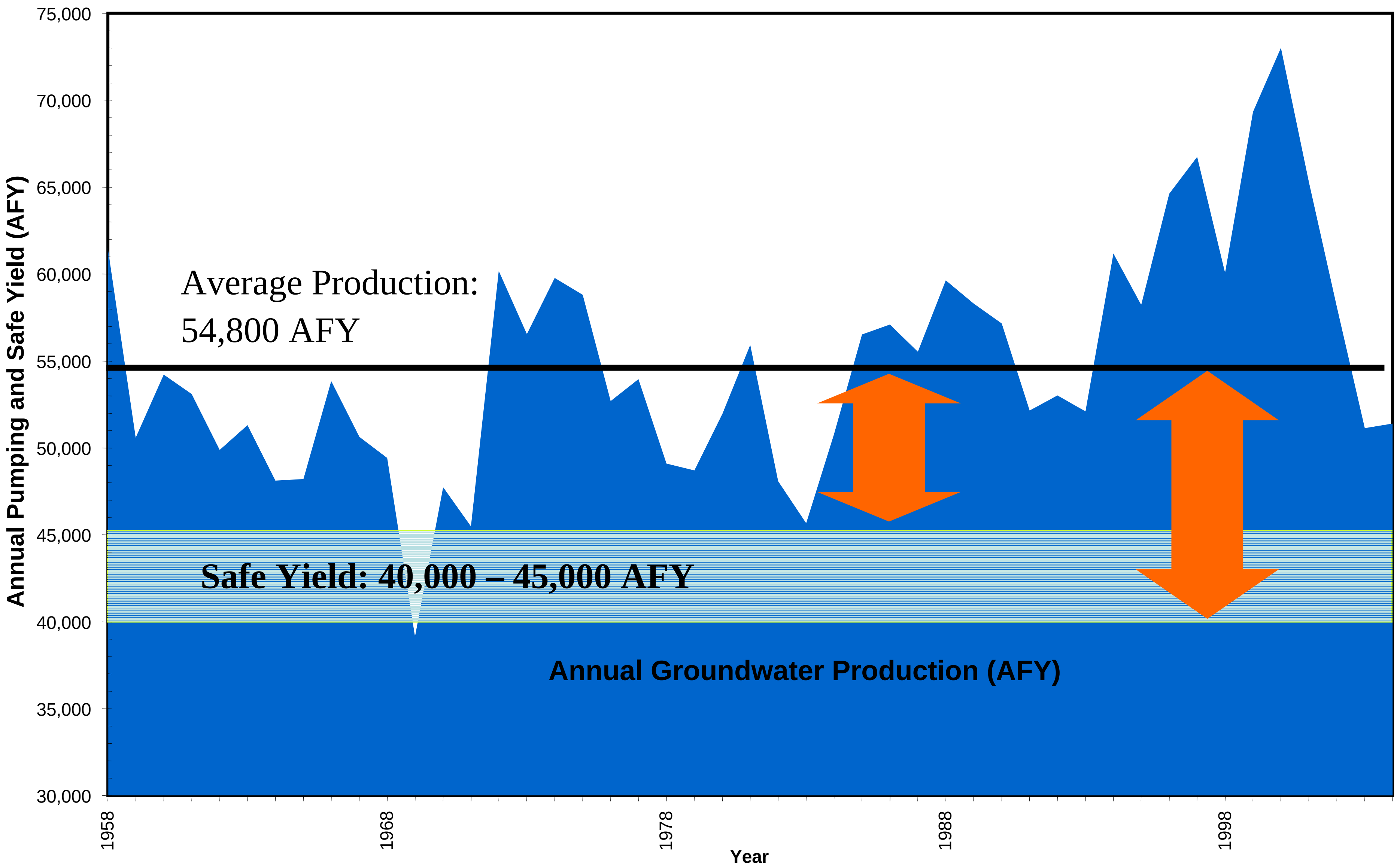
Overdraft is defined in the Stipulated Judgment as the condition whereby groundwater production in the Management Area exceeds the Safe Yield, creating undesirable conditions in the basin. The amount of overdraft is calculated as the difference between long-term average annual groundwater production in the Management Area and Safe Yield. Figure 4.35 shows the estimated annual groundwater production in the Management Area, along with the range of Safe Yield. Based on this figure, the overdraft in the Management Area is estimated to be 10,000 to 15,000 AFY. For planning purposes and to evaluate options to reduce the overdraft, this Plan assumes that the overdraft is at least 10,000 AFY.

4.10 WATER QUALITY CONDITIONS

This section presents a summary of the groundwater quality conditions in the Management Area. This description will assist in establishing a baseline condition for future water management efforts to maintain or improve groundwater quality in the Management Area. The TC has decided that the water quality conditions in the Management Area would be evaluated based on TDS and nitrate levels. This is consistent with the TIN/TDS studies (Wildermuth, 2000) and the emphasis on TDS and nitrate in the Basin Plan as amended (RWQCB, 2004).

The Management Area lies within the jurisdiction of the RWQCB, Santa Ana Region 8. The RWQCB implements state and federal laws through adoption of Water Quality Control Plans or Basin Plans (RWQCB, 1995). The Basin Plan establishes both the legal beneficial use designations and sets the standards to protect these uses. The Basin Plan was recently amended (RWQCB, 2004) to incorporate an updated TDS and Nitrogen Management Plan for the Santa Ana Region, including revised groundwater Management Zones (combining Hemet North and Lakeview into one Management Zone; Hemet North remains treated separately from Lakeview

Figure 4.35 Groundwater Production and Range of Safe Yield Estimates



in this Plan), TDS and nitrate quality objectives for groundwater, TDS and Nitrogen waste load allocations, and stream reach designations.

Within the Santa Ana Watershed, which includes the Management Area, a statistical method has been developed to use nitrate (as N) and TDS to evaluate the status of water quality; to compare sub-basin concentrations; and to trigger management actions (RWQCB, 2004; Wildermuth, 2000, 2005). Point statistics were used to show (i) historical ambient water quality conditions as represented by the 1954-1973 time period, (ii) 1997 Current ambient water quality conditions as represented by the 1978-1997 time period, and (iii) 2003 Current ambient water quality conditions as represented by the 1984-2003 time period. A summary of the data is shown in Table 4.6, revealing nitrate (as N) levels below the MCL of 10 mg/L for all cases. TDS exceeds the recommended secondary MCL of 500 mg/L in Hemet South (current and historical) and Hemet North (current and historical), and TDS exceeds the maximum secondary MCL of 1000 mg/L in the 1997 current levels in Hemet South.

Table 4.6 Historical (1954-1973), 1997 Current (1978-1997), and 2003 Current (1984-2003) Ambient Nitrate as N and TDS Concentrations (mg/L)

Sub-basin	Nitrate as N [1]				TDS[2]			
	Basin Plan Objective[3]	Historical	1997 Current	2003 Current	Basin Plan Objective[4]	Historical	1997 Current	2003 Current
Canyon	2.5	2.5	1.6	2.1	230	**234**	220	**420**
Upper Pressure	1.4	1.4	**1.9**	**1.7**	320	**321**	**370**	**370**
Hemet South	4.1	4.1	**5.2**	**5.4**	**730**	**732**	**1030**	**850**
Hemet North	1.8	1.8	**2.7**	**3.4**	520	519	**830**	**840**

Source: Wildermuth, 2005. 2003 update 1984-2003)
[1] Table 3-2
[2] Table 3-1
[3] Basin Plan Amendment, 2004 (Table 5-4)
[4] Basin Plan Amendment, 2004 (Table 5-3)

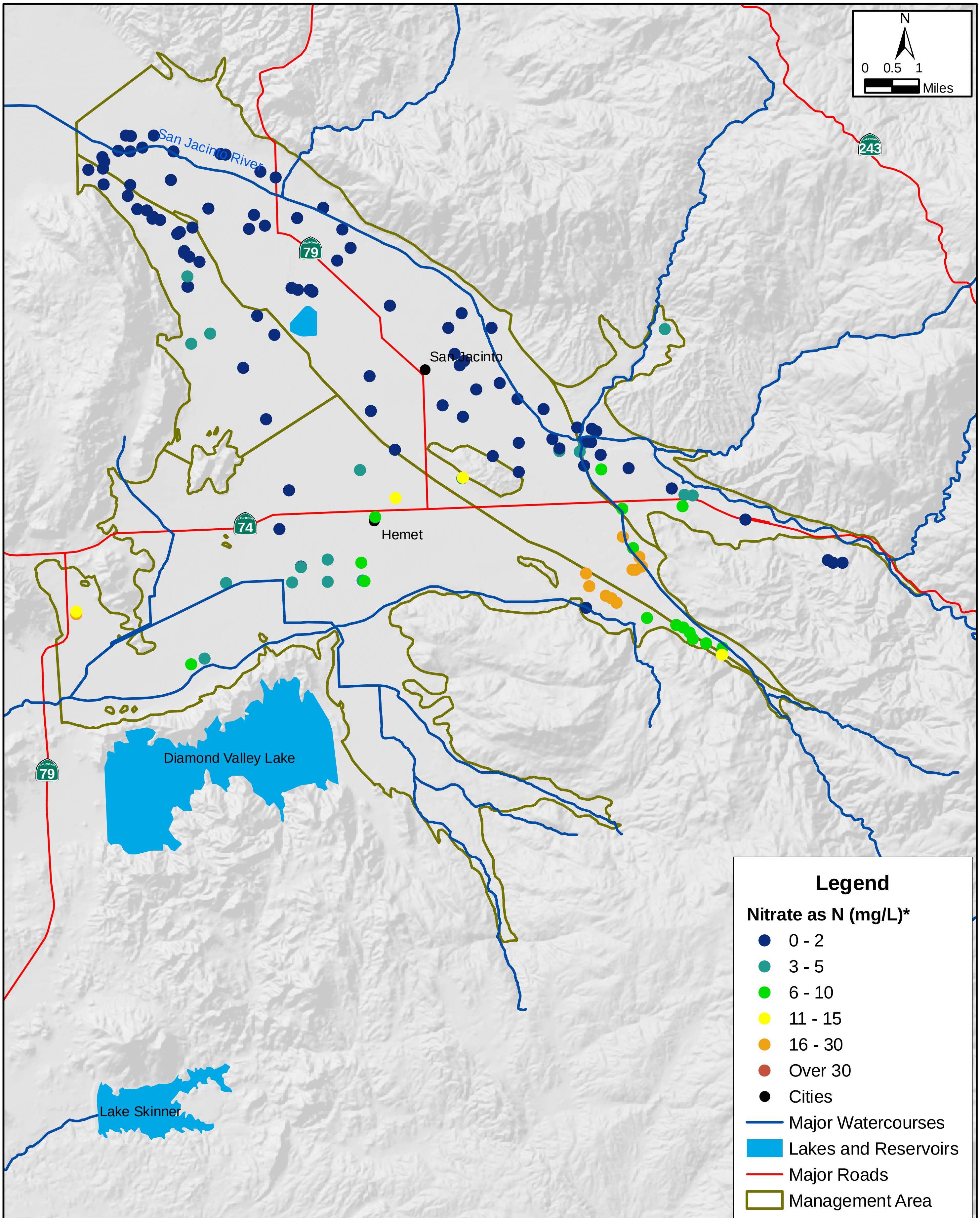
The point statistics and water quality objectives were used by the RWQCB to develop estimates of assimilative capacity. Areas with assimilative capacity are able to accept waters with higher concentrations of a constituent than the concentration in the receiving waters because natural processes such as recharge and dilution will allow for the water quality objectives to continue to be met. The most recent computations indicate that Hemet South, Hemet North, Canyon, and Upper Pressure Management Zones do not currently have assimilative capacity for TDS. For nitrate, the Hemet South, Hemet North, and Upper Pressure Management Zones do not have assimilative capacity remaining, and the Canyon area has only a very small amount of nitrate that it can assimilate (0.4 mg/l nitrate as N; Wildermuth, 2005).

Table 4.7 shows the changes seen over the 30-year time period between the historical and 2003 Current time periods. The Canyon Management Zone shows a decrease in nitrate as N concentrations while all other nitrate (as N) and TDS concentrations for all other Management Zones show increases in concentrations of between 0.3 and 1.6 mg/L nitrate (as N) and 49 to 321 mg/L TDS. It should be noted that changes seen between these time periods are a combination of true changes in ambient water quality and artificial changes due to limitations in monitoring data and the estimation technique (Wildermuth, 2005). In the future, as current monitoring programs assemble more data, a long-term record of analytical data at specific wells will be available to better show changes over time at specific locations.

Table 4.7 Change in Ambient Concentration (mg/L) of Nitrate as N and TDS, Between Historical (1954-1973) and 2003 Current (1984-2003) Time Periods

Sub-basin	Change in Nitrate as N (mg/L)	Change in TDS (mg/L)
Canyon	-0.4	186
Upper Pressure	0.3	49
Hemet South	1.3	118
Hemet North	1.6	321

The most recent data from public and private wells, as complied by EMWD, were used to plot the 2004 nitrate (as N) and TDS conditions as shown in Figures 4.36 and 4.37. While these values are taken from wells screened at different depths, the plots show the general variability in concentrations across the Management Area.



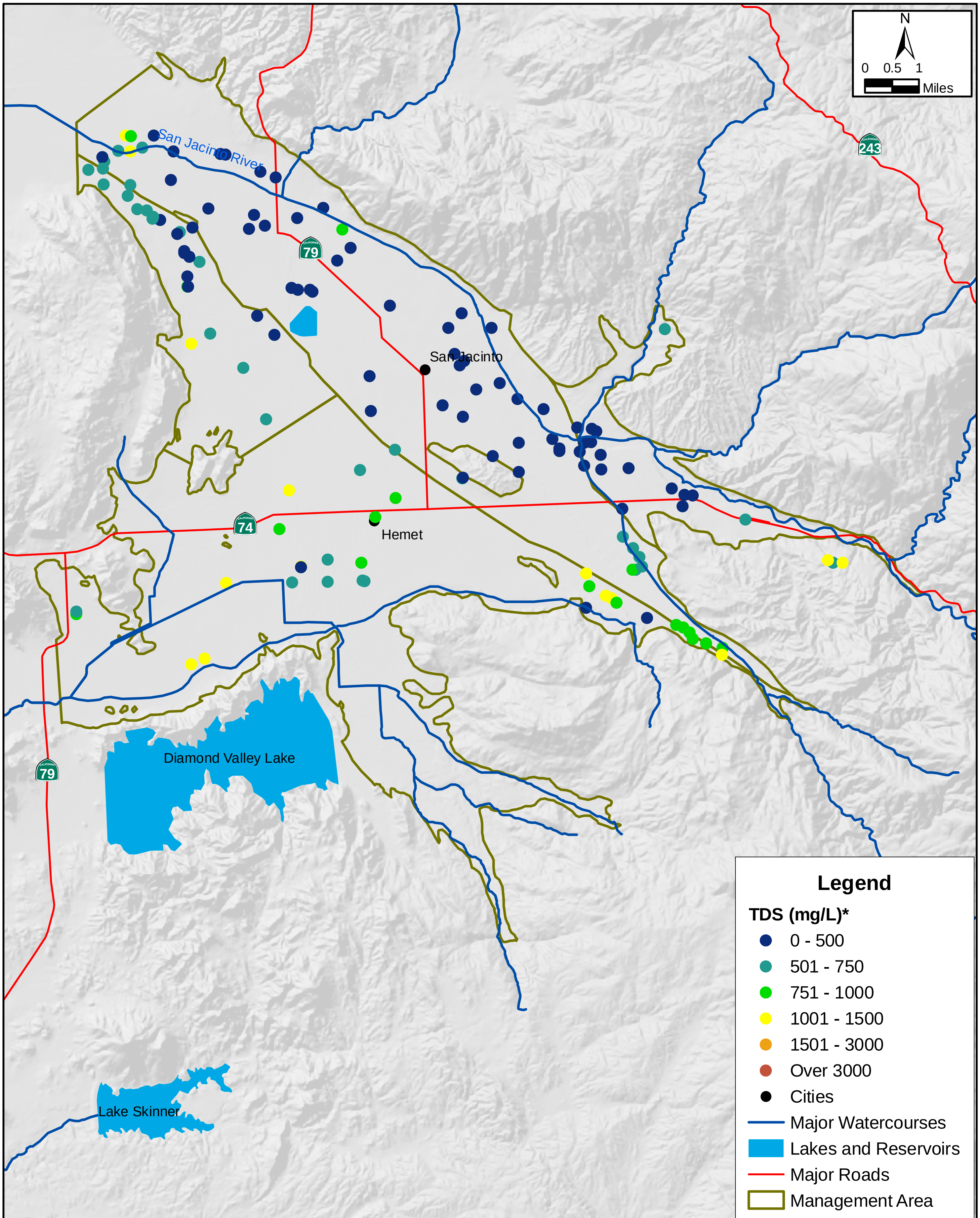
2004 Nitrate as N Concentrations in Groundwater (mg/L)

Hemet / San Jacinto Water Management Plan

*Source: EMWD

October 2007

Figure 4.36



RIME

2004 TDS Concentrations in Groundwater (mg/L)

Hemet / San Jacinto Water Management Plan

*Source: EMWD

October 2007

Figure 4.37

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SECTION 5 PROJECTED WATER DEMANDS AND FUTURE PLAN PHASES

5.1 PROJECTED LAND USE CONDITIONS

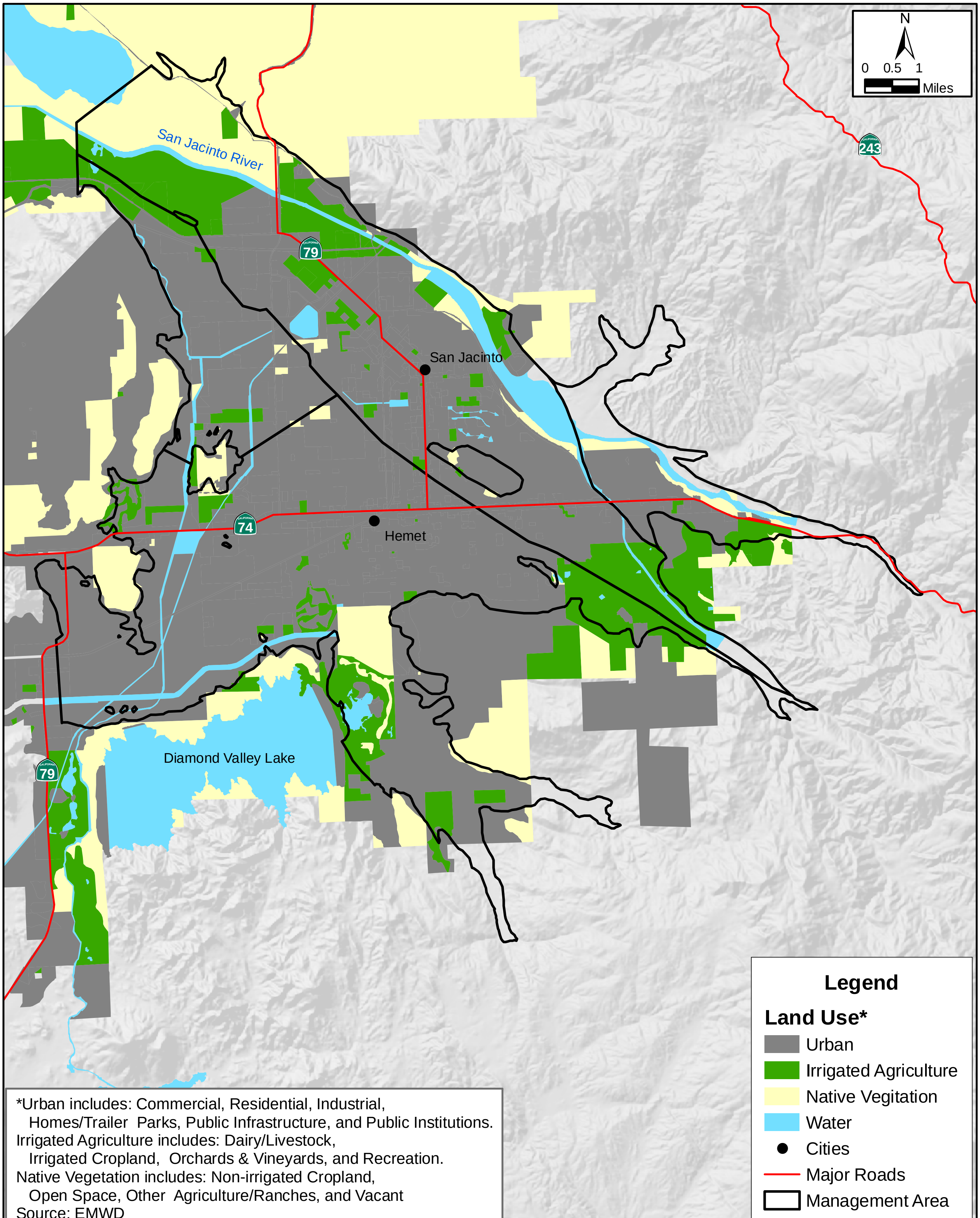
This Section presents a brief description of the projected land use conditions in the Management Area. Figure 5.1 shows the general land use categories at build-out.

Area UWMPs echo the projected urban growth indicated in the build-out land use:

- EMWD UWMP – EMWD service area population, including areas outside the Management Area, projected to increase from 494,000 in 2005 to 830,000 in 2025. (EMWD, 2005a)
- LHMWD UWMP – LHMWD service area population projected to increase from 39,100 in 2005 to 49,500 in 2025. (LHMWD, 2005)
- Hemet UWMP:
    - City of Hemet population projected to increase from 78,600 in 2005 to 154,000 in 2025; and
    - City of Hemet water system service area population projected to increase from 20,200 in 2005 to 22,300 in 2025. (Hemet, 2006)
- San Jacinto UWMP:
    - City of San Jacinto population projected to increase from 34,100 in 2005 to 63,600 in 2025; and
    - City of San Jacinto water system service area population projected to increase from 13,200 in 2005 to 24,000 in 2025. (San Jacinto, 2005)

The total land use acreage for each category is estimated and presented in Table 5.1.

Based on Tables 5.1 and 4.3, the urban area is projected to increase from 28% in the 1998 survey to 65% at build out. This increase is due to a combination of conversion of agricultural land and undeveloped land to urban uses. These future conversions have significant implications on the total projected water demand in the Management Area, as well as impacts on the precipitation, runoff, and recharge conditions. This concept is further discussed in the following sections.



WRIME

2025 Projected Ultimate Land Use

Hemet / San Jacinto Water Management Plan

October 2007

Figure 5.1

Table 5.1 Generalized Projected Acreage in the Management Area

Land Use	Total Acreage	Percent
Urban	37,100	65%
Irrigated Cropland	8,100	14%
Non-Irrigated Cropland	4,500	8%
Water	3,600	6%
Unmapped*	4,000	7%
Total	57,300	100%

*Unmapped areas are outside EMWD's service area and were not included in the EMWD ultimate land use dataset.
Source: EMWD ultimate land use (1998), based on city general plans

5.2 PROJECTED WATER DEMANDS

Projected water demands are based on information contained in 2005 UWMP, the *Hemet/San Jacinto Water Management Area 2004 Annual Report* (EMWD, 2005b), and *Basin Assessment Report Technical Memorandum No. 1* (WRIME, 2003a). The projected water demands of each of the stakeholders and of the Management Area as a whole are described below.

5.2.1 EMWD

Projected retail water demand for the portion of EMWD's service area within the Management Area is based on the *Hemet/San Jacinto Water Management Area 2004 Annual Report*. Projected total demand is shown together with recent historical demand in Figure 5.2. Estimates of projected demand are also presented in the EMWD's 2005 UWMP, but these values are for the entire EMWD service area; the UWMP system-wide projections show a similar rate of increase in water demand of approximately 50% from 2005 to 2020.

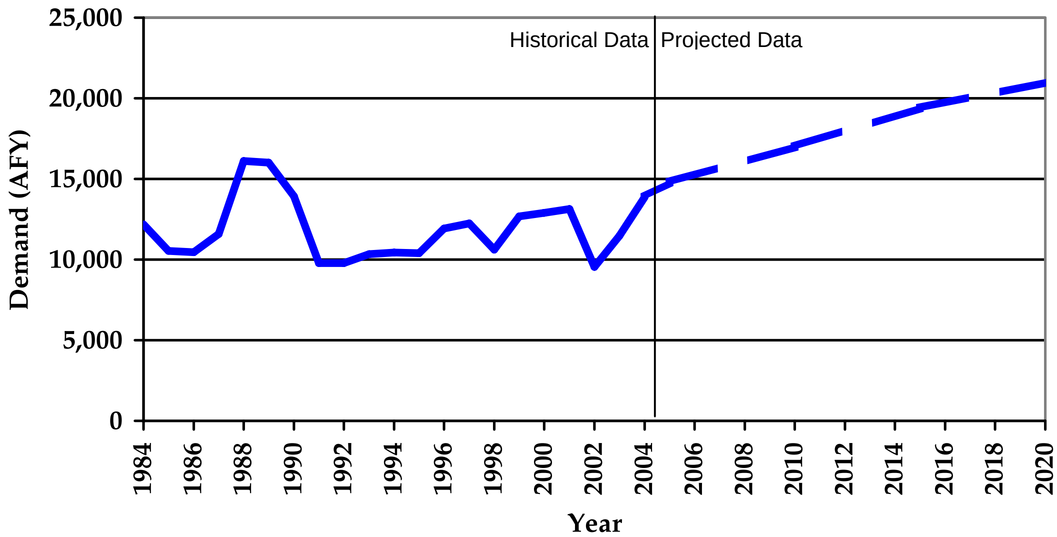


Figure 5.2 EMWD Historical and Projected Demand

5.2.2 LHMWD

Projected water demand is based on *Lake Hemet Municipal Water District 2005 Urban Water Management Plan* (LHMWD, 2005). Projected total demand is shown together with recent historical demand on Figure 5.3.

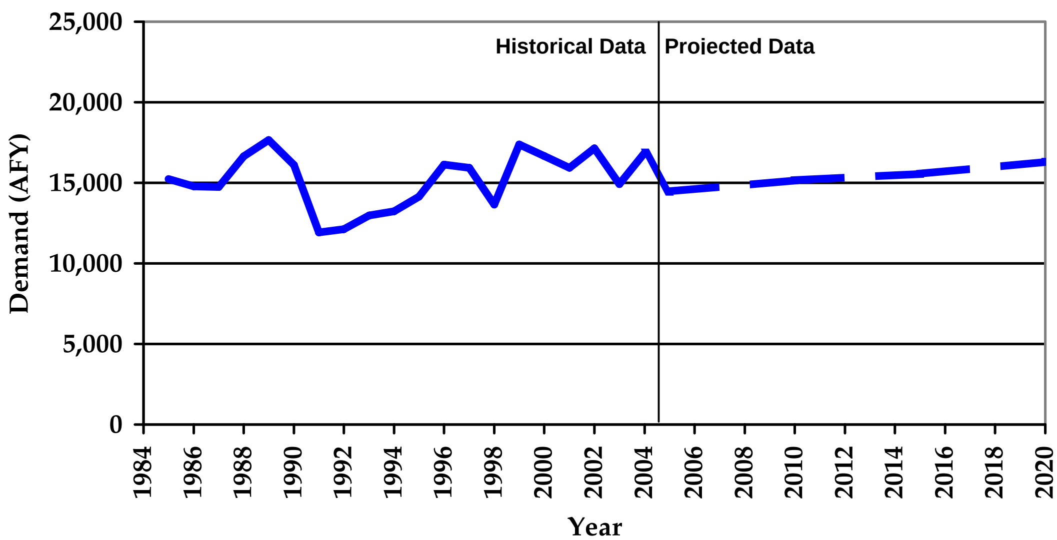


Figure 5.3 LHMWD Historical and Projected Demand

5.2.3 City of Hemet Water Service Area

Projected water demand in the City of Hemet's water service area is based on *City of Hemet 2005 Urban Water Management Plan* (Hemet, 2006). Projected demand is shown together with recent historical demand on Figure 5.4.

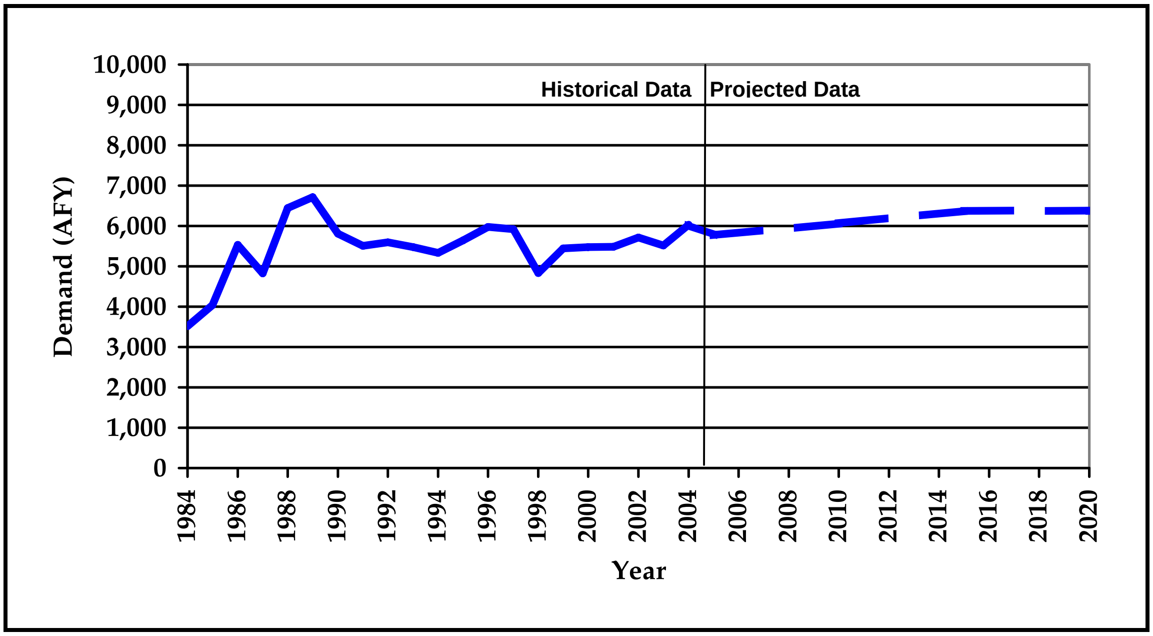


Figure 5.4 City of Hemet Water Service Area Historical and Projected Demand

5.2.4 City of San Jacinto

Projected water demand in the City of San Jacinto's water service area is based on *City of San Jacinto 2005 Urban Water Management Plan* (San Jacinto, 2005). Projected demand is shown together with recent historical demand on Figure 5.5.

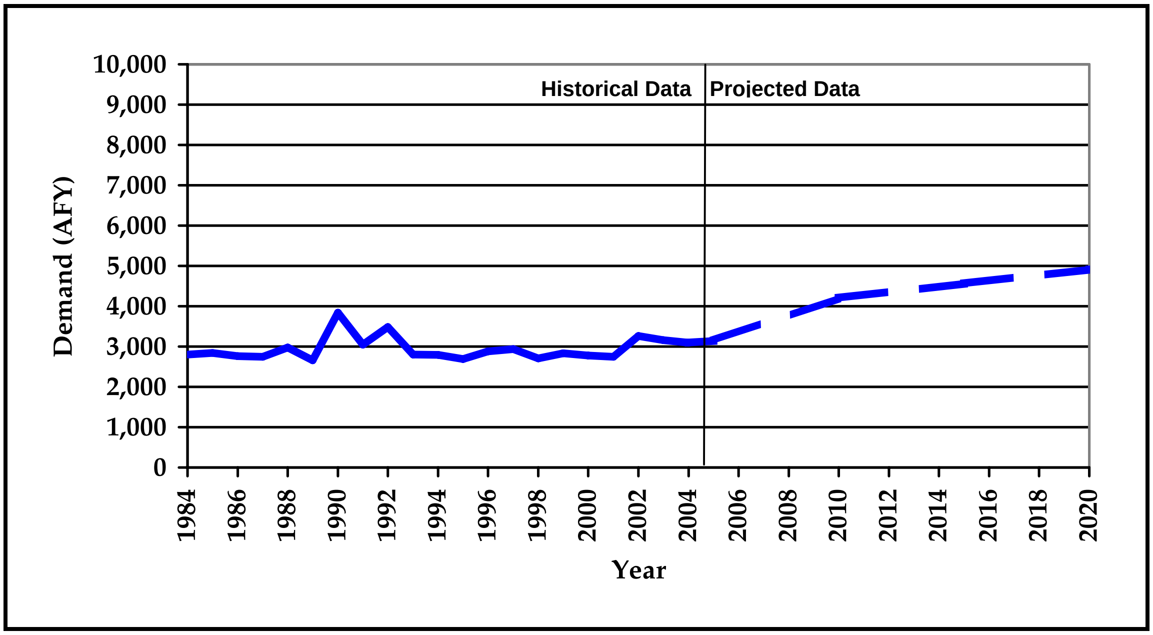


Figure 5.5 City of San Jacinto Water Service Area Historical and Projected Demand

5.2.5 SOBOBA TRIBE

Projected water demand for the Soboba Tribe is taken from the Settlement Agreement, assuming that the Settlement Agreement is implemented in 2008. Projected total demand is shown together with recent historical demand on Figure 5.6.

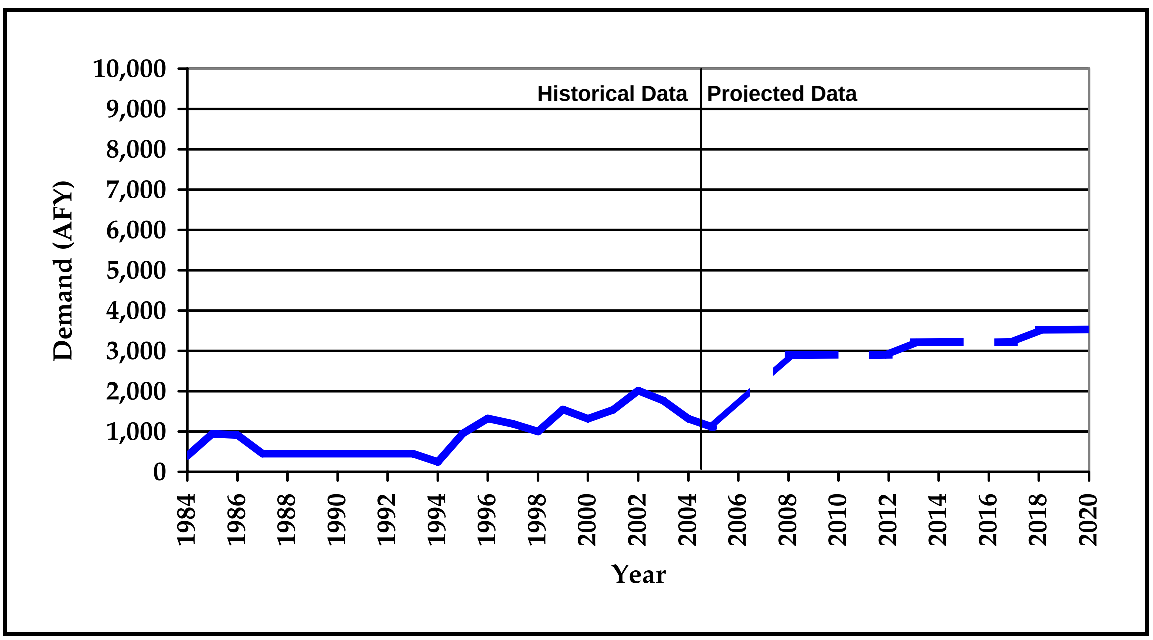


Figure 5.6 Soboba Tribe Historical and Projected Demand

5.2.6 Private Water Producers

Projected water demand for the Private Water Producers is a refinement of estimates presented in the Operational Yield Study (WRIME, 2003d) based on updated information on current and future development and their impact on water demand. Figure 5.7 shows the assumed future agricultural water use by local producers together with recent historical demand.

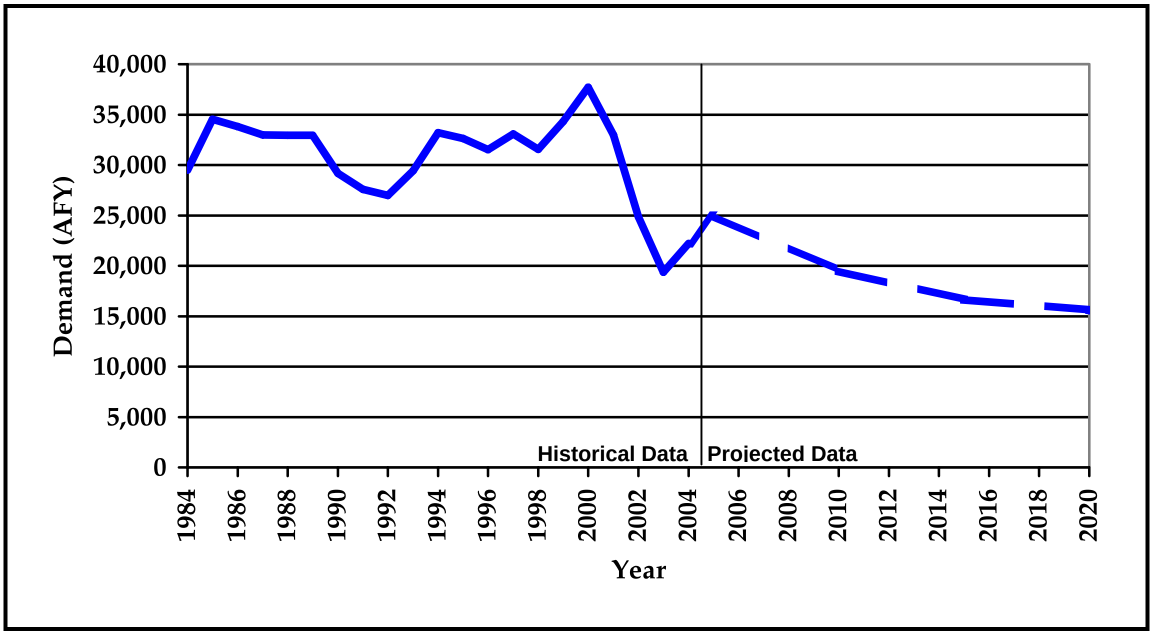


Figure 5.7 Private Water Producers Historical and Projected Demand

5.2.7 Management Area

Projected and historical water demand for the Management Area as a whole presented in Figure 5.8 as the sum of the demand for the individual entities presented in the previous subsections.

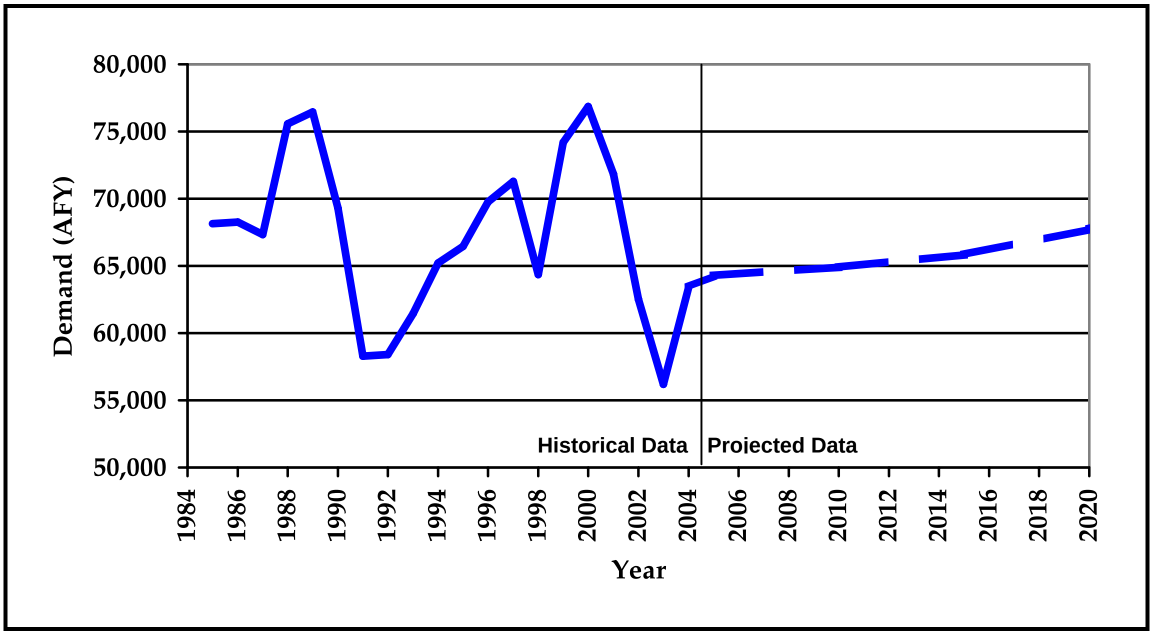


Figure 5.8 Management Area Historical and Projected Demand

5.3 FUTURE PLAN PHASES

The Integrated Recharge and Recovery Project is considered to be the core of the Physical Solution. The project is designed and implemented in two Phases. Phase I is described in Section 3 of this Plan. While Phase II facilities are described at the conceptual level, and the EIR is certified, there are additional projects that have been considered by the TC and will need to be evaluated for possible design and implementation. Following is a discussion of Phase II of the IRRP, along with other potential projects.

5.3.1 SAN JACINTO RIVER INTEGRATED RECHARGE AND RECOVERY PROJECT, PHASE II

Phase II of the project consists of construction of the remaining portions of the San Jacinto Integrated Recharge and Recovery Project. The information presented here is based on previously published documents adjusted based on the latest knowledge at the time of publication from ongoing negotiations with regulators. Phase II will provide up to 110 cfs of recharge water capacity and will cost approximately $50 million*. A schematic of Phase II is shown in Figure 5.9. Major activities during Phase II are:

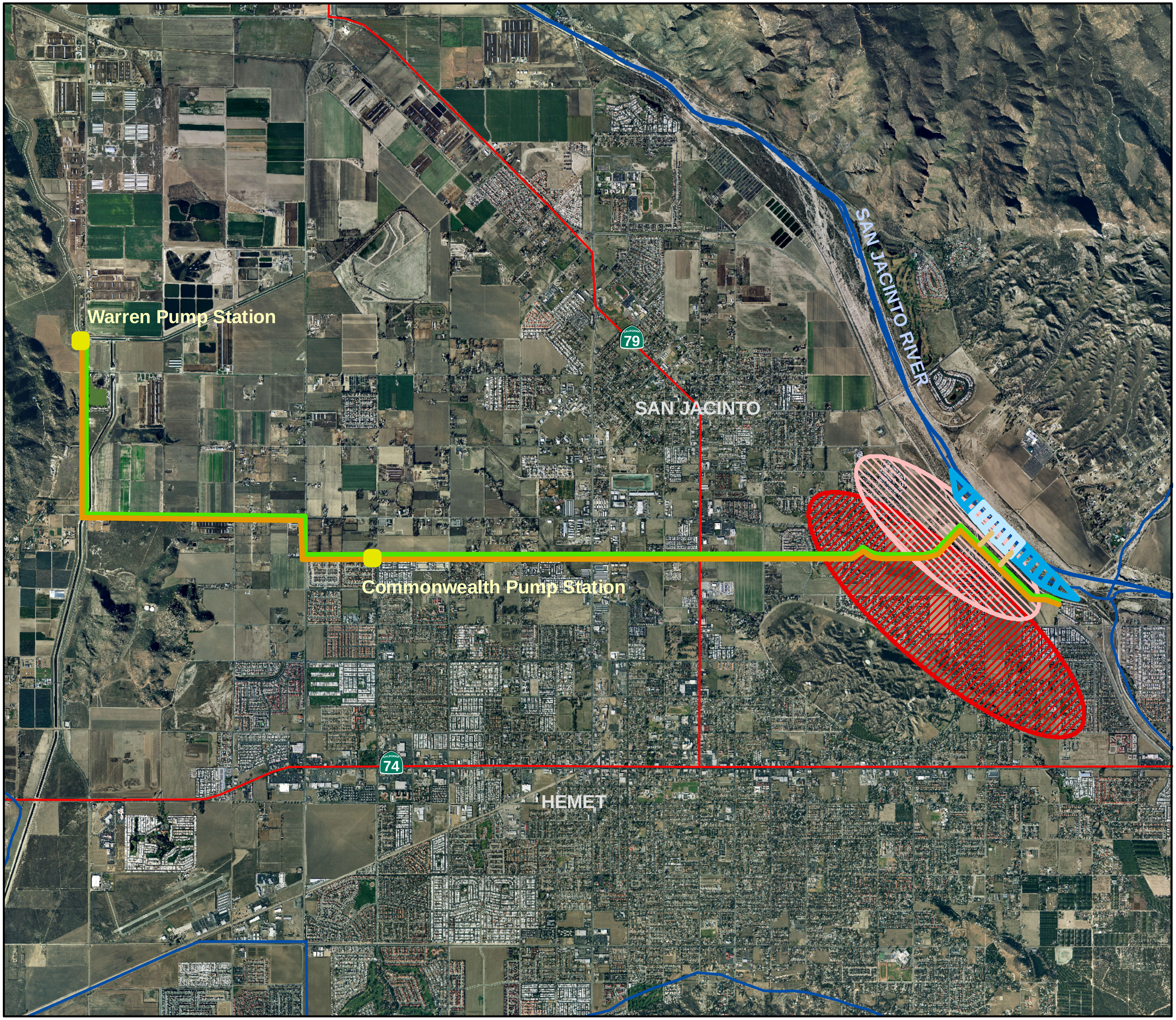
1. **Construction of Recharge Basins -** This activity includes construction of nine additional recharge ponds within the San Jacinto River bed in three clusters of

* Number has been updated since the publication of the IRRP Feasibility Report.

Hemet / San Jacinto
Water Management
Plan

Schematic of Integrated Recharge Recovery Program - Phases I and II

Figure 5.9



Legend

- Pump Station
- Phase I Pipeline
- Phase II Pipeline
- Phase I Ponds
- Phase II Ponds
- Existing Pipeline
- Phase I Well Field
- Phase II Well Field

Source: EMWD

N

0 0.5 1 Miles

October 2007

RIME

three basins each, covering approximately 35 acres. Combined Phases I and II will have 15 basins covering approximately 70 acres*.

2. **Construction of Pipelines -** This includes design and construction of a 7.7 mile water supply pipeline from the EM-14 turnout to the proposed recharge basins. Included is increasing the capacity of the EM-14 turnout structure from 40 cfs to 110 cfs; replacing 200 feet of 48-inch-diamater pipeline with 63-inch-diamater pipeline; constructing 15,800 feet of new 54-inch-diamater pipeline paralleling the existing 39-inch-diamater pipeline; and constructing 24,800 feet of new 57-inch-diameter pipeline paralleling the existing 33-inch-diamater pipeline.
3. **Pump Station Upgrades –** Upgraded or new pump stations would be built to increase capacity at the Warren Road and Commonwealth pump stations.
4. **Drilling of Extraction Wells -** This includes construction and testing of up to five additional extraction wells designed and operated identically to those constructed in Phase I. The construction of these new wells will result in a total of up to eight Phase I and II extraction wells.
5. **Design and Construction of Monitoring Wells –** Up to three additional monitoring wells will be constructed, bringing the total number of Phase I and II monitoring wells to up to six wells.

Only Phase I has been designed in detail and funding sources are being secured.

5.3.2 POTENTIAL CONJUNCTIVE USE PROJECTS

Conjunctive use is the coordinated operation of surface water storage and use, groundwater storage and use, and conveyance facilities to meet water management needs. This recognizes that there is a hydrologic connection between the surface water resource and the groundwater resource (DWR, 2006). In the Management Area, conjunctive use helps utilize available subsurface storage along with seasonally available water (imports and local surface water) or recycled water. Methods currently being considered include direct recharge and in-lieu recharge.

As part of the basin planning process, the TC identified and selected seven potential direct recharge sites and two potential in-lieu recharge projects for further evaluation and prioritization out of a pool of 15 direct recharge sites and two in-lieu projects initially considered. Further information is provided in *Hemet/San Jacinto Basin Assessment – Basin Assessment Report/Integrated Water Management Plan, Technical Memorandum No. 2, Analysis of Impacts of Conjunctive Use Projects* (WRIME, 2003c).

The recharge sites were selected based on screening criteria that included:

* Number has been updated since the publication of the IRRP Feasibility Report.

- General site characteristics (size, recharge needs, ownership, etc.),
- Hydrogeologic suitability,
- Sub-basin interaction,
- Engineering suitability,
- Land use suitability, and
- Environmental impacts.

The seven potential direct-recharge sites and two in-lieu projects are shown on Figure 5.10. In general, the direct recharge sites would utilize imported water, surface water, or recycled water to recharge the groundwater through surface spreading; the in-lieu projects (Upper Pressure In-Lieu Project and Hemet-Simpson CU Area) were designed to reduce the amount of groundwater production by delivering imported water, from either the Colorado River or the State Water Project, to be used in conjunction and coordination with local groundwater.

A preliminary description of the recharge sites is presented based on information from City of Hemet, City of San Jacinto, LHMWD, and EMWD, along with a brief review of available reports. Table 5.2 summarizes the findings for the nine potential projects. All findings are tentative planning-level data and should not be used in any intensive analysis without further research.

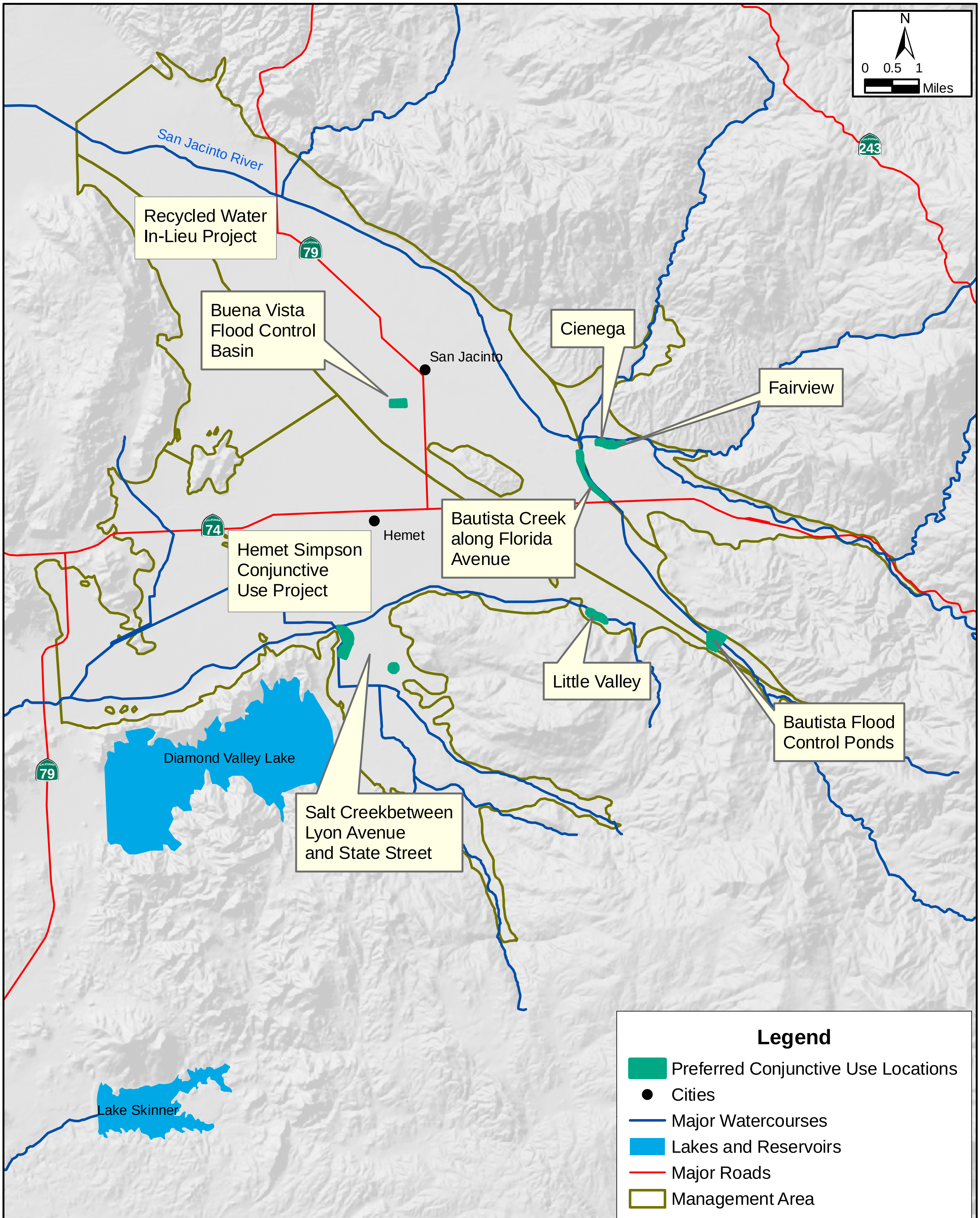
The identification of the potential sites allows for the concentration of future work on these sites. The future work includes:

- Evaluation of the general site conditions;
- Evaluation of water supply availability and reliability;
- Preparation of an environmental checklist; and
- Evaluation of the effectiveness of the projects in meeting the goals and objectives of the Management Area.

A more detailed description of each site is provided below.

5.3.3 Direct Recharge Projects

Direct recharge projects involve utilizing available imported, surface, or recycled water in a constructed basin for percolation to groundwater. Successful projects require a site with high permeability to allow for water to quickly percolate to groundwater; compatible nearby land uses; an available and accessible water supply; and the ability to either recapture the water or allow the water to raise groundwater levels. The Plan supports the use of direct recharge of water of suitable quality.



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Location of Nine Preferred Projects

Hemet / San Jacinto Water Management Plan

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Figure 5.10

Table 5.2 Summary of Selected Conjunctive Use Site Conditions

Site	Project Type	Water Source	Annual Water Availability	Soils Infiltration Rate	Approximate Depth to Water (ft)	Potential Constraints
Buena Vista Flood Control Basin	Recharge	Runoff, recycled, or imported	600 AF	n/a	200 – 250	Groundwater quality
Cienega	Recharge	River diversion	n/a	High	210 - 240	Kangaroo Rat, water rights
Fairview	Recharge	River diversion	n/a	High	210 - 240	Kangaroo Rat, water rights
Bautista Creek along Florida Avenue	Recharge	Irrigation water, Bautista Creek, imported	n/a	Moderate	n/a	n/a
Salt Creek between Lyon Avenue and State Street	Recharge	Salt Creek diversion/runoff	1,000 AF	Moderate	200 - 250	n/a
Little Valley	Recharge	Runoff, LHMWD flume, imported	n/a	High and variable	85	Potential archeological sites, shallow bedrock
Bautista Flood Control Ponds	Recharge	Surface runoff/ river diversion	n/a	n/a	180 - 210	No proponent
Upper Pressure In-lieu Project	In-lieu	Imported (Colorado River)	n/a		n/a	Must gain agreements between many parties
Hemet-Simpson Conjunctive Use Project	In-lieu	Imported (Colorado River and State Water Project)	n/a		n/a	Must gain agreements between many parties

5.3.3.1 Buena Vista Flood Control Basin

The existing Buena Vista flood control basin has been identified as a potential recharge project site. Buena Vista basin, located at the end of Buena Vista Street north of Esplanade Avenue, is located in the Upper Pressure Management Zone and is owned and operated by RCFC&WCD.

The site would initially use storm water for recharge purposes. Recharge water would be conveyed to the site from the 2,700-acre drainage area by existing drainage facilities that are owned by RCFC&WCD. It is estimated that approximately 600 AF of water could be delivered to the basin via runoff, with a first flush volume of approximately 20 AF. Surface water quality is good, with some elevated levels of oil and grease, suspended residues, and iron, based on sampling on March 6, 1992 (Singh, 1992). The basin can be enlarged through excavation to provide an additional 36 AF of storage volume, approximately equal to the average storm event runoff.

There is an existing EMWD raw water pipeline that runs nearby along Oakwood Street. This pipeline could potentially be used to supply the project with recycled or imported water (if supplies were to be available) in the future, although it would require the construction of an approximately 4,000-foot pipeline to connect to the basin.

The following items should be considered before moving forward with this project:

- Availability of the site for use and coordination with flood control needs;
- Surface water quality;
- Water infiltration potential;
- Deep percolation potential;
- Availability of imported water to augment surface runoff;
- Subsurface conditions; and
- The clogging potential of surface soils with local runoff.

5.3.3.2 Cienega and Fairview

The Cienega and Fairview sites are adjacent, thus conditions are essentially the same and described together. Preference between the two sites would be based on political, engineering, environmental, and operational factors.

The Cienega and Fairview sites are located in the Canyon Management Zone. Fairview was first used in the early 1990s by LHMWD. LHMWD cut basins near the riverbed and placed a diversion dam in the river. Water was diverted into the basins during the rainy season, typically the 1st quarter of the year. Future use of Fairview, potentially by LHMWD and/or EMWD, would likely involve an expansion of the basin area. Water would be supplied from the river during periods of increased flow, typically January through March. Imported water could also be used if water becomes available and the infrastructure could be built. Infiltration rates are considered high based on monitoring well responses during LHMWD's use, a study by EMWD at the Cienega blowoff pond, and the prevalence of coarse-sand riverbed deposits.

Potential problems for development of the project include San Bernardino Kangaroo Rat habitat, water rights, and limited available underground storage.

5.3.3.3 Bautista Creek along Florida Avenue

Bautista along Florida is located along the boundary between Upper Pressure and Canyon Management Zones. There is an existing recharge site located along the west side of Bautista Creek. The creek was placed in a concrete channel in the 1970s and 1980s, reducing recharge to the aquifer system. The current recharge facility was installed in the 1960s and consists of 3 ponds located along the creek. The three ponds cover approximately 15–20 acres. Future use of the site could include increasing the pond area through expansion to the north and increasing the supply of water to the ponds. Water for the existing project is provided by a turnout that captures agricultural runoff of acceptable quality from Bautista Creek. In general, creek water is not diverted into the ponds. Currently, approximately 200-300 AFY is recharged. Future recharge activities could take advantage of the nearby imported (State Project Water) raw water line on Cedar Avenue. Percolation rates at the site are considered reasonable based on field observations of surface sediments.

5.3.3.4 Salt Creek between Lyon Avenue and State Street

Two potential sites are identified along Salt Creek for a recharge project. One site, State Street Basin, is at the State Street crossing of Salt Creek; a second site, Lyon Basin, is downstream of State Street, near Lyon Avenue. Both sites are located in Hemet South Management Zone. Lyon Basin is the preferred location and is planned to be approximately 40 acres in size and approximately 5 feet deep, resulting in a maximum storage volume of 200 AF. The volume of the State Street Basin would likely be similar to that of the Lyon Basin. Both sites would initially use storm runoff for recharge purposes. Recharge water to both sites would be conveyed to the site via Salt Creek. It is estimated that five storm events per year could each fill the Lyon Basin, resulting in delivery of approximately 1000 AF/year for recharge. Anticipated future development of the watershed will likely increase the amount of available runoff. The State Street site would likely have slightly lower volumes due to its upstream location. Due to limited upstream development, water quality is anticipated to be good.

Potential problems for development of the project include water rights, relatively shallow depth to water and relatively shallow depth to bedrock that may limit the amount and rates of recharge at the sites.

5.3.3.5 Little Valley

Little Valley is located in Hemet South Management Zone. Previously in a pilot project, water was supplied over 2 or 3 years via a LHMWD flume to the area. Water for the recharge basin would be provided by local surface runoff, the LHMWD flume, or from imported water. Infiltration testing in the past has shown rates between 0.6 and 1.4 ft/day in the central part of the valley and 2.0 and 4.6 ft/day in the eastern part of the valley (Rees, 1994).

The following items should be considered before moving forward with this project:

- Potential environmental constraints including possible archeological sites; and
- Shallow depth to bedrock may limit the amount and rate of recharge at the site.

5.3.3.6 Bautista Flood Control Ponds

The Bautista Flood Control Ponds are located in the Upper Pressure Management Zone, very close to the boundary with the Hemet South Management Zone.

The existing ponds are owned and operated by RCFC&WCD and are comprised of a debris dam that creates the 49-acre pond. Future use of the site, apart from continued flood control, would likely be for water harvesting.

5.3.4 IN-LIEU PROJECTS

In-lieu recharge projects involve reducing the usage of groundwater and substituting it with available imported, surface, or recycled water. Successful projects require water users whose needs coincide with the availability and quality of the alternate water supply. The Plan supports the use of quality direct recharge projects.

5.3.4.1 Raw Water In-Lieu Projects

Imported raw water is available from MWD and provides opportunities for in-lieu recharge projects for agricultural users or landscape irrigation. Raw water is available from the State Water Project via EM-14 and from the Colorado River Aqueduct via EM-1. Proximity to these connections is an important factor for keeping costs low for in-lieu projects. One hurdle for such projects is that the period when there is the most availability of raw water, winter, coincides with the period of lowest demand for most agricultural users. Another hurdle is the need for blending the raw water with higher quality groundwater supplies to meet the needs of some of the more sensitive users, such as dairies.

5.3.4.2 Recycled Water In-Lieu Projects

Recycled water is a reliable source of water year round and offers an opportunity for in-lieu use. Public perception generally limits the usage of recycled water to agricultural and landscape irrigation uses. The nearest source of recycled water is the San Jacinto Valley Regional Water Reclamation Facility. Proximity to this source is an important factor for keeping costs low for in-lieu projects.

One project already in the planning stages would deliver between 3,500 and 8,000 AFY of recycled water to Rancho Casa Loma and the Scott Brothers Dairy, both located roughly between Ramona Expressway and Gilman Springs Road and between Sanderson Avenue and Bridge Street in the northwestern-most portion of the Upper Pressure and Hemet North Management Zones. The delivered recycled water would coincide with an equivalent reduction in groundwater pumping by both Rancho Casa Loma and Scott Brothers Dairy. Details of the project include construction of approximately 13,000 linear feet of 24-inch pipeline, and acquisition of property in fee title and easement. Project costs would be split between the Public Agencies based on the pro-rata share of proposed production rights. Agreements with Rancho Casa Loma and the Scott Brothers Dairy would set limits on groundwater production and provide for payment of a portion of the O&M costs.

5.3.4.3 Hemet-Simpson Conjunctive Use Project

Currently MWD delivers treated water from Colorado River and State Water Project to its wholesale customers using the Skinner Water Treatment Plant. Although the Skinner plant is at full capacity, during wet years there appears to be excess water available from the plant for other potential wholesale customers.

The Simpson pump station is currently capable of pumping water to both the west and east. The treated water available from the Skinner plant would be used by customers such as the City of Hemet in lieu of groundwater pumping. The Simpson pump station has a capacity of approximately 14.5 cfs.

The following issues and constraints should be evaluated for this project:

- Quantity and timing of water available from the Skinner Plant;
- Quality of Skinner Plant water in relation to the groundwater quality used by customers such as City of Hemet, and any blending issues;
- Use of chlorinated water from Skinner Plant versus well water that does not contain chlorine;

- Transmission pipeline from Skinner line to the Simpson pump station and from Simpson pump station to local distribution system;
- Connections to the local distribution system and their impacts on the distribution system pressure zones; and
- Cost of MWD water and the cost distribution of such delivery.

5.3.4.4 Hemet Water Filtration Plant

Availability of treated imported water for distribution, in-lieu of groundwater production, has become a significant source for reducing stress on the groundwater system. One of the limiting factors in the substitution of imported water for groundwater is the ability to treat the imported water, which requires more treatment than groundwater. To allow for increased use of imported water, EMWD is building the 10 mgd (11,000 AFY) Hemet Water Filtration Plant near the intersection of Commonwealth Avenue and Kirby Street in Hemet. The plant will utilize State Water Project supplies.

The purpose of this Section is to document the background and settings in establishing the groundwater production rights for each Public Agency. The Base Production Rights and the method for determining Adjusted Production Rights have been established in a collaborative manner among the agencies, and have been the basis for the distribution of costs in a number of occasions during the development of the Plan.

6.1 PUBLIC AGENCIES BASE PRODUCTION RIGHTS

6.1.1 General

Together, the Public Agencies agreed upon some basic principles as a basis for allocating Base Production Rights. The base period for documenting actual pumping was determined to be calendar years 1995 through 1999. Figure 6.1 shows the average annual groundwater production by each Public Agency for 1995 – 1999. It was also recognized that, as a result of various operational activities of the Public Agencies, several adjustments would need to be made to the raw pumping data for 1995-1999. It was ultimately agreed to finalize all appropriate adjustments and to make one comprehensive adjustment to each Public Agency's raw 1995-1999 recorded pumping.

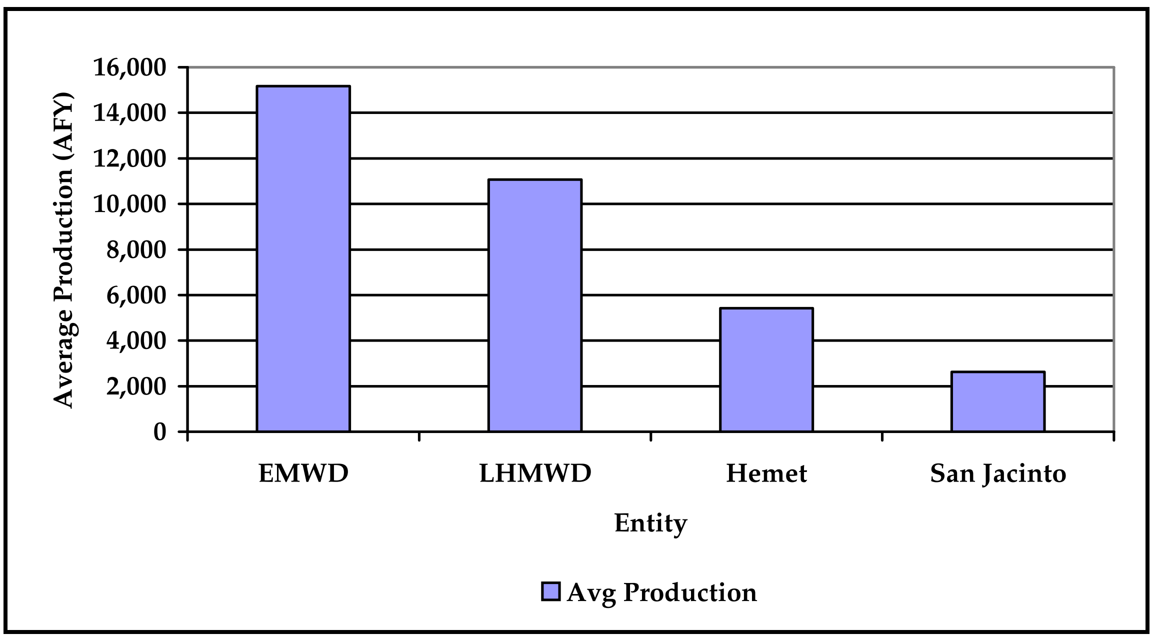

Figure 6.1 Average Annual Groundwater Production, 1995 - 1999

The operational activities that impacted groundwater resources, and therefore were used to make appropriate adjustments to raw 1995-1999 pumping data, include:

- Recharge Activities;
- MWD San Jacinto Tunnel Seepage;
- Fruitvale Entitlement Water Sold by EMWD to LHMWD, City of Hemet and City of San Jacinto;
- River Diversions;
- Conveyance Water Deliveries; and
- Other Considerations.

The Fruitvale Entitlement allocation amount was determined to be a total of 597 acre-feet for LHMWD, and Cities of Hemet and San Jacinto. The Tunnel Seepage allocation amount was determined to be 1,800 AFY, and the river diversions were determined to be 3,635 AFY for pro-ration to the four agencies. The Public Agencies have, therefore, been assigned the pro-rata shares of Base Production Rights as shown in Table 6.1:

Table 6.1 Base Production Rights

Public Agency	Base Production Rights (AFY)	Base Production Rights (Percent)
EMWD	10,869	33.7%
LHMWD	11,063	34.2%
City of Hemet	6,320	19.6%
City of San Jacinto	4,031	12.5%
Total	**32,283**	**100 %**

The details of the Public Agencies Base Production Right, with their corresponding adjustments, are described below:

6.1.2 EMWD Base Production Rights

For EMWD, the 1995-1999 actual average annual pumping was determined to be 15,166 AFY. After consideration of all appropriate adjustments, it was determined that EMWD’s Base Production Right would include a deduction of 2,497 acre-feet for conveyance water and an additional net deduction of 1,800 acre-feet for other operational activities, including tunnel seepage, export, and Fruitvale Entitlement water sales. Therefore, EMWD’s Base Production Right was set at 10,869 AFY.

6.1.3 LHMWD Base Production Rights

For LHMWD, the 1995-1999 actual average annual pumping was determined to be 11,063 AFY. There were no net adjustments for LHMWD as their credit for the Fruitvale entitlement water purchase tunnel seepage was deemed to be equivalent to their surface water diversion. Thus, the Base Production Right for LHMWD is set to 11,063 AFY.

6.1.4 City of Hemet Base Production Rights

For the City of Hemet, the 1995-1999 actual average annual pumping was determined to be 5,420 AFY. After consideration of all appropriate adjustments, it was agreed that the City of Hemet's Base Production Right would include an additional 900 AFY pumping right to account for Fruitvale Entitlement water purchase tunnel seepage credit, and surface diversion water. Therefore, the City of Hemet's Base Production Right was set at 6,320 AFY.

6.1.5 City of San Jacinto Base Production Rights

For the City of San Jacinto, the 1995-1999 actual average annual pumping was determined to be 2,631 AFY. However, review of the city's historic pumping showed the 1995-1999 base period was not as representative as other historic pumping periods. Therefore, it was agreed for the City of San Jacinto to receive an additional 500 AFY of pumping rights. In addition, after consideration of all other appropriate adjustments, it was determined that San Jacinto's Base Production Right would include an additional 900 AFY pumping right to account for Fruitvale Entitlement water purchase tunnel seepage credit and surface diversion water. Therefore, the City of San Jacinto's Base Production Right was set at 4,031 AFY.

6.2 PRIVATE WATER PRODUCER'S PRODUCTION RIGHTS

6.2.1 General

Development of the Hemet-San Jacinto Water Management Plan recognizes the rights of the overlying pumpers to pump and beneficially use needed groundwater. The overlying pumpers within the management area include Private Water Producers (and the Soboba Band of Luiseño Indians, discussed later). In recognition of the Private Water Producers' overlying rights, the management plan does not adversely impact or affect these rights and uses that are consistent with historical uses.

The Plan provides for the Private Water Producers to be Non-participants, Class A Participants, or Class B Participants. For Non-participants, the private producer(s) may elect to not participate and/or not acknowledge the Plan's existence. Non-participants are free to continue their past practices of pumping groundwater for beneficial uses according to state law. Non-participants are also excluded from future participation in the Plan. Class A and Class B Participants are described below.

6.2.2 CLASS A PRODUCTION RIGHTS

Class A Participants in the Plan have agreed to cooperate with the administrative and pumping accounting portions of the Plan. While historic pumping and beneficial uses may continue, the Class A Participants' pumping facilities are subject to metering, testing, and water level and water quality sampling at no cost to the owner. This information is valuable for successful implementation of the Plan. Class A participants are eligible to convert to Class B Participant status during the first three years of formal Plan implementation (Entry of the Judgment), with the payment of all past assessments (without interest) that would have been incurred as a Class B Participant.

6.2.3 CLASS B PRODUCTION RIGHTS

Class B Participants become participants to the Plan and have their water rights determined. The annual Base Production Right shall be determined based upon the average annual production from 1995 to 1999, less any amount of water that had been used on land that was developed for non-agricultural purposes after 1999, which is the Participant's Base Production Right. The Class B Participant shall pay Replenishment Water Assessments for pumping in excess of the individual Base Production Right. Class B Participants are not subject to Administrative Assessments, and until conversion to a Public Agency, not subject to reduction in Safe Yield. Class B Participants may sell or lease unused groundwater to the Watermaster or one of the Public Agencies, under terms and conditions approved by the Watermaster. Upon conversion of a Class B Participant's land from agricultural to a use that requires water service from a Public Agency, the Public Agency shall credit, to the extent legally permissible, the Class B Participant's Base Production Right, adjusted pursuant to certain reductions, against any requirement then in effect for any water supply assessment requirements, or against any fees associated with water supply that the Public Agency may then have in effect. The Public Agency serving the converted land shall receive a credit added to its Base Production Right as set forth in the Judgment. Class B Participants to the Plan have also agreed to participate in the groundwater monitoring and pumping accounting portion of the Plan, at no cost to the owner.

6.3 SOBOBA TRIBE WATER RIGHTS

Section 8 of this document provides a detailed description of the Soboba Indian Tribe water rights.

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This Section provides a description of the surface water rights and licenses held by LHMWD and EMWD. The contents of this Section are provided for general information and documentation of the surface water rights only; such rights are not affected by the Stipulated Judgment or this Plan.

7.1 LHMWD'S DIVERSION RIGHTS

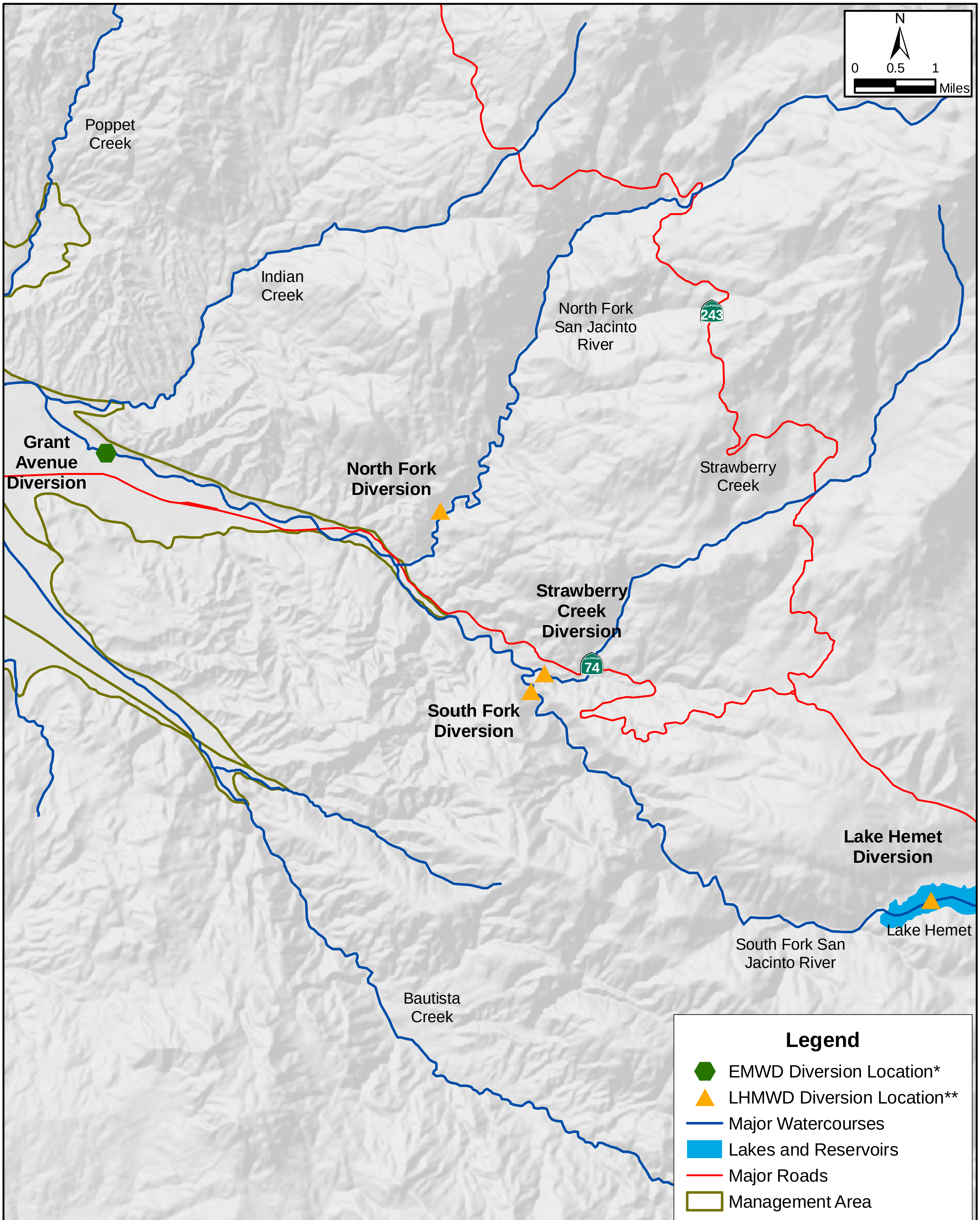
LHMWD holds pre-1914 rights to divert and store water in Lake Hemet, and to divert water from Strawberry Creek, and from the North and South Forks of the San Jacinto River (See Figure 7.1). These rights have been acquired as the successor-in-interest to rights established by the Fairview Land and Water Company, the Lake Hemet Company, the Lake Hemet Water Company, the Florida Water Company, Charles Thomas, H. M. Johnston, E. L. Mayberry, W. F. Whittier, William B. and Mary Webster, and others.

7.1.1 LAKE HEMET

Construction of Lake Hemet Dam began in 1889 and was completed in 1895. The reservoir is located in Township 6S, Range 3E, Sections 7 and 8. Water rights for the diversion and storage of water are based on actual use and upon at least these Notices of Appropriation filed on November 18, 1884 in Book 1 of Water Claims, page 38; on January 19, 1885 in Book 1 of Water Claims, page 47; on December 23, 1885 in Book 1 of Water Claims, page 115; on April 7, 1886 in Book 1 of Water Claims, page 134; and on October 18, 1890 in Book 2 of Water Claims, page 61. The reservoir impounds water from Hurkey Creek and the South Fork of the San Joaquin River, and has a capacity of 12,775 acre-feet. Releases from the reservoir are discharged into the South Fork of the San Jacinto River.

7.1.2 SOUTH FORK OF THE SAN JACINTO RIVER

This diversion site is located about a quarter of a mile upstream of the river's confluence with Strawberry Creek. A wooden diversion dam was originally constructed in 1888, but later replaced with a concrete diversion dam, taking water through a tunnel on the right bank of the stream into a 30-inch pipeline. Water rights are based on actual use and upon at least these Notices of Appropriation filed on June 6, 1885 in Book 1 of Water Claims, page 61; on August 11, 1886 in Book 1 of Water Claims, page 160; and on the Judgment entered



WRIME

Location of Surface Water Diversions

Hemet / San Jacinto Water Management Plan

*Source: EMWD
**Source: LHMWD

October 2007

Figure 7.1

November 24, 1894 in the case of Florida Water Company v. Mary Webster, et al., No. 169, Riverside Superior Court.

7.1.3 NORTH FORK OF THE SAN JACINTO RIVER

This diversion site is now located on the North Fork of the San Jacinto River near the "Falls" in Section 17, T5S, R2E. The original facilities consisted of a small rock dam and a 10-inch sheet iron pipe constructed in about 1887. Current facilities, constructed in 1969-1970, consist of a concrete diversion dam, concrete intake and control structure, and 24-inch steel pipeline. Water rights are based on actual use and upon at least these Notices of Appropriation filed on September 14, 1886 in Book 1 of Water Claims, page 173; on May 19, 1897 in Book 1 of Water Claims, page 159; and on the Judgment described above.

7.1.4 STRAWBERRY CREEK

LHMWD's diversion site on Strawberry Creek is located in Section 28, T5S, R2E, about 1,300 feet upstream of its confluence with the South Fork of the San Jacinto River. Original construction of a concrete diversion dam and flume, carrying the water over the South Fork and into the main water line, occurred in about 1905. Current facilities consist of a concrete diversion dam, intake structure, and 28-inch pipeline. Water rights are based upon actual use and at least on these Notices of Appropriation filed on January 27, 1885 in Book 1 of Water Claims, page 49; on August 11, 1886 in Book 1 of Water Claims, page 160; and on deeds recorded July 24, 1885 in Book 51, page 145; on August 25, 1886 in Book 64, page 223; on February 21, 1887 in Book 73, page 235; on April 21, 1887 in Book 79, page 264; on April 27, 1887 in Book 79, page 266; and on the Judgment described above.

7.2 EMWD'S DIVERSION RIGHTS

EMWD holds a license to divert water from the San Jacinto River (see Appendix G). EMWD currently does not divert surface water for direct use, but recharges the water, when available, into the aquifer to augment groundwater supplies. Thus, the diversion is not directly part of EMWD's water supply. However, it plays an indirect role in groundwater resources. Information on these diversions is presented here.

EMWD's recharge of surface water from the San Jacinto River to the Canyon Management Zone takes place at EMWD's Grant Avenue Ponds in the Valle Vista area (See Figure 7.1). An application for a permit to appropriate water from the San Jacinto River and Indian Creek, Application 924, was filed on February 14, 1918 by the Citizens Water Company. Permit 468 was subsequently approved on August 15, 1918. On November 23, 1920, the filing was assigned to the FMWC as the successor-in-interest to the Citizens Water Company. Upon its 1971 acquisition of the FMWC, EMWD became the successor-in-interest to the filing.

Based on Application 924 and Permit 468, the State Water Resources Control Board issued License No. 10667 for the Diversion and Use of Water to EMWD on June 8, 1976. This license, still held by EMWD, allows for the diversion, underground storage by spreading, and subsequent extraction and beneficial use of 5,760 AFY of San Jacinto River water to be collected from November 1 of each year to June 30 of the succeeding year at a rate of 41 cfs. Additionally, the rate of diversion may be increased to a maximum of 100 cfs provided that the total quantity in any 30-day period does not exceed 2,442 AF.

SECTION 8 SOBOBA TRIBE SETTLEMENT REQUIREMENTS

8.1 ORIGINAL SOBOBA CLAIM

In 1995 the Soboba Tribe filed claims against EMWD and LHMWD for an alleged infringement of their water rights, and for damages in the sum of $70 million related to the alleged historical interference with the Tribe's rights and the unauthorized use of its water. EMWD and LHMWD denied any such interference or wrongful use of Tribal water, but agreed to negotiations to determine the water rights of the Tribe.

8.1.1 EARLY NEGOTIATIONS

Negotiations with the Tribe began in 1995 and in time involved the active participation of the United States.

8.1.2 UNITED STATES SETTLEMENT PROPOSAL

In 1998, the United States proposed a settlement whereby the Tribal Water Right would be determined to be 9,000 AFY, and the Federal government would provide a supply of 7,500AFY. Subsequently this proposal proved not to be feasible.

8.1.3 TRIBAL CLAIM AGAINST MWD

In 2000 the MWD was brought into the dispute when the Tribe filed suit against MWD in the U.S. District Court in Los Angeles, Case No. 00-04208 (GAF) (MANx) ("Los Angeles case"). The complaint alleged that the MWD tunnel drilled through Mt. San Jacinto in the 1930's had dried up springs on the Reservation and otherwise interfered with the Tribe's water supply.

8.1.4 MWD'S CROSS COMPLAINT

MWD brought EMWD into the Los Angeles action based upon an indemnity agreement signed by EMWD when the District was annexed to MWD, and in return for seepage water that continued to flow into the San Jacinto tunnel.

8.1.5 Final Negotiations

After lengthy negotiations among the Tribe, United States, EMWD, LHMWD and MWD, the parties reached an Agreement in 2004, subject to approval of Congress.

8.1.6 Status of Congressional Approval

The Agreement has not yet been approved by Congress, and it expires if such approval is not obtained by December 31, 2007.

8.2 FRAMEWORK OF THE SETTLEMENT AGREEMENT

The Agreement determines the water rights of the Tribe, and settles all claims among the parties, including those made in the Los Angeles case. The Agreement will be incorporated into a Stipulated Judgment in the Los Angeles case, and made subject to the continuing jurisdiction of the Court.

8.3 TRIBAL WATER RIGHT

Under the Agreement, the Tribe has a prior and paramount right, superior to all others, to pump 9,000 acre-feet annually from the Canyon Sub-basin and the Intake portion of the Upper Pressure Sub-basin for any use on the Reservation, and on lands now owned or hereafter acquired by the Tribe contiguous to the Reservation or within the above-mentioned Sub-basins. The Tribe's right is subject to an agreement to limit its pumping according to a yearly schedule, with a maximum of 4,100 AFY, for 50 years after the effective date of the Agreement.

8.4 PAYMENTS TO THE TRIBE

The United States agrees to pay $11 million to the Tribe, and EMWD and LHMWD are obligated to pay $17 million to the Tribe.

8.5 FUNDS RECEIVED BY THE LOCAL AGENCIES

The United States agrees to contribute to EMWD, on behalf of the participants in this Water Management Plan, the sum of $10 million for construction and operation of recharge facilities to accommodate deliveries of Imported Water.

8.6 IMPORTED WATER

MWD agrees to provide an average supply of 7,500 AFY of Imported Water to recharge the Canyon Management Zone and Intake portion of the Upper Pressure Management Zone, at untreated replenishment rates, until 2035, and to negotiate in good faith for an extension of the supply for a total of 50 years after the effective date of the Agreement.

8.6.1 MWD STORAGE RIGHT

The local agencies are obligated to provide groundwater recharge facilities to accommodate a flow rate of 42 cfs and to store up to 40,000 acre feet of Imported Water.

8.6.2 USE OF MWD SUPPLY

The supply of Imported Water provided by MWD is to supply water for the Tribe, and to reduce overdraft. Water not used by the Tribe is available for use by the participants in the Water Management Plan, pursuant to the terms hereof.

8.7 WATER QUALITY REQUIREMENTS

The Agreement provides that all water recharged shall conform to all applicable State water quality regulations and recharge in the Canyon Sub-basin and shall not exceed Federal or State primary or secondary drinking water quality standards (except for turbidity, color or coliform bacteria), nor 0.3 mg/l boron, or 0.05 mg/l lithium.

8.8 PROPERTY TRANSACTIONS

EMWD shall convey to the Tribe approximately 106 acres of land at Domenigoni Parkway and Highway 79. MWD shall convey to the Tribe approximately 21.7 acres of land. LHMWD shall make available for environmental mitigation purposes approximately 12 acres in the San Jacinto River bed. The Tribe shall make available up to 98 acres of land for habitat preservation and/or environmental mitigation in connection with the recharge facilities.

8.9 APPROVAL OF WATER MANAGEMENT PLAN

The Agreement provides that EMWD and LHMWD, with the cooperation of other groundwater producers, shall develop and implement a Water Management Plan for the Canyon

Management Zone and Intake portion of the Upper Pressure Management Zone that will address the current overdraft, and recognize and take into account the Tribal Water Right. This Plan is intended to meet such requirements of the Agreement, and is subject to the approval of the Soboba Tribe and the United States. No implementation or subsequent modification of this Plan shall threaten or adversely affect the rights of the Tribe under the Agreement, and the Tribe and the United States shall have the right under the continuing jurisdiction of the Court in the Los Angeles case to litigate any such issue.

9.1 PURPOSE

The purpose of the Watermaster is to implement the Water Management Plan (The Plan) as embodied in the Stipulated Judgment (JUDGMENT) in Eastern Municipal Water District v. Lake Hemet Municipal Water District, et al.; said implementation may be by Watermaster actions alone, actions undertaken through or in conjunction with one or more Public Agency Members or through a Joint Powers Authority (JPA) composed of some or all of its Public Agency Members.

9.2 WATERMASTER

9.2.1 COMPOSITION

The Watermaster Governing Board will consist of one (1) elected official representing each of the Public Agencies, namely, EMWD, LHMWD, and the Cities of Hemet and San Jacinto (collectively, Public Agencies), and one (1) representative selected by the Class A and Class B private groundwater producers (Private Water Producers).

9.2.2 TERMS OF OFFICE

Each member of the Watermaster shall serve until replaced by the Public Agency or Private Water Producers that made the original appointment.

9.2.3 REMOVAL AND REPLACEMENT

Any Watermaster member may be removed and replaced by the same procedure used in his or her appointment.

9.2.4 VOTING

Each member of the Watermaster shall have one (1) vote. All actions by the Watermaster shall require three (3) affirmative votes, except actions in the following matters that shall require four (4) affirmative votes:

- Any change sought in the form of governance;

- Any change in voting requirements;
- Establishing, levying, increasing or decreasing all assessment amounts;
- Determining the extent of overdraft and quantifying safe yield;
- Determining Adjusted Production Rights;
- Decisions regarding the financing of supplemental water or facilities, other than any financing provisions included in the Judgment;
- Decisions regarding ownership of facilities, other than ownership of the Phase I facilities (described in Section 3.2.2.1), which facilities shall be owned by EMWD, subject to a right of use by those parties participating in the financing thereof;
- Policies for the management of the Management Area;
- Any decision that involves a substantial commitment by the Watermaster, including any contracts for conserved water;
- Retaining the services of legal counsel or Advisor; and
- Adoption or amendment of an annual budget.

9.3 RULES AND REGULATIONS

The Watermaster may make such rules and regulations as may be necessary for the implementation of the Water Management Plan and Judgment, and for its own operations and procedures, subject to Court approval.

9.4 MEETINGS

The meetings of the Watermaster and standing committees will be subject to those provisions of the California Government Code known as the Brown Act (also popularly known as the Open Meeting Laws).

9.5 WATERMASTER ORGANIZATION

In carrying out its development and implementation responsibilities, the Watermaster may hire full-time or part-time personnel, such as managers, engineers, attorneys, hydrologists, geologists, accountants, operators, secretaries, clerical or others; may retain outside consultants on a full-time, part-time, or as-needed basis; and may contract with other agencies to perform some or all of the development and implementation tasks.

The Watermaster shall retain the services of an independent attorney or law firm to act as the Watermaster's legal counsel.

The Watermaster shall retain the services of a qualified independent individual or engineering firm with appropriate experience in hydrology to serve as Advisor to the Watermaster. The Advisor shall assist the Watermaster in the performance of the Watermaster's responsibilities as follows:

- Provide advice to the Watermaster on all matters within the authority and jurisdiction of the Watermaster;
- Provide recommendations for action to the Watermaster on all matters within the authority and jurisdiction of the Watermaster;
- Evaluate proposals for projects and/or recommendations for action received from members of the Watermaster regarding matters within the authority and jurisdiction of the Watermaster;
- Propose and/or evaluate contracts and other agreements to be entered into by the Watermaster necessary to the performance of its responsibilities;
- To administer all contracts and agreements entered into by the Watermaster;
- Assist the Watermaster in evaluating and analyzing data, the collection of which is required under the Judgment and/or Water Management Plan;
- Coordinate the evaluation and analyses of data, proposals, projects, and recommendations by the TC with members of the Watermaster and other consultants of the Watermaster;
- Serve as the Chairman of the TC; and
- Perform such other services, and take such actions, as may be approved by the Watermaster, that are necessary to implement and execute the directions and policies of the Watermaster.

The Watermaster retains the authority to assign or contract the performance of any task or function necessary to consider or perform any matter within the authority and jurisdiction of the Watermaster to any member of the Watermaster, the TC, or any other independent engineering firm or qualified individual. Such assignment or contract shall be coordinated and administered by the Advisor.

As used herein, the term independent means that the Consultant's or Advisor's representation of the Watermaster does not create any actual or potential conflict of interest between the Consultant or Advisor and any other member entity under applicable California statute, regulation, or court decision, or under the common law. Nothing in this definition shall prohibit the Watermaster and affected entity, after appropriate vote, from waiving such conflict in writing.

9.6 GENERAL DUTIES

The general duties of the Watermaster in order to implement the Judgment fall into three categories, as follows:

9.6.1 POLICY

The Watermaster is responsible for the administration of the Judgment and for the development of policies necessary to carry out the implementation of the Water Management Plan, and for additions and modifications thereof.

9.6.2 WATER MANAGEMENT PLAN IMPLEMENTATION

The Watermaster shall implement a water management plan; its responsibilities in that regard include the following:

- Calculating and making determinations regarding the following: (i) safe yield of the Management Area; (ii) each member's share of safe yield; (iii) necessary reductions in each member's Base Production Right to ensure production ultimately equals safe yield; (iv) unused storage capacity which may be used for put and take operations of recycled or imported water; and (v) whether replenishment of exported water is accomplished with an appropriate amount of similar or better quality water.
- Approving projects to be undertaken by the Watermaster in collaboration with member entities as proposed by members of the Watermaster or by the Advisor.
- Providing for the recharge of the Management Area. This includes: (i) implementing a replenishment program for the Management Area; (ii) acquisition of supplemental water supplies (imported, recycled, and Soboba Tribe water); and (iii) providing for the construction and operation of all necessary facilities (including surface and sub-surface percolation and injection facilities).
- Determining the amount of, and levying, billing, and collecting the administrative and replenishment assessments.
- Budgeting and appropriating funds collected by or on behalf of the Watermaster and paying, or authorizing the payment of, costs and expenses of the Watermaster consistent with the Judgment and Water Management Plan.
- Initiating and performing such planning and study activities as may be necessary to implement the Judgment and Water Management Plan, including, but not limited to, preparation of a Watermaster's Annual Report.

- Initiating necessary conservation and drought management measures, and developing water conservation agreements with the Private Water Producers and/or Soboba Tribe for local conservation measures.
- Identifying and participating in the in-lieu replenishment projects.
- Performing all other tasks and taking all other actions as may be necessary to carry out the purpose and intent of the Judgment and the Plan.

9.6.3 Technical Oversight

9.6.3.1 Technical Committee Composition

The Stipulated Judgment provides for the operation of a TC, consisting of representatives named in a written designation by EMWD, LHMWD, the Cities of Hemet and San Jacinto, and the Private Water Producers (as one entity). The representative(s) of an entity may be changed by that entity by written notice of the change to the Watermaster.

9.6.3.2 Technical Committee Purpose

The TC will provide such technical assistance as the Watermaster may request and should make recommendations to the Advisor and to the Watermaster on all matters requiring four votes for Watermaster action as outlined in the Voting section above, and on such other matters as requested by the Watermaster. The TC members shall also keep their respective City Councils and Boards of Directors of the Public Agency parties and the Private Water Producers fully informed about the implementation of the Plan.

9.6.3.3 Technical Committee Chairperson

The Advisor will act as the TC's Chairperson and fulfill all the necessary administrative functions required on behalf of the TC.

9.6.3.4 Technical Committee Costs

Costs incurred by individual TC members are the responsibility of the entity appointing that member, and Watermaster funds cannot be used to cover the costs and expenses incurred as a result of the TC activities and functions.

9.7 WATERMASTER INTERACTION WITH EMWD

9.7.1 CONTRACT FOR SERVICES

The Watermaster will contract with EMWD to provide the following services:

- Collection and maintenance of all production, water level, water quality, and other technical data necessary under or required by the Water Management Plan and the transmittal of such data to the Watermaster, its Advisor, and the TC as directed by the Watermaster; the foregoing shall not restrict the Watermaster from entering into other agreements with other members of the Watermaster and/or private firms and individuals for the collection of data.
- Obtaining imported water from MWD or other sources as requested by the Watermaster for replenishment or direct delivery; the foregoing shall not restrict the Watermaster's ability to enter into other agreements with other members of the Watermaster and/or private firms and individuals for the purchase and delivery of imported and/or supplemental water.
- Construct and operate the Phase I facilities (existing EMWD facilities, expansions thereof, and newly constructed facilities) in a manner consistent with the Water Management Plan.
- Perform the accounting functions necessary under the Judgment, i.e., the levy, billing, and collection of all assessments provided for under the Judgment; the payment of costs and expenses of the Watermaster; and related and required accounting and related functions. All funds collected shall be held in a segregated account. All expenses and disbursements shall be separately accounted for. The foregoing shall not restrict the Watermaster from entering into other agreements with other members of the Watermaster and/or private firms and individuals to perform some or all of the accounting functions.

9.7.2 FINANCIAL RESPONSIBILITIES

EMWD will establish restricted accounts and hold all funds collected on behalf of the Watermaster separate from other EMWD funds. All expenditures, encumbrances, and use of funds from these accounts are subject to Watermaster authorization and will be limited to activities related to the Plan. EMWD will transmit periodic reports regarding its financial activities to the Advisor, including annual reporting summarizing the preceding fiscal year financial activities for the approval of the Advisor and the Watermaster.

10.1 ANNUAL BUDGET

The Advisor shall prepare an Annual Budget for review, approval, and adoption by the Watermaster. This Budget shall identify each Public Agency member's financial obligations and assessments and a description of budgeted expenditures, including:

- Replenishment water purchase;
- Operation and maintenance;
- Data collection and evaluation;
- Plan implementation administration;
- Project planning and reporting;
- Billing and assessment collection;
- Capital facilities financial obligations; and
- Preparation of an Annual Audit.

10.2 OWNERSHIP OF FACILITIES

Each Public Agency will continue to own its existing capital facilities for water management. However, in some situations, it may be necessary and/or convenient to form a JPA to finance and build specific capital facilities. Responsibility for the cost of any existing and future capital facilities of the Management Plan should be apportioned among the Public Agencies based on relative benefit to be derived by each Public Agency.

10.2.1 EXISTING FACILITIES

The existing groundwater recharge facilities in the Management Area are owned by EMWD. The Phase I project which is an upgrade of the existing recharge facilities is defined in Section 3.2.2 of this document, and EMWD will own these upgraded facilities. However, the use of the upgraded facilities and the benefits of the low-cost MWD water deliveries through this system will be shared by all agencies based on the level of construction funding contributions for the Phase I facilities and level of participation in the Soboba Settlement financing.

10.2.2 FUTURE PROJECTS

Any of the participating Public Agencies may propose water supply projects to the Watermaster for inclusion in the Plan. Such proposals, after evaluation by the Advisor and the TC, shall be presented to the Watermaster for approval or rejection. If the Watermaster chooses to reject the proposal, the proposing Public Agency may implement the rejected project as long as it does not significantly impact the implementation of the Plan and/or interfere with ongoing groundwater production by the Public Agencies.

10.2.3 USE OF MEMBER AGENCY ASSETS

It is the intent of the Member Agencies that their respective facilities shall be used in a manner that facilitates the implementation of the Plan, on terms that are equitable to all parties and consistent with each agency's obligations to its customer base.

10.3 ASSESSMENTS

Public agencies participating in the Plan are subject to two different assessments:

- Administrative Assessment; and
- Replenishment Assessment.

The purpose and use of these assessment funds are described in the following two sections:

10.3.1 ADMINISTRATIVE ASSESSMENTS

Administrative Assessments will be levied on each acre-foot pumped by each Public Agency up to the agency's Adjusted Production Right. These assessments can be used to pay costs associated with:

- Advisor's activities and his/her administrative expenses;
- Billing and assessment collection costs;
- Data collection and evaluation projects;
- Plan implementation administration, including monitoring plan, and associated salaries and overhead; and
- Project planning and reporting expenses.

Initially, the Administrative Assessment shall be Fifty Dollars ($50.00) per AF, subject to adjustment by the Watermaster.

At the discretion of the Watermaster, any excess funds not used for the above expenditures at the end of the fiscal year can be used to purchase, deliver, and recharge the groundwater within the Management Area. These recharge waters are above and beyond groundwater replenishment waters purchased using the replenishment assessments, and should not be credited to individual Public Agencies as part of their required replenishment obligations. This shall not prohibit the development of a program or plan to provide credits for water purchased above and beyond that needed to satisfy a party's replenishment obligation.

Subject to the Watermaster's approval, funds may also be used to acquire and deliver water for direct use in lieu of pumping.

10.3.2 REPLENISHMENT ASSESSMENTS

Replenishment Assessments will be levied on each acre-foot of water pumped in excess of each Public Agency's or Class B Participant's Adjusted Production Right. Replenishment Assessments will be in amounts equal to the cost of importing or acquiring supplemental water to recharge the Management Area. The component costs will include the cost of the water (including conveyance, transportation and energy costs, operations and maintenance costs, a reserve for replacement and other administrative costs). These assessments will be levied on a per AF of water in excess of each respective member's adjusted Base Production Right. The revenue received for the replacement component shall be placed in a separate reserve fund to be used to fund the replacement cost of the existing system. New and/or expanded facilities will be financed from other resources.

10.3.3 COLLECTIONS AND ACCOUNTS

All the collected assessments and accounts associated with the Plan will be administered by the EMWD and are subject to the policies set by the Watermaster. All payments made to the Watermaster shall be maintained in a separate restricted account established by EMWD, and all accounts shall be subject to annual independent financial audits.

All revenues and assessments shall be used exclusively to acquire supplemental water for the recharge of the management Area and for the facilities and operational and administrative expenses associated with the Plan.

10.4 PHASE I FACILITIES CONSTRUCTION AND SOBOBA SETTLEMENT FINANCING

10.4.1 EMWD CONSTRUCTION COST

The initial facilities, Phase I, shall consist of existing EMWD facilities and expansion and additions to be constructed by EMWD at a cost currently estimated at $16.12 million less public grants totaling $5.0 million, for a net cost of $11.12 million. EMWD shall finance the construction of these facilities through a bond issue or cash payment or by combination thereof. Each Public Agency shall be responsible for pro-rata repayment of the bonds through EMWD or reimbursement to EMWD (to the extent EMWD pays cash for said construction) based on that Agency's Base Production Right allocation percentage, i.e., 34.2% for LHMWD, 33.7% for EMWD, 19.6% for the City of Hemet, and 12.5% for the City of San Jacinto.

10.4.2 PAYMENTS TO SOBOBA TRIBE

In addition to the financing of the construction of Phase I facilities referred to in Section 10.4.1 above, the Soboba Settlement requires the payment of an additional $17 million to the Soboba Tribe in return for the right to use low cost MWD water delivered for the benefit of the Tribe but which the Tribe does not use and other unused Tribal water. The $17 million will be financed in the same manner as the construction of the initial Phase I facilities, i.e., by bond issue or cash payment by EMWD or a combination thereof. The $17 million obligation will be partially offset by a $10 million contribution by the United States toward the costs of constructing the Phase I facilities. Each Public Agency shall be responsible for pro-rata repayment of the bonds through EMWD or reimbursement to EMWD (for cash payment) based on that Agency's Base Production Right allocation percentage, as set out in Subparagraph (a) above.

10.4.2.1 Water Cost

The payment described above to the Soboba Tribe for the right to use low-cost MWD water delivered for the benefit of the Tribe but not used by the Tribe does not include the price of the water itself, which must be paid to MWD. Each Public Agency shall contractually agree with EMWD to pay its share of MWD's price for such water that it acquires for use to EMWD to enable EMWD to pay MWD.

10.4.3 EMWD OBLIGATION

Agreements between EMWD and each other Public Agency setting forth that Agency's financial commitment as required under Sections 10.4.1 and 10.4.2 (*citation*) above will be required as a condition precedent to EMWD's obligation to finance the facilities construction and the payment to the Tribe so as to establish a dedicated source of revenue for bond repayment or reimbursement, as appropriate. Said agreements shall also provide that, in return for said financial commitment, the Public Agency shall be entitled to: (1) share in the capacity of the Phase I facilities (those in existence and those to be constructed) and (2) share in the rights to the MWD water not used by the Tribe and other unused Tribal water, in each case based on the Agency's Base Production Right allocation percentage, as set out in Subparagraph (a) above. Each agreement with EMWD shall provide for the Agency's method of pro-rata repayment of bonds or reimbursement to EMWD, provided, however, that no Agency will be required to do so by cash payment without its consent.

10.4.4 RIGHT TO TRANSFER ENTITLEMENT TO USE FACILITIES AND/OR ENTITLEMENT TO SHARE IN RIGHTS TO WATER NOT USED BY TRIBE

Each Public Agency shall have the right to sell, lease or otherwise transfer the rights and obligations it holds to use the Phase I facilities described in Section 10.4.1 above and/or to share in the rights to the MWD water not used by the Tribe or other water not used by the Tribe described in Sections 10.4.2 and 10.4.3 above, provided that the transferee thereof shall be bound by said obligations. The foregoing notwithstanding, the Watermaster shall have the right of first refusal regarding any such transfer proposed by a Public Agency.

10.5 FUTURE CAPITAL FACILITIES

Future facilities may be required to meet the growth needs of the Management Area, which may require that a JPA or other financing conduit be formed. In either case, each Public Agency's contribution toward the cost of acquiring the added facilities shall be established by the Watermaster at the time such facilities will be needed. The use of such facilities shall be at the discretion of the Watermaster and be dedicated to replenishment activities. The foregoing shall not affect the right of a Public Agency to undertake a water supply project pursuant to Section 10.4.2 above.

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The five-member Watermaster Governing Board (Watermaster) will be composed of one elected official each from the City of Hemet, City of San Jacinto, LHMWD, and EMWD (Public Agencies) and one representative elected by the private groundwater producers (Private Water Producers). Each member of the Watermaster will have one vote and will serve until replaced by the entity (Public Agencies or the Private Water Producers) making the original appointment.

The Watermaster is responsible for administering and enforcing the provisions of the Stipulated Judgment and any subsequent instructions or orders of the Court. The implementation of the Management Plan, along with any additions or modifications as may from time to time be appropriate, and all financial matters relating to Management Plan Activities are the responsibility of the Watermaster.

This section describes how the Watermaster is expected to implement different elements of the Physical Solution outlined in the Stipulated Judgment. Information provided in this section should be used for planning purposes and is not intended to set or change any conditions imposed by the Stipulated Judgment. The timelines provided in this section should be used as guidelines and are not meant to imply any obligation to be met by the Watermaster. The Watermaster is expected to use the information provided in this section during the early years after its formation and refine, revise, or redefine the information, as it deems appropriate.

11.1 ORGANIZATION

The Watermaster will receive assistance and support from legal counsel, an Advisor, a Technical Committee (TC), and Eastern Municipal Water District (EMWD). The duties and responsibilities of each entity are outlined in subsequent sections. Figure 11.1 demonstrates the relationships between the Watermaster and its supporting entities.

Within one month of the Stipulated Judgment approval, the Private Pumpers identified as Class A and B participants are expected to develop a procedure for electing their representative. The elected officials from the Agencies and the Private Pumpers serving as the Watermaster should be identified within the first two months of Stipulated Judgment approval, and the Watermaster should conduct its first meeting at a mutually acceptable location within one month after that.

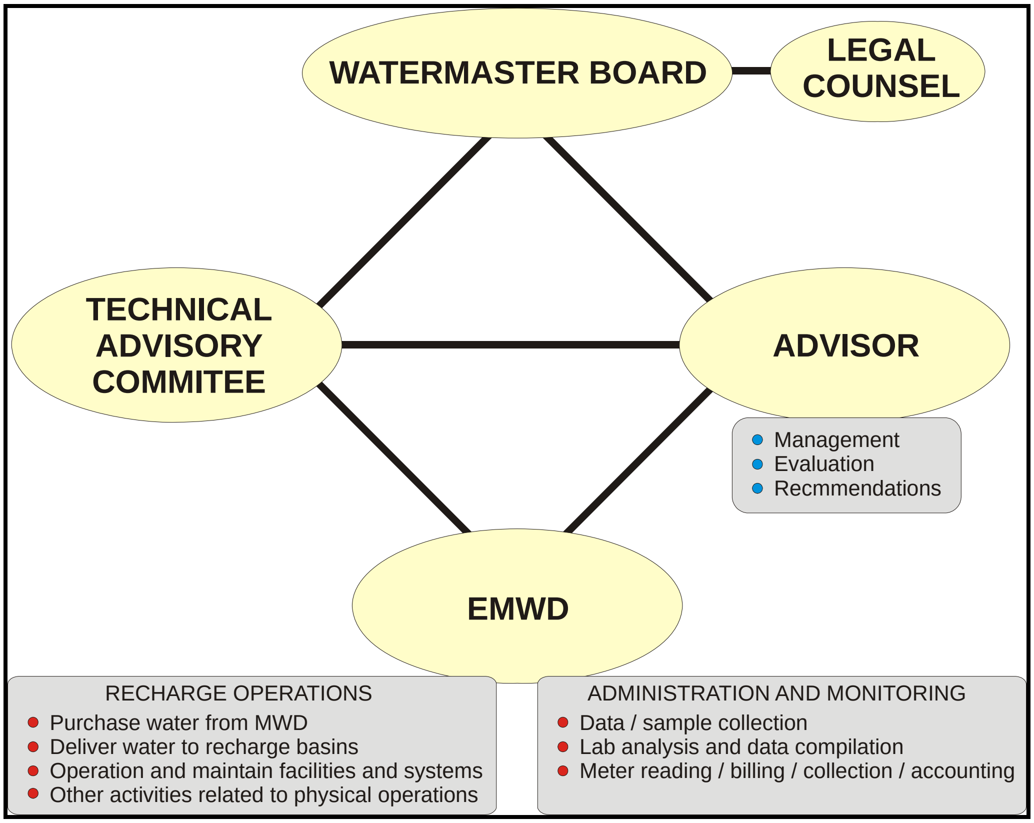


Figure 11.1 Relationships between Entities

Within three months of the Watermaster's first meeting, the Watermaster will retain the services of an independent attorney or legal firm (Legal Counsel) to provide assistance with legal matters and to provide ongoing advice and recommendations in legal areas appropriate to the Watermaster carrying out its duties

Also within three months of the Watermaster's first meeting, the Watermaster will contract with either an independent engineering firm or a qualified individual (Advisor) experienced in hydrology to evaluate and analyze the data collected by EMWD and any conclusions based on that data, and to make recommendations to the Watermaster. The Advisor will provide general coordination between the Watermaster, the Technical Committee, and EMWD with respect to their respective functions, and will also perform such executive functions as the Watermaster may direct. The Watermaster may refer any matter it chooses to any person it may select for assistance in carrying out its duties under the Judgment.

The TC will consist of managerial and technical representatives of the Agencies and Private Water Producers. The Advisor will serve as the TC chairman. The TC will provide technical assistance at the request of the Watermaster. The TC will make recommendations to the Advisor and to the Watermaster on all matters requiring four votes for Watermaster action, which are:

- Any change in the form of governance;
- Any change in voting requirements;
- Retaining the services of legal counsel and Advisor;
- Establishing, levying, increasing or decreasing all assessment amounts;
- Adopting or amending the annual budget;
- Determining the extent of overdraft and quantifying safe yield;
- Determining Adjusted Production Rights;
- Decisions regarding the financing of Supplemental Water or facilities;
- Decisions regarding ownership of facilities, other than ownership of the Phase I facilities, which will be owned by EMWD, subject to a right of use by those parties participating in the Phase I financing;
- Management policies for the Management Area; and
- Any decision that involves a substantial commitment by the Watermaster, including any contracts for conserved water.

In addition, the TC will receive all Monitoring Program and associated data from EMWD for review and evaluation. The TC members are anticipated to keep the City Councils, Agency Boards of Directors, and participating Private Pumpers informed about the Watermaster activities and the Water Management Plan's status.

Within six months of Stipulated Judgment approval, the Watermaster will prepare and adopt Rules and Regulations for its own operation as well as for the operation of the Water Management Plan and Judgment. A dispute resolution process will be included in the Rules and Regulations.

11.2 MONITORING PROGRAM IMPLEMENTATION

The Monitoring Program was initiated with the execution of the September 2003 *Agreement to Develop a Groundwater Monitoring Program in the Hemet/San Jacinto Management Area* between the Cities of Hemet and San Jacinto, EMWD, and LHMWD. Its purpose was to measure and monitor groundwater levels to assist in the accurate evaluation of conditions of overdraft and the evaluation of the operational safe yield in the Management Area. In addition to water levels, the program included water quality and production monitoring. The agreement for 2005 added surface water monitoring of San Jacinto River flows in conjunction with the U.S. Geological Survey. Funded equitably among the agencies, the Monitoring Program has been managed by EMWD. The monitoring locations currently are sampled annually for quality and are measured semi-annual for water levels. The locations are presented in Figure 11.2. These locations may be updated based on the recommendations in the annual monitoring program as discussed later in this Section.

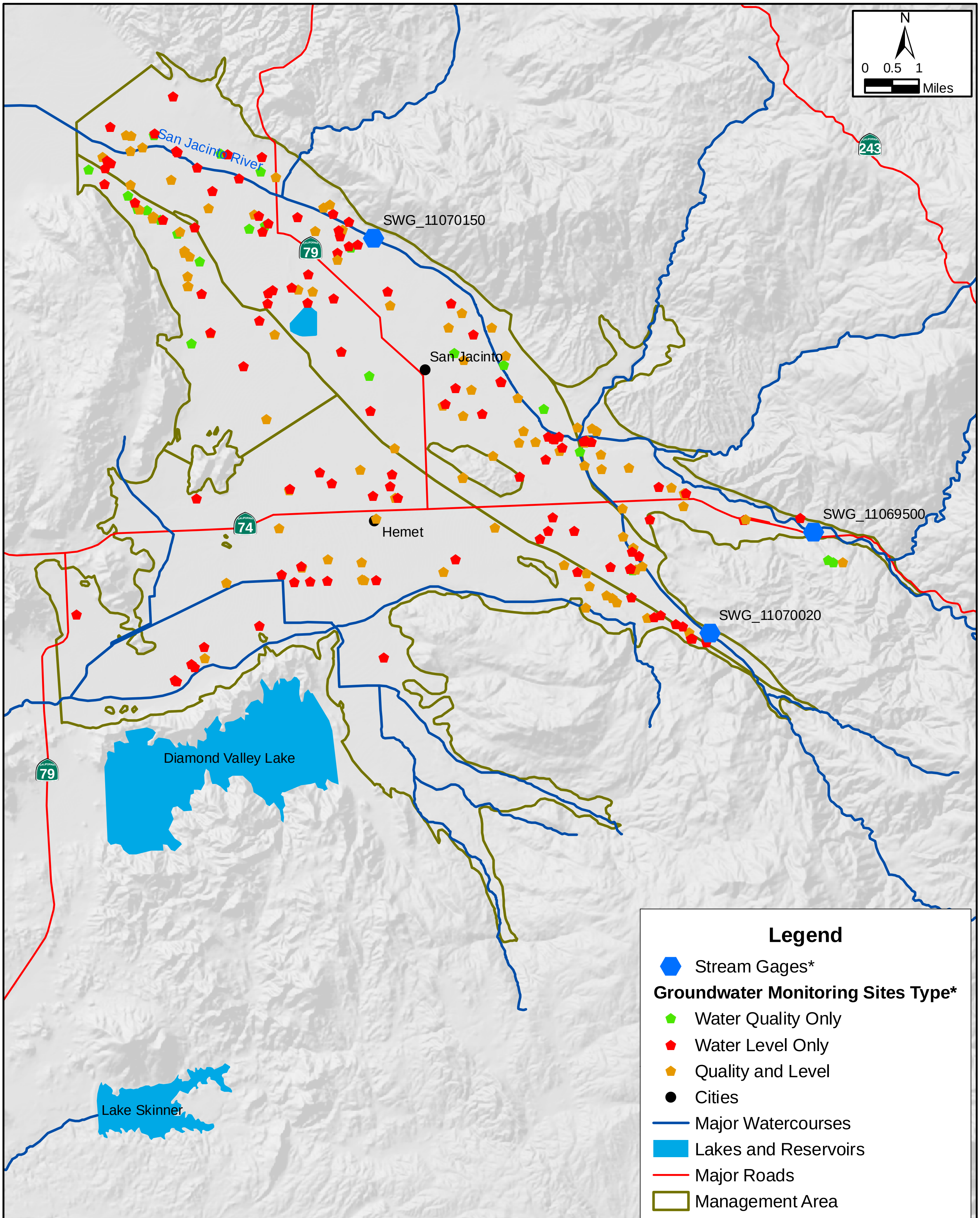
To protect groundwater supplies, an Inactive Well Capping/Sealing Program is included in the Monitoring Programs. Under this program, an inactive well or open casing will be capped/sealed at no charge to the well owner. These wells may still be used for water level and, in some cases, water quality monitoring. Priority is given to those wells that are potentially dangerous open holes (16-18" casings) or those located in areas where flooding resulting from precipitation might carry manure, fertilizers, or other contaminants into the well.

Any Agency or well owner can provide the Watermaster or Monitoring Program personnel with the location of an unused well or open casing for consideration for the Inactive Well Capping/Sealing Program.

Under a contract with the Watermaster, EMWD will lead the Monitoring Program effort. Prior to January 1st of any given year, EMWD staff will present a proposed Monitoring Program to the Advisor. The program is anticipated to include:

1. Estimated number of wells to be monitored for groundwater levels;
2. Estimated number of wells to be sampled for water quality;
3. Number of meters to be read monthly or installed or repaired;
4. Estimated number of inactive wells to be capped;
5. Any changes or variation from the previous year's activities; and
6. Estimated budget to include cost for the field activities and development of the annual report.

The Advisor will review, revise, approve or reject the proposed monitoring program and initiate the annual monitoring program before the end of January of each year. The annual Monitoring Program budget must be approved by the Watermaster before the end of February of each year. The Monitoring Program is run on a calendar year basis and each annual report and associated budget will reflect such a calendar year time period.



RIME

Stream Gages and Groundwater Monitoring Sites

Hemet / San Jacinto Water Management Plan

*Source: EMWD

October 2007

Figure 11.2

Data to be considered for collection and inclusion in the Hemet/San Jacinto Water Management Area Annual Reports to assess the status of the basins and to monitor the responses for future management activities may include, but is not limited to:

- Groundwater level monitoring results;
- Groundwater quality monitoring results;
- Groundwater production;
- Surface water flow monitoring results;
- Surface water quality;
- Surface water diversions;
- Imported water;
- Hydrologic data (rainfall and evaporation);
- Recycled water production;
- Recycled water sales/use;
- Conveyance water;
- Water conservation measures;
- Population growth and development; and
- Land use and crop mix.

EMWD will submit the Annual Hemet/San Jacinto Water Management Area Report resulting from the Monitoring Program to the Advisor for review within four months after completion of each calendar year's monitoring program. The Advisor will then provide the Watermaster with recommendations on how best to operate the Management Area as well as provide a proposed determination of Administrative and Replenishment Assessments for each agency based on previous year's activities. Within the first six years, the Watermaster, with input from its Advisor and the TC, will make a determination of the safe yield of the Management Area. Thereafter, the safe yield shall be reviewed and modified, if necessary, upon the recommendation of the TC or as the Watermaster may determine.

The Watermaster will use information provided in the Annual Hemet/San Jacinto Water Management Area Report and Advisor's recommendations to decide on how to meet the goals for the upcoming year(s).

11.3 MANAGEMENT PLANNING TOOLS

In the future, the Watermaster may want to develop or use databases and other numerical models as planning tools. EMWD maintains a RWRD. Data from the Groundwater and Surface

Water Monitoring Programs, as well as other water and groundwater-related data, are stored in this database. These data form the basis of the Hemet/San Jacinto Water Management Area Annual Reports and can be made available to the Advisor.

EMWD's groundwater flow/transport numerical model can also be made available to assist the Advisor and the Watermaster in evaluating different water resources management alternatives for future projects, for planning purposes, for analysis as in the Regional Water Quality Control Board permitting process, and for determining safe yield. The model is capable of calculating the water budget, exhibiting trends, evaluating regulatory constraints, and can be used as a planning tool. It is recommended that the model be updated every three to five years at the discretion of the Watermaster.

To use EMWD's RWRD and groundwater flow/transport numerical model, the Watermaster is anticipated to enter into a contract with EMWD to cover the Watermaster related cost of software upgrades, necessary hardware, and resources required for maintenance of these tools.

11.4 FINANCIAL ADMINISTRATION

The Watermaster is responsible for the levying, billing, and collection of all assessments provided for under the Judgment, for the payment of all costs and expenses of the Watermaster, and for the performance of accounting and related functions required in connection with performing the Watermaster's duties. The Agencies' groundwater production will be subject to Administrative and Replenishment Assessments. Class B participants are only subject to Replenishment Assessments.

The Watermaster will determine the amount of the Administrative Assessments. For the first year of implementation these assessments are set at $50 per acre-foot. The amount of the Replenishment Assessments will equal the cost of providing a like quantity of supplemental water to recharge the Management Area. The cost of providing a like quantity of water will include the costs of water, operations and maintenance costs of the replenishment system; capital recovery, and other administrative costs as defined in the Stipulated Judgment. An Administrative Assessment will be levied on each acre foot pumped by an Agency up to its adjusted base production right excluding any adjustments as outlined in the Stipulated Judgment.

In order to obtain operating funds for the Watermaster, the Agencies will advance payment of their share of the Administrative Assessments. These payments are anticipated to be paid within the first quarter of each year. Replenishment Assessments due will be determined on the basis of production during the prior calendar year, and are expected to be paid within the first quarter of the year following the prior calendar year's production. Replenishment Assessments will be collected prior to actual recharge by the Watermaster.

In addition, the Agencies will be required to make payments as required under other obligations with EMWD, such as, Phase 1 Facilities and Construction Cost and Use, and delivery and use of recycled water agreements.

Starting with the second year, the Watermaster's invoices should reflect the balance of the Administrative and Replenishment Assessment payments from the previous year as a credit or debit on the invoices.

Within three months of Stipulated Judgment approval, the Watermaster is anticipated to contract with EMWD to perform the Watermaster's accounting functions including billing, collection, and accounting. EMWD will maintain a restricted account for such activities as the operation of the Monitoring Programs and purchase of replenishment water. In addition, EMWD will invoice the Watermaster for its share of imported water costs. EMWD's restricted accounts will be included in the Watermaster's year-end audits to be conducted in accordance with accepted accounting principles.

Funding for the monitoring program, development and use of the management planning tools, and the financial management of the accounts are anticipated to come from Administrative Assessments.

All funds collected by EMWD must be held in a segregated account and all expenses and disbursements must be separately accounted for.

11.5 STIPULATED JUDGMENT ADMINISTRATION

The Watermaster shall prepare, file with the Court, and distribute to relevant parties a Watermaster Annual Report including a summary of all activities during the preceding calendar year, an audited statement of all accounts and financial activities of the Watermaster, and a summary of extractions and replenishments as well as all other pertinent information. The Watermaster will provide the Court updated estimates of the groundwater budget, safe yield, and overdraft as required.

During the development of the Water Management Plan, a number of Agreements and MOUs were initiated among and between the Agencies. Within three months of the Stipulated Judgment approval, the Watermaster will review and re-issue the Agreements and MOUs in the name of the Watermaster if necessary and appropriate. The current MOUs are presented in Appendix H.

Upon Settlement Agreement implementation, the Watermaster will recognize the Tribal Water Rights, as set forth in the Stipulated Judgment and the applicable provisions of the Soboba Tribe Settlement Agreement.

11.6 FACILITIES AND PROJECTS

Each Agency shall continue to own its existing capital facilities for water management. However, capital facilities may be jointly constructed and owned by the Management Plan. Joint financing of such facilities may be funded by regional capital fees, loans and grants, municipal bonds, and contributions for storage by The Metropolitan Water District of Southern California or other third parties. Responsibility for the costs of any existing and future capital facility of the Management Plan should be apportioned among the Agencies based on the relative benefit to be derived by each Agency. Any Agency may propose a project to be included in the Management Plan to increase Management Area water supply. Such proposals, after evaluation by the Watermaster, shall be included or rejected. If the Watermaster chooses to reject a proposal, the proposing Agency may implement the rejected project as long as it does not significantly impact the implementation of the Management Plan and/or interfere with the ongoing production by the Agencies. The maintenance and upgrading of facilities currently owned by any Agency, and used to further the goals of the Management Plan, will be considered by the Watermaster for funding.

The Agencies have been evaluating and developing a number of programs to mitigate overdraft. The stakeholders agreed that the primary project, the core of the Physical Solution, is the IRRP. This project involves the artificial recharge of imported water into the basin along the San Jacinto River. An agreement that documents the ownership, financing, and operation of the facilities for Phase I of the IRRP is anticipated to be executed after completion of the California Environmental Quality Act (CEQA) process.

The Recycled Water In-Lieu Program identifies large agricultural pumpers in the Management Area that can use recycled water as their source of supply instead of producing groundwater. Providing recycled water to these producers will reduce the stress on groundwater resources and will reduce the community’s long-term need for imported replenishment water.

The Watermaster, with assistance from the Advisor, TC, and EMWD, will develop recycled water strategies. The operational feasibility of these strategies will be assessed and determined by the Advisor and EMWD. The Advisor will recommend economically feasible projects to the Watermaster for implementation. It is anticipated that EMWD, as the sole recycled water provider in the Management Area will, own, operate and administer facilities required for these projects.

11.7 SPECIAL PROJECTS AND STUDIES

It will be necessary to conduct technical or other investigations such as hydrogeologic investigations, GIS analyses, field investigations, numerical modeling, or feasibility studies. The Watermaster may act individually or participate with other entities to conduct such investigations or to collect data necessary to accomplish the main goals of the Management Plan. In addition, any Agency may propose investigations or studies that are appropriate to the goals of the Management Plan. Such proposals, after review by the Advisor and evaluation by the Watermaster, shall either be accepted or rejected. If the Watermaster rejects a study, the proposing Agency may still implement the investigation or study so long as it does not significantly impact the implementation of the Management Plan or interfere with the ongoing activities by the Agencies.

11.8 CONSERVATION PROGRAMS

Each agency maintains its own individual Conservation Program. Additional conservation measures can be designed and implemented using Best Management Practices by the agencies and/or implemented by the agricultural producers and dairy water users. The Watermaster has the discretion to expand its involvement in local conservation programs and if appropriate, lead any collaborative conservation program amongst the agencies.

11.9 WELL CONSTRUCTION, ABANDONMENT, AND DESTRUCTION

Riverside County regulates the construction, reconstruction, abandonment, and destruction of community water supply wells, individual domestic wells, and agricultural wells. Through the offices of the Department of Environmental Health, the County is responsible for issuing permits for well drilling or abandonment.

Section 10 of the Ordinance No. 682.3 states, *"Standards for the construction, reconstruction, abandonment, or destruction of wells shall be the standards recommended in the Bulletins of the California Department of Water Resources as follows: Bulletin NO 74-81 Chapter II Water Wells, and Bulletin NO 74-90 (Supplement to Bulletin 74-81) and as these Bulletins may be amended by the State of California from time to time."*

To oversee management of the groundwater resources in the area, the Watermaster is expected to coordinate with the County of Riverside, and track new developments in the area. This will help the Watermaster to identify critical groundwater monitoring wells that are located in areas to be developed. A plan for proper abandonment and/or destruction, and replacement of the well as a monitoring well, if appropriate, will then be set in motion.

If the well is critical in providing data for the Management Area Monitoring Program, the Watermaster will work with the appropriate jurisdictional agency and the well owner to save the well for monitoring or to replace it with a new monitoring well in an area adjacent to a retention basin, park, green belt, or other community area in the vicinity of the original well location.

The Advisor, with the concurrence of the Watermaster, will arrange meetings with the Agencies to discuss and review future construction of any facilities that may be of value or interest to the Management Plan area. The Watermaster will work with the project proponent with regard to enhancing and or modifying the facilities to maximize the benefit to the Management Plan effort.

11.10 PUBLIC PARTICIPATION

The process by which interested and affected individuals, organizations, agencies and government entities are consulted and included in decision making, has been the driving force in the development of the Water Management Plan. Stakeholders in the Hemet/San Jacinto basins have recognized for several years that their groundwater basins are in a state of overdraft. The Soboba Water rights Proposal presented in February of 1995 provided the impetus for the examination of the overdraft problem. The topic of discussion of a public meeting held on December 13, 2000 was the state of the Hemet/San Jacinto groundwater basins.

EMWD sponsored community discussions in early 2001 entitled: "Groundwater Management: Avoiding Political Pitfalls", "State of the Hemet/San Jacinto Basins", and "Cooperate to Self-govern". The Principles for Water Management were drafted as the basis for a starting point to develop solutions, both for the Soboba proposal and for the overdrafted basin. The Principles were circulated to the general public in February 2001.

In June, 2001, EMWD, LHMWD, City of Hemet and City of San Jacinto signed a conjunctive management Memorandum of Understanding (MOU) with DWR. Two committees were organized to work cooperatively to address the issues. The policy committee, comprised of elected officials and staff members of the four agencies, plus local private pumpers, and a technical advisory committee with representatives from the four agencies, the private pumpers and a neutral consultant provide by DWR. The policy committee meetings are open to the public and are frequently attended by agricultural pumpers, local business owners, local residents, and tribal members, attorneys and technical consultants of the Soboba Band of Luiseño Indians.

Water Outreach Public Information Programs hosted by EMWD have been held at a local restaurant in Hemet in October 2001 and August 2002 to discuss the progress of the Groundwater and Technical Committees in the development of a Water Management Plan.

The Watermaster will continue this process of public involvement and community outreach during Management Plan implementation. Meetings of the Watermaster will be public meetings and will, therefore, be subject to the Brown Act.

11.11 GROUNDWATER MANAGEMENT PLAN COMPONENTS AND CONSISTENCY WITH THE CALIFORNIA WATER CODE

Groundwater management is the planned and coordinated local effort of sustaining the groundwater basin to meet future water supply needs. With the passage of AB 3030 in 1992, local water agencies were provided a systematic way of formulating groundwater management plans (California Water Code, Sections 10750 et seq.). AB 3030 also encourages coordination between local entities through joint-power authorities or MOUs. SB 1938, passed in 2002, further emphasized the need for groundwater management in California. SB 1938 requires AB 3030 groundwater management plans to contain specific plan components to receive state funding for water projects.

The Water Management Plan includes the seven mandatory components that are required to be eligible for the award of certain funds administered by DWR for the construction of groundwater projects or groundwater quality projects. The Plan also addresses the 12 specific technical issues identified in the California Water Code along with the seven recommended components identified in DWR Bulletin 118 (DWR 2003). Appendix I lists the required and recommended components and identifies the specific location within this Plan where the information can be found.

11.12 SCHEDULE

The Plan Implementation Schedule is shown in Table 11.1.

Phase I of the Integrated Recharge and Recovery Program is scheduled to be constructed in two phases, Phase A and Phase B. The schedule for activities related to these phases is shown in Table 11.2.

Table 11.1 Plan Implementation Schedule

<table>
<tr><th>Task No.</th><th>Description</th><th>Time Required</th><th>Estimated Completion</th></tr>
<tr><td>1</td><td>Retain Services of Legal Counsel</td><td>3 Mos.</td><td rowspan="4">Within 6 mos. of Stipulated Judgment Approval (S.J.A.)</td></tr>
<tr><td>2</td><td>Retain Services of Advisor</td><td>3 Mos.</td></tr>
<tr><td>3</td><td>Review and Re-issue Existing Agreements and MOUs in the Name of the Watermaster if Appropriate and/or Necessary</td><td>3 Mos.</td></tr>
<tr><td>4.</td><td>Watermaster Enter into Contract(s) with EMWD to:
a) Manage/administer the Groundwater and Surface Water Monitoring Programs and prepare the Hemet/San Jacinto Water Management Plan Annual Report containing Monitoring Program results and related information;
b) Compile all data and maintain the Regional Water Resources Database;
c) Operate, maintain, and update the Groundwater Model.
d) Provide Accounting Functions.
e) Manage Recharge Facilities and any Other Field Operations.</td><td>3 Mos.</td></tr>
<tr><td>6</td><td>First Watermaster Annual Report to the Court</td><td>3 Mos.</td><td>Within 14 mos. of S.J.A.</td></tr>
<tr><td>7</td><td>Develop and Adopt Rules and Regulations</td><td>3 Mos.</td><td>Within 6 mos. of S.J.A.</td></tr>
<tr><td>8</td><td>Administrative Assessment Payment</td><td>1st Quarter of Each Year</td><td>On-going</td></tr>
<tr><td>9</td><td>Replenishment Assessment Payment</td><td>1st Quarter of Each Year Following the Actual Production</td><td>On-going</td></tr>
</table>

Table 11.2 Phase I Project Construction

Task No.	Description	Time Required	Estimated Completion
PHASE A			
1	Environmental Process (EIR)	---	Completed
2	Land Acquisition		Within 6 mos. of Settlement Agreement Approval (S.A.A.)
3	Grant Approval, Advertising, Award	7 Mos.	
4	Extraction Well Drilling	17 Mos.	
5	Extraction Well Pump & Chlorination Equipping	12 Mos.	
6	Pump Station Modifications	12 Mos.	
PHASE B			
1	NEPA/Permitting Process	---	Before S.A.A.
2	Extraction Well Drilling	6 Mos.	Within 12 mos. of S.A.A.
3	Extraction Well Pump & Chlorination Equipping	19 Mos.	
4	Recharge Basins	5 Mos.	
5	Pipelines	5 Mos.	
6	Monitoring Wells	6 Mos.	

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SOBOBA BAND OF LUISEÑO INDIANS

SETTLEMENT AGREEMENT

THIS SETTLEMENT AGREEMENT is entered into by the Soboba Band of Luiseño Indians on behalf of itself and its members (collectively, the ñSoboba Tribeò); the United States of America solely in its capacity as trustee for the Soboba Tribe (the ñUnited Statesò); the Eastern Municipal Water District (ñEMWDò); the Lake Hemet Municipal Water District (ñLHMWDò); and The Metropolitan Water District of Southern California (ñMWDò).

ARTICLE 1- RECITALS

1.1 The Soboba Tribe has made claims against EMWD and LHMWD (collectively, the ñLocal Districtsò) for alleged infringement of its water rights in the San Jacinto River (ñRiverò) and the Canyon Sub-basin and the Intake portion of the Upper Pressure Sub-basin associated therewith (collectively ñBasinò) in Riverside County, California, and for damages related to historical interference with the Soboba Tribeôs rights and the unauthorized use of its water. Specifically, the Soboba Tribe alleges that the Local Districts, through their longstanding diversion of waters from the River and pumping of Groundwater from the Basin, have interfered with the Soboba Tribeôs water resources and its rights to the beneficial use and enjoyment of the Reservation.

1.2 The Soboba Tribe also has filed a lawsuit against MWD styled *Soboba Band of Luiseño Indians v. Metropolitan Water District of Southern California*, United States District Court Case No. 00-04208 GAF (MANx) (the ñActionò). The Action alleges that MWD, by the construction and operation of the San Jacinto Tunnel (the ñTunnelò), has interfered with the Soboba Tribeôs water resources and its rights to the beneficial use and enjoyment of the Reservation.

1.3 The Parties have agreed to settle the Soboba Tribeôs claims on the terms set forth in this Settlement Agreement.

1.4 MWD also contends that it has legal indemnification claims and other rights against EMWD for the Action arising out of MWD Board Resolution 3940 (EMWDós Terms of Annexation into MWD). In 1951, EMWD was created and annexed into MWD for the purposes of resolving claims that MWDós construction and operation of the Tunnel interfered with local water rights in the Basin and to obtain a supplemental supply of water for the area. The Terms of Annexation required EMWD to resolve potentially conflicting rights to the Tunnel seepage water and that MWD annually credit EMWD for the entire amount of Tunnel seepage, which MWD has done every year since 1951. In exchange for the benefits of being annexed into the MWD service area and the return of the Tunnel seepage water to EMWD, EMWD was required to defend and indemnify Metropolitan from certain claims seeking recovery for loss or injury as a consequence of the Tunnel seepage, specifically including claims brought by the Tribe. In response to the Tribeós Action, MWD tendered the defense and indemnity of the Tribeós claims to EMWD, which EMWD declined on the grounds that the Action allegedly exceeded the scope of its obligations under the Terms of Annexation. MWD subsequently filed a third party action against EMWD seeking to enforce the defense and indemnity provisions contained in the Terms of Annexation. EMWD and MWD dispute each otherós contentions.

1.5 EMWD and MWD have agreed as part of this settlement to resolve their dispute over the scope of EMWDós defense and indemnity obligations to MWD reflected in the EMWDós Terms of Annexation.

NOW, THEREFORE, in consideration of the promises and agreements hereinafter set forth, the Parties agree as follows:

ARTICLE 2 - DEFINITIONS

This Settlement Agreement employs abbreviated terms that have the meanings below. To the extent that the definitions below conflict with those terms defined in other sections of the Settlement Agreement, the definitions in Article 2 shall prevail.

2.1 ñActò unless otherwise indicated, shall mean the Soboba Settlement Act approving this Settlement Agreement, attached as Exhibit A.

2.2 ñActionò means the Soboba Tribeôs lawsuit against MWD styled Soboba Band of Luiseño Indians v. Metropolitan Water District of Southern California, United States District Court Case No. 00-04208 GAF (MANx) and includes MWDôs third party claim against EMWD.

2.3 ñAFAò means acre-foot of water per annum.

2.4 ñBasinò means collectively the Canyon Sub-basin and the Intake portion of the Upper Pressure Sub-basin as depicted on Exhibit B (map) and described in Exhibit C.

2.5 ñBest Effortsò means that the Districts will take all commercially reasonable actions to fulfill the referenced contractual obligation.

2.6 ñCanyon Sub-basinò means the groundwater basin as depicted on Exhibit B (map) and described in Exhibit C.

2.7 ñCourtò shall mean the Federal District Court for the Central District of California, Central Division, which has exercised jurisdiction over the Action.

2.8 ñDecree Courtò means the court with jurisdiction over the judgment and decree entered in accordance with this Settlement Agreement.

2.9 ñDistrictsò means EMWD, LHMWD, and MWD.

2.10 ñEffective Dateò means the date on which the Secretary causes to be published in the Federal Register a statement of findings that the conditions in Section 3.1 have been fulfilled.

2.11 ñEMWDò means the Eastern Municipal Water District.

2.12 ñGroundwaterò for the purposes of this Settlement Agreement means all water beneath the surface of the earth.

2.13 ñImported Waterò means water sold by MWD to EMWD pursuant to Section 4.4 and is not intended to have the same meaning as the term ñImported Waterò is used in MWDôs Administrative Code.

2.14 ñIntake Sub-basinò means the portion of the Upper Pressure groundwater Sub-basin as depicted on Exhibit B (map) and described in Exhibit C.

2.15 ñLHMWDò means the Lake Hemet Municipal Water District.

2.16 ñLocal Districtsò means EMWD and LHMWD.

2.17 ñMWDò means The Metropolitan Water District of Southern California.

2.18 ñPartyò is the singular form of ñParties,ò which means the entities represented by the signatories to this Settlement Agreement.

2.19 ñRecharge Facilitiesò means those facilities to be constructed by the Local Districts pursuant to Section 4.4.G of this Settlement Agreement for the purpose of recharging the Imported Water into the Basin.

2.20 ñReservationò means the Soboba Indian Reservation as depicted on Exhibit D (map), comprising approximately 5,935 acres, as established by Executive Order on June 19, 1883; thereafter expanded by Executive Orders on January 29, 1887, and December 29, 1891, the purchase of 709.65 acres known at ñTract 8ò in 1911, the issuance of a trust patent for 68.9 acres in 1913, and the transfer of 880 acres pursuant to the Southern California Indian Land Transfer Act, Pub. L. No. 100-581, 102 Stat. 2946 (1988); and, thereafter modified by Executive Orders of March 22, 1886, and January 29, 1887, and the issuance of a fee patent for 32.84 acres in 1900. It does not include the 950 acres northwest of and contiguous to the Reservation known as the ñJones Ranch,ò purchased by the Soboba Tribe in fee on July 21, 2001, and placed into trust on January 13, 2003, nor the 278.49 acres southeast of and contiguous to the Reservation known as the ñGreater Horseshoe,ò purchased by the Soboba Tribe in fee in five separate transactions in June and December 2001 and December 2004; nor the 478 acres north of and contiguous to the Reservation known as ñKwiili,ò purchased by the Soboba Tribe in fee on April 4, 2004.

2.21 ñRiverò means the surface flow of the San Jacinto River and its tributaries from its origins in the San Jacinto Mountains into and across the Basin as shown on Exhibit B (map).

2.22 ñSecretaryò means the Secretary of the Interior or her designee.

2.23 ñSettlement Agreementò means this document including all exhibits, which are incorporated by reference.

2.24 ñSoboba Tribeò means the Soboba Band of Luiseño Indians, a body politic and federally recognized Indian tribe, and its individual members.

2.25 ñSurface Waterò means all surface water flows of the River.

2.26 ñTerms of Annexationò means Metropolitan Resolution No. 3940 which sets forth the terms of EMWDôs annexation to MWD.

2.27 ñTribal Water Rightò means the Soboba Tribeôs rights to water set forth in Section 4.1.

2.28 ñTunnelò means that portion of the Colorado River Aqueduct known as the San Jacinto Tunnel.

2.29 ñUnited States,ò unless otherwise indicated, means the United States of America solely in its capacity as trustee on behalf of the Soboba Tribe or its members.

2.30 ñUntreated Replenishment Waterò means untreated water sold pursuant to the Replenishment Service program as defined by MWDôs Administrative Code at sections 4104, 4114 and 4514.

2.31 ñUpper Pressure Sub-basinò means the groundwater basin as depicted on Exhibit B (map).

2.32 ñWMPò means the Water Management Plan that will be developed by EMWD, LHMWD, the City of Hemet, the City of San Jacinto and other Basin users, pursuant to Section 4.8.A of this Settlement Agreement, to manage the Canyon Sub-basin, the Upper Pressure Sub-basin downstream to Bridge Street, and the Hemet Basins. The principles of the Water Management Plan are attached as Exhibit E. The area covered by the Water Management Plan is depicted on Exhibit F (map) and described in Exhibit G.

ARTICLE 3 – CONDITIONS PRECEDENT AND ENFORCEMENT

3.1 This Settlement Agreement shall become enforceable, and the releases and waivers of Article 5 effective, as of the date the Secretary causes to be published in the Federal Register a statement of findings that the following conditions have been fulfilled:

A. the Act has been enacted;

B. to the extent that the Settlement Agreement conflicts with the Act, the Settlement Agreement has been revised to conform with the Act;

C. the Settlement Agreement, as so revised, and the Waivers and Releases have been executed by the Parties and the Secretary;

D. warranty deeds for the property to be conveyed in fee to the Soboba Tribe pursuant to Section 4.6 have been placed in escrow with instructions that they shall be delivered to the Soboba Tribe by close of business on the first business day following the date that all of the conditions in this paragraph have been fulfilled;

E. the Soboba Tribe and the United States have approved the WMP;

F. the Judgment and Decree attached to the Settlement Agreement as Exhibit H have been approved by the United States District Court, Eastern Division of the Central District of California, and that judgment and decree have become final and nonappealable; and

G. the Congress of the United States has appropriated the funds and the funds have been deposited in the appropriate accounts pursuant to Sections 4.5 and 4.7.

3.2 Other than to take all necessary steps to cause the events described in this Article to occur, no Party shall be required to perform any of the obligations, or be entitled to any of the benefits, under this Settlement Agreement before all conditions precedent have been fulfilled. After the fulfillment of all conditions precedent, the Parties shall be bound by all provisions of this Settlement Agreement.

3.3 If all of the conditions listed in Section 3.1 have not been fulfilled by December 31, 2007, this Settlement Agreement shall be null and void, and any consideration, together with any income earned thereon, shall be returned to the depositing entity.

ARTICLE 4 - TRIBAL WATER RIGHTS

4.1 Water Rights. The Parties ratify, confirm, declare to be valid and agree not to object to or dispute or challenge in any judicial or administrative proceedings the rights of the Soboba Tribe and the United States solely in its capacity as trustee for the Soboba Tribe, to the water rights set forth in this Section. In so doing, the Parties acknowledge that these rights are the result of bargained for and exchanged concessions, as a result of which the Local Districts have agreed to supply water to the Soboba Tribe if it is unable, except for mechanical failure of its wells, pumps or water facilities, to produce the water to which it is entitled under this Article. Therefore, the Soboba Tribe shall have the following water rights which shall be held in trust by the United States for the benefit of the Soboba Tribe:

A. The prior and paramount right, superior to all others, to pump 9,000 AFA from the Basin for any use on the Reservation and lands now owned or hereafter acquired by the Soboba Tribe contiguous to the Reservation or within the Basin.

B. The Soboba Tribeǿs right to pump a total of 9,000 AFA from the Basin is without regard to whether the water was naturally or artificially recharged.

C. In the event the Soboba Tribe is unable, except for mechanical failure of its wells, pumps or water facilities, to produce from its existing wells or equivalent replacements up to 3,000 AFA production from the Canyon Sub-basin and the remainder of its Tribal Water Right from the Intake Sub-basin, subject to Section 4.3.A, the Local Districts shall deliver any shortage to the Soboba Tribe. Any shortage shall be delivered at such locations as the Soboba Tribe and the Local Districts may agree, or if there is no agreement, at the wellheads where the shortage occurred. Such water may be supplied from Local District wells in either the Canyon or Intake Sub-basins, or from other sources. For any water delivered pursuant to this paragraph, the Soboba Tribe shall pay an acre-foot charge equal to its then current cost of production, and any avoided cost of treatment, from the wells where the shortage occurred, assuming pumping lifts equal to the Soboba Tribeǿs averages in the respective Sub-basins over the preceding ten years.

4.2 Water Quality. Recharged water placed in the Canyon Sub-basin by Local Districts and/or the WMP and any replacement water delivered to the Soboba Tribe pursuant to Section 4.3.C shall conform to all applicable State water quality regulations and, without prior written approval from the Soboba Tribe, shall neither exceed (1) any Federal or State of California primary or secondary drinking water standards (except with respect to recharged water, turbidity, color, or coliform bacteria) nor (2) 0.3 milligrams per liter (mg/l) boron or 0.05

mg/l lithium. Recharged water placed in the Intake Sub-basin by EMWD, LHMWD, and/or the WMP shall conform to all applicable State water quality regulations. Nothing in this paragraph shall affect the water quality obligations assumed by Metropolitan for Imported Water set forth in Section 4.4.

4.3 Soboba Tribeõs Water Use. Beginning on the Effective Date, the Soboba Tribeõs right to pump groundwater in the exercise of its Tribal Water Right shall be subject to the following provisions:

A. The Soboba Tribe agrees to limit its exercise of the Tribal Water Right to 4,100 AFA for a period of fifty (50) years commencing with the Effective Date, according to the schedule set forth in Exhibit I to this Settlement Agreement. Should the Soboba Tribe during that period identify a need for water in addition to the Schedule set forth in Exhibit J, the Soboba Tribe shall have the right to purchase water from the WMP at the rate then being charged to the WMPõs municipal producers.

B. Any use of the Tribal Water Right by an individual member of the Soboba Tribe shall be satisfied out of the water resources provided to the Soboba Tribe in this Settlement Agreement.

C. In addition to the limitation in Section 4.3.A, the Soboba Tribe may enter into contracts and options to lease, contracts and options to exchange, or contracts and options to forbear the use of the Tribal Water Right or postpone undertaking new or expanded water uses, provided that any such contract or option for a term greater than five years shall require the approval of the Secretary. Any such water thereby made available to others shall only be used by participants in, or other users within the area of, the WMP. No contract shall be for a term exceeding one hundred (100) years, nor shall any contract provide for permanent alienation of any portion of the Tribal Water Right.

4.4 Purchase of Imported Water [see definition of Imported Water in Section 2.13 of this Settlement Agreement]. In order to provide water to the Soboba Tribe and to reduce the overdraft of the Basin, EMWD and MWD agree to enter into a contract pursuant to which MWD will sell and EMWD on behalf of the WMP will purchase the Imported Water under the following terms:

A. Price. The Imported Water will be sold by MWD to EMWD at the then prevailing service rate charged by MWD for Untreated Replenishment Water, which rate is reflected in MWDôs Administrative Code at section 4401(a)(2). As of the date this Settlement Agreement is signed by MWD, the service rate for such water is $233 per acre foot. Changes in the rates charged for Imported Water shall be effective the same date that the new rates for Untreated Replenishment Water become applicable to MWDôs member agencies. Should MWD ever discontinue the delivery of Untreated Replenishment Water, the service rate for water supplied pursuant to this contract shall initially be determined by taking the last published service rate for Untreated Replenishment Water and charged to EMWD under this contract. Thereafter, the rate for Imported Water would continue to be adjusted on the same percentage basis as MWDôs service rate for the non-interruptible untreated water deliveries to its member agencies, which adjustments shall become effective on the same date that the new service rates become applicable to MWDôs member agencies.

B. Use. For purposes of the Imported Water only, MWD releases EMWD from all covenants that now, or may in the future, require that water purchased at the service rate for Untreated Replenishment Water be left in the ground or otherwise not used for any period of time.

C. Duration. The contract shall commence upon the Effective Date and will expire on December 31, 2035. EMWD and MWD agree to negotiate in good faith a possible extension of this water sale contract for an additional period which, when added to the original term expiring on December 31, 2035, would provide for a total term of 50 years. In determining whether or not to extend the term of this contract for this additional period, MWD will consider the current status of its replenishment water program, the status of MWDôs State Water Project contract, the implementation of this Settlement Agreement, and any other information that MWD deems relevant to the possible extension of the water sale contract. Nothing in this paragraph shall be construed to require MWD to extend the water sale contact.

D. Water Quality. Water sold by MWD pursuant to this contract shall be of a quality that is consistent with MWDôs operational and water quality goals. MWD agrees to make Best Efforts to meet water quality objectives set by the Santa Ana Regional Water Quality Control Board for recharged water being put into the Basin. MWD takes no risks associated with any discrepancy between the water quality obligations assumed by MWD pursuant to this paragraph and water quality standards applicable to recharged water set by the Santa Ana Regional Water Quality Control Board or other regulatory body.

E. Deliveries. Deliveries under this contract shall not begin until the Effective Date. Once deliveries are commenced, MWD shall use Best Efforts to deliver 7,500 AFA for the duration of the contract based upon 15-year averages. Annual deliveries shall be calculated on a January 1 to December 31 calendar year and shall be pro rated for any portion of a year during which the contract is in force. MWD reserves the right to deliver water at any time of the year. MWD shall give EMWD advance notice of Imported Water deliveries as provided for in MWDôs then current Administrative Code and implementing guidelines for replenishment water deliveries, which presently is reflected in section 4514(c) of MWDôs Administrative Code.

F. Point of Delivery. Deliveries shall be made by MWD to EMWD at the connection known as EM-14 or, upon mutual agreement of MWD and EMWD, at one or more additional existing or future connections. The Parties acknowledge that the suspension or termination of deliveries to EM-14 may, at any time, as determined by MWDôs Chief Executive Officer, be required to meet MWDôs operational needs. If deliveries to this location are suspended or terminated, then EMWD and MWD agree to negotiate in good faith to identify an alternative delivery point or points and, if MWD and EMWD are unable to reach agreement, the dispute shall be resolved by the Decree Court.

G. Recharge Facilities. The Local Districts, through the WMP, shall construct, operate, and maintain facilities for artificial Groundwater recharge and banking of the Imported Water. Said facilities shall be sufficient to accommodate a flow rate of 42 cubic feet per second and to store up to 40,000 acre feet of Imported Water in the Basin. MWD shall have a paramount right to use capacity in the Recharge Facilities sufficient to accommodate a flow rate of 42 cubic feet per second and a paramount right to store up to 40,000 acre feet of Imported Water to meet its obligations under this Settlement Agreement, provided that MWDôs sole remedy if the required storage capacity is not made available is to reduce its obligation by the amount of water that it was prepared but unable to deliver due to the lack of storage capacity. MWDôs obligations under this Section 4.4 shall not arise until the Recharge Facilities are capable of meeting the capacity and storage requirements set forth in this paragraph.

H. Postponed Deliveries. EMWD shall have the right to postpone deliveries during periods when the Recharge Facilities are not capable of meeting the capacity and storage requirements set forth in Section 4.4.G, provided that each of the following four conditions are met: (i) the inability to meet capacity and storage requirements is the result of events beyond the control of the Local Districts and/or the WMP; (ii) the inability to meet capacity and storage requirements is not the result of negligence on the part of the Local Districts and/or the WMP; (iii) the inability to meet capacity and storage requirements is not the result of water quality limitations that are more restrictive than those established pursuant to Section 4.4.D, and (iv) that the Local Districts use Best Efforts to make necessary repairs and/or take other actions necessary to make the Recharge Facilities fully operational.

(1) If the conditions for postponed deliveries are met as required herein, MWD shall make up such deferred deliveries at a later time, to the extent that MWD has Untreated Replenishment Water available.

(2) If the conditions for postponed deliveries are not met as required herein, then MWDôs obligation to deliver water shall be reduced by the amount of water that MWD was prepared to deliver, subject to the 42 cubic feet per second maximum flow rate, and the existence of unused storage capacity up to the 40,000 acre-foot maximum.

I. Pre-Deliveries. MWD shall have complete discretion concerning use of the 40,000 acre feet of storage capacity for the pre-delivery of Imported Water, including the right not to use such capacity. As such, MWD makes no commitments to pre-deliver any amount of Imported Water.

4.5 Funding for Infrastructure. In accordance with the Act, the United States shall establish in the Treasury of the United States a fund in the amount of $10,000,000, managed by the Secretary of the Interior, which may be drawn upon by EMWD to pay or reimburse costs associated with constructing, operating, and maintaining that portion of the Recharge Facilities necessary to accommodate deliveries of the Imported Water.

4.6 Land Transfer.

A. EMWD Property. In settlement of the Action, EMWD shall place into escrow a warranty deed conveying to the Soboba Tribe in fee all of the property presently owned by EMWD at Domenigoni Parkway and Highway 79, consisting of approximately 106 acres which is described and illustrated in Exhibit J to this Settlement Agreement. The escrow instructions shall provide that the warranty deed shall be delivered to the Soboba Tribe by close of business on the first business day following the Effective Date.

B. MWD Property. In settlement of the Action, MWD shall place into escrow a warranty deed conveying to the Soboba Tribe in fee property presently owned by MWD at Domenigoni Parkway and Patterson Avenue, consisting of approximately 21.7 acres which is described and illustrated in Exhibit K to this Settlement Agreement. The escrow instructions shall provide that the warranty deed shall be delivered to the Soboba Tribe by close of business on the first business day following the Effective Date.

C. The Secretary shall accept into trust for the benefit of the Tribe the lands conveyed to the Tribe pursuant to this Section.

D. Use of Property. Management and development by the Soboba Tribe of the lands transferred by this paragraph shall comply with all applicable Federal law. Any regulation by the Soboba Tribe of the environment on, under or above such lands that impacts MWDôs operations, including but not limited to its operations related to Diamond Valley Reservoir, shall be consistent with, and no more stringent than, comparable regulation by the United States and the

State of California.

4.7 Development Funds.

A. Local Districts. No later than 120 days after the Effective Date and before any funds are released to the Local Districts under Section 4.5, the Local Districts shall pay to the Soboba Tribe the sum of $17,000,000 plus interest at the average daily prime rate (as reported by the Wall Street Journal) plus two and one-quarter percent (2.25%) per annum from the Effective Date until paid. These funds are determined to be non-trust funds and shall be managed by the Soboba Tribe in its sole discretion. The United States shall have no responsibility with respect to the funds provided to the Soboba Tribe pursuant to this paragraph.

B. United States. In accordance with the Act, the United States shall establish in the Treasury of the United States a trust fund in the amount of $11,000,000, managed by the Secretary of the Interior in accordance with the American Indian Trust Fund Management Reform Act of 1994 (25 U.S.C. 4001 et seq.) and this Settlement Agreement. There shall be no expenditures from the trust fund until the conditions in Section 3.1 are fulfilled.

(1) Investment of the Fund**.** The Secretary shall invest amounts in this fund in accordance with the Act of April 1, 1880 (21 Stat. 70, ch. 41, 25 U.S.C. 161), the first section of the Act of June 24, 1938 (52 Stat. 1037, ch. 648, 25 U.S.C. 162a), and this paragraph.

(2) Fund Uses. This fund may be drawn upon by the Soboba Tribe with the approval of the Secretary to pay or reimburse costs associated with constructing, operating, and maintaining water and sewage infrastructure or other water-related development projects.

4.8 Other Terms.

A. The Local Districts, with the cooperation of other Groundwater producers in the Basin, shall develop and implement a WMP for the Basin that will address the current Basin overdraft, and recognize and take into account the Tribal Water Right. The WMP shall not be final or deemed effective for the purposes of this Settlement until it is approved by the Soboba Tribe and the United States. No implementation or subsequent modification of the WMP shall threaten or adversely affect the rights of the Soboba Tribe hereunder, and the Soboba Tribe and the United States reserve the right under the continuing jurisdiction of the Decree Court to litigate any such issue.

B. EMWD will credit to the Soboba Tribe the sum of $1,000,000 to be deducted from the cost of water and sewage financial participation fees (connection fees) and similar fees charged by EMWD for any property owned by the Soboba Tribe within EMWD's then existing service area for which service is sought pursuant to an agreement for service between the Soboba Tribe and EMWD. The Soboba Tribe and EMWD agree to negotiate in good faith concerning any future agreement for service which shall be funded in whole or in part by the credit established pursuant to this paragraph.

C. LHMWD will make available for habitat preservation and/or environmental mitigation purposes property it owns in the San Jacinto River bed, consisting of approximately 12 acres which is described and illustrated in Exhibit L to this Settlement Agreement. This property shall be used for habitat preservation and/or environmental mitigation to assist in meeting the requirements of applicable Federal and State environmental laws relating to the Recharge Facilities.

D. In consideration for the benefits received under this Settlement Agreement, the Soboba Tribe shall make available, without transfer of title, up to 98 acres of land for habitat preservation and/or environmental mitigation to assist in meeting the requirements of applicable Federal and State environmental laws relating to the Recharge Facilities. The area from which the Soboba Tribe, in consultation with the United States Fish and Wildlife Service, will select the land to be used for these purposes is described and illustrated in Exhibit M of this Settlement Agreement.

E. The Soboba Tribe agrees to provide the Local Districts with all information reasonably available to the Soboba Tribe that the Local Districts and the Soboba Tribe agree is required to implement this Settlement Agreement and the WMP.

F. MWD shall not be joined in any legal proceeding to enforce the Tribal Water Right described in Sections 4.1 through 4.3 or which concerns the duties and obligations reflected at Section 4.8, paragraphs A through E, unless said proceeding relates to MWDõs failure to perform its obligations to deliver water set forth in Section 4.4.

ARTICLE 5 - RELEASES AND WAIVERS

5.1 Soboba Tribe

A. The Soboba Tribe, on behalf of itself and its members, and the United States solely in its capacity as trustee for the Tribe releases EMWD, LHMWD, and MWD for:

(1) All past, present and future claims to Surface and Groundwater rights for the Reservation, from time immemorial through the Effective Date and anytime thereafter;

(2) All past, present and future claims for injury of any kind, whether to person, property, or other right or interest, arising from, or in any way related to, interference with Surface and Groundwater rights and resources of the Reservation, including, but not limited to, all claims for injury to the Soboba Tribeõs use and enjoyment of the Reservation, economic development, religion, language, social structure and culture, and injury to the natural resources of the Reservation, from time immemorial through the Effective Date;

(3) All past, present and future claims for injury of any kind, whether to person, property, or other right or interest, arising from, or in any way related to, continuing interference with Surface and Groundwater rights and resources of the Reservation, including the full scope of claims defined in Section 5.1.A(2), to the extent that such continuing interference began prior to the Effective Date, from time immemorial through the Effective Date and anytime thereafter;

(4) All past, present and future claims for injury of any kind, whether to person, property, or other right or interest, arising from, or in any way related to, seepage of water into the Tunnel, including the full scope of claims defined in Section 5.1.A(2), from time immemorial through the Effective Date and anytime thereafter.

B. The Soboba Tribe, on behalf of itself and its members, releases the United States for:

(1) All claims described in Section 5.1.A(1)-(4);

(2) All past, present and future claims for failure to acquire or develop water rights

and resources of the Reservation from time immemorial through the Effective Date and anytime thereafter;

(3) All past, present and future claims for failure to protect water rights and resources of the Reservation from time immemorial through the Effective Date, and any past, present and future claims for any continuing failure to protect water rights and resources of the Reservation, from time immemorial through the Effective Date and, to the extent that such continuing failure to protect began before the Effective Date, anytime thereafter;

(4) All past, present and future claims arising from the failure of any non-federal Party to fulfill the terms of this Settlement Agreement at anytime.

(5) All past, present, and future claims arising out of the negotiation of this Settlement Agreement or the negotiation and enactment of the Act, or any specific terms or provisions thereof, including but not limited to the Soboba Tribeõs consent to limit the number of participant parties to this Settlement Agreement.

C. The Soboba Tribe, on behalf of itself and its members, expressly preserves as against all Parties all rights and remedies relating to:

(1) The enforcement of this Settlement Agreement;

(2) The infringement of any water rights arising under Federal or State law which may be appurtenant to property, other than the Reservation, that is now owned or hereafter acquired by the Soboba Tribe, excepting claims identified in Section 5.1.A(4), which relate to Tunnel seepage, and any challenge to approved portions of the WMP.

D. The Soboba Tribe agrees to defend, indemnify, and hold harmless EMWD, LHMWD, MWD, and the United States for any claim seeking damages or other form of relief based upon the rights released by the Soboba Tribe in Section 5.1.A and B, and all of their respective subparts.

5.2 EMWD

A. EMWD shall release LHMWD, MWD, the Soboba Tribe, and the United States from:

(1) All past and present claims arising from or in any way related to the claims released by the Soboba Tribe and the United States solely in its capacity as trustee for the Soboba Tribe in Section 5.1, A and B, and all of their respective subparts; and

(2) All past and present claims arising from, or in any way related to, interference with EMWDôs Surface and Groundwater rights under Federal or State law from time immemorial through the Effective Date, including, but not limited to, all rights originally belonging to EMWDôs predecessors and/or otherwise acquired by EMWD prior to the Effective Date .

B. Notwithstanding the dispute between EMWD and MWD over the scope of EMWDôs defense and indemnity obligations reflected in Section 8 of Resolution 3940 (the Terms of Annexation) or the language of Section 8, EMWD shall defend and indemnify MWD against all demands, claims, suits, or other administrative or legal proceedings arising from, or in anyway connected to, the infiltration of water into the Tunnel. This obligation shall apply irrespective of when the claim arose or the alleged infringement, harm, or injury occurred.

C. EMWD expressly preserves all rights and remedies relating to:

(1) As against all Parties, the enforcement of this Settlement Agreement;

(2) As against all Parties, the infringement of any water rights arising under State law acquired in the future by EMWD; and

(3) As against MWD, the Terms of Annexation, except as expressly agreed to in Section 5.2.B.

5.3 LHMWD

A. LHMWD shall release EMWD, MWD, the Soboba Tribe, and the United States from:

(1) All past and present claims arising from or in any way related to the claims released by the Soboba Tribe and the United States solely in its capacity as trustee for the Soboba Tribe in Section 5.1.A and B, and all of their respective subparts; and

(2) All past and present claims arising from, or in any way related to, interference

with LHMWDôs Surface and Groundwater rights under Federal or State law from time immemorial through Effective Date.

B. LHMWD expressly preserves all rights and remedies relating to:

(1) As against all Parties, the enforcement of th is Settlement Agreement; and

(2) As against all Parties, the infringement of any water rights arising under State law acquired in the future by LHMWD.

5.4 MWD

A. MWD shall release EMWD, LHMWD, the Soboba Tribe, and the United States from:

(1) All past and present claims arising from or in any way related to the claims released by the Soboba Tribe and the United States solely in its capacity as trustee for the Soboba Tribe in Section 5.1.A and B, and all of their respective subparts; and

(2) All past and present claims arising from, or in any way related to, interference with MWDôs Surface and Groundwater rights under Federal or State law from time immemorial through the Effective Date .

B. MWD expressly preserves all rights and remedies relating to:

(1) As against all Parties, the enforcement of this Settlement Agreement;

(2) As against all Parties, the infringement of any water rights arising under State law acquired in the future by MWD; and

(3) As against EMWD, the Terms of Annexation, except as expressly agreed to in Section 5.2.B.

5.5 All Parties Release of Unknown Claims.

A. Each Party acknowledges and agrees that certain of the releases reflected in Sections 5.1 through 5.5 apply to all claims whether known or unknown to the releasing Party.

B. Each Party certifies that it has read the following provisions of California Civil Code Section 1542:

ñA general release does not extend to claims which the creditor does not know or suspect to exist in his favor at the time of executing the release, which if known by him must have materially affected his settlement with the debtor.ò

C. Each Party waives the application of California Civil Code Section 1542. In doing so, each Party acknowledges that it is consciously releasing claims that may exist as of the date of this release but which it does not know exist, and which, if known, would materially affect its decision to execute this Settlement Agreement, regardless of whether the Partiesô lack of knowledge is the result of ignorance, oversight, error, negligence, or any other cause.

5.6 Waiver of Sovereign Immunity. If any Party to this Settlement Agreement brings an action or other proceeding in any court of the United States relating only and directly to the interpretation or enforcement of the Act or the Settlement Agreement and names the United States or the Soboba Tribe as a party, the United States, the Tribe, or both, may be joined in any such action, and any claim by the United States or the Tribe to sovereign immunity from the action is waived, other than with respect to claims for monetary awards, for the limited and sole purpose of such interpretation or enforcement.

ARTICLE 6- ADMINISTRATION AND OTHER CONSIDERATIONS

6.1 Disclaimer. Nothing in this Settlement Agreement shall be construed as establishing any standard to be used for the quantification of Federal reserved rights, aboriginal claims, or any other Indian claims to water or lands in any judicial or administrative forum or proceeding. Nothing in this Settlement Agreement shall be construed to quantify or otherwise affect the water rights, claims or entitlements to water of any California tribe, band or community other than the Soboba Tribe.

6.2 Evidentiary Effect of Negotiations. This Settlement Agreement has been arrived at in the process of good faith negotiation for the purpose of resolving legal disputes, including pending litigation, and all Parties agree that no conduct, statements, offers, or compromises made in the course thereof shall be construed as admissions against interest or be used in any legal forum or proceeding other than one for approval, confirmation, interpretation, or enforcement of this Settlement Agreement.

6.3 Authorship. The Parties agree that this Settlement Agreement reflects the joint drafting efforts of all Parties. In the event that any dispute, disagreement, or controversy arises regarding this Settlement Agreement, the Parties shall be considered joint authors and no provision shall be interpreted against any Party because of authorship.

6.4 Authorization to Execute. Each Party represents and warrants that she or he is authorized to execute this Settlement Agreement on behalf of the respective Parties to this Settlement Agreement and does so freely and voluntarily.

6.5 Effect of Execution by the Districts. Execution of this Settlement Agreement by the Districts signifies that provisions of this Settlement Agreement affecting the Districts have been approved by their respective Boards of Directors, and these agencies assume the obligations of and are entitled to the benefits of this Settlement Agreement.

6.6 No Inducements. Each Party acknowledges and represents that in executing this Settlement Agreement it has not relied upon any inducements, promises, or representations made by the other Parties which are not reflected in this Settlement Agreement.

6.7 Advice of Counsel. Each Party warrants and represents that, in executing this Settlement Agreement, it has relied upon legal advice from counsel of its choice; that the terms of this Settlement Agreement have been read and its consequences have been completely explained to it by counsel; and that it fully understands the terms of this Settlement Agreement.

6.8 Contingent on Appropriation of Funds. The expenditure or advance of any money or the performance of any obligation by the United States under this Settlement Agreement is contingent upon appropriation of funds therefor. If funds are not appropriated, the United States shall accrue no liability.

6.9 Officials Not to Benefit. No member of or delegate to Congress or Resident Commissioner shall be admitted to any share or part of this Settlement Agreement or to any benefit that may arise from this Settlement Agreement. This restriction shall not be construed to extend to this Settlement Agreement if made with a corporation or company for its general benefit.

6.10 Counterparts. This Settlement Agreement may be signed in counterparts by one or more of the Parties, and those counterparts, when taken together, shall have the same force and effect as if a single, original document had been signed by all the Parties.

6.11 Jurisdiction. The Decree Court retains jurisdiction over the Judgment and Decree and the Settlement Agreement.

6.12 Governing Law. This Settlement Agreement shall be construed in accordance with Federal laws and where appropriate the laws of the State of California.

6.13 Successors and Assigns. This Settlement Agreement and the attached waivers and agreements shall, unless otherwise indicated, be binding on and inure to the benefit of the Parties, and their respective successors and assigns.

6.14 Integration. This Settlement Agreement incorporates all the exhibits and sets forth the entire agreement of the Parties with respect to the subject matter hereof, with the exception that EMWD and MWD have resolved certain rights and obligations by way of a Partial Settlement Agreement dated November 14, 2001 which shall remain binding on those two Parties only. This Settlement Agreement may be amended only by written agreement executed by the Parties.

ARTICLE 7- NOTICE AND SIGNATURES

7.1 Notices. Any notice or other communication given under this Settlement Agreement must be in writing and delivered by overnight courier service or certified mail, return receipt requested, postage prepaid and properly addressed to the Parties at the addresses listed below (or to any other or further addresses the Parties may subsequently designate by notice in this manner). All these notices and communication shall be effective when delivery to the required recipient is completed in accordance with this paragraph:

To the Soboba Tribe:

Chairperson
Soboba Band of Luiseño Indians
P.O. Box 487
San Jacinto, CA 92581

To the United States of America:

Asst. Secretary for Indian Affairs
U.S. Department of the Interior
1849 C St. NW 4104 MIB
Washington, DC 20240-0001
Chief, U.S. Dept. of Justice
Indian Resources Section
P.O. Box 44378
LŒnfant Plaza Station Washington, DC 20026-4378

cc: Regional Director
Bureau of Indian Affairs
Pacific Region
2800 Cottage Way
Sacramento, CA 95825

To EMWD:

General Manager
Eastern Municipal Water District
P.O. Box 8300
Perris, CA 92572-8300

To LHMWD:

General Manager
Lake Hemet Municipal Water District
2480 East Florida Avenue
P.O. Box 5039
Hemet, CA 92544

To MWD:

Chief Executive Officer
Metropolitan Water District of Southern California
P.O. Box 54153
Los Angeles, California 90054-0153

General Counsel
Metropolitan Water District of Southern California
P.O. Box 54153
Los Angeles, California 90054-0153

IN WITNESS WHEREOF, the Parties have executed this Settlement Agreement on the day and year written below.

SOBOBA BAND OF LUISEÑO INDIANS

Date: ___________

By:____
Robert J. Salgado Sr., Chairman

THE UNITED STATES OF AMERICA

Date: ___________ By:____

THE EASTERN MUNICIPAL WATER DISTRICT

Date: ___________ By:____
Randy A. Record, President

THE LAKE HEMET MUNICIPAL WATER DISTRICT

Date: ___________ By:____
Joseph D. Van Sickle, President

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Date ___________ By:____
Jeffrey Kightlinger, General Manager

EXHIBITS TO SETTLEMENT AGREEMENT

A. Soboba Settlement Act

B. Map of the Basin and San Jacinto River

C. Description of the Basin

D. Map of the Soboba Reservation

E Principles for Water Management

F. Map of the Water Management Plan Area

G. Description of the Water Management Plan Area

H. Judgment and Decree

I. Soboba Tribeǒs Water Development Schedule

J. Description of EMWD Property

K. Description of MWD Property

L. Description of LHMWD Property

M. Map of Potential Soboba Reservation Lands for Habitat Preservation and/or Environmental Mitigation

SEC. 1. SHORT TITLE.

This Act may be cited as the 'Soboba Band of Luiseño Indians Settlement Act'.

SEC. 2. FINDINGS AND PURPOSES.

(a) FINDINGS.– The Congress finds the following–

(1) The Soboba Band of Luiseño Indians is a federally-recognized Indian tribe whose Reservation of approximately 6,000 acres, extending east and north from the banks of San Jacinto River in Riverside County, California, was created by an Executive Order of June 19, 1883, and enlarged and modified by subsequent Executive Orders, purchases, and an Act of Congress.

(2) The Tribe's water rights have not been quantified, and the Tribe has longstanding unresolved claims for interferences with the water resources of its Reservation, which the Tribe maintains have rendered much of the Tribe's Reservation useless for habitation, livestock, or agriculture. On April 20, 2000, the Tribe filed a lawsuit against The Metropolitan Water District of Southern California for interference with the Tribe's water resources and damages to its Reservation allegedly caused by Metropolitan's construction and operation of the San Jacinto Tunnel, which is part of the Colorado River Aqueduct. The lawsuit, styled *Soboba Band of Luiseño Indians v. Metropolitan Water District of Southern California*, No. 00-04208 GAF (MANx), is pending in the United States District Court for the Central District of California.

(3) The Tribe also has made claims against Eastern Municipal Water District and Lake Hemet Municipal Water District, located adjacent to the Reservation, seeking to secure its water rights and damages arising from alleged past interference with the Tribe's water resources.

(4) Recognizing that the final resolution of its water rights and claims through litigation will take many years and entail great expense to all parties, continue to limit the Tribe's access to water with economic, social, and cultural consequences to the Tribe, prolong uncertainty as to the availability of water supplies, and seriously impair the long-term economic planning and development of all parties, the Tribe and non-Indian entities have sought to settle their water-related disputes and reduce the burdens of litigation.

(5) After negotiations, which included participation by representatives of the Tribe, the United States, The Metropolitan Water District of Southern California, Eastern Municipal Water District, and Lake Hemet Municipal Water District, the parties have entered into a Settlement Agreement to determine the Tribe's water rights, resolve all of its claims for interference with the water resources of, and damages to, its Reservation, and provide for the construction of water projects to facilitate the exercise of the Tribe's rights.

(6) Pursuant to the Settlement Agreement, Eastern Municipal Water District and Lake Hemet Municipal Water District acknowledge and assure the Tribe's prior and paramount right, superior to all others, to pump 9,000 acre-feet of water annually from the San Jacinto River basin. To provide water to the Tribe and to

reduce the overdraft of the basin, the two water districts and The Metropolitan Water District of Southern California will contract to import and recharge supplemental water supplies into the basin. The water districts also will make substantial additional contributions to the settlement, including the conveyance of certain replacement lands and economic development funds to the Tribe, to carry out the Settlement Agreement's provisions.

(7) It is appropriate that the United States participate in the implementation of the Settlement Agreement, and contribute funds to enable the Tribe to use its water entitlement in developing its Reservation, and to assist the neighboring non-Indian entities in the construction, operation, and maintenance of the facilities required to recharge the imported water.

(b) PURPOSES.– The purposes of this Act are–

(1) to approve, ratify, and confirm the Settlement Agreement entered into by the Tribe and non-Indians entities;

(2) to authorize and direct the Secretary of the Interior to execute and perform the Settlement Agreement and related waivers;

(3) to authorize the actions, agreements, and appropriations as provided in the Settlement Agreement and this Act.

SEC. 3. DEFINITIONS.

In this Act–

(1) RESTORATION FUND.– The term 'Restoration Fund' means the San Jacinto Basin Restoration Fund established by section 6 of this Act.

(2) DEVELOPMENT FUND.– The term 'Development Fund' means the Soboba Band of Luiseño Indians Water Development Fund established by section 7 of this Act.

(3) RESERVATION.– The term 'Reservation' means the Soboba Indian Reservation created by an Executive Order dated June 19, 1883, and enlarged and modified by subsequent Executive Orders, purchases, and an Act of Congress, excluding the 950 acres northwest of and contiguous to the Reservation known as the "Jones Ranch," purchased by the Soboba Tribe in fee on July 21, 2001, and placed into trust on January 13, 2003, the 129.19 acres southeast of and contiguous to the Reservation known as the "Horseshoe Properties," purchased by the Soboba Tribe in fee in four separate transactions in June and December 2001, and the 478 acres north of and contiguous to the Reservation known as "Kwiili," purchased by the Soboba Tribe in fee on April 4, 2004.

(4) SECRETARY.– The term 'Secretary' means the Secretary of the Interior or her designee.

(5) SETTLEMENT AGREEMENT.– The term 'Settlement Agreement' means that agreement dated __________, 2004, together with all exhibits thereto. The parties to the Settlement Agreement are the Soboba Band of Luiseño Indians and its members, the United States on behalf of the Tribe and its members, The

Metropolitan Water District of Southern California, Eastern Municipal Water District, and Lake Hemet Municipal Water District.

(6) TRIBE, SOBOBA TRIBE, or SOBOBA BAND OF LUISEÑO INDIANS.– The terms ‘Tribe’, ‘Soboba Tribe’, or ‘Soboba Band of Luiseño Indians’ means the body politic and federally recognized Indian tribe, and its members.

(7) WATER MANAGEMENT PLAN.– The term ‘Water Management Plan’ means the plan, approved by the Soboba Tribe and the Secretary, developed pursuant to Section 4.8, paragraph A of the Settlement Agreement to resolve the overdraft of the San Jacinto basin.

SEC. 4. RATIFICATION OF SETTLEMENT AGREEMENT; AUTHORIZATION.

(a) IN GENERAL.– The United States hereby approves, ratifies, and confirms the Settlement Agreement, except to the extent it conflicts with the provisions of this Act, and consents to be made a party to the pending action described in section 2, paragraph (a)(2) of this Act for the purpose of entering the judgment and decree attached to the Settlement Agreement as Exhibit H.

(b) AUTHORIZATION.– The Secretary is authorized and directed to execute, and take such other actions as are necessary to implement, the Settlement Agreement and any amendments approved by the parties necessary to make the Settlement Agreement consistent with this Act.

SEC. 5. AUTHORIZATION OF APPROPRIATIONS.

(a) RESTORATION FUND.– There is authorized to be appropriated to the San Jacinto Basin Restoration Fund established in section 6 of this Act the amount of $10,000,000 to pay or reimburse costs associated with constructing, operating, and maintaining the portion of the basin recharge project, described in Section 4.5 of the Settlement Agreement, necessary to accommodate deliveries of the supplemental imported water under Section 4.4 of the Settlement Agreement.

(b) DEVELOPMENT FUND.– There is authorized to be appropriated to the Soboba Band of Luiseño Indians Water Development Fund established in section 7 of this Act the amount of $11,000,000 to pay or reimburse costs associated with constructing, operating, and maintaining water and sewage infrastructure, and other water-related development projects.

SEC. 6. RESTORATION FUND.

(a) ESTABLISHMENT.– There shall be established within the Treasury of the United States a non-interest bearing account to be known as the ‘San Jacinto Basin Restoration Fund’, consisting of the amounts authorized to be appropriated in section 5, paragraph (a) of this Act.

(b) ADMINISTRATION.– The Restoration Fund shall be administered by the Secretary for the purposes set forth in paragraph (d) of this section.

(c) AVAILABILITY.– The funds authorized to be appropriated pursuant to section 5, paragraph (a) of this Act shall be available for expenditure or withdrawal only after the requirements set forth in section 9(e) of this Act and paragraph (d) of this section have been met.

(d) EXPENDITURES AND WITHDRAWALS.–

(1) EXPENDITURE PLAN.–

(A) IN GENERAL.– Eastern Municipal Water District, on behalf of the Water Management Plan, shall submit to the Secretary for approval an expenditure plan for use of the Restoration Fund.

(B) REQUIREMENTS.– The expenditure plan shall require that any funds be expended or reimbursed in accordance with the purposes described in section 5, paragraph (a) of this Act.

(C) APPROVAL.– The Secretary shall approve the expenditure plan if it is reasonable and not inconsistent with this Act.

(2) WITHDRAWALS.– On approval by the Secretary of the expenditure plan described in this section, Eastern Municipal Water District, on behalf of the Water Management Plan, may withdraw monies from the Restoration Fund as provided in the plan.

(3) ENFORCEMENT.– The Secretary may take judicial or administrative action to enforce the provisions of any expenditure plan to ensure that monies withdrawn from the Restoration Fund under the plan are used in accordance with this Act.

(4) LIABILITY.– If Eastern Municipal Water District, on behalf of the Water Management Plan, exercises the right to withdraw monies from the Restoration Fund, neither the Secretary nor the Secretary of the Treasury shall retain any liability for the expenditure or investment of the monies withdrawn.

(5) ANNUAL REPORT.– Eastern Municipal Water District shall submit to the Tribe and the Secretary an annual report that describes all expenditures from the Restoration Fund during the year covered by the report.

SEC. 7. DEVELOPMENT FUND.

(a) ESTABLISHMENT.– There shall be established within the Treasury of the United States an interest bearing account to be known as the ‘Soboba Band of Luiseño Indians Water Development Fund’, to be managed and invested by the Secretary, consisting of the amounts authorized to be appropriated in section 5, paragraph (b) of this Act.

(b) MANAGEMENT.– The Secretary shall manage the Development Fund, make investments, and make monies available for distribution consistent with the American Indian Trust Fund Management Reform Act of 1994 (25 U.S.C. 4001 et seq.) (referred to in this section as the ‘Trust Fund Reform Act’), this Act, and the Settlement Agreement.

(c) INVESTMENT.– The Secretary shall invest amounts in the Development Fund in accordance with–

(1) the Act of April 1, 1880 (21 Stat. 70, ch. 41, 25 U.S.C. 161);

(2) the first section of the Act of June 24, 1938 (52 Stat. 1037, ch. 648, 25 U.S.C. 162a); and

(3) paragraph (b) of this section.

(d) AVAILABILITY.– The funds authorized to be appropriated pursuant to section 5, paragraph (b) of this Act shall be available for expenditure or withdrawal only after the requirements set forth in section 9(e) of this Act and paragraph (e) below have been met.

(e) EXPENDITURES AND WITHDRAWALS.–

(1) TRIBAL MANAGEMENT PLAN.–

(A) IN GENERAL.– The Tribe may withdraw all or part of the Development Fund on approval by the Secretary of a tribal management plan as described in the Trust Fund Reform Act.

(B) REQUIREMENTS.– In addition to the requirements under the Trust Fund Reform Act, the tribal management plan shall require that any funds be expended or reimbursed in accordance with the purposes described in section 5, paragraph (b) of this Act.

(2) ENFORCEMENT.– The Secretary may take judicial or administrative action to enforce the provisions of any tribal management plan to ensure that monies withdrawn from the Development Fund under the plan are used in accordance with this Act.

(3) LIABILITY.– If the Tribe exercises the right to withdraw monies from the Development Fund, neither the Secretary nor the Secretary of the Treasury shall retain any liability for the expenditure or investment of the monies withdrawn.

(4) ANNUAL REPORT.– The Tribe shall submit to the Secretary an annual report that describes all expenditures from the Development Fund during the year covered by the report.

(5) NO PER CAPITA DISTRIBUTIONS.– No part of the Development Fund shall be distributed on a per capita basis to members of the Tribe.

SEC. 8. WAIVERS AND RELEASES.

(a) TRIBE AND UNITED STATES AUTHORIZATION.– The Tribe, on behalf of itself and its members, and the Secretary, on behalf of the United States in its capacity as trustee for the Tribe and its members, are authorized, as part of the performance of their obligations under the Settlement Agreement, to execute a waiver and release for claims under Federal, State, or other law against The Metropolitan Water District of Southern California, Eastern Municipal Water District and Lake Hemet Municipal Water District, for any and all–

(1) past, present, and future claims to surface and groundwater rights for the Reservation from time immemorial through the effective date described in section 10 of this Act and anytime thereafter;

(2) past, present, and future claims for injury of any kind, whether to person, property, or other right or interest, arising from, or in any way related to,

interference with surface and groundwater rights and resources of the Reservation, including, but not limited to, all claims for injury to the Tribe's use and enjoyment of the Reservation, economic development, religion, language, social structure and culture, and injury to the natural resources of the Reservation, from time immemorial through the effective date described in section 10 of this Act;

(3) past, present, and future claims for injury of any kind, whether to person, property, or other right or interest, arising from, or in any way related to, continuing interference with surface and groundwater rights and resources of the Reservation, including the full scope of claims defined in Section 5.1, paragraph A(2) of the Settlement Agreement, to the extent that such continuing interference began prior to the effective date described in section 10 of this Act, from time immemorial through the effective date described in section 10 of this Act and anytime thereafter; and

(4) past, present, and future claims for injury of any kind, whether to person, property, or other right or interest, arising from, or in any way related to, seepage of water into the San Jacinto Tunnel, including the full scope of claims defined in Section 5.1, paragraph A(2) of the Settlement Agreement, from time immemorial through the effective date described in section 10 of this Act and anytime thereafter.

(b) TRIBAL WAIVERS AGAINST THE UNITED STATES.– The Tribe is authorized, as part of the performance of its obligations under the Settlement Agreement, to execute a waiver and release for claims against the United States (acting in its capacity as trustee for the Tribe or its members, or otherwise acting on behalf of the Tribe or its members), including any agencies, officials, or employees thereof, for any and all–

(1) claims described in paragraph (a) of this section;

(2) past, present, and future claims for failure to acquire or develop water rights and resources of the Reservation from time immemorial through the effective date described in section 10 of this Act and anytime thereafter;

(3) past, present, and future claims for failure to protect water rights and resources of the Reservation from time immemorial through the effective date described in section 10 of this Act, and any past, present, and future claims for any continuing failure to protect water rights and resources of the Reservation, from time immemorial through the effective date described in section 10 of this Act and, to the extent that such continuing failure to protect began before the effective date described in section 10 of this Act, anytime thereafter;

(4) past, present, and future claims arising from the failure of any non-federal Party to fulfill the terms of the Settlement Agreement at anytime; and

(5) past, present, and future claims arising out of the negotiation of the Settlement Agreement or the negotiation and enactment of this Act, or any specific terms or provisions thereof, including, but not limited to, the Tribe's consent to limit the number of participant parties to the Settlement Agreement.

SEC. 9. MISCELLANEOUS PROVISIONS.

(a) WAIVER OF SOVEREIGN IMMUNITY.– If any party to the Settlement Agreement brings an action or other proceeding in any court of the United States relating only and directly to the interpretation or enforcement of this Act or the Settlement Agreement and names the United States or the Soboba Tribe as a party–

(1) the United States, the Tribe, or both, may be joined in any such action; and

(2) any claim by the United States or the Tribe to sovereign immunity from the action is waived, other than with respect to claims for monetary awards, for the limited and sole purpose of such interpretation or enforcement.

(b) TRIBAL USE OF WATER.–

(1) IN GENERAL.– With respect to water rights made available under the Settlement Agreement–

(A) the Tribe may use water made available to it under the Settlement Agreement for any use it deems advisable on the Reservation and on any other lands it owns or may acquire, in fee or in trust, contiguous to the Reservation or within the area of the groundwater basin described in Section 2.4 of the Settlement Agreement;

(B) such water rights shall be held in trust by the United States in perpetuity, and shall not be subject to forfeiture or abandonment; and

(C) State law shall not apply to the Tribe's use of water made available to it under the Settlement Agreement.

(2) LIMITATION.–

(A) IN GENERAL.– Except as provided in paragraph (B) below, the Tribe shall not sell or lease water made available to it under the Settlement Agreement.

(B) EXCEPTION.– The Tribe may enter into contracts and options to lease, contracts and options to exchange, or contracts and options to forbear the use of water made available to it under the Settlement Agreement or postpone undertaking new or expanded water uses, provided that any such contract or option for a term greater than five years shall require the approval of the Secretary. Any such water thereby made available to others shall only be used by participants in, or other users within the area of, the Water Management Plan described in Section 2.32 of the Settlement Agreement. No contract shall be for a term exceeding one hundred years, nor shall any contract provide for permanent alienation of any portion of the water rights made available under the Settlement Agreement.

(c) ACCEPTANCE OF LAND INTO TRUST.– The Secretary shall accept into trust for the benefit of the Tribe the lands conveyed to the Tribe pursuant to Section 4.6 of the Settlement Agreement, which conveyed lands shall be considered for all purposes as if they were so acquired into trust status in 1937, except as to valid rights existing at the time of acquisition pursuant to this Act.

(d) HABITAT CONSERVATION.– The United States, in its capacity as trustee for the Tribe, and the Tribe in its own right shall make available, including, if necessary, by conveyance of a permanent easement to the United States Fish and Wildlife Service or other agency of the United States, up to 98 acres of Reservation land for habitat conservation related to the portion of the basin recharge project necessary to accommodate deliveries of the supplemental imported water described in Section 4.4 of the Settlement Agreement.

(e) AVAILABILITY OF APPROPRIATIONS.– The funds authorized to be appropriated under section 5 of this Act shall not be available for expenditure or withdrawal until the requirements of section 10(a) of this Act have been met and the waivers and releases set out in section 8 of this Act become effective.

(f) RETENTION OF RIGHTS.–

(1) In the event the waivers and releases set out in section 8 of this Act do not become effective pursuant to section 10(a) of this Act, the Soboba Tribe and the United States shall retain the right to assert all rights and claims enumerated in section 8, and any claims or defenses of the parties to the Settlement Agreement shall also be retained.

(2) The parties expressly reserve all rights not specifically granted, recognized, waived, or released by the Settlement Agreement or this Act.

(g) PRECEDENT.– Nothing in this Act shall be construed or interpreted as a precedent for the quantification or litigation of federal reserved water rights or the interpretation or administration of future water settlement Acts.

(h) OTHER INDIAN TRIBES.– Nothing in the Settlement Agreement or this Act shall be construed in any way to quantify or otherwise adversely affect the water rights, claims, or entitlements to water of any Indian tribe, band, or community, other than the Soboba Tribe.

(i) ENVIRONMENTAL COMPLIANCE.–

(1) Signing by the Secretary of the Settlement Agreement does not constitute major Federal action under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.).

(2) The Secretary shall comply with all aspects of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), and other applicable environmental laws, in implementing the terms of the Settlement Agreement and this Act.

SEC. 10. EFFECTIVE DATE.

(a) IN GENERAL.– The waiver and release authorizations contained in subsections (b) and (c) of section 8 of this Act shall become effective as of the date the Secretary causes to be published in the Federal Register a statement of findings that–

(1) this Act has been enacted;

(2) to the extent that the Settlement Agreement conflicts with this Act, the Settlement Agreement has been revised to conform with the Act;

(3) the Settlement Agreement, revised as necessary, and the waivers and releases described in Article 5 of the Settlement Agreement and section 8 of this Act have been executed by the parties and the Secretary;

(4) warranty deeds for the property to be conveyed to the Tribe described in section 4.6 of the Settlement Agreement have been placed in escrow;

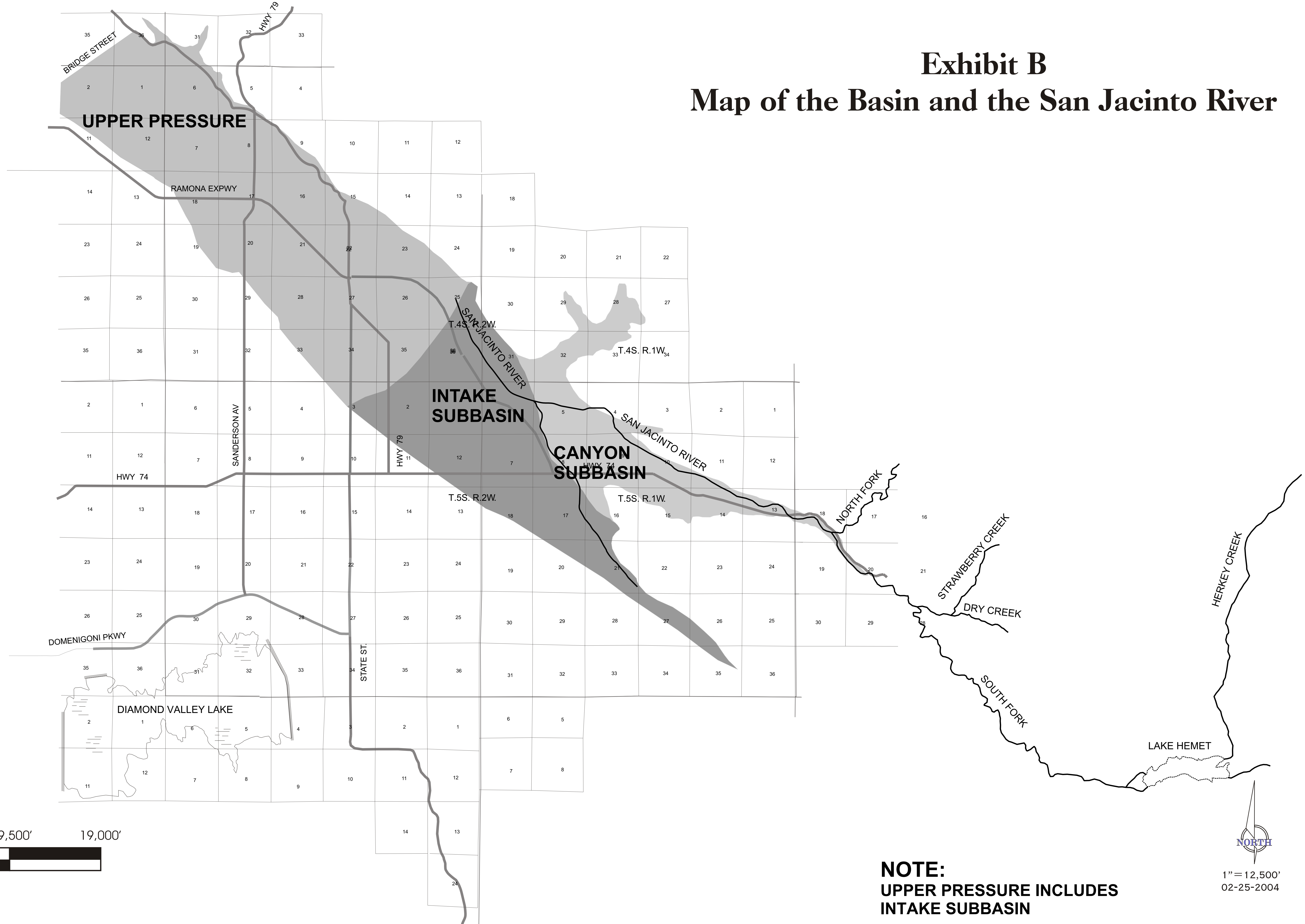
(5) the Tribe and the Secretary have approved the Water Management Plan;

(6) the judgment and decree attached to the Settlement Agreement as Exhibit H has been approved by the United States District Court, Eastern Division of the Central District of California, and that judgment and decree have become final and nonappealable; and

(7) the payment of the funds authorized by section 5 of this Act have been appropriated and deposited into the Restoration Fund and the Development Fund.

(b) DEADLINE FOR EFFECTIVE DATE.– If the conditions precedent required under paragraph (a) of this section have not been fulfilled by December 31, 2007, the Settlement Agreement and this Act shall not thereafter be effective and shall be null and void. Any funds and the interest accrued thereon appropriated pursuant to section 5 shall revert to the general fund of the United States Treasury on October 1, 2008.

Exhibit B
Map of the Basin and the San Jacinto River



NOTE:
UPPER PRESSURE INCLUDES INTAKE SUBBASIN

Exhibit C – Description of the Basin

Legal Description for Canyon Sub-basin

Beginning at a point lying North 03-03-37 East, a distance of 8693.42 feet from the north one quarter corner of Section 7, Township 5 South, Range 1 East, S.B.B. & M.:

Thence South 33-29-10 East, a distance of 1188.9727
Thence South 20-26-50 East, a distance of 500.9370
Thence South 27-28-23 East, a distance of 428.6517
Thence South 31-35-33 East, a distance of 630.8741
Thence South 21-07-46 East, a distance of 910.5965
Thence South 18-48-47 East, a distance of 1015.1730
Thence South 24-22-09 East, a distance of 638.3066
Thence South 14-50-24 East, a distance of 1778.9616
Thence South 09-47-36 East, a distance of 1132.4407
Thence South 10-53-51 East, a distance of 909.1444
Thence South 21-23-19 East, a distance of 960.3948
Thence South 16-05-57 East, a distance of 627.4825
Thence South 17-13-52 East, a distance of 1029.1928
Thence South 26-09-14 East, a distance of 249.2721
Thence South 46-45-44 East, a distance of 1246.0249
Thence South 45-42-20 East, a distance of 804.0414
Thence South 53-45-51 East, a distance of 494.8303
Thence South 41-51-15 East, a distance of 662.8068
Thence South 37-57-12 East, a distance of 682.2970
Thence South 44-35-54 East, a distance of 598.8896
Thence South 31-20-45 East, a distance of 1101.0137
Thence South 37-47-48 East, a distance of 1333.2990
Thence South 55-04-55 East, a distance of 865.4271
Thence South 61-29-59 East, a distance of 379.0620
Thence South 66-22-49 East, a distance of 339.4363
Thence South 42-07-01 East, a distance of 362.8961
Thence South 59-20-26 East, a distance of 310.8241
Thence North 44-35-20 West, a distance of 271.0057
Thence North 27-14-21 West, a distance of 679.4763
Thence North 09-26-25 West, a distance of 669.1250
Thence North 15-50-43 West, a distance of 716.4738
Thence North 22-47-41 West, a distance of 436.5304
Thence North 20-37-42 West, a distance of 399.1550
Thence North 05-56-49 West, a distance of 259.3960
Thence North 12-05-28 West, a distance of 264.3646
Thence North 14-27-19 East, a distance of 118.1782
Thence North 50-21-25 East, a distance of 158.1102
Thence North 65-13-15 East, a distance of 328.2188
Thence North 82-49-41 East, a distance of 264.3181
Thence South 84-49-29 East, a distance of 420.5895
Thence South 77-19-12 East, a distance of 411.1524
Thence South 62-03-23 East, a distance of 453.0744
Thence South 53-30-14 East, a distance of 237.5929
Thence South 57-59-51 East, a distance of 266.6488
Thence South 66-45-48 East, a distance of 360.0835
Thence South 74-02-50 East, a distance of 326.3171
Thence South 70-08-39 East, a distance of 314.8424
Thence South 63-01-30 East, a distance of 234.3736
Thence South 35-38-22 East, a distance of 237.4798

57	Thence South 42-04-07 East, a distance of 284.3200
58	Thence South 48-59-46 East, a distance of 322.1632
59	Thence South 55-05-28 East, a distance of 338.9985
60	Thence South 76-41-52 East, a distance of 627.2030
61	Thence South 80-50-12 East, a distance of 689.1699
62	Thence South 68-34-43 East, a distance of 243.1736
63	Thence South 51-17-14 East, a distance of 422.9187
64	Thence South 23-13-07 East, a distance of 305.0162
65	Thence South 17-07-37 East, a distance of 348.0598
66	Thence South 20-36-34 East, a distance of 243.2560
67	Thence South 77-20-44 East, a distance of 411.1112
68	Thence North 88-22-32 East, a distance of 489.4467
69	Thence South 89-35-23 East, a distance of 209.5054
70	Thence South 77-48-51 East, a distance of 428.1470
71	Thence South 46-33-41 East, a distance of 358.4156
72	Thence South 54-02-09 East, a distance of 300.5375
73	Thence North 76-21-42 East, a distance of 288.1242
74	Thence North 17-30-54 East, a distance of 237.5765
75	Thence North 16-48-48 East, a distance of 309.4149
76	Thence North 34-06-01 East, a distance of 125.9718
77	Thence North 84-56-56 East, a distance of 368.4308
78	Thence South 89-35-24 East, a distance of 227.1308
79	Thence South 79-15-43 East, a distance of 390.4622
80	Thence South 89-35-24 East, a distance of 751.1442
81	Thence North 68-02-21 East, a distance of 321.0451
82	Thence North 76-24-34 East, a distance of 144.1615
83	Thence North 82-57-46 East, a distance of 405.0514
84	Thence North 77-54-02 East, a distance of 322.0287
85	Thence South 66-25-23 East, a distance of 265.9506
86	Thence South 68-58-41 East, a distance of 149.3127
87	Thence North 54-52-10 East, a distance of 300.6385
88	Thence North 29-27-12 East, a distance of 179.7287
89	Thence North 56-43-55 East, a distance of 251.9098
90	Thence South 81-28-20 East, a distance of 370.4709
91	Thence South 78-57-07 East, a distance of 284.3959
92	Thence South 67-47-29 East, a distance of 470.2621
93	Thence South 83-24-48 East, a distance of 650.0405
94	Thence South 87-51-03 East, a distance of 576.6556
95	Thence North 81-40-49 East, a distance of 229.7933
96	Thence South 89-34-59 East, a distance of 524.0139
97	Thence South 80-08-29 East, a distance of 424.8993
98	Thence South 68-58-59 East, a distance of 149.1738
99	Thence South 85-18-12 East, a distance of 700.7279
100	Thence North 69-21-28 East, a distance of 243.2410
101	Thence North 83-18-13 East, a distance of 140.9616
102	Thence North 87-02-55 East, a distance of 297.3945
103	Thence South 84-24-08 East, a distance of 385.7145
104	Thence South 73-38-13 East, a distance of 381.5806
105	Thence South 60-46-31 East, a distance of 398.7573
106	Thence South 44-33-51 East, a distance of 197.5537
107	Thence South 44-36-26 East, a distance of 148.2746
108	Thence South 80-51-20 East, a distance of 229.6689
109	Thence South 77-41-23 East, a distance of 339.1733
110	Thence South 80-08-20 East, a distance of 106.1940
111	Thence South 74-17-21 East, a distance of 199.1918
112	Thence South 63-03-57 East, a distance of 156.1926

113 Thence South 89-35-24 East, a distance of 139.7536
114 Thence North 69-52-16 East, a distance of 149.1074
115 Thence South 74-22-05 East, a distance of 199.2446
116 Thence South 54-02-09 East, a distance of 150.2688
117 Thence South 57-32-02 East, a distance of 164.7486
118 Thence South 80-08-39 East, a distance of 212.5112
119 Thence South 81-28-20 East, a distance of 246.9807
120 Thence South 57-34-32 East, a distance of 164.8208
121 Thence South 59-51-45 East, a distance of 281.7053
122 Thence South 49-18-45 East, a distance of 297.3849
123 Thence South 53-35-18 East, a distance of 237.6448
124 Thence South 41-33-00 East, a distance of 235.0086
125 Thence South 49-00-08 East, a distance of 483.1160
126 Thence South 55-49-43 East, a distance of 125.8518
127 Thence South 44-35-25 East, a distance of 123.5701
128 Thence South 44-36-30 East, a distance of 271.6237
129 Thence South 44-36-10 East, a distance of 197.5973
130 Thence South 31-11-39 East, a distance of 266.6825
131 Thence South 29-50-24 East, a distance of 242.6743
132 Thence South 26-09-18 East, a distance of 273.3663
133 Thence South 28-55-20 East, a distance of 320.7559
134 Thence South 44-37-15 East, a distance of 247.0063
135 Thence South 39-21-54 East, a distance of 136.3797
136 Thence South 39-30-43 East, a distance of 1115.9357
137 Thence South 56-57-13 East, a distance of 518.5041
138 Thence South 32-18-58 East, a distance of 290.6424
139 Thence South 54-36-52 East, a distance of 213.2716
140 Thence South 47-36-34 East, a distance of 234.9146
141 Thence South 44-35-24 East, a distance of 172.8920
142 Thence South 35-05-29 East, a distance of 150.2478
143 Thence South 59-20-24 East, a distance of 242.6739
144 Thence South 59-19-30 East, a distance of 242.5664
145 Thence South 89-35-24 East, a distance of 139.7536
146 Thence South 89-35-24 East, a distance of 139.7536
147 Thence South 89-35-23 East, a distance of 52.3763
148 Thence North 67-16-06 East, a distance of 132.9522
149 Thence North 00-24-32 East, a distance of 52.5643
150 Thence North 33-16-47 West, a distance of 62.8730
151 Thence North 58-37-01 West, a distance of 203.6710
152 Thence North 47-58-30 West, a distance of 210.3380
153 Thence North 50-17-39 West, a distance of 248.1038
154 Thence North 41-34-22 West, a distance of 235.0915
155 Thence North 35-34-47 West, a distance of 237.6102
156 Thence North 52-44-11 West, a distance of 261.9812
157 Thence North 49-21-11 West, a distance of 297.5341
158 Thence North 49-21-20 West, a distance of 297.3572
159 Thence North 44-34-50 West, a distance of 271.7576
160 Thence North 38-15-35 West, a distance of 335.4983
161 Thence North 27-27-57 West, a distance of 336.0671
162 Thence North 50-30-00 West, a distance of 360.1165
163 Thence North 21-23-39 West, a distance of 470.1461
164 Thence North 10-11-56 West, a distance of 284.4954
165 Thence North 07-44-11 West, a distance of 246.9982
166 Thence North 19-33-17 West, a distance of 204.2826
167 Thence North 41-52-09 West, a distance of 259.7636
168 Thence North 63-00-09 West, a distance of 429.5609

Exhibit C – Description of the Basin

169 Thence North 43-07-25 West, a distance of 481.8419
170 Thence North 42-44-17 West, a distance of 382.9316
171 Thence North 28-24-46 West, a distance of 398.7864
172 Thence North 28-23-07 West, a distance of 398.6130
173 Thence North 38-46-12 West, a distance of 608.4346
174 Thence North 72-21-04 West, a distance of 530.2057
175 Thence North 77-53-41 West, a distance of 517.3797
176 Thence North 84-31-51 West, a distance of 596.0885
177 Thence North 68-33-48 West, a distance of 486.5318
178 Thence North 67-12-28 West, a distance of 642.2768
179 Thence North 76-42-02 West, a distance of 627.0671
180 Thence North 60-32-28 West, a distance of 899.1237
181 Thence North 75-54-13 West, a distance of 665.1543
182 Thence North 66-23-19 West, a distance of 665.0515
183 Thence North 80-51-29 West, a distance of 459.4613
184 Thence North 74-27-13 West, a distance of 669.4943
185 Thence North 63-02-06 West, a distance of 312.4704
186 Thence North 73-53-13 West, a distance of 580.5569
187 Thence North 76-51-43 West, a distance of 555.1563
188 Thence North 72-03-23 West, a distance of 347.9228
189 Thence North 71-08-13 West, a distance of 497.2030
190 Thence North 69-01-58 West, a distance of 746.1565
191 Thence North 46-26-06 West, a distance of 382.9739
192 Thence North 55-28-34 West, a distance of 654.0611
193 Thence North 65-37-13 West, a distance of 516.0126
194 Thence North 73-38-41 West, a distance of 508.7107
195 Thence North 70-36-46 West, a distance of 591.0123
196 Thence North 69-01-55 West, a distance of 447.6429
197 Thence North 64-48-32 West, a distance of 1750.7575
198 Thence North 68-24-13 West, a distance of 917.8053
199 Thence North 68-02-33 West, a distance of 1427.2827
200 Thence North 64-07-22 West, a distance of 1625.0677
201 Thence North 43-46-42 West, a distance of 876.7911
202 Thence North 47-49-40 West, a distance of 655.7561
203 Thence North 61-41-57 West, a distance of 335.8997
204 Thence North 51-42-49 West, a distance of 199.2231
205 Thence North 48-40-34 West, a distance of 346.7099
206 Thence North 47-34-33 West, a distance of 235.0408
207 Thence North 36-26-36 West, a distance of 174.6548
208 Thence North 09-53-20 East, a distance of 106.2668
209 Thence South 78-41-19 East, a distance of 462.3561
210 Thence South 74-50-24 East, a distance of 343.1933
211 Thence South 79-53-51 East, a distance of 726.5141
212 Thence South 82-28-31 East, a distance of 422.3874
213 Thence North 74-29-44 East, a distance of 254.3821
214 Thence North 67-11-37 East, a distance of 399.0744
215 Thence North 60-41-37 East, a distance of 281.6756
216 Thence North 79-05-27 East, a distance of 445.1700
217 Thence North 00-26-51 East, a distance of 192.0059
218 Thence North 31-36-58 West, a distance of 164.7668
219 Thence North 80-07-13 West, a distance of 637.4534
220 Thence North 79-17-00 West, a distance of 585.8427
221 Thence North 83-52-06 West, a distance of 702.1421
222 Thence North 81-40-22 West, a distance of 634.8176
223 Thence North 71-46-52 West, a distance of 513.7552
224 Thence North 78-48-11 West, a distance of 746.7136

225 Thence North 70-26-56 West, a distance of 905.9868
226 Thence North 65-52-49 West, a distance of 2823.3710
227 Thence North 52-03-27 West, a distance of 1519.7285
228 Thence North 36-15-37 West, a distance of 1023.5333
229 Thence North 28-50-12 West, a distance of 1501.3573
230 Thence North 03-16-40 East, a distance of 699.5825
231 Thence North 40-00-38 East, a distance of 657.5376
232 Thence North 55-55-24 East, a distance of 339.1029
233 Thence North 56-42-53 East, a distance of 377.8643
234 Thence North 26-59-25 East, a distance of 312.6105
235 Thence North 71-58-47 East, a distance of 497.0045
236 Thence North 80-06-42 East, a distance of 585.9547
237 Thence South 87-23-25 East, a distance of 454.3462
238 Thence North 42-41-35 East, a distance of 519.3043
239 Thence North 65-30-29 East, a distance of 539.2736
240 Thence North 85-13-27 East, a distance of 192.9198
241 Thence South 77-48-22 East, a distance of 428.1601
242 Thence South 79-18-05 East, a distance of 195.2692
243 Thence North 69-51-14 East, a distance of 298.5136
244 Thence North 28-19-28 East, a distance of 335.9044
245 Thence North 31-22-11 East, a distance of 305.6825
246 Thence North 56-01-15 East, a distance of 402.0238
247 Thence North 82-39-26 East, a distance of 387.8052
248 Thence North 78-08-24 East, a distance of 411.1519
249 Thence North 60-22-03 East, a distance of 383.3919
250 Thence North 59-26-14 East, a distance of 203.6705
251 Thence North 05-12-58 East, a distance of 210.3711
252 Thence North 54-35-53 West, a distance of 426.4772
253 Thence North 11-40-50 West, a distance of 250.0533
254 Thence North 49-48-05 East, a distance of 161.0345
255 Thence North 48-23-44 East, a distance of 235.0392
256 Thence North 00-24-37 East, a distance of 174.5675
257 Thence North 23-13-24 West, a distance of 304.9592
258 Thence North 70-45-15 East, a distance of 259.7676
259 Thence South 78-49-18 East, a distance of 373.3326
260 Thence South 72-19-46 East, a distance of 530.4007
261 Thence North 68-01-44 East, a distance of 321.0687
262 Thence North 61-21-05 East, a distance of 179.8988
263 Thence North 15-39-15 East, a distance of 199.2007
264 Thence North 00-24-37 East, a distance of 174.5675
265 Thence North 09-52-20 West, a distance of 195.3932
266 Thence North 38-41-05 West, a distance of 359.9806
267 Thence North 38-15-35 West, a distance of 335.4983
268 Thence North 24-47-03 West, a distance of 328.3020
269 Thence North 18-01-30 West, a distance of 220.9698
270 Thence North 00-27-21 East, a distance of 157.1300
271 Thence North 24-36-33 West, a distance of 289.0680
272 Thence North 26-08-49 West, a distance of 195.4380
273 Thence North 37-10-21 West, a distance of 286.5286
274 Thence North 71-10-31 West, a distance of 276.0141
275 Thence North 89-35-24 West, a distance of 366.7594
276 Thence North 47-18-37 West, a distance of 259.8516
277 Thence North 02-26-15 West, a distance of 349.7545
278 Thence North 02-27-48 West, a distance of 125.0526
279 Thence North 02-27-50 West, a distance of 78.5106
280 Thence North 02-27-01 West, a distance of 146.1957

281	Thence North 05-17-26 West, a distance of 351.1208
282	Thence North 29-50-24 West, a distance of 242.6743
283	Thence North 87-54-29 West, a distance of 594.1460
284	Thence South 25-25-45 West, a distance of 289.0690
285	Thence South 07-33-35 West, a distance of 54.1577
286	Thence South 07-31-36 West, a distance of 368.3617
287	Thence South 15-40-43 West, a distance of 398.2550
288	Thence South 21-34-12 West, a distance of 580.7325
289	Thence South 17-07-05 West, a distance of 546.9813
290	Thence South 18-03-11 West, a distance of 403.3575
291	Thence South 25-37-23 West, a distance of 328.0751
292	Thence South 34-42-09 West, a distance of 465.0331
293	Thence South 25-01-48 West, a distance of 461.1868
294	Thence South 54-23-57 West, a distance of 475.1916
295	Thence South 69-37-52 West, a distance of 541.7496
296	Thence North 73-56-54 West, a distance of 453.4280
297	Thence North 48-34-43 West, a distance of 532.4290
298	Thence North 28-23-07 West, a distance of 398.6121
299	Thence North 54-35-53 West, a distance of 426.4777
300	Thence North 16-41-42 West, a distance of 237.5764
301	Thence North 12-06-59 West, a distance of 322.1772
302	Thence North 33-16-47 West, a distance of 251.7194
303	Thence North 60-46-31 West, a distance of 398.7569
304	Thence North 40-31-06 West, a distance of 346.7031
305	Thence North 29-18-46 West, a distance of 281.6207
306	Thence North 31-34-49 West, a distance of 329.6291
307	Thence North 65-37-55 West, a distance of 344.1602
308	Thence North 33-16-48 West, a distance of 314.8173
309	Thence North 40-10-53 West, a distance of 160.9938
310	Thence South 48-09-08 West, a distance of 259.5913
311	Thence South 05-10-56 West, a distance of 210.3598
312	Thence South 01-52-06 East, a distance of 437.1073
313	Thence South 17-14-28 East, a distance of 403.1796
314	Thence South 16-17-52 East, a distance of 546.9801
315	Thence South 17-24-29 East, a distance of 513.9131
316	Thence South 44-35-54 East, a distance of 296.2405
317	Thence South 40-10-11 East, a distance of 322.2593
318	Thence South 35-07-29 East, a distance of 300.4644
319	Thence South 31-25-13 East, a distance of 596.0948
320	Thence South 27-28-50 East, a distance of 335.9003
321	Thence South 04-21-44 East, a distance of 210.3594
322	Thence South 42-01-35 West, a distance of 210.4263
323	Thence South 45-23-50 West, a distance of 197.5089
324	Thence South 52-08-16 West, a distance of 422.9006
325	Thence South 45-24-36 West, a distance of 469.3541
326	Thence South 70-25-56 West, a distance of 408.8638
327	Thence South 66-59-15 West, a distance of 571.0711
328	Thence South 33-18-10 West, a distance of 353.7851
329	Thence South 37-17-32 West, a distance of 349.2845
330	Thence South 49-29-46 West, a distance of 346.7099
331	Thence South 65-13-51 West, a distance of 328.1924
332	Thence South 55-43-12 West, a distance of 276.0820
333	Thence South 59-26-46 West, a distance of 407.4482
334	Thence South 55-41-57 West, a distance of 385.3996
335	Thence South 74-49-34 West, a distance of 746.6568
336	Thence South 88-29-17 West, a distance of 502.1748

Thence North 70-28-56 West, a distance of 460.1936
Thence North 69-36-20 West, a distance of 783.2207
Thence North 43-33-28 West, a distance of 939.4676
Thence South 90-00-00 East, a distance of 0.0000
to the point of beginning.

Perimeter: 140686.1563

Area: 191218952.8402 4389.7831 acres

Legal Description for Intake Sub-basin

Beginning at a point lying North 03-03-37 East, a distance of 8693.42 feet from the north one quarter corner of Section 7, Township 5 South, Range 1 East, S.B.B. & M.:

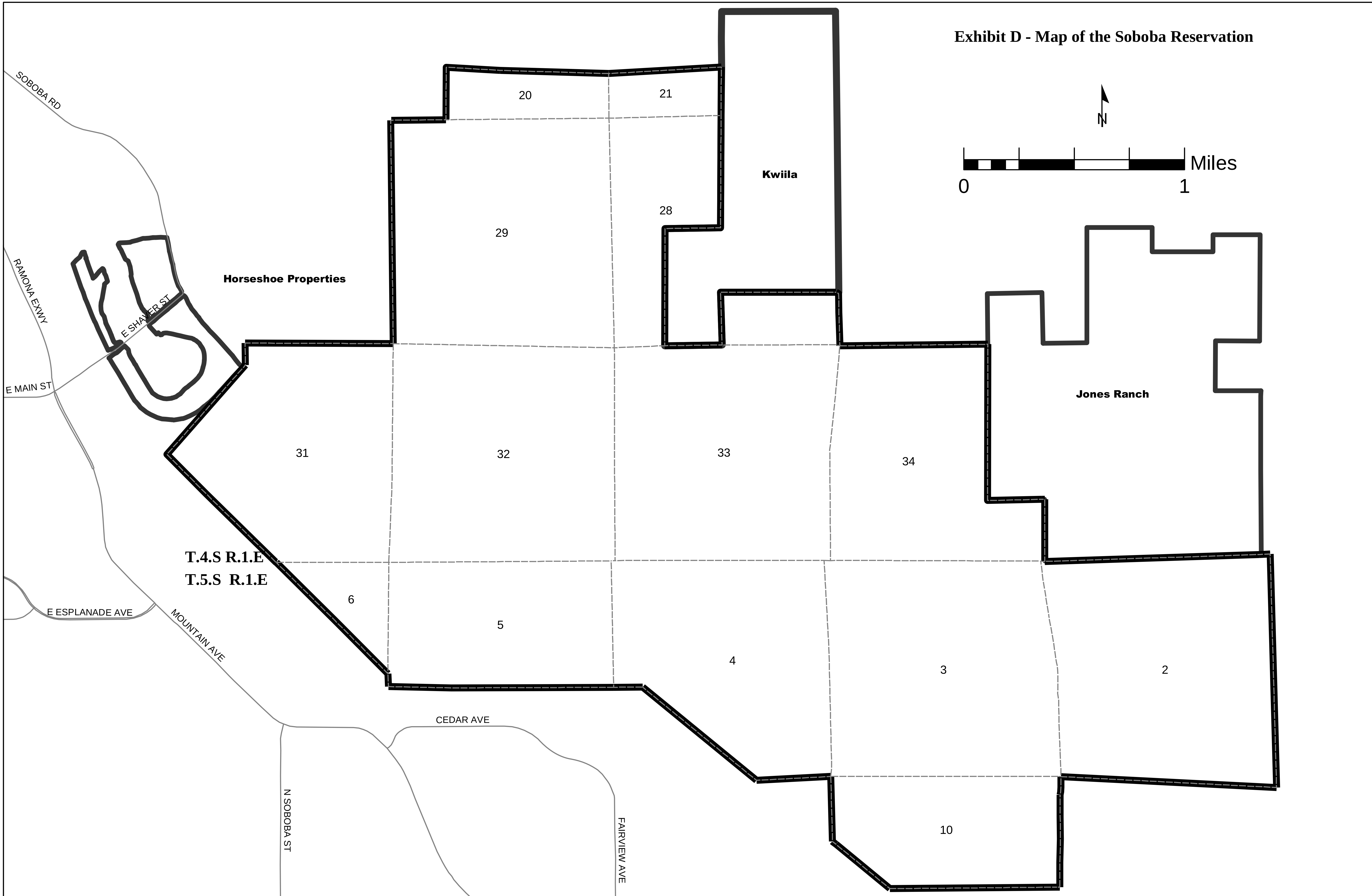
Thence North 43-33-19 West, a distance of 1036.0201
Thence North 40-54-46 West, a distance of 2583.7541
Thence North 31-11-35 West, a distance of 1531.8376
Thence North 29-04-17 West, a distance of 883.9252
Thence North 09-00-43 East, a distance of 1454.7700
Thence North 54-11-24 West, a distance of 779.7834
Thence North 87-31-53 West, a distance of 469.5258
Thence South 14-02-10 West, a distance of 1192.3299
Thence South 19-44-49 West, a distance of 1658.1895
Thence South 20-33-22 West, a distance of 1709.5454
Thence South 30-34-45 West, a distance of 1022.5993
Thence South 37-11-05 West, a distance of 1456.6566
Thence South 37-20-58 West, a distance of 1912.8988
Thence South 36-19-37 West, a distance of 1688.8119
Thence South 47-17-26 West, a distance of 1415.9609
Thence South 51-20-25 West, a distance of 1024.9459
Thence South 62-35-33 West, a distance of 1217.0825
Thence South 67-50-01 West, a distance of 1166.6981
Thence South 53-21-57 West, a distance of 2545.3471
Thence South 51-32-23 East, a distance of 1521.6193
Thence South 52-06-41 East, a distance of 3640.2127
Thence South 54-16-42 East, a distance of 2832.0686
Thence South 54-45-45 East, a distance of 8093.9477
Thence South 66-45-32 East, a distance of 1985.2225
Thence South 63-00-45 East, a distance of 1076.6119
Thence South 57-44-44 East, a distance of 10768.6202
Thence South 52-42-56 East, a distance of 2888.8756
Thence South 55-53-51 East, a distance of 6249.5878
Thence South 52-42-56 East, a distance of 2888.8756
Thence South 53-45-11 East, a distance of 2138.0014
Thence South 64-43-22 East, a distance of 2206.1030
Thence North 46-42-44 West, a distance of 156.7825
Thence North 44-35-15 West, a distance of 405.2711
Thence North 46-18-48 West, a distance of 669.1426
Thence North 37-52-35 West, a distance of 693.8574
Thence North 34-17-42 West, a distance of 906.2395
Thence North 33-57-07 West, a distance of 659.8059
Thence North 44-35-16 West, a distance of 608.0830
Thence North 46-47-40 West, a distance of 1054.3274
Thence North 48-19-10 West, a distance of 1868.4824
Thence North 56-06-31 West, a distance of 2130.4779
Thence North 66-07-44 West, a distance of 1655.6256
Thence North 58-12-53 West, a distance of 1376.2780
Thence North 41-24-29 West, a distance of 730.8163
Thence North 41-13-30 West, a distance of 345.0212
Thence North 26-08-55 West, a distance of 384.6138
Thence North 13-37-46 West, a distance of 354.3535
Thence North 41-34-35 West, a distance of 385.5755
Thence North 42-50-20 West, a distance of 669.1777

Thence North 50-29-55 West, a distance of 1181.6210
Thence North 31-24-48 West, a distance of 978.2580
Thence North 26-09-14 West, a distance of 704.9949
Thence North 08-33-23 West, a distance of 551.1343
Thence North 10-42-42 East, a distance of 640.9180
Thence North 35-06-54 East, a distance of 453.0875
Thence North 45-23-44 East, a distance of 243.3389
Thence North 52-32-18 East, a distance of 326.7674
Thence North 00-25-00 East, a distance of 171.8795
Thence North 34-34-34 West, a distance of 349.7803
Thence North 44-35-13 West, a distance of 337.0774
Thence North 59-20-26 West, a distance of 310.8241
Thence North 42-07-01 West, a distance of 362.8961
Thence North 66-22-49 West, a distance of 339.4363
Thence North 61-29-59 West, a distance of 379.0620
Thence North 55-04-55 West, a distance of 865.4271
Thence North 37-47-48 West, a distance of 1333.2990
Thence North 31-20-45 West, a distance of 1101.0137
Thence North 44-35-54 West, a distance of 598.8896
Thence North 37-57-12 West, a distance of 682.2970
Thence North 41-51-15 West, a distance of 662.8068
Thence North 53-45-51 West, a distance of 494.8303
Thence North 45-42-20 West, a distance of 804.0414
Thence North 46-45-44 West, a distance of 1246.0249
Thence North 26-09-14 West, a distance of 249.2721
Thence North 17-13-52 West, a distance of 1029.1928
Thence North 16-05-57 West, a distance of 627.4825
Thence North 21-23-19 West, a distance of 960.3948
Thence North 10-53-51 West, a distance of 909.1444
Thence North 09-47-36 West, a distance of 1132.4407
Thence North 14-50-24 West, a distance of 1778.9616
Thence North 24-22-09 West, a distance of 638.3066
Thence North 18-48-47 West, a distance of 1015.1730
Thence North 21-07-46 West, a distance of 910.5965
Thence North 31-35-33 West, a distance of 630.8741
Thence North 27-28-23 West, a distance of 428.6517
Thence North 20-26-50 West, a distance of 500.9370
Thence North 33-29-10 West, a distance of 1188.9727
Thence South 90-00-00 East, a distance of 0.0000
to the point of beginning.

Perimeter: 115214.4657

Area: 308717524.7511 7087.1792 acres

Exhibit D - Map of the Soboba Reservation



PRINCIPLES FOR WATER MANAGEMENT

1. Water Management Plan. These Principles, approved by the appropriate authority of each party, are intended to form the basis from which the parties will develop a Water Management Plan ("Management Plan") for the area described in Section 2. The Management Plan is being developed to ensure an adequate and reliable source of future water supply. The Management Plan is also intended to facilitate and accommodate a settlement of the claims of the Soboba Band of Luiseno Indians ("Soboba Tribe").

2. Management Area. The area included in the Management Plan consists of the Canyon Sub-basin and the San Jacinto Upper Pressure Sub-basin, downstream to Bridge Street, and the Hemet Basins ("Management Area"). The Management Area is shown upon the attached map.

3. Pumpers within the Management Area. The primary pumpers within the Management Area are: Eastern Municipal Water District ("Eastern"), Lake Hemet Municipal Water District ("Lake Hemet"), City of San Jacinto ("San Jacinto"), and City of Hemet ("Hemet") (individually

"Public Agency," collectively "Public Agencies"); the Soboba Tribe (not a Management Plan participant); and approximately 62 individual agricultural and other private pumpers who pump more than 25 acre-feet per year ("Private Pumpers").

4. Goals. The parties agree that the Management Plan shall incorporate and serve to implement the following goals:

A. Allowing for Future Urban Growth. The parties acknowledge that the Management Area will continue to experience residential, commercial, and industrial growth and development, and that existing water production and service systems will need to be expanded to meet this growth. It is estimated that at least 15,000 afy incremental water supply capacity over the existing base production rights of the Public Agencies must be dedicated to adequately serve this growth. The Management Plan should serve and provide a clear planning process so that each affected Public Agency will be able to meet these projected growth needs.

B. Water Quality Protection. Implementation of the Management Plan should protect and/or enhance Management Area water quality. However, implementation of certain elements of the Management Plan may cause limited localized water quality degradation. If such degradation impedes the then current beneficial use of any Public Agency in the Management Area, the Watermaster described in Section 22 ("Watermaster") shall implement appropriate mitigation measures to ensure water supply to the affected Public Agency and bear the associated costs. The standards for local water quality degradation shall be defined in the Management Plan.

C. Cost-Effective Management. The Management Plan should serve to support the pursuit of cost-effective water supply and water treatment by the Public Agencies, both individually and collectively.

D. Overdraft. The groundwater levels within the Management Area have generally been declining for a number of years, and the Management Area is presently in a condition of overdraft. It is recognized that the Management Plan will, within a reasonable period, eliminate groundwater overdraft and enhance operational yield by implementing a combination of available water resources management elements. These elements include: reduction in native groundwater production; enhanced recharge with native, imported and/or recycled water; development of supplemental supplies such as imported and recycled water; and water conservation programs.

E. Monitoring. The Watermaster shall implement a monitoring program to ensure the Management Plan activities follow best management and engineering principles to protect Management Area water resources.

5. Public Agencies Base Production Rights.

A. The base production rights of Eastern, Lake Hemet and Hemet in the first year of the Management Plan shall be based upon their average production for calendar years 1995-1999. This period was chosen to reflect these Public Agencies' recent pumping, and shall determine their base production rights.

B. The base production right of San Jacinto in the first year of the Management Plan, shall be based upon its average production for calendar years 1995-1999, plus 500 afy. The 500 afy is added because San Jacinto's recent production does not reflect its historic production because of water purchases and other factors.

C. Pursuant to Section 21 below, for the life of the Management Plan, Hemet and San Jacinto shall each add an additional 900 afy to their base production rights. The additional 900 afy shall not be subject to reduction by the Watermaster as provided in Section 5.D and shall not be subject to any Administrative or Replenishment Assessments as provided in Section 6, or other fee or charge imposed under the Management Plan.

D. It is the goal of the Management Plan to adjust base production rights over time to a level consistent with the Watermaster's calculation of the Public Agencies' share of safe yield for the Management Area. Based on current information, it appears that the total reduction in base production rights will need to be approximately 35%. The ultimate reduction will be based on periodic demand, hydrology, recharge and availability of imported water. In order to implement this reduction in a phased manner, each Public Agency's base production rights shall be subject to adjustment as follows:

(1) A 10% reduction from the base production rights in the first year of the Management Plan; and

(2) Until base production rights are consistent with the Public Agencies' share of safe yield, Watermaster shall determine the reductions in base production rights in each subsequent year of the Management Plan, to achieve this goal within 6 years of approval of the Management Plan. Each reduction shall not be more than 10% of the base production right of the prior year.

(3) Pursuant to Section 7(A)(2)(b), upon conversion of a Class B Participant's land from agricultural to a use that requires water service from a Public Agency, the Public Agency shall receive an increase in its base production rights equal to the adjusted base production right of the Class B Participant.

6. Public Agency Production Assessments. The Public Agency production will be subject to the following assessments:

A. An Administrative Assessment on each acre-foot pumped by a Public Agency up to its adjusted base production right. The parties contemplate that the Administrative Assessment will be $50.00 per acre-foot of water pumped in the first year of the Management Plan, and that such amount will thereafter be set by the Watermaster.

B. A Replenishment Assessment on each acre-foot pumped by a Public Agency in excess of its adjusted base production right equal to the cost of providing a like quantity of supplemental water to recharge the Management Area, including recharge losses. Pumping by a Public Agency in excess of its adjusted base production right in order to meet increasing demands is expected and permissible, provided that such excess extractions shall be subject to the Replenishment Assessment. The costs of providing a like quantity of supplemental water shall include the costs of water, O&M costs of the replenishment system, capital recovery and other administrative costs. Currently, the total of these cost items is estimated to be in the range of $300 to $400 per acre-feet; the actual amount will reflect the costs at the time incurred.

7. Private Pumpers Water Rights. The Public Agencies recognize the overlying water rights of the Private Pumpers, and do not intend to take or adversely impact these rights without an agreement with the owner of such rights. The Management Plan will lay out alternatives for the retention, protection, or transfer of such rights, leaving selection of the alternative to the individual overlying water rights owner. A Private Pumper can elect not to participate in the Management Plan and not to formally acknowledge its existence. Such Pumpers shall be referred to herein as "Non-Participants"; such Pumpers shall continue to exercise whatever water rights they may hold under California law unaffected by the Management Plan. There is no intent to affect water use that is consistent with the historical use of the Private Pumpers. However, other pumpers under the Management Plan do not waive their rights to challenge new or expanded water rights. Non-Participants will not have the option of joining the program at a later date. The alternatives available to participants are as follows:

A. (1) Class A Participation. A Private Pumper can elect to sign a written agreement acknowledging the existence of the Management Plan. Such Pumper shall be a Class A Participant and shall be entitled to vote for and/or be elected to serve as the Private Pumper representative on the Management Plan's governing board or body described in Paragraph 22 below, but shall not otherwise be required to participate in the Management Plan implementation. A Class A Participant may, without any financial assessment by the Watermaster, pump from his/her/its property within the Management Area the amount of water that can be put to reasonable and beneficial use on the Pumper's land as may be authorized under California law. Class A Participants shall have the right to convert to Class B Participation during a grace period that shall end three (3) years after the effective date of the Management Plan, as approved by a judgment of the Superior Court for Riverside County, upon payment of the total assessments the Pumper would have paid had the Pumper elected to be a member of Class B from the outset, plus interest.

(2) Class B Participation. A Private Pumper can become a Class B Participant by electing to limit annual pumping to the Pumper's average annual production during the calendar years 1995 through

1999 and to pay replenishment assessments on amounts in excess of that average annual production. A Class B Participant shall enjoy the following benefits of Plan Participation:

a. Vote for and/or be elected to serve as the Private Pumper's representative on the Management Plan's Governing Board;

b. Upon conversion of Pumper's land from agricultural use to a use that requires water service from a participating Public Agency, Public Agency shall credit to the extent legally permissible, Pumper or Pumper's successor-in-interest's adjusted production right, using the formula in Section 5 towards satisfaction of any requirement then in effect for water supply assessment requirements. Furthermore, Pumper or Pumper's successor-in-interest shall be given a credit for Pumper's adjusted production right using the formula in Section 5 towards any fees associated with water supply that the Public Agency may then have in effect. The Public Agency serving the converted land shall receive a credit to its production right as set forth in Section 5.

c. To the extent the Pumper's land is not covered under Section 7(A)(2)(b), Pumper will be eligible to enter into a contract with the Management Plan, or a participating Public Agency, to sell for a defined period of time some portion of Pumper's adjusted production right, under terms and conditions mutually agreed upon by the Pumper and the Management Plan. Criteria used in consideration of such contract shall include:

(i) Management Plan's need to acquire additional water supplies to address Basin overdraft and recovery;

(ii) Submission of a water conservation plan, including use of in lieu water, by Pumper that will reasonably guarantee conservation of water that would otherwise be produced from the Basin;

(iii) Public policy considerations of local government jurisdictions, including economic and land use impacts of proposed water conservation plan.

B. In-Lieu Water Use. In the event a Private Pumper (or successor) receives recycled and/or imported water from a Public Agency to serve an overlying use in place of groundwater, or otherwise engages in an in-lieu program, the overlying water right of the Private Pumper (or successor) shall not be diminished by the receipt and use of such recycled and/or imported water or by engaging in an in-lieu program.

C. Well Monitoring. To become a Class A or B Participant, a Private Pumper shall authorize the metering of the Pumper's well(s) and the collection of groundwater level and quality data, and the reading thereof by Management Plan personnel. The metering and reading shall be at no cost to the Pumper, and the Pumper shall receive copies of the reports and information obtained upon request.

D. Future Production Participation. Any new Pumper after the effective date of the Management Plan, as approved by a judgment of the Superior Court for Riverside County, can only participate as a Class A Participant as described in Section 7A(1).

E. Replacement Wells. The redrilling of existing wells and the drilling of new wells to replace existing wells will not be considered new private production.

8. Capital Facilities. Each Public Agency shall continue to own its existing capital facilities for water management. However, capital facilities may be jointly constructed and owned by the Management Plan. Joint financing of such facilities may be funded by regional capital fees, loans and grants, contributions for storage by The Metropolitan Water District of Southern California ("Metropolitan") or other third-parties, and municipal bonds. Responsibility for the costs of any existing and future capital facility of the Management Plan should be apportioned among the Public Agencies based on relative benefit to be derived by each Public Agency. Any of the participating Public Agencies may propose projects to be included in the Management Plan to increase Management Area water supply. Such proposals, after evaluation by the Watermaster, shall be included or rejected. If the Watermaster chooses to reject the proposal, the proposing Public Agency may implement the rejected project as long as it does not significantly impact the implementation of the Management Plan and/or interfere with the ongoing production by the Public Agencies.

9. Soboba Tribe's Water Rights. The Soboba Tribe's water rights shall be determined as part of a settlement among the Soboba Tribe, the United States, Eastern, Lake Hemet and Metropolitan. Major points of the proposed settlement are:

A. The Soboba Tribe shall have a senior, prior right in the Canyon and San Jacinto Upper Pressure Sub-basins of 9000 afy, but its use shall be limited to a maximum of 4100 afy during the first 50 years after the effective date of the settlement.

B. The Soboba Tribe shall have the right to purchase replenishment water for use pursuant to the Principles of Settlement at the Management Plan replenishment rate.

C. The Soboba settlement provides that, among other things, Metropolitan will use its best efforts to deliver sufficient water to yield a 15-year average of 7,500 afy to the Management Plan until 2035 at its long-term interruptible rate (currently $233/af).

D. Subject to full funding of the settlement by the United States, the Management Plan shall pay the Soboba Tribe $10 million.

E. The Management Plan will also pay the Soboba Tribe $7 million. A Public Agency's payment of its share of this amount is optional, but in order to obtain the benefits of the low-cost Metropolitan water delivered pursuant to the settlement, a Public Agency shall pay its share of this amount.

F. The Management Plan will receive $10 million for capital improvements from the United States, and all unused Soboba Tribe water based on the Public Agency's participation in the payment in Section 9(E) above.

10. Implementation of These Principles. These Interim Principles for Water Management shall be used by the parties as a basis for the preparation of the Management Plan, and a stipulated judgment in a water rights adjudication. As explained below, the Management Plan shall be administered by the Watermaster. The Watermaster will be under the continuing jurisdiction of the Court.

11. Assessment Program. The assessment program contemplated by the Management Plan shall be administered by the Watermaster subject to the governance provisions herein. All payments shall be made to the Watermaster and shall be maintained in a separate restricted fund. All assessments shall be used exclusively to acquire imported, recycled or Metropolitan water for the recharge of the Management Area, and for the facilities and operational and administrative expenses associated with the assessment and recharge programs. Subject to Management Plan approval, assessments may also be used by affected parties to acquire and deliver water for direct use by the parties, in lieu of pumping.

12. Replenishment Program. The replenishment program contemplated by the Management Plan shall also be administered by the Watermaster. The program shall include: the acquisition of supplemental water supplies (including imported, recycled and Soboba Tribe water); the expenditure of assessments; the recharge of the Management Area; and the construction and operation of all necessary facilities, including but not limited to, development of surface and sub-surface percolation and injection facilities. Priority for replenishment will be based on an equitable

apportionment of available replenishment water among the sub-basins after full consideration of: the Public Agency's participation in the payment in Section 9(E) above; the Management Area conditions; water demands; the availability of storage capacity to accommodate the recharge of natural flows; the availability of appropriate conveyance facilities; and the availability of replenishment or imported water. The Watermaster is encouraged to take advantage of surplus imported water that occasionally may be available at low cost, and to use available assessment funds to bank such recharge against future pumping in excess of adjusted production rights.

13. Rights to Groundwater. Groundwater in the Management Area may occur from: natural recharge; spreading operations of natural flows; replenishment with imported, recycled or Metropolitan water acquired with assessment funds; or in-lieu recharge programs financed with assessment funds. All such groundwater shall be available to support the pumping of the parties as allowed herein, and shall not be the property of any individual party, subject to the provisions of Section 14.

14. Storage Rights. The parties recognize that unused storage capacity exists in the Management Area, and the Management Plan contemplates that this capacity will be managed conjunctively with available imported and recycled water supplies. Subject to availability of the Management Plan fund for assessments and unused storage capacity as determined by Watermaster, the Management Area will be recharged and water stored therein when such supplies are available, and drawn upon by the Public Agencies in dry years when such supplemental water supplies may not be available. In addition, unused storage capacity as determined by Watermaster may be used for "put and take" operations of recycled or imported water that is paid for by any party to the Management Plan provided that:

A. Such operations do not interfere with the rights of any other pumper, or with the use of the storage capacity for recharge and storage under the Management Plan;

B. Water available for recharge is purchased first, as needed, for the Management Plan;

C. Later recovery of stored water shall exclude losses; and

D. Such recovered water may be used anywhere within the service area of the party.

Any conjunctive use programs for the benefit of territory outside of the Management Area shall be subject to the governance provisions herein. Any storage, conjunctive use programs by third parties or in-lieu recharge programs financed with assessment funds shall be subject to the governance provisions herein.

15. Spreading Operations. The Public Agencies shall independently or jointly operate their respective facilities to maximize the existing spreading and recharge operations of natural flow in the Management Area.

16. Recharge Water Quality. Consistent with Section 4(E) above all water used to replenish any sub-basin in the Management Area shall meet the Regional Water Quality Control Board requirements, and may be used in any sub-basin where such requirements are met.

17. Recharge Losses. The accounting for storage recharge of the Management Area shall not include any water that escapes therefrom and migrates downstream beyond the Management Area. Losses will be calculated based upon best engineering principles.

18. Recycled Water. The use of recycled water can be of substantial benefit in providing additional water in the Management Area. Each Public Agency may implement a recycled water program, including the ownership, operation and construction of all necessary facilities, and the application for and administration of any loan or grant applications. The Management Plan will support loan or grant applications, and the Public Agencies will work to integrate recycled water into the Management Plan to the extent economically feasible while meeting regulatory standards. Subject to existing recycled water contracts, the Management Plan will have a first right of refusal to purchase excess recycled water for recharge. Priority shall be given to Management Area recharge for the use of recycled water which originates therefrom.

19. Export. The Public Agencies may export water outside the Management Area, on a temporary basis, upon approval by the Watermaster.

However, any water exported shall be replenished with an appropriate amount of similar or better quality water as determined by Watermaster. Also, water exports by the Public Agencies shall not interfere with the Management Plan or any other Public Agency's operations. The Management Plan will set forth the specific criteria for the export of water, including, but not limited to, conjunctive use programs.

20. Credits. Recharge credits documented before the Management Plan shall be calculated pursuant to the Management Plan. Future recharge credits shall be established by replenishment of water or by not exercising the full, adjusted base production right, and shall be calculated pursuant to the Management Plan.

21. Tunnel Seepage, Stream Diversions, Fruitvale To resolve Eastern's use of Tunnel seepage, Lake Hemet's stream diversions and Eastern's use of Fruitvale water, 900 afy shall be added to Hemet's adjusted base production and 900 afy shall be added to San Jacinto's adjusted base production right as discussed in Section 5 above. This is intended to provide Hemet and San Jacinto a fair share of water from these disputed issues.

22. Governance. The Management Plan will be administered by a Watermaster as follows:

A. The governing board of the Watermaster shall consist of one elected official from each of the Public Agencies and one Private Pumper representative selected by the Private Pumpers who participate in the Management Plan. Each member shall have one vote.

B. The Watermaster's duties shall include: determining safe yield; determining replenishment needs; determining annual adjusted base production rights; purchasing and selling imported and recycled water; constructing future capital facilities; establishing assessment rates; initiating necessary conservation and drought management measures; and implementing other responsibilities identified in the Management Plan documents.

Dated: ______, 2004.

EASTERN MUNICIPAL WATER DISTRICT

By: ____________________________

Dated: ______, 2004. LAKE HEMET MUNICIPAL WATER DISTRICT

By: ____________________________

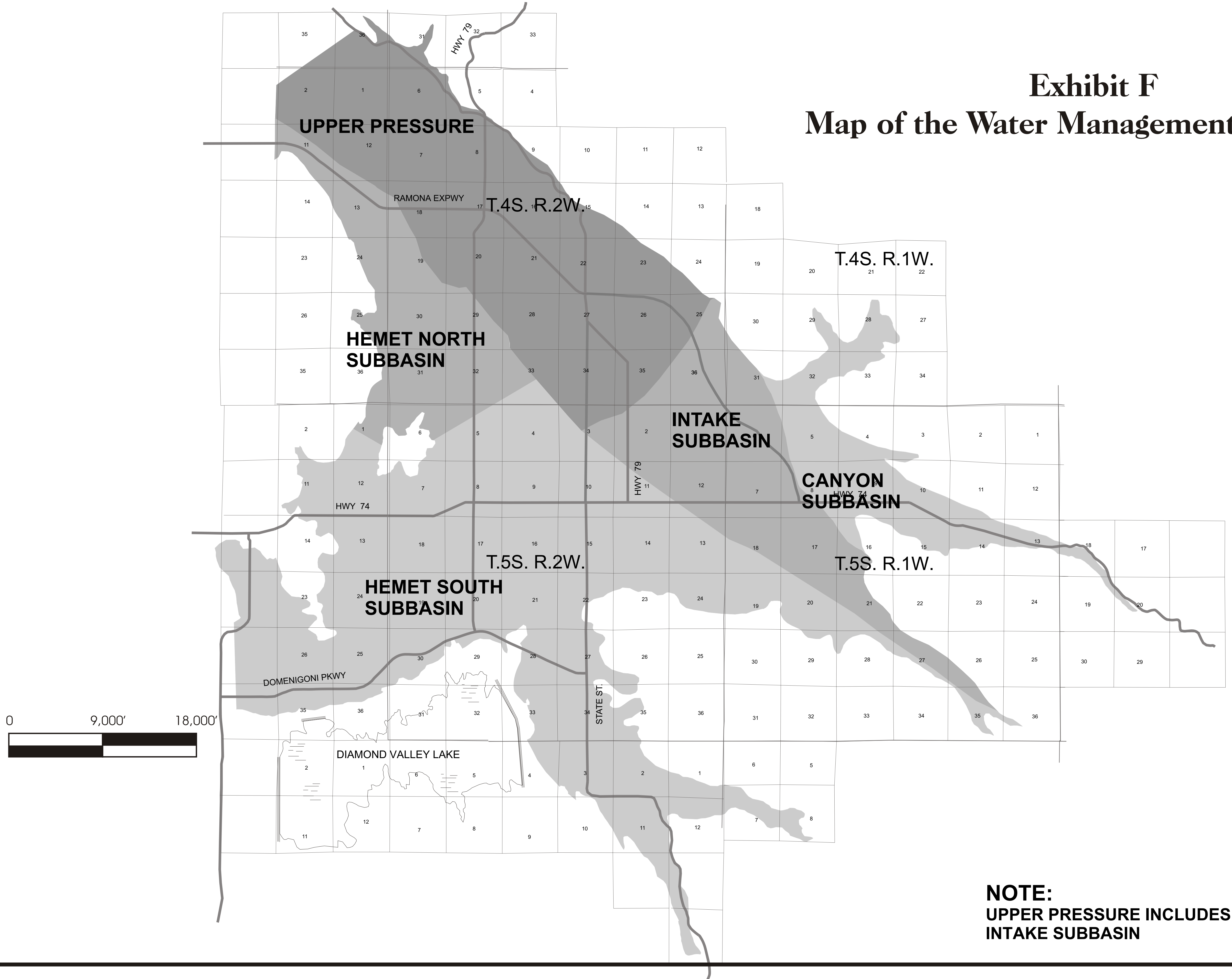
Dated: ______, 2004. CITY OF HEMET

By: ____________________________

Dated: ______, 2004. CITY OF SAN JACINTO

By: ____________________________

Exhibit F
Map of the Water Management Plan Area



NOTE:
UPPER PRESSURE INCLUDES INTAKE SUBBASIN

Exhibit G – Description of the Water Management Plan Area

Water Management Plan Area

Beginning at the North quarter Corner of Section 2, Township 4 South, Range 2 West, S.B.B.& M.:

Thence South 55-09-46 West, a distance of 3086.02 to the True Point of Beginning;

Thence South 01-57-57 West, a distance of 3159.1491
Thence South 00-29-02 West, a distance of 429.3273
Thence South 00-14-26 West, a distance of 1908.6588
Thence South 01-46-37 West, a distance of 1567.6119
Thence North 55-21-31 East, a distance of 446.8379
Thence North 26-23-15 East, a distance of 631.4127
Thence South 87-18-21 East, a distance of 191.4616
Thence South 87-17-52 East, a distance of 446.7468
Thence South 70-03-12 East, a distance of 419.5431
Thence South 48-59-17 East, a distance of 352.6834
Thence South 49-46-27 East, a distance of 298.9505
Thence South 38-14-56 East, a distance of 408.2682
Thence South 43-41-06 East, a distance of 568.0886
Thence South 33-24-04 East, a distance of 907.5881
Thence South 39-40-04 East, a distance of 681.4619
Thence South 44-35-36 East, a distance of 523.0954
Thence South 40-05-37 East, a distance of 805.0741
Thence South 37-55-01 East, a distance of 359.8351
Thence South 35-20-31 East, a distance of 531.5890
Thence South 22-00-05 East, a distance of 405.3986
Thence South 17-22-41 East, a distance of 504.7266
Thence South 25-17-32 East, a distance of 595.1082
Thence South 32-14-23 East, a distance of 575.2528
Thence South 38-11-56 East, a distance of 414.9866
Thence South 21-26-59 East, a distance of 691.8554
Thence South 22-44-15 East, a distance of 524.2415
Thence South 20-38-45 East, a distance of 573.2541
Thence South 32-15-39 East, a distance of 191.7948
Thence South 88-14-08 East, a distance of 156.3241
Thence South 46-34-05 East, a distance of 439.2778
Thence South 12-36-58 East, a distance of 409.7686
Thence South 18-19-44 East, a distance of 426.9082
Thence South 16-24-51 East, a distance of 572.8471
Thence South 22-07-10 East, a distance of 731.9991
Thence South 22-31-31 East, a distance of 720.1255
Thence South 22-41-43 East, a distance of 1039.9629
Thence South 38-30-56 East, a distance of 426.1504
Thence South 37-08-43 East, a distance of 350.8795
Thence South 35-21-27 East, a distance of 265.6921
Thence South 00-21-06 West, a distance of 692.3260
Thence South 09-53-35 East, a distance of 427.7983
Thence South 14-00-56 East, a distance of 460.9092
Thence South 00-49-47 East, a distance of 353.9741
Thence South 39-14-44 West, a distance of 334.1122
Thence North 88-16-13 West, a distance of 312.6425
Thence North 88-15-40 West, a distance of 327.5258

Exhibit G – Description of the Water Management Plan Area

Thence South 65-20-48 West, a distance of 211.1187
Thence South 51-19-16 West, a distance of 262.9182
Thence North 81-25-48 West, a distance of 270.5204
Thence North 00-23-36 East, a distance of 254.9440
Thence North 14-20-10 West, a distance of 196.8810
Thence North 69-38-37 West, a distance of 331.8501
Thence North 88-16-15 West, a distance of 312.7674
Thence South 45-39-54 West, a distance of 220.8974
Thence South 00-40-33 West, a distance of 158.9491
Thence South 08-40-14 West, a distance of 373.9607
Thence South 18-56-44 West, a distance of 166.3231
Thence South 13-04-14 East, a distance of 219.4350
Thence South 88-17-54 East, a distance of 208.3419
Thence South 52-36-50 East, a distance of 454.9685
Thence South 57-10-41 East, a distance of 307.7555
Thence South 10-23-15 East, a distance of 271.0676
Thence South 47-38-04 East, a distance of 488.4199
Thence South 38-59-11 East, a distance of 489.7587
Thence South 43-18-04 East, a distance of 225.0918
Thence South 36-19-43 East, a distance of 1211.7791
Thence South 00-40-32 West, a distance of 159.0111
Thence South 15-40-02 East, a distance of 555.4493
Thence South 32-13-48 East, a distance of 383.6829
Thence South 34-03-33 East, a distance of 457.3251
Thence South 06-55-29 West, a distance of 478.9941
Thence South 11-48-53 West, a distance of 538.4695
Thence South 04-00-47 East, a distance of 639.4428
Thence South 57-16-59 West, a distance of 374.5463
Thence South 59-59-38 West, a distance of 302.6944
Thence South 45-44-02 West, a distance of 220.8122
Thence South 40-23-23 West, a distance of 407.4181
Thence South 27-02-10 West, a distance of 234.5719
Thence South 18-54-48 West, a distance of 499.3999
Thence South 18-54-28 West, a distance of 332.9008
Thence South 08-40-29 West, a distance of 373.7759
Thence South 11-49-45 West, a distance of 538.4344
Thence South 00-40-31 West, a distance of 318.1471
Thence South 00-39-43 West, a distance of 530.0974
Thence South 30-14-06 West, a distance of 422.2534
Thence South 31-26-41 West, a distance of 305.2671
Thence South 77-24-27 West, a distance of 214.1513
Thence North 25-17-38 West, a distance of 238.1444
Thence South 35-31-17 West, a distance of 637.9021
Thence South 39-15-19 West, a distance of 169.0961
Thence South 39-13-20 West, a distance of 165.0641
Thence South 39-14-20 West, a distance of 668.3212
Thence South 30-15-45 West, a distance of 422.1539
Thence South 06-16-29 West, a distance of 531.8110
Thence South 18-55-03 West, a distance of 166.5596
Thence South 21-01-01 West, a distance of 449.2623
Thence South 27-03-08 West, a distance of 351.8017
Thence South 31-28-15 West, a distance of 305.2794
Thence South 45-41-33 West, a distance of 515.4747
Thence South 77-23-51 West, a distance of 642.2232
Thence South 85-54-45 West, a distance of 522.5793
Thence North 82-59-20 West, a distance of 576.5611

Exhibit G – Description of the Water Management Plan Area

Thence North 64-53-25 West, a distance of 400.6090
Thence North 66-16-35 West, a distance of 566.0858
Thence North 38-59-11 West, a distance of 489.7595
Thence North 32-14-03 West, a distance of 383.4039
Thence North 20-39-20 West, a distance of 286.6781
Thence North 43-18-43 West, a distance of 225.0460
Thence South 18-53-52 West, a distance of 166.3412
Thence North 88-17-24 West, a distance of 416.8106
Thence South 04-55-55 East, a distance of 533.6007
Thence South 51-18-38 East, a distance of 264.5584
Thence South 16-03-15 East, a distance of 723.6602
Thence South 34-10-30 West, a distance of 188.4831
Thence South 37-27-05 West, a distance of 261.0635
Thence South 06-18-55 East, a distance of 428.4127
Thence South 00-40-32 West, a distance of 371.0878
Thence South 66-17-12 East, a distance of 283.1573
Thence South 54-26-34 East, a distance of 380.8999
Thence South 18-53-51 West, a distance of 499.4190
Thence South 32-15-38 East, a distance of 191.7957
Thence South 14-32-01 West, a distance of 434.8520
Thence South 17-11-06 West, a distance of 549.9921
Thence South 31-27-03 West, a distance of 305.2142
Thence South 60-02-12 West, a distance of 302.7087
Thence South 60-45-52 West, a distance of 721.1047
Thence South 83-27-27 West, a distance of 367.5184
Thence South 57-14-27 West, a distance of 374.5758
Thence South 20-39-20 East, a distance of 286.6781
Thence South 88-16-51 East, a distance of 312.5156
Thence South 25-17-24 East, a distance of 476.0654
Thence South 57-08-56 East, a distance of 307.8569
Thence North 50-10-17 East, a distance of 479.5142
Thence North 29-05-00 East, a distance of 656.5286
Thence South 34-02-30 East, a distance of 457.5323
Thence South 17-22-42 East, a distance of 168.2415
Thence South 00-40-33 West, a distance of 158.9491
Thence South 60-02-12 West, a distance of 302.7087
Thence South 00-40-31 West, a distance of 371.2758
Thence South 67-32-00 East, a distance of 448.9489
Thence South 64-52-57 East, a distance of 400.4958
Thence North 71-51-49 East, a distance of 481.6809
Thence South 89-35-03 East, a distance of 344.3841
Thence South 46-25-17 East, a distance of 279.7030
Thence South 03-10-14 East, a distance of 409.0632
Thence South 23-51-22 West, a distance of 416.9340
Thence South 03-24-06 East, a distance of 383.4255
Thence South 66-09-28 East, a distance of 498.9547
Thence North 61-17-01 East, a distance of 418.4674
Thence North 62-31-22 East, a distance of 424.9349
Thence South 60-02-46 East, a distance of 439.7373
Thence South 24-58-10 East, a distance of 414.5596
Thence South 33-07-02 East, a distance of 260.1327
Thence South 34-34-28 East, a distance of 318.9559
Thence South 18-21-02 East, a distance of 308.8960
Thence South 13-34-41 West, a distance of 413.1727
Thence South 42-19-37 West, a distance of 343.9836
Thence South 63-55-07 West, a distance of 198.5981

Exhibit G – Description of the Water Management Plan Area

Thence North 85-31-13 West, a distance of 366.4946
Thence North 76-58-32 West, a distance of 406.8413
Thence North 72-11-08 West, a distance of 279.2651
Thence South 48-26-06 West, a distance of 204.3228
Thence South 34-26-55 West, a distance of 484.3828
Thence South 07-01-37 West, a distance of 389.2991
Thence South 05-32-54 East, a distance of 480.9402
Thence South 47-03-44 East, a distance of 682.8003
Thence South 21-46-09 East, a distance of 371.7621
Thence South 02-53-33 East, a distance of 483.0534
Thence South 14-20-24 West, a distance of 531.9487
Thence South 35-28-25 West, a distance of 663.8471
Thence South 52-23-59 West, a distance of 364.7668
Thence South 08-13-01 East, a distance of 698.7991
Thence South 67-31-20 East, a distance of 449.3910
Thence South 25-24-05 East, a distance of 238.0781
Thence South 22-14-37 West, a distance of 282.6599
Thence South 22-16-19 West, a distance of 282.6499
Thence South 26-41-31 East, a distance of 328.3674
Thence South 08-00-01 East, a distance of 374.5201
Thence South 00-14-32 West, a distance of 295.8146
Thence South 22-50-30 East, a distance of 524.2347
Thence South 32-19-47 East, a distance of 135.8012
Thence South 74-41-41 East, a distance of 495.5765
Thence North 87-48-16 East, a distance of 230.0439
Thence South 62-02-24 East, a distance of 271.0081
Thence South 27-01-09 East, a distance of 158.7654
Thence South 00-25-08 West, a distance of 188.1300
Thence South 47-28-36 West, a distance of 306.8174
Thence South 67-08-04 West, a distance of 1017.9951
Thence South 88-16-15 West, a distance of 559.2547
Thence North 38-00-54 West, a distance of 199.5152
Thence North 01-24-06 West, a distance of 209.4997
Thence North 29-50-03 West, a distance of 268.0941
Thence North 58-00-46 West, a distance of 880.2816
Thence North 18-49-54 East, a distance of 131.2772
Thence North 41-46-48 East, a distance of 881.2088
Thence North 53-22-34 East, a distance of 244.5273
Thence North 12-17-03 East, a distance of 196.8192
Thence North 32-10-09 West, a distance of 185.4739
Thence North 63-33-01 West, a distance of 250.0488
Thence North 87-33-20 West, a distance of 561.2607
Thence North 66-33-29 West, a distance of 616.6454
Thence North 08-43-43 East, a distance of 216.6340
Thence North 67-39-56 East, a distance of 702.4460
Thence North 35-11-58 East, a distance of 228.9973
Thence North 05-39-39 West, a distance of 221.7695
Thence North 52-37-23 West, a distance of 454.7550
Thence North 70-59-03 West, a distance of 713.5651
Thence North 88-13-32 West, a distance of 260.3749
Thence North 81-50-24 West, a distance of 472.9131
Thence North 46-37-10 West, a distance of 638.0651
Thence North 43-16-43 West, a distance of 300.1255
Thence North 38-12-54 West, a distance of 414.8389
Thence North 17-22-30 West, a distance of 336.5442
Thence North 15-44-09 East, a distance of 601.0252

Exhibit G – Description of the Water Management Plan Area

Thence North 17-21-42 West, a distance of 673.1694
Thence North 20-38-46 West, a distance of 573.2531
Thence North 18-52-30 West, a distance of 622.8685
Thence South 60-02-48 West, a distance of 302.6778
Thence North 69-38-36 West, a distance of 331.8504
Thence South 60-02-48 West, a distance of 302.6778
Thence North 43-18-30 West, a distance of 675.1831
Thence North 32-14-42 West, a distance of 383.5238
Thence North 57-09-25 West, a distance of 615.5074
Thence South 80-11-19 West, a distance of 529.6212
Thence South 86-26-44 West, a distance of 574.6054
Thence North 35-20-05 West, a distance of 531.4653
Thence North 00-38-55 East, a distance of 265.0170
Thence North 67-31-12 West, a distance of 448.8571
Thence South 88-18-10 West, a distance of 886.2638
Thence South 60-46-39 West, a distance of 721.0129
Thence South 45-41-01 West, a distance of 589.1057
Thence South 14-55-27 East, a distance of 387.3153
Thence South 00-40-32 West, a distance of 371.0888
Thence South 13-04-27 East, a distance of 438.7482
Thence South 21-26-38 East, a distance of 692.0304
Thence South 46-37-24 East, a distance of 638.0219
Thence South 47-03-19 East, a distance of 563.1754
Thence South 14-56-23 East, a distance of 387.4074
Thence South 23-12-42 East, a distance of 643.1882
Thence South 28-23-55 East, a distance of 428.9302
Thence South 14-56-32 East, a distance of 387.3475
Thence South 08-36-11 East, a distance of 323.3886
Thence South 04-55-55 East, a distance of 533.6007
Thence South 13-03-12 East, a distance of 205.8819
Thence South 09-36-40 East, a distance of 902.1630
Thence South 33-16-14 East, a distance of 321.9605
Thence South 36-27-41 West, a distance of 173.5290
Thence South 58-28-58 West, a distance of 639.1622
Thence South 01-42-32 East, a distance of 8216.1537
Thence North 78-59-47 East, a distance of 87.1013
Thence South 88-12-52 East, a distance of 469.3529
Thence South 74-02-23 East, a distance of 432.5486
Thence South 69-39-25 East, a distance of 664.8422
Thence South 88-10-48 East, a distance of 208.6052
Thence South 69-38-45 East, a distance of 498.6348
Thence South 82-26-13 East, a distance of 525.1939
Thence North 80-15-12 East, a distance of 265.0761
Thence South 69-37-59 East, a distance of 332.4062
Thence North 80-15-12 East, a distance of 265.0761
Thence North 61-21-31 East, a distance of 418.1679
Thence North 78-16-23 East, a distance of 907.4410
Thence South 79-58-51 East, a distance of 370.0179
Thence North 82-08-20 East, a distance of 316.2216
Thence North 55-40-58 East, a distance of 239.1251
Thence North 32-41-32 East, a distance of 260.8180
Thence North 87-54-28 East, a distance of 267.0530
Thence South 74-39-09 East, a distance of 360.3507
Thence South 81-59-59 East, a distance of 351.1678
Thence South 85-51-12 East, a distance of 535.0256
Thence North 74-27-22 East, a distance of 253.5225

Exhibit G – Description of the Water Management Plan Area

Thence North 68-04-45 East, a distance of 405.9771
Thence North 72-57-30 East, a distance of 164.2103
Thence North 68-40-29 East, a distance of 674.5618
Thence South 88-12-52 East, a distance of 469.3529
Thence North 84-02-19 East, a distance of 787.1317
Thence North 57-20-59 East, a distance of 187.2075
Thence North 72-57-06 East, a distance of 328.3010
Thence North 89-27-22 East, a distance of 1303.8087
Thence North 69-30-36 East, a distance of 279.4284
Thence North 55-24-17 East, a distance of 446.5897
Thence North 77-27-37 East, a distance of 428.3428
Thence North 57-20-59 East, a distance of 187.2075
Thence North 68-40-15 East, a distance of 674.4450
Thence North 54-02-04 East, a distance of 259.7702
Thence North 61-32-05 West, a distance of 236.0350
Thence North 11-48-13 East, a distance of 268.8725
Thence North 74-44-23 East, a distance of 542.1152
Thence North 79-01-23 East, a distance of 478.8868
Thence North 72-58-07 East, a distance of 328.4024
Thence North 39-15-47 East, a distance of 333.7907
Thence North 18-52-51 East, a distance of 332.5833
Thence North 77-29-05 East, a distance of 428.3020
Thence South 64-07-57 East, a distance of 518.8621
Thence South 88-12-19 East, a distance of 365.1791
Thence North 57-18-33 East, a distance of 748.5774
Thence North 30-13-53 East, a distance of 421.8035
Thence North 50-13-44 East, a distance of 479.1141
Thence North 27-01-48 East, a distance of 351.2419
Thence North 69-48-55 East, a distance of 347.5974
Thence North 73-52-54 East, a distance of 276.2335
Thence North 64-10-01 East, a distance of 564.5414
Thence North 48-25-39 East, a distance of 770.2680
Thence North 02-42-04 West, a distance of 363.4037
Thence North 07-15-13 East, a distance of 494.0156
Thence South 82-00-37 East, a distance of 544.5357
Thence North 23-34-36 East, a distance of 248.7655
Thence North 08-21-28 West, a distance of 257.9899
Thence North 12-57-56 West, a distance of 211.7095
Thence North 39-05-14 East, a distance of 188.3414
Thence South 59-36-44 East, a distance of 294.3064
Thence South 29-40-15 East, a distance of 384.3301
Thence North 77-27-50 East, a distance of 214.2324
Thence South 37-11-16 East, a distance of 340.4048
Thence South 29-37-50 East, a distance of 310.4751
Thence North 63-11-55 East, a distance of 298.2940
Thence North 54-27-48 East, a distance of 484.6434
Thence North 53-19-04 East, a distance of 504.0777
Thence North 70-16-43 East, a distance of 313.3817
Thence North 68-19-13 East, a distance of 338.7091
Thence South 79-55-46 East, a distance of 321.3256
Thence South 88-11-10 East, a distance of 260.6306
Thence South 88-14-05 East, a distance of 365.1733
Thence South 61-32-01 East, a distance of 235.8955
Thence South 69-37-59 East, a distance of 332.4058
Thence South 71-22-52 East, a distance of 548.3222
Thence South 13-09-09 East, a distance of 219.1868

Exhibit G – Description of the Water Management Plan Area

Thence South 22-05-36 East, a distance of 405.4599
Thence South 35-25-24 East, a distance of 265.9093
Thence South 61-31-13 East, a distance of 235.9251
Thence North 09-57-27 East, a distance of 320.9599
Thence North 12-08-01 West, a distance of 709.4744
Thence North 05-00-10 West, a distance of 533.2184
Thence North 31-28-03 East, a distance of 304.8291
Thence North 62-04-26 East, a distance of 534.2079
Thence North 76-04-08 East, a distance of 380.0540
Thence North 50-36-14 East, a distance of 898.3854
Thence South 60-30-43 East, a distance of 295.9651
Thence South 09-03-18 East, a distance of 874.4608
Thence South 42-03-39 West, a distance of 1049.7552
Thence South 33-04-47 East, a distance of 305.9692
Thence South 00-25-20 West, a distance of 424.0115
Thence South 08-41-25 West, a distance of 175.3885
Thence South 18-57-27 West, a distance of 88.8830
Thence South 00-37-56 West, a distance of 158.5727
Thence South 02-24-11 West, a distance of 420.3696
Thence South 10-51-56 West, a distance of 218.1612
Thence South 23-17-39 West, a distance of 1081.6711
Thence South 22-14-55 West, a distance of 282.6016
Thence South 09-56-34 West, a distance of 642.1445
Thence South 00-36-30 West, a distance of 423.7739
Thence South 05-36-43 East, a distance of 480.6166
Thence South 34-07-27 East, a distance of 457.6755
Thence South 43-22-35 East, a distance of 525.6352
Thence South 43-21-59 East, a distance of 468.2066
Thence South 86-51-47 East, a distance of 194.1659
Thence North 13-02-05 West, a distance of 207.2779
Thence North 31-29-15 East, a distance of 304.8943
Thence South 28-28-33 East, a distance of 429.1724
Thence South 00-37-56 West, a distance of 101.9432
Thence South 00-34-18 West, a distance of 162.8831
Thence South 79-04-14 West, a distance of 215.9165
Thence South 16-16-25 East, a distance of 365.7800
Thence South 29-40-24 East, a distance of 310.3196
Thence South 00-36-30 West, a distance of 211.8869
Thence South 11-46-39 West, a distance of 268.8469
Thence South 34-06-24 East, a distance of 457.6575
Thence South 32-18-47 East, a distance of 383.7376
Thence South 05-00-57 East, a distance of 533.2921
Thence South 18-52-51 West, a distance of 332.5833
Thence South 34-14-57 West, a distance of 564.8157
Thence South 62-30-45 West, a distance of 350.7168
Thence South 27-53-02 East, a distance of 1292.0070
Thence South 26-38-27 East, a distance of 844.3959
Thence South 35-16-45 East, a distance of 1398.9888
Thence South 43-11-11 East, a distance of 1392.1514
Thence South 42-14-40 East, a distance of 491.7866
Thence North 45-24-07 East, a distance of 151.1478
Thence South 77-29-31 East, a distance of 410.3647
Thence South 18-02-51 East, a distance of 181.1631
Thence South 39-21-33 East, a distance of 223.9113
Thence South 33-18-20 East, a distance of 206.6998
Thence South 00-25-39 West, a distance of 167.5677

Exhibit G – Description of the Water Management Plan Area

Thence South 54-42-30 East, a distance of 111.6424
Thence South 50-39-25 East, a distance of 838.8686
Thence North 11-47-14 West, a distance of 130.9483
Thence North 07-43-40 West, a distance of 202.6535
Thence North 00-24-22 East, a distance of 229.3178
Thence North 00-25-00 East, a distance of 171.8795
Thence North 37-17-40 East, a distance of 143.3793
Thence South 83-52-17 East, a distance of 288.0212
Thence South 35-07-26 East, a distance of 246.5899
Thence South 57-35-35 East, a distance of 270.2065
Thence South 66-24-50 East, a distance of 218.3676
Thence South 84-22-46 East, a distance of 316.5217
Thence South 67-45-17 East, a distance of 154.3641
Thence South 60-13-50 East, a distance of 526.0466
Thence South 30-34-27 East, a distance of 334.2156
Thence South 20-07-23 East, a distance of 244.8868
Thence South 21-23-16 East, a distance of 463.0777
Thence South 26-09-54 East, a distance of 192.1947
Thence South 37-28-06 East, a distance of 326.7182
Thence South 31-11-18 East, a distance of 437.6249
Thence South 36-28-24 East, a distance of 429.8103
Thence South 32-03-48 East, a distance of 373.6888
Thence South 38-14-10 East, a distance of 366.9793
Thence South 26-09-29 East, a distance of 448.5666
Thence South 26-08-48 East, a distance of 256.4284
Thence South 28-11-19 East, a distance of 359.0890
Thence South 27-53-11 East, a distance of 423.0643
Thence South 28-12-22 East, a distance of 359.1480
Thence South 32-03-30 East, a distance of 373.7422
Thence South 44-37-29 East, a distance of 80.9655
Thence North 18-52-20 East, a distance of 181.2433
Thence North 00-24-01 East, a distance of 143.1905
Thence North 14-50-58 West, a distance of 326.7890
Thence North 05-18-17 West, a distance of 287.9834
Thence North 00-24-59 East, a distance of 258.0698
Thence North 53-33-00 East, a distance of 143.2788
Thence North 84-41-51 East, a distance of 288.1079
Thence South 51-43-06 East, a distance of 326.7620
Thence South 44-34-21 East, a distance of 527.0298
Thence South 31-11-28 East, a distance of 437.3463
Thence South 33-58-56 East, a distance of 659.7382
Thence South 38-14-14 East, a distance of 550.5564
Thence South 63-00-06 East, a distance of 384.5311
Thence South 38-59-18 East, a distance of 1038.4843
Thence South 15-17-56 East, a distance of 952.6996
Thence South 55-56-23 East, a distance of 206.5605
Thence South 55-53-00 East, a distance of 516.8216
Thence South 38-53-16 East, a distance of 407.1779
Thence South 16-56-09 East, a distance of 1441.3852
Thence South 07-11-08 East, a distance of 433.7182
Thence South 21-02-16 East, a distance of 862.1560
Thence South 27-40-23 East, a distance of 487.1621
Thence South 26-09-29 East, a distance of 448.5666
Thence South 45-22-28 West, a distance of 81.1422
Thence South 06-42-29 East, a distance of 231.1453
Thence South 20-08-17 East, a distance of 244.7103

Exhibit G – Description of the Water Management Plan Area

Thence South 09-04-03 East, a distance of 174.4926
Thence South 09-02-24 East, a distance of 174.2271
Thence South 07-43-40 East, a distance of 202.6525
Thence South 00-24-00 West, a distance of 286.5700
Thence South 14-49-32 East, a distance of 326.8170
Thence South 00-24-00 West, a distance of 286.5070
Thence South 21-21-44 East, a distance of 154.4223
Thence South 13-37-15 East, a distance of 236.2051
Thence South 13-38-35 East, a distance of 236.3570
Thence South 15-31-50 East, a distance of 208.6814
Thence South 22-46-58 East, a distance of 218.2129
Thence South 22-46-35 East, a distance of 218.2700
Thence South 55-52-57 East, a distance of 206.7006
Thence South 78-16-53 East, a distance of 146.1716
Thence North 79-05-28 East, a distance of 292.2816
Thence North 74-28-54 East, a distance of 208.6048
Thence North 82-16-12 East, a distance of 202.5910
Thence South 89-35-39 East, a distance of 229.3808
Thence South 80-06-19 East, a distance of 174.2164
Thence North 22-12-54 East, a distance of 154.3976
Thence North 26-07-54 West, a distance of 192.1396
Thence North 36-27-45 West, a distance of 286.6826
Thence North 41-34-35 West, a distance of 385.5748
Thence North 26-08-54 West, a distance of 384.3343
Thence North 13-37-11 West, a distance of 354.5964
Thence North 24-22-44 West, a distance of 410.3376
Thence North 18-00-48 West, a distance of 362.5852
Thence North 12-07-44 West, a distance of 264.1464
Thence North 05-55-46 West, a distance of 519.0893
Thence North 00-24-59 East, a distance of 429.9494
Thence North 02-18-24 West, a distance of 602.4882
Thence North 02-04-24 West, a distance of 659.9320
Thence North 02-05-06 West, a distance of 659.6867
Thence North 25-08-41 West, a distance of 730.7479
Thence North 42-06-19 West, a distance of 466.4456
Thence North 19-15-13 West, a distance of 426.0813
Thence North 02-57-04 West, a distance of 488.0222
Thence North 00-24-41 East, a distance of 487.3876
Thence North 00-25-30 East, a distance of 286.5709
Thence North 19-34-09 West, a distance of 335.5043
Thence North 34-05-50 West, a distance of 556.3259
Thence North 22-12-56 West, a distance of 745.1916
Thence North 23-12-25 West, a distance of 500.5652
Thence North 06-43-37 West, a distance of 462.0560
Thence North 10-53-48 West, a distance of 292.2697
Thence North 00-25-22 East, a distance of 372.6971
Thence North 00-24-28 East, a distance of 544.3888
Thence North 00-24-21 East, a distance of 458.6995
Thence North 13-37-02 West, a distance of 472.5327
Thence North 16-18-14 West, a distance of 299.2196
Thence North 06-09-17 East, a distance of 287.9729
Thence North 63-49-21 East, a distance of 256.2870
Thence North 63-49-04 East, a distance of 192.3620
Thence South 89-35-15 East, a distance of 286.5074
Thence South 72-52-12 East, a distance of 299.4071
Thence South 36-27-54 East, a distance of 286.4572

Exhibit G – Description of the Water Management Plan Area

Thence South 63-00-19 East, a distance of 320.4094
Thence South 87-05-43 East, a distance of 659.8478
Thence South 87-18-26 East, a distance of 717.0418
Thence North 78-19-20 East, a distance of 410.3691
Thence North 86-20-49 East, a distance of 402.1922
Thence North 75-28-47 East, a distance of 444.9628
Thence North 68-35-42 East, a distance of 463.0656
Thence South 89-35-15 East, a distance of 573.1398
Thence North 74-30-26 East, a distance of 208.7087
Thence North 67-12-39 East, a distance of 218.1548
Thence North 40-38-39 East, a distance of 488.2085
Thence North 56-43-24 East, a distance of 309.9471
Thence North 82-49-48 East, a distance of 433.6411
Thence South 64-49-28 East, a distance of 410.3555
Thence South 79-35-09 East, a distance of 494.7756
Thence South 51-42-35 East, a distance of 326.8004
Thence South 67-19-51 East, a distance of 681.2553
Thence South 53-53-05 East, a distance of 1129.4102
Thence South 36-27-09 East, a distance of 573.2902
Thence South 69-38-11 East, a distance of 335.3323
Thence North 82-19-37 East, a distance of 202.6898
Thence North 75-09-58 East, a distance of 326.6362
Thence South 86-44-29 East, a distance of 573.9280
Thence South 44-35-15 East, a distance of 405.2711
Thence South 54-53-15 East, a distance of 453.2260
Thence South 26-08-48 East, a distance of 256.4275
Thence South 70-17-49 East, a distance of 607.3060
Thence South 72-29-09 East, a distance of 389.8210
Thence South 57-07-23 East, a distance of 373.7322
Thence South 78-17-20 East, a distance of 292.2079
Thence North 60-38-50 East, a distance of 231.0356
Thence North 63-52-05 East, a distance of 192.2792
Thence North 63-50-06 East, a distance of 256.2596
Thence North 33-14-52 West, a distance of 103.2813
Thence North 73-39-56 West, a distance of 208.6728
Thence North 83-14-16 West, a distance of 259.5556
Thence North 83-52-07 West, a distance of 287.8969
Thence North 38-15-29 West, a distance of 183.7039
Thence North 31-36-33 West, a distance of 270.2132
Thence North 06-40-38 West, a distance of 231.1308
Thence North 31-21-38 East, a distance of 167.1723
Thence North 36-29-06 West, a distance of 286.5315
Thence North 52-43-48 West, a distance of 143.2535
Thence North 12-07-13 West, a distance of 264.3292
Thence North 00-26-14 East, a distance of 229.3817
Thence North 49-48-32 East, a distance of 264.1064
Thence North 63-50-04 East, a distance of 64.2044
Thence North 81-00-14 East, a distance of 174.2687
Thence North 37-17-40 East, a distance of 143.3793
Thence North 11-41-40 East, a distance of 146.1588
Thence North 00-22-29 East, a distance of 114.6895
Thence North 44-33-45 West, a distance of 162.1090
Thence North 54-04-38 West, a distance of 246.5087
Thence North 74-39-06 West, a distance of 444.8663
Thence North 55-53-48 West, a distance of 206.6659
Thence North 81-26-16 West, a distance of 202.7599

Exhibit G – Description of the Water Management Plan Area

Thence North 89-35-15 West, a distance of 286.5074
Thence South 60-39-45 West, a distance of 231.1446
Thence South 75-28-47 West, a distance of 444.9625
Thence South 84-04-11 West, a distance of 259.5139
Thence North 74-39-14 West, a distance of 889.8532
Thence North 37-28-30 West, a distance of 326.6682
Thence North 60-56-43 West, a distance of 359.0601
Thence North 51-42-35 West, a distance of 326.8004
Thence North 74-40-45 West, a distance of 444.9374
Thence North 78-16-36 West, a distance of 584.4413
Thence North 59-50-38 West, a distance of 462.3204
Thence North 41-12-16 West, a distance of 345.1619
Thence North 36-28-24 West, a distance of 429.8103
Thence North 44-33-45 West, a distance of 324.2179
Thence North 78-17-37 West, a distance of 292.3305
Thence North 82-27-35 West, a distance of 230.9974
Thence North 85-45-59 West, a distance of 430.9259
Thence North 74-51-11 West, a distance of 563.0613
Thence South 86-51-26 West, a distance of 459.4410
Thence South 66-26-36 West, a distance of 282.2731
Thence North 87-12-58 West, a distance of 688.4375
Thence North 66-44-39 West, a distance of 590.7479
Thence North 71-08-45 West, a distance of 815.7709
Thence North 61-17-05 West, a distance of 423.1666
Thence North 75-34-27 West, a distance of 472.6522
Thence North 86-00-24 West, a distance of 459.4906
Thence North 54-52-19 West, a distance of 453.1594
Thence North 77-03-58 West, a distance of 792.7378
Thence North 64-34-10 West, a distance of 474.3353
Thence North 69-21-42 West, a distance of 580.3709
Thence North 65-57-27 West, a distance of 500.4138
Thence North 48-24-23 West, a distance of 914.0925
Thence North 48-58-47 West, a distance of 528.5110
Thence North 26-09-15 West, a distance of 576.8086
Thence North 28-38-22 West, a distance of 294.9630
Thence North 05-55-05 West, a distance of 259.4447
Thence North 39-03-22 East, a distance of 183.5086
Thence North 08-32-50 East, a distance of 202.6892
Thence North 18-02-29 West, a distance of 181.2221
Thence North 44-34-49 West, a distance of 283.6904
Thence North 16-56-18 West, a distance of 480.5332
Thence North 26-57-57 East, a distance of 63.9531
Thence North 26-59-06 East, a distance of 320.3812
Thence North 00-24-56 East, a distance of 86.1903
Thence North 13-36-07 West, a distance of 117.9965
Thence North 55-53-15 West, a distance of 103.4197
Thence North 80-07-57 West, a distance of 348.6579
Thence South 83-19-15 West, a distance of 231.0682
Thence South 71-56-46 West, a distance of 181.3012
Thence North 89-35-15 West, a distance of 286.5074
Thence North 65-37-31 West, a distance of 282.2862
Thence North 21-24-19 West, a distance of 154.4679
Thence North 00-25-00 East, a distance of 257.8188
Thence North 50-35-45 East, a distance of 223.8940
Thence North 72-00-09 East, a distance of 362.4866
Thence North 77-51-49 East, a distance of 264.2818

Exhibit G – Description of the Water Management Plan Area

Thence North 51-44-27 East, a distance of 367.0951
Thence North 54-54-11 East, a distance of 246.4308
Thence North 56-41-40 East, a distance of 310.0497
Thence North 62-07-05 East, a distance of 423.2595
Thence North 06-43-28 East, a distance of 259.4095
Thence North 21-22-37 West, a distance of 617.2803
Thence North 23-33-48 West, a distance of 282.3551
Thence North 89-33-45 West, a distance of 114.6283
Thence North 89-35-22 West, a distance of 401.2603
Thence South 69-51-30 West, a distance of 244.8490
Thence South 60-09-01 West, a distance of 398.0591
Thence South 54-23-11 West, a distance of 389.9315
Thence South 54-22-33 West, a distance of 389.8293
Thence South 61-48-41 West, a distance of 359.0890
Thence South 84-03-32 West, a distance of 259.6446
Thence North 89-35-15 West, a distance of 286.5074
Thence North 57-07-23 West, a distance of 373.7322
Thence North 00-24-59 East, a distance of 258.0698
Thence North 30-40-48 East, a distance of 398.0960
Thence North 00-23-59 East, a distance of 143.3785
Thence North 18-00-35 West, a distance of 90.5622
Thence North 40-11-02 West, a distance of 264.2419
Thence North 65-07-41 West, a distance of 346.2386
Thence North 83-15-30 West, a distance of 519.0892
Thence North 44-35-39 West, a distance of 324.3934
Thence North 60-59-24 West, a distance of 359.0481
Thence North 30-30-56 West, a distance of 167.1519
Thence North 18-02-29 West, a distance of 362.4451
Thence North 00-25-00 East, a distance of 171.9425
Thence North 53-32-05 East, a distance of 286.7694
Thence North 79-07-22 East, a distance of 292.1233
Thence South 89-35-23 East, a distance of 200.6301
Thence South 84-48-57 East, a distance of 345.1619
Thence South 50-18-17 East, a distance of 407.2701
Thence South 44-36-07 East, a distance of 324.3485
Thence South 47-35-44 East, a distance of 385.4597
Thence South 47-57-26 East, a distance of 345.2181
Thence South 50-18-41 East, a distance of 407.2305
Thence South 65-07-08 East, a distance of 346.2647
Thence South 85-11-02 East, a distance of 373.6944
Thence South 89-35-12 East, a distance of 372.6347
Thence North 70-25-25 East, a distance of 335.3866
Thence North 67-14-11 East, a distance of 218.3853
Thence North 32-23-49 East, a distance of 270.3989
Thence North 00-24-59 East, a distance of 344.0091
Thence North 06-44-46 West, a distance of 230.9107
Thence North 37-17-40 East, a distance of 286.7579
Thence North 00-23-34 East, a distance of 200.5677
Thence North 00-23-58 East, a distance of 143.4405
Thence North 54-03-04 West, a distance of 493.0265
Thence North 79-16-58 West, a distance of 640.9295
Thence North 85-45-54 West, a distance of 430.8012
Thence North 74-20-13 West, a distance of 653.5178
Thence North 71-09-25 West, a distance of 543.7674
Thence North 53-33-23 West, a distance of 779.7344
Thence North 26-08-55 West, a distance of 768.9482

Exhibit G – Description of the Water Management Plan Area

Thence North 21-24-02 West, a distance of 617.3128
Thence North 04-14-31 East, a distance of 430.9305
Thence North 42-24-18 East, a distance of 385.5473
Thence North 41-00-36 East, a distance of 264.2145
Thence North 30-08-41 East, a distance of 230.9893
Thence North 07-43-31 West, a distance of 202.7149
Thence North 40-45-25 West, a distance of 304.6257
Thence North 70-17-49 West, a distance of 607.3060
Thence North 55-54-46 West, a distance of 310.0155
Thence North 26-09-10 West, a distance of 256.3718
Thence North 00-27-01 East, a distance of 143.1924
Thence North 14-27-19 East, a distance of 118.1782
Thence North 00-23-59 East, a distance of 143.3785
Thence North 54-03-37 West, a distance of 246.4075
Thence North 81-58-34 West, a distance of 433.8727
Thence North 77-04-54 West, a distance of 264.1866
Thence North 37-26-54 West, a distance of 326.8667
Thence North 00-25-42 East, a distance of 200.6306
Thence North 00-24-14 East, a distance of 372.5092
Thence North 15-40-06 East, a distance of 326.7674
Thence North 16-21-03 East, a distance of 208.6903
Thence North 35-24-20 East, a distance of 349.7396
Thence North 63-50-04 East, a distance of 64.2044
Thence North 63-50-50 East, a distance of 256.3718
Thence North 56-43-24 East, a distance of 309.9471
Thence North 53-33-00 East, a distance of 286.5577
Thence North 76-22-18 East, a distance of 945.3672
Thence North 52-15-15 East, a distance of 510.2846
Thence North 66-11-52 East, a distance of 628.5904
Thence North 74-26-54 East, a distance of 625.9155
Thence North 58-25-38 East, a distance of 270.2542
Thence South 85-01-19 East, a distance of 718.8363
Thence South 63-01-36 East, a distance of 384.4457
Thence South 66-20-26 East, a distance of 218.3532
Thence South 69-03-13 East, a distance of 244.9364
Thence North 83-16-16 East, a distance of 230.9660
Thence North 53-34-47 East, a distance of 143.3794
Thence South 84-23-40 East, a distance of 949.5407
Thence South 56-51-35 East, a distance of 476.9601
Thence South 58-35-04 East, a distance of 167.2702
Thence North 84-03-22 East, a distance of 519.0406
Thence North 56-46-52 East, a distance of 103.2473
Thence North 58-23-45 East, a distance of 270.4916
Thence North 71-54-54 East, a distance of 90.6009
Thence South 89-35-01 East, a distance of 172.0045
Thence South 74-03-10 East, a distance of 535.4830
Thence South 44-34-13 East, a distance of 324.1737
Thence South 33-18-20 East, a distance of 310.0497
Thence South 20-36-19 East, a distance of 399.2270
Thence South 47-58-49 East, a distance of 345.0929
Thence South 53-33-09 East, a distance of 389.8856
Thence South 76-35-51 East, a distance of 764.7010
Thence South 81-44-01 East, a distance of 838.9669
Thence South 77-41-35 East, a distance of 556.5393
Thence South 84-08-48 East, a distance of 1209.1792
Thence South 87-06-12 East, a distance of 1319.5612

Exhibit G – Description of the Water Management Plan Area

Thence North 82-17-20 East, a distance of 607.8717
Thence South 89-35-38 East, a distance of 458.6365
Thence North 68-02-09 East, a distance of 526.8664
Thence North 76-22-18 East, a distance of 472.6836
Thence North 76-23-14 East, a distance of 590.8480
Thence South 89-35-37 East, a distance of 114.5029
Thence North 56-42-13 East, a distance of 103.4884
Thence North 63-53-06 East, a distance of 128.0747
Thence North 45-25-36 East, a distance of 243.2076
Thence North 29-27-11 East, a distance of 295.1445
Thence North 41-00-36 East, a distance of 264.2145
Thence South 89-35-37 East, a distance of 114.6279
Thence North 82-16-29 East, a distance of 202.7149
Thence South 89-35-00 East, a distance of 257.8818
Thence South 83-52-26 East, a distance of 288.1455
Thence South 52-40-48 East, a distance of 143.1916
Thence South 30-33-09 East, a distance of 167.2154
Thence South 09-52-16 West, a distance of 174.2679
Thence South 30-08-41 West, a distance of 230.9893
Thence South 22-12-22 West, a distance of 154.4560
Thence South 00-26-15 West, a distance of 229.1317
Thence South 00-23-59 West, a distance of 143.3785
Thence South 26-09-10 East, a distance of 384.5573
Thence South 30-33-01 East, a distance of 334.2063
Thence South 47-04-25 East, a distance of 466.5541
Thence South 59-51-47 East, a distance of 462.0867
Thence South 66-04-10 East, a distance of 718.7888
Thence South 60-34-06 East, a distance of 295.0830
Thence South 36-26-24 East, a distance of 429.9371
Thence South 38-16-32 East, a distance of 183.4302
Thence South 50-55-44 East, a distance of 367.0959
Thence South 80-07-32 East, a distance of 522.9976
Thence South 83-14-16 East, a distance of 259.5556
Thence South 89-35-00 East, a distance of 343.8841
Thence North 59-26-40 East, a distance of 167.0758
Thence North 60-38-50 East, a distance of 231.0356
Thence North 66-27-54 East, a distance of 282.3629
Thence North 63-51-05 East, a distance of 192.3069
Thence South 89-35-22 East, a distance of 200.5051
Thence South 44-36-00 East, a distance of 202.5910
Thence South 18-01-23 East, a distance of 181.4008
Thence South 13-38-22 East, a distance of 236.4173
Thence South 03-58-18 East, a distance of 373.5851
Thence South 10-53-48 East, a distance of 292.2697
Thence South 22-46-58 East, a distance of 218.2120
Thence South 31-34-53 East, a distance of 270.4261
Thence South 39-24-51 East, a distance of 223.8461
Thence North 76-20-46 East, a distance of 118.0872
Thence North 68-37-46 East, a distance of 154.3636
Thence North 18-52-43 East, a distance of 181.1847
Thence North 26-57-53 East, a distance of 256.3714
Thence North 18-50-39 East, a distance of 362.6232
Thence North 36-25-57 East, a distance of 389.8114
Thence North 45-25-49 East, a distance of 364.7890
Thence North 58-48-12 East, a distance of 437.5179
Thence North 73-54-12 East, a distance of 807.0133

Exhibit G – Description of the Water Management Plan Area

Thence South 89-35-13 East, a distance of 372.6347
Thence South 70-07-37 East, a distance of 516.6417
Thence South 57-26-00 East, a distance of 1184.7900
Thence South 42-06-12 East, a distance of 933.1152
Thence South 68-33-43 East, a distance of 399.1137
Thence South 44-35-55 East, a distance of 283.7774
Thence South 68-32-12 East, a distance of 399.1825
Thence South 71-10-13 East, a distance of 453.1256
Thence South 86-24-01 East, a distance of 516.6443
Thence South 63-00-36 East, a distance of 256.2886
Thence South 47-57-26 East, a distance of 345.2181
Thence South 61-08-28 East, a distance of 782.1325
Thence South 53-20-23 East, a distance of 533.2286
Thence South 58-37-21 East, a distance of 835.5739
Thence South 44-35-29 East, a distance of 526.8518
Thence South 68-43-27 East, a distance of 644.0187
Thence South 60-46-50 East, a distance of 654.2487
Thence South 56-28-54 East, a distance of 786.8458
Thence South 34-42-45 East, a distance of 946.2958
Thence South 31-35-39 East, a distance of 1081.5570
Thence South 24-47-42 East, a distance of 1076.9010
Thence South 09-02-24 East, a distance of 174.2261
Thence South 10-53-23 East, a distance of 292.4543
Thence South 29-50-59 East, a distance of 398.0591
Thence South 54-01-30 East, a distance of 246.5173
Thence South 55-54-06 East, a distance of 206.8047
Thence South 39-23-59 East, a distance of 223.7180
Thence South 35-07-27 East, a distance of 246.5891
Thence South 49-48-18 East, a distance of 223.7016
Thence South 71-06-40 East, a distance of 272.0239
Thence South 82-30-21 East, a distance of 230.9730
Thence South 89-35-39 East, a distance of 114.6279
Thence South 78-15-28 East, a distance of 146.1842
Thence South 63-02-06 East, a distance of 192.2788
Thence South 62-57-36 East, a distance of 128.1311
Thence North 00-22-28 East, a distance of 57.3762
Thence North 30-32-53 West, a distance of 166.9909
Thence North 36-27-13 West, a distance of 430.0114
Thence North 55-53-59 West, a distance of 309.9120
Thence North 29-50-11 West, a distance of 398.2213
Thence North 16-42-00 West, a distance of 389.7520
Thence North 03-40-13 West, a distance of 402.2620
Thence North 34-06-00 East, a distance of 310.1378
Thence South 89-35-37 East, a distance of 114.6279
Thence South 89-35-00 East, a distance of 257.8818
Thence South 33-18-20 East, a distance of 103.3499
Thence South 50-17-04 East, a distance of 407.3895
Thence South 83-51-32 East, a distance of 288.0279
Thence South 63-02-07 East, a distance of 192.2783
Thence South 58-09-42 East, a distance of 604.5925
Thence South 59-00-31 East, a distance of 732.2881
Thence North 85-12-37 East, a distance of 316.6057
Thence South 89-35-00 East, a distance of 343.8841
Thence South 79-34-59 East, a distance of 494.6526
Thence North 51-42-18 West, a distance of 326.6633
Thence North 53-35-56 West, a distance of 82.4656

Exhibit G – Description of the Water Management Plan Area

Thence North 53-34-06 West, a distance of 307.3090
Thence North 55-53-22 West, a distance of 413.3665
Thence North 72-53-50 West, a distance of 598.4647
Thence North 60-58-05 West, a distance of 718.2480
Thence North 46-42-41 West, a distance of 390.6740
Thence North 46-42-44 West, a distance of 156.7825
Thence North 44-35-15 West, a distance of 405.2711
Thence North 46-18-48 West, a distance of 669.1426
Thence North 37-52-35 West, a distance of 693.8574
Thence North 34-17-42 West, a distance of 906.2395
Thence North 33-57-07 West, a distance of 659.8059
Thence North 44-35-16 West, a distance of 608.0830
Thence North 46-47-40 West, a distance of 1054.3274
Thence North 48-19-10 West, a distance of 1868.4824
Thence North 56-06-31 West, a distance of 2130.4779
Thence North 66-07-44 West, a distance of 1655.6256
Thence North 58-12-53 West, a distance of 1376.2780
Thence North 41-24-29 West, a distance of 730.8163
Thence North 41-13-30 West, a distance of 345.0212
Thence North 26-08-55 West, a distance of 384.6138
Thence North 13-37-46 West, a distance of 354.3535
Thence North 41-34-35 West, a distance of 385.5755
Thence North 42-50-20 West, a distance of 669.1777
Thence North 50-29-55 West, a distance of 1181.6210
Thence North 31-24-48 West, a distance of 978.2580
Thence North 26-09-14 West, a distance of 704.9949
Thence North 08-33-23 West, a distance of 551.1343
Thence North 10-42-42 East, a distance of 640.9180
Thence North 35-06-54 East, a distance of 453.0875
Thence North 45-23-44 East, a distance of 243.3389
Thence North 52-32-18 East, a distance of 326.7674
Thence North 00-25-00 East, a distance of 171.8795
Thence North 34-34-34 West, a distance of 349.7803
Thence North 44-35-13 West, a distance of 337.0774
Thence North 44-35-20 West, a distance of 271.0057
Thence North 27-14-21 West, a distance of 679.4763
Thence North 09-26-25 West, a distance of 669.1250
Thence North 15-50-43 West, a distance of 716.4738
Thence North 22-47-41 West, a distance of 436.5304
Thence North 20-37-42 West, a distance of 399.1550
Thence North 05-56-49 West, a distance of 259.3960
Thence North 12-05-28 West, a distance of 264.3646
Thence North 14-27-19 East, a distance of 118.1782
Thence North 50-21-25 East, a distance of 158.1102
Thence North 65-13-15 East, a distance of 328.2188
Thence North 82-49-41 East, a distance of 264.3181
Thence South 84-49-29 East, a distance of 420.5895
Thence South 77-19-12 East, a distance of 411.1524
Thence South 62-03-23 East, a distance of 453.0744
Thence South 53-30-14 East, a distance of 237.5929
Thence South 57-59-51 East, a distance of 266.6488
Thence South 66-45-48 East, a distance of 360.0835
Thence South 74-02-50 East, a distance of 326.3171
Thence South 70-08-39 East, a distance of 314.8424
Thence South 63-01-30 East, a distance of 234.3736
Thence South 35-38-22 East, a distance of 237.4798

Exhibit G – Description of the Water Management Plan Area

Thence South 42-04-07 East, a distance of 284.3200
Thence South 48-59-46 East, a distance of 322.1632
Thence South 55-05-28 East, a distance of 338.9985
Thence South 76-41-52 East, a distance of 627.2030
Thence South 80-50-12 East, a distance of 689.1699
Thence South 68-34-43 East, a distance of 243.1736
Thence South 51-17-14 East, a distance of 422.9187
Thence South 23-13-07 East, a distance of 305.0162
Thence South 17-07-37 East, a distance of 348.0598
Thence South 20-36-34 East, a distance of 243.2560
Thence South 77-20-44 East, a distance of 411.1112
Thence North 88-22-32 East, a distance of 489.4467
Thence South 89-35-23 East, a distance of 209.5054
Thence South 77-48-51 East, a distance of 428.1470
Thence South 46-33-41 East, a distance of 358.4156
Thence South 54-02-09 East, a distance of 300.5375
Thence North 76-21-42 East, a distance of 288.1242
Thence North 17-30-54 East, a distance of 237.5765
Thence North 16-48-48 East, a distance of 309.4149
Thence North 34-06-01 East, a distance of 125.9718
Thence North 84-56-56 East, a distance of 368.4308
Thence South 89-35-24 East, a distance of 227.1308
Thence South 79-15-43 East, a distance of 390.4622
Thence South 89-35-24 East, a distance of 751.1442
Thence North 68-02-21 East, a distance of 321.0451
Thence North 76-24-34 East, a distance of 144.1615
Thence North 82-57-46 East, a distance of 405.0514
Thence North 77-54-02 East, a distance of 322.0287
Thence South 66-25-23 East, a distance of 265.9506
Thence South 68-58-41 East, a distance of 149.3127
Thence North 54-52-10 East, a distance of 300.6385
Thence North 29-27-12 East, a distance of 179.7287
Thence North 56-43-55 East, a distance of 251.9098
Thence South 81-28-20 East, a distance of 370.4709
Thence South 78-57-07 East, a distance of 284.3959
Thence South 67-47-29 East, a distance of 470.2621
Thence South 83-24-48 East, a distance of 650.0405
Thence South 87-51-03 East, a distance of 576.6556
Thence North 81-40-49 East, a distance of 229.7933
Thence South 89-34-59 East, a distance of 524.0139
Thence South 80-08-29 East, a distance of 424.8993
Thence South 68-58-59 East, a distance of 149.1738
Thence South 85-18-12 East, a distance of 700.7279
Thence North 69-21-28 East, a distance of 243.2410
Thence North 83-18-13 East, a distance of 140.9616
Thence North 87-02-55 East, a distance of 297.3945
Thence South 84-24-08 East, a distance of 385.7145
Thence South 73-38-13 East, a distance of 381.5806
Thence South 60-46-31 East, a distance of 398.7573
Thence South 44-33-51 East, a distance of 197.5537
Thence South 44-36-26 East, a distance of 148.2746
Thence South 80-51-20 East, a distance of 229.6689
Thence South 77-41-23 East, a distance of 339.1733
Thence South 80-08-20 East, a distance of 106.1940
Thence South 74-17-21 East, a distance of 199.1918
Thence South 63-03-57 East, a distance of 156.1926

Exhibit G – Description of the Water Management Plan Area

Thence South 89-35-24 East, a distance of 139.7536
Thence North 69-52-16 East, a distance of 149.1074
Thence South 74-22-05 East, a distance of 199.2446
Thence South 54-02-09 East, a distance of 150.2688
Thence South 57-32-02 East, a distance of 164.7486
Thence South 80-08-39 East, a distance of 212.5112
Thence South 81-28-20 East, a distance of 246.9807
Thence South 57-34-32 East, a distance of 164.8208
Thence South 59-51-45 East, a distance of 281.7053
Thence South 49-18-45 East, a distance of 297.3849
Thence South 53-35-18 East, a distance of 237.6448
Thence South 41-33-00 East, a distance of 235.0086
Thence South 49-00-08 East, a distance of 483.1160
Thence South 55-49-43 East, a distance of 125.8518
Thence South 44-35-25 East, a distance of 123.5701
Thence South 44-36-30 East, a distance of 271.6237
Thence South 44-36-10 East, a distance of 197.5973
Thence South 31-11-39 East, a distance of 266.6825
Thence South 29-50-24 East, a distance of 242.6743
Thence South 26-09-18 East, a distance of 273.3663
Thence South 28-55-20 East, a distance of 320.7559
Thence South 44-37-15 East, a distance of 247.0063
Thence South 39-21-54 East, a distance of 136.3797
Thence South 39-30-43 East, a distance of 1115.9357
Thence South 56-57-13 East, a distance of 518.5041
Thence South 32-18-58 East, a distance of 290.6424
Thence South 54-36-52 East, a distance of 213.2716
Thence South 47-36-34 East, a distance of 234.9146
Thence South 44-35-24 East, a distance of 172.8920
Thence South 35-05-29 East, a distance of 150.2478
Thence South 59-20-24 East, a distance of 242.6739
Thence South 59-19-30 East, a distance of 242.5664
Thence South 89-35-24 East, a distance of 139.7536
Thence South 89-35-24 East, a distance of 139.7536
Thence South 89-35-23 East, a distance of 52.3763
Thence North 67-16-06 East, a distance of 132.9522
Thence North 00-24-32 East, a distance of 52.5643
Thence North 33-16-47 West, a distance of 62.8730
Thence North 58-37-01 West, a distance of 203.6710
Thence North 47-58-30 West, a distance of 210.3380
Thence North 50-17-39 West, a distance of 248.1038
Thence North 41-34-22 West, a distance of 235.0915
Thence North 35-34-47 West, a distance of 237.6102
Thence North 52-44-11 West, a distance of 261.9812
Thence North 49-21-11 West, a distance of 297.5341
Thence North 49-21-20 West, a distance of 297.3572
Thence North 44-34-50 West, a distance of 271.7576
Thence North 38-15-35 West, a distance of 335.4983
Thence North 27-27-57 West, a distance of 336.0671
Thence North 50-30-00 West, a distance of 360.1165
Thence North 21-23-39 West, a distance of 470.1461
Thence North 10-11-56 West, a distance of 284.4954
Thence North 07-44-11 West, a distance of 246.9982
Thence North 19-33-17 West, a distance of 204.2826
Thence North 41-52-09 West, a distance of 259.7636
Thence North 63-00-09 West, a distance of 429.5609

Exhibit G – Description of the Water Management Plan Area

Thence North 43-07-25 West, a distance of 481.8419
Thence North 42-44-17 West, a distance of 382.9316
Thence North 28-24-46 West, a distance of 398.7864
Thence North 28-23-07 West, a distance of 398.6130
Thence North 38-46-12 West, a distance of 608.4346
Thence North 72-21-04 West, a distance of 530.2057
Thence North 77-53-41 West, a distance of 517.3797
Thence North 84-31-51 West, a distance of 596.0885
Thence North 68-33-48 West, a distance of 486.5318
Thence North 67-12-28 West, a distance of 642.2768
Thence North 76-42-02 West, a distance of 627.0671
Thence North 60-32-28 West, a distance of 899.1237
Thence North 75-54-13 West, a distance of 665.1543
Thence North 66-23-19 West, a distance of 665.0515
Thence North 80-51-29 West, a distance of 459.4613
Thence North 74-27-13 West, a distance of 669.4943
Thence North 63-02-06 West, a distance of 312.4704
Thence North 73-53-13 West, a distance of 580.5569
Thence North 76-51-43 West, a distance of 555.1563
Thence North 72-03-23 West, a distance of 347.9228
Thence North 71-08-13 West, a distance of 497.2030
Thence North 69-01-58 West, a distance of 746.1565
Thence North 46-26-06 West, a distance of 382.9739
Thence North 55-28-34 West, a distance of 654.0611
Thence North 65-37-13 West, a distance of 516.0126
Thence North 73-38-41 West, a distance of 508.7107
Thence North 70-36-46 West, a distance of 591.0123
Thence North 69-01-55 West, a distance of 447.6429
Thence North 64-48-32 West, a distance of 1750.7575
Thence North 68-24-13 West, a distance of 917.8053
Thence North 68-02-33 West, a distance of 1427.2827
Thence North 64-07-22 West, a distance of 1625.0677
Thence North 43-46-42 West, a distance of 876.7911
Thence North 47-49-40 West, a distance of 655.7561
Thence North 61-41-57 West, a distance of 335.8997
Thence North 51-42-49 West, a distance of 199.2231
Thence North 48-40-34 West, a distance of 346.7099
Thence North 47-34-33 West, a distance of 235.0408
Thence North 36-26-36 West, a distance of 174.6548
Thence North 09-53-20 East, a distance of 106.2668
Thence South 78-41-19 East, a distance of 462.3561
Thence South 74-50-24 East, a distance of 343.1933
Thence South 79-53-51 East, a distance of 726.5141
Thence South 82-28-31 East, a distance of 422.3874
Thence North 74-29-44 East, a distance of 254.3821
Thence North 67-11-37 East, a distance of 399.0744
Thence North 60-41-37 East, a distance of 281.6756
Thence North 79-05-27 East, a distance of 445.1700
Thence North 00-26-51 East, a distance of 192.0059
Thence North 31-36-58 West, a distance of 164.7668
Thence North 80-07-13 West, a distance of 637.4534
Thence North 79-17-00 West, a distance of 585.8427
Thence North 83-52-06 West, a distance of 702.1421
Thence North 81-40-22 West, a distance of 634.8176
Thence North 71-46-52 West, a distance of 513.7552
Thence North 78-48-11 West, a distance of 746.7136

Exhibit G – Description of the Water Management Plan Area

Thence North 70-26-56 West, a distance of 905.9868
Thence North 65-52-49 West, a distance of 2823.3710
Thence North 52-03-27 West, a distance of 1519.7285
Thence North 36-15-37 West, a distance of 1023.5333
Thence North 28-50-12 West, a distance of 1501.3573
Thence North 03-16-40 East, a distance of 699.5825
Thence North 40-00-38 East, a distance of 657.5376
Thence North 55-55-24 East, a distance of 339.1029
Thence North 56-42-53 East, a distance of 377.8643
Thence North 26-59-25 East, a distance of 312.6105
Thence North 71-58-47 East, a distance of 497.0045
Thence North 80-06-42 East, a distance of 585.9547
Thence South 87-23-25 East, a distance of 454.3462
Thence North 42-41-35 East, a distance of 519.3043
Thence North 65-30-29 East, a distance of 539.2736
Thence North 85-13-27 East, a distance of 192.9198
Thence South 77-48-22 East, a distance of 428.1601
Thence South 79-18-05 East, a distance of 195.2692
Thence North 69-51-14 East, a distance of 298.5136
Thence North 28-19-28 East, a distance of 335.9044
Thence North 31-22-11 East, a distance of 305.6825
Thence North 56-01-15 East, a distance of 402.0238
Thence North 82-39-26 East, a distance of 387.8052
Thence North 78-08-24 East, a distance of 411.1519
Thence North 60-22-03 East, a distance of 383.3919
Thence North 59-26-14 East, a distance of 203.6705
Thence North 05-12-58 East, a distance of 210.3711
Thence North 54-35-53 West, a distance of 426.4772
Thence North 11-40-50 West, a distance of 250.0533
Thence North 49-48-05 East, a distance of 161.0345
Thence North 48-23-44 East, a distance of 235.0392
Thence North 00-24-37 East, a distance of 174.5675
Thence North 23-13-24 West, a distance of 304.9592
Thence North 70-45-15 East, a distance of 259.7676
Thence South 78-49-18 East, a distance of 373.3326
Thence South 72-19-46 East, a distance of 530.4007
Thence North 68-01-44 East, a distance of 321.0687
Thence North 61-21-05 East, a distance of 179.8988
Thence North 15-39-15 East, a distance of 199.2007
Thence North 00-24-37 East, a distance of 174.5675
Thence North 09-52-20 West, a distance of 195.3932
Thence North 38-41-05 West, a distance of 359.9806
Thence North 38-15-35 West, a distance of 335.4983
Thence North 24-47-03 West, a distance of 328.3020
Thence North 18-01-30 West, a distance of 220.9698
Thence North 00-27-21 East, a distance of 157.1300
Thence North 24-36-33 West, a distance of 289.0680
Thence North 26-08-49 West, a distance of 195.4380
Thence North 37-10-21 West, a distance of 286.5286
Thence North 71-10-31 West, a distance of 276.0141
Thence North 89-35-24 West, a distance of 366.7594
Thence North 47-18-37 West, a distance of 259.8516
Thence North 02-26-15 West, a distance of 349.7545
Thence North 02-27-48 West, a distance of 125.0526
Thence North 02-27-50 West, a distance of 78.5106
Thence North 02-27-01 West, a distance of 146.1957

Exhibit G – Description of the Water Management Plan Area

Thence North 05-17-26 West, a distance of 351.1208
Thence North 29-50-24 West, a distance of 242.6743
Thence North 87-54-29 West, a distance of 594.1460
Thence South 25-25-45 West, a distance of 289.0690
Thence South 07-33-35 West, a distance of 54.1577
Thence South 07-31-36 West, a distance of 368.3617
Thence South 15-40-43 West, a distance of 398.2550
Thence South 21-34-12 West, a distance of 580.7325
Thence South 17-07-05 West, a distance of 546.9813
Thence South 18-03-11 West, a distance of 403.3575
Thence South 25-37-23 West, a distance of 328.0751
Thence South 34-42-09 West, a distance of 465.0331
Thence South 25-01-48 West, a distance of 461.1868
Thence South 54-23-57 West, a distance of 475.1916
Thence South 69-37-52 West, a distance of 541.7496
Thence North 73-56-54 West, a distance of 453.4280
Thence North 48-34-43 West, a distance of 532.4290
Thence North 28-23-07 West, a distance of 398.6121
Thence North 54-35-53 West, a distance of 426.4777
Thence North 16-41-42 West, a distance of 237.5764
Thence North 12-06-59 West, a distance of 322.1772
Thence North 33-16-47 West, a distance of 251.7194
Thence North 60-46-31 West, a distance of 398.7569
Thence North 40-31-06 West, a distance of 346.7031
Thence North 29-18-46 West, a distance of 281.6207
Thence North 31-34-49 West, a distance of 329.6291
Thence North 65-37-55 West, a distance of 344.1602
Thence North 33-16-48 West, a distance of 314.8173
Thence North 40-10-53 West, a distance of 160.9938
Thence South 48-09-08 West, a distance of 259.5913
Thence South 05-10-56 West, a distance of 210.3598
Thence South 01-52-06 East, a distance of 437.1073
Thence South 17-14-28 East, a distance of 403.1796
Thence South 16-17-52 East, a distance of 546.9801
Thence South 17-24-29 East, a distance of 513.9131
Thence South 44-35-54 East, a distance of 296.2405
Thence South 40-10-11 East, a distance of 322.2593
Thence South 35-07-29 East, a distance of 300.4644
Thence South 31-25-13 East, a distance of 596.0948
Thence South 27-28-50 East, a distance of 335.9003
Thence South 04-21-44 East, a distance of 210.3594
Thence South 42-01-35 West, a distance of 210.4263
Thence South 45-23-50 West, a distance of 197.5089
Thence South 52-08-16 West, a distance of 422.9006
Thence South 45-24-36 West, a distance of 469.3541
Thence South 70-25-56 West, a distance of 408.8638
Thence South 66-59-15 West, a distance of 571.0711
Thence South 33-18-10 West, a distance of 353.7851
Thence South 37-17-32 West, a distance of 349.2845
Thence South 49-29-46 West, a distance of 346.7099
Thence South 65-13-51 West, a distance of 328.1924
Thence South 55-43-12 West, a distance of 276.0820
Thence South 59-26-46 West, a distance of 407.4482
Thence South 55-41-57 West, a distance of 385.3996
Thence South 74-49-34 West, a distance of 746.6568
Thence South 88-29-17 West, a distance of 502.1748

Exhibit G – Description of the Water Management Plan Area

Thence North 70-28-56 West, a distance of 460.1936
Thence North 69-36-20 West, a distance of 783.2207
Thence North 43-33-28 West, a distance of 939.4676
Thence North 43-33-19 West, a distance of 1036.0201
Thence North 40-54-46 West, a distance of 2583.7541
Thence North 31-11-35 West, a distance of 1531.8376
Thence North 29-04-17 West, a distance of 883.9252
Thence North 09-00-43 East, a distance of 1454.7700
Thence North 54-11-24 West, a distance of 779.7834
Thence North 87-31-53 West, a distance of 468.6850
Thence North 57-43-25 West, a distance of 728.5775
Thence North 45-11-13 West, a distance of 1123.8200
Thence North 42-28-03 West, a distance of 639.0971
Thence North 44-35-23 West, a distance of 993.5551
Thence North 53-37-20 West, a distance of 1053.8761
Thence North 45-08-03 West, a distance of 1265.5924
Thence North 59-09-53 West, a distance of 2532.3330
Thence North 47-35-59 West, a distance of 2350.0134
Thence North 58-27-25 West, a distance of 2060.8752
Thence North 66-50-08 West, a distance of 1174.2981
Thence North 63-57-03 West, a distance of 968.6480
Thence North 63-00-31 West, a distance of 390.6801
Thence North 70-40-49 West, a distance of 646.2686
Thence North 40-55-19 West, a distance of 581.6539
Thence North 34-57-19 West, a distance of 664.1211
Thence North 29-30-50 West, a distance of 665.0486
Thence North 40-11-42 West, a distance of 644.1840
Thence North 32-41-45 West, a distance of 479.4718
Thence North 31-47-25 West, a distance of 557.3641
Thence North 35-29-16 West, a distance of 625.5074
Thence North 57-26-41 West, a distance of 722.0837
Thence North 56-11-52 West, a distance of 920.3187
Thence North 52-01-01 West, a distance of 859.5622
Thence North 43-09-18 West, a distance of 988.3405
Thence North 48-19-27 West, a distance of 1138.6784
Thence North 49-20-55 West, a distance of 892.3305
Thence North 61-42-59 West, a distance of 128.6036
Thence North 61-46-06 West, a distance of 582.4067
Thence North 38-45-39 West, a distance of 608.3563
Thence North 57-50-10 West, a distance of 431.4674
Thence North 54-15-44 West, a distance of 513.7375
Thence North 47-06-09 West, a distance of 284.2715
Thence North 61-17-55 West, a distance of 257.9420
Thence North 69-55-30 West, a distance of 259.6503
Thence North 82-28-31 West, a distance of 422.3874
Thence North 76-33-36 West, a distance of 233.1347
Thence North 73-00-13 West, a distance of 856.5357
Thence North 30-02-19 West, a distance of 344.5967
Thence North 32-29-37 West, a distance of 707.3623
Thence North 37-17-46 West, a distance of 485.6130
Thence North 24-21-08 West, a distance of 500.1906
Thence North 19-14-31 West, a distance of 519.2580
Thence North 09-53-20 East, a distance of 212.5327
Thence North 00-24-37 East, a distance of 296.8196
Thence North 38-14-00 West, a distance of 335.6954
Thence North 89-35-24 West, a distance of 192.1299

Exhibit G – Description of the Water Management Plan Area

Thence North 89-35-24 West, a distance of 209.6304
Thence North 55-06-11 West, a distance of 339.1010
Thence North 16-16-08 West, a distance of 182.4945
Thence North 34-35-39 West, a distance of 213.1185
Thence North 64-49-05 West, a distance of 250.1489
Thence North 70-17-53 West, a distance of 370.0374
Thence North 44-34-57 West, a distance of 345.8289
Thence North 16-18-05 West, a distance of 364.7246
Thence North 29-57-57 West, a distance of 587.1073
Thence North 16-16-28 West, a distance of 182.4350
Thence North 38-34-12 East, a distance of 310.9619
Thence North 26-58-53 East, a distance of 507.7685
Thence North 26-02-10 East, a distance of 484.4089
Thence North 28-30-44 East, a distance of 296.9540
Thence North 09-08-31 East, a distance of 229.7301
Thence North 06-25-49 East, a distance of 333.7245
Thence North 09-22-35 East, a distance of 336.0530
Thence North 04-13-57 East, a distance of 262.5279
Thence North 31-34-44 West, a distance of 164.7022
Thence South 45-26-05 West, a distance of 98.9540
Thence South 50-38-19 West, a distance of 136.2910
Thence South 31-20-58 West, a distance of 203.7449
Thence South 20-23-24 West, a distance of 204.5015
Thence South 37-18-31 West, a distance of 174.6797
Thence South 35-56-42 West, a distance of 300.4641
Thence South 30-10-36 West, a distance of 281.7456
Thence South 19-50-56 West, a distance of 314.7618
Thence South 10-42-47 West, a distance of 390.6845
Thence South 56-43-54 West, a distance of 251.9103
Thence South 62-31-10 West, a distance of 335.9003
Thence North 83-15-45 West, a distance of 316.4353
Thence South 67-46-15 West, a distance of 226.9957
Thence South 84-04-56 West, a distance of 316.4363
Thence North 80-51-20 West, a distance of 229.6689
Thence North 66-23-39 West, a distance of 398.4678
Thence North 66-22-50 West, a distance of 665.7744
Thence North 40-11-08 West, a distance of 805.0972
Thence North 55-01-37 West, a distance of 954.6359
Thence North 44-35-45 West, a distance of 419.8105
Thence North 59-05-55 West, a distance of 344.5304
Thence North 42-58-24 West, a distance of 432.4011
Thence North 50-05-14 West, a distance of 384.7675
Thence North 63-02-07 West, a distance of 312.4699
Thence North 64-14-47 West, a distance of 367.0874
Thence South 17-59-39 East, a distance of 110.4651
Thence South 35-50-56 East, a distance of 324.8520
Thence South 32-28-58 East, a distance of 353.7862
Thence South 31-35-51 East, a distance of 329.4689
Thence South 44-35-03 East, a distance of 420.0770
Thence South 41-51-46 East, a distance of 519.2197
Thence South 13-37-56 East, a distance of 287.9879
Thence South 09-35-21 East, a distance of 301.6528
Thence South 05-18-52 East, a distance of 175.4412
Thence South 27-00-57 West, a distance of 117.2299
Thence South 49-48-06 West, a distance of 161.0338
Thence North 89-35-23 West, a distance of 157.1290

Exhibit G – Description of the Water Management Plan Area

Thence North 72-13-07 West, a distance of 292.8656
Thence North 38-14-40 West, a distance of 223.5397
Thence North 49-21-21 West, a distance of 1487.2756
Thence North 50-30-26 West, a distance of 154.9607
Thence South 53-10-59 West, a distance of 150.5821
Thence South 54-44-21 West, a distance of 1005.8733
Thence South 55-06-24 West, a distance of 6992.3760
Thence South 54-09-37 West, a distance of 1051.0319
to the True Point of Beginning.

Perimeter: 551741.8300

Area: 2495992473.0343   57300.1027 acres
Mapcheck Closure - (Uses listed courses & COGO Units)
Error of Closure: 0.02737   Thence South 68-46-44 W
Precision 1: 20161685.12

Exhibit H – Judgment and Decree

UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

SOBOBA BAND OF LUISEÑO INDIANS, a federally recognized Indian tribe, Plaintiff, v. METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, a California metropolitan water district; LAKE HEMET MUNICIPAL WATER DISTRICT, a California water district; the UNITED STATES OF AMERICA for the benefit of the Soboba Band of Luiseño Indians, Defendants, v. EASTERN MUNICIPAL WATER DISTRICT, a California water district, Third-Party Defendant.	Case No. 00-04208 GAF (MANx) Judge: Honorable Gary A. Feess STIPULATED JUDGMENT

JUDGMENT AND DECREE

The Court has considered the Settlement Agreement dated _______, 2004, which permanently resolves the claims of the Soboba Band of Luiseño Indians, (hereinafter "Soboba Tribe") and the United States appearing for the benefit of the Soboba Tribe for alleged infringement of its water rights in the San Jacinto River and the Canyon Sub-basin and Intake portion of the Upper Pressure Sub-basin associated therewith (collectively "Basin") in Riverside County, California, and for damages related to historical interference with the Soboba Tribe's rights and unauthorized use of its water. A copy of the Settlement Agreement is attached as Exhibit 1 to the Stipulation and Request for Entry of Judgment and Decree.

After consideration of the pleadings and papers filed in this action, the evidence presented by the Parties, and the Stipulation and Request for Entry of Judgment and Decree, it is hereby ORDERED, ADJUDGED AND DECREED:

1. The Settlement Agreement is hereby approved in its entirety, and this Judgment and Decree incorporates the definitions set forth therein. When used in this Judgment and Decree, the term "United States" shall mean the United States of America acting on behalf of the Soboba Tribe, and in no other capacity except as specifically otherwise provided herein.

2. The Soboba Tribe shall have the right to waters beneath the Soboba Indian Reservation, which shall be held in trust by the United States for the benefit of the Soboba Tribe, as follows:

A. The prior and paramount right, superior to all others, to pump 9,000 AFA from the Basin for any use on the Reservation and lands now owned or hereafter acquired by the Soboba Tribe contiguous to the Reservation or within the Basin.

B. The Soboba Tribe's right to pump a total of 9,000 AFA from the

Basin is without regard to whether the water was naturally or artificially recharged.

C. In the event the Soboba Tribe is unable, except for mechanical failure of its wells, pumps or water facilities, to produce from its existing wells or equivalent replacements up to 3,000 AFA production from the Canyon Sub-basin and the remainder of its Tribal Water Right from the Intake Sub-basin, Eastern Municipal Water District and Lake Hemet Municipal Water District ("the Local Districts") shall deliver any shortage to the Soboba Tribe. Any shortage shall be delivered at such locations as the Soboba Tribe and the Local Districts may agree, or if there is no agreement, at the wellheads where the shortage occurred. Such water may be supplied from Local District wells in either the Canyon or Intake Sub-basins, or from other sources. For any water delivered pursuant to this paragraph, the Soboba Tribe shall pay an acre-foot charge equal to its then current cost of production, and any avoided cost of treatment, from the wells where the shortage occurred, assuming pumping lifts equal to the Soboba Tribe's averages in the respective Sub-basins over the preceding ten years.

3. Beginning on the Effective Date of the Settlement Agreement, the Soboba Tribe's right to pump groundwater in the exercise of its Tribal Water Right shall be subject to the following provisions:

A. The Soboba Tribe agrees to limit its exercise of the Tribal Water Right to 4,100 acre-feet annually, for a period of fifty (50) years commencing with the Effective Date of the Settlement Agreement, according to the schedule set forth in Exhibit F of the Settlement Agreement. Should the Soboba Tribe during that period identify a need for water in addition to the Schedule set forth in Exhibit F, the Soboba Tribe shall have the right to purchase water from the Water Management Plan at the rate then being charged to the Water Management Plan's municipal producers.

B. Any use of the Tribal Water Right by an individual member of the

Soboba Tribe shall be satisfied out of the water resources provided to the Soboba Tribe in the Settlement Agreement and this Judgment and Decree.

4. The foregoing rights are in full satisfaction of all of the Soboba Tribe's claims as provided in Article 5 of the Settlement Agreement.

5. This Court retains jurisdiction over this matter and the Parties for the limited and sole purpose of interpretation and enforcement of this Judgment and Decree and the Settlement Agreement.

6. The Action shall be transferred to the United States District Court, Central District of California, Eastern Division.

7. Except as may be included in the payments contemplated by the Settlement Agreement, no Party shall recover any attorney's fees or costs from any other Party.

8. The Parties have waived their rights to appeal, and therefore, this Judgment and Decree shall become final and nonappealable as of the date it is entered. This Judgment and Decree shall become enforceable as of the date the United States Secretary of the Interior causes to be published in the Federal Register a statement of findings that all actions necessary to make the settlement effective have been completed, as required by Section 10 of the Soboba Band of Luiseño Indians Settlement Act, Public Law ______.

Dated: ________________, 200_ ________________________________

United States District Court Judge

Exhibit I – Soboba Tribe's Water Development Schedule

SETTLEMENT YEARS (FROM EFFECTIVE DATE)	**MAXIMUM TRIBAL USAGE (AFA)**
1 – 5	2900
6 – 10	3215
11 – 15	3520
16 – 20	3825
21 – 25	4010
26 – 30	4020
31 – 35	4025
36 – 40	4040
41 – 45	4075
46 – 50	4100

Exhibit J – Description of EMWD Property

Parcel 1:

The North half of the Northwest quarter of Section 34 in Township 5 South, Range 2 West, San Bernardino Meridian, in the County of Riverside, State of California, according to the Official Plat thereof;

Excepting therefrom the Westerly 30 feet for road purposes as conveyed to the County of Riverside, by Deed recorded November 13, 1929 in Book 722 page 447 of Deeds, Riverside County Records;

Also excepting therefrom that portion conveyed to the County of Riverside, for road purposes, by Deed filed for record January 18, 1949 as Instrument No. 1917, Official Records.

Also except that portion conveyed to Riverside County Flood Control and Water Conservation District by Grant Deed recorded May 13, 1987 as Instrument No. 133741, Official Records.

Also except that portion conveyed to the Metropolitan Water District of Southern California, a public corporation, by Grant Deed recorded July 22, 1994 as Instrument No. 291698, Official Records.

Also except that portion conveyed to the Metropolitan Water District of Southern California by Grant Deed recorded July 22, 1994 as Instrument No. 291699, Official Records.

Also except that portion conveyed to the Metropolitan Water District of Southern California, a public corporation by Grant Deed recorded January 30, 1997 as Instrument No. 32920, Official Records.

Parcel 2:

The South half of the Northwest quarter of Section 34, Township 5 South,.Range 2 East, San Bernardino Meridian, in the County of Riverside, State of California, according to the Official Plat thereof.

Except that portion conveyed to the County of Riverside, by deed recorded April 26, 1949 in Book 1071, Page 392, Official Records.

Also except that portion conveyed to the Metropolitan Water District of Southern California, a public corporation, by Grant Deed recorded July 22, 1994 as Instrument No. 291698, Official Records.

Also except that portion conveyed to the Metropolitan Water District of Southern California, a public corporation by Grant Deed recorded January 30, 1997 as Instrument No. 32920, Official Records.

Also except that portion conveyed to the Metropolitan Water District of Southern California, a public corporation, by Grant Deed recorded May 5, 1997 as Instrument No. 154365, Official Records.

Exhibit K - Description of MWD Property

DRAFT

EXHIBIT A

Diamond Valley Lake
144-1-649C
Grant Deed
MWD to
The Soboba Band of Luiseno Indians

That parcel of land conveyed to The Metropolitan Water District of Southern California by Grant Deed recorded April 25, 1996 as Instrument No. 149322 Official Records of Riverside County, California, lying within the west half of the northeast quarter of Section 34, Township 5 South, Range 2 West San Bernardino Meridian, as shown on Record of Survey filed in Book 104, pages 62 through 76, inclusive, Records of Survey of said County.

EXCEPTING therefrom that portion lying southerly of the northerly line of that certain parcel conveyed to the County of Riverside by Grant Deed recorded November 21, 1999 as Document No. 1999-463789 Official Records of said County.

ALSO EXCEPTING therefrom that portion lying northerly of the southerly line of that certain parcel conveyed to the Riverside County Flood Control and Water Conservation District by Document No. 1999-441419, recorded October 4, 1999, Official Records of said County

Containing 21.718 acres, more or less.

All as shown on EXHIBIT "B" attached hereto and made a part hereof.

END OF DESCRIPTION

PREPARED UNDER MY SUPERVISION

DRAFT

Date ______________________

DRAFT

EXHIBIT B

W1/2NE1/4, SEC. 34, T5S, R2W, SBM,
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

THIS EXHIBIT IS TO BE ATTACHED TO THE LEGAL DESCRIPTION

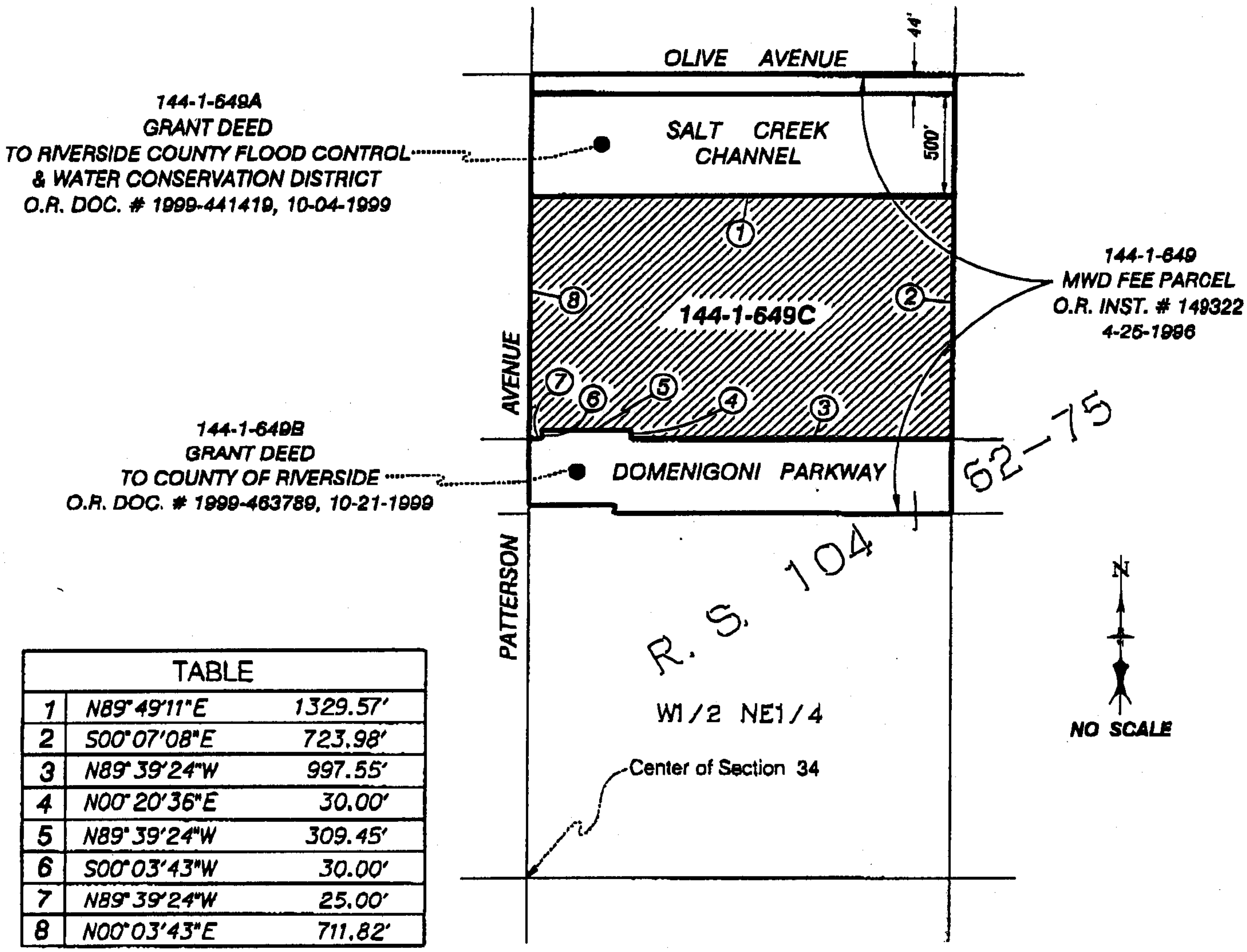
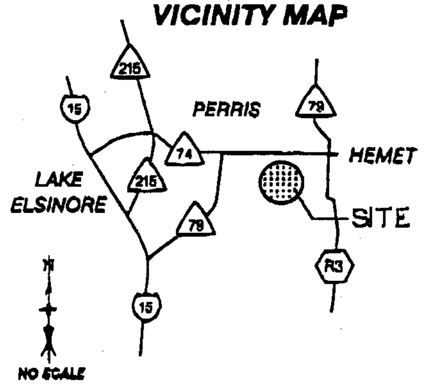


TABLE		
1	N89°49'11"E	1329.57'
2	S00°07'08"E	723.98'
3	N89°39'24"W	997.55'
4	N00°20'36"E	30.00'
5	N89°39'24"W	309.45'
6	S00°03'43"W	30.00'
7	N89°39'24"W	25.00'
8	N00°03'43"E	711.82'

LEGEND

(hatched) = **144-1-649C GRANT DEED 21.718 ACRES.**

VICINITY MAP



PREPARED UNDER
MY SUPERVISION

DRAFT

DATE

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

DIAMOND VALLEY LAKE PROJECT

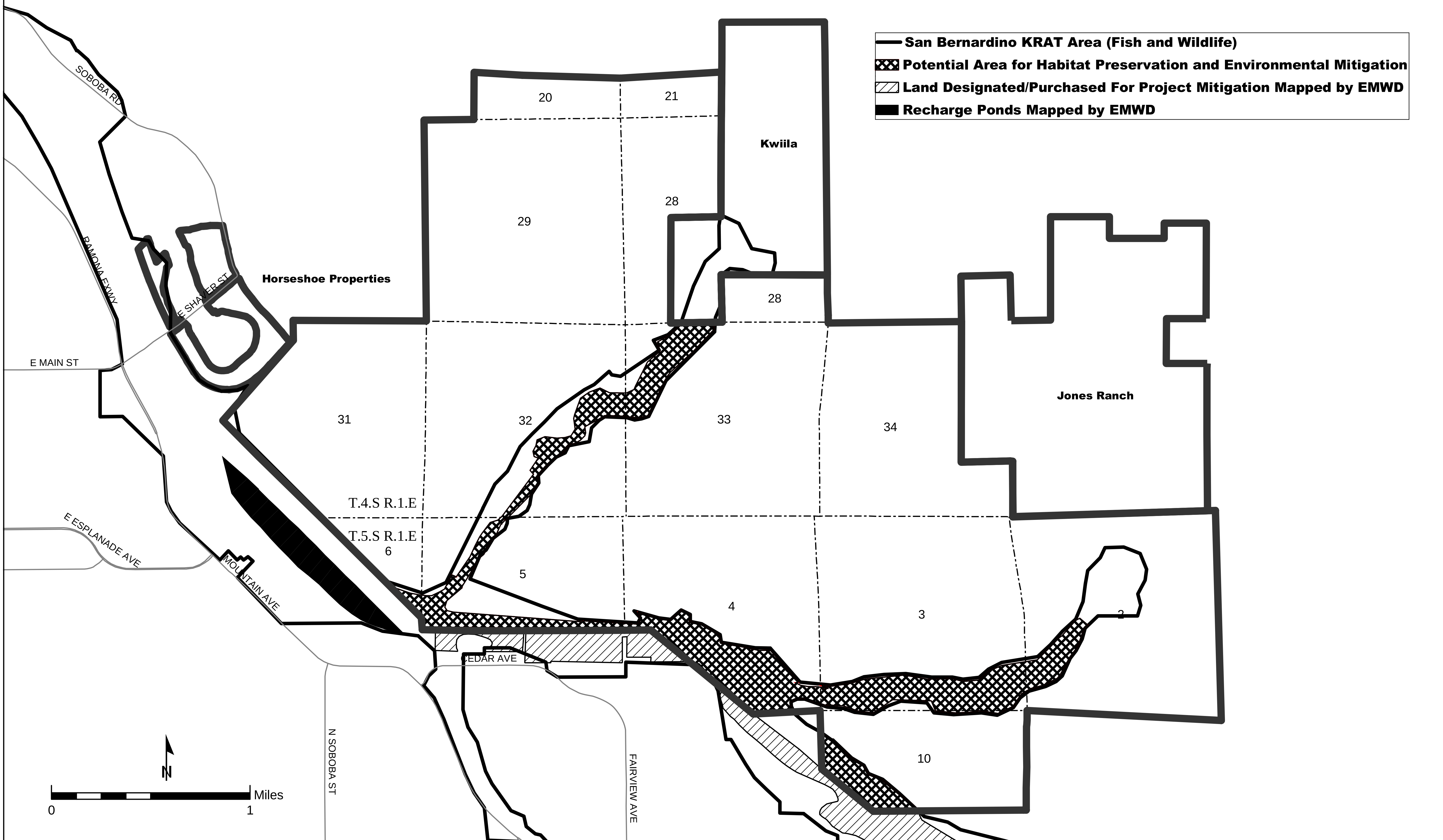
GRANT DEED

MWD
TO
THE SOBOBA BAND OF LUISENO INDIANS
144-1-649C

Exhibit L – Description of LHMWD Property

Portions of Lots 3, 4 and 5 of Fairview Tract, as shown on the plat in San Diego Map Book 006, page 307, in Riverside County, California, comprising 11.57 acres more or less.

Exhibit M - Map of Potential Soboba Reservation Lands for Habitat Preservation and /or Environmental Mitigation



APPENDIX B STIPULATED JUDGMENT

DRAFT
May 19, 2006

DRAFT

Attorneys for ______________________

____

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF RIVERSIDE

EASTERN MUNICIPAL WATER DISTRICT, a California municipal water district, Plaintiff, v. LAKE HEMET MUNICIPAL WATER DISTRICT, a California municipal water district; CITY OF HEMET, a California municipal corporation; CITY OF SAN JACINTO, a California municipal corporation; ________________, an individual; ________________, an individual; ________________, an individual; _ ________________, an individual, Defendants.	Case No. Judge: STIPULATED JUDGMENT Action Filed: _________, 200_ Trial Date: Stipulation

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7/6/06 11:50 AM

FINDINGS

After consideration of the pleadings and the Stipulation for Entry of Judgment, the Court finds that:

1. Complaint. On __________, 200_, Plaintiff Eastern Municipal Water District ("Eastern") filed a Complaint against Defendants Lake Hemet Municipal Water District ("Lake Hemet"), City of Hemet ("Hemet"), City of San Jacinto ("San Jacinto"), __________, ________, ________. The Complaint requests a declaration of Plaintiff's and Defendants' individual and collective rights to surface water and groundwater in the Canyon Sub-basin, the San Jacinto Upper Pressure Sub-basin downstream to Bridge Street, and the Hemet Basin ("Management Area") and the imposition of a physical solution to achieve the optimum, reasonable, beneficial use of the waters of the Management Area pursuant to Section 2 of Article X of the California Constitution. A map describing the boundaries of the Management Area is attached to this Judgment as Exhibit A and to the Complaint.

2. Parties.

A. Eastern. Eastern is a California municipal water district formed pursuant to the Municipal Water District Law, California Water Code Sections 71000-73001 (West 1966), with its principal place of business in Riverside County, California. Eastern diverts surface water from the San Jacinto River, and pumps groundwater from the Management Area for use by its customers within its boundaries.

LAW OFFICES OF
BEST BEST & KRIEGER LLP
3750 UNIVERSITY AVENUE
P.O. BOX 1028
RIVERSIDE, CALIFORNIA 92502

B. Lake Hemet. Lake Hemet is a California municipal water district formed pursuant to the Municipal Water District Law, California Water Code Sections 71000-73001 (West 1966), with its principal place of business in Riverside County, California. Lake Hemet diverts surface water from the Santa Jacinto River and its tributaries, and pumps groundwater from the Management Area for use by its customers within its boundaries.

C. Hemet. Hemet is a California municipal corporation providing utility services pursuant to the California Constitution, Article XI, Section 9. Hemet pumps groundwater from the Management Area for use by its customers within its boundaries.

D. San Jacinto. San Jacinto is a California municipal corporation providing utility services pursuant to the California Constitution, Article XI, Section 9. San Jacinto pumps groundwater from the Management Area for use by its customers within its boundaries.

E. __________, ________, ________, ________ and ________ are persons who own farms or other property within the Management Area, and pump groundwater from the Management Area.

3. Answers and Stipulation for Judgment. On ___________, 200_, Defendants filed Answers. On ____________, 200_, the Parties filed a Stipulation for Entry of Judgment.

4. Sole Producers. Other than the Soboba Band of Luiseno Indians, and certain overlying users not parties to this litigation, the parties claim essentially all of the rights to produce surface water and groundwater in the Management Area.

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5. Importance of Surface Water and Groundwater. Surface water and groundwater from the Management Area are important water supplies for agriculture, domestic and municipal use. The Parties have a mutual and collective interest in the coordinated management of such water resources to ensure that the common resource is used efficiently and reasonably, and that it is sustained and replenished.

6. Overdraft. It is estimated that the overdraft of the Management Area is at least 10,000 acre-feet per year. This estimate will be refined through further studies to be completed pursuant to the Water Management Plan, including data on the several sub-basins within the Management Area. Studies confirm that in recent years the total production from the Management Area, including pumping by those persons not parties to this litigation, has averaged approximately 63,800 acre-feet per year.

7. Importance of Judgment. The Parties have an interest in the physical solution imposed by this Judgment to promote the efficient and coordinated management of surface water and groundwater, to avoid problems from overdraft, to assist in protecting the rights of the Soboba Band of Luiseno Indians, to sustain and enhance water resources, and to resolve competing claims to surface water and groundwater.

8. Jurisdiction. This Court has jurisdiction to enter this Judgment declaring and adjudicating the rights of the Parties to the reasonable and beneficial use of surface water and groundwater in the Management Area, and to impose a physical solution pursuant to law, including California Constitution, Article X, Section 2.

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JUDGMENT

IT IS ORDERED, ADJUDGED AND DECREED:

1. DEFINITIONS.

1.1 Adjusted Production Right – the Base Production Right of each Public Agency, as adjusted pursuant to Sections 3.2 to 3.2.5.

1.2 Administrative Assessment – an acre-foot charge to be levied against each Public Agency for water pumped up to its Adjusted Production Right, including any unused amount of such Right that is pumped in a following year. Such assessments shall be used for Administrative Expenses, and for the purchase of Supplemental Water after Administrative Expenses have been paid.

1.3 Administrative Expenses – Watermaster's expenses for office rental, personnel, supplies, office equipment, general overhead, preparing and collecting assessments, monitoring well pumping, measuring water levels, sampling and analyzing water quality, compiling and interpreting collected data, conducting special studies, and litigation.

1.4 Advisor. An independent engineering firm or qualified individual as provided in Section 9.6.3.

1.5 Annual Basin Yield – the quantity of Groundwater that Watermaster determines the Parties may Produce from the Management Area in a calendar year without a replenishment obligation under the Physical Solution.

1.6 Base Production Right – the water right of a Public Agency or Class B Participant as set forth in the attached Exhibit "C."

1.7 Carry-Over Credit – a Party's credit against the Replenishment Assessment in a Fiscal Year, based on the Party's Adjusted Production Right or share of Imported Water not produced in prior calendar years.

1.8 Class A Participant – a Private Pumper who stipulates to this Judgment and participates in the Water Management Plan as defined in Sections 4.3 to 4.3.5.

1.9 Class B Participant – a Private Pumper who stipulates to this Judgment and participates in the Water Management Plan as defined in Sections 4.4 to 4.4.6.

1.10 Fiscal Year – the period from July 1 through June 30 of the following calendar year.

1.11 Fruitvale Documents –

(a) Fruitvale Judgment – The Judgment and Decree entered in the Superior Court for the County of Riverside on June 4, 1954, in an action titled The City of San Jacinto, et al. v. Fruitvale Mutual Water Company, et al., Case No. 51-546;

(b) Fruitvale Mutual Water Company Sale of Assets to Eastern – That certain "Agreement for the Sale of Assets of the Fruitvale Mutual Water Company to Eastern Municipal Water District" dated September 10, 1971;

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(c) Fruitvale Mutual Water Company Agency Agreements – The Agreement Between the City of San Jacinto and Eastern Municipal Water District dated June 15, 1972, the Agreement Between Lake Hemet Municipal Water District and Eastern Municipal Water District dated June 9, 1972, and the Agreement Between the City of Hemet and Eastern Municipal Water District dated June 13, 1972, all providing for recognition of ownership of stock in Fruitvale Mutual Water Company by the Cities and by Lake Hemet, and making provision for the continued sale of water produced through the Fruitvale facilities by Eastern to the Cities and to Lake Hemet.

1.12 Groundwater – all water within and beneath the ground surface of the Management Area.

1.13 Imported Water – An average of 7,500 acre feet annually of water sold by The Metropolitan Water District of Southern California to Eastern pursuant to Section 4.4 of the Soboba Band of Luiseño Indians "Settlement Agreement."

1.14 Management Area –the Canyon Sub-basin, the San Jacinto Upper Pressure Sub-basin downstream to Bridge Street, and the Hemet Basin, as delineated on the map attached as Exhibit "A."

1.15 Metropolitan – The Metropolitan Water District of Southern California.

1.16 Natural Recharge – Groundwater replenishment within the Management Area occurring from precipitation on the surface, percolation from surface flows of the San Jacinto River and its tributaries, return flows from irrigation, artificial spreading or injection of such surface flows, and subsurface inflows.

1.17 Non-Participant – a Private Pumper who elects not to participate in the Management Plan, or to be a party to this Judgment.

1.18 Overdraft – a condition whereby pumping in the Management Area exceeds the Safe Yield thereof.

1.19 Overlying Right – the appurtenant right of an owner of land overlying the Management Area to pump water from such land for beneficial use thereon.

1.20 Party or Parties – Eastern, Lake Hemet, Hemet, San Jacinto and the other Persons listed in the attached Exhibit "B."

1.21 Person – any individual, partnership, association, corporation, trust, government agency or other organization.

1.22 Physical Solution – the Court decreed method of managing the water supply of the Management Area to maximize the reasonable and beneficial use of the waters thereof pursuant to the California Constitution, Article X, Section 2, to eliminate overdraft pursuant to the provisions of this Judgment, to protect the prior rights of the Soboba Tribe, and to provide for the substantial enjoyment of all water rights recognizing their priorities.

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1.23 Private Pumper – a Person who owns land with an Overlying Right or other right in the Management Area and pumps more than 25 acre-feet per year.

1.24 Public Agency or Agencies – Eastern, Lake Hemet, Hemet and San Jacinto.

1.25 Recharge or Replenish – to sink, spread or inject water directly or indirectly underground in the Management Area.

1.26 Recharge Right – a Party's right to the use of Recharge Water.

1.27 Recharge Water – water used for Recharge.

1.28 Recycled Water – treated wastewater which is processed and suitable for controlled use in the Management Area, including Recharge.

1.29 Replenishment Assessment – an acre-foot charge to be levied against each Public Agency for water pumped in excess of the sum of its respective Adjusted Production Right, its share of Imported Water, and applicable Carry-Over Credits; and against each Class B Participant for pumping in excess of its 1995-99 average production, i.e., its Base Production Right. Such assessments shall be determined by the Watermaster to be used for Replenishment Expenses.

1.30 Replenishment Expenses – Watermaster expenses for the acquisition of Supplemental Water supplies, for land, and for the construction, maintenance and operation of facilities necessary to replenish groundwater in the

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Management Area, or otherwise to provide water to producers within the Management Area.

1.31 Safe Yield – the long term, average quantity of water supply in the Management Area that can be pumped without causing undesirable results, including the gradual reduction of natural groundwater in storage over long-term hydrologic cycles.

1.32 Settlement Agreement – that Agreement titled "The Soboba Band of Luiseño Indians Settlement Agreement" among the Soboba Tribe, the United States, as Trustee for the Tribe, Eastern Municipal Water District, Lake Hemet Municipal Water District, and The Metropolitan Water District of Southern California.

1.33 Soboba Tribe (sometimes the "Tribe") – the Soboba Band of Luiseno Indians.

1.34 Soboba Action – the lawsuit entitled Soboba Band of Mission Indians, etc., v. Metropolitan, etc., et al, U.S. District Court, Central District of California, Case No. 00-84208 GAF (MANx).

1.35 Storage Agreement – an agreement between Watermaster and a Party to store Supplemental Water by sinking, spreading, injecting or in-lieu procedures in the Management Area, and subsequently to recover such water, without payment of Replenishment Assessments.

1.36 Storage Right – a Party's right to store and pump Supplemental Water pursuant to a Storage Agreement.

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1.37 Stored Water – Supplemental Water stored by a Party pursuant to a Storage Agreement.

1.38 Surface Water – all water tributary to the Management Area and flowing above the ground surface.

1.39 Supplemental Water – nontributary water imported into the Management Area, including Imported Water and Recycled Water, and in-lieu programs that reduce groundwater pumping.

1.40 Transfer – a temporary or permanent conveyance, assignment, sale, contract or lease of part or all of a Party's Adjusted Production Right, Carry-Over Credit, Storage Right or Recharge Right to any other Party, or a temporary assignment, contract, lease or sale of part of the Soboba Tribe's quantified water right.

1.41 Tribal Water Rights – the Soboba Tribe's rights to water set forth in Section 4.1 of the Settlement Agreement and Section 5 of this Stipulated Judgment.

1.42 Tunnel – the San Jacinto Tunnel in Riverside County, California, constructed by Metropolitan in the 1930s.

1.43 Watermaster – the Board with the powers and duties defined in Section 9.

1.44 Water Management Plan (sometimes the "Plan") – the Plan adopted by the Watermaster, as it may be modified from time to time, to

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implement the Physical Solution, to ensure an adequate and reliable source of future water supply for the Management Area, and to protect the prior rights of the Soboba Tribe.

2. EXHIBITS.

The following exhibits are attached to this Judgment and incorporated in it:

"A." Map of the Management Area and the Management Area Watershed.

"B." List of Parties to this Judgment.

"C." Description of each Public Agency's and Class B Participant's Base Production Right.

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3. PUBLIC AGENCIES' WATER RIGHTS.

3.1 Base Production Right. The Public Agencies are owners of rights to pump groundwater from the Management Area as set forth in Exhibit "C." These rights are for a calendar year and were calculated as follows:

3.1.1 The Base Production Right of Eastern is based upon its respective average pumping for calendar years 1995-1999, less an adjustment of 1800 acre-feet for seepage from Metropolitan's San Jacinto tunnel, and for use of Fruitvale water. The 1995-1999 period was chosen to reflect recent production prior to the commencement of negotiations leading to this Stipulated Judgment.

3.1.2 The Base Production Right of Lake Hemet is based on its average production for calendar years 1995-1999.

3.1.3 The Base Production Right of Hemet is based on its average production for calendar years 1995-99, plus an adjustment of 900 acre feet per year.

3.1.4 The Base Production Right of San Jacinto is based upon its average Production for calendar years 1995-1999, plus 500 acre-feet per year, and plus an adjustment of 900 acre feet per year. The 500 acre-feet per year has been added because San Jacinto's recent pumping does not reflect its historic production, due to water purchases and other factors.

3.1.5 The Base Production Rights of Hemet and San Jacinto each include 900 acre-feet per year that have been added to their respective amounts of pumping for calendar years 1995-1999. These amounts have been added to provide Hemet and San Jacinto a fair share of water from, and to resolve disputes regarding, Eastern's use of tunnel seepage, Eastern's use of Fruitvale waters, and Lake Hemet's surface stream diversions. These additional amounts of 900 acre-feet per year shall be treated as the first amounts pumped by Hemet and San Jacinto, shall not be subject to reduction by the Watermaster as provided in Sections 3.2 to 3.2.2, and shall not be subject to any Administrative or Replenishment Assessments as provided in Sections 3.3 to 3.3.2, or to any other fee or charge imposed under the Management Plan.

3.2 Adjusted Production Rights. It is the goal of the Physical Solution to adjust Base Production Rights over time on a pro-rata basis to a level consistent with the Watermaster's determination of Safe Yield. The reduction will be based on periodic demand, hydrology, recharge, and the community's ability to pay for Supplemental Water, and protection of the Tribal Water Rights. In order to implement this reduction in a phased manner, each Public Agency's Base Production Right shall be subject to adjustment as follows:

3.2.1 Subject to Section 3.1.5, a 10% reduction from each Base Production Right in the first full year after entry of this Judgment.

3.2.2 Until Adjusted Production Rights are consistent with the Public Agencies' share of Safe Yield, Watermaster shall determine the required reductions in Adjusted Production Rights in each subsequent year to achieve Safe Yield within a reasonable period of time as determined by the Watermaster, considering the extent of the overdraft, the economic impact on the Parties bound by this Judgment, and other relevant factors. The goal is to achieve Safe Yield over a six (6) year period assuming an annual overdraft of 10,000 acre feet. In the event the extent of the overdraft is greater or lesser than assumed, then the period of time reasonably required to reach Safe Yield may be extended or reduced accordingly. However, in no event shall any reduction be more than 10% of the Adjusted Production Rights of the prior year.

3.2.3 A party may pump in excess of its Adjusted Production Right, without any additional Replenishment Assessment, by an amount equal to its share of the 7,500 acre feet of Imported Water that is not used by the Tribe. The amount of the Tribe's unused portion of the 7,500 acre feet shall be determined annually by the Watermaster. This provision shall apply only during such period as Imported Water is provided pursuant to Section 5.2 hereof. Shares of unused Imported Water shall be allotted in proportion to Base Production Rights, and shall be acquired and paid for pursuant to contract with Eastern.

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3.2.4 A Base Production Right of a Public Agency serving the land of a Class B Participant shall be increased in an amount equal to such Participant's Base Production Right, adjusted and reduced pursuant to Sections 3.2.1 and 3.2.2, when the Participant's land is converted from agricultural use to water service from the Public Agency, pursuant to Section 4.4.3.

3.2.5 The Adjusted Production Rights of the Public Agencies may be increased by the Watermaster on a prorata basis to the extent that pumping by Class A participants, or pumping by persons not parties to this Judgment, may decrease, and the Watermaster finds that achieving the goal of maintaining the Management Area in a Safe Yield condition can still be met.

3.3 Public Agency Production Assessments. Public Agency pumping shall be subject to the following assessments:

3.3.1 An Administrative Assessment as provided in Section 1.2 . The Administrative Assessment will be $50.00 per acre-foot of water pumped in the first full year after entry of this Judgment, and such amount thereafter will be set by the Watermaster.

3.3.2 A Replenishment Assessment as provided in Section 1.29. Pumping by a Public Agency in excess of the sum of its Adjusted Production Right, its share of Imported Water, and applicable Carry-Over Credits in order to meet increasing demands is permissible, provided that such excess extractions shall be subject to Replenishment Assessments.

3.4 Surface Rights. Eastern holds License Number 016667 from the State Water Resources Control Board to divert, spread and recover surface flows of the San Jacinto River within the Management Area. Lake Hemet holds pre-1914 appropriative rights to divert and store surface flows in Lake Hemet, and to divert surface flows tributary to but outside of the Management Area from Strawberry Creek and from the North and South Forks of the San Jacinto River. All Parties acknowledge such Eastern and Lake Hemet rights, and the fact that they are not subject to any assessments under this Judgment; provided that any water pumped by Eastern under its License shall be included in its Adjusted Production Right.

3.5 Fruitvale Judgment, Sale of Assets, and Agreements. The Court hereby finds that Eastern purchased all of the water rights and assets of the Fruitvale Mutual Water Company ("Fruitvale") pursuant to the Agreement described in Section 1.11(b) hereof, and is now the owner thereof. Eastern, as the successor in interest to Fruitvale, is also a defendant in the action described in Section 1.11(a) hereof. The Court finds that the only other remaining party in such action is the plaintiff City of San Jacinto. The Court retained continuing jurisdiction in such action, and Eastern has made annual reports pursuant to the Fruitvale Judgment. Pursuant to stipulation between Eastern and San Jacinto, and in accord with the physical solution and terms of this Judgment, the Court hereby finds that the rights and obligations of the Fruitvale Judgment have been subsumed in, and superseded by, this Judgment and are no longer enforceable; that the limitations upon the place and amounts of water use in the Fruitvale Judgment, the sale Agreement, and the Agency Agreements described in Sections 1.11(a), (b), (c) are no longer applicable or enforceable; and that the continuing jurisdiction of the Court under the Fruitvale Judgment, and the obligation of Eastern to report thereunder, are hereby terminated; provided, however, that none of the service area agreements included in the Fruitvale documents in Section

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1.11, or any other agreements related to mutual aid, system interties, or service areas, shall be affected by this Judgment.

3.6 Fruitvale Agency Rights. The water rights of Hemet, San Jacinto and Lake Hemet under the several agreements with Eastern described in Section 1.11(c) hereof have been incorporated in their respective Base Production Rights under this Judgment.

4. PRIVATE PUMPERS' WATER RIGHTS

4.1 Recognition of Rights. The Private Pumpers are owners of Overlying or other water rights to pump from the Management Area. The Public Agencies recognize these rights, and do not intend to take or adversely impact these rights without an agreement with the owner of such rights. There is no intent to affect water use that is consistent with the historical use of the Private Pumpers.

4.2 Non-Participation. A Private Pumper can elect not to participate in the Water Management Plan and not to formally acknowledge its existence. Such Pumpers are referred to as Non-Participants. Non-Participants shall continue to exercise whatever water rights they may hold under California law unaffected by the Plan. However, the Parties do not waive their rights to challenge any new or expanded use of water or water rights. Non-Participants will not have the option of intervening as a party under the Judgment at a later date.

4.3 Class A Participation. A Private Pumper can stipulate to be a party to the Judgment as a Class A Participant under the following terms:

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4.3.1 A Class A Participant approves this Physical Solution and may vote for and/or be elected to serve as the Private Pumper representative on the Watermaster, but other than Section 4.3.4 shall not otherwise have any obligation for the implementation of the Physical Solution or the Water Management Plan.

4.3.2 A Class A Participant may, without any assessment by the Watermaster, pump from the Participant's property within the Management Area the amount of water that can be put to reasonable and beneficial use in the Participant's historic place of use or as authorized under California law.

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4.3.3 A Class A Participant shall have the right to convert to Class B Participation during a grace period that shall end 3 years after the entry of this Judgment, and upon payment of the total assessments, without interest, that the Class A Participant would have paid had the Class A Participant elected to be a Class B Participant from the outset.

4.3.4 A Class A Participant hereby authorizes the installation of water meters, and the collection and reading of Groundwater production, level and water quality data from the Class A Participant's well(s) by personnel authorized by the Watermaster. The metering, meter reading, and other related monitoring efforts shall be at no cost to the Class A Participant, and the Class A Participant shall receive copies of the reports and information obtained upon request.

4.3.5 The Stipulation signed by a Class A Participant shall describe or otherwise identify the Participant's land and wells within the Management Area. The heirs, successors and assigns of such land and wells shall succeed to the benefits of the Participant's rights under the Judgment, and be bound by the obligations thereof, provided that such successor intervenes as a party under the Judgment. Absent such intervention, the successor will be treated as a Non-Participant.

4.4 Class B Participation. A Private Pumper can stipulate to be or intervene as a party under the Judgment as a Class B Participant on the following terms:

4.4.1 A Class B Participant's annual pumping shall be limited to average annual Production during the calendar years 1995 through 1999, less any amount of water that had been used on land that was developed for non-agricultural purposes after 1999, which is the Participant's Base Production Right. The Class B Participant shall pay Replenishment Assessments on amounts in excess of its Base Production Right. A Class B Participant shall not be subject to Administrative Assessments, and until conversion to a Public Agency, such Base Production Right shall not be subject to reduction to Safe Yield. In the absence of production history for this period, the Watermaster, using all available information including power consumption records and records of water use by similar farming operations in the area, will estimate the average annual production for the Participant.

4.4.2 The Class B Participant approves this Physical Solution and may vote for and/or be elected to serve as the Private Pumper's representative on the Watermaster;

4.4.3 Upon conversion of a Class B Participant's land from agricultural to a use that requires water service from a Public Agency, the Public Agency shall credit, to the extent legally permissible, the Class B Participant's Base

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Production Right, adjusted pursuant to the percentage reductions in Sections 3.2.1 and 3.2.2, against any requirement then in effect for any water supply assessment requirements, or against any fees associated with water supply that the Public Agency may then have in effect. The Public Agency serving the converted land shall receive a credit added to its Base Production Right as set forth in Section 3.2.4.

4.4.4 A Class B Participant is eligible to enter into a contract with the Watermaster, or a participating Public Agency, to sell for a defined period of time the unused portion of the Class B Participant's Base Production Right, under terms and conditions approved by the Watermaster. Criteria used in consideration of such contract shall include:

4.4.4.1 The Water Management Plan's need to acquire additional water supplies to address overdraft and recovery;

4.4.4.2 Submission of a water conservation plan, including use of in lieu water, by the Class B Participant that will reasonably guarantee conservation of water that would otherwise be produced from the Management Area; and the amount of conserved water transferred reflects a reduction pursuant to Sections 3.2.1 and 3.2.2.

4.4.4.3 Public policy considerations of local government jurisdictions, including economic, land use and community impacts of any proposed water conservation plan.

4.4.5 The Class B Participant hereby authorizes the installation of meters and the collection and reading of Groundwater production, water level

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and water quality data from the Class B Participant's well(s) by personnel authorized by the Watermaster. The metering, meter reading and other related monitoring efforts shall be at no cost to the Class B Participant, and the Class B Participant shall receive copies of the reports and information obtained upon request.

4.4.6 The Stipulation signed by a Class B Participant shall describe or otherwise identify the Participant's land and wells within the Management Area. The heirs, successors and assigns of such land and wells shall succeed to the benefits of the Participant's rights under the Judgment, and be bound by the obligations thereof, provided that such successor intervenes as a party under the Judgment. Absent such intervention, the successor will be treated as a Non-Participant.

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4.5 In-Lieu Water Use. In the event a Private Pumper receives Supplemental Water from a Public Agency to serve an historic use in place of Groundwater, or otherwise engages in an in-lieu program, the Overlying Right of the Private Pumper shall not be diminished by the receipt and use of such Supplemental Water or by engaging in an in-lieu program.

4.6 Future Production Participation. Any new pumper after the entry of this Judgment may intervene in this action and Judgment only as a Class A Participant.

4.7 Replacement Wells. Re-drilling of existing wells and the drilling of new wells to replace existing wells will not be considered new production as provided in Section 4.6.

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5. TRIBAL WATER RIGHTS

The Tribal Water Rights will be determined as part of a settlement among the Soboba Tribe, the United States, Eastern, Lake Hemet and Metropolitan. The settlement will be reflected in a Settlement Agreement, Congressional legislation and appropriation of funds, and a Judgment in the Soboba Action. Such settlement includes the following provisions, which shall be effective only upon fulfillment of all of the conditions precedent set forth in Article 3 of the Settlement Agreement, a copy of which is attached hereto.

5.1 Senior Right. The Soboba Tribe shall have a prior and paramount right, superior to all others, to pump 9000 acre-feet per year (3000 acre feet from the Canyon Subbasin and the remainder from a portion of the San Jacinto Upper Pressure Subbasin referred to as the Intake Subbasin), for use on the Reservation, as defined in Article 2.20 of the Settlement Agreement, and on lands now owned or hereafter acquired by the Soboba Tribe contiguous to the Reservation or within the Canyon and Intake Subbasins; provided, however, that such use shall be limited to 4100 acre-feet per year for the first 50 years after the Effective Date as set forth in the Settlement Agreement. The Tribe's right to pump applies to all Groundwater, whether replenished by Natural Recharge or by Supplemental Water. In addition, the Tribe shall have the right to purchase additional water from the Watermaster during the fifty years that its use is limited to 4,100 AFA at the rate then being charged to the Public Agencies under the Water Management Plan. In the event the Soboba Tribe is unable, except for mechanical failure of its wells, pumps or water facililties, to produce from its existing wells or equivalent replacements up to 3000 AFA production from the Canyon Sub-basin and the remainder of its Tribal Water Rights from the Intake Sub-basin, Eastern and Lake Hemet shall deliver any shortage to the Soboba

Tribe as provided in Section 4.1C of the Settlement Agreement. Pumping for such purpose shall not be subject to Administrative or Replenishment Assessments, and shall not be counted as part of Adjusted Production Rights.

5.2 Metropolitan Water. The Soboba settlement provides, among other matters, that Metropolitan will use its best efforts to deliver sufficient Imported Water to yield 7,500 acre-feet per year, based upon 15 year averages, for recharge in the Management Area at its untreated replenishment water rate, or any successor rate as provided in Section 4.4A of the Settlement Agreement.

5.3 Settlement Payment. Subject to the Effective Date of the Settlement Agreement and funding by the United States, Eastern pursuant to the terms set forth in the Water Management Plan, will pay the Soboba Tribe $17 million dollars pursuant to Article 4.7A of the Settlement Agreement in consideration, in part, of the Tribe's agreement to limit its water use up to 4,100 acre-feet per year for the first 50 years after the Effective Date according to the build-up schedule set forth in the Settlement Agreement as Exhibit I. Subject to contracts with Eastern, the Public Agencies shall have the right to pump and use all Imported Water not used by the Tribe, and the unused portion of the Tribal Water Rights shall be available for use by the Parties, pursuant to their rights herein.

5.4 Capital Facilities. Eastern on behalf of the Water Management Plan participants will receive $10 million from the United States, to be applied to the costs of constructing and operating the Phase I capital facilities necessary to import and recharge Supplemental Water as described in the Plan. Additional grant funds from the State of California or the United States may also be available for such capital facilities. The rights of the Public Agencies to the

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use of such facilities will be affirmed by contract as set forth in Sections 9.6.4(a) and 9.6.4(c).

5.5 Acknowledgement of Soboba Tribe Settlement. The Parties to this Judgment hereby recognize the Tribal Water Rights, as set forth above, and the applicable provisions of the Soboba Tribe Settlement Agreement, and acknowledge that protection of Tribal Water Rights is one of the goals of the Water Management Plan.

6. PHYSICAL SOLUTION.

6.1 Purpose and Objective. Pursuant to California water law and the California Constitution, Article X, Section 2, the Court adopts this Physical Solution to maximize reasonable beneficial use of Surface Water, Groundwater and Supplemental Water for water users in or dependent upon the Management Area, to eliminate overdraft, to protect the prior rights of the Soboba Tribe, and to provide the Parties with the substantial enjoyment of their respective rights, including~~,~~ the priorities thereof.

6.2 Need for Flexibility. In order to adapt to potential changes in hydrology, land use, and social and economic conditions, the Physical Solution must provide some degree of flexibility and adaptability. Accordingly, the Court retains broad jurisdiction to supplement the discretion granted to the Watermaster.

6.3 Rights to Groundwater. Groundwater in the Management Area may occur from: natural recharge; spreading operations of natural flows; recharge with Supplemental Water acquired with Assessment funds; return flows,

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fallowing or in-lieu recharge programs financed with Assessment funds. All such Groundwater shall be available to support the pumping of the Parties as allowed herein, and shall not be the property of any individual Party. Subject to the provisions of Section 6.7.2, this Section does not preclude any Party, pursuant to a Storage Agreement, from storing Supplemental Water at its own cost, retaining title thereto, and pumping such water without Assessment.

6.4 Resolution of Priorities. By reason of the long and continuous overdraft of the Management Area, the contribution of all parties to the overdraft, the economies that have developed on the basis of the overdraft, the severe economic disruption that could occur under strict priorities and the doctrines of prescription and laches, the complexity of determining appropriative priorities, and the need to make the maximum beneficial use of the water resources of the State, the Parties are estopped and barred from asserting specific priorities or preferences to the pumping of groundwater in the Management area, except as provided in this Judgment, and the Court finds that the provisions of this Judgment provide for the substantial enjoyment of the respective rights of the Parties.

6.5 Water Management Plan. The Watermaster will approve and implement a Water Management Plan to enforce and implement the Physical Solution, and may modify such Plan as conditions require, subject to the provisions of the Settlement Agreement. The Plan will also facilitate and accommodate the settlement of the water rights of the Soboba Tribe, and shall be subject to the approval of the Soboba Tribe and the United States as trustee for the Tribe. The Parties agree that the Plan shall incorporate and serve to implement the following goals:

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6.5.1 Groundwater levels within the Management Area have generally been declining for a number of years, and the Management Area is presently in a condition of Overdraft. The Plan will, within a reasonable period, eliminate Groundwater Overdraft and provide for excess production by implementing a combination of available water resources management elements. These elements include: reduction in natural Groundwater production; enhanced Recharge with native and/or Supplemental Water; increased use of recycled water; in-lieu replenishment; acquisition and development of Supplemental Water; and water conservation programs.

6.5.2 The Management Area is expected to experience residential, commercial, and industrial growth and development over the next decade. The estimated amount of Supplemental Water that will be necessary to provide for and adequately serve this new growth and development is 15,000 acre feet per year. The Water Management Plan shall accommodate the orderly expansion of existing water production and service systems, and provide a clear planning process for meeting these projected growth trends.

6.5.3 The Plan should be implemented in a manner to protect and/or enhance Management Area water quality. However, implementation of certain elements of the Plan may cause limited localized water quality degradation. If such degradation impedes the then current beneficial uses of water by any Public Agency in the Management Area, the Watermaster shall implement appropriate mitigation measures to ensure the water supply to the affected Public Agency, and to bear the associated costs. The standards for local water quality degradation shall be defined in the Plan.

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6.5.4 The Water Management Plan should serve to support the pursuit of cost-effective water supply and water treatment by the Public Agencies, both individually and collectively.

6.5.5 The Water Management Plan should serve to protect Tribal Water Rights.

6.5.6 The Watermaster shall implement a monitoring program to ensure that Plan activities follow best management and engineering principles to protect Management Area water resources, and to compile and analyze data on groundwater production, water levels, water quality and groundwater in storage.

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6.6 Replenishment Program. The groundwater replenishment program shall be administered by the Watermaster. The program shall include: the acquisition of Supplemental Water; the collection and expenditure of Replenishment Assessments; the recharge of the Management Area; and the construction and operation of all necessary facilities, including but not limited to, development of surface and sub-surface percolation and injection facilities. In addition, a source of Recharge Water for agencies contributing to the Settlement Payment described in Section 5.3 will be Imported Water provided by Metropolitan under the Settlement Agreement, and not used by the Soboba Tribe.

6.6.1 Priority for replenishment will be based on an equitable apportionment of available replenishment water among the sub-basins after full consideration of:

6.6.1.1 The Public Agency's participation in the payment in the Settlement Payment described in Section 5.3.

6.6.1.2 Hydrologic conditions in the Management Area.

6.6.1.3 The Management Area's Water demands.

6.6.1.4 The availability of storage capacity to accommodate the Natural Recharge of surface flows.

6.6.1.5 The availability of appropriate conveyance facilities.

6.6.1.6 The availability of Supplemental Water,

6.6.1.7 Protection of Tribal Water Rights.

6.6.2 The Watermaster is encouraged to take advantage of surplus imported water from Metropolitan that occasionally may be available at low cost, and to use available Assessment funds to bank such Recharge Water against future production in excess of Adjusted Production Rights.

6.6.3 The Public Agencies shall independently or jointly operate their present facilities to maximize the existing spreading and Recharge operations of natural flow in the Management Area. Such Recharge Water shall be available to support the pumping of all users, and shall not be the property of the spreading Public Agency.

6.6.4 All water used to replenish any sub-basin in the Management Area shall meet the Regional Water Quality Control Board, Santa Ana

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Region requirements, and the provisions of Article 4.2 of the Settlement Agreement, and may be used in any sub-basin where such requirements are met.

6.7 Storage Rights. Unused storage capacity may exist in the Management Area, and this capacity will be managed by the Watermaster conjunctively with natural and available Supplemental Water supplies.

6.7.1 Subject to availability of Assessment funds and unused storage capacity as determined by Watermaster, the Management Area may be Recharged when water is available, to be drawn upon by the Public Agencies in later years when such Supplemental Water may not be available.

6.7.2 Unused storage capacity, as determined by Watermaster, and pursuant to a Storage Agreement, may be used for "put and take" operations of Supplemental Water that is paid for by any Public Agency provided that:

6.7.2.1 Such operations do not interfere with the rights of any other pumper, or with the use of the storage capacity for recharge and storage under the Water Management Plan.

6.7.2.2 The Watermaster shall have the first right to purchase any water available for Recharge for use under the Plan.

6.7.2.3 Later recovery of Stored Water shall exclude losses, and shall not be subject to either Administrative or Replenishment Assessments.

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6.7.2.4 Such recovered water may be used anywhere within the service area of the Party.

6.7.2.5 Such Stored Water may be transferred while still in storage.

6.7.3 Any conjunctive use programs for the benefit of territory outside of the Management Area shall be subject to the Watermaster and the governance provisions herein. Any storage, conjunctive use programs by third parties, or in-lieu recharge programs financed with assessment funds, shall be subject to the Watermaster and the governance provisions herein; provided that Metropolitan has the right under the Soboba Settlement Agreement to use up to 40,000 acre-feet of storage capacity in the San Jacinto Upper Pressure Sub-basin for the pre-delivery of water required under Section 5.2.

6.7.4 Eastern and Lake Hemet have previously provided water for replenishment of the Management Area. As of May 1, 2005 these amounts, less losses, were 12,694 acre-feet for Eastern and 950 acre-feet for Lake Hemet Such Parties shall have Recharge Rights to recover these amounts, less any future losses, without either Administrative or Replenishment Assessments, and may be used to offset excess pumping in lieu of Replenishment Assessments. The water available under such Recharge Rights shall be pumped within 15 years of the entry of this Judgment, but at not more than 2000 acre-feet in a single year. The Public Agencies shall notify the Watermaster when such Recharged Water is being pumped, and in what amounts, and the Watermaster shall keep an accounting of the amounts remaining. The use of such credits shall be interpreted and administered so as not to increase the replenishment obligations or assessments of those parties without such past credits, or after such credits have been fully used.

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6.7.5 The accounting for recovery of Stored Water or Recharge Water from the Management Area shall not include any water that escapes therefrom and migrates downstream beyond the Management Area. Losses will be calculated based upon best engineering principles.

6.8 Recycled Water. The use of Recycled Water produced by Eastern can be of substantial benefit in providing additional water in the Management Area. The Watermaster shall have a right of first refusal to purchase all recycled water produced from treatment facilities serving the Management Area that is not subject to then existing contracts. Such recycled water may be used for recharge or direct use within the Management Area..

6.8.1 Each Public Agency may implement its own Recycled Water program, for direct use, subject to the availability of recycled water. The Public Agency shall be responsible for financing, operating and maintaining the facilities necessary for that program. The Watermaster will support loan or grant applications, and the Public Agencies will work to integrate Recycled Water into the Water Management Plan, to the extent economically feasible while meeting regulatory standards.

6.8.2 Currently only Eastern has Recycled Water available for Recharge. To the extent such Recycled Water is not acquired by the Watermaster for use under the Plan, the water if recharged in the Management Area shall remain the property of Eastern and may be pumped (less losses) without Replenishment Assessments.

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6.9 Assessment Program. The assessment program contemplated by the Water Management Plan shall be administered by Eastern pursuant to a contract with the Watermaster pursuant to the provisions of Section 9.6.4(e).

6.9.1 All Assessments shall be used for Replenishment Expenses and Administrative Expenses.

6.9.2 Subject to the limitations in this Judgment, each Public Agency that produces less than its Adjusted Production Right and share of Imported Water, and any Class B Participant producing less than its Base Production Right, shall have the following Carry-Over Credit:

6.9.2.1 Carry-Over Credit shall be the difference in acre-feet between a Party's Adjusted Production Right and share of Imported Water, or the Class B Participant's Base Production Right, and the Party's actual production in a calendar year.

6.9.2.2 The Carry-Over Credit may be applied to reduce the amount of acre feet upon which a Party must pay a Replenishment Assessment. Carry-Over Credits are transferable among the Parties, and may be retained for more than one calendar year. The Parties shall notify the Watermaster if a Carry-Over Credit is being retained.

6.9.2.3 The Watermaster shall keep an accounting of all Carry-Over Credits.

6.9.3 All Watermaster assessment invoices shall be payable to Watermaster within 60 days of notice. Any delinquent assessments shall bear interest at a rate to be set by the Watermaster. Watermaster is entitled to recover its reasonable expenses in collecting any assessment, including attorney's fees and costs.

6.10 Export. The Public Agencies may export water outside the Management Area, on a temporary basis, upon approval by the Watermaster. However, any water exported shall be replenished with an appropriate amount of similar or better quality water as determined by Watermaster. Water exports by the Public Agencies shall not interfere with the Water Management Plan or any other Public Agency's operations. The Water Management Plan will set forth the specific criteria for the export of water, including, but not limited to, conjunctive use programs.

6.11 Capital Facilities. Each Public Agency shall continue to own its existing capital facilities for water supply and management, subject to the provisions of Section 9.6.6. However, the Phase I capital facilities necessary to implement the Water Management Plan shall be owned and operated by Eastern, pursuant to the Plan and in a fiduciary capacity for the benefit of all Parties under this Judgment, pursuant to Sections 5.4; 9.6.4(a); 9.6.4(c).

6.11.1 Financing of Water Management Plan facilities may be funded by Assessments, regional capital fees, loans and grants, contributions for storage rights by Metropolitan or other third-parties, and municipal bonds. Responsibility for the costs of future capital facilities necessary to implement the Plan, beyond the Phase I facilities, shall be determined by the Watermaster and apportioned on relative benefit to be derived by each Public Agency.

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6.11.2 Any of the participating Public Agencies may propose projects to be included in the Water Management Plan to increase the Management Area water supply. Such proposals, after evaluation by the Watermaster, shall be included or rejected. If the Watermaster chooses to reject the proposal, the proposing Public Agency may implement the rejected project at its own cost so long as it does not significantly impact the implementation of the Management Plan and/or interfere with the ongoing production by the Public Agencies.

7. INJUNCTION.

Each Party and his, her or its officers, agents, employees, successors and assigns, is enjoined and restrained from:

7.1 Producing water from the Management Area without payment of required Administrative Assessments.

7.2 Producing water from the Management Area in excess of the Party's Adjusted Production Right and share of Imported Water, or the Base Production Right in the case of a Class B Participant, without payment of required Replenishment Assessments.

7.3 Transferring Production Rights except as authorized in this Judgment.

7.4 Recharging water in the Management Area except as authorized in this Judgment.

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7.5 Storing or exporting water except as authorized in this Judgment.

8. CONTINUING JURISDICTION.

8.1 Full Jurisdiction. Full jurisdiction, power and authority is reserved to the Court as to all matters contained in this Judgment, including expedited intervention by successors in interest to Private Pumpers, except:

8.1.1 To redetermine Base Production Rights of the Public Agencies or Class B Participants.

8.1.2 As otherwise limited by law.

8.2 Motion to Interpret. By motion to the Court, upon 30 days written notice and after hearing, any Party or Watermaster may request the Court to make such further or supplemental orders to interpret, enforce, carry-out or amend this Judgment. Any such motion shall be reviewed de novo by the Court. Any such motion shall be served on all Parties and Watermaster at the addresses on the Watermaster's notice list.

9. WATERMASTER.

9.1 Composition. The Watermaster shall consist of a board composed of one elected official selected by each of the Public Agencies and one Private Pumper representative selected by the Class A and Class B Private Pumpers.

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9.2 Terms. Each member of the Watermaster shall serve until replaced by the Public Agency or Private Pumpers that made the original appointment.

9.3 Removal and Replacement. Any Watermaster member may be removed and replaced by the same procedure used in his or her appointment.

9.4 Voting. Each member of the Watermaster shall have one vote. Four affirmative votes shall be required in order to constitute Watermaster action on each of the following matters. (1) any change sought in the form of governance; (2) any change in voting requirements; (3) retaining the services of legal counsel and Advisor; (4) establishing, levying, increasing or decreasing all assessment amounts; (5) adopting or amending an annual budget; (6) determining the extent of overdraft and quantifying safe yield; (7) determining Adjusted Production Rights; (8) decisions regarding the financing of Supplemental Water or facilities, other than any financing provisions included in this Stipulated Judgment as provided in Sections 5.3, 5.4, 5.5 hereof; (9) decisions regarding ownership of facilities, other than ownership of the Phase I facilities described in the Water Management Plan~~,~~ which shall be owned by Eastern Municipal Water District, subject to a right of use by those parties participating in the financing thereof; (10) policies for the management of the Management Area; (11) and any decision that involves a substantial commitment by the Watermaster, including any contracts for conserved water. All other actions by the Watermaster shall require three affirmative votes.

9.5 Court Review. Any action by the Watermaster, or any failure to act by virtue of insufficient votes, may be reviewed by the Court on motion by

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any party, with notice to all other parties. The Court's review shall be de novo, and the Court's decision shall constitute action by the Watermaster.

9.6 Powers and Duties. In order to implement the provisions of this Judgment, the Watermaster shall have the following duties and powers:

9.6.1 Water Management Plan. Watermaster shall develop and implement a Water Management Plan, with such additions and modifications as may from time to time be appropriate, and shall administer the provisions of this Judgment. The Water Management Plan shall be subject to approval by the Court, by the Soboba Tribe, and by the United States.

9.6.2 Independent Counsel. The Watermaster shall retain independent legal counsel to provide such legal services as the Watermaster may direct.

9.6.3 Advisor. The Watermaster shall retain either an independent engineering firm or qualified individual experienced in hydrology to evaluate and analyze the data collected by Eastern, and any conclusions based thereon, and to make recommendations to the Watermaster, referred to herein as "Advisor." The Advisor shall also provide general coordination among Eastern, the Technical Advisory Committee and the Watermaster with respect to their respective functions, and perform such executive functions as the Watermaster may direct. The Watermaster reserves the right to refer any matter it may choose to any person it may select for assistance in carrying out its duties under this Judgment.

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9.6.4 Operations and Other Functions.

(a) *Operations – Phase I Facilities*. The Phase I Facilities (including capital facilities and spreading basins, as more particularly defined in the Water Management Plan) are either existing facilities of Eastern that will be expanded or improved as part of the Water Management Plan, or are new facilities that will be integrated into Eastern's existing facilities and will be owned by Eastern. Pursuant to the terms and conditions of contracts to be entered into between Eastern and the Watermaster, and Eastern and the other Public Agencies, Eastern shall construct, install, and operate the Phase I Facilities consistent with the Water Management Plan.

(b) *Operations – Other Facilities*. The Water Management Plan anticipates the need for the construction and installation of other facilities in order to accomplish the goals of the Judgment. Such facilities may be constructed, installed and operated under contract with the Watermaster, by a member of the Watermaster or, in circumstances approved by the Watermaster, by other responsible entities.

(c) *Purchase of Water for Groundwater Recharge*. The Soboba settlement requires Metropolitan to use its best efforts to deliver an average of 7500 acre-feet per year of Imported Water for recharge of the Management Area. This supply is dedicated first to satisfy the rights of the Soboba Tribe as provided in the Settlement Agreement. Such portion of the supply that is not used by the Soboba Tribe will be available to those Parties who have participated in the cost thereof. Subject to the approval of the Watermaster, Eastern shall enter into a contract with Metropolitan for the purchase and delivery of such Imported Water supply. Eastern shall also purchase as a member agency of Metropolitan, or otherwise acquire, such additional supplies of water as may be directed by the Watermaster to implement the Water Management Plan, subject to availability and transmission capacity. All such water delivered by Metropolitan, or otherwise acquired by Eastern, and all Eastern facilities used to deliver, recharge and recapture such water, shall be subject to rights of use by the Parties entitled thereto. Such rights of use shall be confirmed in detail in written contracts with Eastern. Recyled water is also available for direct and indirect groundwater recharge from Eastern's wastewater treatment facilities serving the Management Area. The Watermaster shall have a right of first refusal to purchase all recycled water produced from such plant that is not subject to then existing contracts. Nothing contained herein shall limit the right of the Watermaster to acquire Imported or Supplemental Water supplies from any of the Parties, or from other responsible entities.

(d) *Data Collection.* The Watermaster shall provide for the collection and maintenance of all production, water level, water quality, and other

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technical data necessary under or required by the Water Management Plan ("Data"). Pursuant to the terms and conditions of a contract to be entered into between Eastern and the Watermaster, Eastern shall collect and maintain all such Data and transmit such Data to the Watermaster, its Advisor, and the Technical Advisory Committee as directed by the Watermaster. The foregoing clause does not restrict the ability of the Watermaster to enter into other agreements with other members of the Watermaster and/or private firms and individuals for the collection of Data.

(e) *Accounting*. The Watermaster shall provide for the levy, billing, and collection of all assessments provided for under the Judgment, for the payment of costs and expenses of the Watermaster, and for the performance of such accounting and related functions as may be required in connection with those functions ("Accounting Functions"). All funds collected shall be held in a segregated account. All expenses and disbursements shall be separately accounted for. Pursuant to the terms and conditions of a contract to be entered into between Eastern and the Watermaster, Eastern shall initially perform the Accounting Functions for Watermaster. The foregoing clause does not restrict the ability of the Watermaster to enter into other agreements with other members of the Watermaster and/or private firms and individuals to provide some or all of the Accounting Functions.

9.6.5 <u>Technical Advisory Committee</u>. There has been a Technical Advisory Committee that has functioned throughout the development of the Water Management Principles and Plan, and this Stipulated Judgment. That Committee has been composed of such managerial and technical representatives as the individual parties decide to appoint. Each party has paid the costs of its own representatives, and shall continue to do so in the future. The Technical Advisory Committee shall continue to function, and to provide such technical assistance as the Watermaster may request. The Technical Advisory Committee shall make recommendations to the Watermaster's Advisor and to the Watermaster on all matters requiring four votes for Watermaster action, and shall receive from Eastern all data associated with such matters for its review and evaluation. The Technical Advisory Committee and its members shall also function as a way to keep the City Councils, Boards of Directors and participating Private Pumpers fully informed about the implementation of this Judgment.

9.6.6 Reservation of Rights. The Watermaster reserves the right to assume, on its own, any functions set forth in Section 9.6.4, except as provided in Section 9.6.4(a), and to undertake all other acts required to implement the Plan and this Judgment, so long as it is legally capable of performing such functions. The Watermaster, if it should choose, may also act through or in conjunction with the other Public Agencies, or through a Joint Powers Agency composed of all the Public Agencies hereunder. Except as specifically provided in Section 9.6.4(a) with respect to Eastern's facilities used in Phase I, the Watermaster shall have no right to use or acquire the water facilities of any of the Parties, without their consent, provided that it is the intent of the Parties that their individual facilities will be available where appropriate to implement the Water Management Plan, upon terms equitable to all parties, and consistent with their respective obligations to their own customers.

9.6.7 Rules and Regulations. The Watermaster may make such rules and regulations as may be necessary for its own operations as well as for the operation of the Plan and this Judgment, subject to Court approval. Meetings of the Watermaster shall be subject to the Brown Act .

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9.6.8 Reports to Court. The Watermaster shall file annually with the Court, and serve on all Parties, a report regarding its activities during the preceding year, including an audited statement of all accounts and financial activities.

9.6.9 Notice to Parties. Watermaster shall maintain a current list of the Parties and their addresses for notice purposes. Rules for service shall be governed by the California Code of Civil Procedure and the California Rules of Court. Each Party shall notify Watermaster in writing of the name and address for its receipt of notice and service under this Judgment. A Party may change this information by written notice to Watermaster. Notice shall be deemed sufficient if directed to the most recent address provided by the Watermaster.

9.7 Watermaster Records. Watermaster's records shall be kept at the office of Eastern unless changed by the Watermaster and approved by the Court. These records shall be treated as public records under the Public Records Act. Cal. Gov't Code §§ 6250-6277 (West 1995 and Supp. 2002).

10. MISCELLANEOUS.

10.1 Intervention After Judgment. Any Person who is not a Party and who proposes to Produce water from the Management Area, or who is an heir, successor or assign of an existing party, may become a Party to this action and Judgment, subject to the conditions contained herein, by filing a petition in intervention. The petition may be filed and approved ex parte with notice to the Watermaster. Such intervener shall thereafter be a Party bound by this Judgment, and entitled to the rights and privileges accorded under this Judgment.

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10.2 Loss of Rights. No right adjudicated in this Judgment shall be lost by non-use, abandonment, forfeiture or otherwise, except upon a written election by the owner of the right filed with Watermaster, or by order of the Court upon noticed motion and after hearing.

10.3 Attorney's Fees and Costs. No Party shall recover any attorney's fees or costs in this proceeding from any Party.

Dated: ________________, 200_

____
Judge of the Superior Court

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EXHIBIT B

List of Parties to this Judgment

1. Parties

   A. Eastern Municipal Water District ("Eastern)
   B. Lake Hemet Municipal Water District ("Lake Hemet")
   C. City of Hemet ("Hemet")
   D. City of San Jacinto ("San Jacinto")

2. Class A Participants

   A.
   B.
   C.
   D.

3. Class B Participants

   A.
   B.
   C.

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Exhibit C

Base Production Rights

1. Public Agencies

Agency Name	Base Production Rights (Acre-feet per year)
Eastern Municipal Water District	10,869
Lake Hemet Municipal Water District	11,063
City of Hemet	6,320
City of San Jacinto	4,031

2. Class B Participants

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APPENDIX C LIST OF GOVERNING BODIES

Eastern Municipal Water District:

Name	Title
David J. Slawson	Board President, Division 5
Ronald Sullivan	Board Vice President, Division 4
Joe Kuebler, CPA	Director Division 2, EMWD Board Treasurer
Philip E. Paule	Director Division 1
Randy A. Record	Director Division 3, MWD Director

Lake Hemet Municipal Water District:

Name	Title
Frank Douglas Marshall III	Board President
Patrick Searl	Board Vice President
Herbert C. Forst	Board Secretary
John S. Fricker	Board Treasurer
Larry Minor	Director

City of Hemet:

Name	Title
Marc Searl	Mayor
Lori Van Arsdale	Vice- Mayor
C. Robin Resser Lowe	Councilperson
Brian Christie	Councilperson
Eric Mc Bride	Councilperson
Steve Clayton	City Clerk
Judith Oltman	City Treasurer

City of San Jacinto:

Name	Title
Jim Ayres	Mayor
Chris Carlson	Vice- Mayor
Dale Stubblefield	Council Member
Robert Ritchie	Council Member
John Mansperger	Council Member

APPENDIX D PRINCIPLES FOR WATER MANAGEMENT

PRINCIPLES FOR WATER MANAGEMENT

1. Water Management Plan. These Principles, approved by the appropriate authority of each party, are intended to form the basis from which the parties will develop a Water Management Plan ("Management Plan") for the area described in Section 2. The Management Plan is being developed to ensure an adequate and reliable source of future water supply. The Management Plan is also intended to facilitate and accommodate a settlement of the claims of the Soboba Band of Luiseno Indians ("Soboba Tribe").

2. Management Area. The area included in the Management Plan consists of the Canyon Sub-basin and the San Jacinto Upper Pressure Sub-basin, downstream to Bridge Street, and the Hemet Basins ("Management Area"). The Management Area is shown upon the attached map.

3. Pumpers within the Management Area. The primary pumpers within the Management Area are: Eastern Municipal Water District ("Eastern"), Lake Hemet Municipal Water District ("Lake Hemet"), City of San Jacinto ("San Jacinto"), and City of Hemet ("Hemet") (individually

“Public Agency,” collectively “Public Agencies”); the Soboba Tribe (not a Management Plan participant); and approximately 62 individual agricultural and other private pumpers who pump more than 25 acre-feet per year (“Private Pumpers”).

4. Goals. The parties agree that the Management Plan shall incorporate and serve to implement the following goals:

A. Allowing for Future Urban Growth. The parties acknowledge that the Management Area will continue to experience residential, commercial, and industrial growth and development, and that existing water production and service systems will need to be expanded to meet this growth. It is estimated that at least 15,000 afy incremental water supply capacity over the existing base production rights of the Public Agencies must be dedicated to adequately serve this growth. The Management Plan should serve and provide a clear planning process so that each affected Public Agency will be able to meet these projected growth needs.

B. Water Quality Protection. Implementation of the Management Plan should protect and/or enhance Management Area water quality. However, implementation of certain elements of the Management Plan may cause limited localized water quality degradation. If such degradation impedes the then current beneficial use of any Public Agency in the Management Area, the Watermaster described in Section 22 ("Watermaster") shall implement appropriate mitigation measures to ensure water supply to the affected Public Agency and bear the associated costs. The standards for local water quality degradation shall be defined in the Management Plan.

C. Cost-Effective Management. The Management Plan should serve to support the pursuit of cost-effective water supply and water treatment by the Public Agencies, both individually and collectively.

D. Overdraft. The groundwater levels within the Management Area have generally been declining for a number of years, and the Management Area is presently in a condition of overdraft. It is recognized that the Management Plan will, within a reasonable period, eliminate groundwater overdraft and enhance operational yield by implementing a combination of available water resources management elements. These elements include: reduction in native groundwater production; enhanced recharge with native, imported and/or recycled water; development of supplemental supplies such as imported and recycled water; and water conservation programs.

E. Monitoring. The Watermaster shall implement a monitoring program to ensure the Management Plan activities follow best management and engineering principles to protect Management Area water resources.

5. Public Agencies Base Production Rights.

A. The base production rights of Eastern, Lake Hemet and Hemet in the first year of the Management Plan shall be based upon their average production for calendar years 1995-1999. This period was chosen to reflect these Public Agencies' recent pumping, and shall determine their base production rights.

B. The base production right of San Jacinto in the first year of the Management Plan, shall be based upon its average production for calendar years 1995-1999, plus 500 afy. The 500 afy is added because San Jacinto's recent production does not reflect its historic production because of water purchases and other factors.

C. Pursuant to Section 21 below, for the life of the Management Plan, Hemet and San Jacinto shall each add an additional 900 afy to their base production rights. The additional 900 afy shall not be subject to reduction by the Watermaster as provided in Section 5.D and shall not be subject to any Administrative or Replenishment Assessments as provided in Section 6, or other fee or charge imposed under the Management Plan.

D. It is the goal of the Management Plan to adjust base production rights over time to a level consistent with the Watermaster's calculation of the Public Agencies' share of safe yield for the Management Area. Based on current information, it appears that the total reduction in base production rights will need to be approximately 35%. The ultimate reduction will be based on periodic demand, hydrology, recharge and availability of imported water. In order to implement this reduction in a phased manner, each Public Agency's base production rights shall be subject to adjustment as follows:

(1) A 10% reduction from the base production rights in the first year of the Management Plan; and

(2) Until base production rights are consistent with the Public Agencies' share of safe yield, Watermaster shall determine the reductions in base production rights in each subsequent year of the Management Plan, to achieve this goal within 6 years of approval of the Management Plan. Each reduction shall not be more than 10% of the base production right of the prior year.

(3) Pursuant to Section 7(A)(2)(b), upon conversion of a Class B Participant's land from agricultural to a use that requires water service from a Public Agency, the Public Agency shall receive an increase in its base production rights equal to the adjusted base production right of the Class B Participant.

6. Public Agency Production Assessments. The Public Agency production will be subject to the following assessments:

A. An Administrative Assessment on each acre-foot pumped by a Public Agency up to its adjusted base production right. The parties contemplate that the Administrative Assessment will be $50.00 per acre-foot of water pumped in the first year of the Management Plan, and that such amount will thereafter be set by the Watermaster.

B. A Replenishment Assessment on each acre-foot pumped by a Public Agency in excess of its adjusted base production right equal to the cost of providing a like quantity of supplemental water to recharge the Management Area, including recharge losses. Pumping by a Public Agency in excess of its adjusted base production right in order to meet increasing demands is expected and permissible, provided that such excess extractions shall be subject to the Replenishment Assessment. The costs of providing a like quantity of supplemental water shall include the costs of water, O&M costs of the replenishment system, capital recovery and other administrative costs. Currently, the total of these cost items is estimated to be in the range of $300 to $400 per acre-feet; the actual amount will reflect the costs at the time incurred.

7. Private Pumpers Water Rights. The Public Agencies recognize the overlying water rights of the Private Pumpers, and do not intend to take or adversely impact these rights without an agreement with the owner of such rights. The Management Plan will lay out alternatives for the retention, protection, or transfer of such rights, leaving selection of the alternative to the individual overlying water rights owner. A Private Pumper can elect not to participate in the Management Plan and not to formally acknowledge its existence. Such Pumpers shall be referred to herein as “Non-Participants”; such Pumpers shall continue to exercise whatever water rights they may hold under California law unaffected by the Management Plan. There is no intent to affect water use that is consistent with the historical use of the Private Pumpers. However, other pumpers under the Management Plan do not waive their rights to challenge new or expanded water rights. Non-Participants will not have the option of joining the program at a later date. The alternatives available to participants are as follows:

A. (1) Class A Participation. A Private Pumper can elect to sign a written agreement acknowledging the existence of the Management Plan. Such Pumper shall be a Class A Participant and shall be entitled to vote for and/or be elected to serve as the Private Pumper representative on the Management Plan's governing board or body described in Paragraph 22 below, but shall not otherwise be required to participate in the Management Plan implementation. A Class A Participant may, without any financial assessment by the Watermaster, pump from his/her/its property within the Management Area the amount of water that can be put to reasonable and beneficial use on the Pumper's land as may be authorized under California law. Class A Participants shall have the right to convert to Class B Participation during a grace period that shall end three (3) years after the effective date of the Management Plan, as approved by a judgment of the Superior Court for Riverside County, upon payment of the total assessments the Pumper would have paid had the Pumper elected to be a member of Class B from the outset, plus interest.

(2) Class B Participation. A Private Pumper can become a Class B Participant by electing to limit annual pumping to the Pumper's average annual production during the calendar years 1995 through

1999 and to pay replenishment assessments on amounts in excess of that average annual production. A Class B Participant shall enjoy the following benefits of Plan Participation:

a. Vote for and/or be elected to serve as the Private Pumper's representative on the Management Plan's Governing Board;

b. Upon conversion of Pumper's land from agricultural use to a use that requires water service from a participating Public Agency, Public Agency shall credit to the extent legally permissible, Pumper or Pumper's successor-in-interest's adjusted production right, using the formula in Section 5 towards satisfaction of any requirement then in effect for water supply assessment requirements. Furthermore, Pumper or Pumper's successor-in-interest shall be given a credit for Pumper's adjusted production right using the formula in Section 5 towards any fees associated with water supply that the Public Agency may then have in effect. The Public Agency serving the converted land shall receive a credit to its production right as set forth in Section 5.

c. To the extent the Pumper's land is not covered under Section 7(A)(2)(b), Pumper will be eligible to enter into a contract with the Management Plan, or a participating Public Agency, to sell for a defined period of time some portion of Pumper's adjusted production right, under terms and conditions mutually agreed upon by the Pumper and the Management Plan. Criteria used in consideration of such contract shall include:

(i) Management Plan's need to acquire additional water supplies to address Basin overdraft and recovery;

(ii) Submission of a water conservation plan, including use of in lieu water, by Pumper that will reasonably guarantee conservation of water that would otherwise be produced from the Basin;

(iii) Public policy considerations of local government jurisdictions, including economic and land use impacts of proposed water conservation plan.

B. In-Lieu Water Use. In the event a Private Pumper (or successor) receives recycled and/or imported water from a Public Agency to serve an overlying use in place of groundwater, or otherwise engages in an in-lieu program, the overlying water right of the Private Pumper (or successor) shall not be diminished by the receipt and use of such recycled and/or imported water or by engaging in an in-lieu program.

C. Well Monitoring. To become a Class A or B Participant, a Private Pumper shall authorize the metering of the Pumper's well(s) and the collection of groundwater level and quality data, and the reading thereof by Management Plan personnel. The metering and reading shall be at no cost to the Pumper, and the Pumper shall receive copies of the reports and information obtained upon request.

D. Future Production Participation. Any new Pumper after the effective date of the Management Plan, as approved by a judgment of the Superior Court for Riverside County, can only participate as a Class A Participant as described in Section 7A(1).

E. Replacement Wells. The redrilling of existing wells and the drilling of new wells to replace existing wells will not be considered new private production.

8. Capital Facilities. Each Public Agency shall continue to own its existing capital facilities for water management. However, capital facilities may be jointly constructed and owned by the Management Plan. Joint financing of such facilities may be funded by regional capital fees, loans and grants, contributions for storage by The Metropolitan Water District of Southern California ("Metropolitan") or other third-parties, and municipal bonds. Responsibility for the costs of any existing and future capital facility of the Management Plan should be apportioned among the Public Agencies based on relative benefit to be derived by each Public Agency. Any of the participating Public Agencies may propose projects to be included in the Management Plan to increase Management Area water supply. Such proposals, after evaluation by the Watermaster, shall be included or rejected. If the Watermaster chooses to reject the proposal, the proposing Public Agency may implement the rejected project as long as it does not significantly impact the implementation of the Management Plan and/or interfere with the ongoing production by the Public Agencies.

9. Soboba Tribe's Water Rights. The Soboba Tribe's water rights shall be determined as part of a settlement among the Soboba Tribe, the United States, Eastern, Lake Hemet and Metropolitan. Major points of the proposed settlement are:

A. The Soboba Tribe shall have a senior, prior right in the Canyon and San Jacinto Upper Pressure Sub-basins of 9000 afy, but its use shall be limited to a maximum of 4100 afy during the first 50 years after the effective date of the settlement.

B. The Soboba Tribe shall have the right to purchase replenishment water for use pursuant to the Principles of Settlement at the Management Plan replenishment rate.

C. The Soboba settlement provides that, among other things, Metropolitan will use its best efforts to deliver sufficient water to yield a 15-year average of 7,500 afy to the Management Plan until 2035 at its long-term interruptible rate (currently $233/af).

D. Subject to full funding of the settlement by the United States, the Management Plan shall pay the Soboba Tribe $10 million.

E. The Management Plan will also pay the Soboba Tribe $7 million. A Public Agency's payment of its share of this amount is optional, but in order to obtain the benefits of the low-cost Metropolitan water delivered pursuant to the settlement, a Public Agency shall pay its share of this amount.

F. The Management Plan will receive $10 million for capital improvements from the United States, and all unused Soboba Tribe water based on the Public Agency's participation in the payment in Section 9(E) above.

10. Implementation of These Principles. These Interim Principles for Water Management shall be used by the parties as a basis for the preparation of the Management Plan, and a stipulated judgment in a water rights adjudication. As explained below, the Management Plan shall be administered by the Watermaster. The Watermaster will be under the continuing jurisdiction of the Court.

11. Assessment Program. The assessment program contemplated by the Management Plan shall be administered by the Watermaster subject to the governance provisions herein. All payments shall be made to the Watermaster and shall be maintained in a separate restricted fund. All assessments shall be used exclusively to acquire imported, recycled or Metropolitan water for the recharge of the Management Area, and for the facilities and operational and administrative expenses associated with the assessment and recharge programs. Subject to Management Plan approval, assessments may also be used by affected parties to acquire and deliver water for direct use by the parties, in lieu of pumping.

12. Replenishment Program. The replenishment program contemplated by the Management Plan shall also be administered by the Watermaster. The program shall include: the acquisition of supplemental water supplies (including imported, recycled and Soboba Tribe water); the expenditure of assessments; the recharge of the Management Area; and the construction and operation of all necessary facilities, including but not limited to, development of surface and sub-surface percolation and injection facilities. Priority for replenishment will be based on an equitable

apportionment of available replenishment water among the sub-basins after full consideration of: the Public Agency's participation in the payment in Section 9(E) above; the Management Area conditions; water demands; the availability of storage capacity to accommodate the recharge of natural flows; the availability of appropriate conveyance facilities; and the availability of replenishment or imported water. The Watermaster is encouraged to take advantage of surplus imported water that occasionally may be available at low cost, and to use available assessment funds to bank such recharge against future pumping in excess of adjusted production rights.

13. Rights to Groundwater. Groundwater in the Management Area may occur from: natural recharge; spreading operations of natural flows; replenishment with imported, recycled or Metropolitan water acquired with assessment funds; or in-lieu recharge programs financed with assessment funds. All such groundwater shall be available to support the pumping of the parties as allowed herein, and shall not be the property of any individual party, subject to the provisions of Section 14.

14. Storage Rights. The parties recognize that unused storage capacity exists in the Management Area, and the Management Plan contemplates that this capacity will be managed conjunctively with available imported and recycled water supplies. Subject to availability of the Management Plan fund for assessments and unused storage capacity as determined by Watermaster, the Management Area will be recharged and water stored therein when such supplies are available, and drawn upon by the Public Agencies in dry years when such supplemental water supplies may not be available. In addition, unused storage capacity as determined by Watermaster may be used for "put and take" operations of recycled or imported water that is paid for by any party to the Management Plan provided that:

A. Such operations do not interfere with the rights of any other pumper, or with the use of the storage capacity for recharge and storage under the Management Plan;

B. Water available for recharge is purchased first, as needed, for the Management Plan;

C. Later recovery of stored water shall exclude losses; and

D. Such recovered water may be used anywhere within the service area of the party.

Any conjunctive use programs for the benefit of territory outside of the Management Area shall be subject to the governance provisions herein. Any storage, conjunctive use programs by third parties or in-lieu recharge programs financed with assessment funds shall be subject to the governance provisions herein.

15. Spreading Operations. The Public Agencies shall independently or jointly operate their respective facilities to maximize the existing spreading and recharge operations of natural flow in the Management Area.

16. Recharge Water Quality. Consistent with Section 4(E) above all water used to replenish any sub-basin in the Management Area shall meet the Regional Water Quality Control Board requirements, and may be used in any sub-basin where such requirements are met.

17. Recharge Losses. The accounting for storage recharge of the Management Area shall not include any water that escapes therefrom and migrates downstream beyond the Management Area. Losses will be calculated based upon best engineering principles.

18. Recycled Water. The use of recycled water can be of substantial benefit in providing additional water in the Management Area. Each Public Agency may implement a recycled water program, including the ownership, operation and construction of all necessary facilities, and the application for and administration of any loan or grant applications. The Management Plan will support loan or grant applications, and the Public Agencies will work to integrate recycled water into the Management Plan to the extent economically feasible while meeting regulatory standards. Subject to existing recycled water contracts, the Management Plan will have a first right of refusal to purchase excess recycled water for recharge. Priority shall be given to Management Area recharge for the use of recycled water which originates therefrom.

19. Export. The Public Agencies may export water outside the Management Area, on a temporary basis, upon approval by the Watermaster.

However, any water exported shall be replenished with an appropriate amount of similar or better quality water as determined by Watermaster. Also, water exports by the Public Agencies shall not interfere with the Management Plan or any other Public Agency's operations. The Management Plan will set forth the specific criteria for the export of water, including, but not limited to, conjunctive use programs.

20. Credits. Recharge credits documented before the Management Plan shall be calculated pursuant to the Management Plan. Future recharge credits shall be established by replenishment of water or by not exercising the full, adjusted base production right, and shall be calculated pursuant to the Management Plan.

21. Tunnel Seepage, Stream Diversions, Fruitvale To resolve Eastern’s use of Tunnel seepage, Lake Hemet’s stream diversions and Eastern’s use of Fruitvale water, 900 afy shall be added to Hemet’s adjusted base production and 900 afy shall be added to San Jacinto’s adjusted base production right as discussed in Section 5 above. This is intended to provide Hemet and San Jacinto a fair share of water from these disputed issues.

22. Governance. The Management Plan will be administered by a Watermaster as follows:

A. The governing board of the Watermaster shall consist of one elected official from each of the Public Agencies and one Private Pumper representative selected by the Private Pumpers who participate in the Management Plan. Each member shall have one vote.

B. The Watermaster's duties shall include: determining safe yield; determining replenishment needs; determining annual adjusted base production rights; purchasing and selling imported and recycled water; constructing future capital facilities; establishing assessment rates; initiating necessary conservation and drought management measures; and implementing other responsibilities identified in the Management Plan documents.

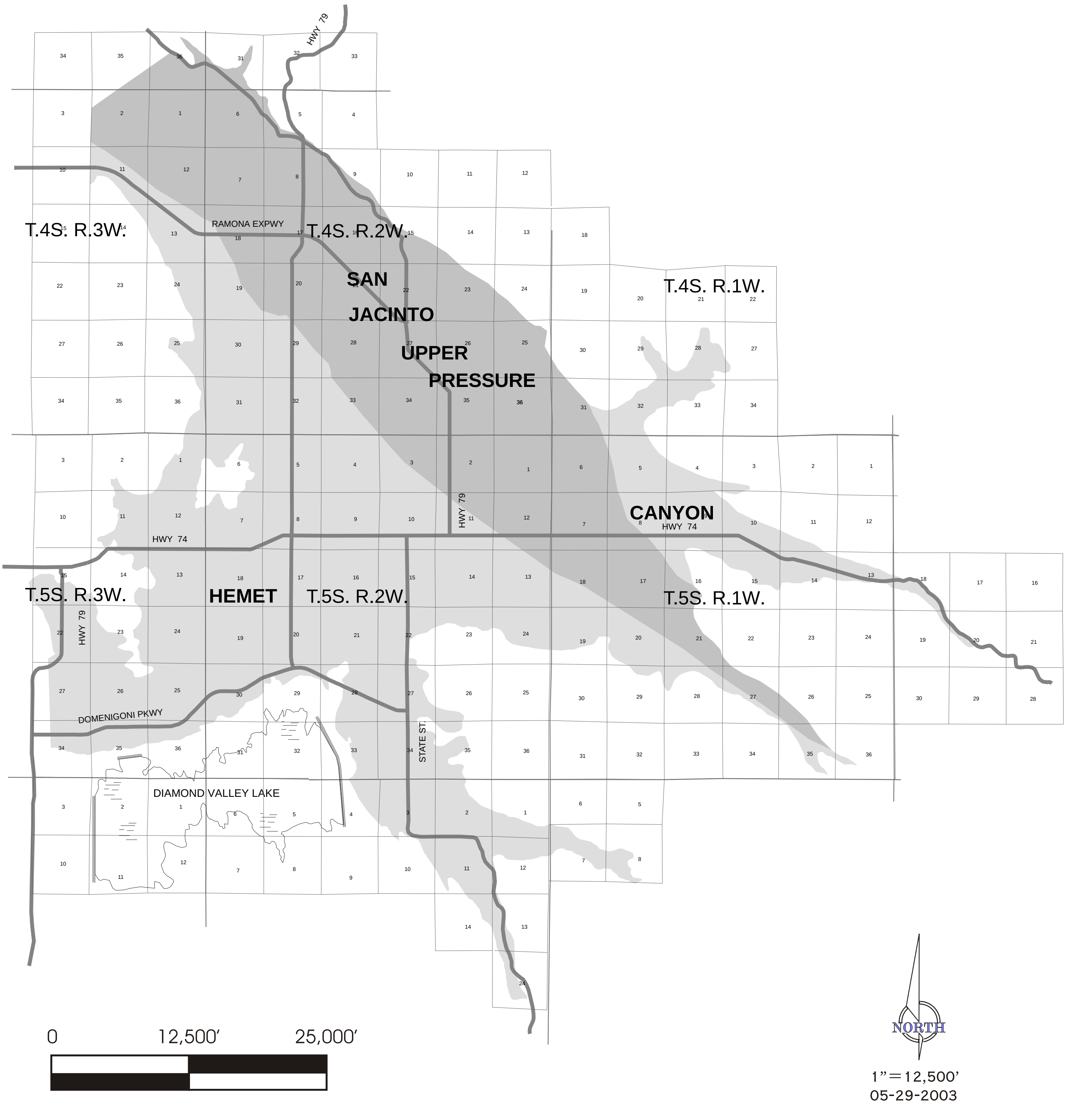
Dated: ______, 2004.

EASTERN MUNICIPAL WATER DISTRICT

By: ___________________________

Dated: ______, 2004.	LAKE HEMET MUNICIPAL WATER DISTRICT
	By: ____________________________
Dated: ______, 2004.	CITY OF HEMET
	By: ____________________________
Dated: ______, 2004.	CITY OF SAN JACINTO
	By: ____________________________

MANAGEMENT AREA



APPENDIX E LIST OF COMMITTEE ATTENDEES

The attendees of the PC who contributed to this plan:

Name	Title	Affiliation
Debi Lara	Administrative Assistant	City of Hemet
Marc Searl	Member, City Council	City of Hemet
Steve Temple	City Manager	City of Hemet
Eric Vail	Attorney	City of Hemet
Lori VanArsdale	Member, City Council	City of Hemet
Dennis Williams	Consultant	City of Hemet
Chris Carlson-Buydos	Member, City Council	City of San Jacinto
Bob Hargreaves	Attorney	City of San Jacinto
Steven Johnson	Consultant	City of San Jacinto
Barry McClellan	City Manager	City of San Jacinto
Ken Shaw	Member, City Council	City of San Jacinto
Samson Haile-Selassie	Project Manager	DWR
Eric Hong	Project Manager	DWR
Dale Schafer	Facilitator	DWR
Ali Taghavi	Consultant	DWR
Mike Garner	Asst. General Manager	EMWD
Richard Hall	Member, BOD	EMWD
Behrooz Mortazavi	Asst. General Manager	EMWD
Tony Pack	General Manager	EMWD
Ravi Ravishanker	Deputy General Manager	EMWD
Gerry Shoaf	Attorney	EMWD
Rodger Siems	Member, BOD	EMWD
Herb Forst	Member, BOD	LHMWD
John Fricker	Member, BOD	LHMWD
Rob Lindquist	General Manager	LHMWD
Art Littleworth	Attorney	LHMWD
John Loncar	Consultant	LHMWD
Tom Wagoner	General Manager	LHMWD
Bruce Scott	Private Water Producer	Private Water Producer
Jim Conner	Private Water Producer	Private Water Producer
Bill Corwin	Private Water Producer	Private Water Producer
Gary McMillan	Private Water Producer	Private Water Producer
Randy Record	Private Water Producer	Private Water Producer
Joe Garcia	Environmental Specialist	Soboba Tribe

The members of the TC who contributed to this plan:

Name	Title	Affiliation
Mike Gow	Director of Public Works	City of Hemet
Dennis Williams	Consultant	City of Hemet
Steve Johnson	Consultant	City of San Jacinto
Maurice Hall	Project Manager	DWR
Eric Hong	Project Manager	DWR
Dale Schafer	Facilitator	DWR
Ali Taghavi	Consultant	DWR
Khos Ghaderi	Director of Operations	EMWD
Joe Lewis	Director of Engineering Svcs.	EMWD
Fahkri Manghi	Hydrologist	EMWD
Behrooz Mortazavi	Asst. General Manager	EMWD
Peter Odencrans	Public Affairs Officer	EMWD
Ralph Phraner	Senior Geologist	EMWD
Ravi Ravishanker	Deputy General Manager	EMWD
John Loncar	Consultant	LHMWD
Tom Wagoner	General Manager	LHMWD
Dick Kelley	Private Water Producer	Private Water Producer
Bruce Scott	Private Water Producer	Private Water Producers
Joe Garcia	Environmental Specialist	Soboba Tribe
Peter Pyle	Consultant	Soboba Tribe

The representatives of each Public Agency and DWR at CAM Committee meetings who contributed to this plan:

Name	Title	Affiliation
Steve Temple	City Manager	City of Hemet
Eric Vail	Attorney	City of Hemet
Dennis Williams	Consultant	City of Hemet
Bob Hargreaves	Attorney	City of San Jacinto
Steve Johnson	Consultant	City of San Jacinto
Barry McClellan	City Manager	City of San Jacinto
Samson Haile-Selassie	Project Manager	DWR
Eric Hong	Project Manager	DWR
Dale Schafer	Facilitator	DWR
Ali Taghavi	Consultant	DWR
Mike Garner	Asst. General Manager	EMWD
Behrooz Mortazavi	Asst. General Manager	EMWD
Tony Pack	General Manager	EMWD
Chuck Rathbone	Director of Finance	EMWD
Gerry Shoaf	Attorney	EMWD
Art Littleworth	Attorney	LHMWD
John Loncar	Consultant	LHMWD
Tom Wagoner	General Manager	LHMWD

LHMWD SURFACE WATER DIVERSION

EMWD IMPORTED WATER USAGE

EMWD RECYCLED WATER PRODUCTION

EMWD RECYCLED WATER SALES

EMWD
Historical Water Supply Components (AF)

Year	Groundwater*	Imports	Recycled Water**	Sales to other Agencies	Conveyance Water	Total
1984	11,763	2,228	0	(1,811)	0	12,181
1985	11,859	971	0	(2,301)	0	10,529
1986	11,605	605	0	(1,750)	0	10,460
1987	12,217	2,889	37	(3,549)	0	11,594
1988	14,539	4,463	42	(2,929)	0	16,116
1989	14,762	5,712	40	(4,500)	0	16,014
1990	16,533	5,774	24	(8,417)	0	13,915
1991	12,051	378	24	(2,667)	0	9,786
1992	11,810	92	25	(2,149)	0	9,778
1993	10,483	0	1	(155)	0	10,329
1994	12,253	0	0	(1,823)	0	10,430
1995	11,055	50	7	(707)	0	10,406
1996	16,349	0	57	(1,902)	(2,583)	11,921
1997	16,282	183	31	(1,133)	(3,120)	12,242
1998	14,692	0	4	(417)	(3,656)	10,623
1999	17,458	0	0	(1,658)	(3,130)	12,670
2000	17,634	198	0	(2,236)	(2,690)	12,906
2001	15,127	1,761	0	(2,853)	(907)	13,128
2002	15,370	0	0	(4,895)	(929)	9,546
2003	13,693	325	0	(1,864)	(686)	11,468
2004	12,515	5,636	0	(4,283)	0	13,868

* Groundwater includes conveyance water

** Recycled water does not include water sold to land owners for irrigation

LHMWD
Historical Water Supply Components (AF)

Year	Groundwater	Purchases from EMWD	Surface Water	Total
1984	4,901	1811	*	*
1985	6,609	2074	6,557	15,241
1986	6,961	1750	6,078	14,789
1987	6,929	3396	4,418	14,743
1988	7,427	2792	6,424	16,642
1989	6,481	4338	6,837	17,656
1990	5,829	8382	1,902	16,114
1991	7,559	2300	2,057	11,917
1992	7,770	2149	2,206	12,125
1993	6,748	155	6,064	12,967
1994	9,780	1820	1,633	13,233
1995	9,166	653	4,328	14,146
1996	10,932	1841	3,359	16,132
1997	12,472	507	2,959	15,938
1998	9,356	266	4,019	13,641
1999	13,390	952	3,033	17,375
2000	13,093	1808	1,765	16,666
2001	12,490	2103	1,348	15,941
2002	12,595	4100	441	17,136
2003	12,044	1343	1,530	14,918
2004	11,900	3635	1,330	16,865

* Surface water data unavailable for 1984

City of Hemet Water Service Area
Historical Water Supply Components (AF)

Year	Groundwater	Purchases from EMWD	Total
1984	3,514	0	3,514
1985	3,810	227	4,037
1986	5,531	0	5,531
1987	4,669	153	4,822
1988	6,306	137	6,443
1989	6,549	162	6,711
1990	5,776	35	5,811
1991	5,138	367	5,505
1992	5,597	0	5,597
1993	5,478	0	5,478
1994	5,327	3	5,330
1995	5,643	1	5,644
1996	5,961	14	5,975
1997	5,891	27	5,918
1998	4,801	31	4,832
1999	4,805	642	5,447
2000	5,048	428	5,476
2001	4,735	749	5,484
2002	4,955	761	5,716
2003	4,999	518	5,517
2004	5,684	345	6,029

City of San Jacinto Water Service Area
Historical Water Supply Components (AF)

Year	Groundwater	Purchases from EMWD	Total
1984	2,805	0	2,805
1985	2,840	0	2,840
1986	2,763	0	2,763
1987	2,746	0	2,746
1988	2,980	0	2,980
1989	2,662	0	2,662
1990	3,841	0	3,841
1991	3,051	0	3,051
1992	3,481	0	3,481
1993	2,802	0	2,802
1994	2,793	0	2,793
1995	2,637	54	2,691
1996	2,831	47	2,878
1997	2,337	600	2,937
1998	2,585	120	2,705
1999	2,766	65	2,831
2000	2,780	0	2,780
2001	2,742	1	2,743
2002	3,231	34	3,265
2003	3,154	2	3,156
2004	2,794	303	3,097

Private Water Producers
Historical Water Supply Components (AF)

Year	Groundwater	Recycled Water	Total
1984	27,420	2086	29,506
1985	30,465	4076	34,541
1986	29,317	4480	33,797
1987	28,512	4461	32,973
1988	27,933	5010	32,943
1989	27,390	5571	32,961
1990	24,725	4439	29,164
1991	23,894	3688	27,582
1992	23,904	3076	26,980
1993	26,130	3301	29,431
1994	30,777	2416	33,193
1995	28,777	3847	32,624
1996	27,216	4312	31,528
1997	28,566	4507	33,073
1998	27,630	3926	31,556
1999	29,358	4975	34,333
2000	33,123	4596	37,719
2001	28,678	4319	32,997
2002	19,962	4888	24,850
2003	15,465	3898	19,363
2004	17,179	5047	22,226

Soboba Tribe
Historical Water Supply Components (AF)

Year	Groundwater	Total
1984	398	398
1985	948	948
1986	912	912
1987	450	450
1988	450	450
1989	450	450
1990	450	450
1991	450	450
1992	450	450
1993	450	450
1994	246	246
1995	951	951
1996	1,324	1,324
1997	1,190	1,190
1998	1,000	1,000
1999	1,545	1,545
2000	1,321	1,321
2001	1,536	1,536
2002	2,016	2,016
2003	1,773	1,773
2004	1,315	1,315

APPENDIX G

EMWD LICENSE FOR SAN JACINTO RIVER DIVERSION

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

License for Diversion and Use of Water

APPLICATION 924 PERMIT 468 LICENSE 10667

THIS IS TO CERTIFY, That EASTERN MUNICIPAL WATER DISTRICT
P. O. BOX 858, HEMET, CALIFORNIA 92343

HAS *made proof as of* JANUARY 23, 1969 *(the date of inspection)* *to the satisfaction of the State Water Resources Control Board of a right to the use of the water of* SAN JACINTO RIVER IN RIVERSIDE COUNTY

tributary to LAKE ELSINORE

for the purpose of IRRIGATION AND DOMESTIC USES *under Permit* 468 *of the Board and that the right to the use of this water has been perfected in accordance with the laws of California, the Regulations of the Board and the permit terms; that the priority of this right dates from* FEBRUARY 14, 1918 *and that the amount of water to which this right is entitled and hereby confirmed is limited to the amount actually beneficially used for the stated purposes and shall not exceed* FIVE THOUSAND SEVEN HUNDRED SIXTY (5,760) ACRE-FEET PER ANNUM, TO BE COLLECTED TO UNDERGROUND STORAGE BY SPREADING FROM NOVEMBER 1 OF EACH YEAR TO JUNE 30 OF THE SUCCEEDING YEAR AT A RATE OF 41 CUBIC FEET PER SECOND AND SUBSEQUENTLY EXTRACTED AND PLACED TO BENEFICIAL USE. SO LONG AS THERE IS NO INTERFERENCE WITH OTHER RIGHTS, JUNIOR, AS WELL AS SENIOR, LICENSEE MAY INCREASE HIS RATE OF DIVERSION TO A MAXIMUM OF 100 CUBIC FEET PER SECOND; PROVIDED THAT THE TOTAL QUANTITY DIVERTED IN ANY 30-DAY PERIOD DOES NOT EXCEED 2,442 ACRE-FEET.

THE POINTS OF DIVERSION OF SUCH WATER ARE LOCATED:

(1) SOUTH 2,900 FEET AND EAST 1,400 FEET FROM NW CORNER OF SECTION 10, T5S, R1E, SBB&M, BEING WITHIN NE1/4 OF SW1/4 OF SAID SECTION 10, AND
(2) NORTH 1,600 FEET AND WEST 900 FEET FROM SW CORNER OF SECTION 4, T5S, R1E, SBB&M, BEING WITHIN NW1/4 OF SW1/4 OF SAID SECTION 4.

A DESCRIPTION OF LANDS OR THE PLACE WHERE
SUCH WATER IS PUT TO BENEFICIAL USE IS AS FOLLOWS:

DOMESTIC USE AND IRRIGATION OF 7,500 ACRES NET WITHIN A GROSS AREA OF 29,500 ACRES WITHIN T4S, R1W; T4S, R1E; T5S, R1E; T5S, R1W; T5S, R2W, SBB&M, AS SHOWN ON MAP FILED WITH STATE WATER RESOURCES CONTROL BOARD.

DIVERSION OF WATER UNDER THIS LICENSE IS, AND SHALL BE, SUBJECT TO THE PROVISION OF JUDGMENT AND DECREE ISSUED IN CASE NUMBER 51,546 IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA IN AND FOR THE COUNTY OF RIVERSIDE, SAID JUDGMENT AND DECREE BEING DATED 3 JUNE, 1954.

Licensee shall allow representatives of the Board and other parties, as may be authorized from time to time by the Board, reasonable access to project works to determine compliance with the terms of this license.

All rights and privileges under this license including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the Board.

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

This license is granted and licensee accepts all rights herein confirmed subject to the following provisions of the Water Code:

Section 1625. Each license shall be in such form and contain such terms as may be prescribed by the Board.

Section 1626. All licenses shall be under the terms and conditions of this division (of the Water Code).

Section 1627. A license shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code) but no longer.

Section 1628. Every license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a license is issued takes the license subject to the conditions therein expressed.

Section 1629. Every licensee, if he accepts a license does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property cannot agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

Dated: MAY 25 1976

STATE WATER RESOURCES CONTROL BOARD

R. L. Rosenberger

Chief, Division of Water Rights

Action	DISTRIBUTION	Copy
	Board Secretary	
	General Manager	
	Deputy General Manager	
	Administrative Services	
	Community Relations	
	Contract Administration	
	Purchasing	
	Engineering Branch	
	Planning	
	Maps & Records	
	Engineering	
	Construction	
	Operations Branch	
	Water Reclam.-Sewer	
	Water Operations & . . st.	X w/encl.
	Water Quality	
	Administrative Branch	
	Customer Service	
	Water Billing	
	Information Systems	
	Finance	
	General Services	

APPENDIX H1: **PREPARATION OF WATER MANAGEMENT PLAN**

APPENDIX H2: **DRAFT AGREEMENT REGARDING PHASE 1 FACILITIES CONSTRUCTION COST AND USE**

APPENDIX H3: **MONITORING PROGRAM**

APPENDIX H4: **INTERIM WATER SUPPLY PLAN**

MEMORANDUM OF UNDERSTANDING

PREPARATION OF WATER MANAGEMENT PLAN FOR THE HEMET/SAN JACINTO MANAGEMENT AREA

This Memorandum Of Understanding; Preparation of Water Management Plan for the Hemet/San Jacinto Management Area ("MOU"), is hereby entered into this 17th day of June, 2004 by and between the EASTERN MUNICIPAL WATER DISTRICT, a California municipal water district ("EMWD"), LAKE HEMET MUNICIPAL WATER DISTRICT, a California municipal water district ("LHMWD"), CITY OF HEMET, a California general law city ("Hemet"), and CITY OF SAN JACINTO, a California general law city ("San Jacinto"), (collectively referred to hereinafter as the "Parties"), based on the following facts:

RECITALS

A. Groundwater in the Hemet/San Jacinto Management area has been, and will remain, a significant source of water for the people and agribusiness of Riverside County providing an invaluable contribution to the local economy and public good. As a result, the Parties have acknowledged their collective interest in the management of local water resources within the Hemet/San Jacinto Management area.

B. In furtherance of this collective interest, the Parties entered into that "Memorandum of Understanding to Work Cooperatively to Promote Conjunctive Use Projects and Programs in Upper San Jacinto River Basins" dated June 19, 2001 (the "Conjunctive Use MOU"). The purpose of the Conjunctive Use MOU is to encourage cooperation among the Parties to facilitate and support local groundwater management efforts and conjunctive use programs particularly those that could increase dry-year water supplies, within the safe-yield and without the overdraft of San Jacinto groundwater basins.

C. In the cooperative spirit of the Conjunctive MOU and with assistance from the State Department of Water Resources, the parties engaged in several rounds of policy discussions and technical investigations into suitable methods to alleviate the overdraft, manage long term water supplies, and provide for demands of growth. As the result of these efforts, the Parties each approved a statement of principles entitled "Principles for Water Management" (the "Principles") in February 2004 with regard to the Hemet and San Jacinto Basins. The Principles established the framework from which the Parties agreed to develop a Water Management Plan for the Hemet and San Jacinto Basins.

D. The intent of this MOU is to provide for the creation of the Water Management Plan ("WMP") called for in the Principles, to appoint Eastern Municipal Water District as the Contract Administrator for preparation of the WMP, and to establish an equitable mechanism for funding the WMP by the Parties.

OPERATIVE PROVISIONS

NOW, THEREFORE, in consideration of the promises made and recited herein, the Parties do hereby enter into this Memorandum of Understanding setting forth their pledges, commitments, understandings and appropriate limiting conditions, as follows:

ARTICLE 1.0 AGREEMENT TO UNDERTAKE WMP

1.1 **<u>Cooperation</u>**. The Parties agree that the WMP shall be timely undertaken and completed in accordance with this MOU. In order to ensure the timely and efficient completion of the WMP within the budget described in this MOU, the Parties agree to cooperate with and amongst each other, to share information necessary for the preparation of the WMP, and to take such other reasonable actions as may be necessary for the timely completion of the WMP, provided such actions do not result in additional costs to the Parties.

1.2. **<u>Scope of Work</u>**. The WMP shall be prepared in accordance with the Scope of Work attached hereto and incorporated herein by reference as Attachment 1 (hereinafter referred to as the "Scope of Work"). The Scope of Work defines the extent of the WMP, the tasks necessary for its completion, assigns responsibility for those tasks, and outlines the basic content of each constituent section.

1.3. **<u>Consultant</u>**. The Parties agree that the WMP shall be prepared by an independent contractor, except for those sections which the Scope of Work designates will be prepared by EMWD or the Parties collectively. The Parties agree that Water Resources & Information Management Engineering, Inc, (hereinafter "WRIME") is hereby selected to be the independent contractor principally responsible for undertaking and completing the Scope of Work. However, it is contemplated that WRIME will subcontract with, or EMWD will enter into separate contracts with, GEOSCIENCE, Support Services, Inc., and Stetson Engineering (hereinafter collectively referred to as "Subconsultants") for certain work identified in the Scope of Work. Subconsultants shall serve as consultants for WRIME with regard to performance of the Scope of Work and shall not serve as consultants for Hemet or San Jacinto or their attorneys for performance of the Scope of Work.

1.4. **<u>Project Cost</u>**. The Parties agree that the amount to be paid to WRIME and Subconsultants for undertaking and completing the Scope of Work shall not exceed that amounts reflected on the WMP Budget attached hereto and incorporated herein by reference as Attachment 2. The WMP Budget reflects a total, not to exceed, project cost of $180,894 ("Total Project Cost"). The Parties agree that the approximately $16,869 remaining in the budget for the Hemet/San Jacinto Groundwater Association ("GWA") and the approximately $20,000 remaining in the budget for the Integrated Water Management Plan ("IWMP") shall be reprogrammed and allocated toward payment of the Total Project Cost. After application of these funds, a cost of $144,025 remains to be funded by and apportioned among the Parties ("Adjusted Project Cost"). The Adjusted

Project Cost excludes individual expenses of the Parties regarding for their own review, comment, and approval of the WMP as well as expenses of EMWD in preparing sections of the WMP for which the Scope of Work indicates it is principally responsible.

ARTICLE 2.0 OBLIGATIONS OF THE PARTIES

2.1 **Funding of WMP**. Each of the Parties individually agrees to fund up to their apportioned share of the Adjusted Project Cost as determined in Article 3.0 "Apportionment of Cost" and to pay such share in a lump sum payment within thirty (30) calendar days of receipt of an invoice from EMWD, provided that EMWD invoices the parties in July of 2004 or thereafter in accordance with Attachment 3.

2.2 **Administration of Contract**. EMWD hereby agrees to act as the contracting agency for the preparation of the WMP. In this regard, EMWD shall enter into and execute the appropriate contract(s) with WRIME and the Subconsultants to perform the Scope of Work for an amount not to exceed the Project Cost. EMWD shall also perform the duties set forth in Attachment 3.

ARTICLE 3.0 APPORTIONMENT OF COST

3.1. **Method of Apportionment.** The Parties agree to apportion the Adjusted Project Cost among themselves based on each Party's pro rata share of the total base production of all the Parties as determined by the Hemet/San Jacinto Policy Committee and shown below:

Apportionment of Adjusted Project Cost (*900 af credit taken out)			
Agency	**Base Production (AF)**	**Percentage**	**Cost Contribution**
City of Hemet*	5,420	17.7 %	$ 25,492
City of San Jacinto*	3,131	10.3 %	$ 14,835
LHMWD.	11,063	36.3 %	$ 52,281
EMWD	10,869	35.7 %	$ 51,417
Totals	**30,483**	**100.0 %**	**$144,025**

ARTICLE 4.0 MISCELLANEOUS PROVISIONS

4.1 **Term**. This MOU shall terminate, unless extended by the mutual agreement of the Parties memorialized in writing, upon acceptance of the completed WMP by the governing boards of each of the Parties, provided the Consultant has been fully paid for the Scope of Work and has released the Parties, and each of them, from any claims for further or additional compensation for the Scope of Work.

4.2 **Ownership of Documents**. The WMP together with all data, information, materials and reports (including electronically or digitally stored materials) produced in the preparation of the WMP shall become the joint property of the Parties upon acceptance of the WMP.

4.3 **Individual Costs & Expenses**. Except for the costs and expenses which the Parties have collectively agreed to fund as provided in Article 3.0 "Apportionment of Funding" of this MOU, any cost or expense incurred any one of the Parties with regard to the WMP or its review or approval, shall remain the sole cost and expense of the incurring Party.

4.4 **Authority**. The individuals executing this Agreement on behalf of the Parties and the instruments referenced on behalf of the Parties represent and warrant that they have the legal power, right and actual authority to bind the Parties to the terms and conditions hereof and thereof.

4.5 **Counterpart Originals**. This Agreement may be executed in original counterparts, which together shall constitute a single agreement.

4.6 **Effective Date**. This MOU has become effective among and between the Parties on the date by which each Party's governing board or council has approved the MOU and the authorized representative of each Party has executed the MOU.

IN WITNESS WHEREOF, the Parties hereto have executed this Memorandum of Understanding on the date and year first above written.

EASTERN MUNICIPAL WATER DISTRICT

By:____________________
AJ GRACK, General Manager

LAKE HEMET MUNICIPAL WATER DISTRICT

By:____________________
ROBERT V. LINDQUIST, JR., General Manager

[additional signatures on following page]

CITY OF HEMET

By:____________________
Steve Temple, City Manager

ATTEST:

By: Sarah McComas
~~Stephen Clayton~~ Sarah McComas
Deputy City Clerk

Approved as to Form:

By: Julie H. Biggs
~~Eric S. Vail~~ Julie H. Biggs
Assistant City Attorney

CITY OF SAN JACINTO

By: Peter A. Cosentini
Peter A. Cosentini, City Manager

ATTEST:

By: Dorothy L. Chouinard
City of San Jacinto
City Clerk

Approved as to Form:

By: Robert Hargreaves
~~Robert Hargreaves~~ Best Best & Krieger
City Attorney

AGREEMENT TO DEVELOP A GROUNDWATER MONITORING PROGRAM IN THE HEMET/SAN JACINTO MANAGEMENT AREA

THIS AGREEMENT is made and entered into by and among the following entities, which are hereinafter collectively referred to as the "AGENCIES."

City of Hemet
Lake Hemet Municipal Water District
City of San Jacinto
Eastern Municipal Water District

I. <u>RECITALS</u>

A - Background:

1. Groundwater in the Hemet/San Jacinto Management Area has been, and will remain, a significant source of water for the people and agribusiness of Riverside County providing an invaluable contribution to the local economy and public good.
2. The Cities of Hemet and San Jacinto, Lake Hemet Municipal Water District, and Eastern Municipal Water District strive to increase the availability and reliability of local surface and ground water resources in the area.
3. The Cities of Hemet and San Jacinto, Lake Hemet Municipal Water District, and Eastern Municipal Water District have an interest in the management of local water resources within the Hemet/San Jacinto Management Area.
4. The Department of Water Resources seeks to support local groundwater management efforts, particularly those that could increase dry-year water supplies, within the safe yield and without the overdraft of groundwater resources.
5. Through cooperation, open communication, and consensus building among the AGENCIES, the Hemet/San Jacinto Groundwater Policy and Technical Committees were formed in June of 2001 to identify programs needed to improve groundwater resources management in the area.
6. The AGENCIES have determined that development and implementation of a groundwater monitoring program is necessary for the accurate evaluation of the operational yield of the Hemet/San Jacinto Management Area.

B – The Purpose of this Agreement:

1. Develop a Monitoring Program in the Hemet/San Jacinto Management Area.
2. Appoint Eastern Municipal Water District as the Monitoring Program Administrator.
3. Establish an equitable funding mechanism among the Agencies to collect and fund the Monitoring Program.

II. COVENANTS

NOW, THEREFORE, in consideration of the foregoing recitals and mutual covenants contained herein, the AGENCIES hereby agree as follows:

A Develop a Groundwater Monitoring Program:

The AGENCIES and other private groundwater producers in the area hereby agree to develop the Groundwater Monitoring Program, as more specifically provided for in Attachment 1.

B Roles and Responsibilities of the AGENCIES:

The AGENCIES shall perform the duties as more specifically provided for in Attachment 1.

C Monitoring Program Costs:

A total of $200,000 is estimated to be required for the meter installation and first year operation of the monitoring program. This amount includes contingencies and uncertainties associated with such monitoring programs. Attachment 1 contains detailed cost estimates.

It is anticipated that Department of Water Resources (DWR) will contribute $100,000 of the $200,000 estimated cost for the meter installation and first year implementation of the monitoring program, provided the Agencies agree to fund and implement the monitoring program into future years pursuant to Covenant II.D, below.

D Cost Sharing of the Monitoring Program:

Until the full implementation of the Water Management Plan, the AGENCIES will share the annual Monitoring Program costs based on their base groundwater production percentages as determined by the Hemet/San Jacinto Groundwater Policy Committee and shown below:

Cost Sharing Prior to Plan Implementation			
Agency	**Base Production (AF)**	**Percentage**	**Cost Contribution**
City of Hemet	6,320	19.6 %	$ 19,600
City of San Jacinto	4,031	12.5 %	$ 12,500
LHMWD.	11,063	34.2 %	$ 34,200
EMWD	10,869	33.7 %	$ 33,700
Totals	**32,283**	**100.0 %**	**$100,000**

As noted above, the AGENCIES' share of the first year's budget is $100,00. Future years' budgets will be approved by the Hemet/San Jacinto Groundwater Policy Committee, and incorporate any excesses or deficits from prior years.

E Term of the Agreement:

This Agreement shall terminate, unless extended by mutual agreement of the AGENCIES, on the date a stipulated judgment for the Water Management Plan is executed by the AGENCIES provided that all debts and liabilities of the Monitoring Program are satisfied.

An Agency may terminate its participation in this agreement on an anniversary date of the Agreement by given the other Agencies written notice three months prior to that anniversary date.

F Ownership of Documents:
All data and reports produced shall become the joint property of the AGENCIES.

G Effective Date:
This Agreement shall become effective upon execution by all AGENCIES pursuant to authorization by each AGENCY's Governing Board.

H Counterparts:
This Agreement may be executed in original counterparts, which together shall constitute a single agreement.

IN WITNESS WHEREOF, the AGENCIES have executed this Agreement on the date set forth below.

CITY OF HEMET

DATE 9/13/03 BY ____________________
City Manager

CITY OF SAN JACINTO

DATE 9-16-03 BY ____________________
City Manager

LAKE HEMET MUNICIPAL WATER DISTRICT

DATE 9/16/03 BY ____________________
General Manager

EASTERN MUNICIPAL WATER DISTRICT

DATE 9/19/03 BY ____________________
General Manager

AGREEMENT TO IMPLEMENT THE 2005 WATERSHED MONITORING PROGRAM IN THE HEMET/SAN JACINTO MANAGEMENT AREA

THIS AGREEMENT is made and entered into by and among the following entities, which are hereinafter collectively referred to as the "AGENCIES."

City of Hemet	City of San Jacinto
Lake Hemet Municipal Water District	Eastern Municipal Water District

I. RECITALS

A - Background:

1. Groundwater in the Hemet/San Jacinto Management area has been, and will remain, a significant source of water for the people and agribusiness of Riverside County providing an invaluable contribution to the local economy and public good.
2. The Cities of Hemet and San Jacinto, Lake Hemet Municipal Water District, and Eastern Municipal Water District strive to increase the availability and reliability of local surface and ground water resources in the area.
3. The Cities of Hemet and San Jacinto, Lake Hemet Municipal Water District, and Eastern Municipal Water District have an interest in the management of local water resources within the Hemet/San Jacinto Management area.
4. The Department of Water Resources seeks to support local groundwater management efforts, particularly those that could increase dry-year water supplies, within the safe yield and without the overdraft of groundwater resources.
5. Through cooperation, open communication, and consensus building among the AGENCIES, the Hemet/San Jacinto Policy and Technical Committees was formed in June of 2001 to identify programs needed to improve groundwater resources management in the area.
6. The AGENCIES developed and implemented a groundwater monitoring program for the year 2004 for the accurate evaluation of groundwater changes within the Hemet/San Jacinto Management area.
7. The AGENCIES are interested in the continuation of the groundwater monitoring program for the accurate evaluation of water resources in the Hemet/San Jacinto Management area.
8. The AGENCIES are interested in overseeing the current USGS surface water monitoring program for better evaluation of the recharge into the Hemet/San Jacinto Management area.
9. The AGENCIES have determined that implementation of a watershed monitoring program which consists of groundwater and surface water monitoring is necessary for the accuate evaluation of the safe yield of the Hemet/San Jacinto Management area.

B – The Purpose of this Agreement:

1. Conduct a Watershed Monitoring Program which consists of groundwater and surface water monitoring in the Hemet/San Jacinto Management area for year 2005.
2. Appoint Eastern Municipal Water District as the Monitoring Program Administrator.
3. Establish an equitable funding mechanism to collect the corresponding shares of each entity to fund the Monitoring Program for 2005.

II. COVENANTS

NOW, THEREFORE, in consideration of the foregoing recitals and mutual covenants contained herein, the AGENCIES hereby agree as follows:

A Watershed Monitoring Program:
The AGENCIES and other private groundwater producers in the area hereby will implement a Watershed Monitoring Program during 2005.

B Roles and Responsibilities of the AGENCIES:
The AGENCIES shall continue the duties as performed during implementation of the Groundwater Monitoring Program in 2004 and oversee the surface water monitoring conducted by U.S. Department of Interior - Geological Survey (USGS).

C Monitoring Program Costs:
A total of $112,000 is estimated to be required for the operation of the watershed monitoring program during 2005. This amount includes participation in a cooperative surface water monitoring program with USGS in addition to the groundwater monitoring program conducted during 2004. Contingencies and uncertainties associated with such monitoring programs are also included in this amount.

D Cost Sharing of the Monitoring Program:
Until the full implementation of the Water Management Plan, the AGENCIES will share the Watershed Monitoring Program costs based on their base groundwater production percentages that are subject to assessments as determined by the Hemet/San Jacinto Policy Committee and shown below:

Cost Sharing For 2005				
Agency	**Base Production (AF)**	**Production subject to Assessment**	**Percentage**	**Cost Contribution**
City of Hemet	**6,320**	5,420	17.8%	$ 19,900
City of San Jacinto	**4,031**	3,131	10.3%	$ 11,500
LHMWD.	**11,063**	11,063	36.3%	$ 40,700
EMWD	**10,869**	10,869	35.7%	$ 39,900

Totals	32,283	30,483	100.0%	$ 112,000

If the above costs increase by more than 10%, the AGENCIES shall meet and confer on the cost allocation amendment.

E Term of the Agreement:
This Agreement shall terminate, unless extended by mutual agreement of the AGENCIES, on the date a stipulated judgment for the Water Management Plan is executed by the AGENCIES provided that all debts and liabilities of the Monitoring Program are satisfied.

F Ownership of Documents:
All data and reports produced shall become the joint property of the AGENCIES.

G Effective Date:
This Agreement shall become effective upon execution by all AGENCIES pursuant to authorization by each AGENCY's Governing Board.

H Counterparts:
This Agreement may be executed in original counterparts, which together shall constitute a single agreement.

IN WITNESS WHEREOF, the AGENCIES have executed this Agreement on the date set forth below.

CITY OF HEMET

DATE 1/26/05 BY ____________
City Manager

CITY OF SAN JACINTO

DATE 1-12-05 BY ____________
City Manager

LAKE HEMET MUNICIPAL WATER DISTRICT

DATE JAN. 12, 2004 BY ______________________
General Manager

EASTERN MUNICIPAL WATER DISTRICT

DATE Jan 19, 2005 BY ______________________
General Manager

MEMORANDUM OF UNDERSTANDING

2006-2008 WATERSHED MONITORING PROGRAM

HEMET/SAN JACINTO MANAGEMENT AREA

This Memorandum Of Understanding; 2006-2008 Watershed Monitoring Program, Hemet/San Jacinto Management Area ("MOU"), is hereby dated for reference purposes as of May 23, 2006, by and between the EASTERN MUNICIPAL WATER DISTRICT, a California municipal water district ("EMWD"), LAKE HEMET MUNICIPAL WATER DISTRICT, a California municipal water district ("LHMWD"), CITY OF HEMET, a California general law city ("Hemet"), and CITY OF SAN JACINTO, a California general law city ("San Jacinto"), (collectively referred to hereinafter as the "Parties"), based on the following facts:

RECITALS

A. The Parties previously entered into an "Agreement to Implement the 2004 Watershed Monitoring Program in the Hemet/San Jacinto Management Area" dated September 19, 2003 ("2004 MOU") and an "Agreement to Implement the 2005 Watershed Monitoring Program in the Hemet/San Jacinto Management Area" dated January 26, 2005 ("2005 MOU"). The purpose and rationale of the Watershed Monitoring Program ("WMP") as reflected in the 2004 MOU and 2005 MOU is to conduct a program which consists of groundwater and surface water monitoring in the Hemet/San Jacinto Management Area ("Management Area") for years 2004 and 2005.

B. The Parties agree that the groundwater in the Management Area has been, and will remain, a significant source of water for the people and agribusiness of Riverside County, thus providing an invaluable contribution to the local economy and public good, for which the Parties strive to increase the availability and reliability of local surface and groundwater resources in the area.

C. The Parties have an interest in the management of local water resources within the Management Area. To this end, the California Department of Water Resources seeks to support local groundwater management efforts, particularly those that could increase dry-year water supplies, within the safe yield and without the overdraft of groundwater resources.

D. Through cooperation, open communication, and consensus building among the Parties, the Hemet/San Jacinto Policy and Technical Committees were formed in June of 2001, to identify programs needed to improve groundwater resources management in the area. Through these committees, the Parties developed and implemented the 2004 MOU and 2005 MOU for the accurate evaluation of groundwater changes within the Management Area. The parties desire to continue the WMP for the accurate evaluation of water resources within the Management Area.

E. The Parties further desire to oversee the current U.S. Department of Interior - Geological Survey ("USGS") Surface Water Monitoring Program for a better evaluation of the recharge into the Management Area. Accordingly, the Parties have determined that implementation of a WMP which consists of groundwater and surface water monitoring is necessary for the accurate evaluation of the safe yield of the Management Area.

F. In furtherance thereof, it is the purpose and intent of the Parties in entering into this MOU to continue the WMP consisting of groundwater and surface water monitoring in the Management Area for years 2006 through 2008, appoint Eastern Municipal Water District as the WMP Administrator, and establish an equitable funding mechanism to collect the corresponding shares of each entity to fund the WMP for 2006 through 2008. To implement this goal, the Parties pledge to undertake the following actions.

OPERATIVE PROVISIONS

NOW, THEREFORE, in consideration of the promises made and recited herein, the Parties do hereby enter into this Memorandum of Understanding setting forth their pledges, commitments, understandings and appropriate limiting conditions, as follows:

1.0 THE PARTIES' PLEDGES AND CONDITIONS

1.1 **Pledges by the Parties**. Subject to the conditions set forth in Section 1.2, the Parties pledge the following:

1.1.1 Implementation of the WMP. The Parties agree to implement, and other local private groundwater producers have separately agreed to implement outside of this MOU, a WMP for the years 2006 through 2008, and agree to continue the duties as performed during implementation of the 2004 MOU and 2005 MOU to oversee the surface water monitoring conducted by U.S. Department of Interior - Geological Survey (USGS).

1.1.2 Appointment of EMWD as WMP Administrator. The Parties agree that EMWD shall be appointed as the WMP Administrator, whose duties shall include the administration of the WMP and the invoicing of the other Parties as provided below.

1.1.3 WMP Costs. An annual cost of $112,000 is estimated to be required for the operation of the WMP for each of the three years from 2006 through 2008. This amount includes participation in a cooperative Surface Water Monitoring Program with USGS in addition to the WMP conducted during 2004 and 2005. Contingencies and uncertainties associated with such monitoring programs are also included in this amount. If the above cost increases by more than 10%, the Parties agree to meet and confer on the cost allocation amendment.

1.1.4 Cost Sharing of the WMP. Until the full implementation of the Water Management Plan, the Parties agree to share the WMP costs based on their base groundwater production percentages that are subject to assessments as determined by the Hemet/San Jacinto Policy Committee and shown in the table below:

Cost Sharing For 2006 through 2008				
Agency	Base Production (AF)	Production subject to Assessment	Percentage	Cost Contribution
Hemet	6,320	5,420	17.8%	$ 19,900
San Jacinto	4,031	3,131	10.3%	$ 11,500
LHMWD	11,063	11,063	36.3%	$ 40,700
EMWD	10,869	10,869	35.7%	$ 39,900
Totals	32,283	30,483	100.0%	$ 112,000

1.2 **Cooperation with Other Parties**. The Parties agree to cooperate with each other to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

2.0 MISCELLANEOUS PROVISIONS

2.1 **Term and Continuation of the WMP**. This MOU shall terminate, unless extended by the mutual agreement of the Parties memorialized in writing, on the earlier of the following dates: (i) the date upon which two or more Parties mutually agree to terminate the MOU; (ii) the date upon which all Parties have adopted the Water Management Plan; or (iii) December 31, 2008. During the Term of this MOU, all of the obligations of the Parties shall be continued and carried over to the next calendar year, subject to adjustment if the WMP cost increases by more than 10%. The Parties shall meet and confer during the last quarter of the preceding year to determine the anticipated cost to be apportioned among the Parties for the forthcoming year and memorialized in a statement signed by the managers of all Parties. In any year subsequent to 2006, no Party shall be obligated to contribute more than one hundred twenty-five percent (125%) of its contribution assigned for the prior year without approval of its Board or Council

2.2 **Invoicing**. The Parties agree that EMWD shall invoice each Party for its contribution to the WMP and subsequent years, either in one lump sum during the year, or in installments over the year as is agreed upon by the Party being invoiced and arranged by that Party with EMWD.

2.3 **Ownership of Documents**. The Parties agree that all data and reports produced shall become the joint property of the Parties.

2.4 **Costs & Expenses**. Other than as set forth above, the Parties shall bear their own costs and expenses of otherwise participating in this MOU.

2.5 **Authority**. The individuals executing this MOU on behalf of the Parties and the instruments referenced on behalf of the Parties represent and warrant that they have the legal power, right and actual authority to bind the Parties to the terms and conditions hereof and thereof.

2.6 **Counterpart Originals**. This Agreement may be executed in duplicate originals, each of which is deemed to be an original.

2.7 **Effective Date**. This MOU has become effective among and between the Parties on the date by which each Party's governing board or council has approved the MOU and the authorized representative of each Party has executed the MOU.

IN WITNESS WHEREOF, the Parties hereto have executed this Memorandum of Understanding on the date and year first above written.

[SIGNATURE ON FOLLOWING PAGES]

EASTERN MUNICIPAL WATER DISTRICT

By: [signature]
Tony Pack
General Manager

ATTEST:

By: Rosemarie V. Howell

Board Secretary

Approved as to Form:

By: [signature]
Gerry Schoaf
General Counsel

LAKE HEMET MUNICIPAL WATER DISTRICT

By: Tom Wagoner
Tom Wagoner, General Manager

ATTEST:

By:
District, Secretary

Approved as to Form:

By: Arthur L. Littleworth
Arthur Littleworth, General Counsel

CITY OF HEMET

By: ______________________
Steve Temple, City Manager

ATTEST:

By: ______________________
Stephen Clayton, City Clerk

Approved as to Form:

By: ______________________
Eric S. Vail, City Attorney

CITY OF SAN JACINTO

By:
Barry McClellan, City Manager

ATTEST:

By:
Dorothy Chouinard, City Clerk

Approved as to Form:

By:
Robert Hargreaves, Special Counsel

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MEMORANDUM OF UNDERSTANDING

INTERIM WATER SUPPLY PLAN

UPPER SAN JACINTO SUB-BASINS

This Memorandum Of Understanding; Interim Water Supply Plan, Upper San Jacinto Sub-Basins ("MOU"), is hereby entered into this 1st day of April, 2004 by and between the EASTERN MUNICIPAL WATER DISTRICT, a California municipal water district ("EMWD"), LAKE HEMET MUNICIPAL WATER DISTRICT, a California municipal water district ("LHMWD"), CITY OF HEMET, a California general law city ("Hemet"), and CITY OF SAN JACINTO, a California general law city ("San Jacinto"), (collectively referred to hereinafter as the "Parties"), based on the following facts:

RECITALS

A. The Parties have entered into that "Memorandum of Understanding to Work Cooperatively to Promote Conjunctive Use Projects and Programs in Upper San Jacinto River Basins" dated June 19, 2001 (the "Conjunctive Use MOU"). The purpose of the Conjunctive Use MOU is to encourage cooperation among the Parties to facilitate and support local groundwater management efforts and conjunctive use programs particularly those that could increase dry-year water supplies, within the safe-yield and without the overdraft of San Jacinto groundwater basins.

B. The Parties have also entered into that "Agreement to Develop a Groundwater Monitoring Program in the Hemet/San Jacinto Management Area" dated __________ 2003 ("GWM Program"). The purpose of the GWM Program is to measure and monitor groundwater levels to assist in the accurate evaluation of conditions of overdraft and the evaluation of operational safe yield in the Hemet/San Jacinto Management Area.

C. Furthermore, in February of 2004, the Parties each approved a statement of principles entitled "Principles for Water Management" (the "PWM") with regard to the Hemet and San Jacinto Basins. The PWM establishes the framework from which the Parties will develop a Water Management Plan for the Hemet and San Jacinto Basins.

D. The Conjunctive Use MOU and the PWM recognize that the Parties, individually and collectively, have an interest in managing and preserving the ground and surface water resources within the Hemet and San Jacinto Basins in order to alleviate an escalating condition of overdraft within those Basins.

E. Through the ongoing GWM Program conducted by the Parties, it has been discovered that well levels within certain portions of the Canyon and Intake sub-areas of the San Jacinto Basin ("Upper San Jacinto Sub-Basins") have declined more than the Parties had originally projected. This fact suggests that the condition of overdraft in the Upper San Jacinto Sub-Basins may be deteriorating more rapidly than anticipated, making a collective effort to address the situation prudent prior to establishment of the Water Management Plan.

F. Therefore, in furtherance of the goals stated in the Conjunctive Use MOU and the PWM, it is the purpose and intent of the Parties in entering into this MOU to provisionally address the deteriorating situation by providing interim stabilization of the Upper San Jacinto Sub-Basins through the application of approximately 6,000 acre feet of direct and indirect groundwater recharge during calendar year 2004. To implement this goal, the Parties pledge to undertake the following actions during the calendar year 2004.

OPERATIVE PROVISIONS

NOW, THEREFORE, in consideration of the promises made and recited herein, the Parties do hereby enter into this Memorandum of Understanding setting forth their pledges, commitments, understandings and appropriate limiting conditions, as follows:

ARTICLE 1.0 - EMWD's PLEDGES AND CONDITIONS

1.1 **Pledges by EMWD**. Subject to the conditions set forth in Section 1.2, EMWD pledges the following:

1.1.1 Purchase and Recharge of Water. EMWD will contribute up to Eight Hundred Eighty Three Thousand Dollars and No Cents ($883,000.00) for the acquisition, transportation, operations, and recharge of imported water into the Upper San Jacinto Sub-Basins. EMWD will coordinate and cooperate with LHMWD and MWD regarding the acquisition of imported water. EMWD understands and agrees that it will implement the transportation and recharge of the purchased imported water into the Upper San Jacinto Sub-Basins using its existing conveyance and spreading facilities within the Management Area.

1.1.2 Restriction on Conveyances and Exports. EMWD will use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper flats area during July, August, and September 2004, and will eliminate the use of any conveyance water during the 2004 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge, or made available due to groundwater recharge, in the Upper San Jacinto Sub-Basins during the 2004 calendar year. In addition, EMWD will pursue construction of Reach 16 to deliver recycled water to the Heartland Area and will investigate water supply contingency plans.

1.2 **EMWD's Conditions**. The pledges of EMWD stated in Section 1.1 are subject to the following conditions:

1.2.1 Optimizing Capacity. That the Parties cooperate with EMWD's efforts to optimize its delivery capacity during the months of July, August, and September 2004, by refraining, to the extent feasible, from exercising their rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD ("Fruitvale Agreements"). It is understood and agreed that any Party's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of their contract rights under the Fruitvale Agreements or such other rights as the Party may have to purchase and receive Fruitvale Water.

1.2.2 Compliance by Other Parties. That each other party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 2.1, 3.2, and 4.2.

1.3 **Acceptance of Other Parties' Conditions**. EMWD hereby accepts each other Party's conditions on their respective pledges.

1.4 **Cooperation with Other Parties**. EMWD agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 2.0 - LHMWD'S PLEDGES AND CONDITIONS

2.1 **Pledges by LHMWD**. Subject to the conditions set forth in Section 2.2, LHMWD pledges the following:

2.1.1 Purchase and Recharge of Water. LHMWD will contribute up to Eight Hundred Twenty-eight Thousand Dollars and No Cents ($828,000.00) for the acquisition, transportation, operations, and recharge of imported water into the Upper San Jacinto Sub-Basins. LHMWD will coordinate and cooperate with EMWD and MWD regarding the acquisition of imported water. LHMWD understands and agrees that EMWD will implement the transportation and recharge of the purchased imported water into the Upper San Jacinto Sub-Basins using its existing conveyance and spreading facilities within the Management Area.

2.1.2 Optimizing Capacity. LHMWD will cooperate with EMWD's efforts to optimize EMWD's delivery capacity during the months of July, August, and September 2004, by refraining during such months, to the extent feasible, from exercising their rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD. It is understood and agreed that LHMWD's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of LHMWD's contract rights under the Fruitvale Agreements or such other rights as LHMWD may have to purchase and receive Fruitvale Water.

2.2 **LHMWD's Conditions**. The pledges of LHMWD stated in Section 2.1 are subject to the following conditions:

2.2.1 Emergency Production of Water. In the event LHMWD experiences an emergency loss of water production capacity or is otherwise unable to satisfy its municipal demand through the use of its own facilities, as determined by the LHMWD, LHMWD reserves the right to exercise its rights to delivery of Fruitvale Water during the months of July, August and September 2004 and shall pay EMWD the standard rate for Fruitvale Water, for amounts delivered within LHMWD's entitlement. For amounts required by LHMWD and delivered by EMWD over the entitlement amount, LHMWD shall pay EMWD's then current wholesale water rates.

2.2.2 Restriction on Conveyance Water and Exports. That EMWD use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper flats area during July, August, and September 2004, and to eliminate the use of any conveyance water during the 2004 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge, or made available due to groundwater recharge, in the Upper San Jacinto Sub-Basins during the 2004 calendar year.

2.2.3 Preservation of Fruitvale Water Rights. Notwithstanding LHMWD's pledge to not exercise its entitlements to purchase and receive Fruitvale Water during July, August and September 2004, such pledge and non-exercise shall not be construed by the Parties or any of them as a waiver, failure to exercise, or other abrogation of LHMWD's rights under the Fruitvale Agreements or Fruitvale Adjudication and such rights shall be preserved, survive without diminishment, and remain valid and in full force and effect.

2.2.4 Compliance by Other Parties. That each other party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 1.1, 3.2, and 4.2.

2.3 **Acceptance of Other Parties' Conditions**. LHMWD hereby accepts each other Party's conditions on their respective pledges.

2.4 **Cooperation with Other Parties**. LHMWD agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 3.0 - HEMET'S PLEDGES AND CONDITIONS

3.1 **Acknowledgement of Conditions**. Hemet acknowledges the need of the Parties to cooperatively minimize the impacts on water resources in the Upper San Jacinto Sub-Basins. The Parties acknowledge that groundwater resources and well levels surrounding Hemet's water production facilities in the Hemet Basin have not experienced the same rate of decline, as have facilities of the Parties in the San Jacinto Basin. The Parties further acknowledge that Hemet's temporary reallocation of production from the Upper San Jacinto Sub-Basins to the Hemet Basin, as stated in

Section 3.2.1 [Reallocation of Water Production], is provided by Hemet as a means of cooperating with, and providing benefit to, the other Parties to address the conditions in the Upper San Jacinto Sub-Basins. The Parties also acknowledge that Hemet's temporary reallocation of production will not adversely impact the rights, interests, or facilities of the other Parties, and will not unreasonable contribute to the overdraft of the Hemet Basin.

3.2 **<u>Pledges by Hemet</u>**. Subject to the conditions set forth in Section 3.3, Hemet pledges the following:

3.2.1 <u>Reallocation of Water Production</u>. Hemet will reduce its water production and/or receipt from the Upper San Jacinto Sub-Basins during calendar year 2004 by a total of 1072 acre feet. The reduction will be accomplished by: (i) reducing groundwater production from Hemet wells No. 6 and No. 9, by approximately 300 acre feet over the 2004 calendar year; and (ii) by foregoing the exercise of its right to receive deliveries of Entitlement Water or Excess Water ("Fruitvale Water") – currently 772 acre feet -- under EMWD's Improvement District No. 24 program as provided in that Agreement between Hemet and EMWD dated June 13, 1972 ("Fruitvale Agreement") during calendar year 2004. Hemet will off-set this decrease in water production and/or receipt with an increase in groundwater production from Hemet's new or existing facilities in the Hemet Basin.

3.2.2 <u>Optimizing Capacity</u>. Hemet will cooperate with EMWD's efforts to optimize EMWD's delivery capacity during the months of July, August, and September 2004, by refraining during such months, to the extent feasible, from exercising its rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD ("Fruitvale Agreements"). It is understood and agreed that Hemet's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of Hemet's contract rights under the Fruitvale Agreements or such other rights as Hemet may have to purchase and receive Fruitvale Water.

3.3 **<u>Hemet's Conditions</u>**. The pledge's of Hemet stated in Section 3.2 are subject to the following conditions:

3.3.1 <u>Emergency Production of Water</u>. In the event Hemet experiences an emergency loss of water production capacity, or is otherwise unable to satisfy its municipal demand from its own facilities, as determined by the Hemet Water District, Hemet shall be entitled to increase water production from Hemet Well No. 6 and No. 9, or receive Fruitvale Water during the duration of the emergency. Hemet's pledge to reallocate water production as provided in Section 3.2 shall be reduced by the same amount. However, Hemet shall contribute an amount of funds equal to the acre feet of water produced multiplied by EMWD's then current wholesale water rate for the acquisition of replacement water.

3.3.2 Preservation of Water Lease Obligations. Hemet has an obligation to produce one hundred (100) acre feet of water per year each from Well No. 6 and Well No. 9. Notwithstanding anything to the contrary in Section 3.2, Hemet shall be entitled to produce such amounts from these wells. Hemet anticipates that it will be able to meet both its pledged reduction and its lease obligations.

3.3.3 Preservation of Fruitvale Water Rights. Notwithstanding Hemet's pledge to not exercise its entitlements to purchase and receive Fruitvale Water during calendar year 2004, such pledge and non-exercise shall not be construed by the Parties or any of them as a waiver, failure to exercise, or other abrogation of Hemet's rights under the Fruitvale Agreements or Fruitvale Adjudication and such rights shall be preserved, survive without diminishment, and remain valid and in full force and effect.

3.3.4 Restriction on Conveyance Water and Exports. That EMWD use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper flats area and to eliminate the use of any conveyance water during the 2004 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge in the Upper San Jacinto Sub-Basins during the 2004 calendar year.

3.3.5 Compliance by Other Parties. That each other party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 1.1, 2.1, and 4.2.

3.4 **Acceptance of Other Parties' Conditions**. Hemet hereby accepts each other Party's conditions on their respective pledges.

3.5 **Cooperation with Other Parties**. Hemet agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 4.0 - SAN JACINTO'S PLEDGES AND CONDITIONS

4.1 **Acknowledgement of Conditions**. San Jacinto acknowledges the need of the Parties to cooperatively minimize the impacts on water resources in the Upper San Jacinto Sub-Basins.

4.2 **Pledges by San Jacinto**. Subject to the conditions set forth in Section 4.3, San Jacinto pledges the following:

4.2.1 Pledge of Future Credits. San Jacinto pledges 243 acre feet (the current equivalent of $78,260 at the import water rate of $322) of future recharge credits that are anticipated to accrue to San Jacinto pursuant to Section 20 of the Principles For Water Management. San Jacinto's recharge credits will be reduced by 243 acre feet once accrued. Another Party may purchase these credits from the

Watermaster for $78,260, which amount will then be applied to the 2004 interim recharge program.

4.2.2 Optimizing Capacity. San Jacinto will make a good faith effort to cooperate with EMWD's efforts to optimize EMWD's delivery capacity during the months of July, August, and September 2004, by refraining, to the extent feasible in its sole discretion, from exercising its rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD ("Fruitvale Agreements"). It is understood and agreed that San Jacinto's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of San Jacinto's contract rights under the Fruitvale Agreements or such other rights as San Jacinto may have to purchase and receive Fruitvale Water.

4.3 **San Jacinto's Conditions**. San Jacinto's pledges as stated in Section 4.2 are subject to the following conditions:

4.3.1 Emergency Production of Water. In the event San Jacinto experiences an emergency loss of water production capacity or is otherwise unable to satisfy its municipal demand through the use of its own facilities, as determined by the San Jacinto, San Jacinto reserves the right to exercise its rights to delivery of Fruitvale Water during the months of July, August and September 2004 and shall pay EMWD the standard rate for Fruitvale Water, for amounts delivered within San Jacinto's entitlement. For amounts required by San Jacinto and delivered by EMWD over the entitlement amount, San Jacinto shall pay EMWD's then current wholesale water rates.

4.3.2 Preservation of Fruitvale Rights. Notwithstanding San Jacinto's pledge to not otherwise exercise its entitlements to purchase and receive Fruitvale Water during July, August and September 2004, such pledge and non-exercise shall not be construed by the Parties or any of them as a waiver, failure to exercise, or other abrogation of San Jacinto's rights under the Fruitvale Agreement or Fruitvale Adjudication and such rights shall be preserved, survive without diminishment, and remain valid and in full force and effect.

4.3.3 Restriction on Conveyances and Exports. That EMWD use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper flats area and will eliminate the use of any conveyance water during the 2004 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge in the Upper San Jacinto Sub-Basins during the 2004 calendar year.

4.3.4 Compliance by Other Parties. That each other party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 1.1, 2.1, and 3.2.

4.4 **Acceptance of Other Parties' Conditions**. San Jacinto hereby accepts each other Party's conditions on their respective pledges.

4.5 **Cooperation with Other Parties**. San Jacinto agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 5.0 - MISCELLANEOUS PROVISIONS

5.1 **Term**. This MOU shall terminate, unless extended by the mutual agreement of the Parties memorialized in writing, on December 31, 2004.

5.2 **Costs & Expenses**. The Parties shall bear the costs of implementing their own pledges, and shall bear their own costs and expenses otherwise participating in this MOU.

5.3 **Authority**. The individuals executing this Agreement on behalf of the Parties and the instruments referenced on behalf of the Parties represent and warrant that they have the legal power, right and actual authority to bind the Parties to the terms and conditions hereof and thereof.

5.4 **Counterpart Originals**. This Agreement may be executed in duplicate originals, each of which is deemed to be an original.

5.5 **Effective Date**. This MOU has become effective among and between the Parties on the date by which each Party's governing board or council has approved the MOU and the authorized representative of each Party has executed the MOU.

IN WITNESS WHEREOF, the Parties hereto have executed this Memorandum of Understanding on the date and year first above written.

EASTERN MUNICIPAL WATER DISTRICT

By: A Beck

Its: GENERAL MANAGER

LAKE HEMET MUNICIPAL WATER DISTRICT

By:

Its: GENERAL MANAGER

CITY OF HEMET

By:

Steve Temple, City Manager

ATTEST:

By:

Stephen Clayton
City Clerk

Approved as to Form:

By:

Eric S. Vail
Assistant City Attorney for the City of Hemet

CITY OF SAN JACINTO

By:

Peter A. Cosentini, City Manager

ATTEST:

Dorothy L. Chouinard, City Clerk

Approved as to Form:

By:

City Attorney for the City of San Jacinto
Best Best & Krieger LLP

MEMORANDUM OF UNDERSTANDING

2005 INTERIM WATER SUPPLY PLAN

UPPER SAN JACINTO SUB-BASINS

This Memorandum Of Understanding; 2005 Interim Water Supply Plan, Upper San Jacinto Sub-Basins ("MOU"), is hereby entered into this 1ST day of March, 2005 by and between the EASTERN MUNICIPAL WATER DISTRICT, a California municipal water district ("EMWD"), LAKE HEMET MUNICIPAL WATER DISTRICT, a California municipal water district ("LHMWD"), CITY OF HEMET, a California general law city ("Hemet"), and CITY OF SAN JACINTO, a California general law city ("San Jacinto"), (collectively referred to hereinafter as the "Parties"), based on the following facts:

RECITALS

A. The Parties previously entered into that "Memorandum of Understanding Interim Water Supply Plan Upper San Jacinto Sub-Basins" dated April 1, 2004 ("2004 MOU") to purchase supplemental water for recharge into certain portions of the canyon and intake sub-areas of the San Jacinto Basin ("Upper San Jacinto Sub-Basins"). The purpose and rationale of the Interim Water Supply Plan ("IWSP") is more fully recited in the 2004 MOU and is incorporated herein by reference.

B. The Parties have determined that it is in the best interest of each of them to continue the IWSP through calendar year 2005 on the terms and conditions set forth in this MOU. The Parties have also affirmed that continuation of the IWSP in this manner is consistent with their effort to engage in collective approaches to addressing the overdraft while the Parties work toward completion of the Water Management Plan.

C. In furtherance thereof, it is the purpose and intent of the Parties in entering into this MOU to assist in providing for interim stabilization of the Upper San Jacinto Sub-Basins through the application of approximately 8,000 acre feet of direct and indirect groundwater recharge during the calendar year 2005. To implement this goal, the Parties pledge to undertake the following actions during the calendar year 2005.

OPERATIVE PROVISIONS

NOW, THEREFORE, in consideration of the promises made and recited herein, the Parties do hereby enter into this Memorandum of Understanding setting forth their pledges, commitments, understandings and appropriate limiting conditions, as follows:

ARTICLE 1.0 - EMWD's PLEDGES AND CONDITIONS

1.1 **Pledges by EMWD**. Subject to the conditions set forth in Section 1.2, EMWD pledges the following:

1.1.1 Purchase and Recharge of Water. EMWD will contribute up to One Million One Hundred Fifty-eight Thousand Two Hundred Dollars and No Cents ($1,158,200.00) for the acquisition, transportation, operation, and recharge of imported water into the Upper San Jacinto Sub-Basins. EMWD will coordinate and cooperate with LHMWD and MWD regarding the acquisition of imported water. EMWD understands and agrees that it will implement the transportation and recharge of the purchased imported water into the Upper San Jacinto Sub-Basins using its existing conveyance and spreading facilities within the Management Area.

1.1.2 Restriction on Conveyances and Exports. EMWD will use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper Flats area during July, August, and September 2005, and will eliminate the use of any conveyance water during the 2005 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge, or made available due to groundwater recharge, in the Upper San Jacinto Sub-Basins during the 2005 calendar year. In addition, EMWD will pursue construction of Reach 16 to deliver recycled water to the Heartland Area and will investigate water supply contingency plans.

1.2 **EMWD's Conditions**. The pledges of EMWD stated in Section 1.1 are subject to the following conditions:

1.2.1 Optimizing Capacity. That the Parties cooperate with EMWD's efforts to optimize its delivery capacity during the months of July, August, and September 2005, by refraining, to the extent feasible, from exercising their rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD ("Fruitvale Agreements"). It is understood and agreed that any Party's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of their contract rights under the Fruitvale Agreements or such other rights the Party may have to purchase and receive Fruitvale Water.

1.2.2 Compliance by Other Parties. That each other Party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 2.1, 3.1, and 4.1.

1.3 **Acceptance of Other Parties' Conditions**. EMWD hereby accepts each other Party's conditions on their respective pledges.

1.4 **Cooperation with Other Parties**. EMWD agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 2.0 - LHMWD'S PLEDGES AND CONDITIONS

2.1 **Pledges by LHMWD**. Subject to the conditions set forth in Section 2.2, LHMWD pledges the following:

2.1.1 Purchase and Recharge of Water. LHMWD will contribute up to Nine Hundred Eighty-seven Thousand Six Hundred Dollars and No Cents ($987,600.00) for the acquisition, transportation, operation, and recharge of imported water into the Upper San Jacinto Sub-Basins. LHMWD will coordinate and cooperate with EMWD and MWD regarding the acquisition of imported water. LHMWD understands and agrees that EMWD will implement the transportation and recharge of the purchased imported water into the Upper San Jacinto Sub-Basins using its existing conveyance and spreading facilities within the Management Area.

2.1.2 Optimizing Capacity. LHMWD will cooperate with EMWD's efforts to optimize EMWD's delivery capacity during the months of July, August, and September 2005, by refraining during such months, to the extent feasible, from exercising their rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD. It is understood and agreed that LHMWD's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of LHMWD's contract rights under the Fruitvale Agreements or such other rights as LHMWD may have to purchase and receive Fruitvale Water.

2.2 **LHMWD's Conditions**. The pledges of LHMWD stated in Section 2.1 are subject to the following conditions:

2.2.1 Emergency Production of Water. In the event LHMWD experiences an emergency loss of water production capacity or is otherwise unable to satisfy its municipal demand through the use of its own facilities, as determined by the LHMWD, LHMWD reserves the right to exercise its rights to delivery of Fruitvale Water during the months of July, August and September 2005 and shall pay EMWD the standard rate for Fruitvale Water, for amounts delivered within LHMWD's entitlement. For amounts required by LHMWD and delivered by EMWD over the entitlement amount, LHMWD shall pay EMWD's then current wholesale water rates.

2.2.2 Restriction on Conveyance Water and Exports. That EMWD use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper Flats area during July, August, and September 2005, and to eliminate the use of any conveyance water during the 2005 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge, or made available due to groundwater recharge, in the Upper San Jacinto Sub-Basins during the 2005 calendar year.

2.2.3 Preservation of Fruitvale Water Rights. Notwithstanding LHMWD's pledge to not exercise its entitlements to purchase and receive Fruitvale Water during July, August and September 2005, such pledge and non-exercise shall not be construed by the Parties or any of them as a waiver, failure to exercise, or other abrogation of LHMWD's rights under the Fruitvale Agreements or Fruitvale Adjudication and such rights shall be preserved, survive without diminishment, and remain valid and in full force and effect.

2.2.4 Compliance by Other Parties. That each other Party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 1.1, 3.1, and 4.1.

2.3 **Acceptance of Other Parties' Conditions**. LHMWD hereby accepts each other Party's conditions on their respective pledges.

2.4 **Cooperation with Other Parties**. LHMWD agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 3.0 - HEMET'S PLEDGES AND CONDITIONS

3.1 **Pledges by Hemet**. Subject to the conditions set forth in Section 3.2, Hemet pledges the following:

3.1.1 Purchase and Recharge of Water. Hemet will contribute up to One Hundred Sixty-four Thousand Dollars and No Cents ($164,000.00) for the acquisition, transportation, operation, and recharge of imported water into the Upper San Jacinto Sub-Basins. Hemet will coordinate and cooperate with EMWD and MWD regarding the acquisition of imported water. Hemet understands and agrees that EMWD will implement the transportation and recharge of the purchased imported water into the Upper San Jacinto Sub-Basins using its existing conveyance and spreading facilities within the Management Area.

3.1.2 Optimizing Capacity. Hemet will cooperate with EMWD's efforts to optimize EMWD's delivery capacity during the months of July, August, and September 2005, by refraining during such months, to the extent feasible, from exercising its rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD ("Fruitvale Agreements"). It is understood and agreed that Hemet's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of Hemet's contract rights under the Fruitvale Agreements or such other rights Hemet may have to purchase and receive Fruitvale Water.

3.2 **Hemet's Conditions**. The pledges of Hemet stated in Section 3.1 are subject to the following conditions:

3.2.1 Emergency Production of Water. In the event Hemet experiences an emergency loss of water production capacity, or is otherwise unable to satisfy its municipal demand from its own facilities, as determined by the Hemet Water District, Hemet shall be entitled to increase water production from Hemet Well No. 6 and No. 9, or receive Fruitvale

Water during the duration of the emergency. Hemet's pledge to reallocate water production as provided in Section 3.2 shall be reduced by the same amount. However, Hemet shall contribute an amount of funds equal to the acre feet of water produced multiplied by EMWD's then current wholesale water rate for the acquisition of replacement water.

3.2.2 Preservation of Fruitvale Water Rights. Notwithstanding Hemet's pledge to not exercise its entitlements to purchase and receive Fruitvale Water during calendar year 2005, such pledge and non-exercise shall not be construed by the Parties or any of them as a waiver, failure to exercise, or other abrogation of Hemet's rights under the Fruitvale Agreements or Fruitvale Adjudication and such rights shall be preserved, survive without diminishment, and remain valid and in full force and effect.

3.2.3 Restriction on Conveyance Water and Exports. That EMWD use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper flats area and to eliminate the use of any conveyance water during the 2005 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge in the Upper San Jacinto Sub-Basins during the 2005 calendar year.

3.2.4 Compliance by Other Parties. That each other Party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 1.1, 2.1, and 4.1.

3.3 **Acceptance of Other Parties' Conditions**. Hemet hereby accepts each other Party's conditions on their respective pledges.

3.4 **Cooperation with Other Parties**. Hemet agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 4.0 - SAN JACINTO'S PLEDGES AND CONDITIONS

4.1 **Pledges by San Jacinto**. Subject to the conditions set forth in Section 4.3, San Jacinto pledges the following:

4.1.1 Purchase and Recharge of Water. San Jacinto will contribute up to Ninety Thousand Two Hundred Dollars and No Cents ($90,200.00) for the acquisition, transportation, operation, and recharge of imported water into the Upper San Jacinto Sub-Basins. San Jacinto will coordinate and cooperate with EMWD and MWD regarding the acquisition of imported water. San Jacinto understands and agrees that EMWD will implement the transportation and recharge of the purchased imported water into the Upper San Jacinto Sub-Basins using its existing conveyance and spreading facilities within the Management Area.

4.1.2 Optimizing Capacity. San Jacinto will make a good faith effort to cooperate with EMWD's efforts to optimize EMWD's delivery capacity during the months of

July, August, and September 2005, by refraining, to the extent feasible in its sole discretion, from exercising its rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD ("Fruitvale Agreements"). It is understood and agreed that San Jacinto's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of San Jacinto's contract rights under the Fruitvale Agreements or such other rights as San Jacinto may have to purchase and receive Fruitvale Water.

4.2 **San Jacinto's Conditions**. San Jacinto's pledges as stated in Section 4.2 are subject to the following conditions:

4.2.1 Emergency Production of Water. In the event San Jacinto experiences an emergency loss of water production capacity or is otherwise unable to satisfy its municipal demand through the use of its own facilities, as determined by San Jacinto, San Jacinto reserves the right to exercise its rights to delivery of Fruitvale Water during the months of July, August and September 2005 and shall pay EMWD the standard rate for Fruitvale Water, for amounts delivered within San Jacinto's entitlement. For amounts required by San Jacinto and delivered by EMWD over the entitlement amount, San Jacinto shall pay EMWD's then current wholesale water rates.

4.2.2 Preservation of Fruitvale Rights. Notwithstanding San Jacinto's pledge to not otherwise exercise its entitlements to purchase and receive Fruitvale Water during July, August and September 2005, such pledge and non-exercise shall not be construed by the Parties or any of them as a waiver, failure to exercise, or other abrogation of San Jacinto's rights under the Fruitvale Agreement or Fruitvale Adjudication and such rights shall be preserved, survive without diminishment, and remain valid and in full force and effect.

4.2.3 Restriction on Conveyances and Exports. That EMWD use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper flats area and will eliminate the use of any conveyance water during the 2004 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge in the Upper San Jacinto Sub-Basins during the 2005 calendar year.

4.2.4 Compliance by Other Parties. That each other party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 1.1, 2.1, and 3.1.

4.3 **Acceptance of Other Parties' Conditions**. San Jacinto hereby accepts each other Party's conditions on their respective pledges.

4.4 **Cooperation with Other Parties**. San Jacinto agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 5.0 - MISCELLANEOUS PROVISIONS

5.1 **Term**. This MOU shall terminate, unless extended by the mutual agreement of the Parties memorialized in writing, on December 31, 2005.

5.2 **Invoicing**. The Parties agree that EMWD shall invoice each Party for its contribution to the 2005 IWSP either in one lump sum during the Term, or in installments over the Term as is agreed upon by the Party being invoiced and arranged by that Party with EMWD.

5.3 **Costs & Expenses**. The Parties shall bear the costs of implementing their own pledges, and shall bear their own costs and expenses of otherwise participating in this MOU.

5.4 **Authority**. The individuals executing this Agreement on behalf of the Parties and the instruments referenced on behalf of the Parties represent and warrant that they have the legal power, right and actual authority to bind the Parties to the terms and conditions hereof and thereof.

5.5 **Counterpart Originals**. This Agreement may be executed in duplicate originals, each of which is deemed to be an original.

5.6 **Effective Date**. This MOU has become effective among and between the Parties on the date by which each Party's governing board or council has approved the MOU and the authorized representative of each Party has executed the MOU.

IN WITNESS WHEREOF, the Parties hereto have executed this Memorandum of Understanding on the date and year first above written.

[SIGNATURE PAGES FOLLOW]

EASTERN MUNICIPAL WATER DISTRICT

By: ______________________

Tony Pack
General Manager

ATTEST:

By: *Rosemarie V. Howell*

____

Board Secretary

Approved as to Form:

By: ______________________

Gerry Schoaf
General Counsel

RIV #4811-6770-7136 v2

LAKE HEMET MUNICIPAL WATER DISTRICT

By:
Rob Lindquist, General Manager

ATTEST:

By:
Karen Hornbarger, ~~Secretary~~
Assistant Secretary

Approved as to Form:

By: Arthur L. Littleworth
Arthur Littleworth, General Counsel

CITY OF HEMET

By:_______________________
Steve Temple, City Manager

ATTEST:

By:_______________________
Stephen Clayton, City Clerk

Approved as to Form:

By:_______________________
Eric S. Vail, City Attorney

CITY OF SAN JACINTO

By: ______________________
Peter Cosentini, City Manager

ATTEST:

By: ______________________
San Jacinto City Clerk

Approved as to Form:

By: ______________________
Robert Hargreaves, Special Counsel

MEMORANDUM OF UNDERSTANDING

2006 INTERIM WATER SUPPLY PLAN

UPPER SAN JACINTO SUB-BASINS

This Memorandum Of Understanding; 2006 Interim Water Supply Plan, Upper San Jacinto Sub-Basins ("MOU"), is hereby dated for reference purposes as of [illegible] 8, 2006, by and between the EASTERN MUNICIPAL WATER DISTRICT, a California municipal water district ("EMWD"), LAKE HEMET MUNICIPAL WATER DISTRICT, a California municipal water district ("LHMWD"), CITY OF HEMET, a California general law city ("Hemet"), and CITY OF SAN JACINTO, a California general law city ("San Jacinto"), (collectively referred to hereinafter as the "Parties"), based on the following facts:

RECITALS

A. The Parties previously entered into that "Memorandum of Understanding, Interim Water Supply Plan, Upper San Jacinto Sub-Basins" dated April 1, 2004 ("2004 MOU") and that "Memorandum of Understanding, 2005 Interim Water Supply Plan, Upper San Jacinto Sub-Basins" dated March 1, 2005 ("2005 MOU"). The purpose and rationale of the Interim Water Supply Plan ("IWSP") as reflected in the 2004 MOU and 2005 MOU is to purchase supplemental water for recharge into certain portions of the canyon and intake sub-areas of the San Jacinto Basin ("Upper San Jacinto Sub-Basins").

B. The IWSP was undertaken by the parties as an interim measure pending completion and adoption of a Water Management Plan and entry of a Stipulated Judgment (collectively "WMP") by a Court of competent jurisdiction, binding the Parties to a long term solution to managing and resolving the overdraft of the Hemet / San Jacinto Basin ("Management Area"). Although the Parties have been working earnestly toward completion of the WMP, it is anticipated that the WMP will not be finalized and adopted by all Parties sufficiently early in 2006 so as to supersede the need for the IWSP.

C. Based on this state of affairs, the Parties have determined that it is in their mutual best interests to continue the IWSP through calendar year 2006 and/or until such time as the WMP is finalized and adopted by all of the Parties. The Parties have also affirmed that continuation of the IWSP in this manner is consistent with their effort to engage in collective approaches to addressing the overdraft while the Parties work toward completion of the WMP.

D. In furtherance thereof, it is the purpose and intent of the Parties in entering into this MOU to assist in providing for interim stabilization of the Upper San Jacinto Sub-Basins through the application of approximately 6,000 acre feet of direct and indirect groundwater recharge during the calendar year 2006 and an equivalent or greater amount of water, adequate supply providing, in subsequent years. To implement this goal, the Parties pledge to undertake the following actions.

OPERATIVE PROVISIONS

NOW, THEREFORE, in consideration of the promises made and recited herein, the Parties do hereby enter into this Memorandum of Understanding setting forth their pledges, commitments, understandings and appropriate limiting conditions, as follows:

ARTICLE 1.0 - EMWD's PLEDGES AND CONDITIONS

1.1 **Pledges by EMWD**. Subject to the conditions set forth in Section 1.2, EMWD pledges the following:

1.1.1 Purchase and Recharge of Water. During the Term of this MOU, EMWD agrees to contribute funds, in the amounts provided for in this MOU, for the acquisition, transportation, operation, and recharge of imported water into the Upper San Jacinto Sub-Basins. EMWD will coordinate and cooperate with LHMWD and MWD regarding the acquisition of imported water. EMWD understands and agrees that it will implement the transportation and recharge of the purchased imported water into the Upper San Jacinto Sub-Basins using its existing conveyance and spreading facilities within the Management Area. For calendar 2006, EMWD agrees to contribute up to Six Hundred Seventy-Five Thousand Seven Hundred Dollars and No Cents ($675,700.00) for imported water under the MOU.

1.1.2 Restriction on Conveyances and Exports. EMWD will use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper Flats area during July, August, and September 2006, and will eliminate the use of any conveyance water during the 2006 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge, or made available due to groundwater recharge, in the Upper San Jacinto Sub-Basins during the 2006 calendar year. In addition, EMWD will investigate water supply contingency plans.

1.1.3 Continued Participation in IWSP. Subject to Section 5.1 EMWD agrees that it will continue its participation in the Interim Water Supply Plan in the same manner and to the same extent as set forth in Article 1.0 of the MOU during each subsequent calendar year until the WMP has been finalized and adopted by all parties.

1.2 **EMWD's Conditions**. The pledges of EMWD stated in Section 1.1 are subject to the following conditions:

1.2.1 Optimizing Capacity. That the Parties cooperate with EMWD's efforts to optimize its delivery capacity during the months of July, August, and September 2006, by refraining, to the extent feasible, from exercising their rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD ("Fruitvale Agreements"). It is understood and agreed that any Party's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of their contract rights under the Fruitvale Agreements or such other rights the Party may have to purchase and receive Fruitvale Water.

1.2.2 Compliance by Other Parties. That each other Party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 2.1, 3.1, and 4.1.

1.3 **Acceptance of Other Parties' Conditions**. EMWD hereby accepts each other Party's conditions on their respective pledges.

1.4 **Cooperation with Other Parties**. EMWD agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 2.0 - LHMWD'S PLEDGES AND CONDITIONS

2.1 **Pledges by LHMWD**. Subject to the conditions set forth in Section 2.2, LHMWD pledges the following:

2.1.1 Purchase and Recharge of Water. During the Term of this MOU, LHMWD agrees to contribute funds, in the amounts provided for in this MOU, for the acquisition, transportation, operation, and recharge of imported water into the Upper San Jacinto Sub-Basins. LHMWD will coordinate and cooperate with EMWD and MWD regarding the acquisition of imported water. LHMWD understands and agrees that EMWD will implement the transportation and recharge of the purchased imported water into the Upper San Jacinto Sub-Basins using its existing conveyance and spreading facilities within the Management Area. For calendar 2006, LHMWD agrees to contribute up to Eight Hundred Forty-Two Thousand Four Hundred Dollars and No Cents ($842,400.00) for imported water under the MOU.

2.1.2 Optimizing Capacity. LHMWD will cooperate with EMWD's efforts to optimize EMWD's delivery capacity during the months of July, August, and September 2006, by refraining during such months, to the extent feasible, from exercising their rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD. It is understood and agreed that LHMWD's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of LHMWD's contract rights under the Fruitvale Agreements or such other rights as LHMWD may have to purchase and receive Fruitvale Water.

2.1.3 Continued Participation in IWSP. Subject to Section 5.1, LHMWD agrees that it will continue its participation in the Interim Water Supply Plan in the same manner and to the same extent as set forth in Article 2.0 of the MOU during each subsequent calendar year until the WMP has been finalized and adopted by all parties.

2.2 **LHMWD's Conditions**. The pledges of LHMWD stated in Section 2.1 are subject to the following conditions:

2.2.1 Emergency Production of Water. In the event LHMWD experiences an emergency loss of water production capacity or is otherwise unable to satisfy its municipal demand through the use of its own facilities, as determined by the LHMWD, LHMWD reserves the right to exercise its rights to delivery of Fruitvale Water during the months of July, August and September 2006 and shall pay EMWD the standard rate for Fruitvale Water, for amounts delivered within LHMWD's entitlement. For amounts required by LHMWD and delivered by EMWD over the entitlement amount, LHMWD shall pay EMWD's then current wholesale water rates.

2.2.2 Restriction on Conveyance Water and Exports. That EMWD use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper Flats area during July, August, and September 2006, and to eliminate the use of any conveyance water during the 2005 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge, or made available due to groundwater recharge, in the Upper San Jacinto Sub-Basins during the 2006 calendar year.

2.2.3 Preservation of Fruitvale Water Rights. Notwithstanding LHMWD's pledge to not exercise its entitlements to purchase and receive Fruitvale Water during July, August and September 2006, such pledge and non-exercise shall not be construed by the Parties or any of them as a waiver, failure to exercise, or other abrogation of LHMWD's rights under the Fruitvale Agreements or Fruitvale Adjudication and such rights shall be preserved, survive without diminishment, and remain valid and in full force and effect.

2.2.4 Compliance by Other Parties. That each other Party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 1.1, 3.1, and 4.1.

2.3 **Acceptance of Other Parties' Conditions**. LHMWD hereby accepts each other Party's conditions on their respective pledges.

2.4 **Cooperation with Other Parties**. LHMWD agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 3.0 - HEMET'S PLEDGES AND CONDITIONS

3.1 **Pledges by Hemet**. Subject to the conditions set forth in Section 3.2, Hemet pledges the following:

3.1.1 Purchase and Recharge of Water. During the Term of this MOU, Hemet agrees to contribute funds, in the amounts provided for in this MOU, for the acquisition, transportation, operation, and recharge of imported water into the Upper San Jacinto Sub-Basins. Hemet will coordinate and cooperate with EMWD and MWD regarding the acquisition of imported water. Hemet understands and agrees that EMWD will implement the transportation and recharge of the purchased imported water into the Upper San Jacinto Sub-Basins using its existing conveyance and spreading facilities within the Management Area. For calendar 2006, Hemet agrees to contribute up to One Hundred Ninety-Four Thousand Dollars and No Cents ($194,000.00) for imported water under the MOU.

3.1.2 Optimizing Capacity. Hemet will cooperate with EMWD's efforts to optimize EMWD's delivery capacity during the months of July, August, and September 2006, by refraining during such months, to the extent feasible, from exercising its rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD ("Fruitvale Agreements"). It is understood and agreed that Hemet's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of Hemet's contract rights under the Fruitvale Agreements or such other rights Hemet may have to purchase and receive Fruitvale Water.

3.1.3 Continued Participation in IWSP. Subject to Section 5.1, Hemet agrees that it will continue its participation in the Interim Water Supply Plan in the same manner and to the same extent as set forth in Article 3.0 of the MOU during each subsequent calendar year until the WMP has been finalized and adopted by all parties.

3.2 **Hemet's Conditions**. The pledges of Hemet stated in Section 3.1 are subject to the following conditions:

3.2.1 Emergency Production of Water. In the event Hemet experiences an emergency loss of water production capacity, or is otherwise unable to satisfy its municipal demand from its own facilities, as determined by the Hemet Water Department, Hemet shall be entitled to increase water production from any one or more of Hemet's wells located within the Upper San Jacinto Sub-Basins, or receive Fruitvale Water during the duration of the emergency for which Hemet shall pay EMWD the standard rate for Fruitvale Water, for amounts delivered within Hemet's entitlement. For amounts required by Hemet and delivered by EMWD over the entitlement amount, Hemet shall pay EMWD's then current wholesale water rates.

3.2.2 Preservation of Fruitvale Water Rights. Notwithstanding Hemet's pledge to not exercise its entitlements to purchase and receive Fruitvale Water during calendar year 2006, such pledge and non-exercise shall not be construed by the Parties or any of them as a waiver, failure to exercise, or other abrogation of Hemet's rights under the Fruitvale Agreements or Fruitvale Adjudication and such rights shall be preserved, survive without diminishment, and remain valid and in full force and effect.

3.2.3 Restriction on Conveyance Water and Exports. That EMWD use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper flats area and to eliminate the use of any conveyance water during the 2006 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge in the Upper San Jacinto Sub-Basins during the 2006 calendar year.

3.2.4 Compliance by Other Parties. That each other Party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 1.1, 2.1, and 4.1.

3.3 **Acceptance of Other Parties' Conditions**. Hemet hereby accepts each other Party's conditions on their respective pledges.

3.4 **Cooperation with Other Parties**. Hemet agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 4.0 - SAN JACINTO'S PLEDGES AND CONDITIONS

4.1 **Pledges by San Jacinto**. Subject to the conditions set forth in Section 4.3, San Jacinto pledges the following:

4.1.1 Purchase and Recharge of Water. During the Term of this MOU, San Jacinto agrees to contribute funds, in the amounts provided for in this MOU, for the acquisition, transportation, operation, and recharge of imported water into the Upper San Jacinto Sub-Basins. San Jacinto will coordinate and cooperate with EMWD and MWD regarding the acquisition of imported water. San Jacinto understands and agrees that EMWD will implement the transportation and recharge of the purchased imported water into the Upper San Jacinto Sub-Basins using its existing conveyance and spreading facilities within the Management Area. For calendar 2006, San Jacinto agrees to contribute up to Eighty-Seven Thousand Nine Hundred Dollars and No Cents ($87,900.00) for imported water under the MOU.

4.1.2 Optimizing Capacity. San Jacinto will make a good faith effort to cooperate with EMWD's efforts to optimize EMWD's delivery capacity during the months of July, August, and September 2006, by refraining, to the extent feasible in its sole discretion, from exercising its rights to delivery of Entitlement Water and/or Excess Water ("Fruitvale Water") under EMWD's Improvement District No. 24 program as provided in those agreements between the Parties individually and EMWD ("Fruitvale Agreements"). It is understood and agreed that San Jacinto's cooperation with such effort by EMWD will not result in a loss, waiver, abrogation or diminishment of San Jacinto's contract rights under the Fruitvale Agreements or such other rights as San Jacinto may have to purchase and receive Fruitvale Water.

4.1.3 Continued Participation in IWSP. Subject to Section 5.1, San Jacinto agrees that it will continue its participation in the Interim Water Supply Plan in the same manner and to the same extent as set forth in Article 4.0 of the MOU during each subsequent calendar year until the WMP has been finalized and adopted by all parties.

4.2 **San Jacinto's Conditions**. San Jacinto's pledges as stated in Section 4.1 are subject to the following conditions:

4.2.1 Emergency Production of Water. In the event San Jacinto experiences an emergency loss of water production capacity or is otherwise unable to satisfy its municipal demand through the use of its own facilities, as determined by San Jacinto, San Jacinto reserves the right to exercise its rights to delivery of Fruitvale Water during the months of July, August and September 2006 and shall pay EMWD the standard rate for Fruitvale Water, for amounts delivered within San Jacinto's entitlement. For amounts required by San Jacinto and delivered by EMWD over the entitlement amount, San Jacinto shall pay EMWD's then current wholesale water rates.

4.2.2 Preservation of Fruitvale Rights. Notwithstanding San Jacinto's pledge to not otherwise exercise its entitlements to purchase and receive Fruitvale Water during July, August and September 2006, such pledge and non-exercise shall not be construed by the Parties or any of them as a waiver, failure to exercise, or other abrogation of San Jacinto's rights under the Fruitvale Agreement or Fruitvale Adjudication and such rights shall be preserved, survive without diminishment, and remain valid and in full force and effect.

4.2.3 Restriction on Conveyances and Exports. That EMWD use its best efforts to eliminate flows from San Jacinto Basin to the Homeland and Juniper flats area and will eliminate the use of any conveyance water during the 2006 calendar year in the Menifee Area. EMWD will not otherwise export any water intended for groundwater recharge in the Upper San Jacinto Sub-Basins during the 2006 calendar year.

4.2.4 Compliance by Other Parties. That each other party use its best efforts in good faith to perform and fulfill their respective pledges as expressed in Sections 1.1, 2.1, and 3.1.

4.3 **Acceptance of Other Parties' Conditions**. San Jacinto hereby accepts each other Party's conditions on their respective pledges.

4.4 **Cooperation with Other Parties**. San Jacinto agrees to cooperate with the other Parties to reasonably facilitate each Party's performance of their pledge, to share information and to regularly meet and confer concerning implementation of this MOU as part of the regularly scheduled meetings of the Groundwater Policy Committee or such sub-committee as the Policy Committee shall designate from time to time.

ARTICLE 5.0 - MISCELLANEOUS PROVISIONS

5.1 **Term and Continuation of the IWSP**. This MOU shall terminate, unless extended by the mutual agreement of the Parties memorialized in writing, on the earlier of the following dates: (i) the date upon which two or more Parties mutually agree to terminate the MOU; (ii) the date upon which all Parties have adopted the WMP; or (ii) December 31, 2008. During the Term of this MOU, all of the obligations of the Parties shall be continued and carried over to the next calendar year, subject to adjustment for the amount of water to be recharged in any subsequent year. The Parties acknowledge that the amount of water to be recharged may fluctuate year to year depending upon conditions within the Management Area, the availability of Imported Water, and the ability to receive and recharge such water. The Parties agree that the goal is to purchase and recharge between 6,000 to 8,000 acre feet of Imported Water each year during the Term. The Parties shall meet and confer during the last quarter of the preceding year to determine the amount of water and the anticipated cost to be apportioned among the Parties for the forthcoming year and memorialized in a statement signed by the managers of all Parties. In any year subsequent to 2006, no Party shall be obligated to contribute more than one hundred twenty-five percent (125%) of its contribution assigned for the prior year without approval of its Board or Council.

5.2 **Invoicing**. The Parties agree that EMWD shall invoice each Party for its contribution to the 2006 IWSP and subsequent years, either in one lump sum during the year, or in installments over the year as is agreed upon by the Party being invoiced and arranged by that Party with EMWD.

5.3 **Costs & Expenses**. The Parties shall bear the costs of implementing their own pledges, and shall bear their own costs and expenses of otherwise participating in this MOU.

5.4 **Authority**. The individuals executing this Agreement on behalf of the Parties and the instruments referenced on behalf of the Parties represent and warrant that they have the legal power, right and actual authority to bind the Parties to the terms and conditions hereof and thereof.

5.5 **Counterpart Originals**. This Agreement may be executed in duplicate originals, each of which is deemed to be an original

5.6 **Effective Date**. This MOU has become effective among and between the Parties on the date by which each Party's governing board or council has approved the MOU and the authorized representative of each Party has executed the MOU.

IN WITNESS WHEREOF, the Parties hereto have executed this Memorandum of Understanding on the date and year first above written.

[SIGNATURE ON FOLLOWING PAGES]

EASTERN MUNICIPAL WATER DISTRICT

By: ______________________
Anthony J. Pack
General Manager

ATTEST:

By: ______________________
Rosemarie V. Howell
Board Secretary

Approved as to Form:

By: ______________________
Gerald R. Shoaf
General Counsel

LAKE HEMET MUNICIPAL WATER DISTRICT

By: Thomas W. Wagoner
Tom Wagoner, General Manager

ATTEST:

By: Karen Hornbarger
Assistant Secretary
Karen Hornbarger

Approved as to Form:

By: Arthur L. Littleworth
Arthur Littleworth, General Counsel

CITY OF SAN JACINTO

By: Barry McClellan
Barry McClellan, City Manager

ATTEST:

By: Dorothy Chouinard
Dorothy Chouinard, City Clerk

Approved as to Form:

By: [signature]
Robert Hargreaves, Special Counsel

CITY OF HEMET

By: ______________________________
Steve Temple, City Manager

ATTEST:

By: ______________________________
Stephen Clayton, City Clerk

Approved as to Form:

By: ______________________________
Eric S. Vail, City Attorney

APPENDIX I SB1938 GROUNDWATER MANAGEMENT PLAN COMPLIANCE CHECKLIST

Water Management Plan GWMP Components

Description	Section(s)
SB 1938 Mandatory Components	
1. Documentation of public involvement	2.2.4, 11.10
2. BMO(s)	3.1
3. Monitoring and management of groundwater elevations, groundwater quality, inelastic land subsidence, and changes in surface water flows and quality that directly affect groundwater levels or quality	3.1.7, 3.2.7, 11.2
4. Plan to involve other agencies located in the groundwater basin	2
5. Adoption of monitoring protocols	11.2
6. Map of groundwater basin boundary, as delineated by DWR Bulletin 118, with agencies boundaries that are subject to GWMP	2.2, 4.1
7. For agencies not overlying groundwater basins, prepare the GWMP using appropriate geologic and hydrogeologic principles	N/A
AB 3030 and SB 1938 Voluntary Components	
1. Control of saline water intrusion	3.2.3
2. Identify and manage well protection and recharge areas	3.2, 11.2
3. Regulate the migration of contaminated groundwater	3.2
4. Administer well-abandonment and destruction program	11.2, 11.9
5. Control and mitigate groundwater overdraft	3.2, 5.3
6. Replenish groundwater	3.2, 5.3
7. Monitor groundwater levels	3.2, 11.2
8. Develop and operate conjunctive use projects	3.2, 5.3
9. Identify well-construction policies	11.9
10. Develop and operate groundwater contamination cleanup, recharge, storage, conservation, water-recycling, and extraction projects	3.2, 5.3
11. Develop relationships with state and federal regulatory agencies	1.1, 3.2, 4.10
12. Review land use plans and coordinate with land use planning agencies to assess activities that create reasonable risk of groundwater contamination	5.1
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1. Manage with guidance of advisory committee	2.4, 9
2. Describe area to be managed under GWMP	2.1
3. Create links between BMOs and goals and actions of GWMP	3, 11.6
4. Describe GWMP monitoring programs	3.2, 11.2
5. Describe integrated water–management planning efforts	3.2, 4.8.3, 5.3.3.1, 5.3.3.6

Description	Section(s)
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Appendix D

Water Shortage Contingency Plan

ORDINANCE NO. 117.2

AN ORDINANCE OF THE BOARD OF DIRECTORS OF THE EASTERN MUNICIPAL WATER DISTRICT AMENDING THE WATER SHORTAGE CONTINGENCY PLAN

BE IT ORDAINED by the Board of Directors of the Eastern Municipal Water District, in Adjourned Regular Session, assembled the 5th day of March, 2009, a majority of the Directors being present and concurring, that the Eastern Municipal Water District Water Shortage Contingency Plan, which is attached hereto and made a part of this Ordinance, be, and the same is hereby approved and adopted.

BE IT FURTHER ORDAINED that the amendments contained and set forth in Ordinance No. 117.1 are hereby rescinded; and

BE IT FINALLY ORDAINED that the effective date of this Ordinance No. 117.2 is April 1, 2009.

ADOPTED this 5th day of March, 2009.

Ronald W. Sullivan

Ronald W. Sullivan, President

ATTEST:

Rosemarie V. Howell

Rosemarie V. Howell, Secretary

(SEAL)

Eastern Municipal Water District

Water Shortage Contingency Plan

Ordinance No.117.2

Effective
April 1, 2009

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Water Shortage Contingency Plan
For Domestic (Potable) Water

Eastern Municipal Water District

Section I: Declaration of Purpose and Principles

In accordance with Water Code 10632 requirements, Eastern Municipal Water District (EMWD) is responsible for conserving the available water supply, protecting the integrity of water supply facilities (infrastructure), and implementing a contingency plan in times of drought, supply reductions, failure of water distribution systems or emergencies. Particular emphasis is placed on use of domestic (potable) water, sanitation, fire protection and preserving public health, welfare, and safety, in addition to minimizing the adverse impacts of water supply shortage or other water supply emergency conditions that do not include recycled water. Therefore, EMWD hereby adopts regulations and restrictions on the delivery and consumption of **potable outdoor water use during water shortages.**

Financial Impacts

In the event that EMWD was to implement the Water Shortage Contingency Plan (the Plan), it is recognized that the reduction in sales would impact the revenues that would normally be generated. To the extent that this reduction negatively impacts the coverage of its fixed related costs (those that are not tied to volume), EMWD will utilize its Rate Stabilization Reserve to mitigate any shortfall.

Priorities

The Plan is based on the following priorities:

- Public safety, health and welfare
- Sustaining economic vitality
- Quality of life

Section II: Public Education

EMWD will periodically provide the public with information about the Plan, including conditions under which each stage of the Plan is to be initiated or terminated and the conservation response measures to be implemented in each stage. This information will be provided by means of public events, website, press releases, bill inserts, etc.

Section III: Coordination with Regional Water Planning Groups

The water service area of EMWD is located primarily within the regional area of the Santa Ana Watershed Project Authority (SAWPA). In addition to SAWPA, coordination and implementation of this Plan are in concert with MWD's Water Supply Allocation Plan as well as EMWD sub-agencies – Lake Hemet Municipal Water District, Nuevo Water Company, Rancho California Water District, and the cities of Perris, Hemet and San Jacinto.

Section IV: Shortage Declaration Process

A. Long and Short Term Water Deficiencies

Driven by the requirements outlined in Water Code 10632, and the demand for potable water expected to be in excess of the water supply, EMWD's General Manager shall request the Board of Directors to authorize and implement the provisions of the Plan. The request shall be made at a regular or special meeting of the Board of Directors, to implement provisions of the Plan. The Board of Directors has the authority to initiate or terminate the water shortage contingency measures described in this Plan.

B. Emergency Water Shortage Response

By adopting this Plan, the Board of Directors authorizes the General Manager to declare the extent of a potable water shortage emergency and to implement the appropriate water shortage contingency measures. The General Manager shall report such water shortage conditions and level of response to the Board of Directors in a timely manner.

The declaration of the Board of Directors shall be made by public announcement and shall be published in a newspaper of general circulation. The declaration shall become effective immediately upon such publication.

Section V: Application

The water shortage contingency measures of this Plan shall apply to all persons, customers, and properties utilizing potable water provided by EMWD. The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, agencies, associations, and all other legal entities.

Section VI: Definitions

For the purposes of this Plan, the following definitions shall apply:

Commercial, Industrial and Institutional (CII): Includes but is not limited to any type of non-profit establishments, governmental entities, schools, retail establishments, hotels, motels, restaurants, car washes and office buildings.

Conservation: Those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that supply is conserved and made available for future or alternative uses.

Customer: Any person, company, agency, or organization using water supplied by EMWD.

EMWD: Eastern Municipal Water District.

Domestic water: Used for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution. Also used for landscape irrigation.

Household: Residential premises served by the customer's meter.

Landscape irrigation use: The irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, rights-of-way and medians.

Long Term Shortage: A prolonged shortage of water supplies expected to last at least a year.

Potable water: Filtered/treated water suitable for drinking; also used for household needs and landscape irrigation.

Short Term Shortage: A shortage of water supplies expected to last less than a year.

Water Shortage Contingency Plan: The Plan as defined by this document.

Water shortage: A condition in which the existing or projected potable water supply available to EMWD is not adequate to meet the water requirements of its customers. This condition may be the result of factors including, but not limited to, voluntary or mandatory curtailment of EMWD's allocation from the MWD, drought, emergency conditions or failure of water distribution systems.

Water shortage period: The period beginning on the effective date of the Board of Director's approval of implementing EMWD's Water Shortage Contingency Plan, and ending on the date of the Board of Director's finding that a potable water shortage no longer exists.

Section VII: Criteria for Initiation/Termination of Water Shortage Contingency Stages

At the time of either a long or short-term water shortage, EMWD shall monitor potable water supply conditions on a regular basis and shall determine when conditions warrant initiation or termination of each stage of the Plan as follows:

Stage 1: When water deficiencies are predicted to or actually range between 0 and less than 5 percent of available supply and/or capacity.

Stage 2: When water deficiencies are predicted to or actually range from 5 percent up to 10 percent of available supply and/or capacity.

Stage 3: When water deficiencies are predicted to or actually range from 10 percent up to 15 percent of available supply and/or capacity.

Stage 4: When water deficiencies are predicted to be or actually range from 15 to 25 percent of available supply and/or capacity and storage is not recovering.

Stage 5: When water deficiencies are predicted to be or actually range from 25 to 35 percent of available supply and/or capacity and storage is not recovering.

Stage 6: When water deficiencies are predicted to be or actually range from 35 to 50 percent of available supply and/or capacity and storage is not recovering.

Stage 7: **When water supply deficiencies are predicted to or actually exceed 50 percent of available supply and/or capacity and/or capacity and storage is not recovering.**

Section VIII: Public Notification Procedures

When EMWD determines that a potable water shortage condition exists, any or all of the following notification procedures may be implemented:

A. Notify the general public and influential local decision-makers what the situation is, actions to be taken, what the customers are intended to achieve, and how these actions are to be implemented.

B. The public at large will be informed of the situation and what must be done. Contact can be made through billing inserts, special mailings, telephone contact, e-mail, roadway signage, water conservation booths, speaker's bureau, community association meetings, newsletters, and education programs, etc. Literature should be provided on the potable water shortage condition, conservation methods, and water-savings devices.

C. Use of media in all its available forms should be employed. This would include public service announcements on radio and cable television as well as press releases in local newspapers.

D. Posting of all pertinent information on EMWD's web site, www.emwd.org.

Section IX: Water Shortage Contingency Measures (Single-Family Residential, Multi-Family Residential and Landscape Customers)

The following measures will be required to meet demand reduction targets for each stage:

Stage 1: The message to the public is focused on a voluntary 10 percent reduction in water use, implementation of the requirements listed in the Water Use Efficiency Ordinance and the potential for mandatory allocations.

Stage 2: Elimination of all wasteful water use is required with a message to the public focused on mandatory efficiency as outlined in the Water Use Efficiency Ordinance to avoid penalties.

Stage 3: A 25 percent reduction in outdoor use and elimination of wasteful water use is required and the following restrictions in addition to the restrictions of the previous stage can be used to meet the restrictions without paying significant penalties:

1. Watering or irrigating of lawn, landscape or other vegetated areas with sprinklers will be limited to the following schedule:

    a. June through August – Three days a week

    b. September, October, and March through May – Two days a week

    c. November through February – One day a week

    Watering days will be established and posted by EMWD.

2. All leaks, breaks, or other malfunctions in the water user's plumbing or distribution system repaired within seventy-two hours.

3. Refrain from filling or re-filling of ornamental lakes or ponds.

4. Refrain from using potable water to wash or clean a vehicle, including but not limited to, any automobile, truck, van, bus, motorcycle, boat or trailer, whether motorized or not.

5. Maintain existing water levels on swimming pools or outdoor spas.

Stage 4: A 50 percent reduction in outdoor water use and elimination of wasteful water use is required and the following restrictions, in addition to the restrictions of the previous stage, can be used to meet the restrictions without paying significant penalties:

1. Watering or irrigating of lawn, landscape or other vegetated areas with sprinklers will be limited to the following schedule:

    a. June through August – Two days a week

    b. September through May – One day a week

    Watering days will be established and posted by EMWD.

Stage 5: A 50 percent reduction in outdoor water use, elimination of water use in excess of 15 percent above the total of indoor and outdoor budgets, and elimination of wasteful water use is required.

Stage 6: A 50 percent reduction in outdoor water use, elimination of water use in excess of indoor and outdoor budgets, and elimination of wasteful water use is required.

Stage 7: Elimination of outdoor water use except for purposes of health and human safety, elimination of water use in excess of indoor budgets, and elimination of wasteful water use is required.

Section X: Water Shortage Contingency Measures (Commercial, Industrial and Institutional)

The following measures will be required to meet demand reduction targets for each stage:

Stage 1: The message to the public is focused on a voluntary 10 percent reduction in water use, efficient water use as listed in the Water Use Efficiency Ordinance and the potential for mandatory allocations.

Stage 2: Elimination of wasteful behavior is required with a message to the public focused on mandatory efficiency as outlined in the Water Use Efficiency Ordinance and penalties for violation.

Stage 3: A 25 percent reduction in outdoor water use and the following restrictions will be imposed in addition to the restrictions in the Water Use Efficiency Ordinance:

1. Watering or irrigating of lawn, landscape or other vegetated areas with sprinklers will be limited to the following schedule:

    a. June through August – Three days a week

    b. September, October, and March through May – Two days a week

    c. November through February – One day a week

    Watering days will be established and posted by EMWD.

2. All leaks, breaks, or other malfunctions in the water user's plumbing or distribution system repaired within seventy-two hours.

3. Refrain from filling or re-filling of ornamental lakes or ponds.

4. Refrain from using potable water to wash or clean a vehicle, including but not limited to, any automobile, truck, van, bus, motorcycle, boat or trailer, whether motorized or not.

5. Maintain existing water levels on swimming pools or outdoor spas.

Stage 4: A 50 percent reduction in outdoor water use is required and the following restrictions will be imposed in addition to the restrictions in the previous stage:

1. Watering or irrigating of lawn, landscape or other vegetated areas with sprinklers will be limited to the following schedule:

    a. June through August – Two days a week

    b. September through May – One day a week

    Watering days will be established and posted by EMWD.

Stage 5: A 50 percent reduction in outdoor use is required with the restrictions of the previous stage continued.

Stage 6: A 50 percent reduction in outdoor use is required with the restrictions of the previous stage continued

Stage 7: No outdoor water use is permitted except for purposes of health and human safety.

Section XI: Water Shortage Contingency Measures (Agriculture)

Stage 1: A voluntary 5 percent reduction in water use is required.

Stage 2: A mandatory 5 percent reduction in agricultural use is required.

Stage 3: A mandatory 10 percent reduction in agricultural water use is required.

Stage 4: A mandatory 15 percent reduction in agricultural water use is required.

Stage 4: A mandatory 15 percent reduction in agricultural water use is required.

Stage 5: A mandatory 25 percent reduction in agricultural water use is required.

Stage 6: A mandatory 35 percent reduction in agricultural water use is required.

Stage 7: A mandatory 50 percent reduction in agricultural water use is required.

Note: These restrictions apply only to agricultural customers paying a full domestic rate for potable water deliveries.

Section XII: Enforcement

No person or entity shall knowingly or intentionally use potable water from EMWD for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan pursuant to action taken by EMWD's Board of Directors to implement provisions of this Plan.

The various responses to drought or emergencies described in previous sections are intended to avoid or defer the need for rationing community water supplies, while preserving some latitude of choice with respect to how much potable water individual customers use. However, the success of this framework depends on all customers using water efficiently. In the event of unreasonable use or waste, EMWD reserves the right to impose penalties in addition to the financial disincentives described, including the right to shut off supply.

If a person or entity knowingly or intentionally violates the provision of the Plan, the Board of Directors may choose to implement event-driven penalties, and/or tiered rate penalties and allocation reduction as described below:

Event Driven Penalties

Beginning with Stage 2 event-driven penalties can be imposed for violating any of the restrictions in the Water Use Efficiency Ordinance in addition to the restrictions listed in this plan.

NOTE: *The penalties listed below will replace runoff penalties listed in the Water Use Efficiency Ordinance during Stages 2 through 7.*

a. For the first violation of these sub-sections, EMWD shall issue a written notice of fact of such violation to the customer.

b. For the second and third violations, a surcharge of 100 percent of current water charges shall be added to the customer's water bill.

c. For the fourth and succeeding violation(s), a surcharge of 200 percent of current water charges shall be added to the customer's water bill.

d. EMWD may also terminate a customer's irrigation/landscape meter service.

In all cases customers will be given the right to apply for a variance. See section XIII.

Tiered Rate (Single-Family Residential, Multi-Family Residential and Landscape Customers)

Penalties and limitations will be applied to discourage prohibited water uses.

Stage 1 - There are no penalties.

Stage 2 - Tier 4 will include a penalty equal to twice the current Tier 4 rate.

Stage 3 - Tier 2, Outdoor Allocation will be reduced by 25 percent to restrict outdoor use; and Tier 4 will include a penalty equal to twice the current Tier 4 rate.

Stage 4 - Tier 2, Outdoor Allocation will be reduced by 50 percent to restrict outdoor use; and Tier 4 will include a penalty equal to twice the current Tier 4 rate.

Stage 5 -Tier 2 will be reduced by 50 percent to restrict outdoor use; the quantity of water provided at the Tier 3 rate will be reduced to 15 percent of Tier 1 and 2 budgets; and Tier 4 will have a penalty rate of twice the current Tier 4 rate.

Stage 6 - Tier 2, Outdoor Allocation will be reduced by 50 percent to restrict outdoor use; the quantity of water provided at the Tier 3 rate will be reduced to zero; and Tier 4 will have a penalty rate of twice the current Tier 4 rate.

Stage 7- Tier 2 and 3 Allocations will be eliminated and Tier 4 will have a penalty rate of twice the current Tier 4 rate.

Tiered Rate Penalty (Agricultural Customers)

NOTE: *These restrictions apply only to agricultural customers paying a full domestic rate for potable water deliveries.*

Stage 1 - There are no penalties.

Stage 2 - Agricultural Use will be allocated at 95 percent of base year use. Deliveries over the allocated amount are subject to the Tier 3 Rate.

Stage 3 - Use will be allocated at 90 percent of base year use. Deliveries over the allocated amount are subject to the Tier 3 Rate.

Stage 4 - Use will be allocated at 85 percent of base year use. Deliveries over the allocated amount are subject to the Tier 3 Rate.

Stage 5 - Use will be allocated at 75 percent of base year use. Deliveries over the allocated amount are subject to the Tier 3 Rate.

Stage 6 - Use will be allocated at 65 percent of base year use. Deliveries over the allocated amount are subject to the Tier 3 Rate.

Stage 7 - Use will be allocated at 50 percent of base year use. Deliveries over the allocated amount are subject to the Tier 3 Rate.

Section XIII: Variances

EMWD may, in writing, grant a temporary variance for existing potable water uses otherwise prohibited under this Plan, if it is determined that failure to grant such 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 Plan cannot be technically accomplished during the duration of the potable water supply shortage or other condition for which the Plan is in effect.

b. Alternative methods can be implemented which will achieve the same level of reduction in potable water use.

All petitions for variances shall be reviewed by EMWD, and shall include the following:

a. Name and address of the petitioner(s).

b. Purpose of potable water use.

c. Specific provision(s) of the Plan from which the petitioner is requesting relief.

d. Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Plan.

e. Description of the relief requested.

f. Period of time for which the variance is sought.

g. Alternative water use restrictions or other measures the petitioner is taking or proposes.

h. Alternative potable water use restrictions or other measures the petitioner is taking, or proposes to take, to meet the intent of this Plan and the compliance date.

i. Other pertinent information.

Variances granted by EMWD shall be subject to the following conditions, unless waived or modified by EMWD:

a. Variances granted shall include an expiration date.

b. Variances granted shall expire when the Plan is no longer in effect, unless the petitioner has failed to meet specified requirements.

No variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance.

Section XIV: Wholesale Supply Allocation

Under a water shortage plan, supply to wholesale customers will be allocated using the formula and methodology based on MWD's Water Supply Allocation Plan. This plan takes into consideration:

a. The impact on retail customers and the economy

b. Population and growth

c. Changes and/or loss of local supply

d. Reclamation and recycling

e. Conservation

f. Investment in local resources

EMWD will establish base period demands and then adjust them for growth and changes in local supply. Regional shortages will be phased in 10 stages. At each stage, the wholesale customers will not experience shortages on the wholesale level that are greater than one-and-a-half times the percentage shortage of regional water supplies. The wholesale customer will also not face a retail shortage less then the regional shortage. Credits will be given for conservation and investment in local supplies.

Section XV: Wholesale Supply Allocation Penalties

Penalties for deliveries over 100 percent up to 110 percent over allocation will have 3 times the Metropolitan Water District's Tier 2 Rate added to the base cost of the water.

Penalties for deliveries over 110 percent of allocation will have 5 times the Metropolitan Water District's Tier 2 Rate added to the base cost of the water.

THE REGIONAL URBAN WATER MANAGEMENT PLAN

NOVEMBER 2010

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

THE METROPOLITAN WATER DISTRICT
OF
SOUTHERN CALIFORNIA

REGIONAL URBAN WATER MANAGEMENT PLAN

Prepared by:

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
Water Resource Management Group
700 North Alameda Street
Los Angeles, CA 90012

November 2010

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LIST OF ABBREVIATIONS

Abbreviation	Terms
AF	Acre-Feet
TAF	Thousand Acre-Feet
MAF	Million Acre-Feet
cfs	Cubic feet per second
GPCD	Gallon Per Capita per Day
KWH	Kilowatt-hours
µg/L	Micrograms per liter
mg/L	Milligrams per liter
pCi/L	Picocuries per liter
AGWA	Association of Ground Water Agencies
AMPAC	American Pacific Corporation
ARRA	American Recovery and Reinvestment Act
BDCP	Bay Delta Conservation Plan
BIOp	Biological Opinion
BLM	U.S. Department of Interior Bureau of Land Management
BMP	Best Management Practices
CAWCD	Central Arizona Water Conservation District
CBSC	California Building Standards Commission
CCL3	Contaminant Candidate List 3
CCP	Conservation Credits Program
CCWD	Contra Costa Water District
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Information System
CPE	Comprehensive Program Evaluation
CRA	California River Aqueduct
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CVWD	Coachella Valley Water District
D/DBP	Disinfectants/Disinfection Byproduct
DBP	Disinfection Byproduct
DFG	Department of Fish & Game
DLR	Detection Level for purposes of Reporting
DOE	U.S. Department of Energy
DPC	Delta Protection Commission
DVL	Diamond Valley Lake
DWCV	Desert Water Agency/Coachella Valley Water District
DWR	Department of Water Resources
EDC	Endocrine Disruptor Chemical
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ELPH	Equivalent Level of Public Health Protection
EMRS	Energy Management & Reliability Study
ESA	Endangered Species Act
FBR	Fluidized Bed Reactors
FWU	Friant Water Users Authority

LIST OF ABBREVIATIONS

Abbreviation	Terms
GRP	Groundwater Recovery Program
HECW	High Efficiency Clothes Washers
IAWP	Interim Agricultural Water Program
ICS	Intentionally Created Surplus
IICP	Incremental Interruption and Conservation Plan
IID	Imperial Irrigation District
IRP	Integrated Water Resources Plan
LAA	Los Angeles Aqueduct
LPP	Local Projects Program
LRP	Local Resources Program
M&I	Municipal & Industrial
MCL	Maximum Contaminant Level
MOU	Memorandum of Understanding
MTBE	Methyl Tertiary-Butyl Ether
NASA	National Aeronautics and Space Administration
NCCPA	Natural Community Conservation Planning Act
NDEP	Nevada Division of Environmental Protection
NDMA	N-nitrosodimethylamine
NMFS	National Marine Fisheries Services
NOAA	National Oceanic and Atmosphere Administration
OEHHA	Office of Environmental Health Hazard Assessment
PG&E	Pacific Gas & Electric
PHG	Public Health Goal
PPCP	Pharmaceutical/Personal Care Product
PPR	Present Perfected Rights
PVID	Palo Verde Irrigation District
QMCP	Quagga Mussel Control Plan
QSA	Quantification Settlement Agreement
RDM	Robust Decision Making
RFP	Request for Proposals
RTS	Readiness-to-Serve
RUWMP	Regional Urban Water Management Plan
RWQCB	Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SAR	System Access Rate
SARI	Santa Ana Regional Interceptor
SBX7-7	Senate Bill 7, Water Use Reduction Target
SCAG	Southern California Association of Governments
SCCWRRS	Southern California Comprehensive Wastewater Recycling and Reclamation Project
SDCWA	San Diego County Water Authority
SDP	Seawater Desalination Program
SNWA	Southern Nevada Water Agency
SPR	System Power Rate
SWC	State Water Contractors
SWP	State Water Project
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids

LIST OF ABBREVIATIONS

Abbreviation	Terms
TOC	Total Organic Carbon
UCMR2	Unregulated Contaminant Monitoring Regulation 2
USBR	U.S. Department of Interior, Bureau of Reclamation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Services
UWMP	Urban Water Management Plan
VOC	Volatile Organic Compounds
WBIC	Weather-Based Irrigation Controllers
WSAP	Water Supply Allocation Plan
WSDM	Water Surplus and Drought Management
WSR	Water Stewardship Rate
WUCA	Water Utility Climate Alliance
YCWA	Yuba County Water Agency
Act	Urban Water Management Planning Act
Arvin-Edison	Arvin-Edison Water Storage District
Bay-Delta	San Francisco Bay/Sacramento-San Joaquin Delta
Calleguas	Calleguas Municipal Water District
Code	Metropolitan's Administrative Code
Conservancy	Sacramento-San Joaquin Delta Conservancy
Council	Delta Stewardship Council
Forum	Colorado River Basin Salinity Control Forum
Kern Delta	Kern Delta Water District
Metropolitan	The Metropolitan Water District of Southern California
Policy	State Recycled Water Policy
Regional Board	Santa Ana Regional Water Quality Control Board
Science Board	Delta Independent Science Board
Semitropic	Semitropic Water Storage District
Urban MOU	California Urban Water Conservation Council Memorandum of Understanding Regarding Water Conservation in California
Valley District	San Bernardino Valley Municipal Water District

SUMMARY OF METROPOLITAN COMPLIANCE UNDER THE DWR GUIDELINES

In 2005, DWR provided guidance materials to aid water districts in developing their urban water management plans. These materials both helped water districts comply with the law and DWR staff review submitted plans for regulatory compliance. The guidance materials consisted of a series of worksheets detailing acceptable responses to the requirements set forth in the Urban Water Management Planning Act (Act), as per the California Water Code. At that time, DWR also provided a checklist for cross referencing sections of the respondent water agency's Plan with the relevant sections of the Water Code to be sure that it addresses all relevant provisions of the Act.

Since the revised guidebook and checklist for the 2010 Urban Water Management Plan will not be released until DWR completes the development of new reporting methodologies for retail agencies, Metropolitan used the 2005 guideline materials in the development of this plan. In addition, Metropolitan also closely monitored changes in the reporting requirements brought about by new legislation and changes to the Act. Presented below is a compliance checklist reflective of these changes. This compliance checklist is organized by Water Code section and summarizes Metropolitan's compliance to the reporting requirements of the Act in the Water Code.

Agency Coordination

Water Code § 10620 (d)(1)(2) Coordination with Appropriate Agencies

Participated in areawide, regional, watershed or basinwide urban water management planning

- See Section 5.

Describe the coordination of the plan preparation and anticipated benefits.

- See Section 5.

Water Code §10620 (f) - Describe resource maximization / import minimization plan

Discuss how water management tools and options are used to maximize resources and minimize the need to import water.

- Metropolitan's planning strategy within the IRP and adaptive implementation approach is discussed in Section 2 and provides an overview of the water management tools and options. See pages 2-1 through 2-11.
- Further details are provided in Sections 3.4 (conservation, pages 3-28 through 3-39) and 3-5 (recycling, groundwater recovery and desalination, pages 3-40 through 3-55.)

Water Code § 10621 (b) - City and County Notification and Participation

Notify any city or county within service area of UWMP of plan review & revision. Consult and obtain comments from cities and counties within service area.

- Notification is discussed in Section 5, pages 5-7 thru 5-11.

Water Code § 10631 (a) - Service Area Information

Describe service area of supplier

- Service area is discussed on pages 1-6 through 1-10.

Include current and projected population

- Population analysis is discussed in Appendix A.1, page A.1-2. Projections are on page A.1-8, Table A.1-2.

Population projections were based on data from state, regional or local agency

- See footnote Table A.1-2, page A.1-8.

Describe climate characteristics that affect water management

- See Page I-15 through I-17.

Describe other demographic factors affecting water management

- See Page I-14.

Contents of UWMP

Water Code § 10631 (b) - Water Sources

Identify existing and planned water supply sources, Provide current water supply quantities, Provide planned water supply quantities

- Historic and current water supplies are described in Appendix A.2. Planned water supplies are discussed in Section 2, and details are provided in Appendix A.3, and particularly in Table A.3-7, pages A.3-43 through A.3-55.

Water Code §10631 (b)(1-4) - If Groundwater identified as existing or planned source

- Metropolitan does not supply groundwater. However, Metropolitan does use groundwater basins for groundwater banking.
- See Section 3.6 and Appendix A.2 (pages A.2-5 through A.2.6) and Appendix A.3 (pages A.3-36 through A.3-42) for discussions of issues related to groundwater basins.

Water Code §10631 (c) (1) - Reliability of Supply

Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage

- Section 2, pages 2-15 though 2-19 and the discussions presented under the CRA and SWP Sections 3-1 and 3-2.

Basis of Water Year data

- Section 2, Tables 2-9 through 2-11, pages 2-17 though 2-19.

Water Code §10631 (c) (2) - Water Sources Not Available on a Consistent Basis

Describe plans to supplement or replace inconsistent sources with alternative sources or water Demand Management Measures (DMMs)

- For a discussion on alternative sources, see adaptive management planning in Section 2 on pages 2-3 through 2-8.
- For a discussion on water demand management measures, see Sections 2 and 3, in particular, pages 2-2, 2-29, and 3-34.

Water Code §10631 (d) - Transfer or Exchange Opportunities

Describe short term and long term exchange or transfer opportunities

- Section 3.1 (pages 3-2 through 3-9) describes plans for banking, exchange and transfer opportunities along the Colorado River and Aqueduct.
- Section 3.2 (pages 3-10 through 3-22) describes plans for banking, exchange and transfer opportunities within the State Water Project.
- Section 3.3 (pages 3-22 through 3-27) describes plans for banking, exchange and transfer opportunities within the Central Valley.
- Section 3.6 (pages 3-56 through 3-60) describes plans for banking, exchange and transfer opportunities within the local region.
- Further details including dry year supply projections are provided in Appendix A.3, particularly Table A.3.7 on pages A.3-43 through A.3-55.

Water Code §10631 (e)(1)(2) - Water Use Provisions

Quantify past water use by sector, current water use by sector, Project future water use by sector

- Past, current, and future water uses are shown in Table A.1-13 on page A.1-12. Water uses by sector and county are shown in Tables A.1-6 through A.1-11 on pages A.1-10 through A.1-12.

Identify and quantify sales to other agencies

- Historic sales are presented in Table A.2-2 on page A.2-4. Metropolitan does not project sales by individual agency. However, total projected sales/demands to other agencies are shown in Section 2.

Water Code §10631 (f) - 2010 Urban Water Management Plan "Review of DMMs for Completeness" Form

- See CUWCC filings in Appendix A.6.

Water Code §10631 (g) - Planned Water Supply Projects and Programs, including non-implemented Demand Management Measures

- See discussion on the conservation credits program and implementation approach, Section 3.4, pages 3-28 through 3-39.

Water Code §10631 (h) - Planned Water Supply Projects and Programs

Detailed description of expected future supply projects & programs
Timeline for each proposed project
Quantification of each projects normal yield (AFY)
Quantification of each projects single dry-year yield (AFY)
Quantification of each projects multiple dry-year yield (AFY)

- Section 3.1 (pages 3-2 through 3-9) describes plans for banking, exchange and transfer opportunities along the Colorado River and Aqueduct.
- Section 3.2 (pages 3-10 through 3-22) describes plans for banking, exchange and transfer opportunities within the State Water Project.
- Section 3.3 (pages 3-23 through 3-27) describes plans for banking, exchange and transfer opportunities within the Central Valley.
- Section 3.6 (pages 3-56 through 3-60) describes plans for banking, exchange and transfer opportunities within the local region.
- Further details including dry year supply projections are provided in Appendix A.3, particularly Table A.3.7 on pages A.3-43 through A.3-55.

Water Code §10631 (i) - Opportunities for development of desalinated water

Describes opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply

- See discussion in Section 3.5 on groundwater recovery and seawater desalination, pages 3-47 through 3-55.
- See Appendix A.5, Table A.5-1 on pages A.5-1 through A.5-3 for a list of existing and conceptual groundwater recovery projects and their ultimate yield/capacity.
- See Appendix A.5, Table A.5-3 on page A.5-10 for a list of conceptual, planned, and under construction seawater desalination projects.

Determination of Demand Management Measures Implementation

Water Code § 10631 (j) - District is a CUWCC signatory

Agency is a CUWCC member
2005-08 annual updates are attached to plan
annual updates are considered completed by CUWCC website

- See Section 3.4 and attached documents in Appendix A.6.

Water Code § 10631 (k) – If supplier receives or projects receiving water from a wholesale supplier

Provided written availability projections, by source, to member agencies

- See Appendix A.3, Table A.3-7.

Water Code § 10631.1 - Projected Water Use for Low-Income Housing

Water use projections for single-family and multi-family residential housing for low-income housing

- This is incorporated with the retail demand forecast, as reflected in the discussions in Section 2.

Water Code § 10631.5 - Implementing water demand management demand measures

Compliance on a regional basis

- In determining its supply reliability, Metropolitan estimates total retail demands for its regional service areas and factors out water savings attributed to conservation, as discussed in section 2.2 (pages 2-9 though 2-14) and shown in tables 2-6 through 2-8.
- Metropolitan has invested over $268 million through a nearly 20-year period in regional conservation programs as discussed in Section 3.4 (pages 3-28 through 3-39).
- Metropolitan's "Water Stewardship Rate" element of its rate structure recovers the cost of providing financial incentives in conservation and water recycling and is identified as a demand management service function of the cost of service process, as discussed in Section 2.7 on page 2-29.
- Metropolitan's Conservation Credits Program provides the basis for financial incentives and funding for urban BMP and other demand management related activities, as discussed in Section 3.4, pages 3-28 though 3-39.
- Metropolitan's conservation related achievements are discussed in Section 3.4 and are shown in Tables 3-7 through 3-10.

Water Shortage Contingency Plan

Water Code § 10632 - Water Shortage Contingency Plan Section

Water Code § 10632 (a) - Stages of Action

Provide stages of action

Provide the water supply conditions for each stage

Includes plan for 50 percent supply shortage

- Documentation of the stages of actions Metropolitan would undertake to address up to 50 percent reduction in its water supplies and a catastrophic interruption in water supplies is included in its Water Surplus and Drought Management and Water Supply Allocation Plans and in the discussion of its Emergency Storage Requirement developed under its catastrophic supply interruption plan. See discussion on Section 2, pages 2-20 through 2-23.

Water Code §10632 (b) - Three-Year Minimum Water Supply

Identifies driest 3-year period

Minimum water supply available by source for the next three years

- Metropolitan has projected its supply capabilities for the next three years 2011 through 2013 under a multiple dry year hydrology (based on a repeat of 1990-1992 hydrology, which represents the three years of shortest supplies). See Table 1-6, page 1-24.

Water Code §10632 (c) - Preparation for catastrophic water supply interruption

Provided catastrophic supply interruption plan

Regional power outage

Earthquake

Delta levee failure

Aqueduct failure

- See Section 2, pages 2-20 through 2-28.

Water Code § 10632 (d) - Prohibitions

List the mandatory prohibitions against specific water use practices during water shortages

- Not applicable.

Water Code § 10632 (e) - Consumption Reduction Methods
List the consumption reduction methods the water supplier will use to reduce water use in the most restrictive stages with up to a 50% reduction.
- See Section 2, especially page 2-22 and Appendix A.4.

Water Code § 10632 (f) - Penalties
List excessive use penalties or charges for excessive use
- See Section 2 and Appendix A.4.

Water Code § 10632 (g) - Revenue and Expenditure Impacts
Describe how actions and conditions impact revenues
Describe how actions and conditions impact expenditures
Describe measures to overcome the revenue and expenditure impacts
- See Section 2-7, pages 2-29 through 2-35.

Water Code § 10632 (h) - Water Shortage Contingency Ordinance/Resolution
Attach a copy of the draft water shortage contingency resolution or ordinance.
- Not applicable to Metropolitan. The WSDM and WSAP plans adopted to deal with shortages are discussed in Section 2, pages 2-20 through 2-23. The WSAP is also included as Appendix A.4.

Water Code § 10632 (i) - Reduction Measuring Mechanism
Provided mechanisms for determining actual reductions
- Metropolitan's water sales are metered. See Section 2.

Recycled Water Plan

Water Code § 10633 - Recycling Plan Agency Coordination
Describe the coordination of the recycling plan preparation information to the extent available.
- See Section 3-5, pages 3-40 through 3-55, Table 3-15 on page 3-54, Table 3-16 on page 3-55, and in Appendix A.5, Table A.5-2.

Water Code § 10633 (a) - Wastewater System Description
Describe the wastewater collection and treatment systems in the supplier's service area
Quantify the volume of wastewater collected and treated
- See Section 3-5, pages 3-40 through 3-55, Table 3-15 on page 3-54, Table 3-16 on page 3-55, and in Appendix A.5, Table A.5-2.

Water Code § 10633 (a - d) - Wastewater Disposal and Recycled Water Uses
Describes methods of wastewater disposal
- See Section 3-5, page 3-40.

Describe the current type, place and use of recycled water
- See Section 3-5, page 3-42, and Table A.5-2.

Describe and quantify potential uses of recycled water
- See Section 3-5, page 3-42, and Table A.5-2.

Determination of technical and economic feasibility of serving the potential uses
- See Section 3-5, pages 3-42 through 3-47.

Water Code § 10633 (e) - Projected Uses of Recycled Water

Projected use of recycled water, 20 years

- See Section 2, Tables 2-6 through Table 2-8, pages 2-12 through 2-14 and Section 3-5.

Compare UWMP 2005 projections with UWMP 2010 actual

- The 2005 RUWMP, Tables II-4, II-5, and II-6, included the following projections for recycled water use in 2010: 310,000 AF for a single dry year; 300,000 AF for a multiple dry year; and 316,000 AF for an average year. In 2009, actual recycled water use is estimated at 310,000 AF, as discussed in Appendix A.2, page A.2-8 of this 2010 RUWMP.

Water Code § 10633 (f) - Plan to Optimize Use of Recycled Water

Describe actions that might be taken to encourage recycled water uses

Describe projected results of these actions in terms of acre-feet of recycled water used per year

Provide a recycled water use optimization plan which includes actions to facilitate the use of recycled water (dual distribution systems, promote recirculating uses)

- See Section 3-5, pages 3-40 through 3-55, Table 3-15 on page 3-54, Table 3-16 on page 3-55, and in Appendix A.5, Table A.5-2.

Water Quality Impacts on Reliability

Water Code §10634 - Water quality impacts on availability of supply

Discusses water quality impacts (by source) upon water management strategies and supply reliability

- See Section 4, Water Quality, pages 4-1 through 4-17.

Water Service Reliability

Water Code § 10635 (a) - Supply and Demand Comparison to 20 Years

Compare the projected normal water supply to projected normal water use over the next 20 years, in 5-year increments.

- See Section 2, Tables 2-6 to 2-8, pages 2-12 through 2-14, for projected water use and Table A.3-7 in Appendix A.3, pages A.3-43 through A.3-55 for projected water supply.

Water Code § 10635 (a) - Supply and Demand Comparison: Single-dry Year Scenario

Compare the projected single-dry year water supply to projected single-dry year water use over the next 20 years, in 5-year increments.

- See Section 2, Tables 2-6 to 2-8, pages 2-12 through 2-14, for projected water use and Table A.3-7 in Appendix A.3, pages A.3-43 through A.3-55 for projected water supply.

Water Code § 10635 (a) - Supply and Demand Comparison: Multiple-dry Year Scenario

Project a multiple-dry year period occurring between 2011-2015 and compare projected supply and demand during those years

Project a multiple-dry year period occurring between 2016-2020 and compare projected supply and demand during those years

Project a multiple-dry year period occurring between 2021-2025 and compare projected supply and demand during those years

Project a multiple-dry year period occurring between 2026-2030 and compare projected supply and demand during those years

- Metropolitan has projected multiple dry year periods for years ending in "0" or "5". Its planning for multiple dry years is based on the three years of shortest supplies (1990-1992 hydrology). The results presented in Section 2 for multiple dry years are for an average of three years with this extreme hydrology. See Section 2, Tables 2-6 to 2-8, pages 2-12 through 2-14, for projected water use and Table A.3-7 in Appendix A.3, pages A.3-43 through A.3-55 for projected water supply.

Water Code § 10642 – Does the plan include public participation and plan adoption?

Attach a copy of adoption resolution

- See Section 5, page 5-11.

Encourage involvement of social, cultural & economic community groups

- See Section 5, pages 5-7 through 5-8.

Plan available for public inspection

- See Section 5, pages 5-9 and 5-10.

Provide proof of public hearing

- See Section 5, page 5-10.

Provided meeting notice to local governments

- See Section 5, page 5-9.

Water Code § 10643 – Review of implementation of 2005 uwmp

Reviewed implementation plan and schedule of 2005 UWMP
implemented in accordance with the schedule set forth in the plan

- Metropolitan has conducted a review of its planning progress through the IRP Update, discussed in Section 2.I. In addition, in each section, Metropolitan has included a "Achievement to Date" that discusses progress towards its planning goals, and discussion on current issues and potential problems with continued implementation of the plan.

DMM Programs

- Metropolitan is a member of CUWCC, and has submitted its recent DMM reports to the CUWCC to comply with the UWMP requirements. In addition, Metropolitan has discussed its conservation plan and approach in Section 3-4. Individual conservation programs are discussed on pages 3-28 through 3-39.

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EXECUTIVE SUMMARY

Metropolitan's 2010 Regional Urban Water Management Plan (RUWMP) has been prepared in compliance with Water Code Sections 10608.36 and 10610 through 10656 of the Urban Water Management Planning Act (Act), which were added by Statute 1983, Chapter 1009, and became effective on January 1, 1984. This Act requires that:

> *"every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually prepare and adopt, in accordance with prescribed requirements, an urban water management plan."*

The Urban Water Management Planning Act (Act) requires urban water suppliers to describe and evaluate sources of water supply, efficient uses of water, demand management measures, implementation strategy and schedule, and other relevant information and programs. Urban water suppliers are required by the Act to update their Urban Water Management Plan (UWMP) and submit a complete plan to California Department of Water Resources (DWR) every five years. An UWMP is required in order for a water supplier to be eligible for DWR administered state grants and loans and drought assistance.

As with Metropolitan's previous plans, the 2010 RUWMP does not explicitly discuss specific activities undertaken by its member agencies unless it relates to one of Metropolitan's water demand or supply management programs. Each member agency will discuss these activities in its UWMP. Information from Metropolitan's 2010 RUWMP may be used by many of the local water suppliers in the preparation of their own plans, although it is not mandatory for local agencies to rely on Metropolitan's plan because participation in any regional planning activity is voluntary (pursuant to Water Code § 10620).

The information included in the 2010 RUWMP represents the most current available planning projections of supply capability and demand developed through a collaborative process with the member agencies. Metropolitan is in the process of completing its 2010 Integrated Water Resources Plan Update (2010 IRP Update), which represents Metropolitan's comprehensive planning process and will serve as Metropolitan's blueprint for long-term water reliability, including key supply development and water use efficiency goals.

Factors of Consideration

The Act requires reporting agencies to describe its water reliability under a single dry-year, multiple dry-year, and average year conditions, with projected information in five-year increments for 20 years. The factors of consideration used to evaluate Metropolitan's supply and demand balance for the 2010 RUWMP are presented below. Some of the considerations and resulting projections may change as Metropolitan's planning process is finalized. These changes may be reflected in future preparations of the RUWMP.

Demand Projections

Within Metropolitan's service area, retail water demands can be met with local supplies or imported supplies. Metropolitan's long-term plan focuses on the future demands for Metropolitan's imported supplies. The expected firm demand on Metropolitan is the difference between total demands, adjusted for conservation, and projected total local supplies. Thus, in order to project the regional need for imported water, Metropolitan starts with a projection of total demand including retail Municipal and Industrial (M&I), retail agricultural, seawater barrier, and replenishment demands, determines the adjustments from total conservation, and subtracts the total local supplies that are available to meet a portion of those demands.

Total Demands

Metropolitan updates its retail M&I projection periodically based on the release of official regional demographic and economic projections. The projections of retail M&I water demands used in the 2010 RUWMP are based on data from the following reports:

- Southern California Association of Governments (SCAG) 2007 Regional Transportation Plan
- San Diego Association of Governments (SANDAG) Series 12: 2050 Regional Growth Forecast Update

The SCAG and SANDAG regional growth forecasts are the core assumptions that drive the estimating equations in Metropolitan's MWD-MAIN demand forecasting model. SCAG and SANDAG's projections undergo extensive local review and incorporate zoning information from city and county general plans and are backed by Environmental Impact Reports.

Retail agricultural demands consist of water use for irrigating crops. Metropolitan's member agencies estimate agricultural water use based on many factors, including farm acreage, crop types, historical water use, and land use conversion. Each member agency estimates its agricultural demands differently, depending on availability of information. Metropolitan relies on member agencies' estimates of agricultural demands for the 2010 RUWMP.

Metropolitan also includes in its assessment of total demands the local groundwater requirements for seawater barrier and basin replenishment. Seawater barrier demands represent the amount of water needed to hold back seawater intrusion into the coastal groundwater basins, and are considered firm demands. Replenishment demands represent the amount of water that member agencies plan to use to replenish the groundwater basins as available. Metropolitan relies on member and groundwater management agencies' projections for these demands. For the 2010 RUWMP, replenishment deliveries are not included as part of firm demands.

Total Conservation

Projected regional water demand is adjusted to account for water conserved by Best Management Practices from active, code-based, and price-effect conservation. Active conservation levels are derived by calculating water savings from all active program device-based savings installed to date. Code-based conservation levels are derived by calculating water savings from devices covered by existing water conservation ordinances and plumbing codes, with replacement and new construction rates driven by demographic growth consistent with those used to derive retail demand. Price-effect conservation is derived by calculating water savings by retail customers attributable to the effect of changes in the real (inflation adjusted) price of water.

Water use reduction under Senate Bill 7 (SBX7-7) is factored into regional local water supplies. This has been done to recognize the fact that one method of compliance with SBX7-7 is the development of recycled water in addition to conservation.

Total Local Supplies

Projections of local supplies are based on information gathered from a number of sources including past urban water management plans, Metropolitan's annual local production surveys, and communications between Metropolitan and member agency staff. The projections include groundwater and surface water production, recycled water and recovery of contaminated or degraded groundwater (funded under the Metropolitan's Local Resources Program as wells as local agency funded programs) and seawater desalination. The local supply projections presented in demand tables for the 2010 RUWMP include existing projects that are currently producing water and projects that are under construction.

The total local supplies presented in the 2010 RUWMP also include Los Angeles Aqueduct deliveries and non-Metropolitan water supplies imported by member agencies from sources outside of Metropolitan service area.

Water Use Reduction Target

On November 10, 2009, the state Legislature passed Senate Bill 7 as part of the Seventh Extraordinary Session, referred to as SBX7-7. This new law is the water conservation component to the historic Delta legislative package, and seeks to achieve a 20 percent statewide reduction in urban per capita water use in California by December 31, 2020. According to Water Code §10608.36, wholesale agencies are required to include in their UWMPs an assessment of present and proposed future measures, programs, and policies that would help achieve the water use reductions required under SBX7-7. Urban wholesale water suppliers are not required to comply with the target-setting and reporting requirements of SBX7-7.

Approximately 380 TAF of the additional conservation and/or recycling would be implemented as a result of full compliance by local water agencies with water reduction targets by 2020 at the retail level. This estimated amount is reflected in the projected demand for imported supply in the 2010 RUWMP and is further described in Section 2.2.

Supply Capabilities

The 2010 RUWMP reports on Metropolitan's water reliability and identifies projected supplies to meet the long-term demand within its service area. Metropolitan's supply capabilities are evaluated using the following assumptions:

Hydrologic Conditions and Reporting Period

The 2010 RUWMP presents Metropolitan's supply capabilities from 2015 through 2035 under the three hydrologic conditions specified in the Act: single dry-year (represented by a repeat of 1977 hydrology), multiple dry-year (represented by a repeat of 1990 to 1992 hydrologies) and average year (represented by the average of 1922 to 2004 hydrologies).

Colorado River Aqueduct Supplies

Colorado River Aqueduct supplies include supplies that would result from existing and committed programs and from implementation of the Quantification Settlement Agreement (QSA) and related agreements. The QSA, which is the subject of current litigation, is a component of the California Plan and establishes the baseline water use for each of the agreement parties and facilitates the transfer of water from agricultural agencies to urban uses. A detailed discussion of the QSA is included in Section 3. Colorado River transactions are potentially available to supply additional water up to the CRA capacity of 1.25 MAF on an as-needed basis.

State Water Project Supplies

State Water Project (SWP) supplies are estimated using the draft 2009 SWP Delivery Reliability Report distributed by DWR in December 2009. The draft 2009 reliability report presents the current DWR estimate of the amount of water deliveries for current

(2009) conditions and conditions 20 years in the future. These estimates incorporate restrictions on SWP and Central Valley Project (CVP) operations in accordance with the biological opinions of the U.S. Fish and Wildlife Service and National Marine Fishery Service issued on December 15, 2008, and June 4, 2009, respectively. Under the 2009 draft reliability report, the delivery estimates for the SWP for current (2009) conditions as percentage of maximum Table A amounts, are 7%, equivalent to 134 TAF, under a single dry-year (1977) condition and 60%, equivalent to 1.15 MAF, under long-term average condition.

In dry, below-normal conditions, Metropolitan has increased the supplies received from the California Aqueduct by developing flexible Central Valley/SWP storage and transfer programs. Over the last two years under the pumping restrictions of the SWP, Metropolitan has worked collaboratively with the other contractors to develop numerous voluntary Central Valley/SWP storage and transfer programs. The goal of this storage/transfer programs is to develop additional dry-year supplies that can be conveyed through the available Banks pumping capacity to maximize deliveries through the California Aqueduct during dry hydrologic conditions and regulatory restrictions.

Delta Improvements

The listing of several fish species as threatened or endangered under the federal or California Endangered Species Acts (ESAs) have adversely impacted operations and limited the flexibility of the SWP. In response to court decisions related to the Biological Opinions for fish species listed under the ESAs, DWR altered the operations of the SWP. This resulted in export restrictions and reduced SWP deliveries. In June 2007, Metropolitan's Board approved a Delta Action Plan that provides a framework for staff to pursue actions with other agencies and stakeholders to build a sustainable Delta and reduce conflicts between water supply conveyance and the environment. The Delta Action Plan aims to prioritize immediate short-term actions to stabilize the Delta while an ultimate solution is selected, and mid-term steps to maintain the Bay-Delta while the long-term solution is implemented.

In the near-term, the physical and operational actions in the Bay-Delta being developed include measures that protect fish species and reduce supply impacts with the goal of reducing conflicts between water supply conveyance and environmental needs. The potential for Increased supply due to these near-term fixes is included in the 2010 RUWMP as a 10 percent increase in water supplies obtained from the SWP allocation for the year. In evaluating the supply capabilities for the 2010 RUWMP, additional supplies from this interim fix are assumed to materialize by 2013. Also included as a possible near-term fix for the Bay-Delta is the proposed Two-Gate System demonstration program, which would provide movable barriers on the Old and Middle Rivers to modify flows and prevent fish from being drawn toward the Bay-Delta pumping plants. The Two-Gate System is anticipated to protect fish and increase SWP supplies.

Operational constraints likely will continue until a long-term solution to the problems in the Bay-Delta is identified and implemented. State and federal resource agencies and various environmental and water user entities are currently engaged in the development of the Bay Delta Conservation Plan (BDCP), which is aimed at addressing the basic elements that include the Delta ecosystem restoration, water supply conveyance, and flood control protection and storage development. In dealing with these basic issues, the ideal solutions sought are the ones that address both the physical changes required as well as the financing and governance. In evaluating the supply capabilities for the 2010 RUWMP, Metropolitan assumed a new Delta conveyance is fully operational by 2022 that would return supply reliability similar to 2005 condition, prior to supply restrictions imposed due to the Biological Opinions. This assumption is consistent with Metropolitan's long-term Delta Action Plan that recognizes the need for a global, comprehensive approach to the fundamental issues and conflicts to result in a sustainable Bay-Delta, sufficient to avoid biological opinion restrictions on planned SWP deliveries to Metropolitan and the other SWP Contractors. Further, recently passed state legislation included pathways for establishing governance structures and financing approaches to implement and manage the identified elements.

Storage

A key component of Metropolitan's water supply capability is the amount of water in Metropolitan's storage facilities. Storage is a major component of Metropolitan's dry-year resource management strategy. Metropolitan's likelihood of having adequate supply capability to meet projected demands, without implementing the Water Supply Allocation plan (WSAP), is dependent on its storage resources.

In developing the supply capabilities for the 2010 RUWMP, Metropolitan assumed a simulated median storage level going into each of five-year increments based on the balances of supplies and demands. Under the median storage condition, there is an estimated 50 percent probability that storage levels would be higher than the assumption used, and a 50 percent probability that storage levels would be lower than the assumption used. All storage capability figures shown in the 2010 RUWMP reflect actual storage program conveyance constraints. It is important to note that under some conditions, Metropolitan may choose to implement the WSAP in order to preserve storage reserves for a future year, instead of using the full supply capability. This can result in impacts at the retail level even under conditions where there may be adequate supply capabilities to meet demands.

Findings of the 2010 Regional Urban Water Management Plan

The 2010 RUWMP provides a comprehensive summary of Metropolitan's demand and supply outlook through 2035. As a reporting document, the RUWMP will be updated every five years to reflect changes in water demand and supply projections.

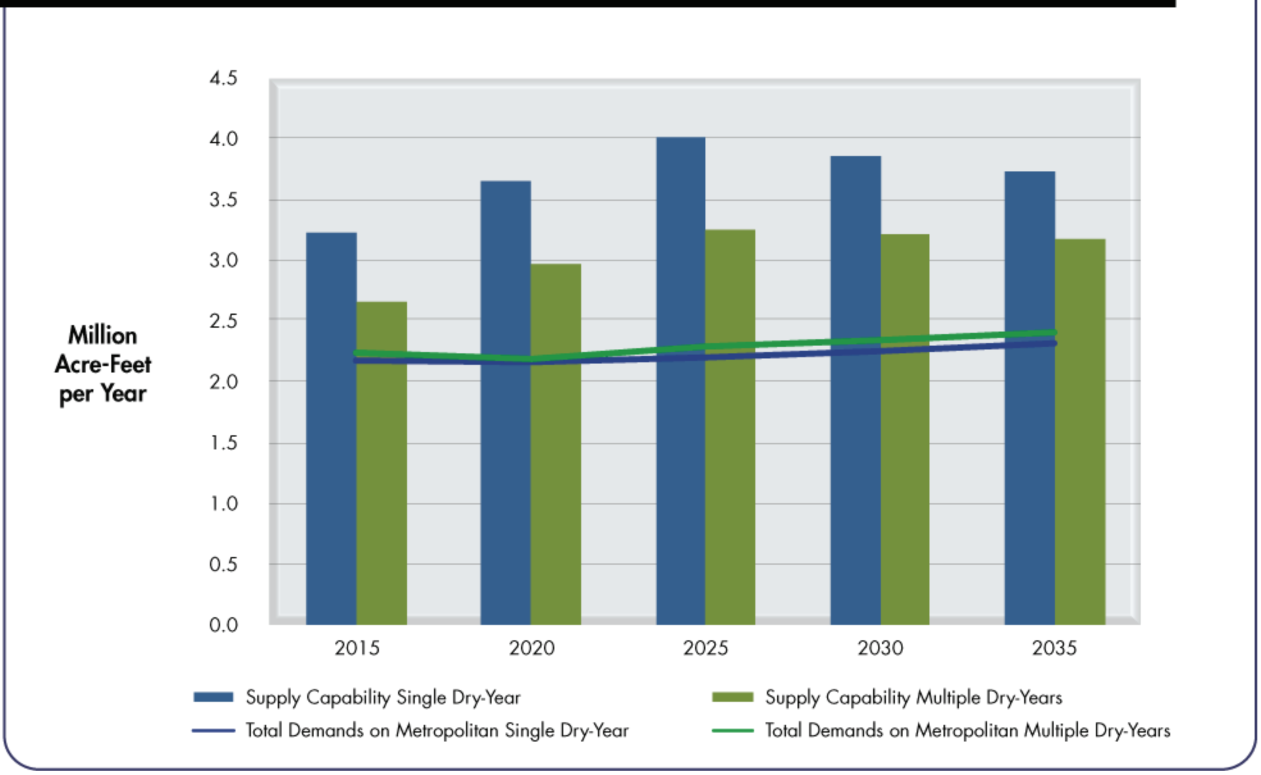
The 2010 RUWMP satisfies all the reporting requirements mandated by the Act. The key reporting points of this report are as follows:

- Metropolitan has supply capabilities that would be sufficient to meet expected demands from 2015 through 2035 under the single dry-year and multiple dry-year conditions, as presented in Figure ES-1.
- Metropolitan has comprehensive plans for stages of actions it would undertake to address up to 50 percent reduction in its water supplies and a catastrophic interruption in water supplies through its Water Surplus and Drought Management and Water Supply Allocation Plans. Metropolitan also developed an Emergency Storage Requirement to mitigate against potential interruption in water supplies resulting from catastrophic occurrences within the Southern California region, including seismic events along the San Andreas fault. In addition, Metropolitan is working with the State to implement a comprehensive improvement plan to address catastrophic occurrences that could occur outside of the Southern California region, such as a maximum probable seismic event in the Delta that would cause levee failure and disruption of SWP deliveries.
- Metropolitan has plans for supply implementation and continued development of a diversified resource

mix including programs in the CRA, SWP, Central Valley transfers, local resource projects, and in-region storage that enables the region to meet its water supply needs.

- Metropolitan has a collaborative process in its planning initiatives, including the preparation of the 2010 RUWMP.

Figure ES-1 Supply Capabilities under Single Dry-Year and Multiple Dry-Year Hydrologies



Note:

1. Supply capabilities are derived using simulated median storage level going into each of five-year increments based on the balances of supplies and demands. Under the median storage condition, there is an estimated 50 percent probability that storage levels would be higher than the assumption used, and a 50 percent probability that storage levels would be lower than the assumption used.
2. Under some conditions, Metropolitan may choose to implement the WSAP in order to preserve storage reserves for a future year, instead of using the full supply capability. This can result in impacts at the retail level even under conditions where there may be adequate supply capabilities to meet firm demands.
3. All storage capability figures shown in the 2010 RUWMP reflect actual storage program conveyance constraints.

Introduction 1

1.1 Introduction to this Document and the Agency

Organization of this Document

This report complies with the Urban Water Management Planning Act of 1984. In addition to complying with the Act, this report details Metropolitan's current situation and how it will meet the challenges of the future. This document contains five sections. The first section is the introduction that defines Metropolitan in terms of governance, structure, and current water supply status. This section also outlines briefly how Metropolitan will meet current and future challenges. The second section describes Metropolitan's planning activities and explains how the agency will manage the region's water resources to ensure a reliable water supply for the region. The third section describes the actions Metropolitan has taken to implement the plans outlined in Section 2 and lists future programs and activities. The fourth section of this report addresses the issue of water quality and steps taken to deliver high-quality water to Metropolitan's service area. The last section details the public outreach component integrated with Metropolitan's planning processes. Appendices that include supporting documents for this report are at the conclusion of this report. The sections are further described in detail below:

Section 1 - Introduction

In addition to demonstrating how this report complies with the Act, the 2010 RUWMP details Metropolitan's current situation and outlines its plan for meeting the challenges of the future. The Introduction section includes:

- Discussion of the Act and Metropolitan's reporting responsibilities under the Act
- Introduction of Metropolitan and description of the formation, purpose, service area, member agencies and governance
- Historical and demographic information on Metropolitan's service area
- Discussion of Metropolitan's current condition, challenges, and resource planning strategies
- Evaluation of Metropolitan's supply capabilities for the next three years under multiple dry-year scenario

Section 2 - Planning for the Future

The Planning for the Future section discusses how Metropolitan plans to meet Southern California's water needs in the future. The section highlights the importance of Integrated Resource Planning by summarizing Metropolitan's planning processes over the years and emphasizes the need for Metropolitan to implement adaptive planning strategies that will prepare the region to deal with uncertainties. This section also includes:

- Evaluation of regional water demand under single dry-year, multiple dry-year, and average year condition for years 2015 through 2035
- Evaluation of supply capabilities under single dry-year, multiple dry-year, and average year condition for years 2015 through 2035
- Discussion of water shortage contingency analysis though the Water Surplus and Drought Management Plan and the Water Supply Allocation Plan

- Discussion of other supply reliability risks including climate change
- Discussion of the different elements of Metropolitan's rate structure and revenue management

Section 3 - Implementation Plan

The Implementation Plan section summarizes Metropolitan's progress in developing a diversified resource mix that enables the region to meet its water supply needs. The investments that Metropolitan has made and its continuing efforts in many different areas coalesce toward its goal of long-term supply reliability for the region. This section includes:

- Discussion of resources and program development within the CRA, SWP, Central Valley transfers programs, conservation, LRP (groundwater recovery, recycling, desalination), and groundwater
- Discussion of Metropolitan's action to meet the water reduction target (20 percent by 2020)

Section 4 - Water Quality

The Water Quality section identifies key regional water quality issues and provides discussion of the protection of the quality of source water and development of water management programs that maintain and enhance water quality. This section also includes:

- Discussion of water quality issues of concern, issues of decreasing concern, and actions that Metropolitan has undertaken to protect its water supplies.

Section 5 - Public Outreach

The Public Outreach section presents the processes undertaken in the development of the 2010 IRP Update, RUWMP, and Groundwater workshops with the stakeholders. It provides a list of all meetings and workshops accomplished to promote and achieve consensus and collaborative planning processes. Also included in this section are the public notification letters and announcements distributed by Metropolitan as required by the Act and a copy of the Metropolitan resolution adopting the 2010 RUWMP and approving it for submittal to DWR. This section also includes description of public processes for:

- IRP Update Process
- Groundwater Process
- 2010 Regional Urban Water Management Plan Process

<u>Appendices</u>

The appendices provided present detailed background on the information presented in the 2010 RUWMP.

- A.1 - Demand Forecasting
- A.2 - Evaluation of existing regional water supplies
- A.3 - Justifications for supply projections
- A.4 - Water Supply Allocation Plan
- A.5 - List of local projects
- A.6 - Recent CUWCC Filings

Urban Water Management Planning Act

This report has been prepared in compliance with Water Code Sections 10610 through 10656 of the Urban Water Management Planning Act (Act), which were added by Statute 1983, Chapter 1009, and became effective on January 1, 1984. This Act requires that "*every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually prepare and adopt, in accordance with prescribed requirements, an urban water management plan.*" These plans must be filed with the California Department of Water Resources (DWR) every five years.[1] The Act's requirements include:

[1] UWMPs prepared by urban wholesale water suppliers are due to DWR by December 31, 2010; plans prepared by urban retail water suppliers were granted a six-month extension and are due to DWR by July 1, 2011.

- Detailed evaluation of the supplies necessary to meet demands over at least a 20-year period in a single year and multi-year droughts and during average year conditions,
- Documentation of the stages of actions it would undertake to address up to 50 percent reduction in its water supplies,
- Description of the actions to be undertaken in the event of a catastrophic interruption in water supplies, and
- Evaluation of reasonable and practical efficient water uses, recycling, and conservation activities.

In addition, Water Code § 10608.36 requires wholesale agencies to include in their UWMPs an assessment of present and proposed future measures, programs, and policies that would help achieve water use reduction targets.

Changes in the Act Since 2005

Since 2005, several amendments have been added to the Act. Some of the amendments provided for reporting on lower income and affordable household water projections, eligibility for state water management grants or loans, and reporting on the feasibility of serving recycled water demands. The following is a summary of the significant changes in the Act that have occurred from 2005 to the present:

- Clarifies that every urban water supplier preparing a plan must give at least 60 days advance notice to any city or county prior to the public hearing on the UWMP within which the supplier provides water supplies to allow opportunity for consultation on the proposed plan (Water Code § 10621(b)).
- Requires plan by retail water suppliers to include water use projections for single-family and multifamily residential housing needed for lower income and affordable households to assist with compliance with the existing requirement under Section 65589.7 of the Government Code that suppliers grant a priority for the provision of service to housing units affordable to lower income households (Water Code § 10631.1).
- Conditions eligibility for a water management grant or loan made to an urban water supplier and awarded or administered by DWR, the State Water Resources Control Board, or the California Bay-Delta Authority or its successor agency on the implementation of water demand management measures, including consideration of the extent of compliance with the conservation measures described in the California Urban Water Conservation Council's Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) (Water Code § 10631.5).[2]
- Exempts projects funded by the American Recovery and Reinvestment Act of 2009 from the conditions placed on state funding for water management to urban water suppliers (Water Code § 10631.5(a)(2)).
- Requires DWR, in consultation with the State Water Resources Control Board and the California Bay-Delta Authority or its successor agency, to develop eligibility requirements to implement the foregoing grant and loan conditions (Water Code § 10631.5(b)).
- Repeals existing grant funding conditions of state water management grants or loans on July 1, 2016 if the UWMP is not extended or altered prior to this date (Water Code § 10631.5(f)).

[2] Although this section is included in the Act, it does not directly relate to the reporting required under the UWMPs. Instead, it is focused on eligibility for DWR grants and loans. Thus, there is no corresponding reporting section for this portion of the Act in this plan.

- Deems water suppliers that are members of the California Urban Water Conservation Council and comply with the MOU, as it may be amended, to be in compliance with the requirement to describe the supplier's water demand management measures in its urban water management plan (Water Code § 10631(j)).
- Required DWR, in consultation with the California Urban Water Conservation Council, to convene a technical panel, no later than January 1, 2009, to provide information and recommendations to the Department and the Legislature on new demand management measures, technologies, and approaches. The panel and DWR were to report to the Legislature on their findings no later than January 1, 2010 and each five years thereafter (Water Code § 10631.7).[3]
- Clarifies that "indirect potable reuse" of recycled water should be described and quantified in the plan, including a determination with regard to the technical and economic feasibility of serving those uses (Water Code § 10633(d)). Requires DWR to recognize exemplary efforts by water suppliers by obligating DWR to identify and report to the technical panel, described above, any "exemplary elements" of individual water suppliers' plans, meaning any water demand management measures adopted and implemented by specific urban water suppliers that achieve water savings significantly above the levels required to meet the conditions to state grant or loan funding (Water Code § 10644(c)).

[3] Due to subsequent changes in the law (see discussion of Senate Bill 7), DWR has not yet convened this technical panel or submitted a report to the Legislature.

Senate Bill 7 of the Seventh Extraordinary Session of 2009 Water Conservation in the Delta Legislative Package

In addition to changes to the Act, the state Legislature passed Senate Bill 7 as part of the Seventh Extraordinary Session, referred to as SBX7-7, on November 10, 2009, which became effective February 3, 2010. This new law was the water conservation component to the historic Delta legislative package, and seeks to achieve a 20 percent statewide reduction in urban per capita water use in California by December 31, 2020. This implements the governor's similar 2008 water use reduction goals. The law will require each urban retail water supplier to develop urban water use targets to help meet the 20 percent goal by 2020, and an interim urban water reduction target by 2015.

The bill states that the legislative intent is to require all water suppliers to increase the efficiency of use of water resources and to establish a framework to meet the state targets for urban water conservation called for by the governor. The bill establishes methods for urban retail water suppliers to determine targets to help achieve increased water use efficiency by the year 2020. The law is intended to promote urban water conservation standards consistent with the California Urban Water Conservation Council's adopted best management practices.

Additionally, the bill specifically includes reporting requirements in the upcoming UWMPs. Specifically, urban retail water suppliers must include in their 2010 UWMPs the following information from its target-setting process: (1) baseline daily per capita water use; (2) urban water use target; (3) interim water use target; and (4) compliance daily per capita water use, including technical bases and supporting data for those determinations. An urban retail water supplier may update its 2020 urban water use target in its 2015 UWMP (Water Code § 10608.20).

To give retail urban water suppliers time to conduct the additional required analyses, SBX7-7 grants an extension for submission of UWMPs due in 2010 to July 1, 2011. The bill does not expressly provide this same extension for wholesale water agencies such as Metropolitan (Water Code § 10608.20(j)).

Urban *wholesale* water suppliers are not required to perform all of the target-setting and reporting requirements of SBX7-7. However, wholesale agencies must include in UWMPs an assessment of present and proposed future measures, programs, and policies that would help achieve the water use reductions required under this bill (Water Code § 10608.36).

Metropolitan addresses the actions it is taking to help achieve the urban per capita water use reduction pursuant to the goals set forth in SBX7-7 in Section 3.7.

Metropolitan's Responsibilities Under the Urban Water Management Planning Act

As with Metropolitan's previous plans, this plan does not explicitly discuss specific activities undertaken by member agencies unless it relates to one of Metropolitan's water demand or supply management programs. Presumably, each member agency will discuss these activities in its Urban Water Management Plan. Information from this Plan may be used by many of the local water suppliers in the preparation of their own plans, but elements of this Plan do not necessarily have to be adopted by the urban water suppliers or the public agencies directly providing retail water because participation in any regional planning activity is voluntary (pursuant to Water Code § 10620). By law, an urban water supplier that provides water indirectly (such as Metropolitan) may not include planning elements in its water management plan that would be applicable to agencies that provide water directly, without the consent of those agencies.

DWR Guidance

In 2005, DWR provided guidance materials to aid water districts in developing their urban water management plans. These materials both helped water districts comply with the law and DWR staff review submitted plans for regulatory compliance. The guidance materials consisted of a series of worksheets detailing acceptable responses to the requirements set forth in the Act. At that time, DWR also provided a checklist for cross referencing sections of the respondent water agency's Plan with the relevant sections of the Water Code to be sure that it addresses all relevant provisions of the Act.

Since the revised guidebook and checklist for the 2010 Urban Water Management Plan will not be released until DWR completes the development of new reporting methodologies for retail agencies, Metropolitan used the 2005 guideline materials in the development of this plan. In addition, Metropolitan also closely monitored changes in the reporting requirements brought about by new legislation and changes to the Act. Included in this plan is a compliance checklist at the beginning of this document, organized by Water Code section, which summarizes response to requirements of the Water Code.

1.2 The Metropolitan Water District of Southern California

Formation and Purpose

The Metropolitan Water District of Southern California (Metropolitan) is a public agency organized in 1928 by a vote of the electorates of 13 Southern California cities. The agency was enabled by the adoption of the original Metropolitan Water District Act (Metropolitan Act) by the California Legislature "for the purpose of developing, storing, and distributing water" to the residents of Southern California. The Metropolitan Act also allows Metropolitan to sell additional water, if available, for other beneficial uses. In 1992, the Metropolitan Board of Directors adopted the following mission statement:

> *"To provide its service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way."*

The first function of Metropolitan was building the Colorado River Aqueduct (CRA) to convey water from the Colorado River. Deliveries through the aqueduct began in the early 1940s and supplemented the local water supplies of the Southern California member cities. In 1960, to meet growing water demands in its service area, Metropolitan contracted for additional water supplies from the State Water Project (SWP) via the California Aqueduct, which is owned and operated by DWR. SWP deliveries began in 1972. Metropolitan currently receives imported water from both of these sources: (1) the Colorado River water via the CRA and (2) the SWP via the California Aqueduct.

Service Area

Metropolitan's service area covers the Southern California coastal plain. It extends about 200 miles along the Pacific Ocean from the city of Oxnard on the north to the international boundary with Mexico on the south, and it reaches as far as 70 miles inland from the coast (Figure 1-1). The total area served is nearly 5,200 square miles, and it includes portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. Table 1-1 shows that although only 14 percent of the land area of the six Southern California counties is within Metropolitan's service area, nearly 90 percent of the populations of those counties reside within Metropolitan's boundaries.

Member Agencies

Metropolitan is currently composed of 26 member agencies, including 14 cities, 11 municipal water districts, and one county water authority. Metropolitan is a water wholesaler with no retail customers. It provides treated and untreated water directly to its member agencies.

Metropolitan's 26 member agencies deliver to their customers a combination of local groundwater, local surface water, recycled water, and imported water purchased from Metropolitan. For some member agencies, Metropolitan supplies all the water used within that agency's service area, while others obtain varying amounts of water from Metropolitan to supplement local supplies. Metropolitan provided between 45 and 60 percent of the municipal, industrial, and agricultural water used in its service area. The remaining water supply comes from local wells, local surface water, recycling, the city of Los Angeles' aqueduct from the eastern Sierra Nevada, and the San Diego County Water Authority's water transfers from the Imperial Irrigation District delivered through an exchange of water supplies with Metropolitan. Member agencies also implement conservation programs that can be considered part of their supplies.

Some member agencies provide retail water service, while others provide water to the local area as wholesalers. Table 1-2 shows Metropolitan member agencies and the type of service that they provide. As shown in the table, 15 member agencies provide retail service to customers, nine provide only wholesale service, and two provide a combination of both. Throughout Metropolitan's service area, approximately 250 retail water supply agencies directly serve the population.

Metropolitan's member agencies serve residents in 152 cities and 89 unincorporated communities. Table 1-3 shows the member agencies of Metropolitan, as well as the cities and communities served by those member agencies. Figure 1-1 also shows the geographical area served by the member agencies.

Currently, member agencies receive water from Metropolitan at various delivery points, and pay for service through a rate structure made up of multiple components. The majority of these components consist of uniform volumetric rates, and the majority of the revenue is collected through a tiered volumetric supply charge. The second tier of this rate is set at the cost of developing new supplies. Metropolitan's pricing and rate structure are described in detail in Section 2.7.

To aid in planning future water needs, member agencies advise Metropolitan in April of each year how much water they anticipate they will need during the next five years. In addition, Metropolitan works with its member agencies to forecast future water demands.

Table 1-1
July 1, 2009 Area and Population in the
Six Counties of Metropolitan's Service Area

County	Total County	In Metropolitan Service Area	Percent in Metropolitan
Land Area (Square Miles)			
Los Angeles County	4,061	1,408	35%
Orange County	789	699	89%
Riverside County	7,208	1,057	15%
San Bernardino County	20,052	242	1%
San Diego County	4,200	1,420	34%
Ventura County	1,845	365	20%
Metropolitan's Service Area	**38,155**	**5,191**	**14%**
Population (Persons)			
Los Angeles County	10,409,000	9,500,000	91%
Orange County	3,155,000	3,155,000	100%
Riverside County	2,128,000	1,520,000	71%
San Bernardino County	2,064,000	816,000	40%
San Diego County	3,208,000	3,076,000	96%
Ventura County	841,000	617,000	73%
Metropolitan's Service Area	**21,805,000**	**18,684,000**	**86%**

Table 1-2
Metropolitan's Member Agencies and Type of Water Service Provided

Member Agency	Retail or Wholesale
Los Angeles County	
Beverly Hills, City of	Retail
Burbank, City of	Retail
Central Basin Municipal Water District	Wholesale
Compton, City of	Retail
Foothill Municipal Water District	Wholesale
Glendale, City of	Retail
Las Virgenes Municipal Water District	Retail
Long Beach, City of	Retail
Los Angeles, City of	Retail
Pasadena, City of	Retail
San Fernando, City of	Retail
San Marino, City of	Retail
Santa Monica, City of	Retail
Three Valleys Municipal Water District	Wholesale
Torrance, City of	Retail
Upper San Gabriel Valley Municipal Water District	Wholesale
West Basin Municipal Water District	Wholesale
Orange County	
Anaheim, City of	Retail
Fullerton, City of	Retail
Municipal Water District of Orange County	Wholesale
Santa Ana, City of	Retail
Riverside County	
Eastern Municipal Water District	Retail & Wholesale
Western Municipal Water District	Retail & Wholesale
San Bernardino County	
Inland Empire Utilities Agency	Wholesale
San Diego County	
San Diego County Water Authority	Wholesale
Ventura County	
Calleguas Municipal Water District	Wholesale

Table 1-3
Member Agencies

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Municipal Water Districts (11)		Member Cities (14)			County Water Authorities (1)
Calleguas	Orange County	Anaheim	Glendale	San Marino	San Diego
Central Basin	Three Valleys	Beverly Hills	Long Beach	Santa Ana	
Foothill	Upper San Gabriel Valley	Burbank	Los Angeles	Santa Monica	
Inland Empire	West Basin	Compton	Pasadena	Torrance	
Eastern	Western	Fullerton	San Fernando		
Las Virgenes					

CITIES WITHIN MEMBER AGENCIES

CALLEGUAS MWD
Camarillo
Camarillo Heights
Fairview
Lake Sherwood Valley
Las Posas
Moorpark
NAWS Point Mugu
NCBC Port Hueneme
Oak Park
Oxnard
Port Hueneme
Santa Rosa Valley
Simi Valley
Somis
Thousand Oaks

Central Basin MWD
Artesia
Bell
Bellflower
Bell Gardens
Cerritos
Commerce
Cudahy
Downey
East Los Angeles
Florence
Hawaiian Gardens
Huntington Park
La Habra Heights
Lakewood
La Mirada
Lynwood
Maywood
Montebello
Norwalk
Paramount
Pico Rivera
Santa Fe Springs
Signal Hill
South Gate
South Whittier
Vernon
Whittier

FOOTHILL MWD
Altadena
La Cañada Flintridge
La Crescenta
Montrose

INLAND EMPIRE
Chino
Chino Hills
Fontana
Montclair
Ontario
Rancho Cucamonga
Upland

Eastern MWD
Good Hope
Hemet
Homeland
Juniper Flats
Lakeview
Mead Valley
Menifee
Moreno Valley
Murrieta
Murrieta Hot Springs
Nuevo
North Canyon Lake
Perris
Quail Valley
Romoland
San Jacinto
Sun City
Temecula
Valle Vista
Winchester

LAS VIRGENES MWD
Agoura
Agoura Hills
Calabasas
Chatsworth
Hidden Hills
Lake Manor
Malibu Lake
Monte Nido
Westlake Village
West Hills

MWD OF ORANGE COUNTY
Aliso Viejo
Brea
Buena Park
Capistrano Beach
Corona Del Mar
Costa Mesa
Coto De Caza
Cypress
Dana Point
Fountain Valley
Garden Grove
Huntington Beach
Irvine
Laguna Beach
Laguna Hills
Laguna Niguel
Laguna Woods
La Habra
Lake Forest
La Palma
Leisure World
Los Alamitos
Mission Viejo
Monarch Beach
Newport Beach
Orange
Placentia
Rancho Santa Margarita
San Clemente

MWD OF ORANGE COUNTY (cont.)
San Juan Capistrano
Seal Beach
Stanton
Tustin
Tustin Foothills
Villa Park
Westminster
Yorba Linda

Three Valleys MWD
Azusa
Charter Oak
Claremont
Covina
Covina Knolls
Diamond Bar
Glendora
Industry
La Verne
Pomona
Rowland Heights
San Dimas
So. San Jose Hills
Walnut
West Covina

UPPER SAN GABRIEL VALLEY MWD
Arcadia
Avocado Heights
Baldwin Park
Bradbury
Citrus
Covina
Duarte
El Monte
Glendora
Hacienda Heights
Industry
Irwindale
La Puente
Mayflower Village
Monrovia
Rosemead
San Gabriel
South El Monte
South Pasadena
South San Gabriel
Temple City
Valinda
West Covina
West Puente Valley

WEST BASIN MWD
Alondra Park
Carson
Culver City
El Segundo
Gardena
Hawthorne
Hermosa Beach
Inglewood
Ladera Heights
Lawndale
Lennox

WEST BASIN MWD (cont.)
Lomita
Malibu
Manhattan Beach
Marina Del Rey
Palos Verdes Estates
Rancho Palos Verdes
Redondo Beach
Rolling Hills
Rolling Hills Estates
Ross-Sexton
Topanga Canyon
West Athens
West Hollywood

WESTERN MWD OF RIVERSIDE COUNTY
Bedford Heights
Canyon Lakes
Corona
Eagle Valley
El Sobrante
Jurupa
Lake Elsinore
Lake Mathews
March AFB
Murrieta
Norco
Riverside
Rubidoux
Temecula
Temescal Canyon
Woodcrest

SAN DIEGO CWA
Alpine
Bonita
Bonsall
Camp Pendleton
Carlsbad
Casa De Oro
Chula Vista
Del Mar
El Cajon
Encinitas
Escondido
Fallbrook
Lakeside
La Mesa
Lemon Grove
Mount Helix
National City
Oceanside
Pauma Valley
Poway
Rainbow
Ramona
Rancho Santa Fe
San Diego
San Marcos
Santee
Solana Beach
Spring Valley
Valley Center
Vista

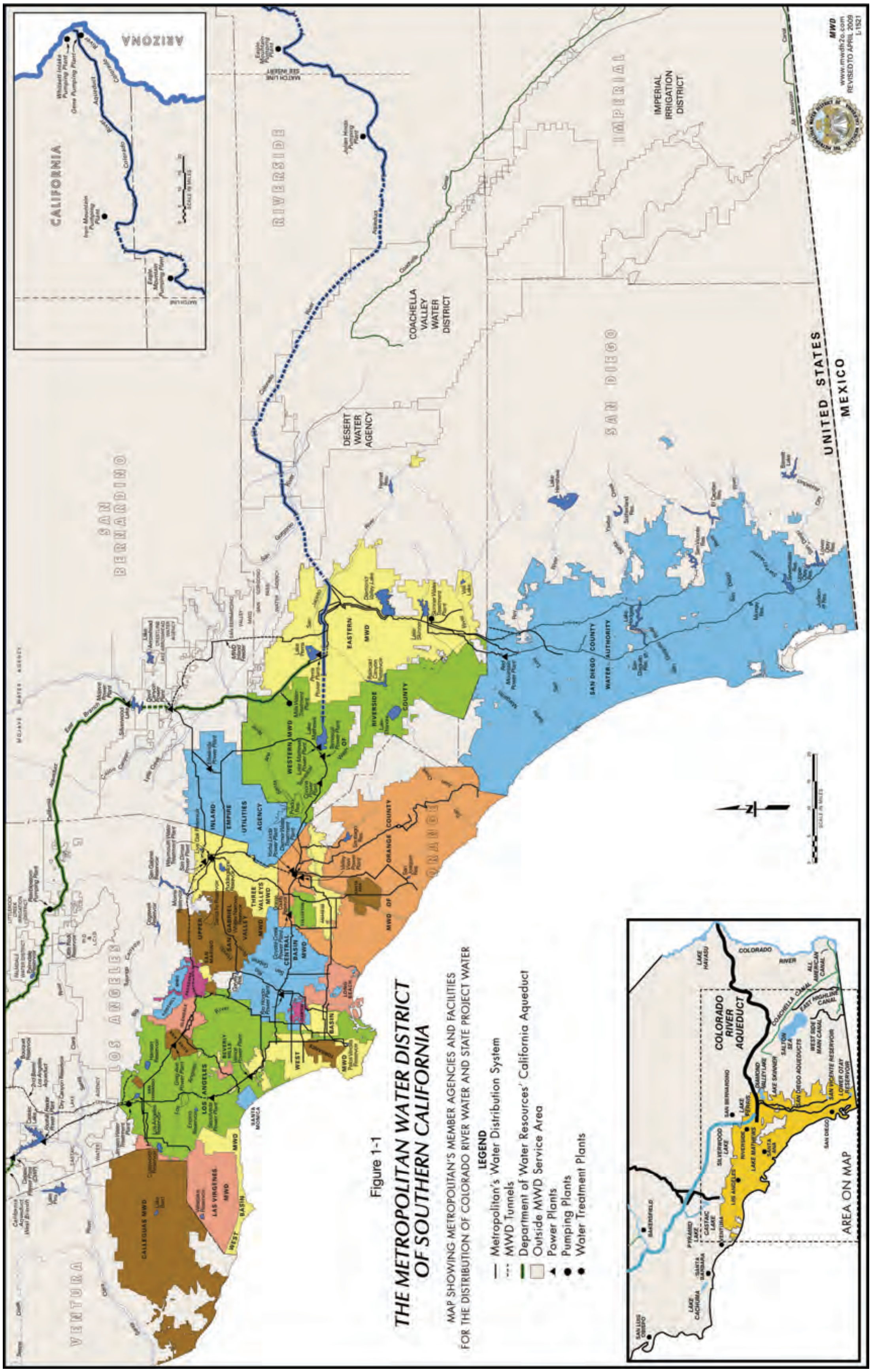


Figure 1-1

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

MAP SHOWING METROPOLITAN'S MEMBER AGENCIES AND FACILITIES FOR THE DISTRIBUTION OF COLORADO RIVER WATER AND STATE PROJECT WATER

Board of Directors and Management Team

Metropolitan's Board of Directors currently consists of 37 directors. The Board consists of at least one representative from each member agency, with each agency's assessed valuation determining its additional representation and voting rights. Directors can be appointed by the chief executive officer of the member agency or be elected by a majority vote of the governing body of the agency. Metropolitan does not compensate directors for their service. The Board includes business, professional and civic leaders. Board meetings are generally held on the second Tuesday of each month and are open to the public.

Throughout its history, the Board has delegated certain tasks to Metropolitan staff, which are codified in Metropolitan's Administrative Code (Code). In addition, Metropolitan has developed policy principles to help achieve its mission to provide adequate and reliable supplies of high-quality water in an environmentally and economically responsible way. These policies can be found in a variety of documents including: specific policy statements, the Administrative Code, Board-adopted policy principles, and letters submitted to the Board. Policy statements are also imbedded in formal Board meeting discussions and recorded in meeting minutes. The policies established by the Board are subject to all applicable laws and regulations. The management of Metropolitan is under the direction of its General Manager, who serves at the discretion of the Board, as do Metropolitan's General Auditor, General Counsel, and Ethics Officer.

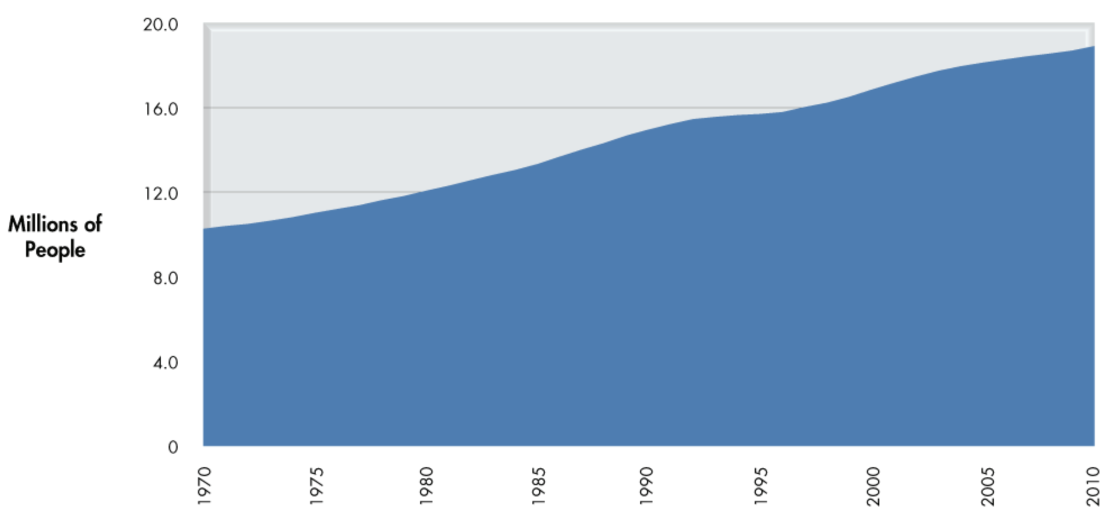
1.3 Metropolitan Service Area Historical Information

Population

In 1990, the population of Metropolitan's service area was approximately 14.8 million people. By 2010, it had reached an estimated 19.1 million, representing about 50 percent of the state's population. In the past, annual growth has varied from about 200,000 annually in the 1970s and early-to-mid-1980s to more than 300,000 annually in the late 1980s. Population growth slowed during the early 1990s to just over 50,000 in 1995, before again rising to more than 300,000 per year in the period 1999 through 2002. Growth has generally oscillated around 200,000 persons per year since that time. Figure 1-2 shows the service area population growth from 1970-2010.

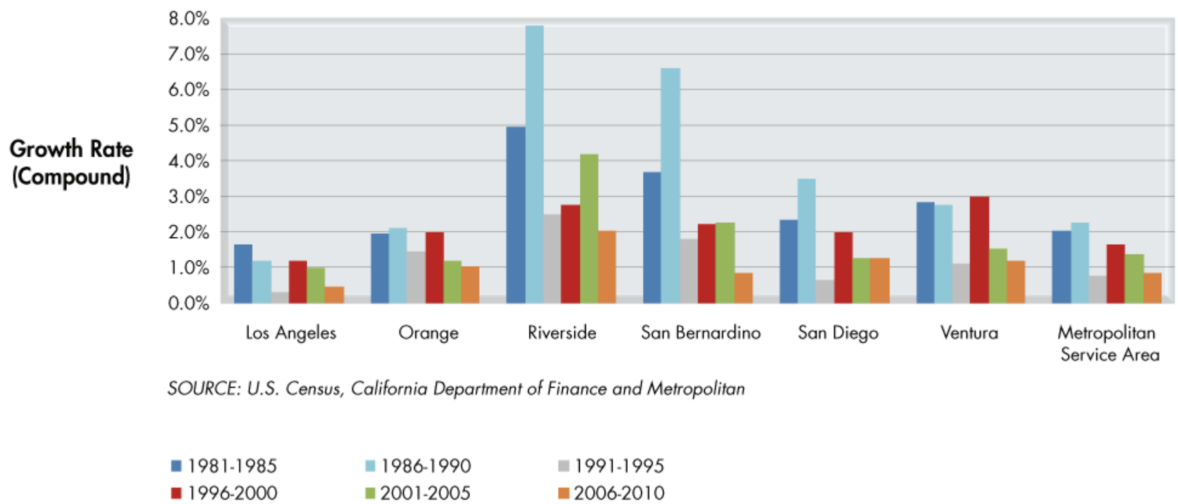
The most populated cities within Metropolitan's service area are Los Angeles (largest city in the state), San Diego (second largest in the state), Long Beach, Anaheim, Santa Ana and Riverside. Between 2006 and 2010 the largest population increases are estimated to have occurred in the city of Los Angeles and in the service area of the San Diego County Water Authority. While these two areas have increased by the largest numbers, Figure 1-3 shows that populations of Riverside and San Bernardino counties have historically increased at the fastest rates. As can also be seen from this figure, however, the rates of increase for Riverside and San Bernardino fell markedly between 2006 and 2010, evidencing the disproportionate effect of the housing "bust" and the economic recession of the late 2000s. Appendix A.1 presents a detailed discussion of the demographic trends in Southern California and their impacts on regional demand forecasts.

Figure 1-2 Service Area Population Growth 1970-2010



SOURCE: U.S. Census, California Department of Finance and Metropolitan

Figure 1-3 Average Annual Population Growth Rates in Metropolitan's Service Area



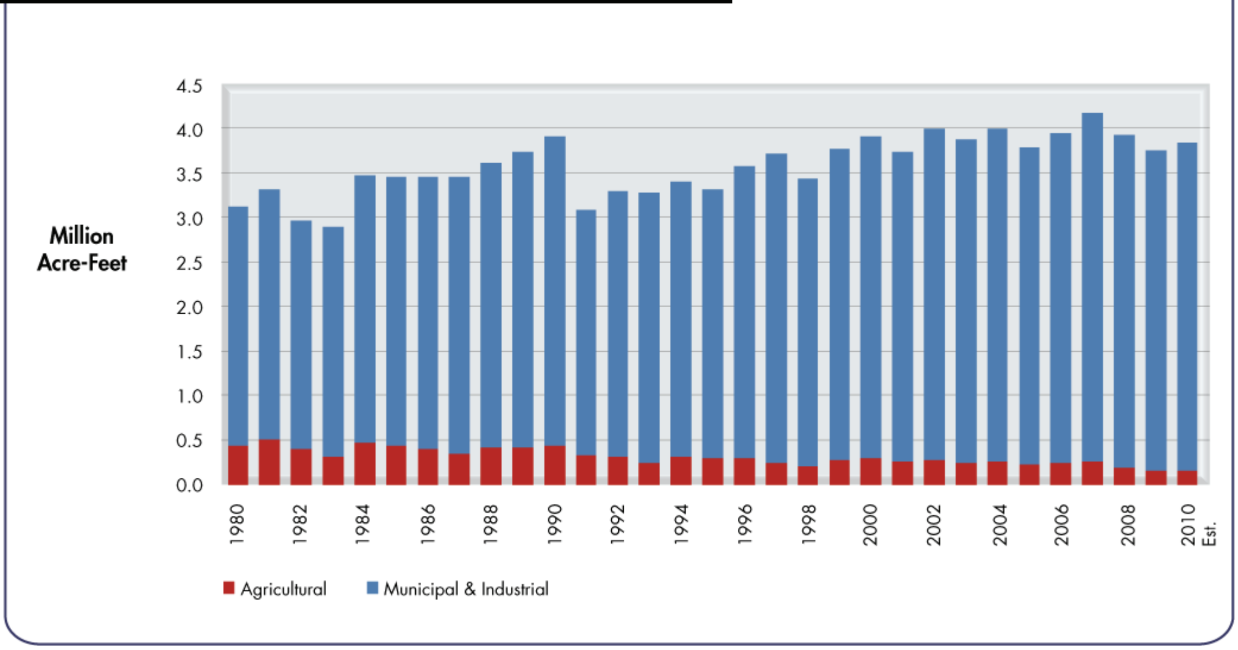
SOURCE: U.S. Census, California Department of Finance and Metropolitan

Historical Retail Water Demands

Figure 1-4 presents historical retail water demands on a calendar year basis in Metropolitan's service area. Since 1980, retail water demands varied from 2.9 million acre-feet (MAF) in 1983 to nearly 4.2 MAF in 2007. Due to the economic recession, drought impacts and conservation, water use declined to 3.1 MAF in 1991. Demand remained below the peak level as a result of continuing effects from the recession and the drought coupled with a number of wet years and ongoing conservation efforts. In 2000, retail demands reached 3.9 MAF surpassing the early peak level for the first time in a decade. Since 2000, retail demands reached a new peak level in 2007 with nearly 4.2 MAF. Calendar year 2007 was the driest year since 1989, with precipitation measured at 5.66 inches in the Los Angeles Civic Center.

Currently, about 93 percent of the retail demands are used for municipal and industrial purposes (M&I), and 7 percent for agricultural purposes. The relative share of M&I water use to total water use has been increasing over time as agricultural water use has declined due to urbanization and market factors, including the price of water. Agricultural water use accounted for 19 percent of total regional water demand in 1970, 16 percent in 1980, 12 percent in 1990 and five percent in 2008. Part of the reduction seen in 2008 was a 30 percent mandatory reduction in Metropolitan's Interim Agricultural Water Program (IAWP) deliveries, which continued into 2009 and is now a 25 percent reduction in 2010.

Figure 1-4 Retail Demand in Metropolitan's Service Area

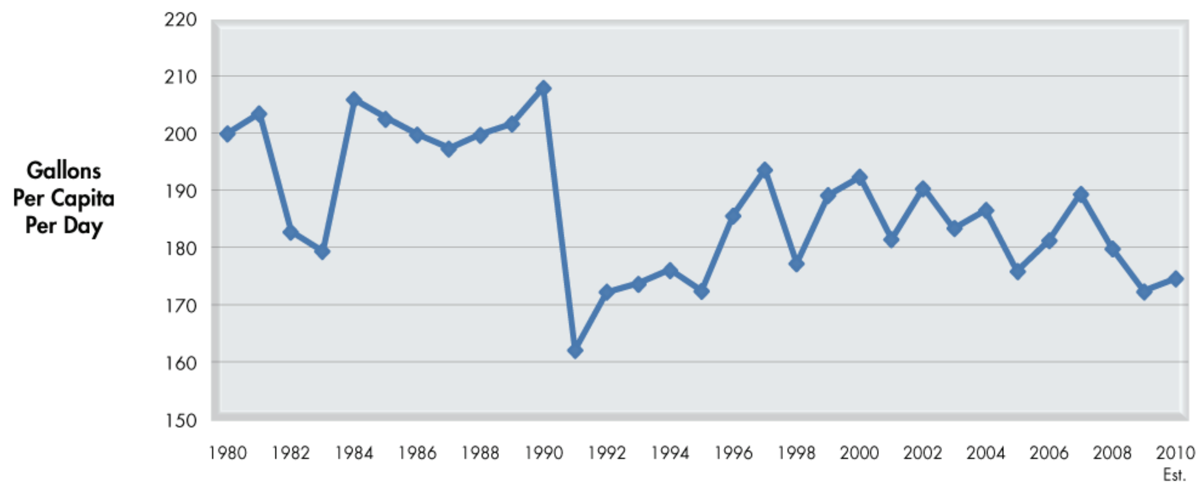


Per Capita Water Use

Per capita water use is defined by law as gross water use divided by population. Per capita water use does not express the amount of water actually used by an individual because it includes all categories of urban water use, including residential, commercial, industrial, fire fighting and other miscellaneous uses. Generally speaking, per capita water use is not a good measure of water use efficiency. For example, Southern California's per capita water-use may be high because it produces more than two-thirds of California's gross product. However, per capita water use can provide a general indication of how water use within a particular region is changing over time. Figure 1-5 shows the change in per capita water use within Metropolitan's service territory. This shows that per capita water use fell from a high of around 206 gallons per capita per day (GPCD) in 1990 and 1991 to a low of 162 GPCD as a result of water restrictions accompanying the drought of the late 1980s and early 1990s. Following recovery from that drought, per capita use has shown a general tendency to decrease and has remained noticeably lower than during the pre-1990 era.

A number of factors affect per capita water use in a particular location, including the relative share of residential versus nonresidential water use in an area, the number and type of housing units, the number of employees, the types of businesses, persons per household, lot sizes, income levels, and climate. Water use varies widely between counties. In Southern California, many of the differences in per capita water use among the counties can be attributed to climate differences. Within Metropolitan's service area, the inland counties of Riverside and San Bernardino account for the greatest levels of M&I per capita water use while the coastal plain counties show lower M&I per capita water use. The historic and projected per capita M&I retail demands for the six counties within Metropolitan's service area are presented in Appendix A.1.

Figure 1-5 Per Capita Water Use in Metropolitan's Service Area



Climate and Rainfall

As Figure 1-6 shows, Metropolitan's service area encompasses three major climate zones. Table 1-4 reports the 30-year (1979-2009) average temperature, rainfall and evapotranspiration (expressed as Et_o) information for representative locations within those three zones. Annual rainfall also varies within the region: average annual rainfall in Pasadena from 1980 through 2003 was more than double the 11 inches received at the San Diego airport and Culver City. Region wide, annual rainfall routinely varies by more than 100 percent from year to year.

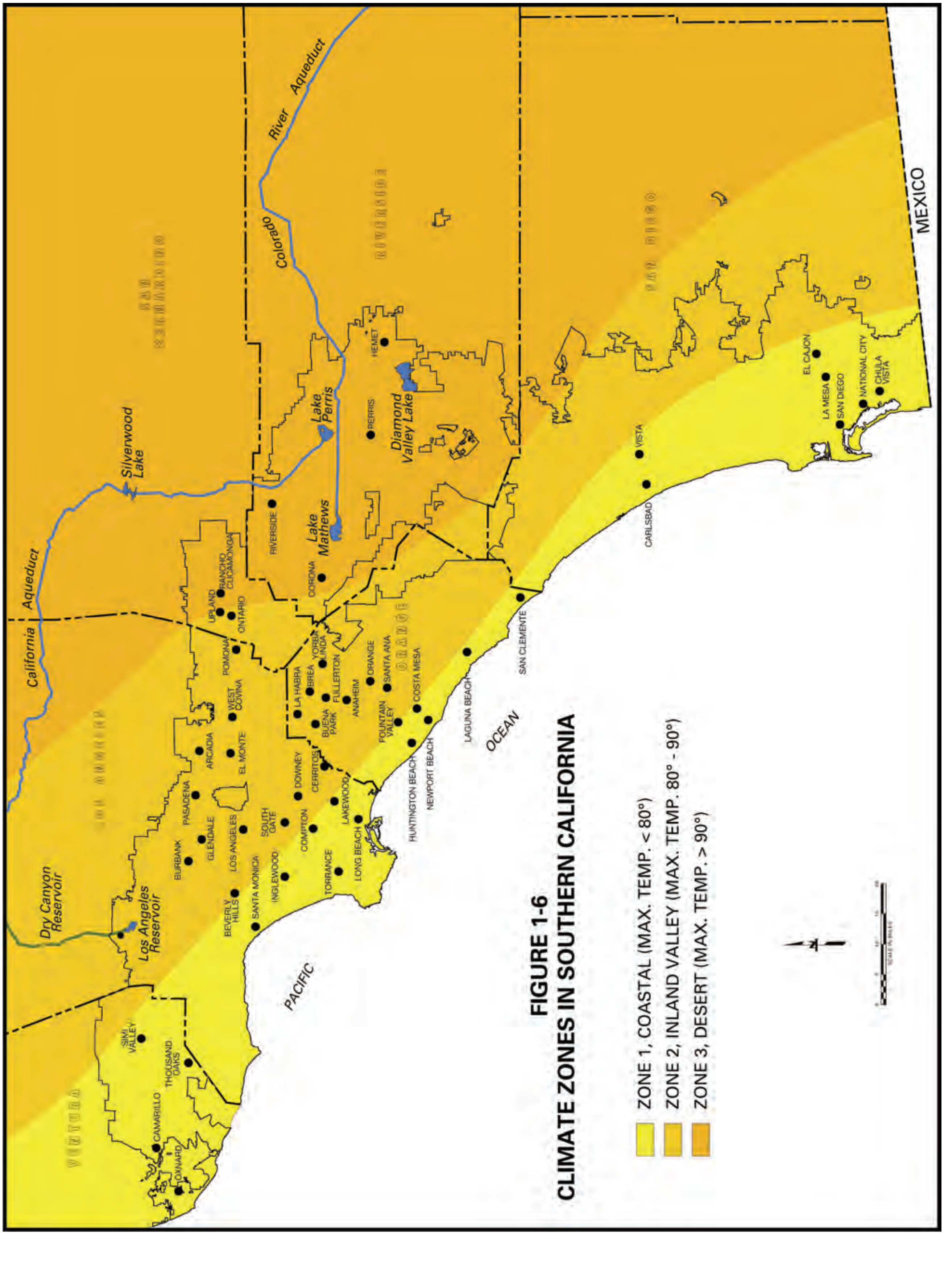


FIGURE 1-6
CLIMATE ZONES IN SOUTHERN CALIFORNIA

Table 1-4
Weather Variables in Three Zones in Metropolitan's Service Area

30-year Average (1979-2009)

Average Temperature	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Los Angeles County[1]	58.99	60.13	61.54	64.32	66.90	70.41	74.47	75.29	74.18	69.67	63.54	58.90	66.53
Riverside County[2]	54.91	56.17	58.44	62.41	67.09	72.09	77.83	78.48	75.37	67.95	59.95	54.67	65.45
San Diego County[3]	57.67	58.54	59.98	62.45	64.60	67.21	70.79	72.29	71.23	67.25	61.79	57.27	64.25

30-year Average (1979-2009)

Average Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Los Angeles County[1]	3.31	4.05	2.68	0.84	0.26	0.09	0.01	0.04	0.23	0.63	1.00	1.97	15.10
Riverside County[2]	2.35	2.52	1.91	0.62	0.20	0.09	0.04	0.09	0.15	0.40	0.79	1.12	10.26
San Diego County[3]	2.17	2.29	1.93	0.74	0.14	0.07	0.03	0.02	0.14	0.51	0.95	1.33	10.33

Et_o[4]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Los Angeles County	2.2	2.7	3.7	4.7	5.5	5.8	6.2	5.9	5.0	3.9	2.6	1.9	50.1
Riverside County	2.5	2.9	4.2	5.3	5.9	6.6	7.2	6.9	5.4	4.1	2.9	2.6	56.4
San Diego County	2.1	2.4	3.4	4.6	5.1	5.3	5.7	5.6	4.3	3.6	2.4	2.0	46.5

1 Temperature and Precipitation data from Western Regional Climate Center, Los Angeles Civic Center Station (045115). Data last updated April 5, 2010.

2 Temperature and Precipitation from Western Regional Climate Center, Riverside Citrus Experiment Station (047473). Data last updated April 5, 2010.

3 Temperature and Precipitation data from Western Regional Climate Center, San Diego WSO Airport Station (047740). Data last updated April 5, 2010.

4 ETo values from Model Water Efficient Landscape Ordinance (September 10, 2009), Appendix A- Reference Evapotranspiration (Eto) Table.
The ETo values were derived from: 1) California Irrigation Management Information System (CIMIS); 2) Reference EvapoTranspiration Zones Map, UC Dept. of Land, Air & Water Resources and California Dept of Water Resources 1999; and 3) Reference Evapotranspiration for California, University of California, Department of Agriculture and Natural Resources (1987) Bulletin 1922, and 4) Determining Daily Reference Evapotranspiration, Cooperative Extension UC Division of Agriculture and Natural Resources (1987), Publication Leaflet 21426

1.4 Current Conditions

Current Challenges

Metropolitan continues to face ongoing water supply challenges. This section offers a brief discussion of Metropolitan's current challenges, current available resources, short-term supply outlook, and short-term actions to meet these challenges. The dry hydrology experienced during the last three years has resulted in diminished snowmelt and runoff levels and additional environmental restrictions were imposed on water imports from the San Francisco Bay/Sacramento-San Joaquin Delta (Bay-Delta). By the end of 2009, mandatory conservation was in place across much of Metropolitan's service area. The restrictions on water use, however, also generated a record demand for water-saving rebates and refocused efforts to increase development of local water resources.

Delta Issues

The Bay-Delta is the hub of California's water supply and is critically important to the entire state. About 30 percent of Southern California's water supply moves across the Bay-Delta. The Bay-Delta's declining ecosystem, caused by a number of factors that include agricultural runoff and operation of water pumps that can alter flows, has led to historic restrictions in water supply deliveries.

Operational constraints likely will continue until a long-term solution to the problems in the Bay-Delta is identified and implemented. The Delta Vision process, established by Governor Schwarzenegger, is aimed at identifying long-term solutions to the conflicts in the Bay-Delta, including natural resource, infrastructure, land use, and governance issues. In addition, State and federal resource agencies and various environmental and water user entities are currently engaged in the development of the Bay Delta Conservation Plan (BDCP), which is aimed at addressing ecosystem needs and securing long-term operating permits for the SWP.

SWP operational requirements may be further modified under new biological opinions for listed species under the Federal Endangered Species Act (ESA) or by the California Department of Fish and Game's issuance of incidental take authorizations under the California ESA. Biological opinions or incidental take authorizations under the Federal ESA and California ESA might further adversely affect the SWP and Central Valley Project operations. Additionally, new litigation, listings of additional species or new regulatory requirements could further adversely affect SWP operations in the future by requiring additional export reductions, releases of additional water from storage or other operational changes impacting water supply operations. SWP delivery restrictions due to the biological opinions resulted in the loss of about one-third of the available SWP supplies in 2008, reducing the likelihood that regional storage can be refilled in the near-term. Impacts due to the biological opinions for a dry year 2009 were approximately 200,000 AF of SWP supplies.

Water Supply Conditions

The water conditions that the region faced in 2010 were shaped by supply conditions and resource actions that occurred in the preceding years, including several extraordinary events, such as:

- An extended ten year drought in the Colorado River watershed that has decreased storage levels in Lake Mead and Lake Powell below 50 percent of capacity in 2007 and early 2008 and keeping storage below surplus levels despite an ease in drought conditions in 2009;
- Groundwater basins and local reservoirs dropping to very low operating levels due to record-dry hydrology in Southern California;
- Restrictions of SWP deliveries by federal court orders due to endangered Delta smelt and salmon which resulted in the combined loss of approximately 700 TAF

of SWP supplies in 2008 and 2009, reducing the likelihood that regional storage can be refilled in the near term;

- End of year 2008 and 2009 SWP supplies in Lake Oroville were at their lowest and third lowest operating levels respectively since the reservoirs were first filled after consecutive dry years since 2006 and the driest spring of record in 2008;
- Supply availability in the Los Angeles Aqueduct system continues to be affected by environmental issues related to Owens Lake and the Lower Owens River.

These supply conditions, along with increasing firm demands on Metropolitan, have led to significant withdrawals from Metropolitan's storage reserves, including Diamond Valley Lake (DVL) and its groundwater banking and conjunctive use programs to meet scheduled water deliveries. To illustrate this point, an estimated 1.1 MAF of storage reserves were withdrawn to meet about one-quarter of wholesale demands from January 2007 through December 2008. In 2009, an additional 49 TAF were taken from storage reserves to meet firm demands within Metropolitan's service area.

In addition, new challenges such as the detection of the quagga mussel in the Metropolitan's CRA supplies and increasingly stringent water quality regulations to control disinfection byproducts exacerbate the water supply condition and underscore the importance of flexible and adaptive regional planning strategies.

Current Available Resources

Metropolitan's primary purpose is to provide a supplemental supply of water for domestic and municipal uses at wholesale rates to its member public agencies. Metropolitan's principal sources of water are the SWP and the Colorado River. Metropolitan's robust planning strategy continues to balance available local and imported water resources and member agencies demands within Metropolitan's service area.

A. Imported Supplies

Historically, Metropolitan has been responsible for obtaining imported water for the region through its operation of the CRA and its contract with the state for SWP supplies. Metropolitan receives water from the SWP through the California Aqueduct and the Colorado River through the CRA. Figure 1-7 shows the historic annual deliveries from the SWP and the CRA.

<u>Colorado River</u>

The Colorado River was Metropolitan's original source of water after Metropolitan's establishment in 1928. Metropolitan has a legal entitlement to receive water from the Colorado River under a permanent service contract with the Secretary of the Interior. The CRA, which is owned and operated by Metropolitan, transports water from Lake Havasu, at the border of the state of California and Arizona, approximately 242 miles to its terminus at Lake Mathews in Riverside County, with a capacity of 1.25 MAF a year.

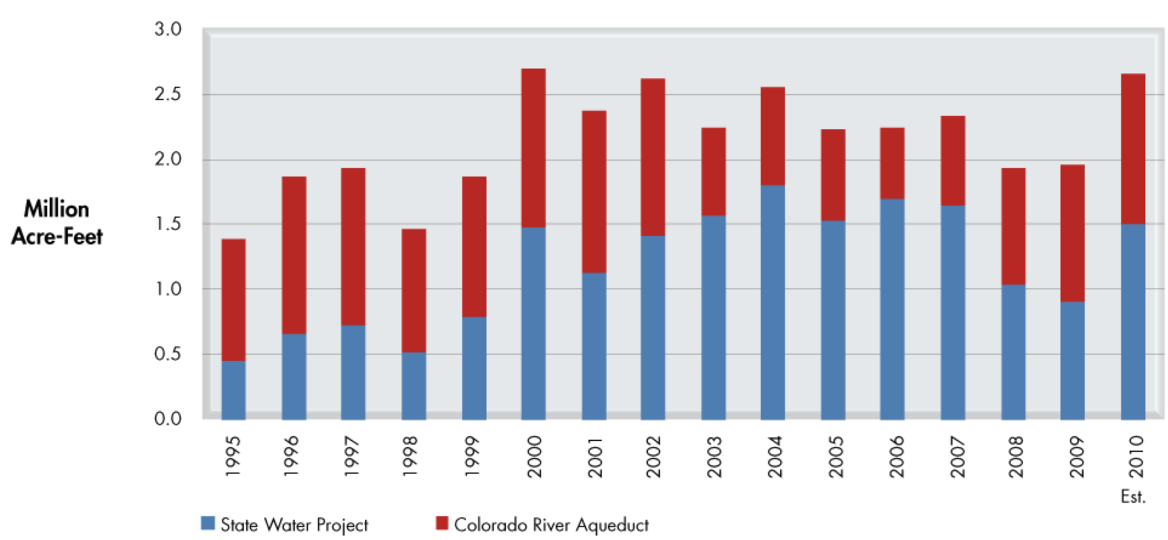
Over the years, Metropolitan increased reliable supply from the CRA through programs that it helped fund and implement including: farm and irrigation district conservation programs, improved reservoir system operations, land management programs, and water transfers and exchanges through arrangements with agricultural water districts in southern California and entities in Arizona and Nevada that use Colorado River water, and the U.S. Department of the Interior, Bureau of Reclamation (USBR). A detailed discussion of availability of Colorado River water for delivery to Metropolitan is described in Section 3.1.

<u>State Water Project</u>

Metropolitan imports water from the SWP, owned by the state of California and operated by the California Department of Water resources (DWR). This project transports Feather River water stored in and released from Oroville Dam and unregulated flows diverted directly from the Bay-Delta south via the California Aqueduct to four delivery points near the northern and eastern boundaries of Metropolitan's service area.

In 1960, Metropolitan signed a contract with DWR. Metropolitan is one of 29 agencies that have long-term contracts for water service from DWR, and is the largest agency in terms of the number of people it serves (19.1 million), the share of SWP water that it has contracted to receive (approximately 46 percent), and the percentage of total annual payments made to DWR by agencies with State water contracts (approximately 60 percent in 2008). A more detailed discussion of the SWP supplies is provided in Section 3.2.

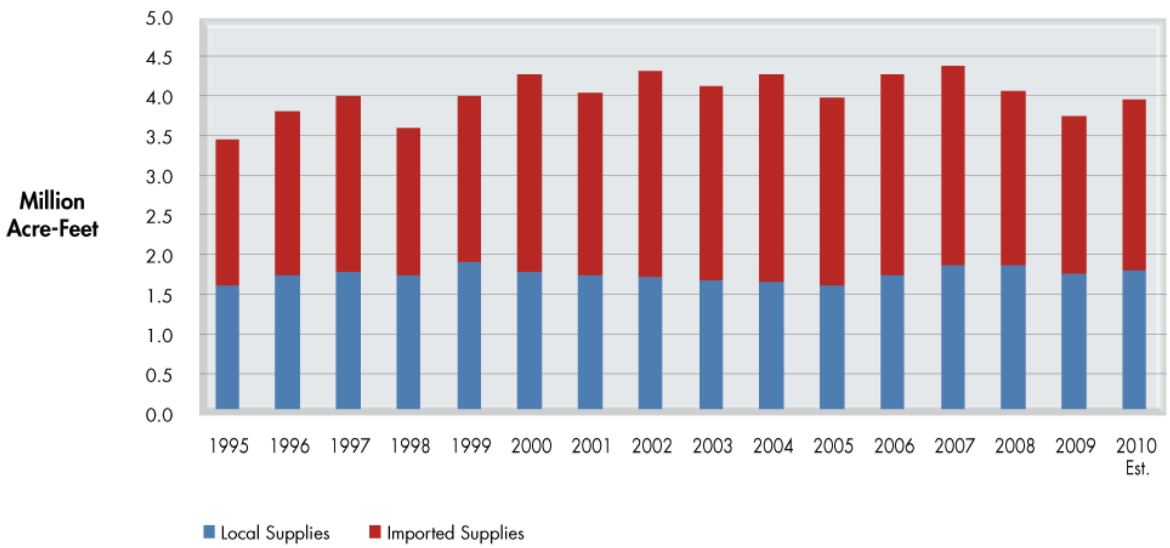
Figure 1-7 Imported Water Supplies in Metropolitan's Service Area



B. Local Supplies

Approximately 50 percent of the region's water supplies come from resources controlled or operated by local water agencies. These resources include water extracted from local groundwater basins, catchment of local surface water, non-Metropolitan imported water supplied through the Los Angeles Aqueduct, and Colorado River water exchanged for Metropolitan supplies. Figure 1-8 shows the historic annual use of local and imported water suppplies within Metropolitan's service area.

Figure 1-8 Annual Regional Water Supplies in Metropolitan's Service Area



Groundwater

The groundwater basins that underlie the region provide approximately 86 percent of the local water supply in Southern California. The major groundwater basins in the region provide an annual average supply of approximately 1.35 MAF. Most of this water recharges naturally, but approximately 200 thousand acre-feet (TAF) has historically been replenished each year through Metropolitan imported supplies. By 2025, estimates show that groundwater production will increase to 1.65 MAF.

Because the groundwater basins contain a large volume of stored water, it is possible to produce more than the natural recharge of 1.16 MAF and the imported replenishment amount for short periods of time. During a dry year, imported replenishment deliveries can be postponed, but doing so requires that the shortfall be restored in wet years. Similarly, in dry years the level of the groundwater basins can be drawn down, as long as the balance is restored to the natural recharge level by increasing replenishment in wet years. Thus, the groundwater basins can act as a water bank, allowing deposits in wet years and withdrawals in dry years.

Recycling and Groundwater Recovery

Recycling and groundwater recovery are regional resources that add balance to Southern California's diverse portfolio of resource options. Water recycling provides extensive treated wastewater for applicable municipal and industrial uses. Common uses of recycled water include landscape irrigation, agricultural irrigation, and commercial and industrial applications. Groundwater recovery employs additional treatment techniques to effectively use degraded groundwater supplies that were previously not considered viable due to high salinity or other contamination.

While water recycling and groundwater recovery projects in the Southern California region are primarily developed by local water agencies, many newer projects have been developed with financial incentives provided through Metropolitan's Local Resources Program (LRP). The LRP is a performance-based program that provides incentives to expand water recycling and support recovery of degraded groundwater. In 2009, the regional water production from water recycling and groundwater recovery totaled 353 TAF, of which 201 TAF was developed with Metropolitan funding assistance. A detailed discussion of recycling and groundwater recovery is presented in Section 3.5.

Seawater Desalination

Seawater desalination represents a significant opportunity to diversify the region's water resource mix with a new, locally-controlled, reliable potable supply. Metropolitan continues to pursue a target for seawater desalination of 150,000 acre-feet (AF) per year by 2025, and several local and retail water agencies have identified seawater desalination as an important component of their future water supply portfolio. The Carlsbad Seawater Desalination Project in San Diego has obtained all of the local, State, and Federal permits for necessary to begin construction, though as of May 2010, there are legal challenges to three of the permits. Project proponents anticipate the project will come on-line as early as 2012, providing the region with an additional 56 TAF of new local supplies.

Surface Water

In addition to the groundwater basins, local agencies maintain surface reservoir capacity to capture local runoff. The average yield captured from local watersheds is estimated at approximately 90 TAF per year. The majority of this supply comes from reservoirs within the service area of the San Diego County Water Authority.

Los Angeles Aqueduct

Although the Los Angeles Aqueduct (LAA) imports water from outside the region, Metropolitan classifies water provided by the LAA as a local resource because it is developed and imported by a local agency (the Los Angeles Department of Water and Power). This resource is estimated to provide approximately 256 TAF per year on average, which may be reduced to approximately 106 TAF during a historical dry period.

Imperial Irrigation District / San Diego County Water Authority Transfer

The San Diego County Water Authority (SDCWA) has executed an agreement with the Imperial Irrigation District (IID) under which IID is transferring water to SDCWA. Since this supply is developed and transferred through an agreement by a local agency (SDCWA), Metropolitan also classifies this water as a local resource. Currently, the water transferred by IID is made available by SDCWA to Metropolitan for diversion at Lake Havasu. Metropolitan provides a matching volume of water to SDCWA by exchange. Under the transfer, 60 TAF was transferred and exchanged with Metropolitan in 2009. The transfer volumes increase in accordance with an annual build-up schedule, reaching 100 TAF annually in 2013 and stabilizing at 200 TAF annually in 2023. Currently, the water is being conserved through land fallowing arrangements made by IID with its customers. Beginning in 2013, IID will begin replacing land fallowing with irrigation efficiency measures that will allow farming operations to continue with reduced amounts of applied water. By 2017, all of the transferred water should be made available through irrigation and distribution system efficiency measures.

Coachella and All-American Canal Lining Projects

The Coachella Canal Lining Project consists of a 35-mile concrete-lined canal, including siphons, which replaced an earthen canal. The project was completed in December 2006. The project is conserving 30,850 AF annually. The All-American Canal Lining Project consists of replacing 23 miles of earthen canal with a concrete-lined canal constructed parallel to the existing canal.

Two reaches of the project were placed in service in 2008 with the third reach placed in service in 2009. This project is conserving 67,700 AF annually beginning in 2010.

Pursuant to the QSA and related agreements, the total 98,550 AF of annual yield from these projects is allocated as follows in 2010: 16,000 AF to Metropolitan, 80,200 AF to SDCWA, and up to 2,350 AF for Coachella Canal Lining Project mitigation, with the amount not needed for mitigation becoming available to SDCWA. The water is made available at Lake Havasu for diversion by Metropolitan, and by exchange, Metropolitan delivers an equal volume of water to SDCWA. Metropolitan classifies the portion of the supply exchanged with SDCWA as local resources and evaluated its availability. Table 1-5 shows the projected local supplies estimate for the average and dry-years for 2015, 2025, and 2035.

Table 1-5
Local Supplies*
(Acre-Feet)

	2015		2025		2035	
	Average Year*	Dry Year	Average Year	Dry Year*	Average Year	Dry Year*
Local Groundwater						
From Natural Recharge	1,251,000	1,214,000	1,242,000	1,202,000	1,240,000	1,206,000
Replenishment	178,000	172,000	187,000	187,000	191,000	190,000
Local Projects						
Groundwater Recovery	*101,000*	100,000	114,000	113,000	126,000	125,000
Recycling	*264,000*	258,000	303,000	299,000	333,000	330,000
Seawater Desalination	*0*	0	0	0	0	0
Local Runoff Stored	103,000	91,000	102,000	91,000	102,000	91,000
Los Angeles Aqueduct	224,000	63,000	226,000	71,000	230,000	78,000
IID/SDCWA Transfer	100,000	100,000	200,000	200,000	200,000	200,000
Coachella & All American Canal Lining	80,000	80,000	80,000	80,000	80,000	80,000
Total	**2,301,000**	**2,078,000**	**2,454,000**	**2,243,000**	**2,502,000**	**2,300,000**

* Dry Year is based on Multiple Dry Years (1990-92)

Short-term Supply Outlook

Metropolitan evaluated the short-term supply outlook during each of the next three years from 2011 through 2013 and determined the minimum water supplies available based on the driest three-year historic sequence of 1990 through 1992. This analysis incorporates the actual storage levels at the beginning of 2010 and the forecasted supplies and demands under a multiple dry-year sequence. This evaluation of supply capabilities also takes into account the actual storage program conveyance constraints. Table 1-6 shows the projected yields of the in-region storage and imported supplies from the SWP and CRA, for both current programs and those under development. Detailed description of the current programs and programs under development are included in Appendix A.3.

For this supply capability evaluation, SWP supplies are estimated using the draft 2009 SWP Delivery Reliability Report distributed by

DWR in December 2009. The draft 2009 reliability report presents the current DWR estimate of the amount of water deliveries for current (2009) conditions and conditions 20 years in the future. These estimates incorporate restrictions on SWP and Central Valley Project (CVP) operations in accordance with the biological opinions of the U.S. Fish and Wildlife Service and National Marine Fishery Service issued on December 15, 2008, and June 4, 2009, respectively.

Metropolitan forecast shows that under a multi-dry year hydrology, Metropolitan could face depleted supply capability during the next three years. This places considerable emphasis on developing robust short-term actions that will increase supply reliability to Metropolitan service area.

Table 1-6

Multiple Dry-Year
Supply Capability[1]
Repeat of 1990-1992 Hydrologies
(acre-feet per year)

Forecast Year	2011	2012	2013
Current Programs			
In-Region Storage	351,000	50,000	17,000
California Aqueduct[2]	582,000	625,000	611,000
Colorado River Aqueduct[3]	998,000	932,000	937,000
Subtotal of Current Programs	***1,931,000***	***1,607,000***	***1,565,000***
Programs Under Development			
In-Region Storage	12,000	12,000	12,000
California Aqueduct	23,000	30,000	374,000
Colorado River Aqueduct	176,000	176,000	176,000
Subtotal of Proposed Programs	***211,000***	***218,000***	***562,000***
Maximum Metropolitan Supply Capability	**2,142,000**	**1,825,000**	**2,127,000**

[1] Represents Supply Capability for resource programs under listed year type.

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.

[3] Colorado River Aqueduct includes water management programs, IID-SDCWA transfers and canal linings.

[3] Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfers and canal linings.

Metropolitan Actions over the Next 15 Years

Metropolitan endeavored to address the on-going challenges and current water supply condition with recent actions that include: (1) Metropolitan Board approval of a Delta Action Plan that provide a framework to help address Bay-Delta issues, (2) development of a Five-Year Supply Plan to identify specific resource and conservation actions to manage water supplies under drought and court ordered restrictions, (3) adoption of a Water Supply alert resolution in response to the proclamation of statewide drought in California, (4) development of the Water Supply Allocation Plan that will serve as the foundation for the urban water shortage contingency analysis and help the region allocate limited supplies, (5) development of the Quagga Mussel Control Plan to protect regional supplies through enhanced detection, surveillance, and mitigation strategies, and (6) continued improvement of Metropolitan facilities to handle increasing stringent water quality regulations and enhance flexibility to deliver supplies to meet region's growing demands.

A. Delta Strategy

In June 2007, Metropolitan's Board approved a Delta Action Plan that provides a framework for staff to pursue actions with other agencies and stakeholders to build a sustainable Delta and reduce conflicts between water supply conveyance and the environment. Building a sustainable Delta will require significant investment and will take decades. The Delta Action Plan aims to prioritize immediate short-term actions to stabilize the Delta while an ultimate solution is selected, and mid-term steps to maintain the Delta while the long-term solution is implemented. The water supply planning implications for the near- and mid-term are described below while the long-term action plan and the Bay Delta Conservation Plan (BDCP) are described in Section 3.2.

Short-Term Action Plan

While a course of action for the long-term restoration of Delta ecosystem and water supply reliability is being developed, short-term actions must be taken to stabilize the current situation. These actions include the following: securing state and federal Endangered Species Acts take authorization; emergency preparedness steps to prepare for possibility of catastrophic failure in the event of earthquake or flood; actions to enhance habitat for Delta smelt and other pelagic species; completion of the BDCP; and actions to begin work on ecosystem restoration projects that will help species regardless of which ultimate solution is selected (e.g., marsh restoration, island rebuilding.)

Mid-Term Action Plan

Upon selection and enactment of an ultimate Delta solution, it will likely take ten years or more to complete environmental documentation and construct new facilities. During this period, it will be necessary to maintain the stabilization process of the Delta through the following actions: continue implementation of the BDCP projects with selected habitat and fishery improvements to improve Delta native species; begin implementing flood control protections, including bypasses and levee improvements; finalize site selection and environmental documentation for new storage projects; implement new governance structures for managing the Delta; and undertake implementation of the long-term Delta solution.

B. Five-Year Supply Plan

Metropolitan staff prepared a Five-Year Supply Plan (Supply Plan) to identify the specific resource and conservation actions that would be implemented over the next five years to manage water deliveries under continued drought conditions and court ordered restrictions. Since April 2008, staff has been working with the member agencies through a series of meetings and workshops to develop and implement the Supply Plan. The Supply Plan was initiated in response to a number of extraordinary events, such as regulatory actions that reduced water supplies from the SWP to protect Delta smelt, as well as a record-dry hydrology that resulted in over 1.1 MAF of withdrawals from Metropolitan storage from January 2007 through December 2008.

The Supply Plan focuses on six categories of resource options to improve Metropolitan's reliability from 2009 through 2013. The individual projects included as part of the resource options are discussed in further detail in Appendix A.3. These six categories of Supply Plan resource options are as follows:

Water Conservation

The Supply Plan targets water conservation strategies to increase and accelerate conservation savings by increasing the use of water efficient devices, affecting water use practices in Southern California and identifying and reducing prohibited uses of water. Key components of this strategy include (1) increased outreach to heighten the public's awareness of the need to conserve, (2) increased resources and support for water use ordinances and conservation-based rate structures to motivate conservation, and (3) accelerated installation of water efficient devices due to Drought Ordinances discussed in this section.

Colorado River Transactions

Metropolitan is pursuing additional supplies such as the emergency short-term fallowing program within Palo Verde Irrigation District (PVID). Metropolitan's Board authorized participation with the Bureau of Reclamation in the pilot operation of the Yuma Desalting Plant that could yield up to 27 TAF in 2010. New initiatives also include expansion of the 2004 storage and interstate release agreement with Southern Nevada Water Agency (SNWA), an agreement with Coachella Valley water District (CVWD), a water exchange with Arizona, and a fallowing program with California Indian tribes. Metropolitan estimates that these programs on the Colorado River could provide an additional 185 TAF of CRA supply in 2010, with the potential to increase in the following years.

Near-Term Delta Actions

Near-term Delta actions being developed include measures that protect fish species and reduce supply impacts, such as habitat and hatchery projects, and physical and operational actions with the goal of reducing conflicts between water supply conveyance and environmental needs. The proposed Two-Gate System would provide movable barriers on the Old and Middle Rivers to modify flows and prevent vulnerable fish from being drawn toward the Bay-Delta pumping plants. The Two-Gate System is anticipated to protect fish habitat while allowing up to an estimated additional 150 TAF per year of water supply export from the Bay-Delta in years when the allocation for State Water Project contractors exceeds 35 percent. The proposed Two-Gate System is subject to operational studies, monitoring, environmental documentation and compliance, acquisition of right-of-way and completion of design and construction.

State Water Project Transactions

The Supply Plan includes transfers from willing sellers located upstream of the Bay-Delta to buyers located downstream of the Bay-Delta through the State Water Project and Central Valley Project. Delivery of these transfers is contingent on sufficient capacity for export of this water through the Bay-Delta. Metropolitan took delivery of 29 TAF from the Drought Water Bank, a transfer program facilitated by DWR, in 2009.

The Supply Plan also includes additional transfers with entities within the Bay-Delta and investigations into the feasibility of crop rotation demonstration projects with Kern County agencies, as well as the return of existing transfers stored in Shasta Lake. In addition, Metropolitan may take up to 27.5 TAF of SWP supplies over the next three years available under a water transfer between North Kern Water Storage District and Desert. This water, along with approximately 8.5 TAF of water transferred to Metropolitan in 2008, will be returned to Desert in increments of 1.2 TAF per year over the next 30 years.

Groundwater Recovery

Groundwater that requires treatment and recovery for consumptive use is a resource that has the potential to yield significant amounts of supply. Based on groundwater inventories conducted by Metropolitan and the member agencies, it is estimated that there is over 300 TAF of groundwater that could be treated and recovered in Metropolitan's service area. Additionally, it is estimated that the Hayfield groundwater basin located adjacent to the Colorado River Aqueduct has 70 to 100 TAF that could be extracted over the next five to ten years. Also, more than 300 TAF of recovered groundwater accumulated from agricultural drainage in the San Joaquin Valley could be made available to Metropolitan if Metropolitan funds groundwater treatment facilities.

<u>Local Resources</u>

Metropolitan is working with its member agencies to determine which local projects could be expanded and/or accelerated with a potential to be on line by 2013. Local projects include recycled water treatment plants, groundwater recovery plants, desalination plants, and new hookups to existing recycled plants. Over 50 potential projects have been identified. The combined annual yield for these efforts has the potential to grow to approximately 60 to 120 TAF by 2014.

Metropolitan's estimate of the dry year yield of the above Supply Plan actions is shown in Table 1-7.

C. Drought Ordinances

In June 2008, following Governor Arnold Schwarzenegger's proclamation of a statewide drought, Metropolitan adopted a Water Supply Alert resolution. Among other provisions, the Alert encouraged cities, counties, and local public water agencies, to adopt and enforce local water conservation ordinances. To facilitate ordinance adoption, Metropolitan compiled a library of available local ordinances, developed a model water conservation ordinance and hosted several workshops. Approximately half of the 19 million residents in Metropolitan's service area are now covered by adopted ordinances, and an additional one-third resides in jurisdictions that have taken action toward adoption of ordinances. Metropolitan is projecting about 235 TAF of water savings in the next few years from adoption and enforcement of local water conservation ordinances.

Table 1-7
Estimated Yield of Five-Year Supply Plan Actions
(in Thousands of Acre-Feet)

	2010	2011	2012	2013	2014
Water Conservation	235	235	235	235	235
Colorado River Transactions	185	176	176	176	176
Near Term Delta Actions[1]	0	0	0	0	0
State Water Project Transactions	36	43	38	33	33
Groundwater Recovery	9	17	28	28	28
Local Resources	0	0	20	40	60
Total	**465**	**471**	**497**	**512**	**532**

[1] It is estimated that the proposed Two-Gate System would provide up to 150 TAF when the State Water Project allocation is greater than about 35 percent. Yield is shown at 0 because of this contingency.

D. Water Supply Allocation

Recent year introduced a number of water supply challenges for Metropolitan and its member agencies. Critically dry conditions in addition to the biological opinions that provided protective measures for the Delta smelt and Chinook salmon in the Sacramento-San Joaquin River Delta brought uncertainty to future supplies from the SWP. This uncertainty, along with the impacts of dry conditions that affected all of Metropolitan's main supply sources, raised the possibility that Metropolitan would not have access to the supplies necessary to meet total firm demands and would have to allocate shortages in supplies to the member agencies.

In preparing for this possibility, Metropolitan staff worked jointly with its member agency managers and staff to develop a Water Supply Allocation Plan (WSAP) that was adopted by the Board in February 2008. The WSAP includes the specific formulas for calculating member agency supply allocations and the key implementation elements needed for administering an allocation, should a shortage be declared. Ultimately, the WSAP will be the foundation for the urban water shortage contingency analysis required under Water Code § 10632.

On April 14, 2009, Metropolitan's Board voted to reduce firm water deliveries to its member agencies for the first time since 1991. In response to expected water supply conditions for the rest of 2009, Metropolitan implemented the WSAP to allocate available water supplies to its member agencies at a WSAP Regional Shortage Level 2. A resolution containing findings describing the water supply conditions in California and Metropolitan's service area and supporting the recommendation to implement the WSAP was also adopted by the Board at that time. On April 13, 2010, Metropolitan's Board approved continuing its member agencies water allocation at Shortage Level 2 for a second year. The unprecedented consecutive year water supply allocation was necessitated by continuing low SWP supplies due to continued environmental restrictions and low storage levels for Metropolitan. The approved allocation offers local water providers the flexibility to choose among various conservation strategies, from tiered pricing to limits on outdoor water use, to help ensure that demands stay in balance with limited supplies. Details of the WSAP are included as Appendix A.4.

E. Quagga Mussels Control

Zebra mussels (Dreissena polymorpha) were introduced into the Great Lakes area of North America in the mid-1980s in the fresh-water ballast of a transoceanic ship traveling from Eastern Europe. Quagga mussels (Dreissena bugensis), a related species to the better-known zebra mussels and indigenous to the Ukraine, were similarly introduced to the Great Lakes in the late 1980s. Although the introduction of these two species into drinking water supplies does not typically result in violation of drinking water standards, invasive mussel infestations can adversely impact aquatic environments. If unmanaged, invasive mussel infestations have been known to severely impact the aquatic ecology of lakes and rivers; clog intakes and raw water conveyance systems; reduce the recreational and aesthetic value of lakes and beaches; alter or destroy fish habitats; and render lakes more susceptible to deleterious algae blooms. These organisms currently infest much of the Great Lakes basin, the St. Lawrence Seaway, and much of the Mississippi River drainage system.

Invasive zebra and quagga mussels spread west of the 100th Meridian in 2007 and 2008. The 100th Meridian has historically been considered as the line of longitude in the United States that represented the boundary between the moist east and the arid west. The term has been adapted by the 100th Meridian Initiative which is a cooperative effort between state, provincial, and federal agencies to prevent the westward spread of zebra mussels and other aquatic nuisance species in North America. Quagga mussels were discovered in January of 2007 in Lake Mead and rapidly spread downstream to the Lower Colorado River. The presence and spawning of quagga mussels in the Lower Colorado River and in reservoirs located in southern California poses an immediate threat to water and power systems serving more than 25 million people in the southwestern United States. The recent spread of zebra mussels into a northern California lake and a Colorado lake further indicates that if these invasive mussels are not controlled, the entire western United States could be impacted.

Although a number of controls for invasive mussels have been reported in the literature, current drinking water and environmental regulations limit the options available for implementation. In 2007, Metropolitan developed a quagga mussel control plan (QMCP) incorporating enhanced detection, surveillance, and mitigation strategies. The QMCP will be conducted in at least three phases. Phase I addressed immediate quagga mussel detection, surveillance, and mitigation strategies for the first seven months of the mussel infestation. Phase I was completed in September of 2007. Phase II consists of infrastructure upgrades and a comprehensive, multi-year approach for mussel management, and Phase III will address long-term needs and cost minimization strategies.

The presence and spawning of quagga mussels in the lower Colorado River from Lake Mead through Lake Havasu poses a threat to Metropolitan and other Colorado River water users due to the potential to continuously seed water conveyance systems with mussel larvae. Chlorination is the most frequently used means to control mussel larvae entering water systems. To date, Metropolitan has appropriated $9.55 million to upgrade chlorination facilities in the aqueduct and at two additional locations in its system, the outlets of Lakes Mathews and Skinner. It is likely that additional upgrade costs will be incurred for these facilities. Chemical control (chlorination) at Copper Basin, Lake Mathews, and the Lake Skinner Outlet costs approximately $3.0-3.2 million per year depending on the amount of CRA moved through the aqueduct.

As part of the QMCP O&M activities, Metropolitan will be evaluating control measures aimed at: (1) Changing environmental conditions in the CRA or in Metropolitan's reservoirs that will promote a suboptimal or antagonistic environment for quagga mussel attachment, growth or proliferation; (2) Identifying physical or mechanical processes to deter attachment or remove quagga mussels from surfaces; (3) Promoting the use of biological controls such as predators, parasites or diseases targeted to suppress or kill larvae or adult quagga; and (4) Applying oxidative chemical controls (i.e., chlorine) or non-oxidative controls (i.e., molluscicides). Limnological and flow pattern studies will be conducted to assess the feasibility of modifying environmental conditions such as oxygen demand, temperature, and pH to control mussels in Metropolitan's reservoirs. In addition, studies of surface treatments which may deter attachment, and of molluscicide use, will be conducted under laboratory and field conditions. The results of these studies will be used to design infrastructure improvements for long-term management of quagga mussels.

F. Facility Improvements

Inland Feeder

The Inland Feeder's origins date to the district-wide Distribution System Overview Study completed in 1988. The study concluded that Southern California needed additional storage and conveyance facilities to reliably meet the region's growing demands and to respond to an emergency such as an earthquake. In response to the identified needs, Metropolitan developed the Diamond Valley Lake and the Inland Feeder.

The completion of the $1.2 billion Inland Feeder in September 2009 further integrated Metropolitan's distribution system, connecting SWP supplies from Northern California with Metropolitan's CRA and allows for delivery of SWP water into Diamond Valley Lake. The Inland Feeder significantly increased Metropolitan's water delivery capacity from the SWP's east branch at the Devil Canyon Power Plant. As the state identifies solutions to problems in the Sacramento-San Joaquin Delta, the operational flexibility offered by the Inland Feeder will ultimately help protect the Delta's fragile environment by allowing Metropolitan to deliver water during wet periods when water is available and then store it in Southern California's reservoirs and groundwater basins. In dry years, the region can rely on these reserves and reduce reliance on imported water sources. The Inland Feeder will also help Southern California deal with future weather uncertainties that may be brought on by climate change, including the possibility of less snowpack but more rain. The Inland Feeder will allow Metropolitan to capture storm related short-duration high-flow water supplies to store for dry times.

<u>Oxidation Retrofit Project</u>

Metropolitan is currently undertaking the Oxidation Retrofit Project for all five water treatment plants in its service area. In January 2002, new U.S. Environmental Protection Agency (USEPA) regulations became effective which balanced the risk of disinfection byproduct (DBP) exposure while more aggressively controlling pathogenic microorganisms. This rule, known as the Stage 1 Disinfectants/ Disinfection Byproducts (D/DBP) Rule, required water systems to comply with new maximum contaminant levels (MCLs) and with a treatment technique to improve control of DBPs. USEPA subsequently promulgated the Stage 2 D/DBP Rule in January 2006 that requires compliance with the MCL at individual distribution system locations, rather than on an averaged, system-wide basis. No further capital facilities are required for Metropolitan to comply with this second stage of the rule.

Prior to completion of its ozonation facilities, Metropolitan operates its treatment plants under interim strategies designed to comply with the regulations. These strategies include adding large amounts of treatment chemicals to reduce DBP precursors, limiting high blends of SWP supplies to reduce DBP formation, and constraining treatment plant flow rates to ensure adequate disinfection. Adverse impacts from these strategies include limited control of taste and odors, production of total dissolved solids (TDS) levels in excess of Metropolitan's goal of 500 mg/L, and potential limitations on plant capacity. In recent years, with less SWP supply available, Metropolitan has not been constrained by these interim strategies.

The addition of ozone as the primary disinfection process at Metropolitan's treatment plants allows treatment of any blend of its source waters and substantially lowers disinfection by-product levels for compliance with both D/DBP Rules. Use of ozone also enhances Metropolitan's ability to treat water with variable source-water quality, and provide critical operational flexibility to meet varying treatment challenges resulting from periodic occurrences such as drought and other source water limitations. Further, ozonation provides the capability to control taste- and odor-causing compounds that periodically affect the source waters. Ozone is also recognized to be effectively removing many pharmaceuticals/personal care products (PPCPs) and endocrine disruptor chemicals (EDCs), some of which have been detected in Metropolitan's raw water supplies.

The ozonation process is currently in use at the Mills, Jensen, and Skinner plants. Construction of ozone-related facilities are underway at the Diemer and Weymouth plants.

Energy Management Initiatives

Metropolitan is currently embarking on energy management initiatives aimed at working toward operating its facilities in the most energy-efficient and cost-effective manner, and enhancing its ability to provide long-term power reliability. To highlight a few recent accomplishments, Metropolitan completed the Energy Management & Reliability Study (EMRS) in December 2009, which is a roadmap to identify future actions and to serve as a blueprint for achieving energy reliability and cost control. Metropolitan also completed the audit and certification of its 2008 carbon footprint with the California Climate Action Registry as a registered member, and submitted emissions data to the Air Resources Board, which is the state agency mandating emissions reporting annually.

In May 2009, Metropolitan completed a 10-acre field of solar panels at the district's Robert A. Skinner Water Treatment Plant in the Temecula Valley of southwestern Riverside County. The 1-megawatt solar installation is designed to generate approximately 2.4 million kilowatt-hours (kWh) of clean, renewable energy a year, equal to the power used by about 250 homes annually. Metropolitan will receive more than $5 million in rebates during the first five years of the facility's operation. Based on projected power costs, the capital expenditure for this project will be recovered in approximately 10-12 years.

Metropolitan also started final design activities for a 2-megawatt solar installation at the Weymouth plant. This planned solar installation would meet up to 20 percent of the Weymouth plant's expected daily power consumption. A total of 10-megawatts of solar power generation is proposed for the Jensen, Weymouth, Mills and Skinner treatment plants, including the existing 1-megawattt at Skinner.

In August 2010, Metropolitan' s Board adopted Energy Management Policies, to provide Metropolitan staff with the necessary guidance in moving forward with cost-effective and environmentally responsible programs, projects, and initiatives. Projects would then be brought to the Board for authorization on a case-by-case basis. These policies recognize the upward pressure on costs caused by the expiration of Metropolitan's Hoover power contract in 2017, by evolving power markets, by increased direct and indirect regulatory pressure to reduce green house gas (GHG) emissions, and by the risk of reduced Colorado River hydropower supplies with climate change. The specific policies are as follows:

- Water/Energy Nexus: Identify collaborative programs and initiatives between the water and energy industries, constructing sustainable partnerships to reduce costs and provide enhanced reliability.
- Regulatory: Track federal and state greenhouse gas regulations and develop strategies to hedge against price and regulatory risks towards Metropolitan.
- Legislation: Pursue legislation to protect or enhance reliability of energy supply and mitigate energy cost risk.
- Contracts: Maintain maximum flexibility on existing and future contracts with Hoover and other energy contracts to hedge against cost and regulatory risks.
- Projects/Partnerships: Pursue cost-effective renewable energy projects and partnerships to hedge against energy price increases and regulatory risks, while reducing Metropolitan' s carbon footprint.

- Revenue Stream: Pursue revenue stream renewable energy facilities on operational lands to assist in cost containment.
- Economic & Environmental Stewardship: Based on projected economic and regulatory conditions, develop cost-effective programs, projects and initiatives to control operational costs and move Metropolitan towards energy independence. Implementation of proposed Energy Management Plan activities would result in substantial reductions in GHG emissions.
- Energy Management Updates: Staff will return to the Board on a regular basis to report on progress on the Energy Management Master Plan and the suitability of these policies, in light of changing regulatory and economic conditions.

Moving forward with these energy management initiatives will enhance Metropolitan's ability to provide long-term power reliability, to protect against energy market price volatility, and to hedge against overall cost risks for operation of Metropolitan's distribution system and the CRA.

I.5 Current Resource Planning

Metropolitan's Long-term Actions

As Metropolitan continues to face various water supply challenges, development of adaptable strategies for managing resources to meet the range of estimated demands into the future and for adjusting to changing resource conditions are on-going.

Resources Planning

Metropolitan's continued progress in developing a diverse resource mix enables the region to meet its water supply needs. The investments that Metropolitan has made and its on-going efforts in many different areas coalesce toward its goal of long-term regional water supply reliability. Metropolitan's actions have been focused on the following:

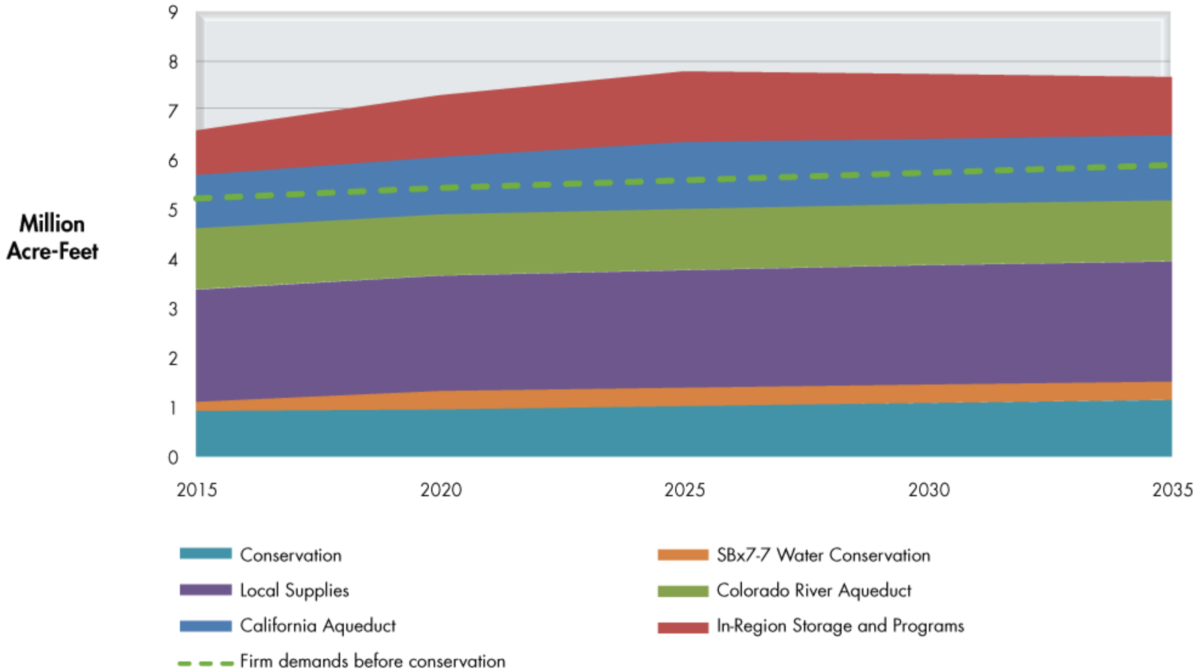
- Pursuing long-term solutions for Delta
- Developing storage programs related to the SWP and the Colorado River
- Developing storage and groundwater management programs within the Southern California region
- Increasing conservation
- Increasing water recycling, groundwater recovery, and seawater desalination
- Developing water supply management programs outside of the region

Many programs have already been successfully implemented through these actions. Others, including institutional and facility changes in the Colorado River region and the SWP, will take more time to execute. Considerations are also in place for emerging integrated supplies, which could augment sources of regional water supply from non-traditional sources. In addition, water demand reductions brought about by legislative mandates could also affect the landscape of future supply planning and implementation.

Metropolitan continues its commitment to regional long-term supply planning, with strategies for implementation discussed in detail in Section 3 of this report.

Figure 1-9 shows the various resources that are expected to be developed to meet the projected demands in Metropolitan service area under a dry-year scenario. The following sections of this report discuss each of these programs, presenting both achievements to date and future expectations for programs that are still under development.

Figure 1-9 Dry-Year Demand and Supplies



Planning for the Future

2

The purpose of this section is to show how Metropolitan plans to meet Southern California's water supply needs in the future. In its role as supplemental supplier to the Southern California water community, Metropolitan faces ongoing challenges in meeting the region's needs for water supply reliability and quality. Increased environmental regulations and competition for water from outside the region have resulted in changes in delivery patterns and timing of imported water supply availability. At the same time, the Colorado River watershed has experienced a protracted drought since 1999 while total water demand continues to rise within the region because of population and economic growth.

As described in the previous chapter, the water used in Southern California comes from a number of sources. About one-third comes from local sources, and the remainder is imported from three sources: the Colorado River, the Sacramento-San Joaquin River Delta (via the State Water Project), and the Owens Valley and Mono Basin (through the Los Angeles Aqueducts).[1]

Because of competing needs and uses associated with these resources, and because of concerns related to regional water operations, Metropolitan has undertaken a number of planning initiatives over the past fifteen years. This Regional Urban Water Management Plan summarizes these efforts, which include the Integrated Resources Plan (IRP), two IRP Updates, the Water Surplus and Drought Management Plan, the Water Supply Allocation Plan, and the Long-term Conservation Plan. Collectively, they provide a policy framework with guidelines and resource targets for Metropolitan to follow into the future.

While Metropolitan coordinates regional water supply planning for the region through its inclusive integrated planning processes, Metropolitan's member agencies also conduct their own planning analyses – including their own urban water management plans – and may develop projects independently of Metropolitan. Appendix A.5 shows a list of these potential local projects provided to Metropolitan by its member agencies.

[1] Although the water from the Los Angeles Aqueduct is imported, Metropolitan considers it a local source because it is managed by the Los Angeles Department of Water and Power and not by Metropolitan.

2.1 Integrated Resource Planning

The 1996 IRP Process

Acknowledging the importance of water to the economic and social well-being of Southern California, Metropolitan has gradually shifted roles from an exclusive supplier of imported water to a regional water planner working in collaboration with its member agencies. After the drought of 1987-1992, Metropolitan recognized the changed conditions and the need to develop a long-term water resources strategy to fulfill the agency's mission of providing a high-quality reliable water supply to its service area. This planning process that was undertaken is now known as the Integrated Resources Plan (IRP). The first IRP was adopted by Metropolitan's Board in 1996 and guided by six objectives established early in the process:

1. Ensuring Reliability
2. Ensuring Affordability
3. Ensuring Water Quality
4. Maintaining Diversity
5. Ensuring Flexibility
6. Acknowledging Environmental and Institutional Constraints.

One of the fundamental outcomes of the IRP was the recognition that regional water supply reliability could be achieved through the implementation of a diverse portfolio of resource investments and conservation measures. The resulting IRP strategy was a balance between demand management and supply augmentation. For example, in its dry year profile, the resource framework counted on almost equal proportion of water conservation and recycled water as withdrawal from storage and water transfers. The IRP also balanced between the use of local resources and imported supplies. In a dry year, about 55 percent of the region's water resources come from local resources and conservation. Additionally, through the IRP process Metropolitan found solutions that offer long-term reliability at the lowest possible cost to the region as a whole.

The 1996 IRP, as a blueprint to resource program implementation, also established the "Preferred Resource Mix that would provide the Metropolitan region with reliable and affordable water supplies through 2020.

The IRP provided details on the Preferred Resource Mix and guidelines to established broad resource targets for each of the major supplies available to the region including:

- Conservation
- Local Resources - Water Recycling, Groundwater Recovery and Desalination
- Colorado River Supplies and Transfers
- State Water Project Improvement
- In-Region Surface Reservoir Storage
- In-Region Groundwater Storage

The 2004 IRP Update

In 2004, the Metropolitan Board adopted an updated IRP. Various legislative issues concerning population growth and water supply called for further planning considerations of these changed conditions. This IRP Update had three objectives:

1. Review the goals and achievements of the 1996 IRP
2. Identify the changed conditions for water resource development
3. Update resource development targets through 2025

The 2004 IRP process fulfilled the new objectives and updated the long-term plan to account for new water planning legislation. The updated plan contained resource development targets through 2025, which reflected changed conditions; particularly increased conservation savings, planned increases in local supplies and uncertainties. The 2004 IRP also explicitly recognized the need to handle uncertainties inherent in any planning process. For the water industry, some of these uncertainties are the level of population and economic growth which directly drive water demands, water quality regulations, new chemicals found to be unhealthful, endangered species affecting sources of supplies, and periodic and new changes in climate and hydrology. As a result, a key component of the Updated Plan was the addition of a 10 percent planning buffer. The planning buffer provided for the identification of additional supplies, both imported and locally developed, that can be implemented to address uncertainty in future supplies and demands.

2010 Integrated Water Resources Plan Update

Metropolitan and its member agencies face increasing uncertainties and challenges as they plan for future water supplies. The 1996 and 2004 IRP resource strategies emphasized the need for a diverse and adaptable water supply strategy to cope with changing circumstances and conditions. Recent history and events have highlighted several emerging trends that need to be addressed in the context of the region's water supply planning and reliability. These trends cover a wide range of considerations including climate change, energy use and greenhouse gas emissions, endangered species protection and conveyance needs in the Sacramento-San Joaquin River Delta system. These trends point strongly to the importance of updating the region's Integrated Resources Plan, and to the need to solidify adaptive strategies to address additional challenges into the long-term future.

The basic objectives of the current IRP process are to:

1. Review the achievements of the 1996 IRP and the 2004 Update
2. Identify changing conditions affecting water resource development
    - Attention will be given to emerging factors and considerations, such as the current drought, climate change, energy use, and changes in Delta pumping operations
3. Update resource development targets through 2030
    - Discussion will focus on adaptation to future uncertainties, and potential alternatives for further diversifying Metropolitan's water resource portfolio and increasing supply reliability in the face of changing circumstances

Public Process

The current IRP Update process has sought input from member agencies, retail water agencies, other water and wastewater managers, environmental, business and community interests. In the fall of 2008, Metropolitan's senior management, Board of directors, member agency managers, elected officials, and community groups collectively discussed strategic direction and regional water solutions at a series of four stakeholder forums; nearly 600 stakeholders participated in the forums.

Similar types of ideas and issues were raised by the participants at all the forums, emphasizing the importance of local resources development and resolving issues with the Delta. Participants suggested that Metropolitan should take a leadership position in several areas including:

- Providing outreach to legislators concerning needs for water supply reliability and quality improvements
- Developing brine lines to enhance recycled water use
- Fostering partnerships with energy utilities
- Building relationships with environmental community
- Participating in research and development of new technologies
- Providing assistance to retail agencies in designing "correct" tiered rate structures

Technical Workgroup Process

Following the stakeholder forums, Metropolitan embarked upon a Technical Workgroup Process to further explore some of the issues and opportunities identified by forum participants. To facilitate the workgroup process, the technical discussions were grouped into six resource areas:

- Conservation
- Graywater
- Groundwater
- Recycled water
- Stormwater / Urban Runoff
- Seawater Desalination

The Technical Workgroup process provided a forum for review of the issues associated with each area, and in-depth discussions with area experts. The workgroups included member agency and retail agency staff, other non-governmental organizations, and staff from wastewater and stormwater management agencies, as well as Metropolitan staff and consultants.

Strategic Policy Review

As part of the current IRP update process, Metropolitan's Board initiated a Strategic Policy Review. This Review examined the ramifications of alternative roles for Metropolitan, member agencies and local retail agencies in future development of water resources. The process explored three alternative policy cases:

1. Current approach – continuation of IRP policies and partnerships with member agencies
2. Imported focus – Metropolitan focuses on addressing Delta issues, imported supplies and water transfers and leaves local supply development entirely to member agencies
3. Enhanced Regional focus – Metropolitan examines new approaches, up to and including development and ownership for implementing large regional scale water recycling, groundwater recharge and seawater desalination

A study of water supply reliability and cost impacts associated with these approaches found that it is in the region's best interest for Metropolitan to continue to explore ways of increasing regional reliability and not limiting itself to singular areas like addressing Delta issues. The study results under this process was a broader view of Metropolitan's role in comprehensive planning and implementation for regional reliability; adopting an adaptive resource development plan for the future may provide the most benefit for the region. In this adaptive approach, Metropolitan may need to take on an enhanced role in local supply development, in order to best adapt and respond to changing regional conditions and lay a solid foundation for future reliability. This role could include the creation of partnership with local agencies or Metropolitan's direct ownership of local projects to ensure regional reliability. The adaptive approach would be incorporated into the 2010 IRP for Board consideration.

Uncertainty Analysis

A major component of the current IRP update effort is to explicitly reflect uncertainty in Metropolitan's future water management environment. This involves evaluating a wider range of water management strategies, and seeking robust and adaptive plans that respond to uncertain conditions as they evolve over time, and that ultimately will perform adequately under a wide range of future conditions. The potential impacts and risks associated with climate change, as well as other major uncertainties and vulnerabilities, will be incorporated in to the update and accounted for. A key evolution from the 2004 IRP will be the identification of vulnerabilities and contingency actions that will extend the concept of a Planning Buffer into tangible actions that will enable construction and implementation of contingency supplies if they are needed.

Adaptive Planning Implementation

Regional water supply reliability largely depends on Metropolitan's preparedness to adapt to supply uncertainties. An adaptive management approach was utilized in developing a strategy that will prepare the region to deal with unforeseen supply shortages. An important step in this approach is identifying where additional water supply will come from. Four local water sources were considered:

- Stormwater
- Recycled Water
- Graywater
- Seawater

The stakeholder groups established during the IRP process evaluated the viability of using one or more of these resources to supplement existing water supply in the region. The stakeholders (e.g., member agencies, retail agencies, and industry experts) gathered important information on each resource such as regional development status, yield potential, and implementation challenges.

Another key aspect of this strategy is determining what actions are required to eliminate or mitigate the implementation challenges in developing these resources. The adaptive approach essentially provides a blueprint on how to address these challenges and develop supply within each resource.

The most important aspect of this strategy is the adaptive management approach used in responding to potential water supply shortage. The implementation elements identified within each blueprint can be executed at varying levels of urgency. Under the adaptive approach, Metropolitan developed three alternative implementation schedules for each resource:

- Status Quo
- Proactive
- Aggressive

Status Quo entails delaying action until a trigger is met. A trigger sets the point in time at which a potential shortage is identified and when deliberate action is taken to mitigate that shortage. The Proactive schedule implements low-risk actions early-on regardless of whether a trigger occurs. Implementing these low-risk actions shortens the overall time required to complete the implementation schedule. The Aggressive option implements both low-risk and medium-to-high risk actions that may require significant investment (e.g. land acquisition). By initiating these actions early-on, the overall implementation time can be shortened significantly. Table 2-1 highlights the differences between each schedule.

Table 2-1
Schedule Options

Schedule Option	Brief Description	Timeframe from Trigger to Production Yield	Financial Risk
Status Quo	Delay action until the adaptive management trigger occurs	Long	Low
Proactive	Begin planning actions (generally lower cost) before the adaptive management trigger occurs	Medium	Medium
Aggressive	Perform project implementation actions, such as land acquisition, before the adaptive management trigger occurs	Short	High

This strategy also utilizes an adaptive approach for determining an optimal project mix, or portfolio, used to meet a supply gap. The portfolio can comprise of projects from any of the four resources. Project drivers such as cost, yield, implementation time, and location of the project will be used to create customized portfolios that could address specific needs. For example, if a water supply shortage is occurring in a specific area, the portfolio could contain projects that serve that area. Another example might entail selecting projects that have the shortest implementation time in order to expedite supply development. Yet another example might involve selecting the most cost-efficient projects ($/AF) regardless of implementation time or location if minimizing costs is of highest priority. Furthermore, the number of projects within a portfolio is scalable based on the level of shortage at hand. This comprehensive approach is illustrated in Figure 2-1.

Metropolitan's adaptive approach is basically organized into four individual sections referred to as Foundational Studies. These individual studies discuss in detail the implementation challenges and recommended action for each resource. The first step in developing planning actions is categorizing the implementation challenges within each resource. In most cases the categories represent common themes such as establishing funding projects (Funding) or garnering legislative support (Legislative). The next step in developing planning actions is identifying implementation elements that mitigate the implementation challenges. This step involves identifying specific actions that are needed to support each implementation element. The last step in this process is developing of timelines and implementation schedules. Three alternative implementation schedules are developed for each resource.

Tables 2-2 through 2-5 summarize the categories and implementation elements for each resource. Detailed actions and schedules can be found in the foundational studies.

Figure 2-1 Comprehensive Approach

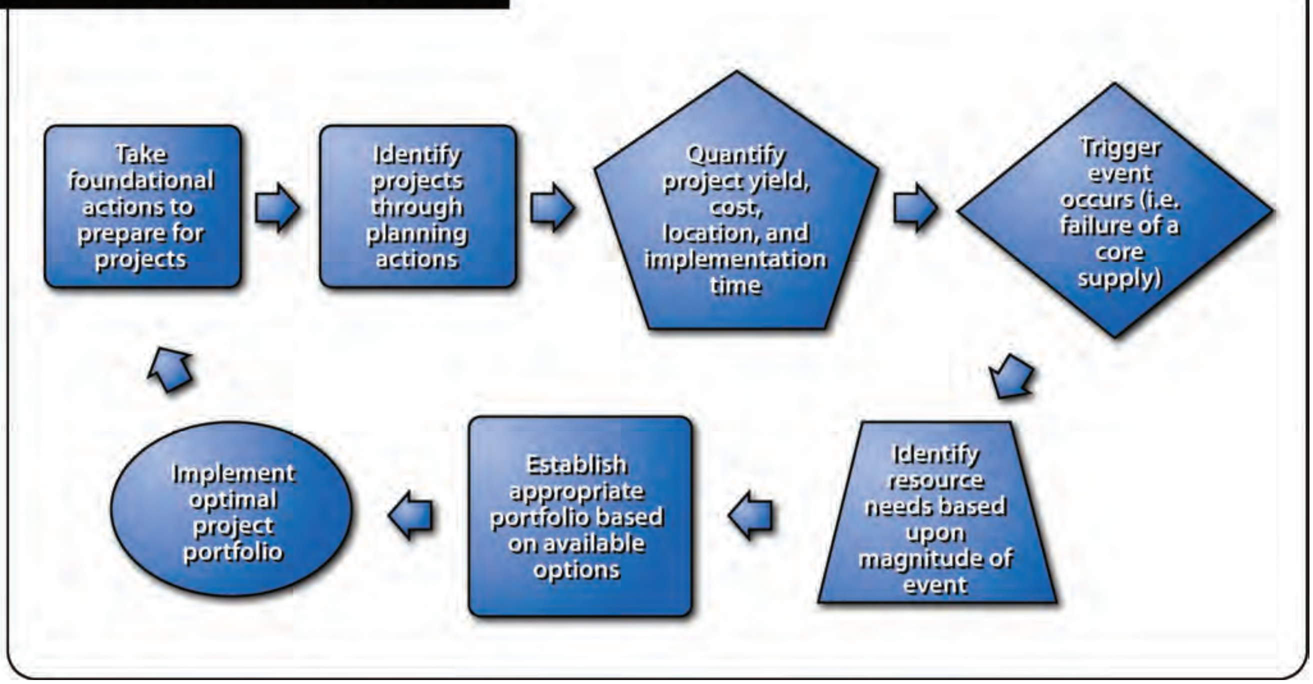


Table 2-2
Stormwater Issue Categories and Implementation Elements

Category	Implementation Element
Data Management	Regional Water Supply Project Database
Legislative/Regulatory/Education	Regional Synergy Task Force
Procedural	Regional Implementation Partnerships
Technical	Regional Feasibility Study
Funding	Funding Strategy Plan
Operational	Local Resource Baseline Plan
Implementation Planning	Alternatives Analysis Plan
Project Implementation	Incentive Programs Land Acquisition Advanced Planning Design Construction
Post Construction	O&M Performance Monitoring

Table 2-3
Recycled Water Issue Categories and Implementation Elements

Category	Implementation Element
Public Perception	Recycled Marketing Campaign Recycled Water Educational Campaign
Legislative	Recycled Water Legislative Task Force
Funding	Regional Recycled Water Finance Committee
Procedural	Regional Recycled Water Permitting and Inspection JPA Regional Recycled Water Policy Task Force
Operational	Regional Salt Management Plan Regional Basin Management Plan Recycled Water Blue Ribbon Panel (SWRCB) Regional Recycled Water Facility Plan
Facility	Regional Project (CIP) Implementation Joint Groundwater Replenishment Project

Table 2-4
Graywater Issue Categories and Implementation Elements

Category	Implementation Element
Public Perception	Graywater Marketing Campaign Graywater Educational Campaign
Legislative	Graywater Legislative Task Force
Technical	Regional Graywater Feasibility Study
Funding	Regional Graywater Finance Committee
Procedural	Regional Graywater Permitting and Inspection Regional Graywater Policy Task Force
Operational	Regional Graywater Management Plan
Construction	Regional Project Implementation

Table 2-5
Desalination Issue Categories and Implementation Elements

Category	Implementation Element
Data Management	Regional Water Supply Project Database
Legislative/Regulatory/Education	Regional Synergy Task Force
Procedural	Regional Implementation Partnerships
Technical	Regional Feasibility Study
Funding	Funding Strategy Plan
Operational	Local Resource Baseline Plan
Project Implementation	Incentive Programs Alternatives Analysis Plan Land Acquisition Advanced Planning Design Construction
Post Construction	O&M Performance Monitoring

Innovative approaches are critical to meeting the water supply needs of Southern California. Maintaining reliable water supplies given regulatory uncertainty, competing uses of groundwater and surface water, and overall variability in water supply is a growing challenge. An adaptive regional approach that develop, promote, and practice integrated regional water management of both traditional and emerging supplies may be the key to continued regional reliability.

2.2 Evaluating Supply Reliability

The Urban Water Management Plan Act requires that three basic planning analyses be conducted to evaluate supply reliability. The first is a water supply reliability assessment requiring development of a detailed evaluation of the supplies necessary to meet projected demands over at least a 20-year period. This analysis is to consider average, single-year and multi-year drought conditions. The second is a water shortage contingency plan which documents the actions that would be implemented in addressing up to a 50 percent reduction in an agency's supplies. Finally, a plan must be developed specifying the steps that would be taken under a catastrophic interruption in water supplies.

To address these three requirements, Metropolitan developed estimates of future demands and supplies from local sources and from Metropolitan. Supply and demand analyses for the single- and multi-year drought cases were based on conditions affecting the SWP. For this supply source, the single driest year was 1977 and the three-year dry period was 1990-1992. The SWP is the appropriate point of reference for these analyses since it is Metropolitan's largest and most variable supply. For the "average" year analysis 83 years of historic hydrology (1922-2004) were used to estimate supply and demand.

Estimating Demands on Metropolitan

Metropolitan developed its demand forecast by first estimating total retail demands for its service area and then factoring out water savings attributed to conservation.[2] Projections of local supplies then were derived using data on current and expected local supply programs and the IRP Local Resource Program Target. The resulting difference between total demands net of conservation and local supplies is the expected regional demands on Metropolitan supplies. These various estimates are shown in Tables 2-6 through 2-8. Major categories used in these tables are defined below.

Total Demands

Total demand is the sum of retail demand for M&I and agricultural, seawater barrier demand, and replenishment demand. Total demand represents the total amount of water needed by the member agencies. Total demands include:

- Retail Municipal and Industrial (M&I) — Retail Municipal and Industrial (M&I) demands represent the full spectrum of urban water use within the region. These include residential, commercial, industrial, institutional and un-metered water uses. To forecast urban water demands Metropolitan used the MWD-MAIN Water Use Forecasting System (MWD-Main), consisting of econometric models that have been adapted for conditions in Southern California. The demographic and economic data used in developing these forecasts were taken from the Southern California Association of Government's (SCAG) 2007 Regional Transportation Plan and from the San Diego County Association of Government's (SANDAG) Series 12: 2050 Regional Growth Forecast (Feb 2010). The SCAG and SANDAG regional growth forecasts are the core assumptions that drive the estimating equations in Metropolitan's MWD-MAIN demand forecasting model. SCAG and SANDAG's projections undergo extensive local review and incorporate zoning information from city and county general plans and are backed by Environmental Impact Reports.

  Impacts of potential annexation are not included in the demand projections for the 2010 RUWMP. However, Metropolitan's Review of Annexation Procedures concluded that the impacts of annexation within the service area beyond 2020 would not exceed 2 percent of overall demands.

[2] Information generated as part of this analysis are contained in Appendix A-1.

- Retail Agricultural Demand — Retail agricultural demands consist of water use for irrigating crops. Member agencies estimate agricultural water use based on many factors, including farm acreage, crop types, historical water use, and land use conversion. Each member agency estimates their agricultural demand differently, depending on the availability of information. Metropolitan relies on member agencies' estimates of agricultural demands for the 2010 RUWMP

- Seawater Barrier Demand — Seawater barrier demands represent the amount of water needed to hold back seawater intrusion into the coastal groundwater basins. Groundwater management agencies determine the barrier requirements based on groundwater levels, injection wells, and regulatory permits.

- Replenishment Demand — Replenishment demands represent the amount of water member agencies plan to use to replenish their groundwater basins. For the 2010 RUWMP, replenishment deliveries are not included as part of firm demands.

Conservation Adjustment

The conservation adjustment subtracts estimated conservation from total retail demand. The conservation estimates consist of three types:

- Code-Based Conservation — Water savings resulting from plumbing codes and other institutionalized water efficiency measures.

- Active Conservation — Water saved as a direct result of programs and practices directly funded by a water utility (e.g., measures outlined by the California Urban Water Conservation Council's "Best Management Practices"). Water savings from active conservation currently completed will decline to zero as the lifetime of those devices is reached. This will be offset by an increase in water savings for those devices that are mandated by law, plumbing codes or other efficiency standards.

- Price Effect Conservation — Reductions in customer use attributable to changes in the real (inflation adjusted) cost of water.

Water Use Reduction Target

On November 10, 2009, the state Legislature passed Senate Bill 7 as part of the Seventh Extraordinary Session, referred to as SBX7-7. This new law is the water conservation component of the historic Delta legislative package, and seeks to achieve a 20 percent statewide reduction in urban per capita water use in California by December 31, 2020. According to Water Code §10608.36, wholesale agencies are required to include in their UWMPs an assessment of present and proposed future measures, programs, and policies that would help achieve the water use reductions required under SBX7-7. Urban wholesale water suppliers are not required to comply with the target-setting and reporting requirements of SBX7-7. Additional discussion of the water reduction target is included in Section 3.7.

Based on Metropolitan' s analysis of population and demand and the methodologies for setting targets described in the legislation, compliance with 20x2020 on an individual agency basis throughout the region would result in reduced potable demand of 380 TAF in 2020 through additional conservation and/or recycling. This estimated amount is reflected in the projected demand tables under 20x2020 Retail Compliance.

Local Supplies

Local supplies represent a spectrum of water produced by the member agencies to meet their total demands. Local supplies are a key component in determining how much Metropolitan supply is needed to supplement member agencies local supplies to meet their total demand. Projections of local supplies relied on information gathered from a number of sources including past urban water management plans, Metropolitan's annual local production surveys, and communications between Metropolitan and member agency staff. Local supplies include:

- Groundwater and Surface Water — Groundwater production consists of extractions from local groundwater basins. Surface water comes from stream diversions and rainwater captured in reservoirs.
- The Los Angeles Aqueduct — A major source of imported water is conveyed from the Owens Valley via the Los Angeles Aqueduct (LAA) by LADWP. Although LADWP imports water from outside of Metropolitan's service area, Metropolitan classifies water provided by the LAA as a local resource because it is developed and controlled by a local agency.
- Seawater desalination — Seawater desalinated for potable use.
- Groundwater Recovery and Recycled Water — Locally developed and operated, groundwater recovery projects treat contaminated groundwater to meet potable use standards. Recycled water projects recycle wastewater for municipal and industrial use.
- Non-Metropolitan Imports — Water supplies imported by member agencies from sources outside of the Metropolitan service area.

The local supply projections presented in demand tables include existing projects that are currently producing water and projects that are under construction. Appendix A.5 contains a complete list of existing, under construction, fully designed with appropriated funds, feasibility, and conceptual projects that are within the service area.

Firm Demands

After calculating the expected regional demands on Metropolitan supplies, projected firm demands were calculated based on Metropolitan's established reliability goal. For the purposes of reliability planning, the 1996 IRP established a reliability goal that states that full service demands at the retail level would be satisfied under all "foreseeable hydrologic" conditions through 2020. This principle has been retained in the current update.

This goal allows for intermittent interruptions to non-firm, discounted rate supplies sold under the Replenishment and Interim Agricultural Water Programs. Thus, firm demand on Metropolitan equals Full Service demands (Tier I and Tier II). For the purpose of analysis, "foreseeable hydrologic conditions" is understood to mean under "historical hydrology," which presently covers the range of historical hydrology spanning the years 1922 through 2004. Tables 2-6 through 2-8 show estimates of firm demands on Metropolitan for single dry-year, multiple dry-year, and average year.

Table 2-6
Metropolitan Regional Water Demands
Single Dry Year
(Acre-Feet)

		2015	2020	2025	2030	2035
A.	**Total Demands[1]**	**5,480,000**	**5,662,000**	**5,804,000**	**5,961,000**	**6,101,000**
	Retail Municipal and Industrial	5,000,000	5,194,000	5,354,000	5,515,000	5,653,000
	Retail Agricultural	231,000	213,000	193,000	186,000	186,000
	Seawater Barrier	71,000	72,000	72,000	72,000	72,000
	Groundwater Replenishment	177,000	184,000	186,000	188,000	191,000
B.	**Total Conservation**	**936,000**	**967,000**	**1,033,000**	**1,096,000**	**1,156,000**
	Existing Active (through 2009)[2]	97,000	46,000	16,000	2,000	0
	Code-based and Price-Effect	589,000	671,000	766,000	844,000	906,000
	Pre-1990 Conservation	250,000	250,000	250,000	250,000	250,000
C.	**SBx7-7 Water Conservation**	**190,000**	**380,000**	**380,000**	**380,000**	**380,000**
	20% by 2020 Retail-Level Compliance	190,000	380,000	380,000	380,000	380,000
D.	**Total Local Supplies**	**2,260,000**	**2,322,000**	**2,366,000**	**2,405,000**	**2,419,000**
	Groundwater	1,457,000	1,395,000	1,407,000	1,423,000	1,416,000
	Surface Water	98,000	97,000	97,000	97,000	97,000
	Los Angeles Aqueduct	66,000	66,000	66,000	66,000	66,000
	Groundwater Recovery	101,000	108,000	114,000	120,000	126,000
	Total Recycling	348,000	375,000	394,000	410,000	426,000
	Other Imported Supplies	190,000	281,000	288,000	288,000	288,000
E.	**Total Metropolitan Demands (E=A-B-C-D)**	**2,094,000**	**1,993,000**	**2,025,000**	**2,080,000**	**2,146,000**
	Full Service (Tier I and Tier II)	1,991,000	1,889,000	1,921,000	1,974,000	2,039,000
	Replenishment Service[3]	103,000	103,000	104,000	106,000	107,000
	Interim Agricultural Water Program[4]	0	0	0	0	0
3	**Firm Demands on Metropolitan[5]**	**1,991,000**	**1,889,000**	**1,921,000**	**1,974,000**	**2,039,000**

Notes:
All units are acre-feet unless specified, rounded the nearest thousand.
Totals may not sum due to rounding.
[1] Growth projections are based on SCAG 2007 Regional Transportation Plan and SANDAG Series 12 2050 Regional Growth Forecast (Feb 2010).
[2] Includes code-based, price-effect and existing active savings through 2009; does not include future active conservation savings. 1990 is base year.
[3] Replenishment Service as defined in MWD Administrative Code Section 4114. Replenishment service includes direct and in-lieu replenishment.
[4] IAWP deliveries will be phased out by 2013.
[5] Firm demand on Metropolitan equals Full Service demands plus 70% of the Interim Agricultural Water Program demands.

Table 2-7
Metropolitan Regional Water Demands
Multiple Dry Year
(Acre-Feet)

		2015	2020	2025	2030	2035
A.	**Total Demands[1]**	**5,478,000**	**5,702,000**	**5,862,000**	**6,017,000**	**6,161,000**
	Retail Municipal and Industrial	5,004,000	5,232,000	5,409,000	5,572,000	5,715,000
	Retail Agricultural	231,000	214,000	195,000	185,000	184,000
	Seawater Barrier	71,000	71,000	72,000	72,000	72,000
	Groundwater Replenishment	172,000	184,000	187,000	188,000	190,000
B.	**Total Conservation**	**936,000**	**967,000**	**1,033,000**	**1,096,000**	**1,156,000**
	Existing Active (through 2009)[2]	97,000	46,000	16,000	2,000	0
	Code-based and Price-Effect	589,000	671,000	766,000	844,000	906,000
	Pre-1990 Conservation	250,000	250,000	250,000	250,000	250,000
C.	**SBx7-7 Water Conservation**	**190,000**	**380,000**	**380,000**	**380,000**	**380,000**
	20% by 2020 Retail-Level Compliance	190,000	380,000	380,000	380,000	380,000
D.	**Total Local Supplies**	**2,171,000**	**2,305,000**	**2,343,000**	**2,378,000**	**2,402,000**
	Groundwater	1,386,000	1,389,000	1,389,000	1,397,000	1,396,000
	Surface Water	91,000	91,000	91,000	91,000	91,000
	Los Angeles Aqueduct	63,000	67,000	71,000	75,000	78,000
	Groundwater Recovery	100,000	107,000	113,000	119,000	125,000
	Total Recycling	340,000	370,000	390,000	407,000	423,000
	Other Imported Supplies	191,000	282,000	288,000	288,000	288,000
E.	**Total Metropolitan Demands (E=A-B-C-D)**	**2,154,000**	**2,049,000**	**2,106,000**	**2,163,000**	**2,224,000**
	Full Service (Tier I and Tier II)	2,056,000	1,947,000	2,003,000	2,059,000	2,119,000
	Replenishment Service[3]	97,000	102,000	103,000	104,000	104,000
	Interim Agricultural Water Program[4]	0	0	0	0	0
F.	**Firm Demands on Metropolitan[5]**	**2,056,000**	**1,947,000**	**2,003,000**	**2,059,000**	**2,119,000**

Notes:
All units are acre-feet unless specified, rounded the nearest thousand.
Totals may not sum due to rounding.
[1]Growth projections are based on SCAG 2007 Regional Transportation Plan and SANDAG Series 12 2050 Regional Growth Forecast (Feb 2010).
[2]Includes code-based, price-effect and existing active savings through 2009; does not include future active conservation savings. 1990 is base year.
[3]Replenishment Service as defined in MWD Administrative Code Section 4114. Replenishment service includes direct and in-lieu replenishment.
[4]IAWP deliveries will be phased out by 2013.
[5]Firm demand on Metropolitan equals Full Service demands plus 70% of the Interim Agricultural Water Program demands.

Table 2-8
Metropolitan Regional Water Demands
Average Year
(Acre-Feet)

		2015	2020	2025	2030	2035
A.	**Total Demands[1]**	**5,449,000**	**5,632,000**	**5,774,000**	**5,930,000**	**6,069,000**
	Retail Municipal and Industrial	4,978,000	5,170,000	5,330,000	5,491,000	5,627,000
	Retail Agricultural	222,000	205,000	186,000	179,000	180,000
	Seawater Barrier	71,000	72,000	72,000	72,000	72,000
	Groundwater Replenishment	178,000	185,000	187,000	189,000	191,000
B.	**Total Conservation**	**936,000**	**967,000**	**1,033,000**	**1,096,000**	**1,156,000**
	Existing Active (through 2009)[2]	97,000	46,000	16,000	2,000	0
	Code-based and Price-Effect	589,000	671,000	766,000	844,000	906,000
	Pre-1990 Conservation	250,000	250,000	250,000	250,000	250,000
C.	**SBx7-7 Water Conservation**	**190,000**	**380,000**	**380,000**	**380,000**	**380,000**
	20% by 2020 Retail-Level Compliance	190,000	380,000	380,000	380,000	380,000
D.	**Total Local Supplies**	**2,395,000**	**2,522,000**	**2,553,000**	**2,581,000**	**2,603,000**
	Groundwater	1,429,000	1,430,000	1,429,000	1,431,000	1,431,000
	Surface Water	103,000	102,000	102,000	102,000	102,000
	Los Angeles Aqueduct	224,000	225,000	226,000	229,000	230,000
	Groundwater Recovery	101,000	108,000	114,000	120,000	126,000
	Total Recycling	348,000	375,000	394,000	410,000	426,000
	Other Imported Supplies	190,000	281,000	288,000	288,000	288,000
E.	**Total Metropolitan Demands (E=A-B-C-D)**	**1,928,000**	**1,763,000**	**1,808,000**	**1,874,000**	**1,931,000**
	Full Service (Tier I and Tier II)	1,826,000	1,660,000	1,705,000	1,769,000	1,826,000
	Replenishment Service[3]	102,000	103,000	103,000	104,000	105,000
	Interim Agricultural Water Program[4]	0	0	0	0	0
F.	**Firm Demands on Metropolitan[5]**	**1,826,000**	**1,660,000**	**1,705,000**	**1,769,000**	**1,826,000**

Notes:
All units are acre-feet unless specified, rounded the nearest thousand.
Totals may not sum due to rounding.
[1] Growth projections are based on SCAG 2007 Regional Transportation Plan and SANDAG Series 12 2050 Regional Growth Forecast (Feb 2010).
[2] Includes code-based, price-effect and existing active savings through 2009; does not include future active conservation savings. 1990 is base year.
[3] Replenishment Service as defined in MWD Administrative Code Section 4114. Replenishment service includes direct and in-lieu replenishment.
[4] IAWP deliveries will be phased out by 2013.
[5] Firm demand on Metropolitan equals Full Service demands plus 70% of the Interim Agricultural Water Program demands.

2.3 Water Supply Reliability

After estimating demands for single dry year, multiple dry years, and average years the water reliability analysis requires urban water suppliers to identify projected supplies to meet these demands. Table 2-9 summarizes the sources of supply for the single dry year (1977 hydrology), while Table 2-10 shows the region's ability to respond in future years under a repeat of the 1990-92 hydrology. Table 2-10 provides results for the average of the three dry years rather than a year-by-year detail, because most of Metropolitan's dry-year supplies are designed to provide equal amounts of water over each year of a three-year period. These tables show that the region can provide reliable water supplies under both the single driest year and the multiple dry year hydrologies. Table 2-11 reports the expected situation on average over all of the historic hydrologies. Appendix A.3 contains detailed justifications for the sources of supply used for this analysis.

Metropolitan' s supply capabilities are evaluated using the following assumptions:

Colorado River Aqueduct Supplies

Colorado River Aqueduct supplies include supplies that would result from existing and committed programs and from implementation of the Quantification Settlement Agreement (QSA) and related agreements. The QSA, which is the subject of current litigation, is a component of the California Plan and establishes the baseline water use for each of the agreement parties and facilitates the transfer of water from agricultural agencies to urban uses. A detailed discussion of the QSA is included in Section 3. Colorado River transactions are potentially available to supply additional water up to the CRA capacity of 1.25 MAF on an as-needed basis.

State Water Project Supplies

State Water Project (SWP) supplies are estimated using the draft 2009 SWP Delivery Reliability Report distributed by DWR in December 2009. The draft 2009 reliability report presents the current DWR estimate of the amount of water deliveries for current (2009) conditions and conditions 20 years in the future. These estimates incorporate restrictions on SWP and Central Valley Project (CVP) operations in accordance with the biological opinions of the U.S. Fish and Wildlife Service and National Marine Fishery Service issued on December 15, 2008, and June 4, 2009, respectively. Under the 2009 draft reliability report, the delivery estimates for the SWP for current (2009) conditions as percentage of maximum Table A amounts, are seven percent, equivalent to 134 TAF, under a single dry-year (1977) condition and 60%, equivalent to 1.15 MAF, under long-term average condition.

In dry, below-normal conditions, Metropolitan has increased the supplies received from the California Aqueduct by developing flexible Central Valley storage and transfer programs. Over the last two years under the pumping restrictions of the SWP, Metropolitan has worked collaboratively with the other contractors to develop numerous voluntary Central Valley storage and transfer programs. The goal of this storage/transfer programs is to develop additional dry-year supplies that can be conveyed through the available Banks pumping capacity to maximize deliveries through the California Aqueduct during dry hydrologic conditions and regulatory restrictions.

Delta Improvements

The listing of several fish species as threatened or endangered under the federal or California Endangered Species Acts (ESAs) have adversely impacted operations and limited the flexibility of the SWP. In response to court decisions related to the Biological Opinions for fish species listed under the ESAs, DWR altered the operations of the SWP. This resulted in export restrictions and reduced SWP deliveries. In June 2007, Metropolitan's Board approved a Delta Action Plan that provides a framework for staff to pursue actions with other agencies and stakeholders to build a sustainable Delta and reduce conflicts between water supply conveyance and the environment. The Delta Action Plan aims to prioritize immediate short-term actions to stabilize the Delta while an ultimate solution is selected, and mid-term steps to maintain the Bay-Delta while the long-term solution is implemented.

In the near-term, the physical and operational actions in the Bay-Delta being developed include measures that protect fish species and reduce supply impacts with the goal of reducing conflicts between water supply conveyance and environmental needs. The potential for Increased supply due to these near-term fixes is included in the 2010 RUWMP as a 10 percent increase in water supplies obtained from the SWP allocation for the year. In evaluating the supply capabilities for the 2010 RUWMP, additional supplies from this interim fix are assumed to materialize by 2013. Also included as a possible near-term fix for the Bay-Delta is the proposed Two-Gate System demonstration program, which would provide movable barriers on the Old and Middle Rivers to modify flows and prevent fish from being drawn toward the Bay-Delta pumping plants. The Two-Gate System is anticipated to protect fish and increase SWP supplies.

Operational constraints likely will continue until a long-term solution to the problems in the Bay-Delta is identified and implemented. State and federal resource agencies and various environmental and water user entities are currently engaged in the development of the Bay Delta Conservation Plan (BDCP), which is aimed at addressing the basic elements that include the Delta ecosystem restoration, water supply conveyance, and flood control protection and storage development. In dealing with these basic issues, the ideal solutions sought are the ones that address both the physical changes required as well as the financing and governance. In evaluating the supply capabilities for the 2010 RUWMP, Metropolitan assumed a new Delta conveyance is fully operational by 2022 that would return supply reliability similar to 2005 condition, prior to supply restrictions imposed due to the Biological Opinions. This assumption is consistent with Metropolitan's long-term Delta Action Plan that recognizes the need for a global, comprehensive approach to the fundamental issues and conflicts to result in a sustainable Bay-Delta, sufficient to avoid biological opinion restrictions on planned SWP deliveries to Metropolitan and the other SWP Contractors. Further, recently passed state legislation included pathways for establishing governance structures and financing approaches to implement and manage the identified elements.

Storage

A key component of Metropolitan's water supply capability is the amount of water in Metropolitan's storage facilities. Storage is a major component of Metropolitan's dry-year resource management strategy. Metropolitan's likelihood of having adequate supply capability to meet projected demands, without implementing the Water Supply Allocation plan (WSAP), is dependent on its storage resources.

In developing the supply capabilities for the 2010 RUWMP, Metropolitan assumed a simulated median storage level going into each of five-year increments based on the balances of supplies and demands. Under the median storage condition, there is an estimated 50 percent probability that storage levels would be higher than the assumption used, and a 50 percent probability that storage levels would be lower than the assumption used. All storage capability figures shown in the 2010 RUWMP reflect actual storage program conveyance constraints. It is important to note that under some conditions, Metropolitan may choose to implement the WSAP in order to preserve storage reserves for a future year, instead of using the full supply capability. This can result in impacts at the retail level even under conditions where there may be adequate supply capabilities to meet demands.

Table 2-9
Single Dry-Year
Supply Capability[1] and Projected Demands
Repeat of 1977 Hydrology
(acre-feet per year)

Forecast Year	2015	2020	2025	2030	2035
Current Programs					
In-Region Storage and Programs	685,000	931,000	1,076,000	964,000	830,000
California Aqueduct[2]	522,000	601,000	651,000	609,000	610,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	1,416,000	1,824,000	1,669,000	1,419,000	1,419,000
Aqueduct Capacity Limit[4]	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*
Colorado River Aqueduct Capability	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Capability of Current Programs	**2,457,000**	**2,782,000**	**2,977,000**	**2,823,000**	**2,690,000**
Demands					
Firm Demands of Metropolitan	1,991,000	1,889,000	1,921,000	1,974,000	2,039,000
IID-SDCWA Transfers and Canal Linings	180,000	273,000	280,000	280,000	280,000
Total Demands on Metropolitan[5]	**2,171,000**	**2,162,000**	**2,201,000**	**2,254,000**	**2,319,000**
Surplus	**286,000**	**620,000**	**776,000**	**569,000**	**371,000**
Programs Under Development					
In-Region Storage and Programs	206,000	306,000	336,000	336,000	336,000
California Aqueduct	556,000	556,000	700,000	700,000	700,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	187,000	187,000	187,000	182,000	182,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**762,000**	**862,000**	**1,036,000**	**1,036,000**	**1,036,000**
Potential Surplus	**1,048,000**	**1,482,000**	**1,812,000**	**1,605,000**	**1,407,000**

[1] Represents Supply Capability for resource programs under listed year type.

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.

[3] Colorado River Aqueduct includes water management programs, IID-SDCWA transfers and canal linings conveyed by the aqueduct.

[4] Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfers and canal linings.

[5] Firm demands are adjusted to include IID-SDCWA transfers and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

Table 2-10
Multiple Dry-Year
Supply Capability[1] and Projected Demands
Repeat of 1990-1992 Hydrology
(acre-feet per year)

Forecast Year	2015	2020	2025	2030	2035
Current Programs					
In-Region Storage and Programs	246,000	373,000	435,000	398,000	353,000
California Aqueduct[2]	752,000	794,000	835,000	811,000	812,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	1,318,000	1,600,000	1,417,000	1,416,000	1,416,000
Aqueduct Capacity Limit[4]	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*
Colorado River Aqueduct Capability	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Capability of Current Programs	**2,248,000**	**2,417,000**	**2,520,000**	**2,459,000**	**2,415,000**
Demands					
Firm Demands of Metropolitan	2,056,000	1,947,000	2,003,000	2,059,000	2,119,000
IID-SDCWA Transfers and Canal Linings	180,000	241,000	280,000	280,000	280,000
Total Demands on Metropolitan[5]	**2,236,000**	**2,188,000**	**2,283,000**	**2,339,000**	**2,399,000**
Surplus	**12,000**	**229,000**	**237,000**	**120,000**	**16,000**
Programs Under Development					
In-Region Storage and Programs	162,000	280,000	314,000	336,000	336,000
California Aqueduct	242,000	273,000	419,000	419,000	419,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	187,000	187,000	187,000	182,000	182,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**404,000**	**553,000**	**733,000**	**755,000**	**755,000**
Potential Surplus	**416,000**	**782,000**	**970,000**	**875,000**	**771,000**

[1] Represents Supply Capability for resource programs under listed year type.

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.

[3] Colorado River Aqueduct includes water management programs, IID-SDCWA transfers and canal linings conveyed by the aqueduct.

[4] Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfers and canal linings.

[5] Firm demands are adjusted to include IID-SDCWA transfers and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

Table 2-11
AverageYear
Supply Capability[1] and Projected Demands
Average of 1922-2004 Hydrologies
(acre-feet per year)

Forecast Year	2015	2020	2025	2030	2035
Current Programs					
In-Region Storage and Programs	685,000	931,000	1,076,000	964,000	830,000
California Aqueduct[2]	1,550,000	1,629,000	1,763,000	1,733,000	1,734,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	1,507,000	1,529,000	1,472,000	1,432,000	1,429,000
Aqueduct Capacity Limit[4]	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*
Colorado River Aqueduct Capability	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Capability of Current Programs	**3,485,000**	**3,810,000**	**4,089,000**	**3,947,000**	**3,814,000**
Demands					
Firm Demands of Metropolitan	1,826,000	1,660,000	1,705,000	1,769,000	1,826,000
IID-SDCWA Transfers and Canal Linings	180,000	273,000	280,000	280,000	280,000
Total Demands on Metropolitan[5]	**2,006,000**	**1,933,000**	**1,985,000**	**2,049,000**	**2,106,000**
Surplus	**1,479,000**	**1,877,000**	**2,104,000**	**1,898,000**	**1,708,000**
Programs Under Development					
In-Region Storage and Programs	206,000	306,000	336,000	336,000	336,000
California Aqueduct	382,000	383,000	715,000	715,000	715,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	187,000	187,000	187,000	182,000	182,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**588,000**	**689,000**	**1,051,000**	**1,051,000**	**1,051,000**
Potential Surplus	**2,067,000**	**2,566,000**	**3,155,000**	**2,949,000**	**2,759,000**

[1] Represents Supply Capability for resource programs under listed year type.

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.

[3] Colorado River Aqueduct includes water management programs, IID-SDCWA transfers and canal linings conveyed by the aqueduct.

[4] Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfers and canal linings.

[5] Firm demands are adjusted to include IID-SDCWA transfers and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

2.4 Water Shortage Contingency Analysis

In addition to the Water Supply Reliability analysis addressing average year and drought conditions, the Act requires agencies to document the stages of actions that it would undertake in response to water supply shortages, including up to a 50 percent reduction in its water supplies. Metropolitan has captured this planning in its Water Surplus and Drought Management Plan (WSDM Plan) which guides Metropolitan's planning and operations during both shortage and surplus conditions. Furthermore, Metropolitan developed the WSAP which provides a standardized methodology for allocating supplies during times of shortage.

Water Surplus and Drought Management Plan

In April 1999, Metropolitan's Board adopted the Water Surplus and Drought Management Plan (WSDM Plan)[3], included in Appendix A.4. It provides policy guidance for managing regional water supplies to achieve the reliability goals of the IRP and identifies the expected sequence of resource management actions that Metropolitan will execute during surpluses and shortages to minimize the probability of severe shortages and reduce the possibility of extreme shortages and shortage allocations. Unlike Metropolitan's previous shortage management plans, the WSDM Plan recognizes the link between surpluses and shortages, and it integrates planned operational actions with respect to both conditions.

WSDM Plan Development

Metropolitan and its member agencies jointly developed the WSDM Plan during 1998 and 1999. This planning effort included more than a dozen half-day and full-day workshops and more than three dozen meetings between Metropolitan and member agency staff. The result of the planning effort is a consensus plan that addresses a broad range of regional water management actions and strategies.

WSDM Plan Principles and Goals

The guiding principle of the WSDM plan is to manage Metropolitan's water resources and management programs to maximize management of wet year supplies and minimize adverse impacts of water shortages to retail customers. From this guiding principle came the following supporting principles:

- Encourage efficient water use and economical local resource programs
- Coordinate operations with member agencies to make as much surplus water as possible available for use in dry years
- Pursue innovative transfer and banking programs to secure more imported water for use in dry years
- Increase public awareness about water supply issues

The WSDM plan also declared that if mandatory import water allocations become necessary, they would be calculated on the basis of need, as opposed to any type of historical purchases. The WSDM plan contains the following considerations that would go into an equitable allocation of imported water:

- Impact on retail consumers and regional economy
- Investments in local resources, including recycling and conservation
- Population growth
- Changes and/or losses in local supplies
- Participation in Metropolitan's Non-firm (interruptible) programs
- Investment in Metropolitan's facilities

WSDM Plan Implementation

Each year, Metropolitan evaluates the level of supplies available and existing levels of water in storage to determine the appropriate management stage. Each stage is associated with specific resource

[3] Metropolitan Water District of Southern California. *Water Surplus and Drought Management Plan,* Report No. 1150, August, 1999.

management actions designed to (1) avoid an Extreme Shortage to the maximum extent possible and (2) minimize adverse impacts to retail customers if an Extreme Shortage occurs. The current sequencing outlined in the WSDM Plan reflects anticipated responses based on detailed modeling of Metropolitan's existing and expected resource mix.

<u>Surplus Stages</u>
Metropolitan's supply situation is considered to be in surplus as long as net annual deliveries can be made to water storage programs. The WSDM Plan further defines five surplus management stages that guide the storage of surplus supplies in Metropolitan's storage portfolio. Deliveries for storage in the DVL and in the SWP terminal reservoirs continue through each surplus stage provided there is available storage capacity. Withdrawals from DVL for regulatory purposes or to meet seasonal demands may occur in any stage. Deliveries to other storage facilities may be interrupted, depending on the amount of the surplus.

<u>Shortage Stages</u>
The WSDM Plan distinguishes between Shortages, Severe Shortages, and Extreme Shortages. Within the WSDM Plan, these terms have specific meaning relating to Metropolitan's ability to deliver water to its customers.

Shortage: Metropolitan can meet full-service demands and partially meet or fully meet interruptible demands, using stored water or water transfers as necessary.

Severe Shortage: Metropolitan can meet full-service demands only by using stored water, transfers, and possibly calling for extraordinary conservation. In a Severe Shortage, Metropolitan may have to curtail Interim Agricultural Water Program deliveries.

Extreme Shortage: Metropolitan must allocate available supply to full-service customers.

The WSDM Plan also defines seven shortage management stages to guide resource management activities. These stages are not defined merely by shortfalls in imported water supply, but also by the water balances in Metropolitan's storage programs. Thus, a ten percent shortfall in imported supplies could be a stage one shortage if storage levels are high. If storage levels are already depleted, the same shortfall in imported supplies could potentially be defined as a more severe shortage.

When Metropolitan must make net withdrawals from storage to meet demands, it is considered to be in a shortage condition. Under most of these stages, it is still able to meet all end-use demands for water. For shortage stages 1 through 4, Metropolitan will meet demands by withdrawing water from storage. At shortage stages 5 through 7, Metropolitan may undertake additional shortage management steps, including issuing public calls for extraordinary conservation, considering curtailment of Interim Agricultural Water Program deliveries in accordance with their discounted rates, exercising water transfer options, or purchasing water on the open market.

Figure 2-2 shows the actions under surplus and shortage stages when an allocation plan would be necessary to enforce mandatory cutbacks. The overriding goal of the WSDM Plan is to never reach Shortage Stage 7, an Extreme Shortage.

At shortage stage 7 Metropolitan will implement its Water Supply Allocation Plan[4] (WSAP) to allocate available supply fairly and efficiently to full-service customers.

Water Supply Allocation Plan

In February 2008 Metropolitan's Board adopted the WSAP. The WSAP includes the specific formula for calculating member agency supply allocations and the key implementation elements needed for administering an allocation.

The WSAP was developed in consideration of the principles and guidelines described in the

[4] Metropolitan Water District of Southern California, Water Supply Allocation Plan, June 2009.

WSDM Plan, with the objective of creating an equitable needs-based allocation. The WSAP formula seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level for shortages of Metropolitan supplies of up to 50 percent. The formula takes into account growth, local investments, changes in supply conditions and the demand hardening aspects of non-potable recycled water use and the implementation of conservation savings programs.

Water Supply Allocation Plan Development

Between July 2007 and February 2008, Metropolitan staff worked jointly with Metropolitan's member agencies to develop the WSAP. Throughout the development process Metropolitan's Board was provided with regular progress reports on the status of the WSAP The WSAP was adopted at the February 12, 2008 Board meeting.

<u>The WSAP Formula</u>
The WSAP formula is calculated in three steps: base period calculations, allocation year calculations, and supply allocation calculations. The first two steps involve standard computations, while the third step contains specific methodology developed for the WSAP.

Step 1: Base Period Calculations

The first step in calculating a water supply allocation is to estimate water supply and demand using a historical base period with established water supply and delivery data. The base period for each of the different categories of demand and supply is calculated using data from the three most recent non-shortage years, 2004-2006.

Step 2: Allocation Year Calculations

The next step in calculating the water supply allocation is estimating water needs in the allocation year. This is done by adjusting the base period estimates of retail demand for population or economic growth and changes in local supplies.

Step 3: Supply Allocation Calculations

The final step is calculating the water supply allocation for each member agency based on the allocation year water needs identified in Step 2. Each element and its application in the allocation formula is discussed in detail in Metropolitan's Water Supply Allocation Plan.[5]

<u>Annual Reporting Schedule on Supply/ Demand Conditions</u>
Managing Metropolitan's water supply resources to minimize the risk of shortages requires timely and accurate information on changing supply and demand conditions throughout the year. To facilitate effective resource management decisions, the WSDM Plan includes a monthly schedule for providing supply/demand information to Metropolitan's senior management and Board, and for making resource allocation decisions. Table 2-12 shows this schedule.

[5] Metropolitan Water District of Southern California, Water Supply Allocation Plan, June 2009.

Figure 2-2 Resource Stages, Anticipated Actions, And Supply Declarations

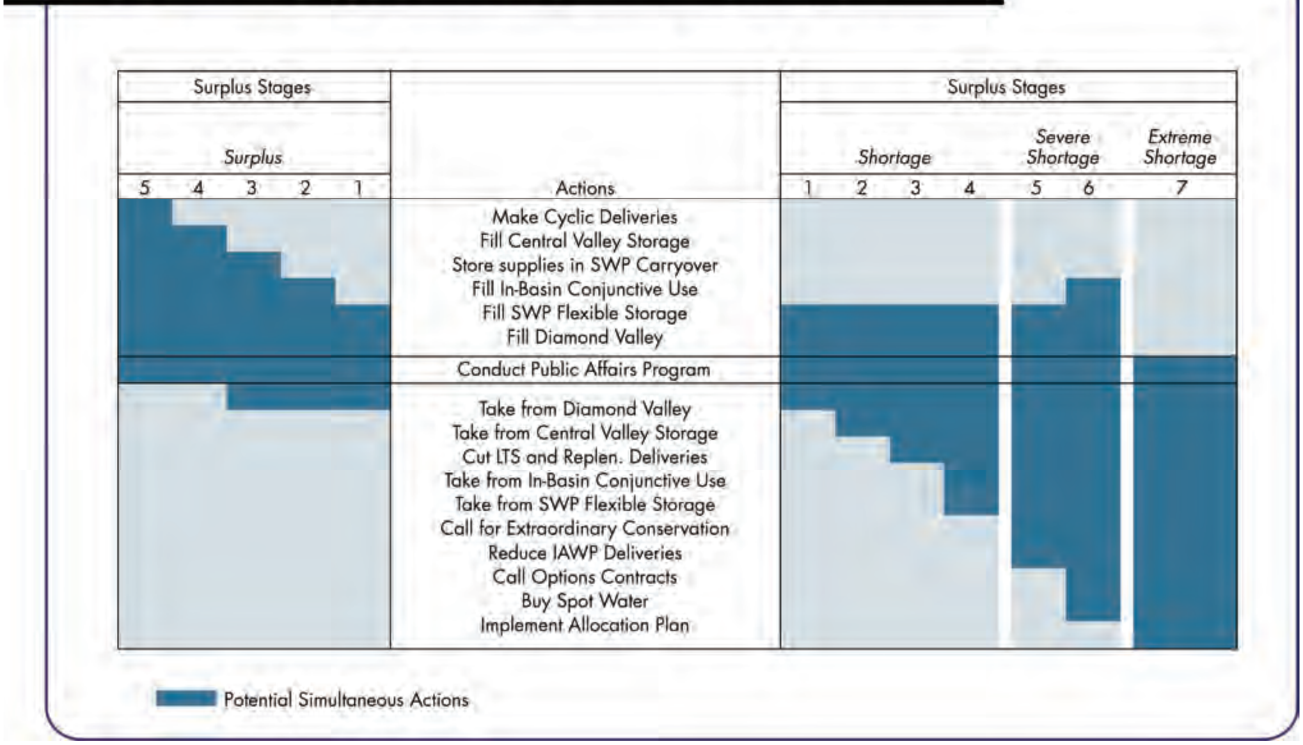


Table 2-12
Schedule of Reporting and Resource Allocation Decision-Making

Month	Information Report/Management Decision
January	Initial supply/demand forecasts for year
February - March	Update supply/demand forecasts for year
April - May	Finalize supply/demand forecasts Management decisions re: Contractual Groundwater and Option Transfer Programs Board decision re: Need for Extraordinary Conservation
October - December	Report on Supply and Carryover Storage
October	Management decisions re: Delivery Interruptions for the Replenishment and Interim Agricultural Water Programs

2.5 Catastrophic Supply Interruption Planning

The third type of planning needed to evaluate supply reliability is a catastrophic supply interruption plan that documents the actions necessary for a catastrophic interruption in water supplies. For Metropolitan this planning is captured in the analysis that went into developing the Emergency Storage Requirements.

Emergency Storage Requirements

Metropolitan established its criteria for determining emergency storage requirements in the October 1991 Final Environmental Impact Report for the Eastside Reservoir, which is now named Diamond Valley Lake. These criteria were again discussed in the 1996 IRP. Metropolitan's Board has approved both of these documents.

Emergency storage requirements are based on the potential of a major earthquake damaging the aqueducts that transport Southern California's imported water supplies (SWP, CRA, and Los Angeles Aqueduct). The adopted criteria assume that damage from such an event could render the aqueducts out of service for six months. Therefore, Metropolitan has based its planning on a 100 percent reduction in its supplies for a period of six months, which is a greater shortage than required by the Act.

To safeguard the region from catastrophic loss of water supply, Metropolitan has made substantial investments in emergency storage. The emergency plan outlines that under such a catastrophe, non-firm service deliveries would be suspended, and firm supplies to member agencies would be restricted by a mandatory cutback of 25 percent from normal-year demand levels. At the same time, water stored in surface reservoirs and groundwater basins under Metropolitan's interruptible program would be made available, and Metropolitan would draw on its emergency storage, as well as other available storage. Metropolitan has reserved up to half of DVL storage to meet such an emergency, while the remainder is available for dry-year and seasonal supplies. In addition, Metropolitan has access to emergency storage at its other reservoirs, at the SWP terminal reservoirs, and in its groundwater conjunctive use storage accounts. With few exceptions, Metropolitan can deliver this emergency supply throughout its service area via gravity, thereby eliminating dependence on power sources that could also be disrupted by a major earthquake. The WSDM Plan shortage stages will guide Metropolitan's management of available supplies and resources during the emergency to minimize the impacts of the catastrophe.

Electrical Outages

Metropolitan has also developed contingency plans that enable it to deal with both planned and unplanned electrical outages. These plans include the following key points:

- In event of power outages, water supply can be maintained by gravity feed from regional reservoirs such as DVL, Lake Mathews, Castaic Lake and Silverwood Lake.
- Maintaining water treatment operations is a key concern. As a result, all Metropolitan treatment plants have backup generation sufficient to continue operating in event of supply failure on the main electrical grid.
- Valves at Lake Skinner can be operated by the backup generation at the Lake Skinner treatment plant.
- Metropolitan owns mobile generators that can be transported quickly to key locations if necessary.

2.6 Other Supply Reliability Risks

Metropolitan provides water to a broad and heterogeneous service area with water supplies from a variety of sources and geographic regions. Each of these demand areas and supplies has its own unique set of benefits and challenges. Among the challenges Metropolitan faces are the following:

Supplies

- The region and Colorado River Basin have been experiencing drought conditions for multiple years.
- Endangered species protections and conveyance needs in the Sacramento-San Joaquin River Delta System have resulted in operational constraints particularly important because pumping restrictions impact many water resource programs – SWP supplies and additional voluntary transfers, Central Valley storage and transfers, in-region groundwater storage and in-region surface water storage.
- Changing climate patterns are predicted to shift precipitation patterns and possibly affect water supply.
- Difficulty and implications of environmental review, documentation, and permitting for multi-year transfer agreements, recycled water projects and seawater desalination plants.
- Public perception of recycled water use for replenishment.

Operations and Water Quality

- The cost and use of energy and greenhouse gas emissions.
- Water quality regulations and issues like the quagga mussels within the Colorado River Aqueduct. Controlling the spread and impacts of the quagga mussels will require more extensive maintenance and reduced operational flexibility.
- Salt and concentrate balance from variety of sources.

Demand

- Uncertain population and economic growth
- Uncertain location of growth
- Uncertain housing stock and density

The challenges posed by continued population growth, environmental constraints on the reliability of imported supplies, and new uncertainties imposed by climate change demand that Metropolitan assert the same level of leadership and commitment to taking on large-scale regional solutions to providing water supply reliability. New solutions are available in the form of dramatically improved water-use efficiency, indirect potable use of recycled water, and large-scale application of ocean desalinization.

Climate Change

Climate change adds its own new uncertainties to the challenges of planning. Metropolitan's water supply planning has been fortunate in having almost one-hundred years of hydrological data regarding weather and water supply. This history of rainfall data has provided a sound foundation for forecasting both the frequency and the severity of future drought conditions, as well as the frequency and abundance of above-normal rainfall. But, weather patterns can be expected to shift dramatically and unpredictably in a climate driven by increased concentrations of carbon dioxide in the atmosphere, as experienced in Australia. These changes in weather significantly affect water supply planning, irrespective of the debate associated with the sources and cause of increasing concentrations of greenhouse gasses. As a major steward of the region's water supply resources, Metropolitan is committed to performing its due diligence with respect to climate change.

Potential Impacts

While uncertainties remain regarding the exact timing, magnitude, and regional impacts of these temperature and precipitation changes, researchers have identified several areas of concern for California water planners. These include:

- Reduction in Sierra Nevada snowpack;
- Increased intensity and frequency of extreme weather events; and
- Rising sea levels resulting in
  - Increased risk of damage from storms, high-tide events, and the erosion of levees; and
  - Potential pumping cutbacks on the SWP and Central Valley Project (CVP).

Other important issues of concern due to global climate change include:

- Effects on local supplies such as groundwater;
- Changes in urban and agricultural demand levels and patterns ;
- Impacts to human health from water-borne pathogens and water quality degradation;
- Declines in ecosystem health and function; and
- Alterations to power generation and pumping regimes.

Metropolitan's Activities Related to Climate Change Concerns

An extended Colorado River drought put climate change on Metropolitan's radar screen in the mid-1990s. In 2000, Metropolitan's Board received a briefing on the potential impacts of climate change on water supply by leading experts in the field. Metropolitan then hosted a California Water Plan meeting on climate change and a held Drought Preparedness Workshop on similar issues. In March 2002, the Board adopted policy principles on global climate change as related to water resource planning. The Principles stated in part that 'Metropolitan supports further research into the potential water resource and quality effects of global climate change, and supports flexible "no regret" solutions that provide water supply and quality benefits while increasing the ability to manage future climate change impacts.'

<u>Knowledge Sharing and Research Support</u>
Metropolitan is an active and founding member of the Water Utility Climate Alliance (WUCA). WUCA consists of ten nationwide water providers collaborating on climate change adaptation and green house gas mitigation issues. As a part of this effort, WUCA pursues a variety of activities on multiple fronts.

WUCA monitors development of climate change-related research, technology, programs and federal legislation. Activities to date include such things as:

- Letter of support for Western Water Assessment's continued funding as a Regional Integrated Sciences and Assessments team under the National Oceanic and Atmospheric Administration (NOAA)
- Letter of support for the 2009 Kerry-Boxer Water Utilities Mitigation and Adaptation Partnerships congressional bill addendum
- Regular communication and consultations with federal agencies on the U.S. Environmental Protection Agency's Climate Ready Water Utility Working Group
- NOAA Climate Service and January 2010 International Climate Change Forum

In addition to supporting federal and regional efforts, WUCA released a white paper entitled "Options for Improving Climate Modeling to Assist Water Utility Planning for Climate Change" in January 2010. The purpose of this paper was to assess Global Circulation Models, identify key aspects for water utility planning and make seven initial recommendations for how climate modeling and downscaling techniques can be improved so that these tools and techniques can be more useful for the water sector.

In order to address water provider-specific needs, WUCA has focused not only on climate change science and Global Circulation Models, but on how best to incorporate that knowledge into water planning. This was explored more thoroughly in a second January 2010 white paper on decision support methods for incorporating climate change uncertainty into water planning. This paper assessed five known decision support approaches for applicability in incorporating Climate Change uncertainty in water utility planning and identified additional research needs in the area of decision support methodologies.

In addition to these efforts, the member agencies of WUCA annually share individual agency actions to mitigate greenhouse gas emissions to facilitate further implementation of these programs. At a September 2009 summit at the Aspen Global Change Institute WUCA, members met with global climate modelers, along with federal agencies, academic scientists, and climate researchers to establish collaborative directions to progress climate science and modeling efforts. WUCA continues to pursue these opportunities and partnerships with water providers, climate scientists, federal agencies, research centers, academia and key stakeholders.

Metropolitan also continues to pursue knowledge sharing and research support activities outside of WUCA. Metropolitan regularly provides input and direction on California legislation related to climate change issues. Metropolitan is active in collaborating with other state and federal agencies, as well as non-governmental organizations on climate change related planning issues. The following list provides a sampling of entities that Metropolitan has recently worked with on a collaborative basis:

- U.S. Bureau of Reclamation
- U.S. Army Corps of Engineers
- American Water Works Association Research Foundation
- National Center for Atmospheric Research
- California Energy Commission
- California Department of Water Resources

<u>Quantification of Current Research</u>
Metropolitan continues to incorporate current climate change science into its planning efforts. A major component of the current IRP update effort is to explicitly reflect uncertainty in Metropolitan's future water management environment. This involves evaluating a wider range of water management strategies, and seeking robust and adaptive plans that respond to uncertain conditions as they evolve over time, and that ultimately will perform adequately under a wide range of future conditions. The potential impacts and risks associated with climate change, as well as other major uncertainties and vulnerabilities, will be incorporated into the update and accounted. Overall, Metropolitan's planning activities strive to support the Board adopted policy principles on climate change by:

- Supporting reasonable, economically viable, and technologically feasible management strategies for reducing impacts on water supply
- Supporting flexible "no regret" solutions that provide water supply and quality benefits while increasing the ability to manage future climate change impacts, and

- Evaluating staff recommendations regarding climate change and water resources against the California Environmental Quality Act (CEQA) to avoid adverse effects on the environment.

Implementation of Programs and Policies
Metropolitan has made great efforts to implement greenhouse gas mitigation programs and policies for its facilities and operations. To date, these programs and policies have focused on:

- Exploring water supply/energy relationships and opportunities to increase efficiencies;
- Joining the California Climate Action Registry;
- Acquiring "green" fleet vehicles, and supporting an employee Rideshare program;
- Developing solar power at the Skinner water treatment plant; and
- Identifying and pursuing development of "green" renewable water and energy programs that support the efficient and sustainable use of water.

Metropolitan also continues to be a leader in efforts to increase regional water use efficiency. Metropolitan has worked to increase the availability of incentives for local conservation and recycling projects, as well as supporting conservation Best Management Practices for industry and commercial businesses.

2.7 Pricing and Rate Structures

Revenue Management

A high proportion of Metropolitan's revenues come from volumetric water rates; during the last five fiscal years through 2008-09, water sales revenues were approximately 75 percent of Metropolitan's total revenues. As a result, Metropolitan's revenues vary according to regional weather and the availability of statewide water supplies. In dry years, local demands increase and Metropolitan may receive higher than anticipated revenues due to increased sales volumes. In contrast, in wet years demands decrease, and revenues drop due to lower sales volumes. In addition, statewide supply shortages such as those in 1991 and 2009 also affect Metropolitan's revenues. Such revenue surpluses and shortages could cause instability in water rates. To mitigate this risk, Metropolitan maintains financial reserves, with a minimum and maximum balance, to stabilize water rates during times of reduced water sales. The reserves hold revenues collected during times of high water sales and are used to offset the need for revenues during times of low sales.

Another way to mitigate rate increases is by generating a larger portion of revenues from fixed sources. Metropolitan currently has two fixed charges, the Readiness-to-Serve Charge and the Capacity Charge. Metropolitan also collects tax revenue from taxable property within its boundaries. For the last five fiscal years the revenues from fixed charges generated almost 18 percent of all Metropolitan revenues. RTS revenues have been increasing gradually, from $80 million in 2007, to $114 million in 2010, $125 million in 2011, and $146 million in 2012.

Finally, Metropolitan generates a significant amount of revenue from interest income, hydroelectric power sales, and miscellaneous income such as rents and leases. For the last five fiscal years, these averaged almost 7 percent of all Metropolitan revenues. These internally generated revenues are referred to as revenue offsets and reduce the amount of revenue that has to be collected from rates and charges.

Elements of Rate Structure

This section provides an overview of Metropolitan's rate structure. The different elements of the rate structure are discussed below and summarized in Table 2-13.

System Access Rate (SAR)

The SAR is a volumetric system-wide rate levied on each acre-foot of water that moves through the Metropolitan system. All system users (member agency or third party) pay the SAR to use Metropolitan's conveyance and distribution system. The SAR recovers the cost of providing conveyance and distribution capacity to meet average annual demands.

Water Stewardship Rate (WSR)

The WSR recovers the costs of providing financial incentives for existing and future investments in local resources including conservation and recycled water. These investments or incentive payments are identified as the "demand management" service function in the cost of service process. The WSR is a volumetric rate levied on each acre-foot of water that moves through the Metropolitan system.

System Power Rate (SPR)

The SPR recovers the costs of energy required to pump water to Southern California through the SWP and Colorado River Aqueduct. The cost of power is recovered through a uniform volumetric rate. The SPR is applied to all deliveries to member agencies.

Treatment Surcharge

The treatment surcharge recovers the costs of providing treated water service through a uniform, volumetric rate. The treatment surcharge recovers all costs associated with providing treated water service, including commodity, demand and standby related costs.

Capacity Charge

The capacity charge is levied on the maximum summer day demand placed on the system between May 1 and September 30 for a three-calendar year period. Demands measured for the purposes of billing the capacity charge include all firm demand and agricultural demand, including wheeling service and exchanges. Replenishment service is not included in the measurement of peak day demand for purposes of billing the capacity charge.

The capacity charge is intended to pay for the cost of peaking capacity on Metropolitan's system, while providing an incentive for local agencies to decrease their use of the Metropolitan system to meet peak day demands and to shift demands into lower use time periods. Over time, a member agency will benefit from local supply investments and operational strategies that reduce its peak day demand on the system in the form of a lower total capacity charge.

Readiness-To-Serve Charge (RTS)

The costs of providing standby service, including emergency storage and those standby costs related to the conveyance and aqueduct system, are recovered by the RTS.

The RTS is allocated to the member agencies based on each agency's proportional share of a ten-year rolling average of all firm deliveries (including water transfers and exchanges that use Metropolitan system capacity). The ten-year rolling average does not include replenishment service and interim agricultural deliveries because these deliveries will be the first to be curtailed in the event of an emergency. A ten-year rolling average leads to a relatively stable RTS allocation that reasonably represents an agency's potential long-term need for standby service under different demand conditions. Member agencies may choose to have a portion of their total RTS obligation offset by standby charge collections levied by Metropolitan on behalf of the member agency. These standby charges are assessed on parcels of land within the boundaries of a given member agency.

Tier 1 Supply Rate

The costs of maintaining existing supplies and developing additional supplies are recovered through a two-tiered pricing approach. The Tier 1 Supply Rate recovers the majority of the supply costs and reflects the cost of existing supplies. Each member agency has a predetermined amount of water that can be purchased at the lower Tier 1 Supply Rate in a calendar year. Purchases in excess of this limit will be made at the higher Tier 2 Supply Rate.

The Tier 1 Supply rate includes a Delta Supply Surcharge of $69 per AF in 2010, $51 per AF in 2011 and $58 per AF in 2012. This surcharge reflects the impact on Metropolitan's water supply rates due to lower deliveries from the SWP as a result of pumping restrictions designed to protect endangered fish species. The Delta Supply Surcharge will remain in effect until a long-term solution for the delta was achieved or until interim facility improvements restore SWP yield.

Tier 2 Supply Rate

The Tier 2 Supply Rate reflects Metropolitan's cost of developing long-term firm supplies. The Tier 2 Supply Rate recovers a greater proportion of the cost of developing additional supplies from member agencies that have increasing demands on the Metropolitan system.

Replenishment Program and Agricultural Water Program

Metropolitan currently administers two pricing programs that make surplus system supplies (system supplies in excess of what is needed to meet consumptive municipal and industrial demands) available to the member agencies at a discounted water rate. The Replenishment Program provides supplies, when available, for the purpose of replenishing local storage. The Interim Agricultural Water Program (IAWP) makes surplus water available for agricultural purposes. In October 2008, the Board approved a phase out of the IAWP by 2013. Because of the critically dry conditions and uncertainty about future supply, discounted replenishment deliveries have been curtailed for the past three years. If water supply conditions improve and surplus water becomes available, Metropolitan could make Replenishment service available to its member agencies at discounted rates, subject to meeting Metropolitan's storage objectives to meet full service demands.

Table 2-13
Rate Structure Components

Rate Design Elements	Service Provided/ Costs Recovered	Type of Charge
System Access Rate	Conveyance/Distribution (Average Capacity)	Volumetric ($/AF)
Water Stewardship Rate	Conservation/Local Resources	Volumetric ($/AF)
System Power Rate	Power	Volumetric ($/AF)
Treatment Surcharge	Treatment	Volumetric ($/AF)
Capacity Charge	Peak Distribution Capacity	Fixed/Volumetric ($/cfs)
Readiness-To-Serve Charge	Conveyance/Distribution/Emergency Storage(Standby Capacity)	Fixed ($Million)
Tier 1 Supply Rate	Supply	Volumetric/Fixed ($/AF)
Tier 2 Supply Rate	Supply	Volumetric ($/AF)
Surplus Water Rates	Replenishment/Agriculture	Volumetric ($/AF)

The following tables provide further information regarding Metropolitan's rates. Table 2-14 summarizes the rates and charges effective January 1, 2010, January 1, 2011, and January 1, 2012. Average costs by member agency will vary depending upon an agency's RTS allocation, Capacity Charge and relative proportions of treated and untreated Tier 1, Tier 2, replenishment, and agricultural water purchases. Table 2-15 provides the details of the Capacity Charge, calculated for calendar year 2011.

Table 2-16 provides the details of the Readiness-to-Serve Charge calculation for calendar year 2011 broken down by member agency. Table 2-17 provides the current Purchase Order commitment quantities that member agencies will purchase from Metropolitan over the 10-year period starting January 2003 through December 2012. Tier 1 limits for each member agency are also shown in this table.

Table 2-14
Metropolitan Water Rates and Charges

Effective	Jan 1, 2010	Jan 1, 2011	Jan 1, 2012
Tier 1 Supply Rate ($/AF)	$101	$104	$106
Delta Supply Surcharge ($/AF)	$69	$51	$58
Tier 2 Supply Rate ($/AF)	$280	$280	$290
System Access Rate ($/AF)	$154	$204	$217
Water Stewardship Rate ($/AF)	$41	$41	$43
System Power Rate ($/AF)	$119	$127	$136
Full Service Untreated Volumetric Cost ($/AF)			
Tier 1	$484	$527	$560
Tier 2	$594	$652	$686
Replenishment Water Rate Untreated ($/AF)	$366	$409	$442
Interim Agricultural Water Program Untreated ($/AF)	$416	$482	$537
Treatment Surcharge ($/AF)	$217	$217	$234
Full Service Treated Volumetric Cost ($/AF)			
Tier 1	$701	$744	$794
Tier 2	$811	$869	$920
Treated Replenishment Water Rate ($/AF)	$558	$601	$651
Treated Interim Agricultural Water Program ($/AF)	$615	$687	$765
Readiness-to-Serve Charge ($M)	$114	$125	$146
Capacity Charge ($/cfs)	$7,200	$7,200	$7,400

Table 2-15
Capacity Charge Detail

	Peak Day Demand (cfs) (May 1 through September 30) Calendar Year				
Agency	2007	2008	2009	3-Year Peak	Calendar Year 2011 Capacity Charge ($7,200/cfs)
Anaheim	37.9	36.1	40.7	40.7	$ 293,040
Beverly Hills	33.9	32.9	31.0	33.9	244,080
Burbank	33.7	34.2	21.6	34.2	246,240
Calleguas	260.8	250.0	192.8	260.8	1,877,760
Central Basin	125.9	102.7	94.7	125.9	906,480
Compton	7.1	4.9	5.9	7.1	51,120
Eastern	303.0	263.1	227.8	303.0	2,181,600
Foothill	25.4	21.5	24.3	25.4	182,880
Fullerton	36.9	27.1	37.4	37.4	269,280
Glendale	54.6	55.7	56.0	56.0	403,200
Inland Empire	176.2	125.8	106.1	176.2	1,268,640
Las Virgenes	45.3	45.3	42.7	45.3	326,160
Long Beach	61.3	68.1	67.2	68.1	490,320
Los Angeles	768.5	821.9	698.2	821.9	5,917,680
MWDOC	469.2	453.7	489.5	489.5	3,524,400
Pasadena	58.5	55.6	50.2	58.5	$421,200
San Diego [1]	1278.4	1039.9	1055.3	1278.4	9,204,480
San Fernando	6.5	0.1	0.0	6.5	$46,800
San Marino	5.2	5.2	3.5	5.2	$37,440
Santa Ana	29.7	14.5	16.4	29.7	213,840
Santa Monica	27.6	26.2	25.0	27.6	198,720
Three Valleys	171.4	168.1	132.7	171.4	1,234,080
Torrance	41.6	35.5	39.3	41.6	299,520
Upper San Gabriel	63.8	36.9	27.6	63.8	459,360
West Basin	262.3	243.3	221.3	262.3	1,888,560
Western	289.1	271.4	219.9	289.1	2,081,520
Total	**4,673.8**	**4,239.7**	**3,927.1**	**4,759.5**	**$ 34,268,400**

Totals may not foot due to rounding

Table 2-16
Readiness-to-Serve Charge (by Member Agency)
Calendar Year 2011 RTS charge

Member Agency	Rolling Ten-Year Average Firm Deliveries (Acre-Feet) FY1999/00 - FY2008/09	RTS Share	12 months @ $125 million per year (1/11-12/11)
Anaheim	20,966	1.11%	$ 1,382,122
Beverly Hills	12,737	0.67%	839,692
Burbank	12,908	0.68%	850,938
Calleguas MWD	113,610	5.99%	7,489,554
Central Basin MWD	63,256	3.34%	4,170,058
Compton	3,146	0.17%	207,408
Eastern MWD	92,013	4.85%	6,065,789
Foothill MWD	11,570	0.61%	762,706
Fullerton	9,694	0.51%	639,087
Glendale	24,150	1.27%	1,592,015
Inland Empire Utilities Agency	61,205	3.23%	4,034,823
Las Virgenes MWD	23,282	1.23%	1,534,813
Long Beach	36,970	1.95%	2,437,211
Los Angeles	314,757	16.60%	20,749,798
Municipal Water District of Orange County	231,692	12.22%	15,273,878
Pasadena	23,397	1.23%	1,542,428
San Diego County Water Authority	491,238	25.91%	32,384,010
San Fernando	119	0.01%	7,819
San Marino	1,001	0.05%	65,963
Santa Ana	12,743	0.67%	840,028
Santa Monica	12,794	0.67%	843,429
Three Valleys MWD	73,095	3.85%	4,818,678
Torrance	20,742	1.09%	1,367,401
Upper San Gabriel Valley MWD	15,631	0.82%	1,030,447
West Basin MWD	141,522	7.46%	9,329,606
Western MWD	71,906	3.79%	4,740,301
MWD Total	**1,896,143**	**100.00%**	**$ 125,000,000**

Totals may not foot due to rounding

Table 2-17
Purchase Order Commitments and Tier 1 Limits
(by Member Agency)

	2011 Tier 1 Limit with Opt-outs	Purchase Order Commitment (acre-feet)
Anaheim	22,240	148,268
Beverly Hills	13,380	89,202
Burbank	16,336	108,910
Calleguas	110,249	692,003
Central Basin	72,361	482,405
Compton	5,058	33,721
Eastern	87,740	504,664
Foothill	10,997	73,312
Fullerton	11,298	75,322
Glendale	26,221	174,809
Inland Empire	59,792	398,348
Las Virgenes	21,087	137,103
Long Beach	39,471	263,143
Los Angeles	304,970	2,033,132
MWDOC	228,130	1,486,161
Pasadena	21,180	141,197
San Diego	547,239	3,342,571
San Fernando	630	-
San Marino	1,199	-
Santa Ana	12,129	80,858
Santa Monica	11,515	74,062
Three Valleys	70,474	469,331
Torrance	20,967	139,780
Upper San Gabriel	16,512	110,077
West Basin	156,874	1,045,825
Western	69,720	391,791
Total	**1,957,768**	**12,495,995**

Totals may not foot due to rounding.

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Implementing the Plan

3

The result of the recent strategic review process reveals a broader view of Metropolitan's role in comprehensive planning and implementation for regional reliability. As Metropolitan continues to deal with current and emerging concerns on changing trends in climate, cost and use of energy, endangered species protections, and conveyance issues in the Sacramento-San Joaquin River Delta System , the need for a robust and flexible water supply planning and implementation that can quickly adapt to variations in future trends becomes evident. Metropolitan's current strategy of implementing an adaptive resource development plan for the future will provide the most benefit for the region. What emanates from this adaptive strategy is a Metropolitan that can adopt alternative roles, including that of an enhanced water importer, local supply funder, and project developer; and a Metropolitan that can respond to changing regional conditions that ultimately will perform efficiently under a wide range of possible future conditions.

This section summarizes Metropolitan's implementation plans and continued progress in developing a diversified resource mix that enables the region to meet its water supply needs. The investments that Metropolitan has made and its on-going efforts in many different areas coalesce toward its goal of long-term regional water supply reliability. Many of the resource programs discussed are already successfully implemented. Others, including institutional and facility changes in the Colorado River region and the SWP, will take more time to execute. Considerations are also in place for emerging integrated supplies, which could augment sources of regional water supply from non-traditional sources. In addition, water demand reductions brought about by legislative mandates could also affect the landscape of future supply planning and implementation. The following sections discuss each of these programs, presenting both successes to date and the programs that are still under way.

3.1 Colorado River Aqueduct

Metropolitan continues to pursue Colorado River Aqueduct (CRA) supplies of 1.2 MAF per year. However, over the years, a number of constraints have developed that restrict Metropolitan's access to Colorado River supplies. As a result, Metropolitan adopted a revised policy of utilizing the full capacity of the CRA when needed through the basic apportionment and various water banking and acquisition programs. This water will help Metropolitan manage regional storage conditions and water quality.

Metropolitan was established to obtain an allotment of Colorado River water, and its first mission was to construct and operate the CRA. Under its contracts with the federal government, Metropolitan has a basic entitlement of 550 TAF per year of Colorado River water. Metropolitan also holds a fifth priority for an additional 662 TAF per year that exceeds California's 4.4 MAF per year basic apportionment, and another 180 TAF per year when surplus flows are available. Metropolitan can obtain water under the fifth priority from:

- Water unused by the California holders of priorities 1 through 3
- Water saved by the Palo Verde land management, crop rotation, and water supply program, or
- When the U.S. Secretary of the Interior makes available either or both:
  - Surplus water, and
  - Water apportioned to, but unused by, Arizona and/or Nevada.

Background

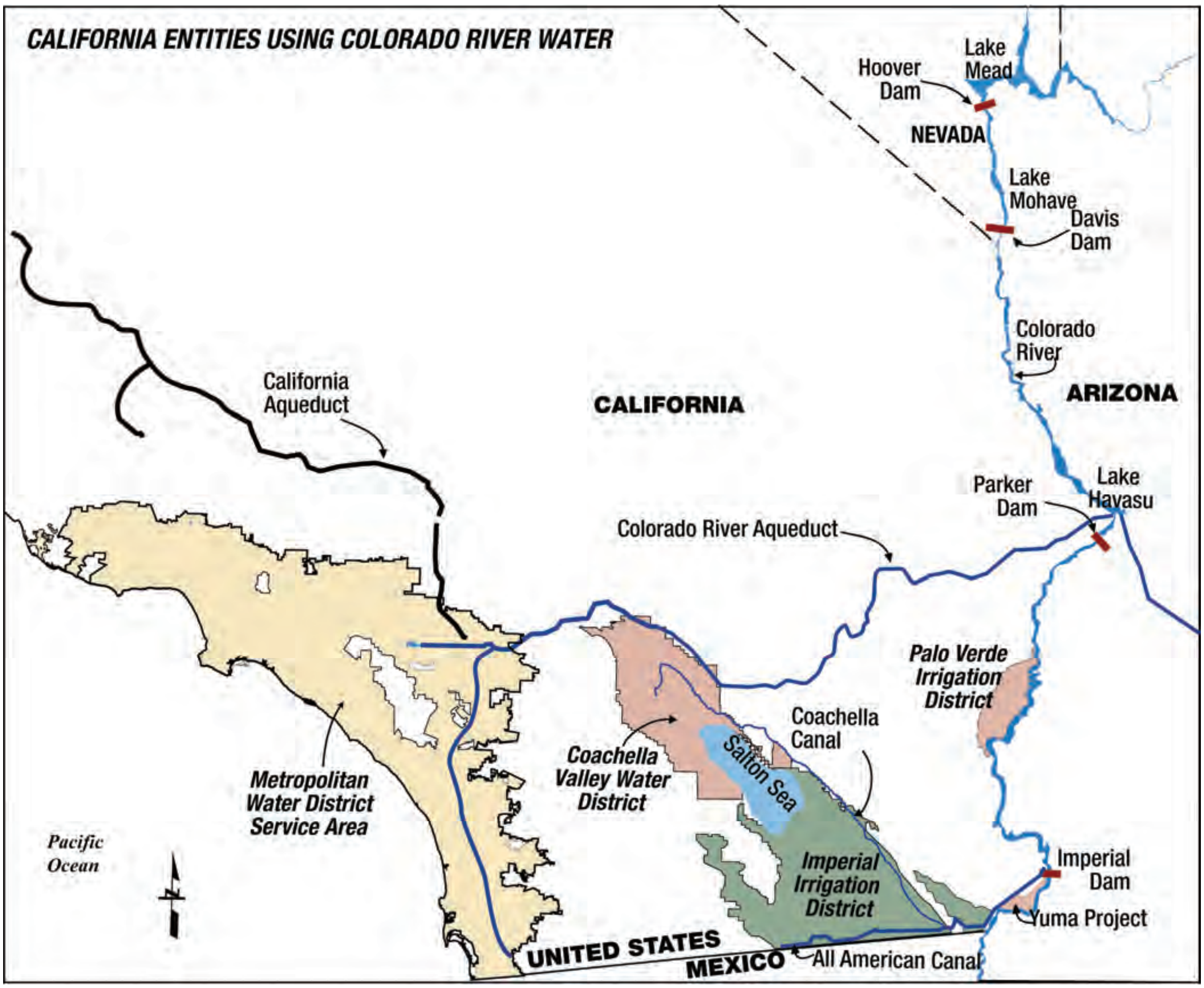
To satisfy a condition imposed by Congress in the Boulder Canyon Project Act, California's legislature enacted the Limitation Act in 1929 agreeing to limit consumptive use of Colorado River water to 4.4 MAF per year, plus not more than one-half of any excess or surplus waters unapportioned by the Colorado River Compact. The 1931 Seven Party Agreement provides the basis for the priorities among California's contractors to use of Colorado River water made available to California. Palo Verde Irrigation District (PVID), the Yuma Project (Reservation Division), Imperial Irrigation District (IID), and Coachella Valley Water District (CVWD), collectively the "agricultural entities"), and Metropolitan are the entities that currently hold the priorities. These priorities are included in the contracts that the Department of the Interior executed with the California agencies in the 1930s for delivery of water from Lake Mead. The first four priorities total the 4.4 MAF per year available to California. Metropolitan has the fourth priority to California's basic apportionment and the fifth priority to 662 TAF per year. Under Priorities 1 through 3, an amount not to exceed 3.85 MAF was apportioned to the agricultural entities for beneficial consumptive use. The Seven Party Agreement did not specify individual quantities for each of the first three priorities; rather, the amount of water available under the third priority was limited to the amount unused by the holders of priorities 1 and 2 on designated areas of land. This lack of quantification among the agricultural priorities posed an obstacle to the acquisition of water from the agricultural entities for use in Metropolitan's service area.

The Consolidated Decree of the U.S. Supreme Court in Arizona v. California, preceded by a 1964 decree, confirmed the allocation of 4.4 MAF per year to California. This limit reduced Metropolitan's dependable supply of Colorado River water to its fourth priority amount of 550 TAF per year. For a period following the Court's ruling, Metropolitan's fifth priority rights were satisfied with water allocated to Arizona and Nevada which they did not use. With the commencement of Colorado River water deliveries to the Central Arizona Project in 1985, the availability of Colorado River water to meet Metropolitan's Consolidated Decree, preceded by a 1979 decree, also quantifies present perfected rights (PPRs) to the use of Colorado River water by certain Indian reservations, federal wildlife refuges, and other users. Since 1985, these PPR holders have used less than 20 TAF annually. Some but not all of these PPR's are encompassed by the Seven Party Agreement. Consumptive use under these non-encompassed PPRs, known as "Miscellaneous and Indian PPRs," could reach as much as 61 TAF annually. Because over 5.362 MAF of Colorado River water were already allocated by California's Seven Party Agreement, it was not clear which rights would be affected by the use of these non-encompassed PPRs.

At that time, no formal guidelines existed to determine whether surplus water would be available. Decisions regarding surplus water availability were to be made at the discretion of the Secretary of the Interior. As a result, the year-to-year availability of Colorado River water to Metropolitan was uncertain beginning in 1985.

Figure 3-1 shows the major aqueducts within southern California including those from the Colorado River, and the entities within the state having rights to the use of more than 5.362 MAF of water from the Colorado River.

Figure 3-1



Changed Conditions

Metropolitan and the State of California acknowledged that Metropolitan would obtain less water from the Colorado River in the future than Metropolitan had in the past, but the lack of clearly quantified water rights hindered efforts to promote water management projects. The Secretary of the Interior asserted that California's users of Colorado River water had to limit their use to a total of 4.4 MAF per year, plus any available surplus water. Under the auspices of the state's Colorado River Board, these users developed a draft plan to resolve the problem, which was known as "California's Colorado River Water Use Plan" or the "California Plan." It characterized how California would develop a combination of programs to allow the state to limit its annual use of Colorado River water to 4.4 MAF per year plus any available surplus water. The 2003 Quantification Settlement Agreement (QSA) among IID, CVWD and Metropolitan is a critical component of the California Plan. It establishes the baseline water use for each of the agencies and facilitates the transfer of water from agricultural agencies to urban uses, and specifies that IID, CVWD, and Metropolitan would forbear use of water to permit the Secretary of the Interior to satisfy the uses of the non-encompassed PPRs.

On November 5, 2003, IID filed a validation action in Imperial County Superior Court, seeking a judicial determination that thirteen agreements associated with the IID/SDCWA water transfer and the QSA are valid, legal and binding. Other lawsuits also were filed challenging the execution, approval and subsequent implementation of the QSA on various grounds. All of the QSA cases were coordinated in Sacramento County Superior Court. After a number of pleading challenges, appeal of rulings dismissing one Imperial County case and dismissing portions of another, and pretrial rulings, the first phase of trial began on November 9, 2009, and concluded on December 2, 2009. One of the key issues was the constitutionality of the QSA Joint Powers Authority Agreement, pursuant to which IID, CVWD, and SDCWA agreed to commit $133 million toward certain mitigation costs associated with implementation of the transfer of 300 TAF of water conserved by IID pursuant to the QSA, and the State agreed to be responsible for any mitigation costs exceeding this amount. A final judgment was issued on February 11, 2010, holding that the State's commitment was unconditional in nature and, as such, violated the State's debt limitation under the California Constitution, and that eleven other agreements, including the QSA, also are invalid because they are inextricably interrelated with the QSA Joint Powers Authority Agreement and the funding mechanism it established to cover such mitigation costs. The court also ruled that all other claims raised by the parties, including CEQA claims related to the QSA Programmatic EIR and the IID Transfer Project EIR, are moot.

Metropolitan, CVWD and SDCWA have filed appeals of the court's decision, which will stay the ruling pending outcome of the appeal. If the ruling stands, it could delay the implementation of programs authorized under the QSA or result in increased costs or other adverse impacts. The impact, if any, that the ruling might have on Metropolitan's water supplies cannot be adequately determined at this time.

Runoff in the Colorado River Basin above Lake Powell from 2000 through 2007 was the lowest eight-year runoff on record bringing Colorado River system storage down to 50 percent of capacity. Runoff returned to near normal during 2008 through 2010 but the system storage remained slightly above 50 percent of capacity.

SDCWA is participating in two projects that are providing additional water supplies to that agency.[1] These projects are resulting in increased amounts of Colorado River water

[1] These projects, the San Diego County Water Authority/Imperial Irrigation District transfer and the Coachella and All-American canal lining projects will be discussed in that Authority's Urban Water Management Plan.

being diverted into the CRA. In exchange, Metropolitan is delivering an amount of water equal to the amount conserved for SDCWA. Federal law allocates a portion of the water available as a result of the Coachella and All-American Canal lining projects for the benefit of parties, including five Indian Bands, involved in litigation over water rights to the San Luis Rey River in San Diego County once certain conditions have been satisfied. Metropolitan has agreed to exchange that water and provide an equal amount of water to the United States for use by the San Luis Rey Settlement Parties, and SDCWA has agreed to convey the water when capacity is available for use within the Settlement Parties' service areas. As the Settlement Parties had not satisfied the conditions required to receive the benefit of those supplies through 2009, Metropolitan has utilized this water. The remainder of the water available as a result of the canal lining projects is exchanged with SDCWA and decreases San Diego's demands on Metropolitan water supplies.

In 2005, Metropolitan entered into a settlement agreement in *Arizona v. California* with the Quechan Indian Tribe and other parties. The Tribe uses Colorado River water on the Fort Yuma Indian Reservation. Under the settlement agreement, the Tribe, in addition to the amounts of water decreed for the benefit of the Reservation in the 1964 decree, is entitled to (a) an additional 20,000 acre-feet of diversions from the Colorado River or (b) the amount necessary to supply the consumptive use required for irrigation of a specified number of acres, and for the satisfaction of related uses, whichever is less. Of the additional water, 13,000 acre-feet became available to the Tribe in 2006. An additional 7,000 acre-feet becomes available to the Tribe in 2035. Metropolitan and the Tribe agreed that if the Tribe chooses to limit proposed development and utilization of their farm lands, which would require the diversion of any of the additional water in a year, and instead allows the water which would otherwise be used to be diverted by Metropolitan, Metropolitan provides an incentive payment to the Tribe to avoid or reduce a loss of supply.

Implementation Approach

Metropolitan's planning strategy recognized explicitly that program development would play an important part in reaching the target level of deliveries from the CRA. The implementation approach explored a number of water conservation programs with water agencies that received water from the Colorado River or were located in close proximity to the CRA. Negotiating the QSA was a necessary first step for all of these programs. On October 10, 2003, after lengthy negotiations, representatives from Metropolitan, IID, and CVWD executed the QSA and other related agreements. Parties involved also included the SDCWA, the California Department of Water Resources (DWR), the California Department of Fish and Game, the U.S. Department of the Interior, and the San Luis Rey Settlement Parties. One of those related agreements was the Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement which specifies to which agencies water will be delivered under priorities 3a and 6a of the Seven Party Agreement during its term.

Metropolitan has identified a number of programs that could be used to achieve the regional long-term development targets for the CRA, as shown in Table 3-1. Metropolitan has entered into or is exploring agreements with a number of agencies as described in this section. In addition, Appendix A.3 provides a detailed discussion of these programs and describes whether the programs are being implemented, are deferred, or under investigation. In developing these supply capabilities, Metropolitan assumed a simulated median storage level going into year 2030 based on the balances of supplies and demands. Under the median storage condition, there is an estimated 50 percent probability that storage levels would be higher and a 50 percent probability that storage levels would be lower than the assumption used. In addition, the storage capability used in this evaluation reflects actual storage program conveyance constraints.

Colorado River Water Management Programs

Imperial Irrigation District / Metropolitan Water District Conservation Program

Under a 1988 agreement, Metropolitan has funded water efficiency improvements within IID's service area in return for the right to divert the water conserved by those investments. Under this program, IID implemented a number of structural and non-structural measures, including the lining of existing earthen canals with concrete, constructing local reservoirs and spill-interceptor canals, installing non-leak gates, and automating the distribution system. Other implemented programs include the delivery of water to farmers on a 12-hour rather than a 24-hour basis and improvements in on-farm water management through the installation of tailwater pumpback systems, and drip irrigation systems. Through this program, Metropolitan obtained an additional 105 TAF per year, on average upon completion of program implementation. Execution of the QSA and amendments to the 1988 and 1989 agreements resulted in changes in the availability of water under the program, extending the term to 2078 if the term of the QSA extends through 2077 and guaranteeing Metropolitan at least 85 TAF per year. The remainder of the conserved water is available to CVWD.

Palo Verde Land Management, Crop Rotation, and Water Supply Program

In May 2004, Metropolitan's Board authorized a 35-year land management, crop rotation, and water supply program with PVID. Under the program, participating farmers in PVID are paid to reduce their water use by not irrigating a portion of their land. A maximum of 29 percent of the lands within the Palo Verde Valley can be fallowed in any given year. Under the terms of the QSA, water savings within the PVID service area are made available to Metropolitan. This program provides up to 133 TAF of water to be available to Metropolitan in certain years, and a minimum of 33 TAF per year. In 2005, 2006, 2007, 2008, and 2009 approximately 108.7, 105.0, 72.3, 94.3, and 120.2 TAF of water, respectively, were saved and made available to Metropolitan. In March 2009, Metropolitan and PVID entered into a one-year supplemental fallowing program within PVID that provides for the fallowing of additional acreage, with savings projected to be as much as 62 TAF. Of that total, 24.1 TAF of water was saved in 2009, with the balance to be made available in 2010.

Southern Nevada Water Authority and Metropolitan Storage and Interstate Release Agreement

Southern Nevada Water Authority (SNWA) has undertaken extraordinary water conservation measures to maintain its consumptive use within Nevada's basic apportionment of 300 TAF. The success of the conservation program has resulted in unused basic apportionment for Nevada. As SNWA expressed interest in storing a portion of the water with Metropolitan, the agencies along with the United States and the Colorado River Commission of Nevada entered into a storage and interstate release agreement in October 2004. Under the agreement, additional Colorado River water supplies are made available to Metropolitan when there is space available in the CRA to receive the water. Metropolitan has received 70 TAF through 2009. SNWA may call on Metropolitan to reduce its Colorado River water order to return this water no earlier than 2019, unless Metropolitan agrees otherwise.

Lower Colorado Water Supply Project

In March 2007, Metropolitan, the City of Needles, and the USBR executed a Lower Colorado Water Supply Project contract. Under the contract, Metropolitan receives, on an annual basis, Lower Colorado Water Supply Project water unused by Needles and other entities with no rights or insufficient rights to use of Colorado River water in California, the beneficiaries of the project. A portion of the payments made by Metropolitan to Needles are placed in a trust fund for potentially acquiring a new water supply for Needles and other users of the Project should the groundwater pumped from the project's wells become too saline for use. In 2009, Metropolitan received 2.3 TAF from this project.

Lake Mead Storage Program

In May 2006, Metropolitan and the USBR executed an agreement for a demonstration program that allowed Metropolitan to leave conserved water in Lake Mead that Metropolitan would otherwise have used in 2006 and 2007. USBR would normally make unused water available to other Colorado River water users, so the program included a provision that water left in Lake Mead must be conserved through extraordinary conservation measures and not simply be water that was not needed by Metropolitan in the year it was stored. This extraordinary conservation was accomplished through savings realized under the Palo Verde Land Management, Crop Rotation, and Water Supply Program. Through the two-year demonstration program, Metropolitan created 44.8 TAF of "Intentionally Created Surplus" (ICS) water. In December 2007, Metropolitan entered into agreements to set forth the rules under which ICS water is developed, and stored in and delivered from Lake Mead. The amount of water stored in Lake Mead, created through extraordinary conservation, that is available for delivery in a subsequent year is reduced by a one-time deduction of five percent, resulting in additional system water in storage in the lake, and an annual evaporation loss, beginning in the year following the year the water is stored. Metropolitan created 55.8 TAF of ICS water through the Palo Verde Land Management, Crop Rotation, and Water Supply Program in 2009. As of January 1, 2010, Metropolitan had a total of 79.8 TAF of Extraordinary Conservation ICS water in Lake Mead.

The December 2007 federal guidelines concerning the operation of the Colorado River system reservoirs provided the ability for agencies to create "System Efficiency ICS" through the development and funding of system efficiency projects that save water that would otherwise be lost from the Colorado River. To that end, in 2008 the Central Arizona Water Conservation District (CAWCD), SNWA, and Metropolitan contributed funds for the construction of the Drop 2 Reservoir by the USBR. The purpose of the Drop 2 Reservoir is to increase the capacity to regulate deliveries of Colorado River water at Imperial Dam reducing the amount of excess flow downstream of the dam by approximately 70 TAF annually. In return for its $28.7 million contribution toward construction[2], 100 TAF of water that remains stored in Lake Mead was assigned to Metropolitan as System Efficiency ICS. As of January 1, 2010, Metropolitan had 66 TAF of System Efficiency ICS water in Lake Mead.

In 2009, Metropolitan entered into an agreement with the United States, SNWA, the Colorado River Commission of Nevada, and CAWCD to have USBR conduct a one-year pilot operation of the Yuma Desalting Plant at one-third capacity. The pilot operation began in May 2010 and is providing data for future decision making regarding long-term operation of the Plant and developing a near-term water supply. Metropolitan's contribution toward plant operating costs is expected to secure 23.2 TAF of System Efficiency ICS by 2011.

Hayfield Groundwater Storage Program

The Hayfield Groundwater Storage Program will allow CRA water to be stored in the Hayfield Groundwater Basin in east Riverside County (about 50 miles east of Palm Springs) for future withdrawal and delivery to the CRA. In June 2000, the Metropolitan Board approved the implementation of the Hayfield program and authorized storage of 800 TAF of

[2] As of April 2010, $1.6 million is being returned to Metropolitan as construction costs are lower than estimated.

CRA supplies when available. As of 2003, there were over 70 TAF in storage. At that time, construction of facilities for extracting the stored water began, but it was then deferred because drought conditions in the Colorado River watershed resulted in a lack of surplus supplies for storage. A prototype well was completed in August 2009. Hydrogeologic investigations indicate that conversion of the prototype well into a production well could extract as much as 5 TAF per year of previously stored water. When water supplies become more plentiful, Metropolitan may pursue this program and develop storage capacity of about 400 TAF.

Achievements to Date

Metropolitan recognizes that in the short-term, programs are not yet in place to provide the full targeted amount, even with the programs adopted under the QSA and the opportunities to store conserved water in Lake Mead. The December 2007 federal guidelines concerning the operation of the Colorado River system reservoirs provide more certainty to Metropolitan with respect to the determination of a shortage, normal, or surplus condition for the operation of Lake Mead.

Table 3-1
Colorado River Aqueduct
Program Capabilities
Year 2030
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Basic Apportionment – Priority 4	550,000	550,000	550,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment (Surplus)	0	0	13,000
PVID Land Management, Crop Rotation, and Water Supply Program	133,000	133,000	133,000
Lower Colorado Water Supply Project	5,000	5,000	5,000
Lake Mead Storage Program	400,000	400,000	400,000
Quechan Settlement Agreement Supply	7,000	7,000	7,000
Forbearance for Present Perfected Rights	(47,000)	(47,000)	(47,000)
CVWD SWP/QSA Transfer Obligation	(35,000)	(35,000)	(35,000)
DWCV SWP Table A Obligation	(77,000)	(60,000)	(155,000)
DWCV SWP Table A Transfer Callback	41,000	32,000	82,000
DWCV Advance Delivery Account	36,000	28,000	73,000
Drop 2 Reservoir Funding	22,000	25,000	25,000
SNWA Agreement	0	0	0
Expand SNWA Agreement	0	0	0
Subtotal of Current Programs	***1,120,000***	***1,123,000***	***1,136,000***
Programs Under Development			
Additional PVID Transfers (Crop Stressing/Fallowing)	62,000	62,000	62,000
Arizona Programs - CAP	50,000	50,000	50,000
California Indians / Other Ag	10,000	10,000	10,000
ICS Exchange	25,000	25,000	25,000
Agreements with CVWD	35,000	35,000	35,000
Hayfield Groundwater Extraction Project	0	0	0
Subtotal of Proposed Programs	***182,000***	***182,000***	***182,000***
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	200,000	200,000	200,000
Coachella & All-American Canal Lining			
To SDCWA	80,000	80,000	80,000
To San Luis Rey Settlement Parties1	16,000	16,000	16,000
Subtotal of Non-Metropolitan Supplies	***296,000***	***296,000***	***296,000***
Maximum CRA Supply Capability[2]	**1,598,000**	**1,601,000**	**1,614,000**
Less CRA Capacity Constraint (amount above 1.25 MAF)	*(348,000)*	*(351,000)*	*(364,000)*
Maximum Expected CRA Deliveries[3]	**1,250,000**	**1,250,000**	**1,250,000**
Less Non-Metropolitan Supplies[4]	*(296,000)*	*(296,000)*	*(296,000)*
Maximum Metropolitan Supply Capability[5]	**954,000**	**954,000**	**954,000**

[1] Subject to satisfaction of conditions specified in agreement among Metropolitan, the United States, and the San Luis Rey Settlement Parties
[2] Total amount of supplies available without taking into consideration CRA capacity constraint.
[3] The Colorado River Aqueduct delivery capacity is 1.250 MAF annually.
[4] Exchange obligation for the SDCWA-IID transfer and the Coachella and All American Canal Lining projects.
[5] The amount of CRA water available to Metropolitan after meeting its exchange obligations.

3.2 State Water Project

Much of the SWP water supply passes through the San Francisco-San Joaquin Bay-Delta (Bay-Delta). More than two-thirds of California's residents obtain some of their drinking water from the Bay-Delta system. For decades, the Bay-Delta has experienced water quality and supply reliability challenges and conflicts due to variable hydrology and environmental standards that limit pumping operations.

The SWP consists of a series of pump stations, reservoirs, aqueducts, tunnels, and power plants operated by DWR. Figure 3-2 shows SWP facilities. This statewide water supply infrastructure provides water to 29 urban and agricultural agencies throughout California. The original State Water Contract called for an ultimate delivery capacity of 4.2 MAF, with Metropolitan holding a contract for 1,911 TAF.

Prior to the 1994 Bay-Delta Accord, the reliability of SWP deliveries was deteriorating rapidly. Based on an analysis of the State Water Resources Control Board's (SWRCB) draft water rights decision 1630, Metropolitan estimated that by 2005 its SWP delivery would be reduced to 171 TAF – about 8.9 percent of its SWP contract – under hydrologic conditions comparable to 1977, the driest year on record for the SWP. The SWRCB subsequently withdrew draft water rights decision 1630, and the Bay-Delta Accord, through SWRCB water rights decision 1641, established new operating criteria for the SWP. Under these new criteria, DWR projects that in critically dry years, SWP delivery would be 418 TAF or about 22 percent of Metropolitan's SWP contractual amounts. Consequently, Metropolitan's key concern is the continual deterioration of water supply reliability.

Another important concern for Metropolitan is sustained improvement in SWP water quality. Metropolitan must be able to meet the increasingly stringent drinking water regulations that are expected for disinfection by-products and pathogens in order to protect public health. Meeting these regulations will require improving the Bay-Delta water supply by cost effectively combining alternative source waters, source improvement, and treatment facilities. Additionally, Metropolitan requires water quality improvements of Bay-Delta water supplies to meet its 500 mg/L salinity blending objective in a cost-effective manner, while minimizing resource losses and helping to ensure the viability of regional recycling and groundwater management programs.

Background

The listing of several fish species as threatened or endangered under the federal or California Endangered Species Acts (respectively, the "Federal ESA" and the "California ESA" and, collectively, the "ESAs") have adversely impacted operations and limited the flexibility of the SWP. An annual environmental water account established under the Bay-Delta Program as a means of meeting environmental flow requirements and export limitations has helped to mitigate these impacts. Currently, five species (the winter-run and spring-run Chinook salmon, Delta smelt, North American green sturgeon, and Central Valley steelhead) are listed under the ESAs. In addition, on June 25, 2009, the California Fish and Game Commission declared the longfin smelt a threatened species under the California ESA.

In 2004 and 2005, the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) issued biological opinions and incidental take statements that govern operations of the SWP and the CVP with respect to the Delta smelt, the winter-run and spring-run Chinook salmon, and the Central Valley steelhead. In July 2006, the USBR reinitiated consultation with the USFWS and NMFS with respect to the 2004 and 2005 biological opinions (with the addition of the North American green sturgeon, which was listed in April 2006) following the filing of legal challenges to those biological opinions and incidental take statements.

Figure 3-2
Current and Projected Facilities of the State Water Project

Litigation filed by several environmental interest groups alleged that the 2004 and 2005 biological opinions and incidental take statements inadequately analyzed impacts on listed species under the Federal ESA. On May 25, 2007, Federal District Judge Wanger issued a decision on summary judgment in *NRDC v. Kempthorne*, finding the USFWS biological opinion for Delta smelt to be invalid. On December 14, 2007, Judge Wanger issued his Interim Remedial Order requiring that the SWP and CVP operate according to certain specified criteria until a new biological opinion for the Delta smelt is issued. Under the Interim Remedial Order, SWP operations were constrained in the winter and spring of 2007-08 by prevailing conditions and the status of the Delta smelt. Export restrictions resulting from the Interim Remedial Order during the winter and spring of 2007-08 reduced SWP deliveries to Metropolitan by approximately 250 TAF, as water that otherwise could have been diverted for delivery through the California Aqueduct bypassed the SWP pumps.

The USFWS released a new biological opinion on the impacts of the SWP and CVP on Delta smelt on December 15, 2008. Metropolitan, The San Luis & Delta Mendota Water Authority, Westlands Water District, Kern County Water Agency, Coalition for a Sustainable Delta and State Water Contractors, a California nonprofit corporation formed by agencies contracting with DWR for water from the SWP (the "State Water Contractors"), the Family Farm Alliance and the Pacific Legal Foundation on behalf of several owners of small farms in California's Central Valley have filed separate lawsuits in federal district court challenging the biological opinion.

The federal court consolidated the six lawsuits challenging the Delta smelt biological opinion under the caption Delta Smelt Consolidated Cases.

On April 16, 2008, the court granted the plaintiffs' motion for summary judgment in *Pacific Coast Federation of Fishermen's Associations v. Gutierrez* and invalidated the 2004 NMFS's biological opinion for the salmon and other fish species that spawn in rivers flowing into the Bay-Delta. The NMFS released its new biological opinion for salmonid species on June 4, 2009. The salmonid species biological opinion contains additional restrictions on SWP and CVP operations. The NMFS calculated that these restrictions will reduce the amount of water the SWP and CVP combined will be able to export from the Bay-Delta by 5 to 7 percent, in addition to restriction due to biological opinion for Delta smelt. DWR estimated a 10 percent average water loss, expected to begin in 2010, under this biological opinion. Six lawsuits have been filed challenging the 2009 salmon biological opinion which the court has consolidated under the caption *Consolidated Salmon Cases.* The court held a multiple-day hearing on motions for preliminary injunction in both the *Delta Smelt Consolidated Cases* and the *Consolidated Salmon Cases. [Discussion to be updated for the Final RUWMP since ruling is expected by May 2010.]*

The impact on SWP deliveries attributable to the Delta smelt and salmonid species biological opinions combined is estimated to be 1.0 MAF in an average year, reducing SWP deliveries from approximately 3.3 MAF to approximately 2.3 MAF for the year under average hydrology.

In addition to the litigation under the Federal ESA, other environmental groups sued DWR on October 4, 2006 in the Superior Court of the State of California for Alameda County alleging that DWR was "taking" listed species without authorization under the California ESA. On April 18, 2007, the Alameda County Superior Court issued its Statement of Decision in this litigation (*Watershed Enforcers v. California Department of Water Resources*), which found that DWR was illegally "taking" listed fish through operation of the SWP export facilities. The Superior Court ordered DWR to "cease and desist from further operation" of those facilities within 60 days unless it obtains take authorization from the California Department of Fish and Game.

DWR appealed the Alameda County Superior Court's order on May 7, 2007. DWR applied for incidental take authorization for the Delta smelt and salmon under the California ESA, based on the consistency of the federal biological opinions with California ESA requirements ("Consistency Determinations"). The California Department of Fish & Game subsequently issued Consistency Determinations under the California ESA authorizing the incidental take of both Delta smelt and salmon. The State Water Contractors and Kern County Water Agency have filed suit in state court challenging the Consistency Determinations under the California ESA that have been issued for both Delta smelt and salmon.

The California Fish and Game Commission's issued its declaration of the longfin smelt as a threatened species on June 25, 2009. On February 23, 2009, in anticipation of the listing action, the California Department of Fish and Game issued a California ESA section 2081 incidental take permit to DWR authorizing the incidental take of longfin smelt by the SWP. This permit authorizes continued operation of the SWP under the conditions specified in the section 2081 permit. The State Water Contractors filed suit against the California Department of Fish and Game on March 25, 2009, alleging that the export restrictions imposed by the section 2081 permit have no reasonable relationship to any harm to longfin smelt caused by SWP operations, are arbitrary and capricious and are not supported by the best available science.

DWR has altered the operations of the SWP to accommodate species of fish listed under the ESAs. These changes in project operations have adversely affected SWP deliveries. Restrictions on Bay-Delta pumping under the Interim Remedial Order in *NRDC v. Kempthorne* reduced deliveries of SWP water to Metropolitan by approximately 250 TAF in 2008. Based on the Water Allocation Analysis released by DWR on March 22, 2010, which incorporated the Delta smelt biological opinion's effects on SWP operations, export restrictions could reduce deliveries to Metropolitan by 150 to 200 TAF for 2010 under median hydrologic conditions. DWR has reported that as of April 21, 2010, real time measurements indicate approximately 520,000 acre-feet have been lost to the SWP for calendar year 2010, of which nearly 240 TAF would have been made available to Metropolitan.

Operational constraints likely will continue until a long-term solution to the problems in the Bay-Delta is identified and implemented. The Delta Vision process, established by Governor Schwarzenegger, was aimed at identifying long-term solutions to the conflicts in the Bay-Delta, including natural resource, infrastructure, land use, and governance issues. In addition, State and federal resource agencies and various environmental and water user entities are currently engaged in the development of the Bay Delta Conservation Plan (BDCP), which is aimed at addressing ecosystem needs and securing long-term operating permits for the SWP.

Other issues, such as the recent decline of some fish populations in the Bay-Delta and surrounding regions and certain operational actions in the Bay-Delta, may significantly reduce Metropolitan's water supply from the Bay-Delta. SWP operational requirements may be further modified under new biological opinions for listed species under the Federal ESA or by the California Department of Fish and Game's issuance of incidental take authorizations under the California ESA. Biological opinions or incidental take authorizations under the Federal ESA and California ESA might further adversely affect SWP and CVP operations. Additionally, new litigation, listings of additional species or new regulatory requirements could further adversely affect SWP operations in the future by requiring additional export reductions, releases of additional water from storage or other operational changes impacting water supply operations. Metropolitan cannot predict the ultimate outcome of any of the litigation or regulatory processes described above but believes they could have an adverse impact on the operation of the SWP pumps, Metropolitan's SWP supplies and Metropolitan's water reserves.

Changed Conditions

In August 2008, DWR issued its 2007 biannual SWP Delivery Reliability Report (Reliability Report). In projecting SWP delivery reliability, DWR incorporated the court-ordered interim operating rules to protect Delta smelt. The Reliability Report identified three areas of reliability uncertainty including pelagic organism decline, climate change and sea level rise, and vulnerability of Delta levees for failure. DWR estimated that with current facilities and regulatory requirements, the SWP will deliver 3.0 MAF per year on average. SWP single dry year and wet year delivery capability was reported to be 0.243 TAF and 3.848 TAF, respectively. Under its contract Metropolitan may use 46 percent of this quantity.

In December 2009, DWR released a draft of the biannual update. The report shows that future SWP deliveries will be impacted by two significant factors. The first is the significant restrictions on SWP and CVP Delta pumping required by the biological opinions issued by the USFWS (December 2008) and NMFS (June 2009). The second is climate change, which is altering the hydrologic conditions in the State. The 2009 draft Reliability Report shows greater reductions in water deliveries on average when compared to the 2007 report. Over multiple-year dry periods, average annual Table A deliveries vary from 32% to 34% of the maximum Table A amount, while average annual deliveries over multiple-year wet periods range from 72 to 94 percent of the maximum Table A amount. Under future conditions, annual SWP Article 21 deliveries average 62 TAF, ranging from 1 TAF to 550 TAF over the 82-year simulation period.

In evaluating the supply outlook for the 2010 RUWMP, Metropolitan used the draft 2009 reliability report as this presents DWR's current estimate of the amount of SWP water deliveries for current (2009) conditions and conditions 20 years in the future.

Implementation Approach

Metropolitan's implementation approach for the SWP depends on the full use of the current State Water Contract provisions, including its basic contractual amounts, Article 21 interruptible supplies, and Turnback Pool supply provisions. In addition, it requires successful negotiation and implementation of a number of agreements**,** including the Sacramento Valley Water Management (Phase 8 Settlement) Agreement, and the BDCP. Each of these stakeholder processes or agreements involves substantial Metropolitan and member agency staff involvement to represent regional interests. Metropolitan is committed to working collaboratively with DWR, SWP contractors, and other stakeholders to ensure the success of these extended negotiations and programs.

SWP Reliability

This discussion provides details of the major actions Metropolitan is undertaking to improve SWP reliability. The BDCP is being prepared through a collaboration of state, federal, and local water agencies, state and federal fish agencies, environmental organizations, and other interested parties. These organizations have formed the BDCP Steering Committee. The plan will identify a set of water flow and habitat restoration actions that contribute to the recovery of endangered and sensitive species and their habitats in California's Bay-Delta. The goal of the BDCP is to provide for both species/habitat protection and improved reliability of water supplies.

In order to select the most appropriate elements of the final conservation plan, the BDCP will consider a range of options for accomplishing these goals using information developed as part of an environmental review process. Potential habitat restoration and water supply conveyance options included in the BDCP will be assessed through an Environmental Impact Report (EIR)/ Environmental Impact Statement (EIS). The BDCP planning process and the supporting EIR/EIS process is being funded by state and federal water contractors.

Lead agencies for the EIR/EIS are DWR, USBR, the USFWS, and NOAA's NMFS, in cooperation with the California Department of Fish and Game, the U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers.

Metropolitan also has been working with Bay-Delta watershed users toward settlement on how all Bay-Delta water users would bear some of the responsibility of meeting flow requirements. In December 2002, all of the parties signed a settlement agreement known as "The Sacramento Valley Water Management Agreement" or "Phase 8 Settlement Agreement." The agreement resulted from the SWRCB Bay-Delta Water Rights Phase 8 proceedings. It includes work plans to develop and manage water resources to meet Sacramento Valley in-basin needs, environmental needs under the SWRCB's Water Quality Control Plan, and export supply needs for both water demands and water quality. The agreement specifies about 60 water supply and system improvement projects by 16 different entities in the Sacramento Valley. Its various conjunctive use projects will yield approximately 185 TAF per year in the Sacramento Valley, and approximately 55 TAF of this water would come to Metropolitan through its SWP allocation. The Agreement specifies a supply breakdown of 110 TAF (60 percent) to the SWP and 75 TAF (40 percent) to the CVP.

Based on the Sacramento Valley Management Agreement, potential annual and dry-year supply capabilities are projected to be 55 TAF in 2010, 55 TAF in 2015, and 110 TAF beyond 2015.

Monterey Amendment

The Monterey Amendment originated from disputes between the urban and agricultural SWP contractors over how contract supplies are to be allocated in times of shortage. In 1994, in settlement discussions in Monterey, the contractors and the DWR reached agreement to settle their disputes by amending certain provisions the long-term water supply contracts. These changes, known as the Monterey Amendment, altered the water allocation procedures such that both shortages and surpluses would be shared in the same manner for all contractors, eliminating the prior "agriculture first" shortage provision. In turn, the agricultural contractors agreed to permanently transfer 130 TAF to urban contractors and permanently retire 45 TAF of their contracted supply. The amendment facilitated several important water supply management practices including ground water banking, voluntary water marketing, and more flexible and efficient use of SWP facilities including borrowing from Castaic Lake and Lake Perris and use of carryover storage in San Luis Reservoir to enhance dry-year supplies. It also provided for the transfer of DWR land to the Kern County Water Agency for development of the Kern Water Bank. The Monterey Amendment was challenged in court and the original Environmental Impact Report (EIR) invalidated. Following a settlement, a new EIR was completed and the CEQA process concluded in May 2010. However, the project has been challenged again in a new round of lawsuits.

SWP Terminal Storage

Metropolitan has contractual rights to 65 TAF of flexible storage at Lake Perris (East Branch terminal reservoir) and 153.94 TAF of flexible storage at Castaic Lake (West Branch terminal reservoir). This storage provides Metropolitan with additional options for managing SWP deliveries to maximize yield from the project. Over multiple dry years it can provide Metropolitan with 73 TAF of additional supply. In a single dry year like 1977 it can provide up to 219 TAF of additional supply to Southern California.

Yuba Dry Year Water Purchase Program

In December 2007, Metropolitan entered into an agreement with DWR providing for Metropolitan's participation in the Yuba Dry Year Water Purchase Program between Yuba County Water Agency and DWR. This program provides for transfers of water from the Yuba County Water Agency during dry years through 2025.

Desert Water Agency/Coachella Valley WD SWP Table A Transfer

Under the transfer agreement, Metropolitan transferred 100 TAF of its SWP Table A contractual amount to Desert Water Agency/Coachella Valley Water District

(DWCV). Under the terms of the agreement, DWCV pays all SWP charges for this water, including capital costs associated with capacity in the California Aqueduct to transport this water to Perris Reservoir as well as the associated variable costs. The amount of water actually delivered in any given year depends on that year's SWP allocation. Water is delivered through the existing exchange agreements between Metropolitan and DWCV. While Metropolitan transferred 100 TAF of its Table A amount, it retained other rights, including interruptible water service; its full carryover amounts in San Luis Reservoir; its full use of flexible storage in Castaic and Perris Reservoirs; and any rate management credits associated with the 100 TAF. In addition, Metropolitan is able to recall the SWP transfer water in years in which Metropolitan determines it needs the water to meet its water management goals. The main benefit of the agreement is to reduce Metropolitan's SWP fixed costs in wetter years when there are more than sufficient supplies to meet Metropolitan's water management goals, while at the same time preserving its dry-year SWP supply. In a single critically dry-year like 1977 the call-back provision of the entitlement transfer can provide Metropolitan about 5 TAF of SWP supply. In multiple dry years like 1990-1992 it can provide Metropolitan about 26 TAF of SWP supply.

<u>Desert Water Agency/Coachella Valley WD Advance Delivery Program</u>

Under this program, Metropolitan delivers Colorado River water to the Desert Water Agency and Coachella Valley WD in advance of the exchange for their SWP Contract Table A allocations. In addition to their Table A supplies, Desert Water Agency and Coachella Valley WD, subject to Metropolitan's written consent, may take delivery of SWP supplies available under Article 21, the Turn-back Pool Program. By delivering enough water in advance to cover Metropolitan's exchange obligations, Metropolitan is able to receive Desert Water Agency and Coachella Valley WD's available SWP supplies in years in which Metropolitan's supplies are insufficient without having to deliver an equivalent amount of Colorado River water. This program allows Metropolitan to maximize delivery of SWP and Colorado River water in such years. These Table A deliveries are incorporated into the estimate of SWP Deliveries under Current Programs shown in Table 3-2.[1]

<u>Desert Water Agency/Coachella Valley WD Other SWP deliveries</u>

Since 2008, Metropolitan has provided Desert Water Agency and Coachella Valley WD written consent to take delivery from the SWP facilities non-SWP supplies separately acquired by each agency. These deliveries include water acquired from the Yuba Dry Year Water Purchase Program and the 2009 Drought Water Bank. Metropolitan has also consented to,

- 10 TAF of exchange deliveries to CVWD for non-SWP water acquired from the San Joaquin Valley from 2008 through 2010, and
- 36 TAF of exchange deliveries to DWA for non-SWP water acquired from the San Joaquin Valley from 2008 through 2015.

Table 3-2 summarizes Metropolitan's SWP supply range for 2030. In developing the program capabilities shown in this table, Metropolitan assumed a simulated median storage level going into year 2030 based on the balances of supplies and demands. Under the median storage condition, there is an estimated 50 percent probability that storage levels would be higher than the assumption used, and a 50 percent probability that storage levels would be lower than the assumption used. In addition, the supply capabilities shown reflect actual storage program conveyance constraints.

[1] 18 TAF out of a total of 509 TAF SWP annual delivery for a multiple dry-year event similar to the period 1990-1992 are due to the DWCV advance delivery provision. For a single-dry year similar to 1977, 6 TAF out of a total of 175 TAF are due to the advance delivery provision.

Table 3-2
California Aqueduct Program Capabilities
Year 2030
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
MWD Table A	469,000	107,000	1,026,000
DWCV Table A	77,000	60,000	155,000
San Luis Carryover [1]	69,000	208,000	208,000
Article 21 Supplies	0	0	52,000
Yuba River Accord Purchase	0	0	0
Subtotal of Current Programs	***615,000***	***375,000***	***1,441,000***
Programs Under Development			
Delta Improvements	341,000	628,000	605,000
IRP SWP Target [2]	0	0	0
Subtotal of Proposed Programs	***341,000***	***628,000***	***605,000***
Maximum Supply Capability	**956,000**	**1,003,000**	**2,046,000**

[1] Includes DWCV carryover.
[2] Remaining supply needed to meet IRP target.

SWP Water Quality

Metropolitan requires a safe drinking water supply from the Bay-Delta to meet current and future regulatory requirements for public health protection. Finding cost-effective ways to reduce total organic carbon (TOC), bromide concentrations, pathogenic microbes, and other unknown contaminants from Bay-Delta water supply is one of Metropolitan's top priorities. Metropolitan also requires a SWP supply that is consistently low in salinity - Total Dissolved Solids (TDS) - so it can blend SWP water with higher-salinity Colorado River water to achieve salinity goals for its member agencies. In addition, Metropolitan needs consistently low-salinity SWP water to increase in-basin water recycling and groundwater management programs. These programs require that blended water supplied to the member agencies meets the TDS goals adopted by Metropolitan's Board, which specify a salinity objective of 500 mg/L for blended imported water.

Metropolitan is actively involved in DWR's Municipal Water Quality Investigations Program. The highly variable quality of State Water Project water influences the operation of Metropolitan's system and its water treatment process. Increasingly restrictive State and Federal drinking water standards, concerns over emerging contaminants such as personal care products and pharmaceuticals, algal taste and odors, and Delta ecosystem fisheries issues are critical variables. DWR's MWQI program strives to monitor, protect, and improve drinking water quality of Delta water deliveries to the urban State Water Contractors and other users of Delta water. The program focuses on issues related to drinking water quality through regular water quality monitoring, special field and laboratory studies, the use of forecasting tools such as computer models and data management systems, and reporting. While the program has developed extensive monitoring in the Delta including real-time monitoring, increased monitoring along the California Aqueduct is the next major step.

Levee modifications at Franks Tract and other source control actions may significantly reduce ocean salinity concentrations in Delta water, which would benefit Delta water users and export interests alike.

Franks Tract is an island located in the central Delta that was actively farmed until levee breaches in 1936 and 1938. Since 1938, the tract has remained a flooded island and its levees remain in disrepair. Tidal flows in the Delta entrap saline ocean water in the flooded tract, resulting in degraded water quality for both in-delta and export users. Recent computer modeling analyses by Metropolitan, DWR, and the US Geological Survey indicate that reducing this salinity intrusion by partially closing existing levee breach openings and/or building radial gate flow control structures will significantly reduce TDS and bromide[2] concentrations in water from the Delta during the summer and fall months and in drought years. Based on Metropolitan's analysis, improvements to Franks Tract alone could reduce peak bromide concentrations in the summer and fall months by about 33 percent at Contra Costa Water District's (CCWD) Rock Slough intake, by 27 percent at CCWD's Old River intake, and by 24 percent at the SWP intake in the South Delta.

DWR and USBR proposed to implement the Franks Tract Project to improve water quality and fisheries conditions in the Bay-Delta. DWR and USBR are evaluating installing operable gates to control the flow of water at key locations (Three mile Slough and/or West False River) to reduce sea water intrusion, and to positively influence movement of fish species of concern to areas that provide favorable habitat conditions. By protecting fish resources, this project also would improve operational reliability of the SWP and CVP because curtailments in water exports (pumping restrictions) are likely to be less frequent.

The state has adopted an "equivalent level of public health protection" (ELPH) program that targets water quality actions outside the Delta. The Bay-Delta Program is coordinating a feasibility study on water quality improvement in the California Aqueduct.

Metropolitan and the Friant Water Users Authority (FWUA) have entered into a partnership to investigate the potential of enhancing the quantity and affordability of the eastern San Joaquin Valley's water supply while improving Southern California's water quality. The FWUA and Metropolitan studied projects that benefited both regions. Using Proposition 13 funds, an existing canal belonging to the Arvin-Edison Water Storage District was enlarged, enabling greater volumes of water to be exchanged between their groundwater and the California Aqueduct.

SWP System Outage and Capacity Constraints

As its infrastructure ages, the SWP becomes increasingly vulnerable to natural disasters, particularly the Delta levee system and the California Aqueduct, which are both susceptible to floods and earthquakes. In June 2004, a levee in the Jones Tract of the Delta failed, resulting in total inundation of the island and disrupting SWP operations. Catastrophic loss of either the Delta levee system or the aqueduct would shut down the project, affecting the welfare of millions. While Metropolitan has made substantial investments in local resources and in-basin storage to insulate Southern California against loss of its imported water supplies, additional investment is needed in the at-risk infrastructure.

The Bay-Delta Levees Program coordinates Delta levee maintenance and improvement activities. Its goal is to protect water supplies needed for the environment, agriculture and urban uses by reducing the threat of levee failure and seawater intrusion. Over the next two to three years, DWR and other agencies will carry out a Comprehensive Program Evaluation (CPE). It will incorporate the risk study that has been commissioned by DWR, including the currently-proposed expanded scope of that study. The CPE will:
(a) supplement the DWR risk study to ensure

[2] The importance of bromides is discussed in the Water Quality chapter.

that it considers all relevant levee risks, (b) include the development of a formal strategic plan that contains a description of any proposed future program changes, and (c) recommend priorities and estimate funding needs for the Levees Program. For example, the Army Corps of Engineers (P.L. 84-99 ROD) target will be reevaluated as part of the CPE using information from the Risk Study.

The California Aqueduct remains susceptible to floods at several points as it travels from the Delta along the west side of the San Joaquin Valley. Key among these is where the aqueduct crosses the Arroyo Pasajero, an alluvial fan located near Coalinga, California. At that spot, the aqueduct effectively forms a barrier to Arroyo flood flows. Although flood control facilities were built to protect the aqueduct, the volumes of runoff and sediment deposition are much greater than originally estimated, so a significant flood risk remains. The aqueduct was severely damaged during March of 1995 when a flood overwhelmed control facilities and overtopped the aqueduct with 10 TAF of floodwater and an estimated 800,000 cubic yards of sediment. Impacts to downstream water users lasted through the summer of 1995. In December of 2004, DWR began construction of "Phase I" improvements to the aqueduct where it crosses the Arroyo. These improvements will increase the size of the detention basins west of the aqueduct to protect it against a 50-year storm event.

DWR is also investing in the replacement of aging SWP infrastructure critical to SWP operations. It is midway into its Turbine Rehabilitation Program at Oroville Reservoir's Hyatt-Thermalito complex. In 2004, DWR awarded a contract to replace four pumps at the Edmonston Pumping Plant. Moreover, improved maintenance procedures have decreased the amount of time pumps at Edmonston come off-line for maintenance to less than 10 percent of the time.

Because of the risk of a prolonged shutdown of the SWP caused by seismic or hydrologic events either within the Delta or along the California Aqueduct, Metropolitan has acted decisively to ensure that Southern California has adequate emergency storage. Diamond Valley Lake and SWP terminal reservoir storage, combined with member-agency emergency storage, are jointly capable of providing the region with a six-month supply of water if combined with a temporary 25 percent reduction in demand. Metropolitan engineering studies indicate this would provide sufficient time to repair the SWP and resume delivery.

Metropolitan is investigating the potential for carbon sequestration in the Delta islands to create a revenue source for Delta landowners. Farming the Delta peat soils generates a large amount of carbon dioxide, and growing native vegetation not only stops those emissions, but actually sequesters an even larger amount of carbon dioxide while rebuilding the peat soils. With the soils rebuilding to their historic elevations, the risk of levee failure would decrease, and may eventually be eliminated.

Achievements to Date

SWP Reliability

<u>Delta Vision</u>

The Delta has suffered from multiple crises for years – ecosystem, water supply, levee stability, water quality, policy, program and litigation. The ecosystem condition continues to deteriorate, with record-low reports of fish populations, Delta smelt and other species on the brink of extinction, and the commercial salmon season shut down completely for two years in a row. Continued drought conditions and court-ordered restrictions on water exports have led to reductions in water deliveries to contractors. Deteriorating levees, land subsidence, earthquake risk and climate change all contribute to growing concerns about mass Delta levee failure. Delta water quality also continues to decline, as the freshwater barrier that keeps salinity from the bay from moving upstream becomes more difficult to maintain, and both agricultural and urban communities contribute contaminants to the system. Finally, the litigation crisis grows as more than 25 lawsuits now stand on Delta-related issues.

Metropolitan's Long-Term Action Plan

Besides the short- and mid-term actions described earlier in Section 1.4, Metropolitan's adopted Delta action plan in June 2007 includes a long-term Delta Plan. The long-term action plan recognizes the need for a global, comprehensive approach to the fundamental issues and conflicts in the Delta to result in a truly sustainable Delta. A piecemeal approach cannot satisfy the many stakeholders that have an interest in the Delta and will fail; there must be a holistic approach that deals with all issues simultaneously. In dealing with the basic issues of the Delta, solutions must address the physical changes required, as well as the financing and governance. There are three basic elements that must be addressed: Delta ecosystem restoration, water supply conveyance, and flood control protection and storage development. In addition, the state needs to establish governance structures and financing approaches to implement and manage the three identified elements.

Governor's Delta Vision Process

Through this enduring Delta crisis, the Legislature and the Governor initiated, in 2006, a process to develop a new long-term vision for the Delta. SB 1574 (Kuehl/2006) required a cabinet committee to present recommendations for a Delta strategic vision. The governor created a Delta Vision Blue-Ribbon Task Force to advise the Cabinet Committee. The Task Force produced an October 2008 Strategic Plan, which the Cabinet Committee largely adopted and submitted, with its recommendations, to the Legislature on January 3, 2009. Metropolitan, as a stakeholder to the process, provided input to the Task Force.

The 2009 Delta Legislation

After delivery of the Delta Vision recommendations, the Legislature held informational hearings from Delta experts, Task Force members, and the Schwarzenegger Administration, as well as the public at large, and engaged in vigorous water policy discussions. Following the informational hearings, several legislators began developing detailed legislation which culminated in pre-print proposals being issued in early August of 2009 for public review and discussion over the summer recess. The Assembly Water, Parks and Wildlife Committee and the Senate Natural Resources and Water Committee then held joint informational hearings on the pre-print proposals and received extensive public comment. Thereafter, legislative leadership appointed a conference committee, which convened and held additional public hearings, with further legislator discussions on key issues. That work continued into the 7th Extraordinary Session, which was called by the governor specifically to address the pending Delta and water issues, and culminated in the signing of a historic package of bills. One of the keystones of that package was SB 1 X7, which reformed Delta policy and governance. Specifically, SB 1 X7:

- Establishes a new legal framework for Delta management, emphasizing the coequal goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" as foundation for state decisions as to Delta management.
- Reconstitutes and redefines role of the Delta Protection Commission (DPC), to narrow membership to focus on local representation and to expand DPC role in economic sustainability.
- Creates a new Sacramento-San Joaquin Delta Conservancy (Conservancy), to support efforts that advance environmental protection and the economic well-being of Delta residents.

- Creates the Delta Stewardship Council (Council) as an independent state agency to guide actions in the Delta that furthers the coequal goals of Delta restoration and water supply reliability.
- Repeals the CALFED Bay-Delta Authority Act and transfers existing staff, contracts, etc. to the Council.
- Creates Delta Independent Science Board (Science Board) and Delta Science Program.
- Requires the State Water Resources Control Board (SWRCB), by August 12, 2010, to develop new flow criteria for the Delta ecosystem necessary to protect public trust resources.
- Requires the Department of Fish and Game (DFG), by December 31, 2010, to develop and recommend to the SWRCB flow criteria and quantifiable biological objectives for aquatic and terrestrial species.
- Creates a Delta Watermaster as the enforcement officer for SWRCB in the Delta.
- Requires the Council to develop, adopt, and commence implementation of the "Delta Plan" by January 1, 2012, with a report to the Legislature by March 31, 2012.
- Requires the DPC to develop a proposal to protect, enhance, and sustain the unique cultural, historical, recreational, agricultural, and economic values of the Delta as an evolving place.
- Requires Delta Plan to further the coequal goals of Delta ecosystem restoration and a reliable water supply.
- Requires the Delta Plan to promote statewide water conservation, water use efficiency, and sustainable use of water, as well as improvements to water conveyance/storage and operation of both to achieve the coequal goals.
- Requires the Delta Plan to attempt to reduce risks to people, property, and state interests in the Delta by promoting effective emergency preparedness, appropriate land uses, and strategic levee investments.
- Requires the Council to consider including the Bay Delta Conservation Plan (BDCP) in the Delta Plan and makes the BDCP eligible for state funding if:
  - The BDCP complies with Natural Community Conservation Planning Act (NCCPA).
  - The BDCP complies with the California Environmental Quality Act and includes a full range of alternatives, including a reasonable range of flow criteria, rates of diversion, and other operational criteria.
  - DWR consults with the Council and Science Board during development of the BDCP.
  - The BDCP incorporates a transparent, real-time operational decision making process in which the fishery agencies ensure that applicable biological performance measures are achieved in a timely manner.

SWP Water Quality

The most significant achievement for SWP water quality has been continued definition and advancement of the Delta Improvement Package. Most notably, the Franks Tract studies identified cost-effective ways to achieve significant improvements in the quality of Delta export water.

Progress was also made on the Southern California-San Joaquin Regional Water Quality Exchange Project. In 2009, Metropolitan and Arvin Edison Water Storage District enlarge their South Canal to enable exchanging more water between their groundwater basins and the California Aqueduct. Their relatively pure water allows Metropolitan to improve source water, and increase quantities, during times when quality and quantity are relatively poor. This project also allows MWD better access to water it has stored in the Arvin Edison Groundwater Storage Project.

SWP System Reliability

The completion and filling of Diamond Valley Lake marked the most important achievement with respect to protecting Southern California against an SWP system outage. Water began pouring into the reservoir in November 1999 and the lake was filled by early 2003. The lake can hold up to 810 TAF that provides Southern California with a six-month emergency water supply as well as carryover and regulatory storage.

The Inland Feeder Project

The Inland Feeder project is a high-capacity water delivery system designed to increase Southern California's water supply reliability in the face of future weather pattern uncertainties, while minimizing the impact on the San Francisco Bay/Sacramento-San Joaquin Delta environment in northern California. The massive water project will take advantage of large volumes of water when available from northern California, depositing it in surface storage reservoirs, such as Diamond Valley Lake, and local groundwater basins for use during dry periods and emergencies. The project also will improve the quality of the Southland's drinking water by allowing more uniform blending of better quality water from the state project with Colorado River supplies, which have a higher mineral content.

3.3 Central Valley/State Water Project Storage and Transfer Programs

Metropolitan endeavors to increase the reliability of supplies received from the California Aqueduct by developing flexible Central Valley storage and transfer programs. Over the years, Metropolitan has developed numerous voluntary Central Valley storage and transfer programs, aiming to develop additional dry-year water supplies.

To date, Metropolitan's Central Valley/SWP storage programs consist of partnerships with Central Valley agricultural districts. These partnerships allow Metropolitan to store its State Water Project (SWP) supplies during wetter years for return in future drier years. Metropolitan's Central Valley transfer programs include partnerships with Sacramento Valley Central Valley Project (CVP) and SWP settlement contractors. They allow Metropolitan to purchase water in drier years for delivery via the California Aqueduct to Metropolitan's service area.

Background

Before the 1994 Bay-Delta Accord, SWP delivery reliability was deteriorating rapidly. To gain a clearer picture of the extent of the deterioration, Metropolitan carried out an analysis based on the State Water Resources Control Board's (SWRCB) draft water rights decision 1630. This analysis showed that by 2005, if the hydrologic conditions were comparable to those of the driest year on record, 1977, Metropolitan's SWP delivery would be reduced to 171 TAF, which is only about 8.9 percent of its SWP contract entitlement.

The SWRCB later withdrew draft water rights decision 1630 and the Bay-Delta Accord established new operating criteria for the SWP. Metropolitan again analyzed these new criteria to estimate the potential water deliveries in critically dry years. Under these criteria, SWP deliveries to Metropolitan, not counting carryover storage, increased to 418 TAF, which is about 22 percent of its SWP contract entitlement. Metropolitan's Board determined that while the new criteria established by the Bay-Delta Accord represented an improvement in SWP reliability, they were not, of themselves, sufficient to meet Metropolitan's overall supply reliability objectives.

Moreover, DWR's most recent estimates of SWP delivery capability, which they released to SWP contractors in August 2008, show that SWP reliability under conditions similar to 1977 could be far worse than earlier modeling indicated. Based on these new DWR reliability projections, Metropolitan estimates that in a single-dry year similar to 1977, SWP deliveries to its service area would be about 134 TAF rather than 418 TAF of Table A water. Metropolitan estimates another 280 TAF of carryover storage could be delivered, for a total delivery of 414 TAF.

Metropolitan believes that it now has in place Central Valley/SWP storage and transfer programs capable of reaching its planning target, and it has several other programs under development. Because yields from individual programs can vary widely depending on hydrologic conditions and CVP/SWP operations, the dry-year yields for the various programs reported in this section are expected values only. In any given year, actual yields could depart from the expected values. Despite that uncertainty, Metropolitan's models of these programs indicate that in the aggregate, they can meet the resource target under a wide range of hydrologic conditions and CVP/SWP operations.

The Central Valley/SWP storage and transfer programs have served to demonstrate the value of partnering, and increasingly, Central Valley agricultural interests see partnering with Metropolitan as a sensible business practice beneficial to their local district and regional economy. In addition, Metropolitan staff has demonstrated the ability to work with DWR and USBR staff to facilitate Central Valley storage and transfer programs. Taken together, these positive changes enabled Metropolitan to reach the 2010 resource target by 2003.

Implementation Approach

Metropolitan currently has several Central Valley/SWP storage programs in operation that serve to increase the reliability of supplies received from the California Aqueduct. Metropolitan is also pursuing a new storage program with Mojave Water Agency, and it is currently under development. In addition, Metropolitan pursues Central Valley water transfers on an as needed basis. Table 3-3 lists the expected yields from these programs. Figure 3-3 shows the location of Metropolitan's statewide groundwater banking programs.

Storage and Transfer Programs

Semitropic Storage Program

Metropolitan has a groundwater storage program with Semitropic Water Storage District located in the southern part of the San Joaquin Valley. The maximum storage capacity of the program is 350 TAF. The specific amount of water Metropolitan can store in and subsequently expect to receive from the programs depends upon hydrologic conditions, any regulatory requirements restricting Metropolitan's ability to export water for storage, and the demands placed on the Semitropic Program by other program participants. During the recent dry year of 2008, the storage program delivered 125 TAF to Metropolitan. During wet years, Metropolitan has the discretion to use the program to store portions of its SWP entitlement water that are in excess of the amounts needed to meet Metropolitan's service area demand. In Semitropic, the water is delivered to district farmers who use the water in-lieu of pumping groundwater. During dry years, the districts return Metropolitan's previously stored water to Metropolitan by direct groundwater pump-in return and the exchange of State Water Project entitlement water.

Arvin-Edison Storage Program

Metropolitan amended the groundwater storage program with Arvin-Edison Water Storage District in 2008 to include the South Canal Improvement Project. The project increases the reliability of Arvin-Edison returning higher water quality to the California Aqueduct. The program storage capacity is 350 TAF. The specific amount of water Metropolitan can expect to store in and subsequently receive from the programs depends upon hydrologic conditions and any regulatory requirements restricting Metropolitan's ability to export water for storage. The storage program is estimated to deliver 75 TAF. During wet years, Metropolitan has the discretion to use the program to store portions of its SWP Table A supplies which are in excess of the amounts needed to meet Metropolitan's service area demand. The water can be either directly recharged into the groundwater basin or delivered to district farmers who use the water in-lieu of pumping groundwater. During dry years, the district returns Metropolitan's previously stored water to Metropolitan by direct groundwater pump-in return or by exchange of surface water supplies.

Table 3-3 summarizes Metropolitan's Central Valley/SWP transfer programs supply range for 2030. In developing the program capabilities shown in this table, Metropolitan assumed a simulated median storage level going into year 2030 based on the balances of supplies and demands. Under the median storage condition, there is an estimated 50 percent probability that storage levels would be higher than the assumption used, and a 50 percent probability that storage levels would be lower than the assumption used. The supply capabilities shown reflect actual storage program conveyance constraints. In addition, SWP supplies are estimated using the draft 2009 SWP Delivery Reliability Report distributed by DWR in December 2009. The draft 2009 reliability report presents the current DWR estimate of the amount of water deliveries for current (2009) conditions and conditions 20 years in the future. These estimates incorporate restrictions on SWP and Central Valley Project (CVP) operations in accordance with the biological opinions of the U.S. Fish and Wildlife Service and National Marine Fishery Service

Table 3-3
Central Valley/State Water Project Storage and Transfer Programs
Supply Projection
Year 2030
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
San Bernardino Valley MWD Minimum Purchase	12,000	8,000	20,000
San Bernardino Valley MWD Option Purchase	12,000	11,000	29,000
Central Valley Storage and Transfers			
Semitropic Program	46,000	41,000	69,000
Arvin Edison Program	63,000	75,000	75,000
San Bernardino Valley MWD Program	16,000	49,000	49,000
Kern Delta Program	47,000	50,000	50,000
Subtotal of Current Programs	***196,000***	***234,000***	***292,000***
Programs Under Development			
Mojave Groundwater Storage Program	11,000	5,000	43,000
North of Delta/In-Delta Transfers	33,000	33,000	33,000
SBVMWD Central Feeder	5,000	5,000	5,000
Shasta Return	18,000	18,000	18,000
Semitropic Agricultural Water Reuse Demonstration	11,000	11,000	11,000
Subtotal of Proposed Programs	***78,000***	***72,000***	***110,000***
Maximum Supply Capability	**274,000**	**306,000**	**402,000**

issued on December 15, 2008, and June 4, 2009, respectively.

San Bernardino Valley MWD Storage Program

The San Bernardino Valley MWD Storage program allows for the purchase of a portion of San Bernardino Valley Municipal Water District's State Water Project supply. The program includes a minimum purchase provision of 20 TAF and the option of purchasing additional supplies when available. This program can deliver between 20 TAF and 70 TAF in dry years, depending on hydrologic conditions. The expected delivery for a single dry year similar to 1977 is 70 TAF. The agreement with San Bernardino Valley MWD also allows Metropolitan to store up to 50 TAF of transfer water for use in dry years.

Kern-Delta Water District Storage Program

This groundwater storage program has 250 TAF of storage capacity. When fully developed, it will be capable of providing 50 TAF of dry-year supply. The water can be either directly recharged into the groundwater basin or delivered to district farmers who use the water in-lieu of pumping groundwater. During dry years, the districts returns Metropolitan's previously stored water to Metropolitan by direct groundwater pump-in return or by exchange of surface water supplies.

Mojave Storage Program

Currently operated as a demonstration program, the program will store SWP supply delivered in wet years for subsequent withdrawal during dry years. When fully developed, the program is expected to have a dry-year yield of 35 TAF depending on hydrologic conditions.

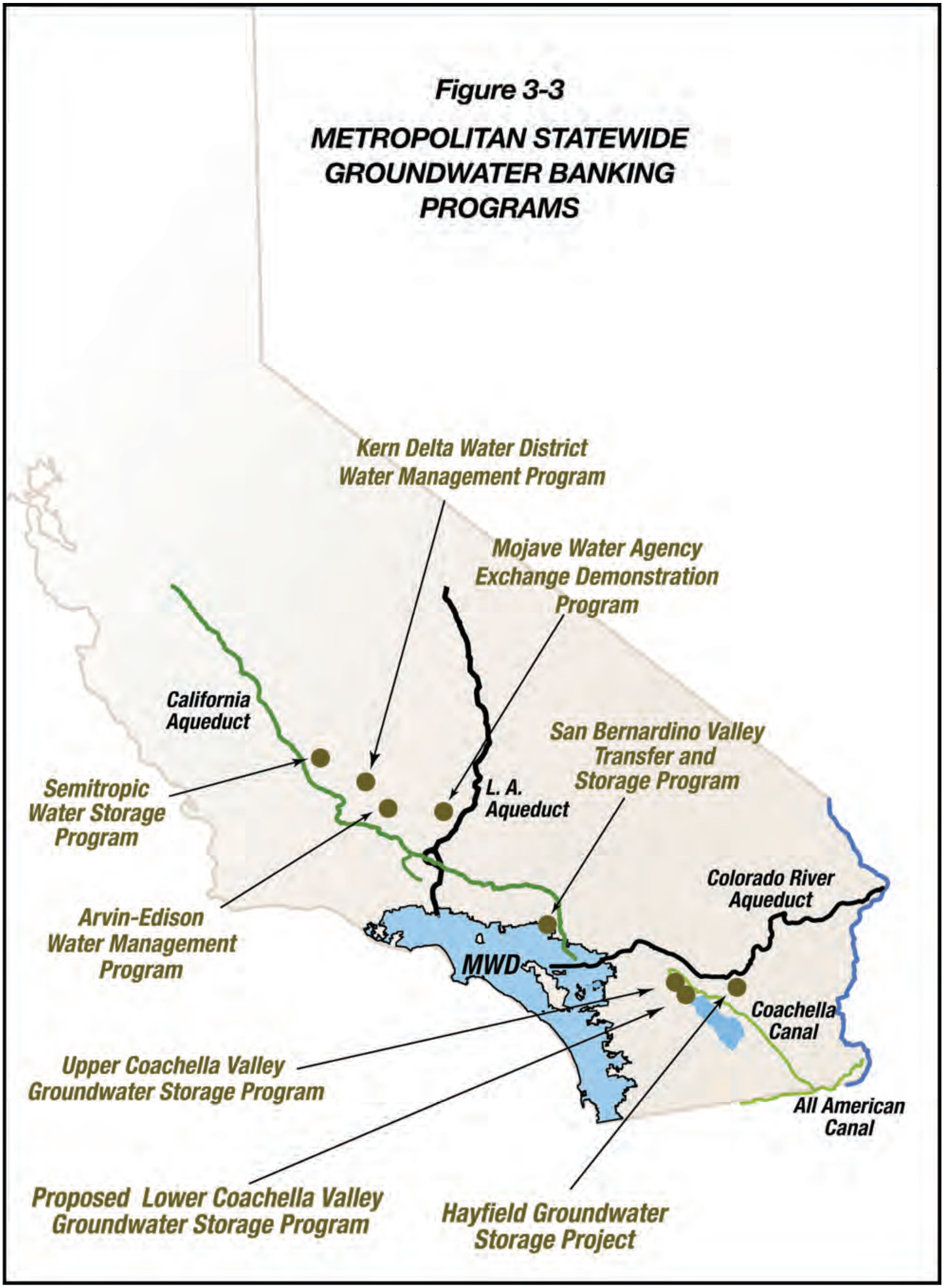


Figure 3-3
METROPOLITAN STATEWIDE GROUNDWATER BANKING PROGRAMS
Kern Delta Water District Water Management Program
Mojave Water Agency Exchange Demonstration Program
California Aqueduct
San Bernardino Valley Transfer and Storage Program
Semitropic Water Storage Program
L. A. Aqueduct
Arvin-Edison Water Management Program
Colorado River Aqueduct
MWD
Coachella Canal
Upper Coachella Valley Groundwater Storage Program
All American Canal
Proposed Lower Coachella Valley Groundwater Storage Program
Hayfield Groundwater Storage Project

Central Valley Transfer Programs

Metropolitan expects to secure Central Valley water transfer supplies via spot markets and option contracts to meet its service area demands when necessary. Hydrologic and market conditions, and regulatory measures governing Delta pumping plant operations will determine the amount of water transfer activity occurring in any year. Transfer market activity in 2003, 2005, 2008, and 2009 provide examples of how Metropolitan has secured water transfer supplies as a resource to fill anticipated supply shortfalls needed to meet Metropolitan's service area demands.

In 2003, Metropolitan secured options to purchase approximately 145 TAF of water from willing sellers in the Sacramento Valley during the irrigation season. These options protected against potential shortages of up to 650 TAF within Metropolitan's service area that might have arisen from a decrease in Colorado River supply or as a result of drier-than-expected hydrologic conditions. Using these options, Metropolitan purchased approximately 125 TAF of water for delivery to the California Aqueduct.

In 2005, Metropolitan, in partnership with seven other State Water Contractors, secured options to purchase approximately 130 TAF of water from willing sellers in the Sacramento Valley, of which Metropolitan's share was 113 TAF. Metropolitan also had the right to assume the options of the other State Water Contractors if they chose not to purchase the transfer water. Due to improved hydrologic conditions, Metropolitan and the other State Water Contractors did not exercise these options.

In 2008, Metropolitan in partnership with seven other State Water Contractors, secured approximately 40 TAF of water from willing sellers in the Sacramento Valley, of which Metropolitan's share was approximately 27 TAF.

In 2009, Metropolitan in partnership with eight other buyers and 21 sellers participated in a statewide Drought Water Bank, which secured approximately 74 TAF, of which Metropolitan's share was approximately 37 TAF.

Metropolitan's recent water transfer activities in have demonstrated Metropolitan's ability to develop and negotiate water transfer agreements either working directly with the agricultural districts who are selling the water or through a statewide Drought Water Bank. Because of the complexity of cross-Delta transfers and the need to optimize the use of both CVP and SWP facilities, DWR and USBR are critical players in the water transfer process, especially when shortage conditions increase the general level of demand for transfers and amplify ecosystem and water quality issues associated with through-Delta conveyance of water. Therefore, Metropolitan views state and federal cooperation to facilitate voluntary, market-based exchanges and sales of water as a critical component of its overall water transfer strategy.

Achievements to Date

Metropolitan has made rapid progress to date developing Central Valley/SWP storage and transfer programs. Most notably, by 2003, it was able to put in place sufficient storage and transfer programs to meet its 2010 dry-year resource target of 300 TAF. This rapid progress may be attributed to several factors, including Metropolitan dedicating additional staff to identify, develop, and implement Central Valley/SWP storage and transfer programs; increased willingness of Central Valley agricultural interests to enter into storage and transfer programs with Metropolitan; and Metropolitan staff's ability to work with DWR and USBR staff to facilitate Central Valley storage and transfer programs.

3.4 Conservation and Public Affairs

Conservation is a core element of Metropolitan's long-term water management strategy. Metropolitan continues to build on a nearly 20-year investment in conservation of more than $268 million, reflecting a long-term commitment to water conservation. Among other measures, this investment has resulted in the retrofit of more than 2.7 million toilets with more water efficient models and the distribution of more than 334,000 high efficiency clothes washers (HECWs). Collectively, Metropolitan's conservation programs and other conservation in the region will reduce Southern California's reliance on imported water by more than 1.033 MAF per year from 1980 through 2025.

Metropolitan's conservation policies and practices are shaped largely by two factors: Metropolitan's planning strategy and the California Urban Water Conservation Council Memorandum of Understanding Regarding Water Conservation in California (Urban MOU). As a signatory to the Urban MOU, Metropolitan pledged to make a good faith attempt to implement a prescribed set of urban water conservation Best Management Practices (BMPs).

Metropolitan's planning strategy places equal emphasis on local and imported resource development and treats conservation as a core local supply, on par with other resources such as water recycling and storage. Conservation savings result from active, code-based, and price-effect conservation efforts. Active conservation consists of water-agency funded programs such as rebates, installations, and education. Code-based and price-based conservation, formerly described as passive conservation, consists of demand reductions attributable to conservation-oriented plumbing codes and usage reductions resulting from increases in the price of water. Including regional pre-1990 conservation savings, Metropolitan continues to pursue a 2025 total conservation target of approximately 1.033 MAF per year. A large share of the target has already been achieved through existing Metropolitan and member agency programs, pre-1990 savings, price-effects, and continued savings that accrue from plumbing codes. The remainder is expected to be achieved through additional agency-sponsored active conservation programs, code changes, and price-effects.

Background

Unlike traditional water supplies, conservation reduces water demand in ways that are quantified indirectly. Demand is reduced through changes in consumer behavior and savings from water-efficient fixtures like toilets and showerheads. Quantifying and projecting conservation savings requires specially designed estimating models. Such models were used during Metropolitan's planning process.

Conservation savings are commonly estimated from a base-year water-use profile. Metropolitan uses 1980 as the base year because it marked the effective date of a new plumbing code in California requiring toilets in new construction be rated at 3.5 gallons per flush or less. Between 1980 and 1990, the region saved an estimated 250 TAF per year as the result of this 1980 plumbing code and unrelated water rate increases. These savings are referred to as "pre-1990 savings." Metropolitan's resource planning target combines pre-1990 savings and estimates of more recently achieved savings.

Distinguishing between active, code-based and price-effect conservation can be analytically complex when, for example, active programs for fixtures are concurrent with conservation-related plumbing codes. This plan combines active, code-based, and price-effect conservation savings using methods that avoid double counting.

Metropolitan does not currently assign a savings value for public awareness campaigns and conservation education because any initial effect on demand reduction and the longevity of the effect is difficult to measure. It is generally accepted that these programs prompt consumers to install water saving fixtures and change water-use behavior thereby creating a residual benefit of increasing the effectiveness of companion conservation programs.

Implementation Approach

Metropolitan's implementation approach for achieving the conservation target includes support to member agencies in developing cost-effective BMP-oriented active conservation programs and new, innovative programs that address regional water uses. The stewardship charge in Metropolitan's rate structure provides the funding mechanism for active programs and non-incentive strategies. Metropolitan continues to seek supplemental state and federal funding in coordination with the member agencies.

Implementation of Conservation "Best Management Practices"

Metropolitan's conservation programs are closely linked to the efforts of the California Urban Water Conservation Council (CUWCC), the organization created to administer the Urban MOU. As a signatory to the Urban MOU, Metropolitan has pledged to make a good faith effort to implement a prescribed set of urban water conservation BMPs. Metropolitan provides technical and financial support needed by member agencies in meeting the terms of the Urban MOU. Table 3-4 provides a list of the BMPs and compares how they apply to Metropolitan, which is a water wholesaler, versus retail water agencies. Enclosed with this report, as Appendix A.7, are copies of the BMP reports Metropolitan has filed with the CUWCC.

Table 3-4
Urban Water Conservation Best Management Practices

BMP Number	BMP Description	Applies to	
		Retailers	Wholesalers
1	Residential Water Surveys	Yes	No
2	Residential Plumbing Retrofits	Yes	No
3	System Water Audits, Leak Detection	Yes	Yes
4	Metering and Commodity Rates	Yes	No
5	Large Landscape Audits	Yes	No
6	High Efficiency Washing Machines	Yes	No
7	Public Information	Yes	Yes
8	School Education	Yes	Yes
9	Commercial, Industrial, & Institutional	Yes	No
10	Wholesale Agency Assistance	No	Yes
11	Conservation Pricing	Yes	Yes
12	Conservation Coordinator	Yes	Yes
13	Water Waste Prohibition	Yes	No
14	Residential ULFT Replacements	Yes	No

In December 2008, the Urban MOU was amended and the BMPs were revised. The revision reorganized the Council's 14 BMPs into five categories. Two categories, Utility Operations and Education, are referred to as "Foundational BMPs," because they are considered to be essential water conservation activities by any utility and are adopted for implementation by all signatories to the Urban MOU as ongoing practices with no time limits. The remaining BMPs are "Programmatic BMPs" and are organized into Residential; Commercial, Industrial, and Institutional (CII); and Landscape categories.

A mapping from the old BMPs to the new BMPs is shown in Table 3-5.

Table 3-5
Mapping of Prior BMPs to New BMPs

Prior BMP Number & Name	New BMP category
Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers	Programmatic: Residential
Residential Plumbing Retrofit	Programmatic: Residential
System Water Audits, Leak Detection and Repair	Foundational: Utility Operations – Water Loss Control
Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections	Foundational: Utility Operations – Metering
Large Landscape Conservation Programs and Incentives	Programmatic: Landscape
High-Efficiency Clothes Washing Machine Financial Incentive Programs	Programmatic: Residential
Public Information Programs	Foundational: Education – Public Information Programs
School Education Programs	Foundational: Education – School Education Programs
Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	Programmatic: Commercial, Industrial, and Institutional
Wholesale Agency Assistance Programs	Foundational: Utility Operations – Operations
Retail Conservation Pricing	Foundational: Utility Operations – Pricing
Conservation Coordinator	Foundational: Utility Operations – Operations
Water Waste Prohibition	Foundational: Utility Operations – Operations
Residential ULFT Replacement Programs	Programmatic: Residential

In addition to implementing cost-effective BMPs, Metropolitan actively supports many CUWCC committee and research activities. For example, Metropolitan has historically assisted in CUWCC's ongoing efforts to document and increase the effectiveness of BMP-related conservation efforts. Presently, Metropolitan is represented on the following CUWCC committees:

- Board (formerly Steering Committee)
- Commercial, Industrial, and Institutional Committee
- Residential Committee
- Landscape Committee
- Research and Evaluation Committee
- Utility Operations Committee
- Education Committee
- BMP Reporting Committee

The following sections describe Metropolitan's conservation programs.

Regional Conservation Programs

Metropolitan's conservation programs focus on two main areas: residential programs, and commercial, industrial and institutional programs.

Residential Programs

Metropolitan's residential conservation consists of three major programs:

SoCal Water$mart

In July 2008, Metropolitan initiated a new region-wide residential program named SoCal Water$mart. During its first year of operation, rebate activity exceeded expectations as many residential customers became increasingly aware of the financial incentives available to them to help offset the purchase of water-efficient devices. Metropolitan issued a record 54,000 rebates for residential fixtures totaling $10 million in fiscal year 2008/09, resulting in approximately 2.3 TAF of water to be saved annually.

Save Water, Save A Buck (Multi-Family)

Metropolitan's regional Save-A-Buck program extends rebates to multi-family dwellings. More than 40,000 rebates were issued fiscal year 2008/09 for high-efficiency toilets and washers for multi-family units within Southern California.

Member Agency Residential Programs

In addition to regional programs implemented by Metropolitan, member and retail agencies also implement local water conservation programs within their respective service areas and receive Metropolitan incentives for qualified retrofits and other water-saving actions. Typical projects include toilet replacements, locally administered clothes washer rebate programs, and residential water audits.

Metropolitan provides incentives on a variety of water efficient devices for the residential sector. The following is a brief description of current and past devices that contribute to projected conservation savings:

High-Efficiency Clothes Washers

High-efficiency clothes washers (HECWs) is a growing segment in water conservation. Metropolitan has supplemented its HECW rebate using state or federal grants whenever possible. The water efficiency of clothes washers is represented by the "water factor," which is a measure of the amount of water used to wash a standard load of laundry. Washers with a lower water factor save more water. Metropolitan has continued to move the market by changing its program requirement to lower water factors. The program eligibility requirement is currently set at water factor 4.0, which saves over 10,000 gallons per year per washer over a conventional top loading washer.

High-Efficiency Toilets and Ultra-Low-Flush Toilets

Metropolitan has provided incentives for toilet programs since 1988. Currently, Metropolitan only provides funding for high-efficiency toilets (1.28 gallons per flush or less), which use

20 percent less than ultra-low-flush toilets (1.6 gallons per flush). Ultra-low-flush toilets are the current standard defined by the plumbing code. Metropolitan uses the EPA's WaterSense list of tested toilets in its programs as qualifying models.

Irrigation Evaluations and Residential Surveys

Metropolitan provides funding to its member agencies that choose to implement irrigation evaluations and indoor surveys for residents. Irrigation evaluations provide customers with a recommended irrigation schedule and suggested improvements for irrigation systems. Indoor residential surveys provide customers with information on identifying leaks and making changes to water-using devices in the home.

Rotating Nozzles for Sprinklers

Pop-up spray heads with multi-stream, multi-trajectory rotating nozzles represent a new alternative to the irrigation of landscapes. Field tests demonstrate these devices apply water more evenly than traditional nozzles with fixed conical spray patterns, offering the potential for significant water savings. Low precipitation rates associated with these nozzles can reduce run-off and related pollution, thereby offering a significant value-added benefit when irrigating sloping landscapes.

Weather-Based Irrigation Controllers

Weather-based irrigation controllers (WBIC) are a rapidly evolving conservation technology. Rather than relying on periodic manual adjustments, WBICs adjust irrigation schedules based on rain, temperature, sunlight, soil moisture, or some combination of indicators. Metropolitan began funding WBIC incentives in homes after conducting a pilot study that evaluated potential savings and ease of use.

Synthetic Turf

From July 2007 through June 2010, Metropolitan offered an incentive for synthetic turf based on a pilot project conducted with financial assistance from the United States Bureau of Reclamation (USBR). Synthetic turf provides water savings benefits as a replacement for irrigated turf and lawn areas.

Commercial, Industrial and Institutional Programs

Metropolitan's commercial industrial and institutional (CII) conservation consists of three major programs:

Save Water, Save-A-Buck Program

The majority of the CII conservation activity comes from Metropolitan's regional Save-A-Buck program. The Save-A-Buck program had its largest year in fiscal year 2008/09, providing about $8.8 million in rebates for approximately 145,000 device retrofits.

Water Savings Performance Program

The Water Savings Performance Program is a component of the commercial program and provides financial incentives for documented water savings for landscape irrigation and industrial process improvements. This program allows large-scale water users to customize conservation projects and receive incentives for five years of water savings for capital water-use efficiency improvements.

Member Agency Commercial Programs

Member and retail agencies also implement local commercial water conservation programs using Metropolitan incentives. Projects target specific commercial sectors, with many programs also receiving assistance from state or federal grant programs. Metropolitan incentives are used as the basis for meeting cost-share requirements.

Accelerated Public Sector Water Efficiency Partnership Demonstration Program

A fourth program, the Public Sector Demonstration Program, also contributes to the savings. From August 2007 through 2008, Metropolitan offered a one-time program to provide up-front funding to increase water use efficiency in public buildings and landscapes within its service area. The program was designed to reinforce the region's conservation message by demonstrating willingness for public agencies to respond to the call to save water. Participants included various special districts, school districts, state colleges and universities, municipalities, counties and other government agencies. There were four components of the program:

1. Water audits
2. Enhanced incentives
3. Pay-for-performance
4. Recycled water hook-up

Free water audits were provided to assess current indoor and outdoor water use and make specific recommendations for practical solutions and improvements for public facility and landscape areas. Water use experts created an equipment inventory list and made recommendations for replacements or upgrades. A written report was provided as a guide to initiating equipment upgrades.

Enhanced incentives were provided to replace high water-use equipment including toilets, urinals, and irrigation controllers. Program incentives were often sufficient to cover the total cost of the equipment, capped at the manufacturer's suggested retail price.

Pay-for-performance incentives were also offered to reduce landscape irrigation water use by at least 10 percent through behavioral modifications.

Metropolitan' s CII programs provide rebates for water-saving plumbing fixtures, landscaping equipment, food-service equipment, cleaning equipment, HVAC (heating, ventilating, air conditioning) and medical equipment. Following is a list of current and past devices that contribute to projected conservation savings:

- Connectionless Food Steamer
- Cooling Tower Conductivity Meter
- Dry Vacuum Pump
- High-Efficiency Clothes Washers
- High-Efficiency Toilet
- High-Efficiency Urinal
- Large Rotors - High Efficiency Nozzle
- Multi Stream Rotating Nozzles
- pH Cooling Tower Controller
- Pre-rinse Spray Head
- Steam Sterilizer
- Synthetic Turf
- Ultra-Low-Flush Toilet
- Ultra-Low-Flush Urinals
- Water Broom
- Weather-Based Irrigation Controller
- X-ray Processor
- Zero Water Urinal

Research and Development Programs

Metropolitan encourages research and development of new and creative ways to conserve water. The Innovative Conservation Program provides funding to individuals and organizations to test new technologies. The Enhanced Conservation Program provides funding directly to Metropolitan's member agencies to encourage new and creative approaches to implement urban water conservation.

Water Conservation Ordinances

In June 2008, Metropolitan adopted a Water Supply Alert resolution following Governor Arnold Schwarzenegger's proclamation of a statewide drought. Among other provisions, the Alert encouraged cities, counties, and local public water agencies to adopt and enforce local water conservation ordinances. To facilitate ordinance adoption, Metropolitan compiled a library of available local ordinances, developed a model water conservation ordinance, and hosted several workshops. Approximately half of the 19 million residents in Metropolitan's service area are now covered by adopted ordinances, and an additional one-third reside in jurisdictions that have taken action toward adoption of ordinances.

New Construction Programs

With grants from the USBR and the State of California, Metropolitan offered financial incentives through the California Friendly® New Home Program. Builders of new single-family model homes and multi-family developments are encouraged to incorporate water efficient fixtures and landscapes, including high-efficiency toilets and clothes washers, smart irrigation controllers, and landscapes designed with appropriate plant palettes and efficient irrigation systems. California Friendly model homes showcase residential water efficiency, helping to increase consumer awareness of water-conserving features and provide inspiration for water-conserving landscapes.

Since program inception in 2003, Metropolitan has provided incentives to eight homebuilders for more than 220 new homes with over 300,000 square feet of landscape.

Conservation Funding

Metropolitan's Conservation Credits Program (CCP) provides the basis for financial incentives and funding for urban BMP and other demand management related activities. Established in 1988, this funding mechanism supports Metropolitan's commitment to conservation as a long-term water management strategy.

The basis of Metropolitan financial support to member agency conservation efforts is estimated as the lesser of $195 per acre-foot of water saved or one-half of average device cost. In general, CCP funded water conservation project proposals must:

- Have demonstrable water savings;
- Reduce water demands on Metropolitan's system; and
- Be technically sound and require Metropolitan's participation to make the project financially and economically feasible.

Grant Programs

Additional funding for conservation programs has been made available through government agencies. Metropolitan has worked to obtain a share of this funding to enhance the region's water conservation investments. Table 3-6 and the following summaries describe briefly past sources and uses of these funds.

Measurement and Evaluation

Measurement and evaluation is an important component of Metropolitan's conservation program. These serve four primary functions:

- Providing a means to measure and evaluate the effectiveness of current and potential conservation programs
- Developing reliable estimates of various conservation programs and assessing the relative benefits and costs of these interventions
- Providing technical assistance and support to member agencies in the areas of research methods, statistics and program evaluation
- Documenting the results and the effectiveness of Metropolitan-assisted conservation efforts

Metropolitan's staff has served as technical advisors for a number of state and national studies involving the quantification and valuation of water savings.

Other Conservation-Related Activities at Metropolitan

Conservation activities are closely coordinated with Metropolitan's External Affairs Group. Table 3-7 summarizes the major conservation-related activities for the public information BMP administered by External Affairs. Table 3-8 shows Metropolitan's extensive commitment to the BMP for conservation-related education programs.

Conservation Outreach Campaign

Metropolitan has conducted annual advertising, education, and community outreach campaigns since 2003 under its bewaterwise.com® and California Friendly® brands to urge Southern California consumers and business owners to make permanent changes in their everyday uses of water. From 2007 through 2010, the Board authorized an expansion of these efforts in order to meet the critical water supply crisis facing the state. Outreach campaigns in the latter part of the decade reflected these unprecedented challenges with more urgent calls for water conservation behavior. Creative such as "Time to Get Serious" and "Cut Your Water Use" were seen and heard across more media outlets at higher frequency levels and over longer periods of time than pre-2007 campaigns. Metropolitan was a lead sponsor of the "California's Water: A Crisis We Can't Ignore" statewide campaign with the Association of California Water Agencies in fall 2007. Leading up to the summer of 2009, Metropolitan's "Move the Needle" outreach campaign (featuring a water supply gauge nearing empty) communicated the change from voluntary to mandatory water conservation in many Southern California cities and communities.

Other activities include:

- Annual reports to the Legislature (SB 60)
- Maintaining and updating the bewaterwise.com® website in English and Spanish (more than 1.7 million individuals have visited bewaterwise.com® for information on water conservation from 2005 to 2010)
- Maintaining 9 California Irrigation Management Information System (CIMIS) stations
- Conducting consumer focus groups and surveys to measure effectiveness of outreach efforts
- Participating in workshops and local fairs regarding conservation outreach

California Friendly Landscape Training Program

Metropolitan's California Friendly Landscape Training Program, formerly known as Professional Protector del Agua, offers in-person and online courses in irrigation efficiency and water-wise garden design. Nearly 9,000 landscape maintenance professionals and residents attended the workshops in fiscal year 2008/09. Courses are conducted in English and Spanish.

Achievements to Date

Conservation is an integral part of water supply planning at Metropolitan. The Regional Supply Unit within Metropolitan works to improve understanding of costs and benefits of water conservation so investment decisions are both efficient and effective at meeting program goals. As a cooperative member of California's water conservation community, Metropolitan has made significant contributions to the development and coordination of conservation activities throughout the state. These contributions have been recognized in the form of "Gold Star" certification from the Association of California Water Agencies and awards from the USBR and California Municipal Utilities Association.

Table 3-9 summarizes Conservation Credits Program savings and investments.
Table 3-10 summarizes activities Metropolitan implemented in its service area beginning fiscal year 1990-91 and shows the achievements the region has made in implementing these programs.

Conservation continues to be an important part of Metropolitan's water supply planning. Continued investment in cost-effective conservation remains a key component of Metropolitan's resource goals

Table 3-6
Grant Program Funding

Funding Source	Program/Project	Funding Amount ($1,000s)	Description	Status
CALFED				
	Residential HECW	$925	Increase rebate amount	Completed
	Protector del Agua	$100	Course development	Completed
Prop 13 Grants				
	HECW	$2,500	Increase rebate amount	Completed
	ET Controllers	$1,800	Initiate rebates	Completed
CPUC (w/CUWCC)				
2003	Pre-Rinse Spray Valves: Phase 1	$1,600[1]	12,000 direct installations[1]	Completed
2004	Pre-Rinse Spray Valves: Phase 2	$2,200[1]	17,000 direct installations[1]	Completed
USBR				
2003	CA-Friendly Landscapes	$182	New home landscapes	Completed
2003	Data Loggers	$50	Software error analysis	Deferred
2004	CA-Friendly Landscapes	$60	New home landscapes	Completed
2004	Synthetic Turf pilot	$220	Provide incentives	Completed
2004	World Forum	$50	College/university grants	Completed
2004	CII Region wide	$250	Add $ to rebate amounts and for administration	Completed
2005	Protector del Agua	$50	Develop web classes	Completed
2005	Landscape Market Analysis	$50	Analyze landscape conservation opportunities	Completed
2005	City Makeover	$50	Public landscapes	Completed
2006	Innovative Conservation Program	$300	Support research projects	Completed
2008	Innovative Conservation Program	$300	Support research projects	In Progress
Water for the West				
	Protector del Agua	$25	Develop web classes	Completed
Prop 50				
	Residential HECW	$1,660	Increase rebate amount	Completed
	CA-Friendly Landscapes	$423	Common area landscapes	In Process
	High Efficiency Toilets	$1,000	Increase rebate amount	Completed
	Protector del Agua	$78	Develop on-line classes	Completed
2008	Residential HECW	$2,000	Increase rebate amount	In Process

[1] This is the funding amount and number of installations that represents Metropolitan's share of the project.

Table 3-7
External Affairs Group
Conservation-Related Activities

Program or Activity	Description
Paid and public service advertising	Metropolitan has conducted annual water conservation advertising and education campaigns since 2003 using television, radio, online, event sponsorship and outdoor billboards.
Speaker's Bureau	Provides speakers for organizations, service clubs, churches, business and other community groups and associations. An estimated 15,000 – 20,000 people attend these presentations annually.
Community Relations	Organizes and conducts an average of 65 to 70 Board of Director-sponsored inspection trips of Metropolitan's distribution system per year for elected officials, community leaders and members of the public. Approximately 3,000 people learn about Metropolitan's conservation and water management policies and practices each year through these trips. Additionally, Metropolitan's education curriculum and program activities engage an average of 100,000 students per year. Metropolitan partners with community-based organizations and others to promote water education through event sponsorships and cost-sharing of educational materials.
Media and Publications	Conducts editorial briefings and media field trips; assembles press packets; prepares and disseminates news releases, speeches, videos, fact sheets, brochures, articles, and editorials describing Metropolitan's water management objectives and programs.
Government Relations	Provides elected officials, public agencies, businesses, and organizations with information about Metropolitan's water management objectives and programs.

Table 3-8
School Education Programs

Program or Activity	Date Initiated	Date Updated	Current Status	Grades	Description
Admiral Splash	1983	2006	Ongoing	Grade 4	A two-week program focusing on Southern California history, the water cycle, supply and the distribution system, water uses and conservation.
All About Water	1991	2008	Ongoing	K-3	Activities to teach young students about droughts, conservation, water quality and physical properties of water.
Geography of Water	1993	1998	Ongoing	Grades 4-8	A curriculum module on the relationship between population, precipitation, geography, economics, and water distribution.
Water Politics	1994	2004	Ongoing	Grades 9-12	A case study-based exploration of water supply issues facing Southern California, the Colorado River Basin, and the Middle East.
Water Ways	1995	2006	Ongoing	Grade 5	A supplement integrated into fifth-grade U.S. History curricula regarding water use, sources, ethics, and environment issues selected from three historical periods. This includes historical attitudes towards the stewardship of water.
Water Quality	2001	-	Ongoing	Grades 7-12	Hands-on activities to investigate water quality issues, with conservation as an element of the overall picture.
Water Works	2001	-	Ongoing	Grades 7-12	A school-to-career, job-specific program featuring activities and profiles on a variety of water-related careers, including conservation specialist.
Water Times	2005	-	Ongoing	Grade 6	An age-appropriate newspaper that provides interdisciplinary concepts, tools, and calculations related to water conservation, and that conveys an overall ethic of water stewardship.
Conservation Connection: Water and Energy Use in Southern California	2010	-	Ongoing	Grades 5-9	An activity-focused unit designed to engage students in finding solutions to conserve both water and energy at school and home. The curriculum also contains an online water and energy survey for students and their families.

Table 3-9
Conservation Credits Program

Fiscal Year	New Annual Water Savings	Investment
2008 – 2009	134,000	$44.5 million
2007 – 2008	118,000	$15.4 million
2006 – 2007	116,000	$10.6 million

Table 3-10
Conservation Achievements in Metropolitan's Service Area

	Qty	Units
CII Rebated Devices (FY 1990-91 to FY 2008-09)		
Audits/Surveys	6,353	ea
Connectionless Food Steamers	26	ea
Cooling Tower Conductivity Controllers	1,028	ea
Dry Vacuum Pump	20	ea
Toilets	107,265	ea
Urinals	20,084	ea
High Efficiency Washers	35,664	ea
pH Conductivity Controllers	103	ea
Pre-Rinse Spray Heads	17,171	ea
Multi-Stream Rotating Nozzles	77,505	ea
Steam Sterilizers	25	ea
Water Brooms	5,942	ea
Weather Based Irrigation Controllers	12,929	acres
X-Ray Processors	185	ea
High Efficiency Nozzles	19,476	ea
Synthetic Turf	5,570,848	sq. ft.
California Friendly Landscape	295,230	sq. ft.
Residential Rebated Devices (FY 1990-91 to FY 2008-09)		
Aerators	158,814	ea
Audits/Surveys	111,199	ea
High Efficiency Clothes Washers	285,903	ea
Toilets	2,629,047	ea
Multi-Stream Rotating Nozzles	65,960	ea
Showerheads	1,735,436	ea
Weather Based Irrigation Controllers	2,203	acres

3.5 Recycling, Groundwater Recovery, and Desalination

Metropolitan continues to support local resources development including water recycling, groundwater recovery, and seawater desalination to meet its supply reliability and water quality objectives in a cost effective manner.

Water recycling has proven to be a reliable core supply, and it helps local agencies comply with environmental regulations. Metropolitan continues to pursue a 2025 target for combined water recycling, groundwater recovery, and seawater desalination elements totaling 500 TAF per year of committed development and 250 TAF per year of planning buffer to address uncertainties and implementation risks. Currently, more than half of the water recycling in California occurs in Metropolitan's service area. Previous regional planning highlighted that a significant amount of future water recycling will be used for groundwater replenishment and seawater intrusion barrier purposes.

In addition, local agencies have implemented several projects to recover contaminated or degraded groundwater for potable uses that help meet the region's current or future water demand. Groundwater recovery projects use a variety of treatment technologies to remove undesirable constituents such as nitrates, volatile organic compounds (VOCs), perchlorate, color, and salt. Desalination of brackish groundwater and other local supplies enhances the continued supply reliability of the region by maximizing local groundwater resources. Furthermore, several agencies are progressively pursuing development of seawater desalination projects.

Background

A. Recycling

Local water recycling projects involve further treatment of secondary treated wastewater that is currently discharged to the ocean or streams and lands and use it for direct non-potable uses such as landscape and agricultural irrigation, commercial and industrial purpose and for indirect potable uses such as groundwater recharge, seawater intrusion barriers, and surface water augmentation. This section provides a description of the wastewater sources that potentially could be used for recycled water.

<u>Wastewater Disposal in the Service Area</u>

As part of regional planning that encourages use of recycled water, a database has been developed that include the name of each wastewater treatment facility, operating agency, location and elevation of the facility, extent of wastewater treatment, capacity and anticipated production, method of effluent disposal, and influent and effluent water qualities. Shown in Table 3-11 are the existing and projected total effluent capacities of the wastewater treatment plants from a database of 89 plants identified within Metropolitan's service area.

Wastewater treatment capacity provides an indication of the amount of wastewater being generated and disposed in Metropolitan's service area. Most wastewater plants in the service area provide secondary treatment, a level of treatment that complies with the Clean Water Act. Inland wastewater plants generally provide treatment to tertiary levels so the effluent may be disposed of in a stream or other water body or for beneficial reuse. A small percentage of tertiary treated effluent undergoes reverse osmosis or electrodialysis reversal processes, producing high-quality recycled water for groundwater recharge, industrial uses, or, in some instances, municipal uses.

Within Metropolitan's service area, many local agencies collect and treat municipal wastewater. Some of the largest agencies include:

- Los Angeles County Sanitation Districts
- Orange County Sanitation District

Table 3-11
Existing and Projected Total Effluent Capacity
Wastewater Treatment Plants within Metropolitan's Service Area

Treatment Level	Existing Capacity (MGD)	2040 Capacity (MGD)
Primary	2,120	3,139
Secondary	1,546	2,708
Tertiary	607	1,464
Advanced	34	229

This data was compiled as part of the Southern California Comprehensive Water Reclamation and Reuse Study.

- City of Los Angeles Bureau of Sanitation
- San Diego Metropolitan Wastewater Department
- Eastern Municipal Water District
- Inland Empire Utilities Agency

Many small special-purpose wastewater agencies, dual-purpose (water and wastewater) special districts, and municipal wastewater agencies also provide wastewater treatment and disposal services within Metropolitan's service area.

As a rule, wastewater is collected in a sewer collection system. From there, it flows to a wastewater treatment plant. Once treated, wastewater is disposed of through one of three mechanisms:

1. *Ocean Outfalls* – Treated wastewater is either disposed of directly through an ocean outfall or conveyed to the ocean outfall via a land pipeline.
2. *Reuse* – Currently, about 308 TAF per year of recycled water is used for irrigation, industrial processes, and groundwater recharge applications. A few inland treatment plants (in Riverside and San Bernardino counties) irrigate feed and fodder crops with recycled water. While this use is considered beneficial, it is not necessarily the highest and best use for recycled water. Higher value uses such as landscape or agricultural irrigation and industrial applications, however, will require more developed markets.
3. *Live Stream Discharge* – A number of inland plants discharge treated effluent into local streams and rivers. That water is then used downstream for beneficial uses, eventually flowing to the ocean. Some of the affected rivers (or ephemeral streams) include:

- Los Angeles River
- Santa Ana River
- Calleguas Creek
- Rio Hondo & San Gabriel Rivers
- Santa Margarita River

Regional Planning for Optimal Recycling

In the 1990s, the United States Bureau of Reclamation, in cooperation with Metropolitan, the California Department of Water Resources, and six other Southern California water agencies, studied the feasibility of regional water reclamation projects in Southern California.[1] This study identified 34 potential regional projects within Metropolitan's service area with an estimated yield of 450 TAF per year. Metropolitan and its member agencies continue to explore these and other projects and develop updated plans on a regular basis.

[1] This was the Southern California Comprehensive Wastewater Recycling and Reclamation Project (SCCWRRS).

Metropolitan has identified a potential for more than 1.0 MAF of recycled water to be developed by 2050. The majority of these projects are currently in conceptual planning phases.

Uses of Recycled Water

There are about 335 TAF per year of planned and permitted uses of recycled water throughout Metropolitan's service area. These include landscape irrigation, commercial and industrial use, seawater intrusion barriers, and groundwater recharge applications. It is anticipated that about 458 TAF per year of new recycled water could be developed in Metropolitan's service area by the year 2035. A number of these projects are currently being implemented and will go on-line within the next five years. Other projects are in various stages of planning, and their development will depend on cost, financing, regulatory actions, and water supply demands.

1. *Industrial* – Industrial users represent a large potential market for recycled water, particularly in heavily industrialized areas, such as the cities of Vernon, Commerce, Industry and the Wilmington area of Los Angeles. Additionally, refineries in West Basin MWD's service area and the city of Torrance use recycled water. Typical industrial uses include cooling tower makeup water, boiler feed water, paper manufacturing, carpet dying, and process water. In 2009, approximately 15 TAF of recycled water was used for industrial purposes. Industrial users are high-demand, continuous-flow customers, which allows greater operational flexibility by allowing plants to base load operations rather than contend with seasonal and diurnal flow variations. Because of these operational benefits, industrial users reduce the need for storage and other peak demand facilities and management.
2. *Irrigation* – Currently, about 132 TAF per year of recycled water is used to irrigate golf courses, parks, schoolyards, cemeteries, greenbelts, and agricultural purposes throughout Southern California. Using recycled water for irrigation reduces the need for imported water during the critical summer months and in drought situations when water supplies are scarce.
3. *Indirect Potable* – Indirect Potable Reuse refers to the use of recycled water for groundwater recharge, and surface water reservoir augmentation purposes.
   a. *Groundwater Recharge* – Metropolitan's service area overlies numerous groundwater basins, some of which are over-drafted, and some of which are threatened by seawater intrusion. Water agencies along the Los Angeles and Orange county coastline inject water into the underlying groundwater basins to create a barrier against this seawater intrusion. The use of recycled water for seawater intrusion barrier projects is increasing and is replacing imported water used for this purpose. Increasing the proportion of recycled water can free imported water for direct consumption. Currently, approximately 118 TAF per year of recycled water is "permitted" for recharge and seawater barrier injection into the Orange County, Central and West Coast groundwater basins.

      About 38 percent of the recycled water in Metropolitan's service area is used for groundwater replenishment and seawater barriers. Table 3-12 presents a summary of this recycled water use.

Table 3-12
2009 Groundwater Replenishment and
Seawater Barrier Injection Projects Using Recycled Water
(TAF per year)

Project	Recycled Water Use
OCWD GWRS	56.0
West Coast Barrier	10.9
Central Basin Spreading	41.8
Alamitos Barrier	2.2
Inland Empire Utilities Agency	2.2
Los Angeles Harbor	2.7
Camp Pendleton and other smaller projects	2.2
Total	**118.0**

Current groundwater recharge regulations require that recycled water be blended with specified percentages of imported water or other local water. With technological advancements, the percentage of recycled water is increasing. It is anticipated that some projects will soon be able to use 100 percent recycled water for seawater barrier and groundwater replenishment projects, thereby increasing recycled water use and further reducing a demand on imported supplies.

Large-scale groundwater replenishment projects utilizing recycled water require case-by-case review by the California Department of Public Health (CDPH). The greater the percentage of recycled water used for replenishment, the more stringent CDPH requirements.

One potential concern related to the use of recycled water for groundwater recharge is adverse impacts to groundwater quality from organic contaminants, metals, and salts.

CDPH has proposed regulations for groundwater recharge with recycled water in aquifers used as a domestic supply source. Advanced treatment of recycled water (reverse osmosis, micro/ultra filtration, ultraviolet light, and hydrogen peroxide) is beginning to address many of these concerns and allow for greater flexibility for future recycled water use.

b. *Reservoir Augmentation* – Reservoir augmentation includes use of advanced treated recycled water to augment a surface water reservoir. Blended water from the reservoir is then treated at a conventional water treatment plant for potable purposes. There is currently no Reservoir augmentation with recycled water in Metropolitan's service area. In continuation of its effort, the City of San Diego recently approved construction of a demonstration project to test the feasibility and design requirements of a full-scale reservoir augmentation project.

Technical and Economic Issues of Recycled Water

Recycled water use is growing rapidly in Metropolitan's service area. Further expansion depends on progress in research, regulatory change, public acceptance, and financing of local projects. Metropolitan supports:

- Increasing water recycling in California and the Colorado River Basin
- Advocating funding assistance by parties that benefit both directly and indirectly from the use of recycled water
- Expanding recycled water uses
- Reviewing recycled water regulations to ensure streamlined administration, public health and environmental protection
- Planning efforts and voluntary cooperative partnerships at the local and statewide levels
- Conducting research and studies to address public acceptance, new technologies and health effects assessments
- Increasing cooperation between agencies to serve recycled water in other agency service areas

Metropolitan is actively involved with other agencies and organizations such as WateReuse Foundation to support research and to further expand the use of recycled water. Metropolitan is also working with the WateReuse Association and other agencies on legislative and regulatory issues to streamline permitting processes and provide needed funding and support for increased use of the recycled water.

Recycled Water Task Force

Pursuant to AB 331 in 2002, the Department of Water Resources (DWR) convened a Task Force consisting of 40 water and wastewater agency managers, water recycling experts, environmental organizations, public health officials, researchers, and the public to evaluate the framework of State and local rules, regulations, ordinances, and permits to identify the opportunities for and obstacles to increasing the safe use of recycled water. The Task Force provided a list of recommendations and overarching issues discussed below.

1. *Funding* – Capital funding is a significant constraint to increased recycled water project development. Recycled water systems are separate from potable systems, so projects require significant capital investments in treatment and distribution. Variability in demand for recycled water lengthens the time needed to fully develop markets, which can affect project economics by increasing unit costs during early years of operation. Uncertainty of market demands creates a risk to cost recovery required for the repayment of capital debt.

   Estimates show the need for about $4 billion in capital improvements for near-term projects to develop 450 TAF per year of recycled water from future projects. This funding could come from many sources, including water agencies, wastewater agencies, and federal and state funding programs. However, the large capital risk may deter agencies from undertaking these projects. Metropolitan's Local Resources Program (LRP) assists member agencies in overcoming this obstacle. In its role as the regional water supplier, Metropolitan provides financial assistance up to $250 per AF to participating projects that displace a demand on its imported water supplies.

   In addition to the LRP, many water agencies partner with wastewater agencies to provide needed financial resources. The San Diego County Water Authority's Reclaimed Water Development Fund assists local agencies in developing recycling projects in San Diego County. Wastewater agencies understand that beneficial reuse may be a cost-effective alternative to regulatory and disposal issues. Implementing a reuse program can defer or eliminate the need for ocean outfall expansions and extensions. Also, a recent trend by the regulatory community to require zero discharge during certain periods encourages wastewater agencies to consider water reuse as a supply option. Project partnerships between water supply and wastewater treatment agencies have led to projects in which both entities contribute financial resources and share multiple benefits.

The USBR's Title XVI program Authorized by congress in 1992 represents another major funding source. To date, approximately $94 million grants has been provided to projects in Metropolitan's service area.

Proposition 50, passed in 2002, includes funding for the development of local projects including water recycling. It is expected to be an important source of funding for local projects.

The proposed bond under the Safe, Clean, and Reliable Drinking Water Supply Act of 2010, if passed by voters in November 2010, could provide an additional one billion dollars of grants and loans for development of water recycling projects.

The State Water Resources Control Board's (SWRCB) State Revolving Fund program continues to provide low interest loans for capital funding of water recycling projects. Loan payment proceeds go back to the Fund to provide loans to other projects.

2. Regulatory Issues – Two state agencies are involved in regulating water recycling projects. The Regional Water Quality Control Board (RWQCB) is the permitting authority and the CDPH oversees public health concerns and standards. Combining water quality concerns and health effects requires meeting stringent goals and standards. Title 22 of the California Administrative Code provides specific guidelines for treatment levels and corresponding reuse opportunities. Currently, state regulatory agencies review and determine requirements for recharge projects on a case-by-case basis.

   a. *SWRCB Recycled Water Policy* – SWRCB adopted the State Recycled Water Policy (Policy) in February 2009 after several years of negotiation. The Policy supports the SWRCB 2008-2001 Strategic Plan to promote sustainable local water supplies and establishes a mandate to increase the use of recycled water in California by 200 TAF per year by 2020 and by an additional 300 TAF per year by 2030. The Policy is organized into recycled water goals, roles of agencies, salt and nutrient management plans, landscape irrigation, groundwater recharge, anti-degradation, emerging constituents, and recycled water incentives.

      Due to incomplete knowledge of emerging contaminants analytical methods and public health impacts, the SWRCB has established a technical blue ribbon advisory panel to evaluate the current situation and provide recommendations to the SWRCB.

   b. *SWRCB General Permit for Landscape Irrigation Use of Municipal Recycled Water* – Pursuant to California Water Code § 13552.5, (Assembly Bill 1481, De La Torre, 2007) the SWRCB adopted a general permit for landscape irrigation uses of recycled water for which CDPH has established uniform statewide recycling criteria pursuant to Section 13521. The General Permit for Landscape Irrigation Uses of Municipal Recycled Water allows the use of recycled water for landscape irrigation including uses for parks, greenbelts, playgrounds, cemeteries, commercial landscaping, and freeway and highway landscaping.

The general permit's intent was to develop a uniform interpretation of state standards that ensures the safe, reliable use of recycled water for landscape irrigation uses, consistent with state and federal water quality law. The general permit would be for uses where CDPH has established uniform statewide standards. The general permit is also intended to reduce costs to producers and users of recycled water by streamlining the permitting process for its use in landscape irrigation.

In addition, Metropolitan continue to work with other agencies and provide comments on the proposed revisions to CDPH's Draft Title 22 Code of Groundwater Recharge Regulations, California Department of Housing and Community Development's Graywater standards, and DWR's proposed Dual Plumbing design standards.

Draft Title 22 Groundwater Recharge Reuse Regulations were proposed by the CDPH on August 5, 2009. The regulations proposed changes the level of treatment, retention time, and dilution of groundwater recharge projects. Additional public comments periods are anticipated in 2010.

The emergency graywater regulations, which added Chapter 16A "Nonpotable Water Reuse Systems" into the 2007 California Plumbing Code, were approved by the California Building Standards Commission (CBSC) on July 30, 2009. The emergency regulations were subsequently filed with the Secretary of State on August 4, 2009 and became effective immediately upon filing.

Assembly Bill 371 (Goldberg 2006) and Senate Bill 283 (DeSaulnier, 2009) directed the DWR, in consultation with the State Department of Health Services, to adopt and submit to the California Building Standards Commission regulations to establish a state version of Appendix J (renamed Chapter 16 Part 2) of the Uniform Plumbing Code to provide design standards to safely plumb buildings with both potable and recycled water systems.

On November 18, 2009 the Building Standards Commission unanimously voted to approve the California Dual Plumbing Code that establishes statewide standards for installing both potable and recycled water plumbing systems in commercial, retail, and office buildings, theaters, auditoriums, condominiums, schools, hotels, apartments, barracks, dormitories, jails, prisons, and reformatories. The code is scheduled to be published in July 2010 with an effective date of January 1, 2011.

3. *Institutional Issues* – Multiple local agencies are often involved in the development of local water recycling projects. For example, recycled water from a single wastewater source may be used by a number of agencies that provide recycled water service, or the recycled water may be treated and delivered by an agency in one service area and used in another. Also, an agency responsible for wastewater collection and treatment may deliver recycled water within a water district's service area. If recycled water is used for groundwater recharge, local agencies must coordinate with groundwater managers. In most instances, these projects require a committed agency that is willing to negotiate with other affected agencies to develop water recycling.

4. *Water Quality* – Water quality requirements for various types of irrigation and industrial uses are critical when evaluating whether recycled water will be an acceptable supply. Possible

constituents in recycled water, such as TDS, chloride, pH, or ammonia, may cause problems for specific applications. Several golf courses and other users have complained about the high salt content in recycled water and expressed reluctance to its use on their property or crops. Also, groundwater basin managers are concern with increasing salt load in groundwater due to use of high salinity recycled water. Therefore, agencies, locally and on regional basis, are engaged in addressing the high salinity in recycled water and plan for salinity management control to accommodate the water quality needs of customers and to reduce salt accumulation in underlying groundwater where recycled water is used.

5. *Seasonal Storage* – Production of wastewater at a water reclamation plant is relatively uniform year round since indoor residential use does not vary much from winter to summer. Flows may be somewhat higher in the winter at the wastewater reclamation plant from stormwater inflow into the sewers, but more than 60 percent of irrigation demand on recycled water (parks, golf courses, etc.) occurs in summer (May through September). Therefore, some projects store surplus recycled water in the winter for later use during the dry summer months to optimize recycling. Agencies such as Las Virgenes Municipal Water District and Irvine Ranch Water District have undertaken extensive engineering and operational studies to manage their seasonal supply variations. Operational storage is also needed because regulations only allow watering at night to reduce opportunities for direct public contact. Current practice is to use supplement recycled water with potable water or other water to meet peak demand in summer which outpace available recycled water supplies.

6. *Public Acceptance* – Public education programs are an integral part of recycled water project implementation. Recycled water users and the general public need to be educated on recycled water benefits and need to be reassured of the safety of recycled water. To encourage public acceptance, Metropolitan supports a continuous review of recycled water use regulations to ensure streamlined administration, public health, environmental protection, and research efforts that address public acceptance, new technologies, and health effects assessments.

B. Groundwater Recovery

All Southern California groundwater basins experience varying degrees of water quality challenges as a result of urban and agricultural uses. The accumulation of high-salinity water and degradation from volatile organics are two common constraints to the economic use of groundwater for urban applications. In some cases, the threat of increased salt buildup can also complicate conjunctive use of groundwater basins and imported supplies.

In limited instances, recovering degraded groundwater costs less than purchasing imported water from Metropolitan. As a result, these projects have moved forward on their own because they make economic sense. In many cases, particularly where total dissolved solids are the constituent of concern, more expensive membrane processes are required, and agencies are more reluctant to make the capital investments necessary to recover the degraded water. In those cases, agencies typically seek financial assistance to offset costs.

Metropolitan initiated its Groundwater Recovery Program (GRP) in 1991 to encourage local agencies to treat and use degraded groundwater for municipal purposes. Under the GRP, Metropolitan provided financial assistance of up to $250 per AF to local agencies for the construction and operation of project facilities used to recover degraded groundwater that will cost the implementing agency more than purchasing that water supply from Metropolitan. The GRP was open to all technologies that recovered and used degraded groundwater. It was retired in 1998 folded into Metropolitan's Local Resources Program, which now includes both recycled water and groundwater recovery projects.

Use of degraded groundwater normally requires high levels of treatment. Membrane processes used to recover the majority of severely degraded water have a high capital cost and incur a high operational cost for power. Once treated, however, recovered groundwater may be integrated to potable water systems.

All processes that recover degraded groundwater also produce concentrated waste flows for which disposal can be problematic. Most importantly, membrane processes produce significant volumes of brine – about 15 percent of the treated water – that require disposal to an ocean outfall or sanitary sewer. Since discharge to sewers only exacerbates the salinity problems that challenge downstream water recycling projects, brine disposal requires separate and expensive ocean outfalls.

Lastly, most of the groundwater basins in Southern California are regulated by basin managers through adjudication or groundwater management plans. Where recovery of contaminated groundwater exceeds the limitations on production of groundwater specified in the basin adjudication or management plan groundwater recovery projects may include groundwater replenishment with supplemental water.

<u>Brine Disposal</u>

All processes that recover degraded groundwater also produce concentrated waste flows for which disposal can be problematic. Most importantly, membrane processes such as reverse osmosis – the predominant desalting technology used in Southern California – produce significant volumes of brine that can account for about 15 percent of the treated water. In Southern California, brines generated from brackish water desalination are typically disposed through dedicated brine lines to ocean outfalls or sanitary sewers. Advanced wastewater treatment with membrane also generates a high salinity brine.

Brine disposal is a critical issue facing Southern California in the further development of brackish groundwater projects and recycled water supplies, since introducing high-salinity brines into sanitary sewers impacts the ability to recycle waste water. The U.S. Bureau of Reclamation, partnering with Metropolitan and 13 other water, waste water and groundwater agencies, recently completed a study of the Region's brine disposal current and future needs. The Southern California Regional Brine-Concentrate Management Study, Phase I, found that brine generation from brackish groundwater desalters is expected to grow from 15 mgd in 2008 to 76 mgd by 2035. Over the same period, brines produced by advanced treatment of wastewater for recycled uses will grow from 17 mgd in 2008 to 60 mgd by 2035. Total local supplies of about 500 mgd would be supported by brine producing projects and necessary disposal by 2035.

The management of existing regional brine lines and the development of new brine line systems will be a critical factor in the continued growth in brackish groundwater desalination and recycled water supplies in Southern California. The region currently has one operating brine line, the Santa Ana Regional Interceptor (SARI line). The SARI line collects brine from desalters in San Bernardino, Riverside, and Orange counties. A key benefit of the SARI line is that it has allowed inland water agencies to recover impaired groundwater resources which would otherwise be unusable. A second brine line – the Calleguas Regional Salinity Management Project is under construction in Ventura County, and will collect brine from existing and planned groundwater desalters and wastewater treatment plants. A third regional line is in the planning phase in San Diego County. The Southern California Salinity Coalition, a coalition of water and wastewater agencies, has advocated for state and federal financial assistance to build these regional brine lines.

C. Seawater Desalination

Seawater desalination represents a significant opportunity to diversify the region's water resource mix with a new, locally controlled, reliable potable supply. Like conservation, recycling, and other new local supplies, seawater desalination will increase regional supply reliability by offsetting existing and future demands for imported water. Metropolitan continues to pursue a target for seawater desalination of 150,000 AF per year by 2025, and several local and retail water agencies have identified seawater desalination as an important component of their water supply portfolio in their Urban Water Management Plans.

The implementation of large-scale seawater desalination plants in California offers many opportunities and challenges. In the past decade, advances in energy efficiency and membrane technology have reduced the cost of seawater desalination relative to the costs for imported water supplies and other supply alternatives. Challenges to seawater desalination include high capital and operation costs, pre-treatment design, addressing environmental issues, system integration, and navigating an uncertain permitting process. Metropolitan's member agencies are actively pursuing research into alternative intake and outfall technologies, process designs, and treatment alternatives that could minimize some of the environmental issues and lower unit costs.

Changed Conditions

The status of locally planned recycling and groundwater recovery projects changes from year to year. Metropolitan periodically surveys its member agencies for planned projects to coordinate local supply projections and plans. Changes in long-term strategies, regulations, funding priorities, and new opportunities contribute to changing outcomes.

Other changes include the following:

- Decreases in the seawater desalination costs;
- Accelerated development of groundwater recovery projects;
- Increases in recycled water use for groundwater replenishment and seawater barriers.

Implementation Approach

The IRP Preferred Resource Mix provides Metropolitan with a strategy to meet future water supply reliability needs. Developing locally owned water recycling, groundwater recovery, and seawater desalination projects allows Metropolitan to reduce its capital improvements and its O&M costs for water importation, treatment, and distribution. Metropolitan schedules its financial assistance for these types of projects to conform to expanding regional needs for imported water.

Since 1982, Metropolitan has implemented several programs to provide financial assistance to its member agencies and subagencies for developing local water supplies. Metropolitan's incentive programs are based on a pay-for-performance principle, with incentive payments provided on a contractual basis for yield developed by local agencies and applied to beneficial uses. These incentive programs have been instrumental in helping the region implement Metropolitan's local resource targets. Since the inception of the program, Metropolitan has invested more than $347 million and partnered with member agencies on 62 recycling projects and 22 groundwater recovery projects. Member and retail agencies have also funded a significant number of local projects without Metropolitan funding, many of which pre-date Metropolitan's incentive programs. The following is a brief summary of the evolution of Metropolitan's investment in water recycling and groundwater recharge implementation.

Water Recycling and Groundwater Recovery

1981 The Local Projects Program (LPP) was initiated and designed to facilitate the development of water reclamation projects. Under the original program, Metropolitan contributed a negotiated amount to help finance project capital costs. Two projects were constructed under this approach for a collective yield of 3,560 AF per year.

1986 The LPP was revised such that Metropolitan contributed its avoided energy costs of State Water Project pumping in the form of a rebate per acre-foot of recycled water delivered to end-use customers. This change was based on the assumption that local projects resulted in the avoidance of water importation pumping costs. Under the 1986 revisions, 14 projects with a combined ultimate yield of 31 TAF per year were approved for LPP assistance.

1990 Metropolitan's Board increased the LPP contribution to $154 per AF, which was calculated based on Metropolitan's avoided capital and operational costs to convey, treat, and distribute water, and included considerations of reliability and service area needs. In 1990, the LPP goal was to achieve an additional 150 TAF of recycled water use by the year 2000.

Attributes of the LPP included a relatively simple program administration where participating agencies could depend on receiving a fixed level of contribution per acre-foot of recycled water delivered, and payments were tied to performance. Disadvantages of the LPP were that fixed contribution payments may not provide sufficient incentives during the early years of a project to encourage development of economical projects. In addition LPP contributions were based on preliminary, feasibility level cost estimates made prior to construction which could result in over payment by Metropolitan.

1991 The Groundwater Recovery Program (GRP) established in 1991, was designed to improve water supply reliability through the recovery of otherwise unusable groundwater that has been degraded by minerals and other contaminants and provide access to the storage assets of the degraded groundwater. An ancillary benefit was maintaining the quality of groundwater resources by reducing the spread of degraded plumes. In 1991, the GRP goal was to implement projects to recover 200 TAF per year of groundwater for domestic purposes.

The GRP was similar to the LPP in that Metropolitan entered into agreements to pay for water produced by each individual project for 20-year terms. However, the GRP contribution was paid based on a sliding scale from $0 to a maximum of $250 per AF. To receive a contribution, project unit costs must have exceeded Metropolitan's non-interruptible treated water rate. When the project unit cost of the GRP project equaled the current applicable Metropolitan water rate, the incentive was zero. Agencies are required to submit annual project costs and production data at the conclusion of each fiscal year of operation in order to determine the appropriate incentive.

The main advantage of the GRP over the LPP was that variable rate contributions provided a greater financial incentive in the early years of project operation, when project unit costs were higher. Further, GRP contributions were based on actual incurred construction, operation and replacement costs, and water production values reported after the end of the fiscal year. These costs and production values are subject to audit. However, program administration under the GRP is more difficult than the LPP because project costs must be verified annually, and discrepancies involving payment adjustments have to be resolved.

1995 During development of the Local Resources Program (LRP), Metropolitan's board allowed the immediate conversion of existing projects under the LPP to include proposed GRP-type incentive terms. The proposal was made to 40 approved LPP projects at the time, of which 37 projects had already executed agreements and three were in the process of final execution. Conversion of projects from the existing LPP to LRP was voluntary and was accomplished through the amendment of existing agreements. The proposal was extended to seven additional LPP projects whose applications were under review at the time.

By June 1999, new agreements were executed that converted 15 LPP projects to include new LRP terms similar to sliding scale incentives paid under the GRP.

1996 Metropolitan's IRP identified goals for a diverse mix of six local and imported water resource elements optimized to meet future supply reliability in a cost-effective manner. The IRP set initial targets for resource development that the region must achieve for water supply reliability through the year 2020. Studies showed reduced long-term costs to the region when local resources were developed due to downsizing or deferral of Metropolitan's capital improvements, reduction in operating costs for importation, treatment and distribution, and reduction in costs for developing alternative regional supplies. Encouraging water recycling and groundwater recovery projects by providing financial assistance was consistent with the IRP goals approved by Metropolitan's board as a strategy to meet future water supply reliability needs of Metropolitan's service area in a cost-effective manner.

1998 Metropolitan established the competitive Local Resources Program, which encourages local development of recycled water and recovered groundwater through a process that emphasizes cost-efficiency to Metropolitan, timing new production according to regional need, and minimizing administrative cost and complexity. The LRP replaced the LPP and GRP with uniform criteria for financial assistance to local projects that contribute to regional water supply reliability. Under the competitive program, agencies requested fixed financial assistance payments up to $250 per AF of production for agreement terms up to 25 years. Proposals that requested lower financial assistance and terms scored higher under the competitive process. Under the LRP, Metropolitan issues a request for proposals for a specified regional quantity of water to achieve production targets identified under the IRP. A review panel evaluates proposals using scoring criteria adopted by Metropolitan's board and identifies the mix of project proposals that best meet the region's needs consistent with the RFP.

In June 1998, Metropolitan issued a Request for Proposals (RFP) for the development of 53,000 AF per year of new water recycling and groundwater recovery projects under the LRP to help achieve regional water supply reliability goals identified by the IRP. Fourteen projects were selected through the competitive process and agreements were executed with the local agencies by April 2000 to provide financial assistance for up to 25 years.

In April 2003, Metropolitan issued the second competitive RFP for the development of an additional 65,000 AF of new recycled water and recovered groundwater under the LRP. Thirteen projects were competitively selected and agreements for ten local projects were executed by December 2005. Three projects did not meet the deadline for inclusion in the LRP.

Under the competitive RFP process the weighted average incentive payment for 27 projects is about $115 per AF of yield, and is below the maximum contribution of $250 per AF. Additionally, some proposals resulted in shorter duration agreements compared to the maximum of 25 years.

2004 The Board approved the IRP Update that refined regional supply development targets based on the identified changed conditions and provided a long-term resources plan to 2025. These targets, specified in five-year intervals, set development schedules needed to ensure regional supply reliability, allowing for compliance with current applicable water code provisions and growth legislation. The IRP Update also established the concept of a 10 percent water supply planning buffer, which set total resource development targets above forecasted water demands for planning purposes, and identified resources in advance of need.

2007 Metropolitan updated the policies and procedures for the LRP and established a goal of financing additional 174 TAF per year of new water recycling and groundwater recovery under the LRP. The program shifts from a competitive selection process to a first-come-first served bases with priorities given to projects that are ready to proceed. Under the new program, LRP incentive are on a sliding scale of up to $250 per AF, calculated annually based on actual project unit cost above Metropolitan's prevailing water rate. Project applications are accepted on a continuous basis until the IRP target is achieved. So far, Metropolitan has approved five projects totaling 57,150 AF per year under the 2007 LRP. Since then, Metropolitan has entered into agreements with local agencies for implementation of five projects with an ultimate yield of 57 TAF of recycled water. Metropolitan is currently reviewing LRP applications for nine water recycling and groundwater recovery projects, which would collectively produce 40 TAF of new water.

Seawater Desalination Program

Metropolitan's Seawater Desalination Program (SDP) was created in 2001 to encourage the development of seawater desalination by local agencies and was modeled after the LRP. Like the LRP, it offers sliding-scale incentives to member and local agencies that provide up to $250 per AF for produced supplies. The incentive is designed accelerate the development of expensive local supply projects by local agencies by lowering their cost. Metropolitan has entered into four SDP agreements, while a fifth potential project is currently on hold.[2] Of the four SDP projects, the Carlsbad Seawater Desalination project is the farthest along. This project has obtained all of the local, State, and Federal permits for necessary to begin construction, though as of May 2010, there are legal challenges to three of the permits. Project proponents anticipate the project will

[2] LADWP's 28,000 AF per year seawater desalination project.

come on-line as early as 2012, providing the region with an additional 56 TAF of new local supplies. Table 3-13 provides a summary of the status of the four SDP projects. Local agencies are also considering three projects independent of the SDP with the potential to produce up to 280,000 AF per year if developed. Table 3-14 provides a summary of these local agency projects.

Table 3-13
Seawater Desalination Program Project Status

Project	Member Agency Service Area	AF per Year	Status	Executed Incentives Contract
Long Beach Seawater Desalination Project	Long Beach Water Department	10,000	Pilot study	Yes
South Orange Coastal Ocean Desalination Project	Municipal Water District of Orange County	16,000-28,000	Pilot study	Yes
Carlsbad Seawater Desalination Project	San Diego County Water Authority	56,000	Permitting	Yes
West Basin Seawater Desalination Project	West Basin Municipal Water District	20,000	Pilot study	Yes
Total: Seawater Desalination Projects		**102,000-114,000**		

Table 3-14
Other Potential Seawater Desalination Projects in Metropolitan's Service Area

Project	Member Agency Service Area	AF per Year	Status
Huntington Beach Seawater Desalination Project	Municipal Water District of Orange County	56,000	Permitting
Camp Pendleton Seawater Desalination Project	San Diego County Water Authority	56,000 to 168,000	Planning
Rosarito Beach Seawater Desalination Feasibility Study	San Diego County Water Authority	28,000 to 56,000[1]	Feasibility study
Total: Other Potential Projects		**140,000 to 280,000**	

[1] Metropolitan's service area would receive a share of the total supply produced by the project.

To promote the development of local seawater desalination projects, Metropolitan provides regional facilitation by supporting member agency projects during permit hearings and other proceedings, coordinating responses to potential legislation and regulations, and working with the member agencies to resolve related issues such as greenhouse gas emission standards and seawater intake regulations that could impact seawater desalination projects. Metropolitan has also formed a special Board Committee to find additional ways to promote potential projects and explore opportunities for developing regional seawater desalination supplies.

Achievements to Date

Metropolitan is committed to providing financial assistance to the development of water recycling projects throughout its service area. Since adopting the IRP in 1996, Metropolitan and its 26 member agencies, have made significant progress in achieving regional targets for recycling and groundwater recovery. Since 1982, Metropolitan executed LRP contracts for 62 recycled water projects, of which 59 produced about 161 TAF in 2009. Local projects not receiving funding from Metropolitan provide an additional 147 TAF of recycled water to the region.

Since 1991, Metropolitan executed GRP and LRP contracts for 23 recovered groundwater projects, of which 22 produced about 62 TAF in 2009. In addition to the projects under Metropolitan's programs, about 35 TAF of degraded groundwater is recovered by agencies in Metropolitan's service area without Metropolitan's financial assistance.

Table 3-15 provides a summary of the current level of regional production from these local projects. To date, Metropolitan has invested $244 million in recycling programs and $102 million for groundwater recovery. Table 3-16 provides a summary of the groundwater and recycled water production and incentive payment under Metropolitan's programs to date.

Metropolitan has continued to develop and refine its programs to encourage the involvement of its member agencies in water recycling, groundwater recovery, and desalination. Developing and managing these programs requires considerable coordination and refinement. Changing conditions over the last five years have reduced the costs of these options and allow Metropolitan to rely on these sources for future water supply.

Table 3-15
2009 Water Production From Recycling and Groundwater Recovery
(TAF)

Type of Project	With Metropolitan Funding	Without Metropolitan Funding	Total
Recycled Water	161	147	308
Groundwater Recovery	62	35	97
Total	**223**	**182**	**405**

Table 3-16
Local Resources Program[1]

	Recovered Groundwater	Recycled Water	Total
Projects			
Planned	22	62	84
In Operation	21	59	80
Ultimate Yield (TAF)	86	335	421
Deliveries (AF)			
FY 2008/2009	62	161	223
Since Inception	545	1,323	1,868
Payments ($ millions)			
FY 20082009	$12.6	$26.7	$39.3
Since Inception	$102.4	$244.3	$346.7

[1]Including Chino II Desalter

3.6 Storage and Groundwater Management Programs: Within the Region

Since the 1950s, local water management in Metropolitan's service area has included the conjunctive use of groundwater and surface water. Conjunctive use of water refers to the use and storage of imported surface water supplies in groundwater basins and reservoirs during periods of abundance. This stored water is available for use during periods of low surface water supplies as a way of augmenting seasonal and multiyear shortages.

Storage capacity in the region's groundwater basins allows for conjunctive use programs. In 2000, the Association of Ground Water Agencies (AGWA) published Groundwater and Surface Water in Southern California: A Guide to Conjunctive Use that estimated the potential for dry-year or long term conjunctive use in Metropolitan's service area at approximately 4.0 MAF. In 2007, Metropolitan published the Groundwater Assessment Study that estimated 3.2 MAF of space in groundwater basins available for storage within Metropolitan's service area.

To prepare for supply disruptions, Metropolitan and its member agencies have adopted goals for water storage within the region. Metropolitan has identified in-region storage that should be set aside for use in emergencies, such as a disruption to the California Aqueduct. In addition, Metropolitan's planning process calls for dry-year storage that can be called on at times of supply shortage due to drought.

Background

Metropolitan established general long-term storage guidelines in its WSDM plan. The WSDM plan provides for flexibility during dry years, allowing Metropolitan to use storage for managing water quality, hydrology, SWP, and CRA issues. Dry-year surface storage yields have been characterized in several ways, including delivery capabilities over two- and three-year dry periods. The approach used in the Metropolitan's resource planning assumes that dry-year surface storage can be used as needed and as available within the WSDM planning framework. Metropolitan had identified an in-region surface water target of 620 TAF of dry-year storage for year 2020. Metropolitan had achieved this target and aims to sustain this level of storage in Diamond Valley Lake (DVL) and in the SWP terminal reservoirs (Castaic and Perris) made available through the Monterey Amendment to the SWP contract.

Metropolitan has also refined its characterization of the flexible storage available in the SWP terminal reservoirs. Previous planning studies assumed that up to 50 percent of the available SWP flexible storage could be used in a repeat of a single dry-year event, such as the 1977 hydrology. In its current planning strategy, Metropolitan's dry-year surface production, including Monterey storage, is not limited in this way. Instead, Metropolitan's reliability modeling determines the availability of stored surface water supplies in each forecast year based on historical hydrology.

Implementation Approach

A. Surface Storage

Since the beginning of the Metropolitan's planning process, two significant changes have occurred to regional surface storage.

Diamond Valley Lake

Construction of Southern California's newest and largest reservoir nearly doubled the area's surface water storage capacity. Transport of imported water to the lake began in November 1999, and the lake reached capacity in early 2003. DVL holds up to 810 TAF, some of which is for dry-year and seasonal storage, and the remainder for emergency storage.

SWP Terminal Reservoirs

Under the 1994 Monterey Agreement, Metropolitan received operational control of 218,940 AF in the reservoirs at the southern terminals of the California Aqueduct. Control of this storage capacity in Castaic Lake and Lake Perris gives Metropolitan greater flexibility in handling supply shortages. In 2005, seismic concerns arose regarding Perris dam. In response, DWR reduced the storage amount at Lake Perris by half until those concerns can be studied and addressed; however, Metropolitan operational storage remained the same. Since then, Metropolitan has continued to withdraw and replace water from the reservoir operating from the lower level. In January 2010, DWR issued a Draft Environmental Impact Report for the repair of the dam at Lake Perris. Discussions are ongoing regarding the ultimate disposition of reservoir as it relates to costs allocated to the SWP contractors.

B. Groundwater Storage

Many local groundwater storage programs have been implemented over the years to maximize the use of local water supplies. These programs have included the diversion of water flows into percolation ponds for recharging groundwater basins and the recovery of degraded groundwater.

- For many years, flood control agencies within Metropolitan's service area have captured and spread stormwater for groundwater replenishment. Local runoff and reclaimed water have been conserved via spreading grounds, injection wells, reservoirs, and unlined river channels. In addition, flood control agencies have operated seawater barrier projects in Los Angeles and Orange Counties to prevent seawater intrusion into the coastal groundwater basins.
- Growing water quality problems have raised serious concerns about the ability to sustain average annual production levels. The federal Superfund program, although slow to implement clean-up projects, has helped maintain or increase the usable groundwater. These increased levels have been augmented by groundwater water recovery projects discussed in Section 3.5.

Conjunctive use of the aquifers offers an even more important source of dry year supplies. Unused capacity in Southern California groundwater basins can be used to optimize imported water supplies, and the development of groundwater storage projects allows effective management and regulation of the region's major imported supplies from the Colorado River and SWP. To meet the adopted targets for dry year storage, Metropolitan and its member agencies have encouraged the recharge of the groundwater basins. Over the years, Metropolitan has implemented conjunctive water use through various incentive programs. Typically this storage takes place in one of two ways:

- Direct deliveries to storage – Metropolitan delivers replenishment water directly to water storage facilities, including spreading sites and injection wells.
- In-lieu deliveries to storage – Metropolitan delivers additional water directly to the member agency's distribution system. The member agency then uses this water rather than pumping the groundwater it otherwise would have taken out of storage. The deferred local production results in water being left in local storage (surface or groundwater) for future use.

Metropolitan has developed a number of local programs to work with its member agencies to increase storage in groundwater basins. Metropolitan has encouraged storage through its replenishment, cyclic, and conjunctive use storage programs. These programs allow Metropolitan to deliver water into a groundwater basin in advance of agency demands. Discounted replenishment service water is delivered when Metropolitan has surplus imported water supply and is for use after one year. Cyclic storage agreements allowed pre-delivery of surplus imported water for recharge into groundwater basins in excess of an agency's planned and budgeted deliveries. This water is then purchased at a later time when the agency has need for groundwater replenishment deliveries. Conjunctive use agreements provide for storage of imported water that can be called for use by Metropolitan during dry, drought, or emergency conditions. During a dry period, Metropolitan has the option to call water stored in the groundwater basins pursuant to its contractual conjunctive use agreements. At the time of the call, the member agency pays Metropolitan the prevailing rate for that water. Since 2007, Metropolitan has drawn on dry-year supply from cyclic storage accounts with several member agencies, long-term replenishment programs, and ten contractual conjunctive use storage programs to address shortages from the State Water Project.

Achievements to Date

In 2000, Metropolitan entered an agreement with the State of California Department of Water Resources to administer $45 million of Proposition 13 state bond funds for Metropolitan's Southern California Water Supply Reliability Projects Program. Metropolitan paired the $45 million of state funds with $35 million of Metropolitan capital funds to develop nine groundwater storage programs in partnership with member and retail agencies and groundwater basin managers. These nine contractual storage programs combined with one additional conjunctive use program previously developed provide for storage of up to 422 TAF and dry-year yield of up to 117 TAF. These programs are summarized in Table 3-17.

In 2007, Metropolitan prepared the Groundwater Assessment Study Report in collaboration with its member agencies and with groundwater basin managers. The report finds that while there is substantial storage space in service area groundwater basins that could be used for conjunctive use, that there are significant challenges that must be overcome in order to implement additional storage programs. Use of additional storage opportunity requires:

- capture, delivery and recharge of additional local and imported surface supplies;
- improved capability to store available of surplus surface supplies with adequate conveyance and recharge capacity; and
- resolution of constraints including: remediation of contamination, institutional and legal issues, funding for significant investment in capital infrastructure, and incongruity between aquifer capability with overlying demand for water supplies.

To follow up on the findings of the Groundwater Assessment Study Report, Metropolitan initiated a series of seven groundwater workshops beginning in July 2008 among Metropolitan, member agencies, groundwater basin managers, and stakeholders to discuss challenges for increasing conjunctive use and to develop recommendations for addressing the challenges. The workgroup's recommendations were submitted as a Board Report to Metropolitan's Board of Directors and provided as input to Metropolitan's current planning process. The recommendations are as follows:

1. Enhance groundwater recharge with increased storm water and recycled water recharge and imported replenishment water when it is available.
2. Streamline requirements, remove policy constraints, clarify procedures, increase coordination and sharing of information to accomplish recharge goals.
3. Develop flexible regional policies and programs that can be tailored to meet

specific local needs of each groundwater basin.

4. Increase integration of local groundwater and regional water supplies with proposal for a comprehensive modeling study to initiate review of innovative opportunities.

5. Use appropriate price signals to encourage conjunctive use and investments for storage.

6. Increase coordination among Metropolitan, member agencies, basin managers, groundwater producers and stakeholders inclusive of collaboration for legislative, regulatory, and educational efforts in support of specific initiatives and funding needed for sound groundwater management.

As an initial effort toward comprehensive modeling for increased integration of local and regional water supplies recommended in the workshop process, Metropolitan worked with groundwater basin managers to develop groundwater basin modules for five key groundwater basins in its service area. The modules are run with Metropolitan's regional supply model, RPSIM, to evaluate conjunctive use opportunities and changes to groundwater basin water levels under a variety of local and regional supply scenarios.

In 2010, Metropolitan entered into an agreement with the Los Angeles County Sanitation District to conduct a feasibility study for developing a regional recharge project using recycled water.

Other Identified Contractual Groundwater Storage Programs

Metropolitan continues to discuss opportunities to expand groundwater conjunctive use storage programs throughout its service area. The use of the supplemental storage program in 2005 provides one example of these opportunities. The state's wet winter of 2004-05 provided Metropolitan with abundant water supplies. To encourage maximized storage in the region, Metropolitan offered discount rates to its member agencies that allowed more storage of surplus imported water supplies than previously planned. The stored water was produced at Metropolitan's call in 2008-09 and 2009-10 to offset imported water demands. Identified potential programs include:

- Chino Basin Storage Program Expansion
- Orange County Basin Storage Program Expansion
- Pasadena Groundwater Storage Program
- North Las Posas Phase 3
- Central Basin Storage Program
- West Basin Storage Program
- San Fernando Basin Storage Program
- San Jacinto Basin Storage Program
- City of San Diego Storage Program

Table 3-17
Contractual Conjunctive Groundwater Projects

Project and Project Proponents	Storage Capacity (TAF)	Dry-Year Yield (TAF/Year)	Balance as of July 1, 2007 (TAF)	Storage Account Balance as of 12/31/2009 (TAF)
LOS ANGELES COUNTY				
Long Beach Conjunctive Use Project Long Beach	13.0	4.3	13.0	6.4
Foothill Area GW Storage Project Foothill MWD	9.0	3.0	3.3	0.6
Long Beach CUP: Expansion in Lakewood Long Beach	3.6	1.2	1.8	1.8
City of Compton Conjunctive Use Program City of Compton	2.3	0.8	1.1	0
Upper Claremont Heights Conjunctive Use Three Valleys MWD	3.0	1.0	0	0
ORANGE COUNTY				
Orange County GW Conjunctive Use Program OCWD, MWDOC	66.0	22.0	47.9	8.6
SAN BERNARDINO COUNTY				
Chino Basin Programs IEUA, TVMWD, Chino Basin Watermaster	100.0	33.0	80.6	23.0
Live Oak Basin Conjunctive Use Project Three Valleys MWD	3.0	1.0	0.70	0.7
RIVERSIDE COUNTY				
Elsinore Groundwater Storage Program Western MWD, Elsinore Valley MWD	12.0	4.0	0.4	0
VENTURA COUNTY				
North Las Posas Groundwater Storage Program Calleguas MWD	210.0	47.0	60.6	43.5
Total	**421.9**	**117.3**	**209.4**	**84.6**

3.7 20x2020 Water Reduction Target

In November 2009, Governor Arnold Schwarzenegger signed the Water Conservation Act of 2009 (SB 7) into law as part of the historic comprehensive water package designed to address the State's growing water challenges. The Act represented the culmination of efforts by water industry leaders (including Metropolitan), the environmental community, and the Legislature to enact legislation that would answer the governor's call for the state to reduce per capita water use 20 percent by the year 2020 (referred to as "20x2020") as part of a larger effort to ensure reliable water supplies for future generations and restore the Bay-Delta.

The 20X2020 legislation requires urban retail water suppliers to develop urban water use targets to help meet the 20 percent reduction in water use by 2020, with interim targets for 2015. The legislation provides flexibility in how targets are established and achieved. Per capita reductions can be accomplished through any combination of increased water conservation, improved water use efficiency, and increased use of recycled water to offset potable demand. Potable demand offsets can occur through direct reuse of recycled water, such as for irrigation, or indirect potable reuse through groundwater recharge and reservoir augmentation. Retail water suppliers receive partial credit for past efforts in conservation and recycled water; therefore, not all agencies need to reduce demand by 20 percent in order to comply with the new law.

The legislation provides additional flexibility by allowing compliance on an individual agency basis or through collaboration with other agencies in a region. Based on Metropolitan's analysis of population and demand and the methodologies for setting targets described in the legislation, compliance with 20x2020 on an individual agency basis throughout the region would result in reduced potable demand of 380 TAF in 2020. The additional conservation and/or recycling that local water agencies would implement at the retail level to attain the 380 TAF target in 2020 and an interim target of 190 TAF by 2015 are reflected in the 2010 RUWMP demand projections.

Achieving regional consistency with the legislative goal – a 20 percent reduction for the region as a whole – would result in additional savings of 200 TAF for a total of 580 TAF. This additional 200 TAF savings target for 2020 could be an important part of the region's future supplies and is included in the Programs under Development in the water supply forecast tables presented in Appendix A.3. For the region, the baseline water demand is estimated to be 178 gallons per capita per day (GPCD). A 20 percent reduction would reduce this to 142 GPCD. Achieving an annual demand reduction of 580 TAF by 2020 will require additional local and regional investments in both conservation and recycled water.

The policies and programs to address the water reduction target will be consistent to Metropolitan's conservation measured described in Sections 3.4 and the water recycling efforts described in Section 3.5.

Metropolitan's 2004 IRP Update includes a goal of 10 TAF per year for active water conservation programs and a recycling goal of 135 TAF of annual recycled water. These two goals combined with measures taken by retail water agencies would be the means to achieve the regional 20x2020 goal.

Over the next five years, Metropolitan will periodically assess water supply conditions and trends in per capita demand within its service area and evaluate potential programs to ensure attainment of the goal. Metropolitan also continues to provide support for retail agency efforts through technical assistance, legislation, code and standards updates, and potential financial incentives where needed for market transformation to increase water use efficiency.

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Water Quality 4

Metropolitan's planning efforts have recognized the importance of the quality of its water supplies. To the extent possible, Metropolitan responds to water quality concerns by concentrating on protecting the quality of the source water and developing water management programs that maintain and enhance water quality. Contaminants that cannot be sufficiently controlled through protection of source waters must be handled through changed water treatment protocols or blending. These practices can increase costs and/or reduce operating flexibility and safety margins. In addition, Metropolitan has developed enhanced security practices and policies in response to national security concerns.

Background

Implementing the major components of Metropolitan's planning efforts – groundwater storage, recycled water, and minimized impacts on the Delta – requires meeting specific water quality targets for imported water. Metropolitan has two major sources of water: the Colorado River and the State Water Project (SWP). Groundwater inflows are also received into the SWP through groundwater banking programs in the Central Valley. Each source has specific quality issues, which are summarized in this section. To date, Metropolitan has not identified any water quality risks that cannot be mitigated. As described in this section, the only potential effect of water quality on the level of water supplies based on current knowledge could result from increases in the salinity of water resources. If diminished water quality caused a need for membrane treatment, Metropolitan could experience losses of up to 15 percent of the water processed. However, Metropolitan would only process a small proportion of the affected water and would reduce total salinity by blending the processed water with the remaining unprocessed water. Thus, Metropolitan anticipates no significant reductions in water supply availability from these sources due to water quality concerns over the study period.

Colorado River

High salinity levels represent a significant issue associated with Colorado River supplies. In addition, Metropolitan has been engaged in efforts to protect its Colorado River supplies from threats of uranium, perchlorate and Chromium VI, which are discussed later in this chapter. Metropolitan has also been active in efforts to protect these supplies from potential increases in nutrient loading due to urbanization, as well as investigating the sources and occurrence of constituents of emerging concern, such as N-nitrosodimethylamine (NDMA) and pharmaceuticals and personal care products (PPCPs). Metropolitan fully expects its source water protection efforts to be successful, so the only foreseeable water quality constraint to the use of Colorado River water will be the need to blend (mix) it with SWP supplies to meet the adopted salinity standards.

State Water Project

The key water quality issues on the SWP are disinfection byproduct precursors, in particular, total organic carbon and bromide. Metropolitan is working to protect the water quality of this source, but it has needed to upgrade its water treatment plants to deal adequately with disinfection byproducts. Disinfection byproducts result from total organic carbon and bromide in the source water reacting with disinfectants at the water treatment plant, and they may place some near term restrictions on Metropolitan's ability to use SWP water. Metropolitan expects these treatment restrictions to be overcome through the addition of ozone disinfection at its treatment plants. Arsenic is also of concern in some groundwater storage programs. Groundwater inflows into the California Aqueduct are managed to comply with regulations and protect downstream water quality while meeting supply targets. Additionally, nutrient levels are significantly higher in the SWP system than within the Colorado River, leading to the potential for algal related concerns that can affect water management strategies. Metropolitan is engaged in efforts to protect the quality of SWP water from potential increases in nutrient loading from wastewater treatment plants. Also, as in the Colorado River watershed, Metropolitan is active in studies on the occurrence, sources, and fate and transport of constituents of emerging concern, such as NDMA and PPCPs.

Local Agency Supplies and Groundwater Storage

New standards for contaminants, such as arsenic, and other emerging standards may add costs to the use of groundwater storage and may affect the availability of local agency groundwater sources. These contaminants are not expected to affect the availability of Metropolitan supplies, but they may affect the availability of local agency supplies, which could in turn affect the level of demands on Metropolitan supplies if local agencies abandon supplies in lieu of treatment options. Metropolitan has not analyzed the effect that many of these water quality issues could have on local agency supply availability. There have, however, been some investigations into the supply impacts of perchlorate groundwater contamination as indicated later in this section.

In summary, the major regional concerns include the following:

- Salinity
- Perchlorate
- Total organic carbon and bromide (disinfection byproduct precursors)
- Nutrients (as it relates to algal productivity)
- Arsenic
- Uranium
- Chromium VI
- N-nitrosodimethylamine (NDMA)
- Pharmaceuticals and personal care products (PPCPs)

Metropolitan has taken several actions and adopted programs to address these contaminants and ensure a safe and reliable water supply. These actions, organized by contaminant, are discussed below. Another constituent previously identified in the 2005 RUWMP as a regional concern, methyl tertiary-butyl ether (MTBE), is now a decreasing concern due to the elimination of this chemical as a gasoline additive in California. This is also further discussed below, along with other water quality programs that Metropolitan has been engaged in to protect its water supplies.

Issues of Concern

Salinity

Imported water from the Colorado River has high salinity levels, so it must be blended (mixed) with lower-salinity water from the SWP to meet salinity management goals. Higher salinity levels in either Colorado River water or groundwater would increase the proportion of SWP supplies required to meet the adopted imported water salinity objectives. Metropolitan adopted an imported water salinity goal because higher salinity could increase costs and reduce operating flexibility. For example,

1. If diminished water quality causes a need for membrane treatment, the process typically results in losses of up to 15 percent of the water processed. These losses result both in an increased requirement for additional water supplies and environmental constraints related to brine disposal. In addition, the process is costly. However, only a portion of the imported water would need to be processed, so the possible loss in supplies is small.
2. High total dissolved solids (TDS) in water supplies leads to high TDS in wastewater, which lowers the usefulness and increases the cost of recycled water.
3. Degradation of imported water supply quality could limit the use of local groundwater basins for storage because of standards controlling the quality of water added to the basins.

In addition to the link between water supply and water quality, Metropolitan has identified economic benefits from reducing the TDS concentrations of water supplies. Estimates show that a simultaneous reduction in salinity concentrations of 100 milligrams per liter (mg/L) in both the Colorado River and SWP supplies will yield economic benefits of $95 million per year within Metropolitan's service territory.[1] This estimate has added to Metropolitan's incentives to reduce salinity concentrations within the region's water supplies.

For all of these reasons, Metropolitan's Board approved a Salinity Management Policy on April 13, 1999. The policy set a goal of achieving salinity concentrations in delivered water of less than 500 mg/L TDS. The Salinity Management Policy is further discussed later in this section.

Within Metropolitan's service area, local water sources account for approximately half of the salt loading, and imported water accounts for the remainder. All of these sources must be managed appropriately to sustain water quality and supply reliability goals. The following sections discuss the salinity issues relevant to each of Metropolitan's major supply sources.

<u>Colorado River</u>

Water imported via the Colorado River Aqueduct (CRA) has the highest level of salinity of all of Metropolitan's sources of supply, averaging around 630 mg/L since 1976. Concern over salinity levels in the Colorado River has existed for many years. To deal with the concern, the International Boundary and Water Commission approved Minute No. 242, Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River in 1973, and the President approved the Colorado River Basin Salinity Control Act in 1974. High TDS in the Colorado River as it entered Mexico and the concerns of the seven basin states regarding the quality of Colorado River water in the United States drove these initial actions. To foster interstate cooperation on this issue, the seven basin states formed the Colorado River Basin Salinity Control Forum (Forum).

The salts in the Colorado River system are indigenous and pervasive, mostly resulting from saline sediments in the Basin that were deposited in prehistoric marine environments. They are easily eroded, dissolved, and transported into the river system. The Colorado River Basin Salinity Control Program is designed to prevent a portion of this abundant salt supply from moving into the river system. The program targets the interception and control of non-point sources, such as surface runoff, as well as wastewater and saline hot springs.

The Forum proposed, the states adopted, and the U. S. Environmental Protection Agency (USEPA) approved water quality standards in 1975, including numeric criteria and a plan for controlling salinity increases. The standards require that the plan ensure that the flow-weighted average annual salinity remain at or below the 1972 levels,

[1] Metropolitan Water District of Southern California and U.S. Bureau of Reclamation, Salinity Management Study: Final Report (June 1999)

while the Basin states continue to develop their 1922 Colorado River Compact-apportioned water supply. The Forum selected three stations on the main stream of the lower Colorado River as appropriate points to measure the river's salinity. These stations and numeric criteria are (1) below Hoover Dam, 723 mg/l; (2) below Parker Dam, 747 mg/l; and (3) at Imperial Dam, 879 mg/l. The numeric criteria are flow-weighted average annual salinity values.

By some estimates, concentrations of salts in the Colorado River cause approximately $353 million in quantified damages in the lower Basin each year. The salinity control program has proven to be very successful and cost-effective. Salinity control projects have reduced salinity concentrations of Colorado River water on average by over 100 mg/L or $264 million per year (2005 dollars) in avoided damages.

During the high water flows of 1983-1986, salinity levels in the CRA dropped to a historic low of 525 mg/L. However, during the 1987-1992 drought, higher salinity levels of 600 to 650 mg/L returned. TDS in Lake Havasu was measured at 628 mg/L in November 2009.

<u>State Water Project</u>

Water supplies from the SWP have significantly lower TDS concentrations than the Colorado River, averaging approximately 250 mg/L in water supplied through the East Branch and 325 mg/L on the West Branch over the long-term, with short term variability as a result of hydrologic conditions.[2] Because of this lower salinity, Metropolitan blends SWP water with high salinity CRA water to reduce the salinity concentrations of delivered water. However, both the supply and the TDS concentrations of SWP water can vary significantly in response to hydrologic conditions in the Sacramento-San Joaquin watersheds.

As indicated above, the TDS concentrations of SWP water can vary widely over short periods of time. These variations reflect seasonal and tidal flow patterns, and they pose an additional problem for use of blending as a management tool to lower the higher TDS from the CRA supply. For example, in the 1977 drought, the salinity of SWP water reaching Metropolitan increased to 430 mg/L, and supplies became limited. During this same event, salinity at the SWP's Banks pumping plant exceeded 700 mg/L. Under similar circumstances, Metropolitan's 500 mg/L salinity objective could only be achieved by reducing imported water from the CRA. Thus, it may not always be possible to maintain both the salinity objective and water supply reliability unless salinity concentrations of source supplies can be reduced.

A federal court ruling and a resulting biological opinion issued through consultation with U.S. Fish and Wildlife Service addressing the effects of the water supply pumping operations on Delta smelt has limited SWP exports at specified times of the year since December 2007. These restrictions have increased reliance on higher salinity Colorado River water, impacting the ability at times to meet Metropolitan's goal of 500 mg/L TDS at its blend plants. Drought conditions leading to lower SWP water supply allocations in recent years also affects Metropolitan's ability to meet its salinity goal.

TDS objectives in Article 19 of the SWP Water Service Contract specify a ten-year average of 220 mg/L and a maximum monthly average of 440 mg/L. These objectives have not been met, and Metropolitan is working with DWR and other agencies on programs aimed at reducing salinity in Delta supplies. These programs aim to improve salinity on the San Joaquin River through modifying agricultural drainage and developing comprehensive basin plans. In addition, studies are underway to evaluate the benefits in reduced salinity of modifying levees in Franks Tract and other flooded islands in the Delta, or by placing operable gates in

[2] The higher salinity in the West Branch deliveries is due to salt loadings from local streams, operational conditions, and evaporation at Pyramid and Castaic Lakes.

strategic locations to impede transport of seawater derived salt.

Recycled Water

Wastewater flows always experience significantly higher salinity concentrations than the potable water supply. Typically, each cycle of urban water use adds 250 to 400 mg/L of TDS to the wastewater. Salinity increases tend to be higher where specific commercial or industrial processes add brines to the discharge stream or where brackish groundwater infiltrates into the sewer system.

Where wastewater flows have high salinity concentrations, the use of recycled water may be limited or require more expensive treatment. Landscape irrigation and industrial reuse become problematic at TDS concentrations of over 1,000 mg/L. Some crops are particularly sensitive to high TDS concentrations, and the use of high-salinity recycled water may reduce yields of these crops. In addition, concern for the water quality in groundwater basins may lead to restrictions on the use of recycled water on lands overlying those basins.

These issues are exacerbated during times of drought, when the salinity of imported water supplies increases because of increased salinity in wastewater flows and recycled water. Basin management plans and recycled water customers may restrict the use of recycled water at a time when its use would be most valuable. To maintain the cost-effectiveness of recycled water, therefore, the salinity level of the region's potable water sources and wastewater flows must be controlled.

In May 2009, the State Water Resources Control Board (SWRCB) adopted a Recycled Water Policy[3] to help streamline the permitting process and help establish uniform statewide criteria for recycled water projects. This policy promotes the development of watershed- or basin-wide salt management plans (to then be adopted by the respective Regional Boards) to meet water quality objectives and protect beneficial uses, rather than imposing project-by-project restrictions. The Recycled Water Policy identifies several criteria to guide recycled water irrigation or groundwater recharge project proponents in developing a salt (and nutrient) management plan.

Groundwater Basins

Increased TDS in groundwater basins occurs either when basins near the ocean are overdrafted, leading to seawater intrusion, or when agricultural and urban return flows add salts to the basins. Much of the water used for agricultural or urban irrigation infiltrates into the aquifer, so where irrigation water is high in TDS or where the water transports salts from overlying soil, the infiltrating water will increase the salinity of the aquifer. In addition, wastewater discharges in inland regions may lead to salt buildup from fertilizer and dairy waste. In the 1950s and 1960s, Colorado River water was used to recharge severely overdrafted aquifers and prevent saltwater intrusion. As a result, the region's groundwater basins received more than 3.0 MAF of this high-TDS imported water, significantly impacting salt loadings.

In the past, these high salt concentrations have caused some basins within Metropolitan's service area to be unsuitable for municipal uses if left untreated. The Arlington Basin in Riverside and the Mission Basin in San Diego required demineralization before they could be returned to municipal service. The capacity of the larger groundwater basins makes them better able to dilute the impact of increasing salinity. While most groundwater basins within the region still produce water of acceptable quality, this resource must be managed carefully to minimize further degradation. Even with today's more heightened concern regarding salinity, approximately 600,000 tons of salts per year accumulate within the region, leading to ever-increasing salinity concentrations in many groundwater basins.

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[3] http://www.swrcb.ca.gov/water_issues/programs/water_recycling_policy/docs/recycledwaterpolicy_approved.pdf

Table 4-1 shows the salinity from existing productive groundwater wells within the region, and Figure 4-1 shows the distribution of those salinity concentrations. To protect the quality of these basins, regional water quality control boards often place restrictions on the salinity concentrations of water used for basin recharge or for irrigation of lands overlying the aquifers. Those situations may restrict water reuse and aquifer recharge, or they may require expensive mitigation measures.

Metropolitan has participated with water and wastewater agencies and the Santa Ana Regional Water Quality Control Board (Regional Board) in a coordinated program to develop water quality data for local and imported supplies used to recharge groundwater basins in the Santa Ana River watershed.[4] In January 2008, this workgroup submitted its "Cooperative Agreement to Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basin" to the Santa Ana Regional Board. This initial agreement addresses nitrogen and TDS and includes the following tasks:

1. Prepare a projection of ambient water quality in each groundwater management zone at six-year intervals for the subsequent 20 years.
2. Determine the impacts of foreseeable recharge projects and compare to baseline ambient water quality with salinity objectives.
3. Compare current water quality in each groundwater management zone with the ambient water quality projection made six years earlier, together with an evaluation of the reason(s) for any differences.

The Salinity Management Policy

The Salinity Management Policy adopted by Metropolitan's Board specified a salinity objective of 500 mg/L for blended imported water. It also identified the need for both local and imported water sources to be managed comprehensively to maintain the ability to use recycled water and groundwater. To achieve these targets, SWP water supplies are blended with Colorado River supplies. Using this approach, the salinity target could be met in seven out of ten years. In the other three years, hydrologic conditions would result in increased salinity and reduced volume of SWP supplies. Metropolitan has alerted its local agencies that such conditions are inevitable, and that despite its best efforts, high salinity could be a concern at such times. Metropolitan has also urged its member agencies to structure the operation of their local projects and groundwater so they are prepared to mitigate the effect of higher salinity levels in imported waters. In addition, Metropolitan will concentrate on obtaining better quality water in the spring/summer months (April through September) to maximize the use of recycled water in agriculture.

Table 4-1
Salinity Levels at Productive Groundwater Wells

TDS Concentration (mg/L)	Annual Production (Million Acre-Feet)	Percent of Production
Less than 500	1.06	78
500 to 1,000	0.15	11
Greater than 1,000	0.15	11
Total	**1.36**	**100**

Source: Metropolitan Water District of Southern California, Salinity Management Study, Final Report, June 1999.

[4] http://www.swrcb.ca.gov/rwqcb8/board_decisions/adopted_orders/orders/2008/08_019.pdf

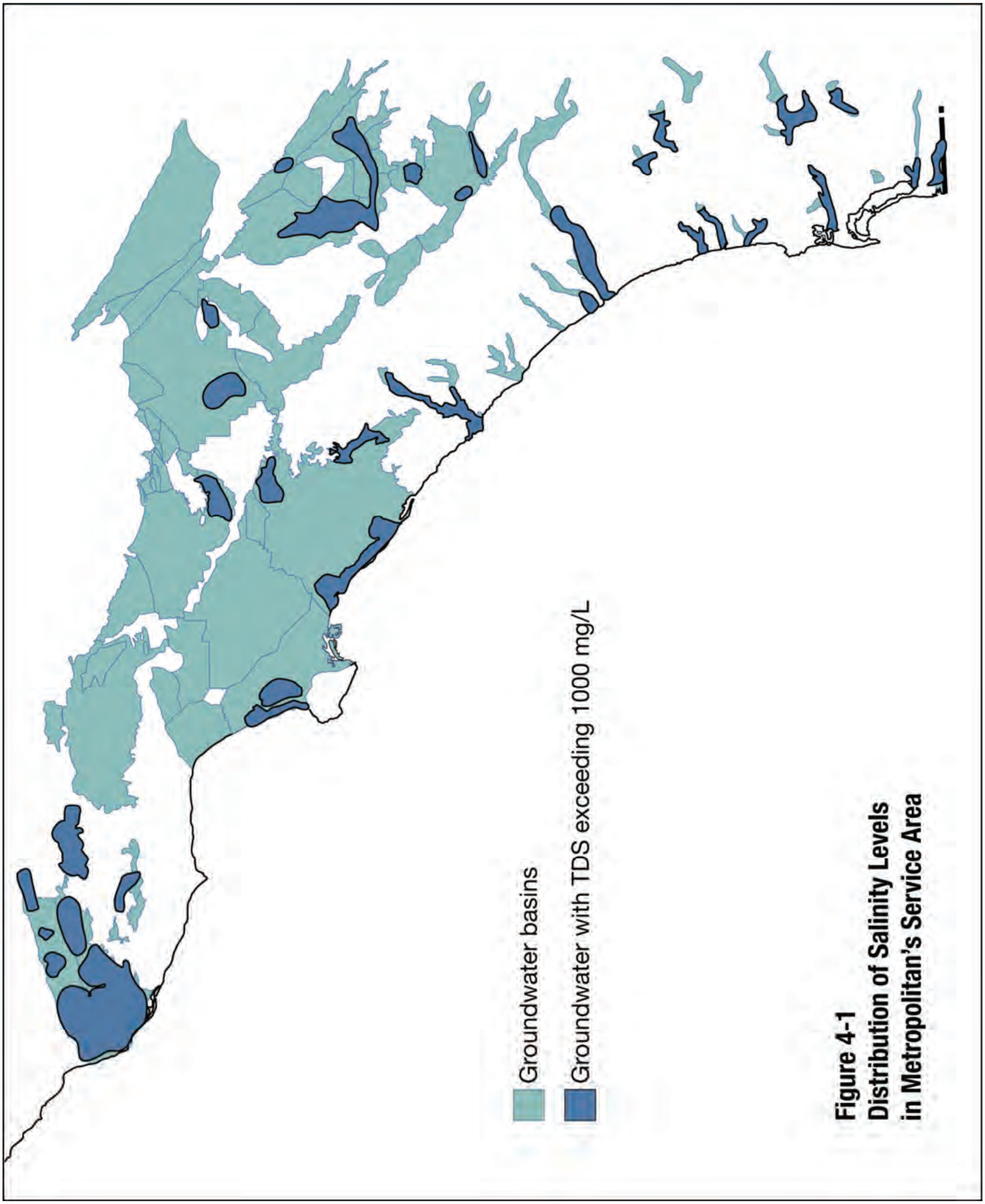

Figure 4-1
Distribution of Salinity Levels in Metropolitan's Service Area

Perchlorate

Perchlorate compounds are used as a main component in solid rocket propellant, and are also found in some types of munitions and fireworks. Perchlorate compounds quickly dissolve and become highly mobile in groundwater. Unlike many other groundwater contaminants, perchlorate neither readily interacts with the soil matrix nor degrades in the environment. Conventional drinking water treatment (as utilized at Metropolitan's water treatment plants) is not effective in removing perchlorate.

The primary human health concern related to perchlorate is its effects on the thyroid. Perchlorate interferes with the thyroid's ability to produce hormones required for normal growth and development. Pregnant women who are iodine deficient and their fetuses, infants and small children with low dietary iodide intake and individuals with hypothyroidism may be more sensitive to the effects of perchlorate.

The California Department of Public Health (CDPH) established a primary drinking water standard for perchlorate with an MCL of 6 micrograms per liter (μg/L)[5] effective October 18, 2007. There is currently no federal drinking water standard for perchlorate, but the USEPA is in the process of making its final regulatory determination for this contaminant. A regulatory determination would be the first step toward developing a national drinking water standard. Metropolitan has offered comments to USEPA during this regulatory process, focusing on the need to protect the Colorado River and to address cleanup of impacted water supplies as a result of federal institutions within its service area. In essence, Metropolitan urged for necessary actions to ensure expedited cleanup in areas that a California drinking water standard could not be enforced.

Perchlorate was first detected in Colorado River water in June 1997 and was traced back to Las Vegas Wash. The source of contamination was found to be emanating from a chemical manufacturing facility in Henderson, Nevada, now owned by Tronox, Inc. Tronox is currently responsible for the ongoing perchlorate remediation of the site. Another large perchlorate groundwater plume is also present in the Henderson area from a second industrial site, and although not known to have reached Las Vegas Wash yet, remediation activities are ongoing for cleanup of that plume by American Pacific Corporation (AMPAC).

Following the detection of perchlorate in the Colorado River, Metropolitan, along with USEPA and agencies in Nevada including the Nevada Division of Environmental Protection (NDEP), organized the forces necessary to successfully treat and decrease the sources of perchlorate loading. Under NDEP oversight, remediation efforts began in 1998 and treatment operations became fully operational in 2004. These efforts have reduced perchlorate loading into Las Vegas Wash from over 1000 lbs/day (prior to treatment) to 60-90 lbs/day since early 2007. This has resulted in over 90 percent reduction of the perchlorate loading entering the Colorado River system. In January 2009, Tronox filed for Chapter 11 bankruptcy protection citing significant environmental liabilities taken from the previous site owner. Tronox has continued operating its remediation system during the bankruptcy proceedings.

Perchlorate levels in Colorado River water at Lake Havasu have decreased significantly in recent years from its peak of 9 μg/L in May 1998 as a result of the aggressive clean-up efforts. Levels have remained less than 6 μg/L since October 2002, and have been typically less than 2 μg/L since June 2006. Metropolitan routinely monitors perchlorate at 34 locations within its system and levels currently remain at non-detectable levels (below 2 μg/L). Metropolitan has not detected perchlorate in the SWP since monitoring began in 1997.

[5] 1 microgram per liter is equivalent to 1 part per billion

Perchlorate has also been found in groundwater basins within Metropolitan's service area, largely from local sources. The vast majority of locations where perchlorate has been detected in the groundwater are associated with the manufacturing or testing of solid rocket fuels for the Department of Defense and the National Aeronautics and Space Administration (NASA), or with the manufacture, storage, handling, or disposal of perchlorate (such as Aerojet in Azusa in the Main San Gabriel Basin and the Jet Propulsion Laboratory/NASA in the Raymond Basin). Past agricultural practices using fertilizers laden with naturally occurring perchlorate have also been implicated in some areas.

Metropolitan has conducted several surveys to determine the impact of perchlorate on its member and retail agencies. As of October 2007, 18 member agencies have detected perchlorate in their service areas at levels greater than 4 μg/L, while 11 have detected levels greater than 6 μg/L in at least 101 out of 1337 wells (7.6 percent). Member and retail agencies have shut down 32 wells over the years due to perchlorate contamination, losing more than 52.5 TAF per year of their groundwater production. Many of these agencies have built new wells, blended their water, or installed ion exchange treatment systems to reduce perchlorate levels, thus lowering their potential additional demand for Metropolitan water supplies to about 15 TAF per year.

Metropolitan has investigated technologies to mitigate perchlorate contamination. Perchlorate cannot be removed using conventional water treatment. Nanofiltration and reverse osmosis do work effectively but at a very high cost. Aerojet has implemented biological treatment through fluidized bed reactors (FBR) in Rancho Cordova and is re-injecting the treated water into the ground. Tronox also utilizes an FBR process train for the cleanup of their Henderson site. A number of sites in Southern California have successfully installed ion exchange systems to treat perchlorate impacted groundwater. The city of Pasadena has been using ion exchange treatment at one well site and, in November 2009, completed a study of biological treatment for perchlorate removal in groundwater. Funding for this study was provided through a Congressional mandate from USEPA to Metropolitan.

Treatment options are available to recover groundwater supplies contaminated with perchlorate. However, it is very difficult to predict whether treatment will be pursued to recover all lost production because local agencies will make decisions based largely on cost considerations, ability to identify potentially responsible parties for cleanup, and the availability of alternative supplies.

Total Organic Carbon and Bromide

Disinfection byproducts (DBPs) form when source water containing high levels of total organic carbon (TOC) and bromide is treated with disinfectants such as chlorine or ozone. Studies have shown a link between certain cancers and DBP exposure. In addition, some studies have shown an association between reproductive and developmental effects and chlorinated water. While many DBPs have been identified and some are regulated under the Safe Drinking Water Act, there are others that are not yet known. Even for those that are known, the potential adverse health effects may not be fully characterized.

Water agencies began complying with new regulations to protect against the risk of DBP exposure in January 2002. This rule, known as the Stage 1 Disinfectants and Disinfection Byproducts (D/DBP) Rule, required water systems to comply with new MCLs and a treatment technique to improve control of DBPs. USEPA then promulgated the Stage 2 D/DBP Rule in January 2006 that makes regulatory compliance more challenging as compliance is based on a locational basis, rather than on a distribution system-wide basis.

Existing levels of TOC and bromide in Delta water supplies present significant concern for Metropolitan's ability to maintain safe drinking water supplies and comply with regulations. Levels of these constituents in SWP water increase several fold due to agricultural drainage and seawater intrusion as water moves through the Delta. One of Metropolitan's primary objectives for the CALFED Bay-Delta process is protection and improvement of the water quality of its SWP supplies to ensure compliance with current and future drinking water regulations. Source water protection of SWP water supplies is a necessary component of meeting these requirements cost effectively.

The CALFED Record of Decision released in August 2000 adopted the following water quality goals for TOC and bromide:

- Average concentrations at Clifton Court Forebay and other southern and central Delta drinking water intakes of 50 µg/L bromide and 3.0 mg/L total organic carbon, or
- An equivalent level of public health protection using a cost-effective combination of alternative source waters, source control, and treatment technologies.

CALFED's Bay-Delta Program calls for a wide array of actions to improve Bay-Delta water quality, ranging from improvements in treatment technology to safeguarding water quality at the source. These actions include conveyance improvements, alternative sources of supply, changes in storage and operations, and advanced treatment by water supply agencies.

Source water quality improvements must be combined with cost-effective water treatment technologies to ensure safe drinking water at a reasonable cost. Metropolitan has five treatment plants: two that receive SWP water exclusively, and three that receive a blend of SWP and Colorado River water. In 2003 and 2005, Metropolitan completed upgrades to its SWP-exclusive water treatment plants, Mills and Jensen, respectively, to utilize ozone as its primary disinfectant. This ozonation process avoids the production of certain regulated disinfection byproducts that would otherwise form in the chlorine treatment of SWP water. The non-ozone plants utilizing blended water have met federal guidelines for these byproducts through managing the blend of SWP and Colorado River water. To maintain the byproducts at a level consistent with federal law, Metropolitan limits the percentage of water from the SWP used in each plant. In mid 2010, Metropolitan anticipates ozone at the Skinner water treatment plant to come online. Metropolitan's Board has also adopted plans to install ozonation at its other two blend plants with a total estimated ozone retrofit program cost of $1.2 billion for all five plants.

Nutrients

Elevated levels of nutrients (phosphorus and nitrogen compounds) can stimulate nuisance algal and aquatic weed growth that affects consumer acceptability, including the production of noxious taste and odor compounds and algal toxins. In addition to taste and odor toxin concerns, increases in algal and aquatic weed biomass can impede flow in conveyances, shorten filter run times and increase solids production at drinking water treatment plants, and add to organic carbon loading. Further, nutrients can provide an increasing food source that may lead to the proliferation of quagga and zebra mussels, and other invasive biological species. Studies have shown phosphorus to be the limiting nutrient in both SWP and Colorado River supplies. Therefore, any increase in phosphorus loading has the potential to stimulate algal growth, leading to the concerns identified above.

SWP supplies have significantly higher nutrient levels than Colorado River supplies. Wastewater discharges, agricultural drainage, and nutrient-rich soils in the Delta are primary sources of nutrient loading to the SWP. Metropolitan and other drinking water agencies receiving Delta water have been engaged in efforts to minimize the effects of nutrient loading from Delta wastewater plants. Metropolitan reservoirs receiving SWP water have experienced numerous taste and odor episodes in recent years. For example, in 2005, Metropolitan reservoirs experienced 12 taste and odor events requiring treatment. A taste and odor event can cause a reservoir to be bypassed and potentially have a short-term effect on the availability of that supply. Metropolitan has a comprehensive program to monitor and manage algae in its source water reservoirs. This program was developed to provide an early warning of algae related problems and taste and odor events to best manage water quality in the system.[6]

Although phosphorus levels are much lower in the Colorado River than the SWP, this nutrient is still of concern. Despite relatively low concentrations (Colorado River has been considered an oligotrophic, or low-productivity, system), any additions of phosphorus to Colorado River water can result in increased algal growth. In addition, low nutrient Colorado River water is relied upon by Metropolitan to blend down the high nutrient SWP water in Metropolitan's blend reservoirs. With population growth expected to continue in the future (e.g., Las Vegas area), ensuring high levels of treatment at wastewater treatment plants to maintain existing phosphorus levels will be critical in minimizing the operational, financial, and public health impacts associated with excessive algal growth and protect downstream drinking water uses. In addition, Metropolitan continues its involvement with entities along the lower Colorado River seeking to enhance wastewater management (and therefore better manage nutrient impacts) within river communities.

Although current nutrient loading is of concern for Metropolitan and is anticipated to have cost implications, with its comprehensive monitoring program and response actions to manage algal related issues, there should be no impact on availability of water supplies. Metropolitan's source water protection program will continue to focus on preventing increases in future nutrient loading as a result of urban and agricultural sources.

Arsenic

Arsenic is a naturally occurring element found in rocks, soil, water, and air. It is used in wood preservatives, alloying agents, certain agricultural applications, semi-conductors, paints, dyes, and soaps. Arsenic can get into water from the natural erosion of rocks, dissolution of ores and minerals, runoff from agricultural fields, and discharges from industrial processes. Long-term exposure to elevated levels of arsenic in drinking water has been linked to certain cancers, skin pigmentation changes, and hyperkeratosis (skin thickening).

The MCL for arsenic in domestic water supplies was lowered to 10 μg/L, with an effective date of January 2006 in the federal regulations, and an effective date of November 2008 in the California regulations. The standard impacts both groundwater and surface water supplies. Historically, Metropolitan's water supplies have had low levels of this contaminant and would not require treatment changes or capital investment to comply with this new standard. However, some of Metropolitan's water supplies from groundwater storage programs are at levels near the MCL. These groundwater storage projects are called upon to supplement flow only during low SWP allocation years. Metropolitan has had to restrict flow from one program to limit arsenic increases in the SWP. Implementation of a pilot arsenic treatment facility by one groundwater banking partner has also resulted in increased cost. Moreover, Metropolitan has invested in solids handling facilities and implemented operational changes to manage arsenic in the solids resulting from the treatment process.

In April 2004, California's Office of Environmental Health Hazard Assessment (OEHHA) set a public health goal for arsenic

[6] William D. Taylor et al., *Early Warning and Management of Surface Water Taste-and-Odor Events*, Project No. 2614 (Denver, CO: American Water Works Association Research Foundation, 2006)

of 0.004 µg/L, based on lung and urinary bladder cancer risk. Monitoring results submitted to CDPH in 2001-2003 showed that arsenic is ubiquitous in drinking water sources, reflecting its natural occurrence. They also showed that many sources have arsenic detections above the 10 µg/L MCL. Southern California drinking water sources that contain concentrations of arsenic over 10 µg/L include San Bernardino (64 sources), Los Angeles (48 sources), Riverside (26 sources), Orange (4 sources), and San Diego (5 sources).[7]

The state detection level for purposes of reporting (DLR) of arsenic is 2 µg/L. Between 2001 and 2008, arsenic levels in Metropolitan's water treatment plant effluents ranged from not detected (< 2 µg/L) to 2.9 µg/L. For Metropolitan's source waters, levels in Colorado River water have ranged from not detected to 3.5 µg/L, while levels in SWP water have ranged from not detected to 4.0 µg/L. Increasing coagulant doses at water treatment plants can reduce arsenic levels for delivered water.

Some member agencies may face greater problems with arsenic compliance. A 1992 study for Central Basin Municipal Water District, for example, indicated that some of the Central Basin wells could have difficulty in complying with a lowered standard.[8] Water supplies imported by the Los Angeles Department of Water and Power may also contain arsenic above the MCL. The cost of arsenic removal from these supplies could vary significantly.

Uranium

A 16-million-ton pile of uranium mill tailings near Moab, Utah lies approximately 750 feet from the Colorado River. Due to the proximity of the pile to the Colorado River, there is a potential for the tailings to enter the river as a result of a catastrophic flood event or other natural disaster. In addition, contaminated groundwater from the site is slowly seeping into the river. The U.S. Department of Energy (DOE) is responsible for remediating the site, which includes removal and offsite disposal of the tailings and onsite groundwater remediation.

Previous investigations have shown uranium concentrations contained within the pile at levels significantly above the California MCL of 20 picocuries per liter (pCi/L). Metropolitan has been monitoring for uranium in the Colorado River Aqueduct and at its treatment plants since 1986. Monitoring at Lake Powell began in 1998. Uranium levels measured at Metropolitan's intake have ranged from 1-6 pCi/L, well below the California MCL. Conventional drinking water treatment, as employed at Metropolitan's water treatment plants, can remove low levels of uranium, however these processes would not be protective if a catastrophic event washed large volumes of tailings into the Colorado River. Public perception of drinking water safety is also of particular concern concerning uranium.

Remedial actions at the site since 1999 have focused on removing contaminated water from the pile and groundwater. Through 2009, over 2,700 pounds of uranium in contaminated groundwater have been removed. In July 2005, DOE issued its Final Environmental Impact Statement with the preferred alternative of permanent offsite disposal by rail to a disposal cell at Crescent Junction, Utah, located approximately 30 miles northwest of the Moab site.

Rail shipment and disposal of the uranium mill tailings pile from the Moab, Utah site began in April 2009. Through March 2010, DOE has shipped over 1 million tons of mill tailings to the Crescent Junction disposal cell. Using American Recovery and Reinvestment Act (ARRA) 2009 funding, DOE has increased shipments in order to meet its ARRA project

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[7] From the CDPH web site: http://www.cdph.ca.gov/certlic/drinkingwater/Pages/Arsenic.aspx . Note that the numbers reported there may change because the website is frequently updated.

[8] *Summary Review on the Occurrence of Arsenic in the Central Groundwater Basin, Los Angeles County, California*, prepared by Richard C. Slade & Associates, Sept. 7, 1993.

commitment to ship an additional 2 million tons of mill tailings by September 2011 and accelerate overall clean-up of the site. DOE estimates completing movement of the tailings pile by 2025, with a goal of 2019 should additional funding be secured. Metropolitan continues to track progress of the remediation efforts, provide the necessary legislative support for rapid cleanup, and work with Congressional representatives to support increased annual appropriations for this effort.

Another uranium-related issue began receiving attention in 2008 due to a renewed worldwide interest in nuclear energy and the resulting increase in uranium mining claims filed throughout the western United States. Of particular interest were thousands of mining claims filed near Grand Canyon National Park and the Colorado River. Metropolitan has since sent letters to the Secretary of Interior to highlight source water protection and consumer confidence concerns related to uranium exploration and mining activities near the Colorado River, and advocate for close federal oversight over these activities. In 2009, Secretary of Interior Ken Salazar announced the two-year hold on new mining claims on 1 million acres adjacent to the Grand Canyon to allow necessary scientific studies and environmental analyses to be conducted. In 2009, H.R. 644 – Grand Canyon Watersheds Protection Act was introduced and if enacted, would permanently withdraw areas around the Grand Canyon from new mining activities.

Chromium VI

Chromium is a naturally occurring element found in rocks, soil, plants, and animals. Chromium III is typically the form found in soils and is an essential nutrient that helps the body use sugar, protein, and fat. Chromium VI is used in electroplating, stainless steel production, leather tanning, textile manufacturing, dyes and pigments, wood preservation and as an anti-corrosion agent. Chromium occurs naturally in deep aquifers and can also enter drinking water through discharges of dye and paint pigments, wood preservatives, chrome plating liquid wastes, and leaching from hazardous waste sites. In drinking water, Chromium VI is very stable and soluble in water, whereas chromium III is not very soluble. Chromium VI is the more toxic species and is known to cause lung cancer in humans when inhaled, but the health effects in humans from ingestion are still in question. There is evidence that when Chromium VI enters the stomach, gastric acids may reduce it to chromium III. However, recent studies conducted by the National Toxicology Program have shown that Chromium VI can cause cancer in animals when administered orally.

Currently, there are no drinking water standards for Chromium VI. Total chromium (including chromium III and Chromium VI) is regulated in California with an MCL of 50 μg/L. On August 20, 2009, OEHHA released a draft public health goal (PHG) of 0.06 μg/L for Chromium VI in drinking water. The PHG is a health-protective, non-regulatory level that will be used by CDPH in its development of an MCL. CDPH will set the MCL as close to the PHG as technically and economically feasible.

Metropolitan utilizes an analytical method with a minimum reporting level of 0.03 μg/L, which is less than the State detection level for purposes of reporting (DLR) of 1 μg/L. The results from all of Metropolitan's source and treated waters are less than the State DLR of 1 μg/L (except for one detection of 1 μg/L at the influent to the Mills water treatment plant). The following summarizes Chromium VI levels found in Metropolitan's system:

- In the past 10 years, results of source and treated water monitoring for Chromium VI indicate: Levels in Colorado River water are mostly not detected (<0.03 μg/L) but when detected range from 0.03 – 0.08 μg/L. SWP levels range from 0.03 – 0.8 μg/L. Treated water levels range from 0.03 – 0.7 μg/L.

- There is a slight increase in Chromium VI in the treated water from the oxidation (chlorination and ozonation) of natural background chromium (total) to Chromium VI.
- Colorado River monitoring results upstream and downstream of the Topock site (discussed below) have ranged from not detected (<0.03 μg/L) to 0.06 μg/L.
- Chromium VI in Metropolitan's groundwater pump-in storage programs in the Central Valley has ranged from not detected (< 1 μg/L) to 9.1 μg/L with the average for the different programs from 1.4 to 5.0 μg/L.
- Chromium VI has been detected in a groundwater aquifer on the site of a Pacific Gas and Electric (PG&E) gas compressor station located along the Colorado River near Topock, Arizona.

PG&E used Chromium VI as an anti-corrosion agent in its cooling towers from 1951 to 1985. Wastewater from the cooling towers was discharged from 1951 to 1968 into a dry wash next to the station. Monitoring wells show the plume concentration has peaked as high as 16,000 μg/L. PG&E operates an interim groundwater extraction and treatment system that is protecting the Colorado River. Quarterly monitoring of the river has shown levels of Chromium VI less than 1 μg/L, which are considered background levels. The California Department of Toxic Substances Control and the U. S. Department of Interior are the lead state and federal agencies overseeing the cleanup efforts. Metropolitan participates through various stakeholder workgroups and partnerships that include state and federal regulators, Indian tribes, and other stakeholders (e.g., Colorado River Board) involved in the corrective action process. In 2010, it is anticipated that a final treatment alternative will be selected, and an Environmental Impact Report will be released for the recommended cleanup alternative.

The federal- and state-approved technologies for removing total chromium from drinking water include coagulation/filtration, ion exchange, reverse osmosis, and lime softening. Potential treatment technologies for Chromium VI in drinking water may include reduction/chemical precipitation, an ion exchange, or reverse osmosis. For several years, the cities of Glendale, Burbank, and Los Angeles have been voluntarily limiting Chromium VI levels in their drinking water to 5 μg/L, an order of magnitude lower than the current statewide total chromium standard of 50 μg/L. The experience of these agencies in the treatment of water containing Chromium VI will be helpful in CDPH's evaluations of treatment technologies and associated costs, which are required as part of a proposed MCL regulation package.

N-Nitrosodimethylamine

N-Nitrosodimethylamine (NDMA) is part of a family of organic chemicals called nitrosamines and is a byproduct of the disinfection of some natural waters with chloramines. Metropolitan utilizes chloramines as a secondary disinfectant at its treatment plants. Wastewater treatment plant effluent and agricultural runoff can contribute organic material into source waters which react to form NDMA at water treatment plants. Certain polymers can also contribute NDMA precursor materials. Some NDMA control measures or removal technologies may be required to avoid adverse impacts on Southern California drinking water supplies. Metropolitan is involved in several projects to understand the watershed sources and occurrence of NDMA precursors in Metropolitan source waters, and to develop treatment strategies to minimize NDMA formation in drinking water treatment plants and distribution systems. Special studies conducted at Metropolitan have shown removal of NDMA using advanced oxidation processes. Other treatment process such as biological, membrane, and carbon adsorption need to be evaluated for NDMA removal.

USEPA considers NDMA to be a probable human carcinogen. USEPA placed NDMA in the Unregulated Contaminant Monitoring

Regulation 2 (UCMR2) and on the Contaminant Candidate List 3 (CCL3). CDPH also considers NDMA to be a probable human carcinogen. CDPH has not established a MCL for NDMA. However, in 1998 CDPH established a notification level of 0.01 µg/L. Occurrences of NDMA in treated water supplies at concentrations greater than 0.01 µg/L are recommended to be included in the utility's annual Consumer Confidence Report. In December 2006, OEHHA set a public health goal for NDMA of 0.003 µg/L. Metropolitan has monitored its source waters (at treatment plant influents) and treated waters on a quarterly basis since 1999. Test results for the presence of NDMA in Metropolitan's system have ranged from non-detect (reporting limit of 0.002 µg/L) to 0.014 µg/L. Preliminary data from UCMR2 confirm that the presence of NDMA is not limited to Metropolitan waters, but is widespread. NDMA, or a broader class of nitrosamines, may likely be the next disinfection byproduct(s) to be regulated by USEPA.

Pharmaceuticals and Personal Care Products

Pharmaceuticals and personal care products (PPCPs) are a growing concern to the water industry. Numerous studies have reported the occurrence of these emerging contaminants in treated wastewater, surface water, and sometimes, in finished drinking water in the United States and around the world. The sources of PPCPs in the aquatic environment include (but may not be limited to) treated wastewater and industrial discharge, agricultural run-off, and leaching of municipal landfills. Currently, there is no evidence of human health risks from long-term exposure to the low concentrations (low ng/L; parts per trillion) of PPCPs found in some drinking water. Furthermore, there are no regulatory requirements for PPCPs in drinking water. In October 2009, USEPA included 13 PPCPs on the CCL3; however, currently there are no standardized analytical methods for these compounds.

In 2007, Metropolitan implemented a monitoring program to determine the occurrence of PPCPs and other organic wastewater contaminants in Metropolitan's treatment plant effluents and selected source water locations within the Colorado River and SWP watersheds. Some PPCPs have been detected at very low ng/L levels, which is consistent with reports from other utilities. However, analytical methods are still being refined and more work is required to fully understand occurrence issues. Metropolitan has been actively involved in various studies related to PPCPs, including analytical methods improvements, and characterization of drinking water sources in California.

Metropolitan has participated with water and wastewater agencies and the Santa Ana Regional Board in a coordinated program to address emerging constituents relevant to local and imported supplies used to recharge groundwater basins in the Santa Ana River watershed. As part of the Regional Board-adopted "Cooperative Agreement to Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basin", there are provisions for the workgroup to initiate development of monitoring for emerging unregulated constituents. Metropolitan, Orange County Water District, and the National Water Research Institute provided substantial input to the workgroup through its two-year monitoring study of emerging constituents in waters found throughout watersheds of the SWP, Colorado River, and Santa Ana River. In April 2009, the workgroup completed its Phase I Report summarizing its findings and recommendations regarding investigation into emerging constituents in water supplies. In December 2009, the workgroup submitted its proposed 2010/11 plan for monitoring of emerging constituents in imported and local waters. The workgroup also provided input to a Blue Ribbon Panel convened by the State Water Resources Control Board to review the emerging science of unregulated chemicals as it relates to the use of recycled water for irrigation and groundwater recharge.

Decreasing Concerns

Methyl Tertiary-Butyl Ether

Methyl tertiary-butyl ether (MTBE) was the primary oxygenate in virtually all the gasoline used in California, prior to the discovery that MTBE had contaminated groundwater supplies and was also found in surface water supplies. MTBE was banned in California as of December 31, 2003, although the concentration of MTBE in gasoline blends was voluntarily reduced beginning in January 2003. MTBE has subsequently been replaced by ethanol which is now the primary oxygenate in use. CDPH has adopted a primary MCL of 13 μg/L for MTBE based on carcinogenicity studies in animals. MTBE also has a California secondary MCL of 5 μg/L, which was established based on taste and odor concerns.

MTBE was introduced into surface water bodies from the motor exhausts of recreational watercraft. At Diamond Valley Lake and Lake Skinner, Metropolitan has taken steps to reduce the potential for MTBE contamination. In 2003, Metropolitan's Board authorized a non-polluting boating program for these reservoirs that calls for specific boat requirements (MTBE-free fuel and clean burning engines) and a monitoring program that will show if MTBE or other gasoline contaminants appear at the lake. Metropolitan regularly monitors its water supply for contamination from MTBE and other oxygenates. In recent years, MTBE testing results in source waters have remained at non-detectable levels (below 3 μg/L).

MTBE still presents a significant problem to local groundwater basins. Leaking underground storage tanks and poor fuel-handling practices in the past at local gas stations may provide a large source of MTBE. MTBE is very soluble in water and has low affinity for soil particles, so it moves quickly into the groundwater. Within Metropolitan's service area, local groundwater producers have been forced to close some of their wells due to MTBE contamination. MTBE is also resistant to chemical and microbial degradation in water, making treatment more difficult than the treatment of other gasoline components. A combination of an advanced oxidation process (typically ozone and hydrogen peroxide) followed by granular activated carbon has been found to be effective in reducing the levels of these contaminants.

Although some groundwater supplies remain contaminated with this highly soluble chemical, contamination of Metropolitan's surface water supplies are no longer a problem. Further, improved underground storage tank requirements and monitoring, and the phase-out of MTBE as a fuel additive, will decrease the likelihood of MTBE groundwater problems in the future.

Other Water Quality Programs

In addition to monitoring for and controlling specific identified chemicals in the water supply, Metropolitan has undertaken a number of programs to protect the quality of its water supplies. These programs are summarized below.

Source Water Protection

Source water protection is the first step in a multi-barrier approach to provide safe and reliable drinking water. In accordance with California's Surface Water Treatment Rule, Title 22 of the California Code of Regulations, CDPH requires large utilities delivering surface water to complete a Watershed Sanitary Survey every five years to identify possible sources of drinking water contamination, evaluate source and treated water quality, and recommend watershed management activities that will protect and improve source water quality. The most recent sanitary surveys for Metropolitan's water sources were completed in 2005 and 2006.[9] The next Sanitary Surveys for the watersheds of the

9 Metropolitan Water District of Southern California, *Colorado River Watershed Sanitary Survey, 2005 Update*. For the State Water Project, the sanitary survey report was prepared on behalf of the State Water Project Contractors Authority, in 2006, and was titled *California State Water Project Watershed Sanitary Survey, 2006 Update*.

Colorado River and the SWP will report on water quality issues and monitoring data through 2010. Metropolitan has an active source water protection program and continues to advocate on behalf of numerous SWP and Colorado River water quality protection issues.

Support SWP Water Quality Programs

Metropolitan supports DWR policies and programs aimed at maintaining or improving the quality of SWP water delivered to Metropolitan. In particular, Metropolitan supported the DWR policy to govern the quality of non-project water conveyed by the California Aqueduct. In addition, Metropolitan has supported the expansion of DWR's Municipal Water Quality Investigations Program beyond its Bay-Delta core water quality monitoring and studies to include enhanced water quality monitoring and forecasting of the Delta and SWP. These programs are designed to provide early warning of water quality changes that will affect treatment plant operations both in the short-term (hours to weeks) and up to seasonally. The forecasting model is currently suitable for use in a planning mode. It is expected that with experience and model refinement, it will be suitable to use as a tool in operational decision making.

Water Quality Exchanges

Metropolitan has implemented selective withdrawals from the Arvin-Edison storage program and exchanges with the Kern Water Bank to improve water quality. Although these programs were initially designed to provide dry-year supply reliability, they can also be used to store SWP water at periods of better water quality so the stored water may be withdrawn at times of lower water quality, thus diluting SWP water deliveries. Although elevated arsenic levels has been a particular concern in one groundwater banking program, there are also short-term water quality benefits that can be realized through other storage programs, such as groundwater pump-ins into the California Aqueduct with lower TOC levels (as well as lower bromide and TDS, in some programs).

Water Supply Security

The change in the national and international security situation has led to increased concerns about protecting the nation's water supply. In coordination with its member agencies, Metropolitan added new security measures in 2001 and continues to upgrade and refine procedures. Changes have included an increase in the number of water quality tests conducted each year (Metropolitan now conducts over 300,000 analytical tests on samples collected within our service area and source waters), as well as contingency plans that coordinate with the Homeland Security Office's multicolored tiered risk alert system.

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Public Outreach 5

Integrated Resources Plan Process Outreach Component

The Integrated Resources Plan is Metropolitan's blueprint for long-term water reliability. It was first adopted in the early 1996 and is updated periodically to reflect Metropolitan's planning strategies. Because of the diverse needs, interests, and institutional entities within the region, Metropolitan's planning goals are achieved through an open and participatory process that involves the major stakeholders. The collaborative planning process sought input from member agencies, retail water agencies, other water and wastewater managers, policy decision-makers, interest groups, environmental, business and community interests. Each interest group provided valuable input and guidance regarding the preferred water resource strategy and carefully reviewed the technical analyses supporting the decision-making process. Collectively, Metropolitan and the regionwide stakeholders analyzed available resources and updated the preferred strategy for resource development. The overall process involved two main components - a technical component (discussed in Section 2 of this report) and an outreach component.

During September and October 2008, Metropolitan's executive management, Board, member agency managers, elected officials, and community groups collectively discussed strategic direction and regional water solutions at these forums. Nearly 600 stakeholders participated in the first round of forums. Similar types of ideas and issues were raised by the participants at all the forums, emphasizing the importance of local resources development and resolving issue with the Bay-Delta. Participants suggested that Metropolitan should take a leadership position in several areas including:

- Outreach to legislators concerning needs for water supply reliability and quality improvements.
- Development of brine lines to enhance recycled water use.
- Foster partnerships with energy utilities.
- Build relationships with environmental community.
- Research and development in new technologies.
- Assist retail agencies in designing "correct" tiered rate structures.
- Review the achievements of the 1996 IRP and 2004 Update.
- Identify changing conditions affecting water resource development.
- Update resource development targets through 2035.

During a second round of workshops in October 2009, participants discussed technical assessments of various resource options, alternate approaches to water supply reliability, recommendations of a preferred approach, and implementation strategies.

In order to have a cooperative and effective outreach effort between Metropolitan, its member agencies, and the interested general public, Metropolitan staff made presentations to city and local governments, associations, and other parties throughout the region. This open and participatory process has allowed for valuable input, guidance and data exchange in which statewide business, environmental, community, agricultural and water interests were represented. Table 5-1 lists the major meetings comprising the 2009 IRP Update outreach process.

Table 5-1
Stakeholder Participation in IRP Update

Year	Month	Meeting
2008	June	IRP Board Workshop: Review and discuss IRP Update process
	July	IRP Steering Committee: Review June Board Workshop and discuss Committee objectives and responsibilities.
	August	IRP Steering Committee: Prepare for September IRP Stakeholder Forums.
	September	IRP Stakeholder Forums: Review and discuss IRP goals and prior resource targets, breakout discussion groups with stakeholders IRP Stakeholder Forum #1 – Newport Beach IRP Stakeholder Forum #2 – Ontario IRP Stakeholder Forum #3 – Los Angeles IRP Steering Committee: Mid-point status briefing of IRP Stakeholder Forums
	October	IRP Stakeholder Forums Continued: Review and discuss IRP goals and prior resource targets, breakout discussion groups with stakeholders IRP Stakeholder Forum #4 – San Diego IRP Technical Oversight Committee: Review of IRP Update process, role of IRP Technical Workgroups, current status of existing and planned projects/programs, and draft evaluation criteria
	December	Stormwater/Urban Runoff Technical Workgroup: Review IRP process and begin work on Stormwater Issue Paper Desalination Technical Workgroup: Review IRP Update process and begin work on Seawater Desalination Issue Paper Conservation Technical Workgroup: Review IRP Update process and begin work on Conservation Issue Paper Graywater Technical Workgroup: Review IRP Update process and begin work on Graywater Issue Paper Recycled Water Technical Workgroup: Review IRP Update process and begin work on Recycled Water Issue Paper

Table 5-1 (Contd)
Stakeholder Participation in IRP Update

Year	Month	Meeting
2009	January	Stormwater/Urban Runoff Technical Workgroup: Review work on draft Stormwater Issue Paper. Graywater Technical Workgroup: Review work on draft Graywater Issue Paper. Recycled Water Technical Workgroup: Review work on draft Recycled Water Issue Paper. IRP Technical Oversight Committee: Review IRP Update schedule, draft evaluation criteria, Technical Workgroup activities, and analytical approach for modeling uncertainty
	February	Stormwater/Urban Runoff Technical Workgroup: Review draft Stormwater Issue Paper Conservation Technical Workgroup: Review draft Conservation Issue Paper Recycled Water Technical Workgroup: Review draft Recycled Water Issue Paper IRP Technical Oversight Committee: Review and discuss updated IRP evaluation criteria
	March	Conservation Technical Workgroup: Review and discuss draft Conservation Issue Paper. Recycled Water Technical Workgroup: Review and discuss draft Recycled Water Issue Paper Stormwater/Urban Runoff Technical Workgroup: Review and discuss draft Stormwater Issue Paper Graywater Technical Workgroup: Review and discuss draft Graywater Issue Paper IRP Steering Committee: Review and discuss status of technical workgroups and IRP schedule
	April	Recycled Water Technical Workgroup: Review and discuss draft Recycled Water Issue Paper Conservation Technical Workgroup: Review and discuss draft Conservation Issue Paper. Graywater Technical Workgroup: Review and discuss draft Graywater Issue Paper Groundwater Study Meeting: Review and discuss groundwater modeling in Orange County Basin Synergy Workshop: Discussion between stakeholders from the groundwater, stormwater and recycled water IRP Update technical workgroups IRP Technical Oversight Committee: Review and discuss IRP Update schedule and status of IRP Update technical workgroups, preliminary supply and demand estimates, climate change data, and analytical models

Table 5-1 (Contd)
Stakeholder Participation in IRP Update

Year	Month	Meeting
2009	May	Member Agency Managers Meeting: Update on activities of the IRP Update technical workgroups, Technical Oversight Committee IRP Steering Committee: Review and discuss IRP Update schedule, supply and demand estimates, and technical workgroup findings
	June	IRP Technical Oversight Committee and Member Agency Managers Meeting: Review and discuss IRP Update schedule, gap analysis, technical workgroup findings, and the Robust Decision Making (RDM) analytical approach
	July	IRP Board Workshop: Review and discuss status of resource development and IRP policy alternatives and provided board members with Issue Paper 1 - IRP Implementation Status and Potential Development Needs and Issue Paper 2 - Metropolitan Involvement in Water Resources Development
	August	Board Transmittal - Supplemental Tables for IRP Issue Paper with the following attachments: 1. Identified project list for recycling and groundwater recovery 2. Tables on CRA supplies 3. Table showing balance of groundwater programs Seawater Desalination Technical Workgroup: Review and discuss draft of the desalination IRP Issue Paper Strategic Policy Review Board Workshop: Review and discuss IRP Update process and schedule, guiding principles and evaluation criteria, and alternatives for new regional supplies
	September	Stormwater/Urban Runoff Technical Workgroup: Review and discuss Stormwater Issue Paper IRP Steering Committee: Review and discuss IRP Update process and schedule, potential policy approaches, and work schedule
	October	Strategic Policy Review Board Workshop: Review and discuss evaluation criteria and alternatives and presentation of the dynamic gap
	November	Strategic Policy Review Board Workshop: Review and discuss cost and reliability under various approaches and key policy questions
2010	February	IRP Steering Committee: Strategic Policy Review, IRP Adaptive Management Approach and Adaptive Resource Options – Conservation
	April	IRP Steering Committee: Adaptive Resource Options - Groundwater and Stormwater IRP Steering Committee: Adaptive Resource Options – Graywater and Recycled Water

Table 5-1 (Contd)
Stakeholder Participation in IRP Update

Year	Month	Meeting
2010	May	IRP Steering Committee: Adaptive Resource Options - Seawater Desalination, overview of minimum/no regrets actions in each adaptive resource area
	June	IRP Steering Committee: Member agency panel discussion on resource options for the future, review of 2010 Update schedule and preliminary overview of Draft IRP Update
	July	IRP Steering Committee, Member Agency Managers Meeting and Board Workshop: Overview of Draft IRP Update
	August	IRP Stakeholder Forums: Review and discuss Draft IRP Update IRP Stakeholder Forum #1 – Orange IRP Stakeholder Forum #2 – Ontario IRP Stakeholder Forum #3 – San Diego IRP Stakeholder Forum #4 – Los Angeles

Groundwater Outreach Component

In 2007, Metropolitan prepared the Groundwater Assessment Study Report in collaboration with its member agencies and with groundwater basin managers. This study evaluated the potential for groundwater storage and identified the challenges in developing additional storage programs. To follow up on the findings of the Groundwater Assessment Study Report, Metropolitan initiated a series of seven groundwater workshops in July 2008 among Metropolitan, member agencies, groundwater basin managers, and stakeholders to discuss challenges for increasing conjunctive use and to develop recommendations for addressing the challenges. Summarized in Table 5-2 are the workshops and meetings which comprised the outreach components for the groundwater strategic process.

Table 5-2
Stakeholder Participation in Groundwater Process

Year	Month	Meeting
2008	July	Groundwater Workshop #1– Initiate process, set ground rules and identify discussion topics
	August	Groundwater Workshop #2 – Review IRP context, review availability of surplus imported water for groundwater recharge
	September	Groundwater Workshop #3 – Continued review of availability of surplus imported water for groundwater recharge; discussion of groundwater basin production capabilities
	October	Groundwater Workshop #4 – Continued discussion of groundwater basin production capabilities
	December	Groundwater Workshop #5 – Review of opportunities; discussion of Groundwater Workgroup policy recommendations for IRP Update
2009	February	Groundwater Workshop #6 – Continued discussion of policy recommendations for IRP Update
	April	Synergy Workshop among Groundwater, Stormwater, and Recycled Water Technical Workgroups Groundwater Basin Module Meeting with Orange Co Basin
	September	Groundwater Basin Module Meeting with Orange Co Basin Groundwater Basin Module Meeting with Central and West Coast basins
	November	Groundwater Basin Module Meeting with Main San Gabriel Basin Groundwater Basin Module Meeting with Chino Basin
2010	January	Groundwater Workshop #7 – Review initial modeling outcomes using groundwater basin modules; Finalize Groundwater Workgroup policy recommendations for the IRP Update
	March	Groundwater Basin Module Meeting with Main San Gabriel Basin

Regional Urban Water Management Program Outreach Component

Public involvement in Metropolitan's planning process continues to be an integral part of the development of this UWMP report. In October 2009, Metropolitan kicked off the update of its Regional Urban Water Management Plan with a meeting at Metropolitan's headquarters. An initial draft data set of demographics, total demands after conservation, local supplies, and demands on Metropolitan at the member agency and regional levels was distributed. In addition, Metropolitan staff held numerous coordination meetings, workshops, and conference calls with the member agencies to review the initial draft data set and address various issues associated with the report preparation. Based on these meetings, Metropolitan finalized the draft data set and developed the draft RUWMP. Simultaneously, Metropolitan developed preliminary estimates of its existing and planned water sources in five-year increments under single-dry, multi-dry, and average-year conditions as required under the Act.

These demand and supply estimates were included in the draft copy of the RUWMP distributed to the member agencies in June 8, 2010. Following the distribution, Metropolitan sponsored a workshop on June 21, 2010, with the member agencies and sanitation districts within the service area to discuss the contents of the draft RUWMP. Table 5-3 lists all the meetings and workshops held during the preparation of the 2010 RUWMP report.

The public review draft was posted prominently on Metropolitan's website on August 9, 2010. The notice of availability of the document was sent to the member agencies, as well as cities and counties in the Metropolitan service area. The announcement is in compliance with Water Code § 10621(b)), which requires that every urban water supplier preparing a plan give at least 60 days advance notice prior to the public hearing on the UWMP to any city or county within which the supplier provides water supplies to allow opportunity for consultation on the proposed plan. Included in this chapter is a copy of the letter of notification sent to cities and counties in Metropolitan's service area. Also included is a copy of the Public Notice advertising the meeting as published in six Southern California newspapers on August 9 and 16, 2010.

Metropolitan held the publicly-noticed meeting, as required by the Act, as part of the Water Planning and Stewardship Committee Meeting of its Board of Directors held on October 11, 2010. On November 9, 2010, Metropolitan's Board determined that the 2010 RUWMP is consistent with the Act and an accurate representation of the water resources plan for the Metropolitan service area. As prescribed in Resolution 9117, the Board approved the 2010 RUWMP for submission to the State of California. Included in this section is a copy of Resolution 9117 approved by the Metropolitan Board.

In summary, this Urban Water Management Plan involved a number of agencies and groups in its preparation:

Water Agencies assisted in plan development, received a copy of draft documents, commented on those documents, were invited to and attended the public meeting, and received notice of the intention to adopt.

Relevant Public Agencies such as cities and counties received notice that the document was available, were invited to comment on those documents, were invited to attend the public meeting, and received notice of the intention to adopt.

Website Posting: The public review draft was posted prominently on Metropolitan's website on August 9, 2010.

Table 5-3 summarizes the workshops and meetings held to satisfy the outreach requirement for completing the 2010 Regional Urban Water Management Plan.

Table 5-3
Stakeholder Participation and Outreach for the 2010 Regional Urban Water Management Plan

Year	Month	Meeting
2009	October	*RUWMP Kick-off Meeting*: Start of the 2010 RUWMP process, discuss schedule and milestones to complete the report, and distribute data on demographics, total demands after conservation, local supplies, and demands on Metropolitan
2010	January	*Coordination Meeting with Inland Empire Utilities Agency:* Review and refinement of demand projections *Coordination Meeting with San Diego County Water Authority:* Review and refinement of demand projections *Coordination Meeting with Eastern MWD:* Review and refinement of demand projections
	February	*Coordination Meeting with City of Santa Monica:* Review and refinement of demand projections *Conference call with Calleguas MWD:* Discuss RUWMP issues, impacts of new legislation, report outline, schedule, and milestones *Coordination Meeting with Calleguas MWD:* Review of demographic assumptions and refine demand projections *Coordination Meeting with City of Pasadena*
	May	RUWMP presentation at the Member Agency Managers Meeting
	June	RUWMP Coordination Workshop with Member Agencies and Sanitation Districts *RUWMP Presentation:* Discussion of the status, contents, and assumptions of the Draft RUWMP at the Member Agency Managers Meeting.
	August	Notification (60-day) for Public Hearing to local publications Sent letters to Cities and Counties within Metropolitan service area RUWMP presentation at the Metropolitan Board of Directors meeting of the Water Planning and Stewardship Committee *Co-hosted Meeting of Southern California Water Committee Urban Task Force*: Discussion of technical and legal aspects of preparing an Urban Water Management Plan with various agencies and stakeholders in Southern California *Coordination Meeting*: Discussion of RUWMP and IRP with Orange County member and retail agencies
	October	*Public Hearing:* Public review and comments on the 2010 Regional Urban Water Management Plan held as part of the Water Planning and Stewardship Committee meeting of Metropolitan's Board of Directors.
	November	*Metropolitan Board of Director's Meeting:* Adopt 2010 Regional Urban Water Management Plan

Letter Notifying Cities and Counties

July 30, 2010

To Whom It May Concern:

This letter serves as notification that The Metropolitan Water District of Southern California (Metropolitan) will be holding a public hearing at the Water Planning and Stewardship Committee Board meeting to receive input on the draft 2010 Regional Urban Water Management Plan (RUWMP). The RUWMP presents Metropolitan's long-term plans for ensuring the reliability and quality of water resources for the region. The RUWMP complies with California state law requiring urban water suppliers to prepare and update Urban Water Management Plans every five years. Public Input is encouraged, appreciated, and will be considered during finalization of the 2010 RUWMP.

Public Hearing will be held on:
Monday, October 11, 2010
Committee Room US 2-456 at 1:30 p.m.
Metropolitan Water District Headquarters Building
700 North Alameda Street
Los Angeles, Ca 90012

The draft Plan will be posted on Metropolitan's web site at www.mwdh2o.com beginning August 9, 2010. Please check on the website for updated room and time information. Written comments are due by **October 11, 2010**. Please send comments to:

Metropolitan Water District
700 North Alameda Street
Los Angeles, Ca 90012
Attn: Edgar Fandialan

If you would like more information or have any questions, please contact Edgar Fandialan at (213) 217-6764 or via email at efandialan@mwdh2o.com.

Very Truly Yours,

Devendra Upadhyay
Manager, Water Resource Management

PUBLIC HEARING SCHEDULED ON
DRAFT REGIONAL URBAN WATER MANAGEMENT PLAN

The Metropolitan Water District of Southern California (Metropolitan) will hold a public hearing on **Monday, October 11, 2010** to receive comments on the draft 2010 Regional Urban Water Management Plan (RUWMP).

The hearing will be held at 1:30 p.m. in the Committee Room US 2-456 of Metropolitan's Headquarters Building at 700 North Alameda Street, Los Angeles, California before the Water Planning and Stewardship Committee of Metropolitan's Board of Directors.

The RUWMP presents Metropolitan's long-term plans for ensuring the reliability and quality of water resources for the region. The RUWMP complies with California State law requiring urban water suppliers to prepare and update urban water management plans every five years. The draft plan is posted on Metropolitan's Web site at www.mwdh2o.com.

Public input is encouraged, appreciated, and will be considered during finalization of the 2010 RUWMP. In addition to the public hearing, Metropolitan will accept written comments on the draft plan. All written comments must be received by **October 11, 2010** to:

The Metropolitan Water District of Southern California
P.O. Box 54153
Los Angeles, CA 90054-0153
Attn: Edgar Fandialan

For more information on the draft RUWMP, please call Edgar Fandialan of Metropolitan's Water Resource Management Group at (213) 217-6764.

RESOLUTION 9117

RESOLUTION
OF THE BOARD OF DIRECTORS
OF THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
ADOPTING THE 2010 REGIONAL URBAN WATER MANAGEMENT PLAN

WHEREAS, the California Urban Water Management Planning Act requires urban water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually prepare and adopt, in accordance with prescribed requirements, an urban water management plan every five years; and

WHEREAS, the California Urban Water Management Planning Act specifies the requirements and procedures for adopting such Urban Water Management Plans; and

WHEREAS, the Board of Directors of The Metropolitan Water District of Southern California has duly reviewed, discussed, and considered such Urban Water Management Plan and has determined the 2010 Regional Urban Water Management Plan to be consistent with the California Urban Water Management Planning Act and to be an accurate representation of the water resources plan for The Metropolitan Water District of Southern California.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of The Metropolitan Water District of Southern California that, on November 9, 2010 this District hereby adopts this 2010 Regional Urban Water Management Plan for submittal to the state of California.

I HEREBY CERTIFY that the foregoing is a full, true and correct copy of a resolution adopted by the Board of Directors of The Metropolitan Water District of Southern California, at its meeting held on November 9, 2010.

Dawn Chin

Board Executive Secretary
The Metropolitan Water District
of Southern California

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APPENDIX A.1
Demand Forecast

A.1 DEMAND FORECAST

Forecast Overview

Retail Municipal and Industrial (M&I) demands represent the full spectrum of urban water use within a region, including residential, commercial, industrial, institutional and unmetered uses. Within the water industry, numerous approaches exist for projecting future retail M&I water demands. These include per capita projections, trend extrapolation, land use build-out estimates, and econometric models.

To forecast urban water demands, Metropolitan uses the MWD-MAIN Water Use Forecasting framework, an implementation of the original IWR-MAIN Water Use Forecasting Model. The MWD-MAIN framework includes statistical models that have been adapted to conditions in Southern California. The model incorporates projections of demographic and economic variables developed by Southern California's two regional planning agencies – the Southern California Association of Governments (SCAG) and the San Diego Association of Governments (SANDAG) – into statistical models of water demand, yielding forecasts of gross retail urban M&I water demand. This estimate of gross retail demand is then adjusted for conservation savings and local agency supplies to obtain an estimate of retail demands needing to be met by Metropolitan.

The MWD-MAIN framework uses separate models for each of three sectors—single-family residential, multi-family residential, and nonresidential. Demand forecast for the two residential sectors are obtained by multiplying model-based estimates of water demand per occupied dwelling unit by SCAG and SANDAG estimates of the future number of occupied units. For the non-residential sector, water use per employee is multiplied by estimates of future employment patterns. The basic relationships involved are shown in Table A.1-1.

In addition to accounting for future demographic trends, Metropolitan's water demand forecasts also account for conservation savings. As a signatory to the 1991 *Memorandum of Understanding (MOU) Regarding Urban Water Conservation*,[1] Metropolitan's efforts to promote water use efficiency are largely informed by the California Urban Water Conservation Council's "Best Management Practices" (BMPs) concerning urban water conservation.[2]

The range of activities intended to promote water conservation within Metropolitan's service area are accounted for in Metropolitan's Conservation Model. This model distinguishes between the following components of regional conservation:

- *Code-Based Conservation* – Water saved as a result of legislative changes in water efficiency requirements as reflected in more efficient plumbing codes and water using devices.

[1] A copy of the MOU can be found at http://www.cuwcc.org/.

[2] Section 3.1 contains a more complete accounting of Metropolitan's efforts in this area.

- *Active Conservation* – Water saved directly as a result of conservation programs funded by water agencies (includes implementation of the Best Management Practices). The form and extent of such conservation is unlikely to result without agency encouragement.
- *Price-effect Conservation* – Water saved by retail customers attributable to the effect of changes in the real (inflation-adjusted) price of water. There may be some overlap between this form of conservation and the previous two. For example, increased water prices might motivate consumers to participate in one or more active conservation programs
- *Reductions in Distribution System Losses* – To the extent that conservation efforts result in less water traveling through the distribution system, system losses will be reduced.

Table A.1-1
MWD-MAIN Demand Model Variables

Demand Sector	Projected Demographic	Dependent Variable	Explanatory Variables
Single Family Residential	Number of Single Family Households	Water use per household	Climate Household Size Income Price and Conservation Housing Density Service Area Location
Multifamily Residential	Number of Multifamily Households	Water use per household	Climate Household Size Income Price and Conservation Housing Density Service Area Location
Commercial, Industrial, Institutional (CII)	Total Urban Employment	Water use per employee	Climate Price and Conservation Industrial / Service employment Share
Unmetered Use			Percentage of total use

Estimates obtained from Metropolitan's Conservation Model are subtracted from gross estimates of retail urban water demand. Following this, adjustments are made for local agency supplies, system losses, and price effects. This results in an estimate of total regional M&I demands facing Metropolitan.

Trends in Southern California

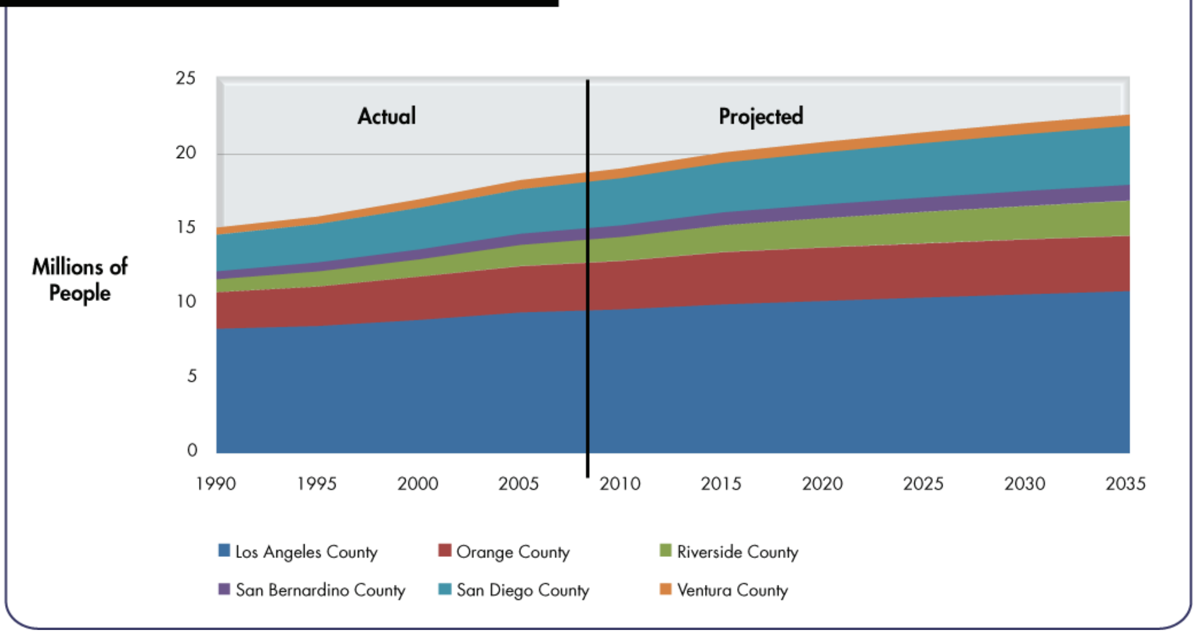
Population

According to SCAG and SANDAG estimates, the population in Metropolitan's service area will reach 18.9 million in 2010, 21.3 million in 2025, and 22.5 million by 2035.[3] While

[3] The most recent calendar year for which actual data are available is 2008. Data for 2009 and later are model-based estimates.

Los Angeles County leads in total population, the inland areas of Riverside and San Bernardino counties are projected to grow at the fastest rates over the next ten years. Generally speaking, however, annual growth rates will slow for all counties between 2010 and 2035. In part this is due to changing patterns of migration. It also reflects the effects of the recession of the late 2000s and the ongoing restructuring of the Southern California economy.

Figure A. 1-1 Actual and Projected Population



Employment

Economic trends are important drivers of water demand. Metropolitan captures economic trends by tracking regional employment growth and the changing mix of industries comprising the Southern California economy.

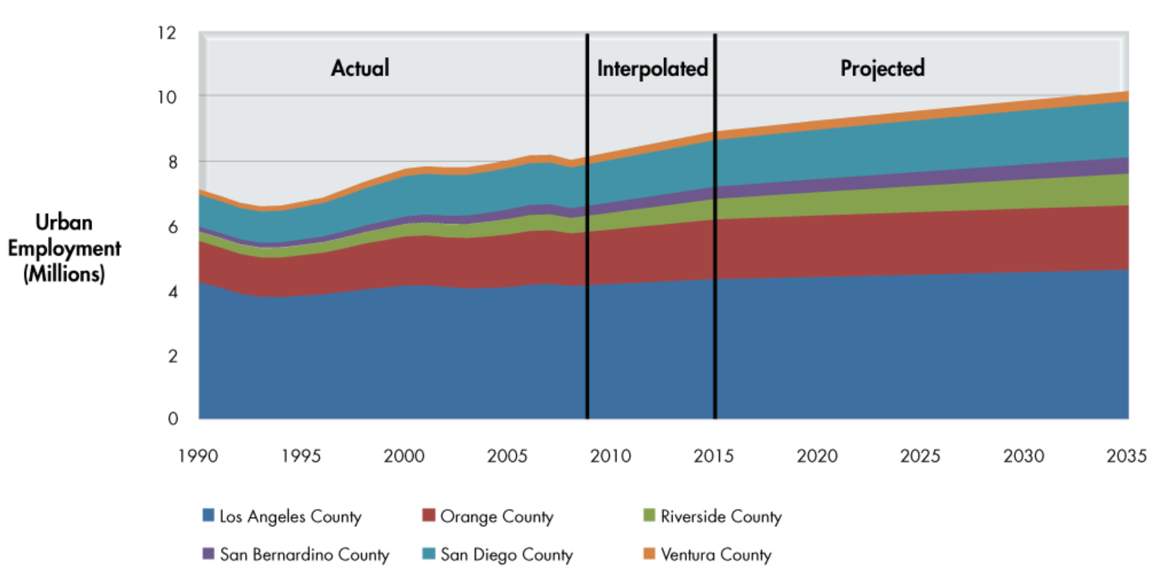
Recession during the 1990s cost Southern California around 400,000 jobs and caused a major shift in the region's industry base. Almost 300,000 manufacturing jobs were lost by 1995, many of them in the aerospace and defense industries. Los Angeles and Orange counties were especially hard hit by these changes. While manufacturing and other sectors of the economy suffered, service employment held steady and experienced modest growth in Riverside and San Bernardino counties.

The economic recovery of the late 1990s included growth in high-tech and computer-related industries and a rapid expansion of the service economy. Job growth in the late 1990s approached levels of the late 1980s. But regional job growth slowed once again during the early 2000s as the result a mild economic downturn and then fell again in response to the economic recession beginning in 2007. Southern California suffered more than most regions during this period due to the combination of housing and economic declines occurring during the post-2007 period.

Within Metropolitan's service area, employment growth is likely to occur unevenly across the six counties. Over the 25-year period between 2010 and 2035, the greatest employment increases are expected to occur in Riverside, San Diego, and Los Angeles counties with estimated increases of 469,000 TAF, 461,000 TAF, and 432,000 TAF jobs respectively. Relative to existing employment, Riverside and San Bernardino counties are expected to have the highest rates of employment growth.

Figure A.1-2 and Table A.1-3 summarize the projected growth of commercial, industrial and institutional employment in Metropolitan's service area. The number of people employed in commerce and industry is expected to increase from 8.3 million in 2010 to about 10.2 million in 2035. This increase of about 23 percent is greater than the projected population increase (19 percent), suggesting that an increased share of the population will be employed over time.

Figure A. 1-2 Actual and Projected Urban Employment



Residential Consumers

Southern California's regional planning agencies have forecast residential housing growth in all parts of the Metropolitan service area. These forecasts are shown in Figure A.1-3 and Table A.1 4. The total occupied housing stock is expected to increase more than 19 percent between 2010 and 2035, growing from 6.1 to around 7.3 million housing units. Much of this growth will likely occur in hotter inland areas of Southern California. Although small changes in geographic service area are expected to occur as the results of annexations, no major increase in the total geographic service area is expected. Within the service territory, the household occupancy size (household population divided by total occupied dwelling units) is projected to decline slightly from about 3.05 persons per unit currently to 3.03 persons per unit by 2035.

Permits for new residential housing construction are another indicator of the future growth in water demand. Figure A.1-4 shows the pattern of historical growth in residential housing permits between 1970 and 2009.[4]

[4] 2009 is the last year for which complete data are available.

Figure A. 1-3 Actual and Projected Households

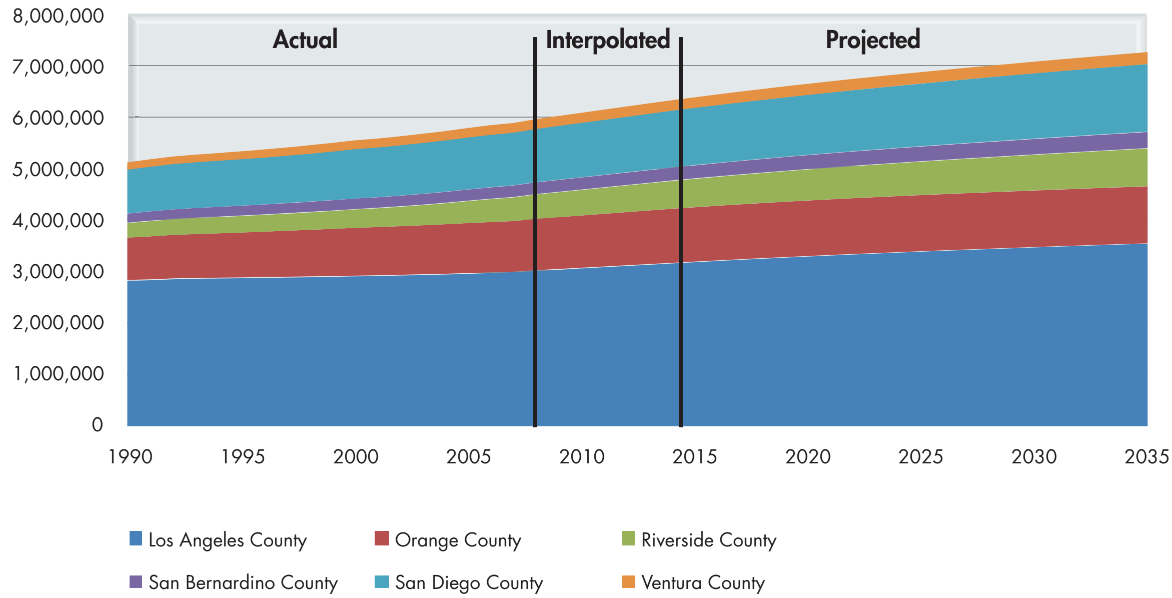
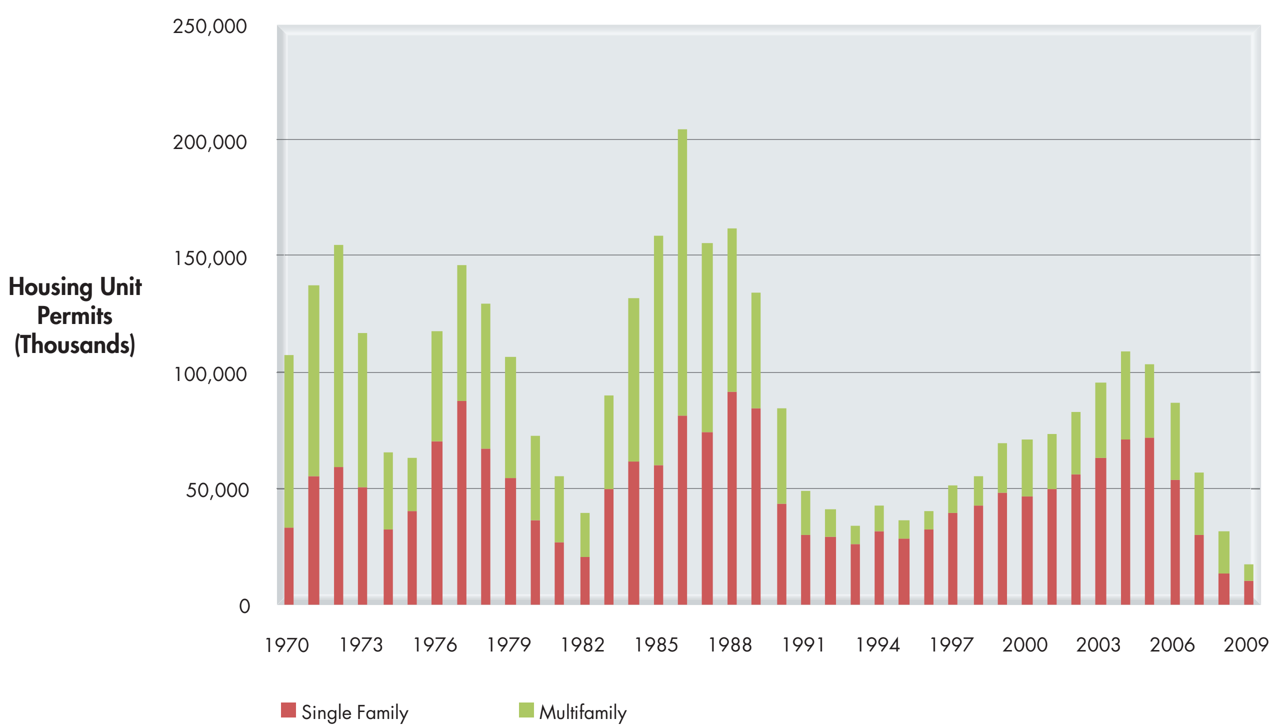


Figure A. 1-4 Residential Housing Permits in Six-County Region



The effect of economic cycles can clearly be seen over time with the precipitous fall in housing construction accompanying the 2007 recession being most notable.

Water Demands

As shown in Figure A.1-5 and Table A.1-5, actual retail water demands within Metropolitan's service area have increased from 3.1 million acre-feet (MAF) in 1980 to a projected 4.0 MAF in 2010.[5] This represents an estimated annual increase of about 1.0 percent. A similar gradual increase in estimated total retail water demand is expected between 2010 and 2035.

Of the estimated 4.0 MAF of total retail water use in 2010, 93 percent is due to M&I use with agriculture accounting for the other 7 percent. The relative share of M&I water use has increased over time at the expense of agricultural use which has declined due to urbanization and market factors. By 2035, it is estimated that agriculture will account for only about 4 percent of total Metropolitan retail demands.

Retail Demand

It is estimated that total M&I water use will grow from an annual average of 4.0 MAF in 2010 to 4.7 MAF in 2035. All water demand projections assume normal weather conditions. Future changes in estimated water demand assume continued water savings due to conservation measures such as water savings resulting from plumbing codes, price effects, and the continuing implementation of utility-funded conservation BMPs.

By County

M&I water demand is not expected to grow uniformly across counties. Consistent with the general pattern of future demographic distributions, the largest absolute increases in urban water demands are expected to occur in Los Angeles and Riverside counties, with respective estimated increases of about 178,300 and 230,700 AF per year between 2010 and 2035.

By Sector

Water use can also be broken down by sector. Between 2010 and 2035, single-family residential water use is expected to increase by 17.5 percent (Table A.1-8), while multifamily water use is estimated to increase by 29.4 percent (Table A.1-9). In contrast, Table A.1-10 shows a relatively flat trend in estimated nonresidential water use between 2010 and 2035.

Residential Water Use

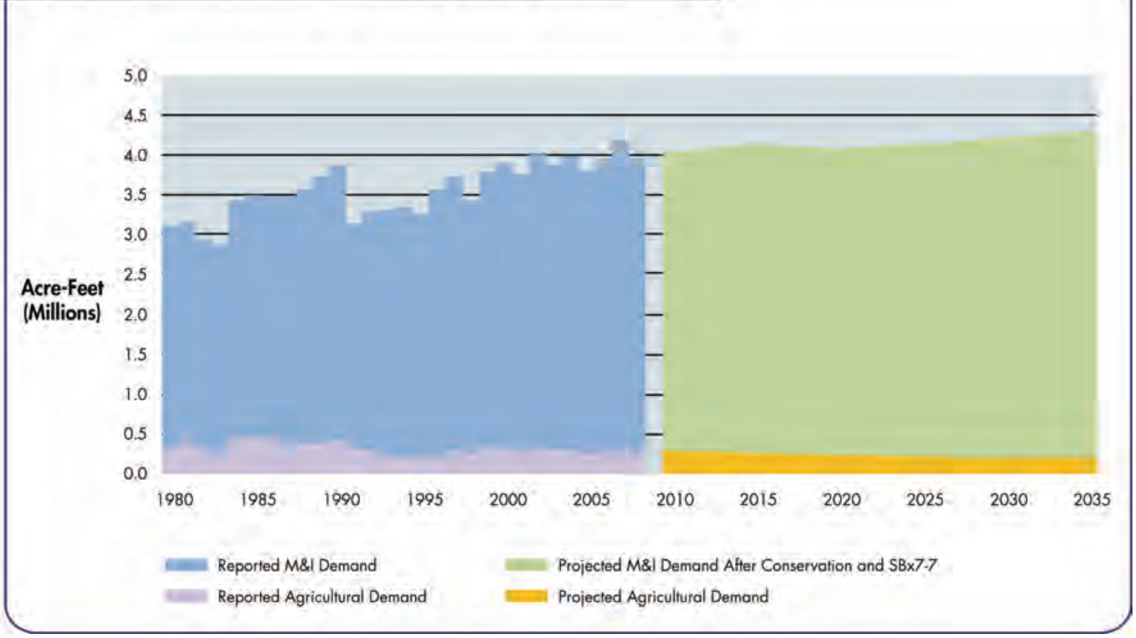
While single-family homes are estimated to account for about 61 percent of the total occupied housing stock in 2010, they are responsible for about 74 percent of total residential water demands (Tables A.1-8 and A.1-9). This is consistent with the fact that single-family households are known to use more water than multifamily households (e.g., those residing in duplexes, triplexes, apartment buildings and condo developments) on a per housing-unit basis. This is because single-family households tend to have more persons living in the household; they are likely to have more water-using appliances and fixtures; and they tend to have more landscaping.

Nonresidential Water Use

Nonresidential water use represents an approximately 25 percent of the total M&I demands in Metropolitan's service area (Table A.1-10). This includes water that is used by businesses, services, government, institutions (such as hospitals and schools), and industrial (or manufacturing) establishments. Within the commercial/institutional category, the top

[5] Complete information for 2010 are not available. The figure given is a model-based estimate.

Figure A. 1-5 Actual and Projected Retail Water Demand



water users include schools, hospitals, hotels, amusement parks, colleges, laundries, and restaurants. In Southern California, major industrial users include electronics, aircraft, petroleum refining, beverages, food processing, and other industries that use water as a major component of the manufacturing process.

Conservation Savings

Table A.1-12 shows estimated conservation savings resulting from active conservation programs ("Active"), ongoing conservation from natural replacement of plumbing fixtures ("Code-Based"), and conservation induced by projected increases in the real price of water ("Price"). Code-Based savings account for the largest share of total conservation. However, aggressive utility-funded conservation programs have made a significant contribution in this area. For example, Metropolitan-assisted programs were responsible for an estimated 134,000 acre-feet in savings during FY 2008/09 and nearly 1.3 MAF in cumulative conservation savings since FY 1990/91.[6]

Projected M&I Demand by Sector

Table A.1-13 provides a summary of municipal and industrial demands, broken down by sector, along with each sector's share of total retail demand. In 2010, residential use accounted for about two-thirds (68 percent) of total projected M&I demand while non-residential use constituted nearly one-fourth (24 percent) of projected M&I demand. These shares are expected to change slightly in 2035 with estimated residential use at 71 percent and non-residential use accounting for approximately 21 percent of total M&I use. System losses and unmetered use are expected to remain relatively constant over this period at about 8.1 percent.

[6] Metropolitan Water District of Southern California. Annual Progress Report to the California State Legislature: Achievements in Conservation, Recycling and Groundwater Recharge. February 2010.

Table A.1-2 Population Growth in Metropolitan' s Service Area (July)

(Persons)

	Actual					Projected				
County	1990	1995	2000	2005	2010*	2015	2020	2025	2030	2035
Los Angeles County	8,268,000	8,458,000	8,860,000	9,364,000	9,567,000	9,900,000	10,132,000	10,356,000	10,574,000	10,781,000
Orange County	2,412,000	2,604,000	2,863,000	3,057,000	3,205,000	3,452,000	3,534,000	3,586,000	3,630,000	3,654,000
Riverside County	851,000	994,000	1,129,000	1,381,000	1,559,000	1,756,000	1,909,000	2,049,000	2,173,000	2,292,000
San Bernardino County	565,000	637,000	707,000	792,000	832,000	915,000	968,000	1,020,000	1,070,000	1,117,000
San Diego County	2,407,000	2,519,000	2,737,000	2,934,000	3,109,000	3,274,000	3,439,000	3,599,000	3,759,000	3,899,000
Ventura County	451,000	478,000	542,000	588,000	624,000	659,000	683,000	702,000	720,000	731,000
Metropolitan's Service Area	**14,954,000**	**15,690,000**	**16,838,000**	**18,116,000**	**18,896,000**	**19,956,000**	**20,665,000**	**21,312,000**	**21,926,000**	**22,474,000**

Source: US Census, CA Department of Finance, SCAG RTP-07, SANDAG Series 12 2050 Regional Growth Forecast (Feb 2010)

* Interpolated

Table A.1-3 Urban Employment Growth in Metropolitan' s Service Area (July)

	Actual					Projected				
County	1990	1995	2000	2005	2010*	2015	2020	2025	2030	2035
Los Angeles County	4,236,000	3,820,000	4,135,000	4,082,000	4,179,000	4,328,000	4,389,000	4,461,000	4,538,000	4,611,000
Orange County	1,260,000	1,240,000	1,500,000	1,616,000	1,671,000	1,830,000	1,890,000	1,925,000	1,953,000	1,974,000
Riverside County	277,000	297,000	373,000	465,000	507,000	622,000	714,000	804,000	895,000	976,000
San Bernardino County	164,000	186,000	246,000	308,000	334,000	387,000	411,000	438,000	469,000	510,000
San Diego County	1,001,000	1,017,000	1,254,000	1,288,000	1,318,000	1,446,000	1,529,000	1,601,000	1,665,000	1,728,000
Ventura County	151,000	156,000	218,000	229,000	235,000	255,000	269,000	281,000	291,000	300,000
Metropolitan's Service Area	**7,089,000**	**6,716,000**	**7,726,000**	**7,988,000**	**8,244,000**	**8,868,000**	**9,202,000**	**9,510,000**	**9,811,000**	**10,099,000**

Source: US Census, CA Department of Finance, SCAG RTP-07, SANDAG Series 12 2050 Regional Growth Forecast (Feb 2010)

* Interpolated

Table A.1-4 Occupied Housing Growth in Metropolitan's Service Area

(Households)

	Actual					Projected				
County	1990	1995	2000	2005	2010*	2015	2020	2025	2030	2035
Los Angeles County	2,825,000	2,875,000	2,911,000	2,961,000	3,064,000	3,185,000	3,299,000	3,389,000	3,475,000	3,545,000
Orange County	832,000	881,000	938,000	981,000	1,027,000	1,072,000	1,088,000	1,102,000	1,111,000	1,118,000
Riverside County	283,000	322,000	357,000	427,000	496,000	552,000	605,000	650,000	692,000	733,000
San Bernardino County	175,000	190,000	203,000	216,000	234,000	253,000	269,000	285,000	300,000	314,000
San Diego County	863,000	913,000	965,000	1,016,000	1,062,000	1,116,000	1,168,000	1,220,000	1,271,000	1,312,000
Ventura County	143,000	151,000	170,000	184,000	197,000	208,000	215,000	221,000	227,000	232,000
Metropolitan's Service Area	**5,121,000**	**5,332,000**	**5,544,000**	**5,785,000**	**6,080,000**	**6,386,000**	**6,644,000**	**6,867,000**	**7,076,000**	**7,254,000**

Source: US Census, CA Department of Finance, SCAG RTP-07, SANDAG Series 12 2050 Regional Growth Forecast (Feb 2010)

* Interpolated

Table A.1-5 Total Retail Demand in Metropolitan's Service Area with Conservation and SBx7-7

(Acre-Feet)

	Actual							Projected				
County	1980	1985	1990	1995	2000	2005	2010*	2015	2020	2025	2030	2035
Los Angeles County	1,528,000	1,703,000	1,734,000	1,558,000	1,739,000	1,643,000	1,762,000	1,704,000	1,664,000	1,676,000	1,694,000	1,705,000
Orange County	521,000	596,000	673,000	577,000	660,000	629,000	624,000	651,000	634,000	635,000	637,000	637,000
Riverside County	348,000	376,000	480,000	404,000	492,000	495,000	544,000	603,000	626,000	664,000	701,000	736,000
San Bernardino County	166,000	188,000	210,000	184,000	251,000	264,000	268,000	259,000	252,000	263,000	275,000	286,000
San Diego County	481,000	487,000	686,000	502,000	661,000	614,000	668,000	687,000	682,000	691,000	709,000	728,000
Ventura County	96,000	113,000	145,000	108,000	132,000	158,000	166,000	170,000	170,000	174,000	178,000	181,000
Metropolitan's Service Area	**3,140,000**	**3,463,000**	**3,928,000**	**3,333,000**	**3,935,000**	**3,803,000**	**4,032,000**	**4,074,000**	**4,028,000**	**4,103,000**	**4,194,000**	**4,273,000**

Table A.1-6 Total Retail M&I Demand in Metropolitan's Service Area with Conservation and SBx7-7

(Acre-Feet)

	Actual							Projected				
County	1980	1985	1990	1995	2000	2005	2010*	2015	2020	2025	2030	2035
Los Angeles County	1,522,000	1,698,000	1,732,000	1,550,000	1,738,000	1,643,000	1,761,000	1,703,000	1,664,000	1,676,000	1,693,000	1,704,000
Orange County	481,000	547,000	646,000	559,000	643,000	619,000	613,000	644,000	630,000	633,000	634,000	634,000
Riverside County	141,000	174,000	279,000	245,000	357,000	413,000	454,000	508,000	532,000	570,000	606,000	641,000
San Bernardino County	120,000	150,000	172,000	152,000	221,000	236,000	242,000	243,000	245,000	256,000	268,000	279,000
San Diego County	365,000	370,000	548,000	438,000	556,000	523,000	596,000	603,000	604,000	631,000	657,000	675,000
Ventura County	77,000	91,000	118,000	94,000	125,000	145,000	151,000	149,000	149,000	152,000	156,000	158,000
Metropolitan's Service Area	**2,706,000**	**3,030,000**	**3,495,000**	**3,038,000**	**3,640,000**	**3,579,000**	**3,817,000**	**3,850,000**	**3,824,000**	**3,918,000**	**4,014,000**	**4,091,000**

Table A.1-7 Total Retail Agricultural Demand in Metropolitan' s Service Area

(Acre-Feet)

	Actual							Projected				
County	1980	1985	1990	1995	2000	2005	2010*	2015	2020	2025	2030	2035
Los Angeles County	6,300	5,300	2,800	7,500	500	400	500	400	400	400	400	400
Orange County	40,300	48,400	26,900	17,700	17,300	9,800	10,900	6,800	3,800	2,900	2,900	2,900
Riverside County	207,000	202,000	200,800	158,700	134,100	81,700	89,600	94,200	94,200	94,200	94,200	94,200
San Bernardino County	46,100	37,700	37,200	32,200	29,800	27,500	26,500	15,200	7,100	7,100	7,100	7,100
San Diego County	116,200	117,400	138,600	64,400	105,600	91,300	72,000	84,300	78,300	59,800	52,300	52,300
Ventura County	19,400	22,000	27,400	14,300	7,500	12,600	14,700	20,900	21,300	21,700	22,300	22,900
Metropolitan's Service Area	**435,300**	**432,800**	**433,700**	**294,800**	**294,800**	**223,300**	**214,200**	**221,800**	**205,100**	**186,100**	**179,200**	**179,800**

* Data not available - estimated based on prior years.

Table A.1-8 Single Family Retail Demand in Metropolitan's Service Area*
(Acre-Feet)

County	Projected					
	2010	2015	2020	2025	2030	2035
Los Angeles County	778,000	831,000	857,000	866,000	878,000	885,000
Orange County	300,000	325,000	334,000	337,000	339,000	341,000
Riverside County	329,000	376,000	411,000	439,000	465,000	490,000
San Bernardino County	138,000	148,000	154,000	159,000	165,000	168,000
San Diego County	265,000	282,000	295,000	303,000	311,000	315,000
Ventura County	91,000	99,000	103,000	105,000	107,000	108,000
Metropolitan's Service Area	**1,901,000**	**2,061,000**	**2,154,000**	**2,209,000**	**2,265,000**	**2,307,000**

* Projections do not include savings estimates to meet SBx7-7.

Table A. 1-9 Multifamily Retail Demand in Metropolitan's Service Area*
Average Year (Acre-Feet)

County	Projected					
	2010	2015	2020	2025	2030	2035
Los Angeles County	318,000	349,000	364,000	373,000	384,000	393,000
Orange County	111,000	125,000	129,000	131,000	133,000	135,000
Riverside County	54,000	62,000	68,000	74,000	79,000	86,000
San Bernardino County	31,000	35,000	38,000	42,000	46,000	50,000
San Diego County	125,000	140,000	154,000	170,000	186,000	201,000
Ventura County	12,000	13,000	14,000	15,000	16,000	16,000
Metropolitan's Service Area	**651,000**	**724,000**	**767,000**	**805,000**	**844,000**	**881,000**

* Projections do not include savings estimates to meet SBx7-7.

Table A. 1-10 Commercial, Industrial and Institutional Retail Demand in Metropolitan's Service Area*
Average Year (Acre-Feet)

County	Projected					
	2010	2015	2020	2025	2030	2035
Los Angeles County	456,000	470,000	467,000	457,000	449,000	441,000
Orange County	169,000	182,000	185,000	182,000	178,000	173,000
Riverside County	47,000	52,000	58,000	62,000	66,000	69,000
San Bernardino County	37,000	44,000	46,000	47,000	49,000	52,000
San Diego County	148,000	164,000	166,000	169,000	169,000	168,000
Ventura County	33,000	33,000	34,000	35,000	35,000	35,000
Metropolitan's Service Area	**890,000**	**945,000**	**956,000**	**952,000**	**946,000**	**938,000**

* Projections do not include savings estimates to meet SBx7-7.

Table A. 1-11 Unmetered Use in Metropolitan's Service Area*

Average Year (Acre-Feet)

	Projected					
County	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Los Angeles County	135,000	143,000	146,000	147,000	148,000	149,000
Orange County	41,000	45,000	46,000	46,000	46,000	46,000
Riverside County	42,000	47,000	52,000	55,000	59,000	62,000
San Bernardino County	28,000	31,000	33,000	34,000	35,000	37,000
Table 2-7	45,000	50,000	52,000	54,000	56,000	58,000
Ventura County	12,000	12,000	13,000	13,000	13,000	14,000
Metropolitan's Service Area	**303,000**	**328,000**	**342,000**	**349,000**	**357,000**	**366,000**

* Projections do not include savings estimates to meet SBx7-7.

Table A.1-12 Conservation Savings in Metropolitan's Service Area - 1980 Base Year

(Acre-Feet)

	Estimated				Projected					
County	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Los Angeles County	0	98,000	194,000	279,000	328,000	347,000	358,000	388,000	416,000	441,000
Orange County	0	29,000	64,000	95,000	116,000	120,000	120,000	128,000	135,000	142,000
Riverside County	0	11,000	23,000	38,000	56,000	65,000	71,000	82,000	92,000	102,000
San Bernardino County	0	4,000	8,000	13,000	21,000	25,000	28,000	32,000	36,000	40,000
San Diego County	0	25,000	56,000	77,000	98,000	109,000	118,000	130,000	142,000	153,000
Ventura County	0	4,000	9,000	13,000	17,000	19,000	21,000	23,000	25,000	27,000
Active, Code and Price	**0**	**171,000**	**355,000**	**515,000**	**636,000**	**686,000**	**717,000**	**783,000**	**846,000**	**906,000**
Pre-1990 Conservation	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
Total Conservation	**250,000**	**421,000**	**605,000**	**765,000**	**886,000**	**936,000**	**967,000**	**1,033,000**	**1,096,000**	**1,156,000**

Note:

* Estimated conservation savings with active savings installed as of calendar year 2009.
Savings projections do not include savings derived from SB7x7.

Table A.1-13 Projected Municipal and Industrial Demands by Sector

(Acre-Feet)

	Historical[1]				Projection[2]					
Sector	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Single-Family	1,754,000	1,529,000	1,837,000	1,812,000	1,901,000	2,061,000	2,154,000	2,209,000	2,264,000	2,307,000
Multifamily	545,000	487,000	600,000	606,000	650,000	724,000	769,000	805,000	844,000	880,000
Non-Residential	915,000	777,000	910,000	874,000	890,000	945,000	956,000	952,000	946,000	938,000
System Losses/Unmetered	282,000	245,000	294,000	289,000	303,000	328,000	342,000	350,000	358,000	365,000
Metropolitan Total	**3,495,000**	**3,038,000**	**3,640,000**	**3,580,000**	**3,744,000**	**4,058,000**	**4,221,000**	**4,315,000**	**4,413,000**	**4,490,000**
Single-Family	50.2%	50.3%	50.5%	50.6%	50.8%	50.8%	51.0%	51.2%	51.3%	51.4%
Multifamily	15.6%	16.0%	16.5%	16.9%	17.4%	17.8%	18.2%	18.7%	19.1%	19.6%
Non-Residential	26.2%	25.6%	25.0%	24.4%	23.8%	23.3%	22.7%	22.1%	21.4%	20.9%
System Losses/Unmetered	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%
Metropolitan Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

[1] Estimates of historical water use by sector are prorated using percentages from projected demands and actual water use.

[2] Projected demand are weather normalized and do not include savings estimates to meet SBx7-7.

APPENDIX A.2
EXISTING REGIONAL WATER SUPPLIES

A.2 EXISTING REGIONAL WATER SUPPLIES

Water used in Metropolitan's service area comes from both local and imported sources. Local sources include groundwater, surface water, and recycled water. Sources of imported water include the Colorado River, the State Water Project (SWP), and the Owens Valley/Mono Basin. Local sources meet about 45 percent of the water needs in Metropolitan's service area, while imported sources supply the remaining 55 percent.

The city of Los Angeles imports water from the eastern Owens Valley/Mono Basin in the Sierra Nevada through the Los Angeles Aqueducts (LAA). This water currently meets about 7 percent of the region's water needs based on a five-year average from 2005-2009, but is dedicated for use by the city of Los Angeles. Contractually and for planning purposes, Metropolitan treats the LAA as a local supply, although physically its water is imported from outside the region. Other supplies come from local sources, and Metropolitan provides imported water supplies to meet the remaining 47 percent of the region's water needs based on the same five-year period. These imported supplies are received from Metropolitan's Colorado River Aqueduct (CRA) and the SWP's California Aqueduct. Table A.2-1 and Figure A.2-1 show the historical use of local and imported supplies within Metropolitan's service area.

Table A.2-2 shows the quantities of Metropolitan water used by member agencies during the last ten years. Metropolitan's largest water customers are the San Diego County Water Authority (28 percent of Metropolitan's supplies based on 2005-2009 average), city of Los Angeles (15 percent) and Municipal Water District of Orange County (13 percent).[1] The reliance on Metropolitan's water supplies varies by agency. For example, in recent years, Upper San Gabriel received as little as 5 percent (in fiscal year 2008/09) of its total water supply from Metropolitan, while Beverly Hills received over 93 percent. However, this relative share of local and imported supplies varies from year to year based on supply and demand conditions.

The following sections describe the current supply sources in more detail. The main body of the Urban Water Management plan contains descriptions of planned future supplies.

Local Water Supplies

Local sources of water available to the region include surface water, groundwater, and recycled water. Some of the major river systems in Southern California have been developed into systems of dams, flood control channels, and percolation ponds for supplying local water and recharging groundwater basins. For example, the San Gabriel and Santa Ana rivers capture over 80 percent of the runoff in their watersheds. The Los Angeles River system, however, is not as efficient in capturing runoff. In its upper reaches, which make up 25 percent of the watershed, most runoff is captured with recharge facilities. In its lower

[1] Metropolitan Fiscal Annual Report 2008-09.

reaches, which comprise the remaining 75 percent of the watershed, the river and its tributaries are lined with concrete, so there are no recharge facilities. The Santa Clara River in Ventura County is outside of Metropolitan's service area, but it replenishes groundwater basins used by water agencies within Metropolitan's service area. Other rivers in Metropolitan's service area, such as the Santa Margarita and San Luis Rey, are essentially natural replenishment systems.

Table A. 2-1
Sources of Water Supply to the Metropolitan Service Area
(Acre-Feet)[1]

Calendar Year	Local Supplies	L.A. Aqueduct	Colorado River Aqueduct[2]	State Water Project[3]	Total
1976	1,363,000	430,000	778,000	638,000	3,209,000
1977	1,370,000	275,000	1,277,000	209,000	3,131,000
1978	1,253,000	472,000	705,000	576,000	3,005,000
1979	1,419,000	493,000	784,000	532,000	3,227,000
1980	1,452,000	515,000	791,000	560,000	3,317,000
1981	1,500,000	465,000	791,000	827,000	3,583,000
1982	1,392,000	483,000	686,000	737,000	3,298,000
1983	1,385,000	519,000	850,000	410,000	3,163,000
1984	1,621,000	516,000	1,150,000	498,000	3,785,000
1985	1,535,000	496,000	1,018,000	728,000	3,776,000
1986	1,510,000	521,000	1,011,000	756,000	3,799,000
1987	1,465,000	428,000	1,175,000	763,000	3,831,000
1988	1,521,000	369,000	1,199,000	957,000	4,047,000
1989	1,542,000	288,000	1,189,000	1,215,000	4,234,000
1990	1,470,000	106,000	1,183,000	1,458,000	4,217,000
1991	1,426,000	186,000	1,252,000	625,000	3,490,000
1992	1,512,000	177,000	1,153,000	744,000	3,586,000
1993	1,408,000	289,000	1,142,000	663,000	3,502,000
1994	1,527,000	133,000	1,263,000	845,000	3,768,000
1995	1,590,000	464,000	933,000	451,000	3,438,000
1996	1,715,000	425,000	1,089,000	663,000	3,892,000
1997	1,759,000	436,000	1,125,000	724,000	4,044,000
1998	1,726,000	467,000	941,000	521,000	3,655,000
1999	1,887,000	309,000	1,072,000	792,000	4,060,000
2000	1,768,000	255,000	1,217,000	1,473,000	4,714,000
2001	1,708,000	267,000	1,245,000	1,119,000	4,340,000
2002	1,706,000	179,000	1,198,000	1,415,000	4,498,000
2003	1,659,000	252,000	676,000	1,561,000	4,148,000
2004	1,627,000	203,000	741,000	1,802,000	4,373,000
2005	1,590,000	369,000	685,000	1,525,000	4,168,000
2006	1,710,000	379,000	535,000	1,695,000	4,319,000
2007	1,852,000	129,000	696,000	1,648,000	4,326,000
2008	1,842,000	147,000	896,000	1,037,000	3,922,000
*2009	1,801,000	137,000	1,043,000	908,000	3,890,000
**2010	1,832,000	243,000	1,150,000	1,500,000	4,725,000

1. Not including system losses.
2. Colorado River Aqueduct deliveries to service area: gross Havasu diversions less return flows, deliveries to USBR, Mexico, and storage.
3. State Water Project deliveries to service area: includes Table A, Art. 21, Art. 14(b), Art. 12(d), Art. 55, draws from storage & carryover, DWCV & other exchanges, transfers, Drought Water Bank and Dry Year Pool Purchases, Pools A&B, Flood Water, wheeling, Port Hueneme lease, SBVMWD Purchases.

* 2009 local supplies are based 2006-08 averages.

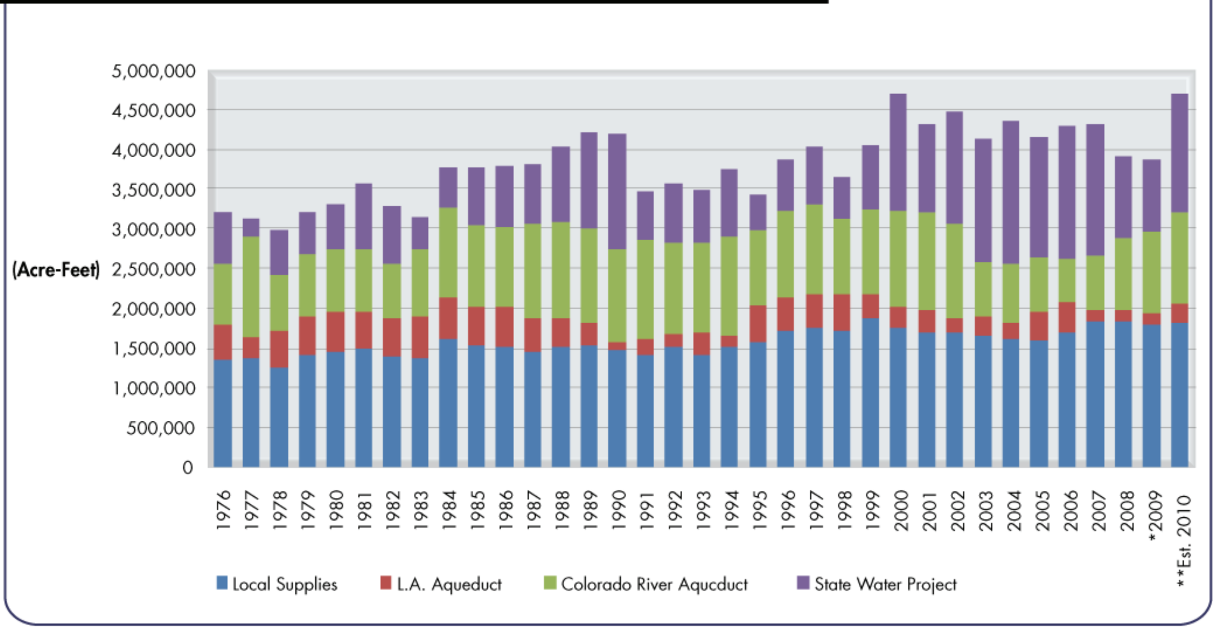
** 2010 CRA and SWP are best estimates as of May 2010; LAA is based on actuals from January thru April plus projections for May thru December; Local Supplies are averages of prior years.

Table A. 2-2
Historic Metropolitan Water Deliveries to Member Agencies
(Acre-Feet)

Agency	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010*
City of Anaheim	25,000	16,000	23,000	21,000	26,000	33,000	25,000	21,000	16,000	21,000	21,000
City of Beverly Hills	14,000	13,000	14,000	12,000	12,000	12,000	12,000	12,000	12,000	11,000	11,000
City of Burbank	12,000	12,000	12,000	14,000	13,000	15,000	16,000	13,000	15,000	12,000	12,000
Calleguas Municipal Water District	120,000	110,000	127,000	118,000	128,000	120,000	126,000	131,000	121,000	101,000	101,000
Central Basin Municipal Water District	128,000	109,000	97,000	62,000	117,000	67,000	114,000	85,000	55,000	53,000	53,000
City of Compton	4,000	4,000	3,000	3,000	3,000	4,000	4,000	3,000	2,000	2,000	2,000
Eastern Municipal Water District	86,000	80,000	101,000	90,000	115,000	113,000	126,000	127,000	109,000	97,000	97,000
Foothill Municipal Water District	12,000	11,000	13,000	13,000	14,000	12,000	12,000	12,000	10,000	10,000	10,000
City of Fullerton	7,000	8,000	13,000	10,000	17,000	18,000	20,000	11,000	8,000	11,000	11,000
City of Glendale	29,000	28,000	23,000	23,000	24,000	22,000	22,000	23,000	21,000	19,000	19,000
Inland Empire Utilities Agency	70,000	67,000	76,000	81,000	84,000	93,000	112,000	75,000	58,000	36,000	36,000
Las Virgenes Municipal Water District	23,000	21,000	23,000	22,000	26,000	21,000	23,000	26,000	27,000	21,000	21,000
City of Long Beach	44,000	44,000	43,000	49,000	48,000	51,000	43,000	36,000	35,000	33,000	33,000
City of Los Angeles	330,000	304,000	403,000	318,000	392,000	184,000	185,000	441,000	430,000	352,000	352,000
Municipal Water District of Orange County	321,000	264,000	340,000	277,000	297,000	303,000	319,000	270,000	234,000	211,000	211,000
City of Pasadena	24,000	19,000	29,000	23,000	24,000	21,000	24,000	25,000	24,000	20,000	20,000
San Diego County Water Authority	593,000	589,000	663,000	652,000	679,000	547,000	598,000	698,000	566,000	540,000	540,000
City of San Fernando	0	0	0	1,000	1,000	1,000	0	1,000	0	0	0
City of San Marino	1,000	0	1,000	1,000	2,000	1,000	2,000	1,000	1,000	1,000	1,000
City of Santa Ana	11,000	13,000	19,000	13,000	20,000	22,000	22,000	12,000	8,000	7,000	7,000
City of Santa Monica	12,000	12,000	13,000	14,000	14,000	13,000	13,000	13,000	12,000	12,000	12,000
Three Valleys Municipal Water District	82,000	71,000	93,000	82,000	86,000	69,000	68,000	74,000	68,000	58,000	58,000
City of Torrance	21,000	22,000	21,000	21,000	21,000	21,000	21,000	20,000	19,000	18,000	18,000
Upper San Gabriel Valley Municipal Water District	60,000	31,000	54,000	72,000	45,000	45,000	48,000	23,000	13,000	6,000	6,000
West Basin Municipal Water District	151,000	141,000	147,000	145,000	147,000	145,000	144,000	142,000	130,000	120,000	120,000
Western Municipal Water District of Riverside County	85,000	82,000	99,000	97,000	106,000	91,000	103,000	120,000	99,000	88,000	88,000
Metropolitan Total	**2,265,000**	**2,071,000**	**2,450,000**	**2,234,000**	**2,461,000**	**2,044,000**	**2,202,000**	**2,415,000**	**2,093,000**	**1,860,000**	**1,860,000**

* Data not available. Assumed 2010 delivery is similar to 2009.

Figure A. 2-1 Sources of Water Supply to Metropolitan's Service Area



Local supplies fluctuate in response to variations in rainfall. During prolonged periods of below-normal rainfall, local water supplies decrease. Conversely, prolonged periods of above-normal rainfall increase local supplies. Sources of groundwater basin replenishment include local precipitation, runoff from the coastal ranges, and artificial recharge with imported water supplies. In addition to runoff, recycled water provides an increasingly important source of replenishment water for the region.

Major Groundwater Basins

Groundwater sources account for about 90 percent of the natural local water supplies, which are found in many basins throughout the Southern California region and provide an annual average total production of about 1.5 MAF per year. Figure A.2-2 shows the location of the major groundwater basins. The majority of groundwater yield comes from natural recharge, which is accomplished through the percolation of rainfall and stream runoff. In certain major drainage areas, runoff is retained in flood control reservoirs and released into spreading basins or ponds for additional percolation into the ground. The Los Angeles County Department of Public Works operates many groundwater recharge facilities located at the upper reaches of the Los Angeles River and San Gabriel River systems providing recharge to San Fernando, Raymond, Main San Gabriel, Central, and West Coast groundwater basins. In addition, the Orange County Water District operates a system of diversion structures and recharge basins along the Santa Ana River that captures much of the storm runoff, as well as water from reclamation facilities in Riverside and San Bernardino counties. Storm runoff is also diverted to recharge basins in the Chino Basin. This water, which would otherwise flow into the Pacific Ocean, is allowed to percolate into the underlying aquifers so it may be pumped for local use when needed. Groundwater basins are also recharged with imported supplies and recycled water, either by injection, by percolation in spreading basins, or in-lieu storage.

Almost all major groundwater basins in Southern California are either adjudicated or managed by special districts or agencies. Over 90 percent of the groundwater used in Metropolitan's service area is produced from adjudicated or managed groundwater basins. Adjudicated basins in the region include: Raymond Basin, San Fernando Basins, Main San Gabriel Basin, Central Basin, West Coast Basin, Six Basins, Chino Basin, and Cucamonga Basin. The Orange County Groundwater Basin is managed by Orange County Water District; portions of the Ventura County Basins are managed by the Fox Canyon Groundwater Management Agency; and San Jacinto Basin is managed by Eastern Municipal Water District. In general, these basins have management plans that include protection from seawater intrusion, water quality deterioration, and excessive lowering of water levels.

Major River Systems and Reservoirs

Local surface water resources consist of runoff captured in storage reservoirs and diversions from streams. Reservoirs hold the runoff for later direct use, and diversions from streams are delivered directly to local water systems. As Table A2.3 shows, local water agencies currently own and operate 34 reservoirs. These reservoirs provide a storage capacity of 737 TAF. The historic average yield of these local surface supplies, which come from reservoir releases and stream diversions, is about 90 TAF per year (based on 2005-09 average). The annual yield varies widely between wet and dry years, and most reservoirs that capture local surface runoff are operated with minimal carry-over storage. San Diego County has the greatest storage capacity for these types of reservoirs, with approximately 80 percent of the total local agency storage capacity in Metropolitan's service area.

In addition to the storage that is owned and operated by local agencies, Metropolitan operates DVL, Lake Skinner and Lake Mathews. DVL stores water imported during years of ample supply. Of DVL's 810 TAF capacity up to half is dedicated to emergency storage; the remainder is available to augment supplies during dry years and for seasonal storage. In contrast, Lake Skinner and Lake Mathews are largely used for system operations rather than dry year storage. Table A.2-4 lists Metropolitan-owned reservoirs.

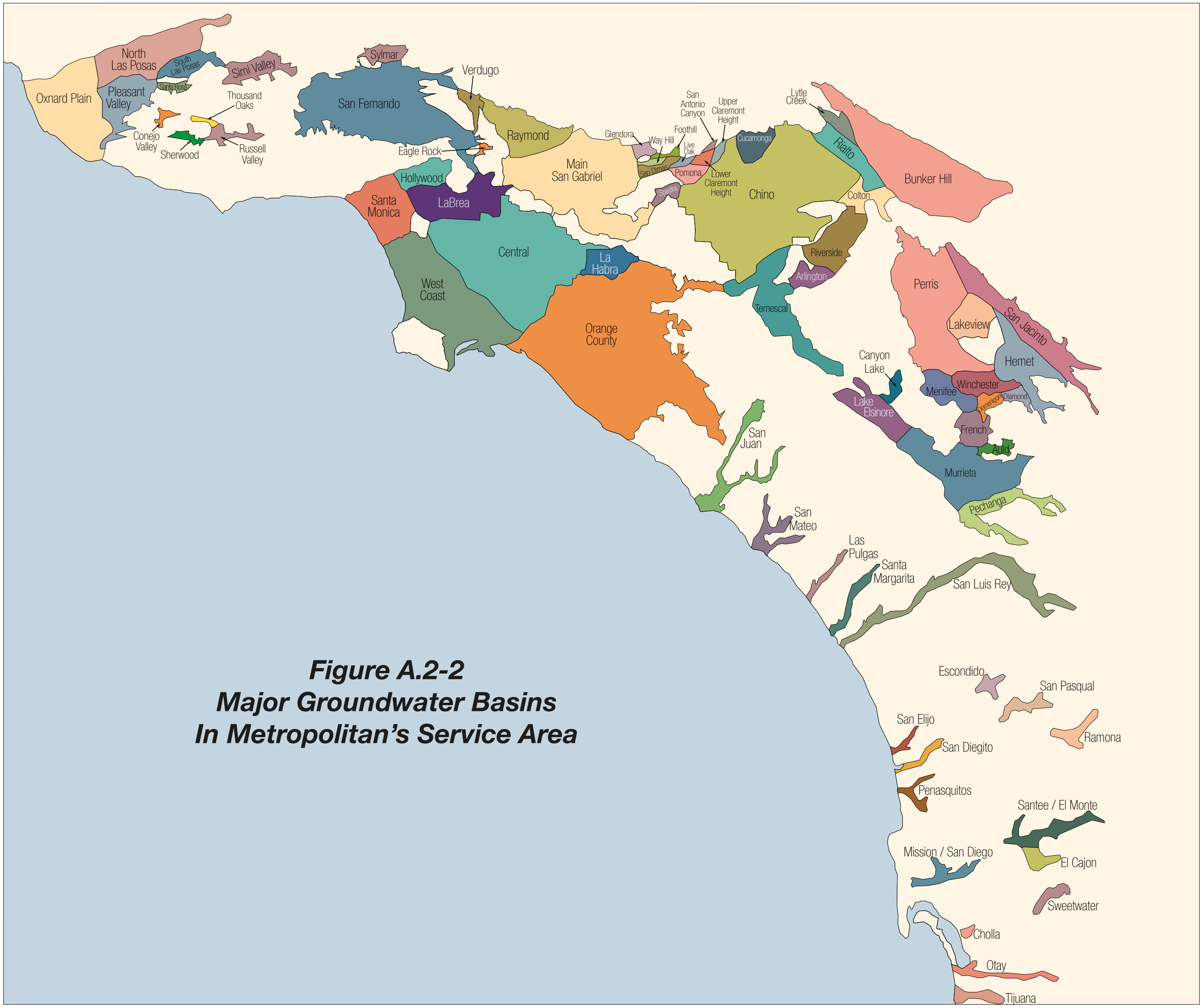


Figure A.2-2
Major Groundwater Basins
In Metropolitan's Service Area

Table A.2-3
Local Storage Reservoirs In Metropolitan's Service Area
(Thousand Acre-Feet

Member Agency/Subagency	Reservoir	Storage Capacity
Eastern MWD		
Rancho California WD	Vail Lake	51.0
Lake Hemet MWD	Lake Hemet	14.0
Las Virgenes MWD	Westlake Reservoir	10.0
City of Los Angeles	Los Angeles	10.2
	Encino	9.8
	Stone Canyon	10.8
	Hollywood	4.2
MWD of Orange Co.		
Irvine Ranch WD & Serrano ID	Santiago	25.0
San Diego County Water Authority		
Carlsbad MWD	Maerkle	0.6
Escondido, City of	Dixon	2.6
	Wohlford	6.5
Fallbrook PUD	Red Mountain	1.3
Helix WD	Cuyamaca	8.2
	Jennings	9.8
Poway, City of	Poway	3.3
Rainbow MWD	Beck	0.6
	Morro Hill	0.5
Ramona MWD	Ramona	12.0
San Diego County Water Authority	Olivenhain - CWA	24.8
San Diego, City of	Barrett	37.9
	El Capitan	112.8
	Hodges	30.3
	Lower Otay	49.5
	Miramar	7.2
	Morena	50.2
	Murray	4.8
	San Vicente	89.3
	Sutherland	29.7
San Dieguito WD	San Dieguito	0.9
Sweetwater Authority	Loveland	25.4
	Sweetwater	28.1
Valley Center M.WD	Turner	1.6
Vista Irrigation District	Henshaw	51.8
Western MWD of Riverside		
Temescal Water Company	Railroad Canyon	12.0
Total		**736.7**

Table A.2-4
Regional Reservoirs in Metropolitan's Service Area

Reservoir	Capacity (TAF)
Diamond Valley	810
Lake Skinner[1]	44
Lake Mathews[1]	182

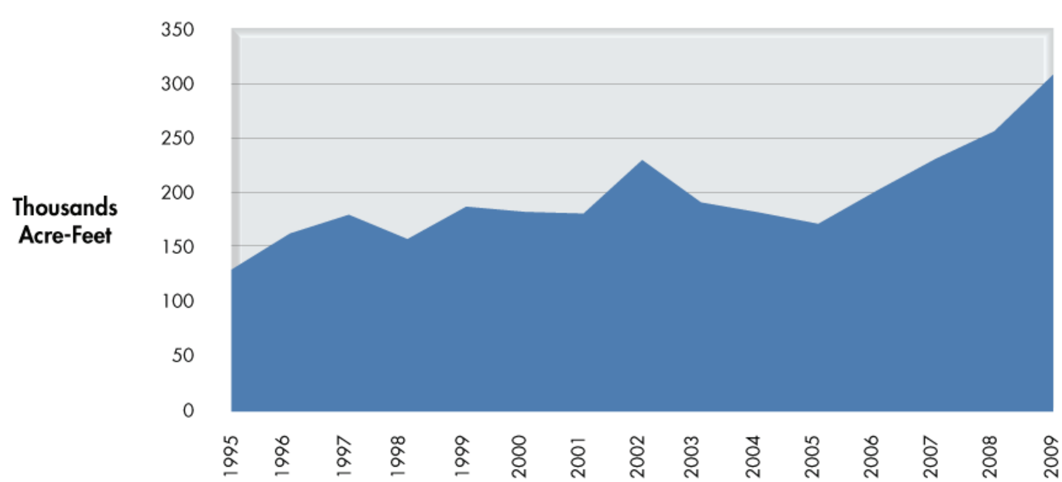
[1] These are used for operations and not primarily for dry year storage.

Lastly, Castaic Reservoir and Perris Reservoir are the terminal reservoirs to the West Branch and East Branch of the California Aqueduct operated by DWR. Through the Monterey Amendment to its SWP water service contract Metropolitan has access to 218.94 TAF of flexible storage capacity in these SWP terminal reservoirs.

Water Recycling and Groundwater Recovery

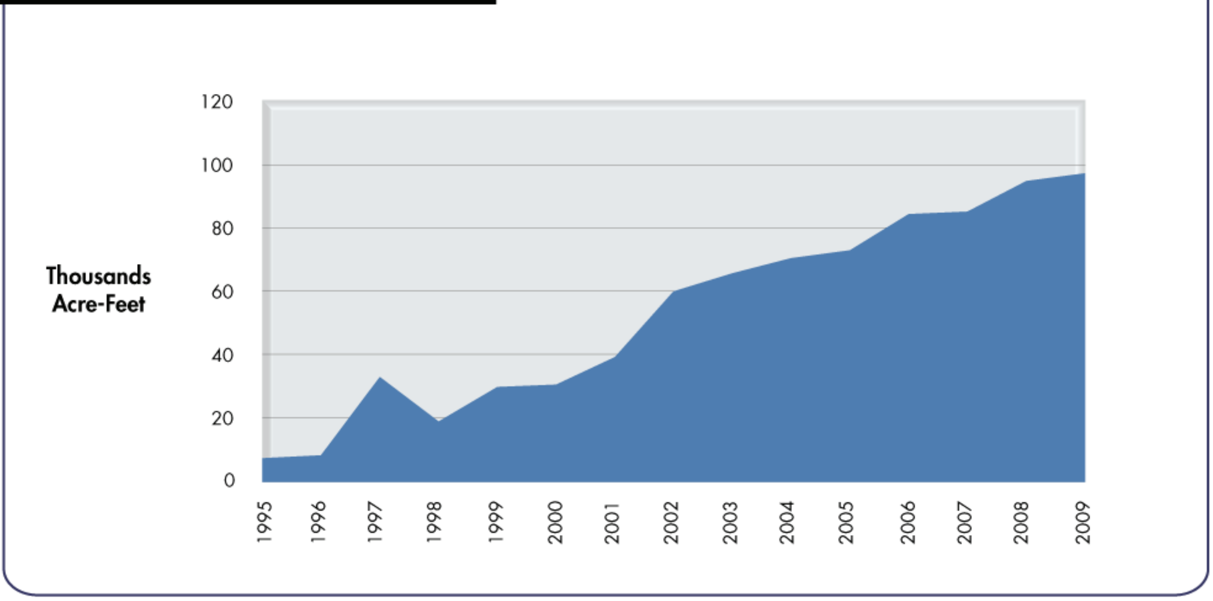
Water recycling projects involve treating wastewater to a level that is acceptable and safe for many nonpotable applications. This resource is providing an increasing level of local water. From 1995 to 2009, Metropolitan invested approximately $244 million in water recycling projects. In 2009, water recycling projects in which Metropolitan has invested produced 161 TAF. In addition, local agency projects that did not receive financial assistance from Metropolitan produced an additional 147 TAF, for a regional total of 308 TAF. Figure A.2-3 demonstrates the increase in this regional supply for direct use.

Figure A.2-3 Recycled Water



In addition, local agencies have implemented several projects to recover contaminated or degraded groundwater for potable uses. The groundwater recovery projects use a variety of treatment technologies to remove nitrates, volatile organic compounds, perchlorate, color and salt. In 1991, Metropolitan began helping to fund its member agencies' groundwater recovery projects. Since that time, Metropolitan has invested approximately $102 million. In 2009, these groundwater recovery projects produced 62 TAF. Other member agency projects that did not receive funding from Metropolitan produced another 35 TAF, for a regional total of 97 TAF. Figure A.2-4 shows this increase in supply.

Figure A.2-4 Groundwater Recovery



Imported Water

Most member agencies and retail water suppliers depend on imported water for a portion of their water supply. For example, Los Angeles and San Diego (the largest and second largest cities in the state) have historically (1995-2004) obtained about 85 percent of their water from imported sources. These imported water requirements are similar to those of other metropolitan areas within the state, such as San Francisco and other cities around the San Francisco Bay.

Figure A.2-5 shows the conveyance facilities for the state's imported water supplies. Descriptions of each of the imported sources of water available to Metropolitan's service area follow. Justification for projected water supplies from these sources, as required for retail water agencies to comply with Senate Bills 221 and 610, are provided in Appendix A.3.

Colorado River

A number of water agencies within California have rights to divert water from the Colorado River. Through the Seven Party Agreement (1931), seven agencies recommended apportionments of California's share of Colorado River water within the state. Table A.2-5 shows the historic apportionment of each agency, and the priority accorded that apportionment.

Table A.2-5
Priorities in Seven-Party Agreement and Water Delivery Contracts

Priority	Description	TAF Annually
1	Palo Verde Irrigation District – gross area of 104,500 acres of land in the Palo Verde Valley	
2	Yuma Project (Reservation Division) – not exceeding a gross area of 25,000 acres in California	
3(a)	Imperial Irrigation District and land in Imperial and Coachella Valleys[1] to be served by All American Canal	3,850
3(b)	Palo Verde Irrigation District—16,000 acres of land on the Lower Palo Verde Mesa	
4	Metropolitan Water District of Southern California for use on the coastal plain of Southern California	550
Subtotal		4,400
5(a)	Metropolitan Water District of Southern California for use on the coastal plain of Southern California	550
5(b)	Metropolitan Water District of Southern California for use on the coastal plain of Southern California[2]	112
6(a)	Imperial Irrigation District and land in Imperial and Coachella Valleys[1] to be served by the All American Canal	
6(b)	Palo Verde Irrigation District—16,000 acres of land on the Lower Palo Verde Mesa	300
7	Agricultural Use in the Colorado River Basin in California	
	Total Prioritized Apportionment	**5,362**

[1] The Coachella Valley Water District now serves Coachella Valley.

[2] In 1946, the City of San Diego, the San Diego County Water Authority, Metropolitan, and the Secretary of the Interior entered into a contract that merged and added the City of San Diego's rights to store and deliver Colorado River water to the rights of Metropolitan. The conditions of that agreement have long since been satisfied.

Figure A.2-5
MAJOR WATER CONVEYANCE FACILITIES IN CALIFORNIA

The water is delivered to Metropolitan's service area by way of the Colorado River Aqueduct (CRA), which has a capacity of nearly 1,800 cubic feet per second or 1.3 MAF per year. The CRA conveys water 242 miles from its Lake Havasu intake to its terminal reservoir, Lake Mathews, near the city of Riverside. Conveyance losses along the Colorado River Aqueduct of 10 TAF per year reduce the amount of Colorado River water received in the coastal plain.

Since the date of the original contract, several events have occurred that changed the dependable supply that Metropolitan expects from the CRA. The most significant event was the 1964 U.S. Supreme Court decree in Arizona v. California that reduced Metropolitan's dependable supply of Colorado River water to 550 TAF per year. The reduction in dependable supply occurred with the commencement of Colorado River water deliveries to the Central Arizona Project. In 1987, Metropolitan entered into a contract with the Bureau of Reclamation for an additional 180 TAF per year of surplus water. In addition, Metropolitan has obtained a minimum of 85 TAF per year of Colorado River water through a conservation program with the Imperial Irrigation District.

In 1979, the Present Perfected Rights (PPRs) of certain Indian reservations, cities, and individuals along the Colorado River were quantified. These PPRs predate the Seven-Party Agreement, but the rights holders were not included in the Seven Party Agreement prioritizing California's use and storage of Colorado River water.

In 1999, the Colorado River Board of California developed "California's Colorado River Water Use Plan" (Plan). The Colorado River Board of California protects California's rights and interests in the resources provided by the Colorado River and represents California in discussions and negotiations regarding the Colorado River and its management. The overall purpose of the Plan is to provide Colorado River water users with a framework by which programs, projects, and other activities may be coordinated and cooperatively implemented. This framework specified how California would make the transition from relying on surplus water supplies from the Colorado to living within its normal water supply apportionment.

To implement these plans, a number of agreements have been executed. In October 2003, representatives from Metropolitan, IID, and Coachella Valley Water District (CVWD) executed the Quantification Settlement Agreement (QSA) and several other related agreements. Parties involved include the San Diego County Water Authority (SDCWA), the California Department of Water Resources (DWR), the California Department of Fish and Game, the U.S. Department of the Interior and the San Luis Rey Indian Water Rights Settlement Parties. The QSA quantifies the use of water under the third priority of the Seven Party Agreement and allows for implementation of agricultural conservation, land management, and other programs identified in Metropolitan's 1996 IRP. Quantification of the third priority provides the needed numeric baseline from which conservation and transfer programs may be measured. The QSA has helped California reduce its reliance on Colorado River water above its normal apportionment.

The quantification of the agricultural priorities under the QSA provided for the water saved under the Palo Verde Land Management and Crop Rotation Program to be made available to Metropolitan. This program provides up to 133 TAF of water to be available to Metropolitan in certain years and will supply a minimum of 33 TAF per year.

In October 2004, SNWA and Metropolitan entered into a storage and interstate release agreement. Under this program, Nevada can request that Metropolitan store unused Nevada apportionment in Metropolitan's service area. The amount of water stored through 2009 under this agreement was approximately 70 TAF. In subsequent years, Nevada may request recovery of this stored water. As part of a recently executed amendment, it is expected that Nevada will not request return of this water until 2019. The stored water provides flexibility to Metropolitan for blending Colorado River water with State Water Project water and improves near-term water supply reliability.

In December 2007, the Secretary of the Interior approved the adoption of specific interim guidelines for reductions in Colorado River water deliveries during declared shortages and coordinated operations of Lake Powell and Lake Mead. These new guidelines provide water release criteria from Lake Powell and water storage and water release criteria from Lake Mead during shortage, normal, and surplus conditions in the Lower Basin, provide a mechanism for the storage and delivery of conserved system and non-system water in Lake Mead, and modify and extend interim surplus guidelines through 2026. The Record of Decision and accompanying agreement among the Colorado River Basin States protect reservoir levels by reducing deliveries during drought periods, encourage agencies to develop conservation programs and allow the states to develop and store new water supplies. The Colorado River Basin Project Act of 1968 insulates California from shortages in all but the most extreme hydrologic conditions.

In May 2006, Metropolitan and the USBR executed an agreement for a demonstration program that allowed Metropolitan to leave conserved water in Lake Mead that Metropolitan would otherwise have used in 2006 and 2007. The water left in Lake Mead must have been made available through extraordinary conservation measures, which was accomplished in 2006 and 2007 through savings realized under the Palo Verde Land Management, Crop Rotation, and Water Supply Program. This Demonstration program was an activity eligible for creation of Extraordinary Conservation Intentionally Created Surplus (ICS) under the provisions of the December 2007 federal guidelines for the operation of Lake Powell and Lake Mead. As of January 1, 2010, Metropolitan had nearly 80 TAF of extraordinary conservation ICS water in Lake Mead.

The December 2007 federal guidelines provided Colorado River contractors the ability to create System Efficiency ICS through development and funding of system efficiency projects. To that end, in 2008 the Central Arizona Conservation District, SNWA, and Metropolitan contributed funds for the construction of the Drop 2 Reservoir by the Bureau of Reclamation. The purpose of the Drop 2 reservoir is to increase the capacity to regulate deliveries of Colorado River water at Imperial Dam reducing the amount of released downstream by approximately 70 TAF annually. In return for funding one-sixth of the project cost, 100 TAF of water stored in Lake Mead was assigned to Metropolitan as System Efficiency ICS. As of January 1, 2010, Metropolitan had nearly 66 TAF of System Efficiency ICS water in Lake Mead.

Metropolitan is undertaking ongoing efforts to maintain and improve the flexibility and quality of its water supply from the Colorado. Section 3.7 of this report describes current programs and plans related to flexibility, and Chapter 4 describes water quality programs.

State Water Project

The State Water Project, which is owned by the state and operated by the

California Department of Water Resources (DWR), is the second source of Metropolitan's imported water supplies. The SWP comprises 32 storage facilities (reservoirs and lakes), 662 miles of aqueduct, and 25 power and pumping plants.

The SWP conveys water from Northern California to the north and south of the San Francisco Bay Area and areas south of the Bay Delta region. Water from the SWP originates at Lake Oroville, which is located on the Feather River in Northern California. That water, along with all additional unused water from the watershed, flows into the Sacramento/San Joaquin Delta. Water from the Delta is then either pumped to water users in the San Francisco Bay area or transported through the California Aqueduct to water users in Central and Southern California.

DWR contracted to deliver water in stages to 32 SWP contractors, with an ultimate delivery of 4,172 TAF per year. Currently, DWR is delivering water to 29 of these SWP contractors. Metropolitan is the largest, with a contracted entitlement of 1,911 TAF per year, or approximately 46 percent of the total contracted amount. Metropolitan receives deliveries of SWP supplies via the California Aqueduct at Castaic Lake in Los Angeles County, Devil Canyon Afterbay in San Bernardino County, and Box Springs Turnout and Lake Perris in Riverside County. The first delivery of SWP water to Metropolitan occurred in 1972.

The initial facilities of the SWP, completed in the early 1970s, were designed to meet the original needs of the SWP contractors. It was intended that additional SWP facilities would be built over time to meet projected increases in contractors' delivery needs. Each contractor's SWP contract provided for a buildup in entitlement over time, with most contractors reaching their maximum annual entitlement by the year 1990. Since the completion of the initial SWP facilities in the early 1970s, major improvements to the system have included: four new pumps added to the Banks Pumping Plant at the Delta, the completion of the Coastal Branch, and the East Branch enlargement. Even with these improvements, however, there are still significant capacity constraints within the SWP that limit the delivery capability of the full contracted entitlement. During the same time, the contractors' needs for water from the SWP have increased. As a result, the contractors' demands for SWP water currently exceed the dependable yield.2 Metropolitan has developed groundwater storage programs with Semitropic Water Storage District, Arvin-Edison Water Storage District, and Kern Delta Water District to supplement the available water supply.

The amount of entitlement DWR approves for delivery varies annually with contractor demands and projected water supplies from tributary sources to the Delta, based on snowpack in the Sierra Nevada, reservoir storage, operational constraints, and demands of other water users. Historically, the SWP has been able to meet all contractors' requests for entitlement water except during the years of 1977, 1990-92, 1994, 2001-02, 2004, and 2007-09. In many years, surplus water has been delivered to contractors. Deliveries to Metropolitan reached a high of 1,802 TAF in calendar year 2004. Metropolitan experienced shortages in SWP supplies in fiscal years 1991 and 1992, with reduced deliveries of 391 TAF and 710 TAF, respectively.[3] More recently, SWP deliveries in 2008 and 2009 were limited to

[2] The dependable yield of the existing SWP facilities is considered to be the delivery capability during a critically dry seven-year period.

[3] These numbers are Metropolitan's allocated entitlement. Total water deliveries to Metropolitan's service area are shown in Table A.2-1.

35 percent and 40 percent of entitlements, respectively, resulting in drafts from storage of approximately 820 AF over this period to meet service area demands. Continued investments in conservation and recycling have allowed Metropolitan to reduce its requirements for SWP water.

In recent years the listing of several fish species in the Sacramento/San Joaquin Delta (Delta) under both state and federal Endangered Species Acts has constrained SWP operations and created more uncertainty in SWP supply reliability. These listed species include Delta smelt, winter-run Chinook salmon, spring-run Chinook salmon, and splittail. In January 2010, DWR released a draft of the biannual update of its Reliability Report. The report shows that future SWP deliveries will be impacted by two significant factors. The first is significant restrictions on SWP and Central Valley Project (CVP) Delta pumping required by the biological opinions issued by the U.S. Fish and Wildlife Service (December 2008) and National Marine Fisheries Service (June 2009). The second is climate change, which is altering the hydrologic conditions in the State. The 2009 draft report shows greater reductions in water deliveries on average when compared to the 2007 report. Over multiple-year dry periods, average annual Table A deliveries vary from 32 percent to 38 percent of the maximum Table A amount, while average annual deliveries over multiple-year wet periods range from 72 to 93 percent of the maximum Table A amount. Under future conditions, annual SWP Article 21 deliveries average 60 TAF, ranging from 1 TAF to 540 TAF over the 82-year simulation period.

Metropolitan is undertaking ongoing efforts to maintain and improve the reliability and quality of its water supply from the State Water Project. Sections 3.5 and 3-6 describe current programs and plans for reliability, and Chapter 4 addresses water quality issues.

Los Angeles Aqueducts

The city of Los Angeles imports water from the eastern Sierra Nevada through the Los Angeles Aqueduct (LAA). The original Los Angeles Aqueduct, completed in 1913, imported water from the Owens Valley. In 1940, the aqueduct was extended to the Mono Basin. A second aqueduct, which parallels the original, was completed in 1970.

With the completion of the aqueduct system in 1970, an average of 470 TAF of water was delivered annually through the LAA. Of this total, 380 TAF originated from surface water and groundwater in the Owens Valley, while 90 TAF came from surface water in the Mono Basin. In 1986, the aqueduct delivered a record 520 TAF of water.

In the late 1980s, a series of court injunctions limited the amount of water that Los Angeles could receive from its aqueduct system. In 1990, these limitations, along with a persistent drought, limited the delivery from the aqueduct to only 106 TAF. The Mono Lake Water Rights Decision (Decision) in September of 1994 ended the litigation in the Mono Basin, while negotiations continue with Inyo County on the fate of the Owens Valley water supply. In the Decision, the state ruled that Mono Lake should rise 17 feet over the next 25 years. During this time, Los Angeles would only be permitted to divert a fraction of its historical amounts. After the lake had risen, the city of Los Angeles would still be allowed only significantly reduced diversions. However, the high precipitation during the nineties allowed increased diversions of water to the LAA to occur at a much earlier time frame than had been foreseen at the time of the Decision.

More recently, the LAA diversions of water from the Owens Valley came under additional pressure. A long history of diversions of water from the Owens River had led to the drying up of Owens Lake by the end of the 1920s. This dry lakebed became a major source of windblown dust, resulting in EPA pressure to develop a State Implementation Plan to bring the region into compliance with federal air quality standards. In 1998, the Los Angeles Department of Water and Power entered into a Memorandum of Agreement with the Great Basin Air Pollution Control District that specified actions needed to control the problem. These actions included shallow flooding and managed vegetation at various lakebed locations. An estimated 54 TAF per year will be required to maintain the dust control measures, further restricting the water available for diversion through the LAA. More recently, the city has been required to restore portions of the Owens River, which could further restrict the water that can be provided from this source.

Historic Total Regional Water Supplies

The previous sections have presented the various sources of Metropolitan and the region's water supply. The amount of water supplied by each local and imported source from 1976 through 2008 appears in Table A.2-1. The imported supplies represent the amount of water imported into Metropolitan's service area, not the amount delivered to member agencies, which is shown in Table A.2-2. The difference between Metropolitan's imports and deliveries is water placed into or withdrawn from storage. The fluctuation in water supplies that occurred during this 1976-2008 period is the result of a number of factors. California experienced an extended drought during this period, which was particularly severe in 1991 and 1992. The long duration of this drought, which began in 1987, resulted in a decline in local supplies over the period due primarily to a reduction in groundwater availability. In addition, shortages in SWP supplies in 1991 and 1992 resulted in significant efforts to increase water conservation activities and, for part of that time, the imposition of water rationing. Water conservation activities in the region were already considerable before the 1991-92 shortage years, but these efforts were greatly expanded during those years and have stayed at similar levels even though adequate supplies have been available. Efforts at increasing water recycling have also continued. As a result of these efforts, consumers in Metropolitan’s service area have reduced their use of both imported and local supplies.

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APPENDIX A.3
JUSTIFICATIONS FOR SUPPLY PROJECTIONS

A.3 JUSTIFICATIONS FOR SUPPLY PROJECTIONS

Legislation authored by Senator Sheila Kuehl (Senate Bill 221 – now Water Code §10613 *et seq.*) and Senator Jim Costa (Senate Bill 610 – now Water Code §66473.7) requires water retailers to demonstrate that their water supplies are sufficient for certain proposed subdivisions and large development projects subject to the California Environmental Quality Act (CEQA). Although Metropolitan and other wholesalers do not have verification responsibilities under this legislation, information provided by Metropolitan may be useful to retailers in complying with these responsibilities. This Appendix provides the basis for the water availability contained in this report, by major source of supply. Such bases and proofs are required for supply verification under the legislation. Links to copies of the legislation can be found at http://www.groundwater.water.ca.gov/water_laws/index.cfm#otherleg.

Throughout this appendix, references are made to Metropolitan's operating budget and its long-term capital investment plan. The most recent operating budget (for fiscal year 2009-10) was adopted at the April 14, 2009 Board Meeting. A copy of the budget summary and the Capital Investment Plan for FY 2009-10 can be found at http://www.mwdh2o.com/mwdh2o/pages/finance/budget/AB09_10web.pdf.

Another document of interest related to Metropolitan's water supply planning is its annual report to the state Legislature in compliance with Senate Bill 60 of 1999 (Hayden).[1] This requires that Metropolitan report on its progress in increasing its emphasis on cost-effective conservation, recycling, and groundwater recharge.

A.3.1 Colorado River Aqueduct Deliveries

A. Colorado River Supplies

Metropolitan obtains water from the Colorado River under a number of categories specified in its supplemental water storage and delivery contract with the Secretary of the Interior: its basic apportionment that is classified as Priority 4 water, unused and surplus water that is classified as Priority 5 and Priority 6(a) water, and water resulting from a number of conservation programs that is classified as Priority 3(a) water. Pursuant to a U.S. Supreme Court decree, and regulations and operating guidelines of the U.S. Bureau of Reclamation, Metropolitan may receive as unused apportionment, water supplies unused by agricultural districts, supplies unused by the states of Arizona and Nevada, and as Intentionally Created Surplus, supplies stored from previous years' extraordinary conservation and efficiency improvements to the operations of the Colorado River system. Subject to the terms of agreements, this stored water may be withdrawn as needed during years in which insufficient supplies are available. Appendix A.2 describes the history

[1] Metropolitan Water District of Southern California, *Annual Progress Report to the California State Legislature: Achievements in Conservation, Recycling and Groundwater Recharge* (February 2010), which can be found at http://www.mwdh2o.com/mwdh2o/pages/yourwater/SB60/SB60_2010.pdf. The legislation requiring this information can be found at http://www.leginfo.ca.gov/pub/99-00/bill/sen/sb_0051-0100/sb_60_bill_19990916_chaptered.pdf. Similar reports have been filed with the Legislature since 2000.

of water supplies and the expected availability from this source, and Section 3.1 describes the agreements for water supplies.

Rationale for Expected Supply

Historical Record

Water supply under Metropolitan's Priority 4 apportionment of Colorado River water has been delivered since 1939. By existing contract, it is expected to be available in perpetuity because of California's senior water rights to use of Colorado River water.

The historical record for available Colorado River water indicates that Metropolitan's fourth priority supply has been available in every year and can reasonably be expected to be available over the next 20 years.

Written Contracts or Other Proof

Metropolitan's entitlement to Colorado River water is based on a series of interstate compacts, federal laws, agreements, court decrees, and guidelines collectively known as "The Law of the River,"[2] which govern the distribution and management of Colorado River water. The following documents specifically determine Metropolitan's dependable supplies:

- 1931 Seven Party Agreement.[3] The 1931 Agreement recommended California's Colorado River use priorities and has no termination date. California's basic annual apportionment is 4.4 MAF. Palo Verde Irrigation District (PVID), Yuma Project (Reservation Division), Imperial Irrigation District (IID), Coachella Valley Water District (CVWD), and Metropolitan are the entities that hold the priorities. As shown in Appendix A.2, these priorities are included in the contracts that the Department of the Interior executed with the California agencies in the 1930s for water from Lake Mead. Metropolitan holds Priority 4 to California's basic apportionment of Colorado River water and utilizes this water – 550 TAF per year – every year. In addition, Metropolitan has access to additional Colorado River water – up to 662 and 38 TAF per year, respectively – through its Priority 5, and Priority 6(a) in the California apportionment. Appendix A.2 describes the current status of water available under this priority.
- Metropolitan's Basic Contracts.[4] Metropolitan's 1930, 1931, and 1946 basic contracts with the Secretary of the Interior permit the delivery of 1.212 MAF per year when sufficient water is available. Metropolitan's 1987 surplus flow contract with Reclamation permits the delivery of water to fill the remainder of the Colorado River Aqueduct when water is available.
- Consolidated Court Decree.[5] The 1964 U.S. Supreme Court Decree confirmed the Arizona, California, and Nevada basic apportionments of 2.8 MAF per year, 4.4 MAF per year and 300 TAF per year, respectively. The 1964 Decree also permits the Secretary of the Interior to make water available that is unused by one of the states for use in the other two states. In addition, it permits the Secretary of the Interior to make surplus water available. Several decrees were subsequently entered by the U.S. Supreme Court in the case *Arizona v. California et al* culminating in the Consolidated Decree entered on March 27, 2006.
- 2003 Quantification Settlement Agreement (QSA) and several other related agreements were executed in

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[2] A description of many of these documents can be found at http://www.usbr.gov/lc/region/pao/lawofrvr.html.

[3] This agreement among the seven California agencies was dated August 18, 1931 and was codified in federal regulations promulgated by the Secretary of the Interior on September 28, 1931.

[4] Including contract number Ilr-645 dated 04-09-1930, supplemented 09-28-1931.

[5] The Consolidated decree entered by the U.S. Supreme Court on March 27, 2006, in *Arizona v. California et al,* can be found at http://www.usbr.gov/lc/region/pao/pdfiles/scconsolidateddecree2006.pdf

October 2003.[6] The QSA quantifies the use of water under the third priority of the Seven Party Agreement, and further allocates 38 TAF of the sixth priority to Metropolitan. The QSA provides the numeric baseline needed to measure conservation and transfer programs, and it allows for implementation of agricultural conservation, land fallowing, and other programs identified in the 1996 IRP. Although this agreement does not directly impact Metropolitan's entitlements, Metropolitan agreed to forbear consumptive use when necessary so that the Secretary of the Interior can satisfy the uses of holders of miscellaneous and Indian present perfected rights in excess of 14.5 TAF.

- 2005 Settlement Agreement with Quechan Indian Tribe. In 2005, Metropolitan entered into a settlement agreement with the Quechan Indian Tribe (Tribe) and other parties. The Tribe uses Colorado River water on the Fort Yuma Indian Reservation. Under the settlement agreement, the Tribe, in addition to the amounts of water decreed for the benefit of the Reservation in 1964, is entitled to (a) an additional 20 TAF of diversions from the Colorado River or (b) the amount necessary to supply the consumptive use required for irrigation of a specified number of acres, and for the satisfaction of related uses, whichever is less. Of the additional water, 13 TAF became available to the Tribe in 2006. An additional 7 TAF becomes available to the Tribe in 2035. Metropolitan and the Tribe agreed that if the Tribe chooses to limit proposed development and utilization of their irrigable lands, which would require the diversion of any of the additional water in a year, and instead allows the water which would otherwise be used to be diverted by Metropolitan, Metropolitan provides an incentive payment to the Tribe to avoid or reduce a loss of supply.
- Colorado River Interim Guidelines for Lower Basin Shortage and the Coordinated Operations for Lake Powell and Lake Mead. In December 2007, the Secretary of the Interior approved a Record of Decision establishing specific interim guidelines for reductions in Colorado River water deliveries in the Lower Basin during declared shortages and coordinated operations of Lake Powell and Lake Mead. These new guidelines provide water release criteria from Lake Powell and water storage and water release criteria from Lake Mead during shortage, normal, and surplus conditions in the Lower Basin, and provide a mechanism for Metropolitan to store and take delivery of conserved system and non-system water in Lake Mead.

Financing

Metropolitan's operating budget (referenced at the beginning of this appendix) includes the cost of delivering Colorado River water and the payment to the Quechan Indian Tribe, which is paid from water sales revenue.

Federal, State, and Local Permits/Approvals

Metropolitan's fourth priority Colorado River water is currently available, and this priority assures delivery of the Basic apportionment.

B. IID - Metropolitan Conservation Program

Source of Supply

The IID-Metropolitan Conservation Program provides an annual supply that is delivered to Metropolitan's service area via its Colorado River Aqueduct (CRA). In 1988, Metropolitan executed a Conservation Agreement to fund water efficiency improvements within IID's service area in return for the right to divert the water conserved by those improvements. The program consists of structural and non-structural measures, including the concrete lining of existing canals, the construction of local reservoirs and spill-interceptor canals, installation of non-leak gates, and

[6] These agreements can be found at http://www.iid.com/Water/QSAAgreementsRelatedDocuments2003.

automation of the distribution system. Other implemented projects include the delivery of water to farmers on a 12-hour basis rather than a 24-hour basis and improvements in on-farm water management through the installation of tailwater pumpback systems and drip irrigation systems.

Expected Supply Capability

The IID-Metropolitan Conservation Program activity began in 1990, has been fully operational since 1998, and makes available 105 TAF of conserved water annually. The initial program agreement provided CVWD the option to call up to about 45 TAF per year if needed to meet its demands. Execution of the QSA has reduced CVWD's option to a maximum of 20 TAF. This water is available to Metropolitan if not required by CVWD, but the minimum supply to MWD has been increased to 85 TAF with continued operation of 24 tailwater pumpback systems through a second amendment to the agreement.

Rationale for Expected Supply

Historical Record

The IID-Metropolitan Conservation Program has been fully operational since 1998. Existing agreements have extended the initial term to at least 2041 or 270 days after the termination of the QSA, whichever is later, and they guarantee Metropolitan a minimum of 85 TAF per year.

With operations beginning in 1990, the program has conserved as much as 109.46 TAF per year to date. By an amendment to the program agreement beginning in 2007 the annual conserved water yield has and will be 105 TAF. The historical record indicates that Metropolitan's expected minimum supply of 85 TAF per year would be available over the next 31 years at least.

Written Contracts or Other Proof

Metropolitan's annual supply from the IID-Metropolitan Conservation Program is based on three agreements and amendments to the agreements.

- 1988 IID-Metropolitan Conservation and Use of Conserved Water Agreement. This Agreement was executed in December 1988 by IID and Metropolitan for a 35-year term following completion of program implementation (1998–2033).
- 1989 Approval Agreement. This Agreement secured the approval of the PVID and CVWD to not divert an amount of water equal to the amount conserved except under limited circumstances. The Agreement was executed in December 1989.
- 1989 Supplemental Approval Agreement. This Agreement was executed in December 1989 between Metropolitan and CVWD to coordinate Colorado River diversions and the use of the conserved water provided by the Program.
- 2003 Amendments to 1988 Agreement and 1989 Approval Agreement. These amendments revise Metropolitan's potential obligation to reduce its use of the conserved water yield in favor of its use by CVWD down to 20 TAF annually. Any of this water not used by CVWD would be available to Metropolitan.
- 2007 Amendments to 1988 Agreement and 1989 Approval Agreement. These amendments specify that beginning in 2007 the annual conserved water yield has and will be 105 TAF, of which up to 20 TAF would be made available to CVWD upon its request.

Financing

The water efficiency improvements under this Program have already been funded, constructed, and put into operation. Metropolitan's five-year financial forecast in the budget includes the cost of operating, maintaining, and delivering the conserved water under the IID-Metropolitan Conservation Program.

Federal, State, and Local Permits/Approvals

A comprehensive environmental review process supported implementation.

- EIR for Program. The IID Board certified the final Environmental Impact Report for the Program in December 1986.[7]
- EIR for Supplemental Program. The IID Board certified the final Environmental Impact Report for the Completion Program in June 1994.[8]
- Program EIR for Quantification Settlement Agreement. Metropolitan's Board certified the final Program Environmental Impact Report for the QSA in June 2002.[9]
- Addendums to the QSA Final Program EIR. Metropolitan's Board adopted the Addendum to the QSA Final Program Environmental Impact Report in December 2002 and a second addendum in September 2003. Metropolitan's Board also adopted the Findings of Fact and Statement of Overriding Considerations, and Mitigation and Monitoring and Reporting Program at that time.

C. Hayfield Groundwater Storage Project

Source of Supply

The Hayfield Groundwater Storage Project (Hayfield Project) is planned to supply up to 100 TAF per year during dry year or non-surplus Colorado River conditions. During wet and surplus years, Metropolitan would replenish the Hayfield Project from the CRA.

[7] Imperial Irrigation District, *Final EIR, Proposed Water Conservation Program and Initial Water Transfer, Imperial Irrigaton District,* October, 1986. SCH Number: 1986012903.

[8] Imperial Irrigation District, *Final EIR for Modified East Lowline and Trifolium Interceptors, and Completion Projects*, May 1994. SCH Number: 1992071061.

[9] Coachella Valley Water District, Imperial Irrigation District, Metropolitan, San Diego County Water Authority, *Final Program EIR, Implementation of the Colorado River Quantification Settlement Agreement*, June 2002, SCH Number 2000061034.

Expected Supply Capability

It is estimated that the Hayfield aquifer can hold up to 400 TAF of additional CRA water. At buildout, this water could be extracted during dry year conditions at a rate of up to 100 TAF per year. This supply would be available to Metropolitan in any year, but delivery is constrained by the existing capacity of the CRA. Incremental deliveries of water to the CRA from the Hayfield Project can be made during wet or average years depending on operating conditions along the CRA. For example, the Hayfield Project may provide operational efficiencies in meeting delivery obligations at Whitewater or other locations along the CRA.

Rationale for Expected Supply

As an integral part of the Colorado River resource strategy for storage programs, the Hayfield Project could be used by Metropolitan in meeting its demands in future dry years.

Program Facilities

The Hayfield Program would consist of facilities in two general areas:

- 390 acres of spreading basins,
- A well field consisting of 40 new wells to extract water from the aquifer, and pumps to return the water to the Colorado River Aqueduct;

Historical Record

Metropolitan's Board of Directors authorized implementation of the Hayfield Project in April 1999. Over 70 TAF of water have been stored in the Hayfield aquifer since that time from historical CRA releases. A prototype extraction well was constructed in 2009.

Written Contracts or Other Proof

The Hayfield Project has been implemented as a component of California's Colorado River Water Use Plan. The following actions have occurred:

- 1998 Memorandum of Understanding (MOU) between Metropolitan and the

U. S. Department of the Interior Bureau of Land Management (BLM). This MOU describes the intent of both Metropolitan and the BLM to exchange properties overlying the Hayfield Basin in order to support the implementation of the Hayfield Project. Approximately 3,800 acres of federally owned property in the Hayfield Valley would be exchanged with like properties held by Metropolitan. The purpose of this exchange of properties is to manage the underlying groundwater resource and protect water quality.

- April 1999 Board of Directors Adoption of the CEQA Document. Metropolitan's Board of Directors adopted the Mitigated Negative Declaration for the Hayfield Project at its regularly scheduled Board of Directors meeting in April 1999.
- June 2000 Board of Directors Approval of the Hayfield Project. Metropolitan's Board of Directors approved the Hayfield Project and appropriated an additional $7.35 million for land acquisition, preliminary design, continued water quality monitoring, additional aquifer testing and other tasks. The Board authorized storage of up to 800 TAF of CRA water.
- December 2002 Board of Directors Appropriation of Design, Testing and Construction Funds. Metropolitan authorized expenditure of an additional $18 million to implement the Hayfield Project. This action increased the authorized funding to implement the Hayfield Project to more than $27 million.
- Because of the recent drought in the Colorado River basin, the storage portion of the Hayfield Program is currently on hold indefinitely.
- October 2008 Board of Directors Authorize Agreements for Final Design. Metropolitan authorized $3 million for the final design of the facilities to extract the previously stored water in three to four years. Facilities included 4 wells, 2.5 miles of pipeline and power lines. Total estimated cost to complete the project is $21 million.
- February 2009 Board of Directors Authorize Installation of Prototype Well for Hydrogeologic Investigations. Metropolitan authorized $1.9 million for the installation of a prototype well to evaluate the hydrogeologic constraints with the extraction of the stored water from Hayfield. This action was taken to address concerns with respect to water quality and well yield.
- March 2010 Authorize Final Design of Hayfield Groundwater Extraction Project. Metropolitan authorized final design for the equipping of the Prototype Well. The prototype well would have the ability to extract the stored water in 15 years. Estimated design and construction cost is $4 million.

Financing

The capital cost of the full-scale Hayfield Project is estimated to be approximately $75 million. A four-well configuration project for extraction only is estimated to cost approximately $21 million. This cost is included in Metropolitan's 10-year capital budget (referenced above) and would be financed through a combination of bonds and water sales revenue.

Federal, State and Local Permits/Approvals

Metropolitan has applied for and requested all appropriate federal, state and local permits for construction. Metropolitan anticipates the operating permit for the Hayfield groundwater recovery project to be issued by California Department of Public Health during the later potion of 2010. Monitoring wells and test wells were completed in accordance with Riverside County permitting procedures. Necessary environmental permits would be acquired as needed.

D. Palo Verde Irrigation District Land Management, Crop Rotation And Water Supply Program

Source of Supply

At its May 11, 2004 meeting, Metropolitan's Board authorized a 35-year land management, crop rotation, and water supply program with the PVID. Under the program, participating farmers in PVID are being paid to reduce their water use by not irrigating a portion of their land. A maximum of 29 percent of lands within PVID can be fallowed in any given year. Under the terms of the QSA, water savings within the PVID service area are made available to Metropolitan. PVID has the first priority for Colorado River water under the water delivery contracts with the U.S. Bureau of Reclamation. Implementation of the program began in January 2005. The program is estimated to provide up to 133 TAF per year. The agreement also specifies that the program will provide a minimum of 33 TAF per year.

Expected Supply Capability

It is estimated that the PVID/Metropolitan Program would provide up to 133 TAF per year of additional Colorado River water. This water would be available in any year as needed and in accordance with the provisions described in the agreements with Palo Verde Valley landowners and PVID.

Rationale for Expected Supply

Historical Record

Metropolitan and PVID tested the concept of developing a water supply for Metropolitan by entering into an agreement in 1992.[10] Agreements were signed with landowners and lessees in the Palo Verde Valley to forego irrigation for a two-year period from August 1992 to July 1994. Water unused by PVID, in the amount of 186 TAF, was stored in Lake Mead for Metropolitan. Both PVID and Metropolitan signed approved Principles of Agreement in 2001. PVID issued the Final Environmental Impact Report for the Proposed Palo Verde Irrigation District Land Management, Crop Rotation and Water Supply Program in September 2002.[11]

Implementation of the program began in January 2005. In 2005, 2006, 2007, 2008, and 2009, approximately 108.7, 105.0, 72.3, 94.3, and 120.2 TAF of water, respectively, were saved and made available to Metropolitan. In March 2009, Metropolitan and PVID entered into a one-year supplemental fallowing program within PVID that provides for the fallowing of additional acreage, with savings projected to be as much as 62 TAF. Of that total, 24.1 TAF of water was saved in 2009, with the balance to be made available in 2010.

Written Contracts or Other Proof

- August 2004 Forbearance and Fallowing Program Agreement. This agreement establishes the PVID/Metropolitan Program, which provides for a solicitation of and provisional approval of landowner participation offers, specifies the process for incorporating offers into agreements with landowners, and states the terms and conditions for fallowing, including payments made by Metropolitan.
- Landowner Agreements for Fallowing in the PVID. These agreements specify an escrow process to consummate the transaction, an easement deed to encumber land for fallowing, a tenant agreement to subordinate a tenant's lease to the agreement and easement, and an encumbrance agreement to subordinate any encumbrance (e.g., a mortgage) to the easement. These agreements also state the landowner's fallowing obligation, payments to be made by Metropolitan, and land management measures to be implemented.

[10] Presented to Metropolitan's Board at its regular meeting January 14, 1992.

[11] SCH Number 2001101149.

Financing

Metropolitan's annual O&M budget (referenced above) includes the cost of the PVID/Metropolitan Program.

Federal, State and Local Permits

A Notice of Preparation for the PVID/Metropolitan Program was published on October 29, 2001. PVID issued the Final Environmental Impact Report for the Proposed Palo Verde Irrigation District Land Management, Crop Rotation, and Water Supply Program in September 2002 (see reference above).

E. All-American and Coachella Canal Lining Projects

Source of Supply

Water is being conserved by the replacement of earthen portions of the Coachella Canal and the All-American Canal with concrete-lined canals. The concrete lining reduces the amount of water lost to seepage from the canals.

Expected Supply Capability

Pursuant to the October 10, 2003 Allocation Agreement, Metropolitan is entitled to delivery of 16 TAF annually until the San Luis Rey Settlement Parties[12] satisfy the conditions described in Section 104 of the San Luis Rey Indian Water Rights Settlement Act (Public Law 100-675 as amended). Once the statutory conditions have been met, Metropolitan will provide by exchange water to the United States for use by the Settlement Parties and San Diego County Water Authority will convey the water for use by the Settlement Parties'.

Rationale for Expected Supply

The All-American and Coachella canal lining projects were implemented pursuant to the authorization contained in Title II of Public Law 100-675. The allocation of the water resulting from these projects is provided under the Allocation Agreement. The Allocation Agreement is a QSA-related agreement. The USBR, on behalf of the Secretary of the Interior, has issued interim determinations for the Coachella Canal Lining Project (January 31, 2008) and the All-American Canal Lining Project (December 4, 2009) that results in the annual delivery to Metropolitan of 4.5 TAF and 11.5 TAF, respectively. Delivery of this water for Metropolitan's use continues until conditions described in Section 104 of Public Law 100-675 and the Allocation Agreement are satisfied.

Program Facilities

The Coachella Canal is owned by the United States and is operated by CVWD. The All-American Canal is owned by the United States and is operated by IID. The water is conveyed through existing CRA facilities from Lake Havasu to Metropolitan.

Historical Record

The Coachella Canal Lining Project began conserving water in 2006 and reached its full conservation yield in calendar year 2009. The All-American Canal Lining Project began conserving water in 2008 and will reach its full conservation yield in calendar year 2010. Actual annual deliveries to Metropolitan are as follows:

Calendar Year	**Volume Delivered to Metropolitan** (AF)
2006	172
2007	4,500
2008	6,013
2009	15,648
2010	16,000 (projected)

Written Contracts or Other Proof

- 2003 Allocation Agreement. This agreement among the United States, Metropolitan, CVWD, IID, San Diego County Water Authority, and the San Luis Rey Settlement Parties, provides for the determination by the Secretary of the

12 The San Luis Rey Settlement Parties are the La Jolla, Pala, Pauma, Rincon and San Pasqual Bands of Mission Indians, the San Luis Rey River Indian Water Authority, and the City of Escondido and Vista Irrigation District.

Interior of the conserved water yield from the All-American Canal Lining Project and the Coachella Canal Lining Project, the allocation of that yield among IID, SDCWA, Metropolitan, and the Settlement Parties, and the delivery of the allocated amounts to the respective users by the Secretary of the Interior.

Financing

Under the Allocation Agreement, water resulting from the All-American and Coachella Canal lining projects is made available to Metropolitan until the conditions specified in Sections 7.2.1, 7.2.2, and 7.2.4 of the Allocation Agreement have been satisfied. Metropolitan and the San Luis Rey River Indian Water Authority have a dispute over the validity of Section 7[13] of the October 10, 2003 Agreement Relating to Supplemental Water among The Metropolitan Water District of Southern California, the San Luis Rey Settlement Parties, and the United States. Pending resolution of the dispute, Metropolitan sets aside funding for the portion of the conserved water it receives as part of its annual O&M budget.

Federal, State, and Local Permits/Approvals

A comprehensive environmental review process supported implementation.

- <u>Program EIR for Quantification Settlement Agreement.</u> Metropolitan's Board certified the final Program Environmental Impact Report for the QSA in June 2002.[14]
- <u>Addendums to the QSA Final Program EIR.</u> Metropolitan's Board adopted the Addendum to the QSA Final Program Environmental Impact Report in December 2002 and a second addendum in September 2003. Metropolitan's Board also adopted the Findings of Fact and Statement of Overriding Considerations, and Mitigation and Monitoring and Reporting Program at that time.
- <u>EIR/EIS for the All-American Canal Lining Project.</u> Reclamation approved the Record of Decision for the All American Canal Lining Project on July 29, 1994. IID certified the All American Canal Lining Project Final EIS/EIR and approved the project on August 16, 1994. Reclamation released a Supplemental Information Report on the All American Canal Lining Project, dated January 12, 2006.
- <u>EIR/EIS for the Coachella Canal Lining Project.</u> Reclamation approved the Record of Decision for the Coachella Canal Lining Project on March 27, 2002. CVWD certified the Coachella Canal Lining Project Final EIS/EIR and approved the project on May 15, 2001. Metropolitan certified that it had reviewed and considered the information contained in those two documents and adopted the Lead Agencies' findings on December 13, 1994, for the All American Canal Lining Project and on September 11, 2001, for the Coachella Canal Lining Project.
- <u>Addendum to EIS/EIR for the Coachella Canal Lining Project.</u> Addendum to the Coachella Canal Lining Project Final EIS/EIR was published on February 27, 2004. CVWD certified the Addendum and approved the project on March 2, 2004.

F. *Metropolitan-CVWD Delivery and Exchange Agreement for 35,000 Acre-Feet*

Source of Supply

Metropolitan delivers to CVWD up to 35 TAF from Metropolitan's available State Water Project (SWP) Table A supply without condition on the actual Department of Water Resources (DWR) allocation for that year. As CVWD does not have a connection to the SWP, the water is delivered to CVWD by an

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[13] Payments from Metropolitan for Supplemental Water and Related Power Delivered Prior to Satisfaction of Section 104

[14] Coachella Valley Water District, Imperial Irrigation District, Metropolitan, San Diego County Water Authority, Final Program EIR, Implementation of the Colorado River Quantification Settlement Agreement, June 2002, SCH Number 2000061034.

exchange with Colorado River water. Metropolitan takes delivery of the Table A supply in conjunction with forgoing diversion of an equal volume of its Colorado River supply effectively leaving this water in the River for diversion by CVWD at Imperial Dam. Exchange deliveries may also be made at the CRA Whitewater service connection or through the Metropolitan-CVWD-Desert Water Agency Advance Delivery Agreement. This program represents a net debit to Metropolitan's supplies.

Expected Capability

Up to 35 TAF of Metropolitan's SWP Table A supply will be delivered annually to CVWD by exchange.

Rationale for the Expected Supply

This program is undertaken pursuant to the Delivery and Exchange Agreement between Metropolitan and Coachella for 35,000 AF dated October 10, 2003 and is a QSA-related agreement.

Program Facilities

Metropolitan takes delivery of the Table A supply from the East Branch of the California Aqueduct at Devil Canyon Afterbay. At Metropolitan's request the USBR releases a portion of Metropolitan's available Colorado River supply from Lake Mead for diversion by CVWD at Imperial Dam and conveyance through the All-American Canal System.

Historical Record

Since the 2003 execution of the QSA and the Delivery and Exchange Agreement, the following volumes of exchange water were delivered to CVWD at Imperial Dam:

Calendar Year	**Volume of Exchange Water** (AF)
2003	0
2004	0
2005	0
2006	34,958
2007	0
2008	0
2009	0
2010	10,000 (projected)

Written Contracts or Other Proof

- 2003 Delivery and Exchange Agreement. This agreement between Metropolitan and CVWD provides for the delivery of up to 35,000 AF of Metropolitan SWP Table A supply by exchange with Colorado River water.

Federal, State, and Local Permits/Approvals

- Program EIR for Quantification Settlement Agreement. Metropolitan's Board certified the final Program Environmental Impact Report for the QSA in June 2002.[15]
- Addendums to the QSA Final Program EIR. Metropolitan's Board adopted the Addendum to the QSA Final Program Environmental Impact Report in December 2002 and a second addendum in September 2003. Metropolitan's Board also adopted the Findings of Fact and Statement of Overriding Considerations, and Mitigation and Monitoring and Reporting Program at that time.
- September 2002 Final Program EIR for Coachella Valley Water Management Plan and State Water Project Entitlement Transfer as certified by the CVWD on October 8, 2002

[15] Coachella Valley Water District, Imperial Irrigation District, Metropolitan, San Diego County Water Authority, Final Program EIR, Implementation of the Colorado River Quantification Settlement Agreement, June 2002, SCH Number 2000061034.

G. SNWA and Metropolitan Storage and Interstate Release Agreement

Source of Supply

The source of supply is SNWA's intentionally created unused Nevada apportionment of Colorado River water made available to Metropolitan for diversion and storage. In later years Metropolitan would return this water through reduced diversions of Colorado River water made at the request of SNWA.

Expected Capability

Based on recent use patterns in Nevada as much as 60 TAF could be made available in a single year to Metropolitan from SNWA. As of January 1, 2010, 70 TAF has been diverted by Metropolitan.

Returns to SNWA are limited to no more than 30 TAF annually and SNWA has agreed to forgo requesting return of stored water through 2019. If the Secretary of the Interior apportions less than 280 TAF of basic apportionment for use in Nevada, SNWA may request the return of up to 50 TAF, 1 acre-foot for each acre-foot less than 280 TAF of basic apportionment apportioned for use in Nevada.

Rationale for the Expected Supply

Program Facilities

Water is diverted through the CRA by Metropolitan. To return the water to SNWA, Metropolitan would reduce its CRA diversions and the Secretary of the Interior would make water available to SNWA at Lake Mead.

Historical Record

The annual volumes of water diverted into the CRA by Metropolitan ares as follows:

Calendar Year	**Volume of Exchange Water (AF)**
2004	10,000
2005	10,000
2006	5,000
2007	0
2008	45,000
2009	0
2010	0 (estimated)

No water has been returned to SNWA.

Written Contracts or Other Proof

- 2004 Storage and Interstate Release Agreement. This agreement among Metropolitan, Colorado River Commission of Nevada, SNWA, and the United States provides for the Secretary of the Interior to make available to Metropolitan for diversion and storage unused Nevada apportionment. In subsequent years, the agreement provides for Metropolitan to make this water available to SNWA by forgoing diversion of a portion of its available Colorado River supply.
- Operational Agreement. As amended on August 11, 2009, the Operational Agreement specifies the conditions under which Metropolitan would divert and store unused Nevada apportionment through 2026 and the return of this water to SNWA to begin no earlier than 2019.

H. Lower Colorado Water Supply Project

Source of Supply

Groundwater is pumped by the Lower Colorado Water Supply Project near the All-American Canal and is discharged to the Canal. IID reduces its net diversions of Colorado River water by an amount equal to the amount of Project water discharged into the Canal, permitting entities along the Colorado River that do not have rights or have insufficient rights to divert Colorado River water to obtain a supply of water. In 2007, Metropolitan entered into a contract with the USBR and the City of Needles to utilize the unused Project capacity.

Expected Capability

The City of Needles projects that Metropolitan will receive 2.8 TAF of Lower Colorado Water Supply Project water in 2010. This is projected to increase to 5 TAF in future years should a new Project well be drilled.

Rationale for the Expected Supply

Program Facilities

Two Lower Colorado Water Supply Project wells pump water into the All-American Canal. The groundwater level in one of the wells has declined to the point that it cannot operate at capacity with existing equipment. Replacement equipment to restore pumping capacity is expected to be installed. A new Project well may be drilled to augment pumping capacity.

Historical Record

Metropolitan has received the following amounts of Lower Colorado Water Supply Project water:

Calendar Year	**Volume of Water** (AF)
2007	5,011
2008	6,300
2009	2,349
2010	3.000 (projected)

Written Contracts or Other Proof

- 2007 Lower Colorado Water Supply Project Contract among the United States, the City of Needles, and Metropolitan. This contract provides for the United States to deliver Colorado River water to Metropolitan, the availability of which results from the pumping of Lower Colorado Water Supply Project groundwater and the exchange of such water.

Financing

Metropolitan's budget includes the cost associated with receipt of Lower Colorado Water Supply Project water.

I. Lake Mead Storage Program, Drop 2 Reservoir Funding, and Yuma Desalting Plant Pilot Project

Source of Supply

Water has been and will be stored in Lake Mead as Intentionally Created Surplus (ICS) through extraordinary conservation measures, such as water saved through the Palo Verde Irrigation District Land Management, Crop Rotation, and Water Supply Program.

Water has been and will be stored in Lake Mead as ICS through system efficiency measures, such as Metropolitan's funding contributions toward construction of the Drop 2 Reservoir near the All-American Canal and pilot operation of the Yuma Desalting Plant.

Expected Capability

Metropolitan may create as much as 400 TAF of extraordinary conservation ICS water in a single year less the amount that may be created by IID, which could be as much as 25 TAF.

Upon creation, 5 percent of the extraordinary conservation ICS is deducted resulting in additional system water in storage in Lake Mead leaving 95 percent of the water available for release to Metropolitan. Each year thereafter, the remaining balance at the end of the year is reduced by three percent to account for evaporation losses.

The amount of extraordinary conservation ICS accumulated in Lake Mead for Metropolitan is limited to 1.5 MAF less the amount accumulated by IID which could be as much as 50 TAF.

Metropolitan may take delivery of as much as 400 TAF of extraordinary conservation ICS from Lake Mead in a year less the amount delivered to IID, which could be as much as 50 TAF.

Rather than storing extraordinary conservation ICS water in Lake Mead, IID may, with the written consent of Metropolitan, have up to 25 TAF of this water delivered to Metropolitan for storage in any one calendar year. Upon request by IID, Metropolitan would return 90 percent of the stored water to IID with the remaining 10 percent left for Metropolitan's use. Also, Metropolitan may make temporary use of IID's extraordinary conservation ICS accumulated in Lake Mead.

As of January 1, 2010, Metropolitan has 66 TAF of system efficiency ICS stored in Lake Mead. There are no evaporation losses charged to stored system efficiency ICS. Metropolitan may take delivery of as much as 34 TAF of this system efficiency ICS through 2010, down to 25 TAF annually from 2011 through 2015. The Bureau of Reclamation may reduce this delivery if it determines a reduction is necessary to avoid a shortage. If a shortage is declared in 2011 or 2012, then Metropolitan must payback any system efficiency ICS used from 2008 through 2010 in the shortage year, restoring that water to Metropolitan's system efficiency ICS account.

Pilot operation of the Yuma Desalting Plant is projected to result in the storage of 23.2 TAF of system efficiency ICS for Metropolitan over the course of its 365 days of operation.

Rationale for the Expected Supply

Program Facilities

This program makes use of Lake Mead and the CRA.

Historical Record

Since 2006 Metropolitan has created 100.6 TAF of extraordinary conservation ICS.

In 2008, the USBR assigned to Metropolitan 100 TAF of water stored in Lake Mead as system efficiency ICS.

As of January 1, 2010 Metropolitan's extraordinary conservation and system efficiency ICS volumes in Lake Mead were approximately 79.8 TAF and 66 TAF, respectively.

Written Contracts or Other Proof

- 2007 Lower Colorado River Basin Intentionally Created Surplus Forbearance Agreement among the Arizona Department of Water Resources, PVID, IID, the City of Needles, CVWD, Metropolitan, SNWA, and the Colorado River Commission of Nevada. This agreement sets forth the rules under which ICS water is developed, and stored in and delivered from Lake Mead.
- 2007 California Agreement for the Creation and Delivery of Extraordinary Conservation Intentionally Created Surplus among Metropolitan, PVID, IID, CVWD, and the City of Needles. This agreement determines the conditions under which California contractors receiving Colorado River water may store and deliver water from Lake Mead.
- 2007 Agreement among the United States, the Colorado River Commission of Nevada, and the SNWA for the Funding and Construction of the Lower Colorado River Drop 2 Storage Reservoir Project. This agreement provides for: the United States to design and construct the Drop 2 Storage Reservoir Project, SNWA to fund the capital cost of the Project, the United States to credit SNWA's ICS account with

600 TAF of System Efficiency ICS; and allows Metropolitan to become a party to the agreement requiring that Metropolitan provide funding for a portion of the capital cost.

- 2007 Delivery Agreement between the United States and Metropolitan. This agreement provides the procedures for creating the ICS water and guarantees delivery of the water to Metropolitan.
- 2008 Metropolitan Notice of Election to Participate as a Party to the Drop 2 Funding Agreement. This notice requires Metropolitan to provide funding for a portion of the capital cost of the Drop 2 Storage Reservoir Project, and the United States to credit Metropolitan's ICS account with 100 TAF of System Efficiency ICS, reducing the amount of System Efficiency ICS in SNWA's account by an equal amount.
- 2009 Agreement among the United States, Metropolitan, the Colorado River Commission of Nevada, SNWA, and the Central Arizona Water Conservation District for a Pilot Project for Operation of the Yuma Desalting Plant. This agreement provides for the allocation of the costs for the preparation and pilot operation of the Yuma Desalting Plant.
- 2010 Yuma Desalting Plant Pilot Project Delivery Agreement between the United States and Metropolitan. This agreement secures delivery of the ICS water created and specifies the manner in which this water will be accounted.

J. *Programs Under Development as Part of the Five-Year Supply Plan*

- *Expansion of the Palo Verde Irrigation District (PVID) Land Management Program:* In March 2009, the Board approved the emergency one year land fallowing expansion of the existing PVID program. An agreement with PVID was signed in April 2009 and farmers began fallowing later that month. The yield of the program is 62 TAF, with 24 TAF saved in 2009 and the balance to be made available in 2010. Additional fallowing agreements may be developed in subsequent years as needed.
- *Arizona Exchange:* An exchange program with Central Arizona Project is still in negotiations. In lieu of Arizona storing Colorado River water in the ground, water would be exchanged with Metropolitan for later return. Arizona does not expect to have water to provide to Metropolitan in 2010, but discussions continue for 2011 and beyond. At this time the potential yield is expected to be up to 150 TAF per year.
- *California Indians:* Discussions continue on developing a fallowing program. There is potential to receive from 10 to 20 TAF beginning in 2011.

A.3.2 California Aqueduct Deliveries

A. *State Water Project Deliveries*

Source of Supply

The State Water Project (SWP) provides imported water to the Metropolitan service area and has provided from 25 to 50 percent of Metropolitan's supplies through 2001. Since 2002, SWP deliveries accounted for an even greater share—as much as 70 percent. In accordance with its contract with the Department of Water Resources (DWR), Metropolitan has a Table A allocation of 1,911,500 AF per year under contract from the State Water Project. Actual deliveries have never reached this amount because they depend on the availability of supplies as determined by DWR. The availability of SWP supplies for delivery through the California Aqueduct over the next 18 years is estimated according to the historical record of hydrologic conditions, existing system capabilities as may be influenced by environmental permits, requests of the state water contractors and SWP contract provisions for allocating Table A, Article 21 and other SWP deliveries including San Luis carryover to each contractor. As shown in this report, the estimates of SWP deliveries to Metropolitan are based on DWR's most recent SWP reliability estimates contained in its State Water Project Delivery Reliability Report 2007[16] and the December 2009 draft of the biannual update.

As part of its contract with DWR, Metropolitan pays both the fixed costs of financing SWP facilities construction and variable costs of operations, maintenance, power and replacement costs for water delivered each year. SWP water is delivered to Metropolitan through the East Branch at Devil Canyon Power Plant afterbay, along the Santa Ana Valley Pipeline, and at Lake Perris. Metropolitan takes delivery from the West Branch at Castaic Lake.

Expected Supply Capability

The Edmund G. Brown California Aqueduct is capable of transporting Metropolitan's full contract amount of 1,911,500 AF per year. However, the quantity of water available for export through the California Aqueduct can vary significantly year to year. The amount of precipitation and runoff in the Sacramento and San Joaquin watersheds, system reservoir storage, regulatory requirements, and contractor demands for SWP supplies impact the quantity of water available to Metropolitan.

Rationale for Expected Supply

Metropolitan and 28 other public entities have contracts with the State of California for State Water Project water. These contracts require the state, through its DWR, to use reasonable efforts to develop and maintain the SWP supply. The state has made significant investment in infrastructure. It has constructed 28 dams and reservoirs, 26 pumping and generation plants, and about 660 miles of aqueducts. More than 25 million California residents benefit from water from the SWP. DWR estimates that with current facilities and regulatory requirements, the project will deliver approximately 2.3 MAF under average hydrology considering impacts attributable to the combined Delta smelt and salmonid species biological opinions.

On a yearly basis, DWR estimates the amount of supplies that are available for that year. Metropolitan uses a forecasting method for SWP deliveries based on historical patterns of precipitation, runoff, and actual deliveries of water.

Further, under the water supply contract, DWR is required to use reasonable efforts to maintain and increase the reliability of service to Metropolitan. As discussed in a subsequent section, DWR is participating in the Bay-Delta process to achieve these requirements.

<u>Historical Record</u>

The historical record shows significant accomplishments by DWR in providing its contractors with SWP water supplies. Through 2008, the SWP has delivered nearly 80 MAF to its contractors. The maximum annual water supply was delivered in 2005, and totaled 3.75 MAF. In 2006 the project delivered 3.7 MAF. DWR has continued to invest in SWP facilities to deliver water to its contractors.

<u>Written Contracts or Other Proof</u>

- <u>1960 Contract between the State of California and The Metropolitan Water District of Southern California for a Water Supply.</u> This Contract, initially executed in 1960 and amended numerous times since, is the basis for SWP deliveries to Metropolitan. It requires DWR to make reasonable efforts to secure water supplies for Metropolitan and its other contractors. The contract expires in 2035. At that time, Metropolitan has the option to renew the contract under the same basic conditions.

Financing

Metropolitan's payments for its State Water contract obligation are approved each year by its Board of Directors and currently

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[16] The State Water Project Delivery Reliability Report 2007 can be accessed at http://baydeltaoffice.water.ca.gov/swpreliability/.

constitute approximately 35 percent of the annual budget (referenced above).

Federal, State and Local Permit/Approvals

- Operation of the SWP. The DWR is responsible for acquiring, maintaining and complying with numerous federal and state permits for operation of the SWP. Metropolitan has been active in monitoring the issues affecting its contract with DWR.
- Environmental Impact Report for the East Branch Enlargement. In April 1984, DWR prepared and finalized an Environmental Impact Report for the Enlargement of the East Branch of the Governor Edmund G. Brown California Aqueduct.
- Environmental Impact Report for the Harvey O. Banks Pumping Plant. In January 1986, DWR prepared and finalized an Environmental Impact Report for the additional pumping units at Harvey O. Banks Delta Pumping Plant.
- Environmental Impact Report for the Mission Hills Extension. In 1990, DWR prepared and finalized an Environmental Impact Report for the State Water Project Coastal Branch, Phase II and Mission Hills Extension.
- East Branch Extension Project Phase 1. In 1998, DWR completed an EIR to extend the East Branch of the California Aqueduct to provide service to San Gorgonio Pass Water Agency. Phase 1 was completed in 2002.
- U.S. Fish and Wildlife Service Biological Opinion. In December 2008, U.S. Fish and Wildlife issued a Biological Opinion for Delta smelt.
- National Marine Fisheries Service Biological Opinion. In June 2009, the National Marine Fisheries Service issued a Biological Opinion for salmon.

B. Desert Water Agency/Coachella Valley Water District/Metropolitan Water Exchange and Advance Delivery Programs

Source of Supply

The Desert Water Agency (DWA) and CVWD, both in Riverside County, have rights to SWP deliveries but do not have any physical connections to the SWP facilities. Both agencies are adjacent to the CRA. For DWA and CVWD to obtain water equal to their SWP allocations, Metropolitan has agreed to exchange an equal quantity of its Colorado River water for DWA and CVWD's SWP water. DWA has a SWP Table A contract right of 55.75 TAF per year and CVWD has a SWP Table A contract right of 138.35 TAF per year, for a total of 194.1 TAF per year.

Expected Supply Capability

Under the existing agreements, Metropolitan provides water from its CRA to DWA and CVWD in exchange for SWP deliveries. Metropolitan can deliver additional water to its DWA/CVWD service connections permitting these agencies to store water. When supplies are needed, Metropolitan can then receive its full Colorado River supply as well as the SWP allocation from the two agencies, while the two agencies can rely on the stored water for meeting their water supply needs. The amount of DWA and CVWD SWP Table A water available to Metropolitan depends on total SWP deliveries and varies from year to year.

In addition to their Table A supplies DWA and CVWD, subject to Metropolitan's written consent, may take delivery of SWP supplies available under Article 21, the Turn-back Pool Program, and non-SWP water supplies they may acquire and convey through the SWP facilities. These non-SWP deliveries are delivered to DWA and CVWD by exchange with Metropolitan in the same manner as Table A deliveries. DWA and CVWD are participants in the Yuba Dry Year Water Purchase Program and DWA participated in the 2009 Drought Water Bank. Metropolitan has also consented to:

- 10 TAF of exchange deliveries to CVWD for non-SWP water acquired from the San Joaquin Valley from 2008 through 2010, and
- 36 TAF of exchange deliveries to DWA for non-SWP water acquired from the San Joaquin Valley from 2008 through 2015.

Rationale for Expected Supply

The DWR estimates the amount of supplies that are available each year. Metropolitan uses a forecasting method for SWP deliveries based on historical patterns of precipitation, runoff and actual deliveries of water.

<u>Historical Record</u>

The DWA and CVWD Exchange Program is currently in operation. The Advance Delivery Agreement has been in place since 1984. Since 1973, Metropolitan has been taking delivery of these agencies' SWP Table A water and has provided equivalent water to those agencies from Metropolitan's CRA supplies. Metropolitan has also been delivering water in advance of the amount needed under the exchange agreements. With water having been delivered in advance, Metropolitan can reduce deliveries to DWA and CVWD as needed. Indeed, from the end of December 2005 through December 2009, Metropolitan drafted approximately 231 TAF leaving 45 TAF in the Advance Delivery account.

<u>Written Contracts or Other Proof</u>

- <u>1967 and 1983 Water Exchange Contract and Agreements.</u> The DWA and CVWD Program is currently in operation. The DWA and CVWD water exchange contract has been in place since 1967, was amended in 1972 and was modified with execution of additional agreements in 1983.
- <u>1984 Advance Delivery Agreement.</u> The Advance Delivery Agreement allows Metropolitan to supply DWA and CVWD with Colorado River water in advance of the time these agencies are entitled to receive water under the exchange agreements. In future years, Metropolitan can recover this water by reducing its deliveries under the exchange agreements.
- <u>The 2003 Exchange Agreement.</u> DWA, CVWD and Metropolitan executed The 2003 Exchange Agreement under which Metropolitan transferred 88,100 AF and 11,900 AF of its SWP Table A to DWA and CVWD, respectively, reducing Metropolitan's Table A volume from 2,011,500 AF to 1,911,500 AF. The 2003 Exchange Agreement became operational in calendar year 2005 with the execution of letter agreements among DWA, CVWD, and Metropolitan governing its implementation. The exhibits to the November 9, 2004, and November 19, 2007, letter agreements also modify certain provisions of the Water Exchange Contract and Agreements and the Advance Delivery Agreement.

Financing

The funds for deliveries under this Program are included in Metropolitan's O&M budget and Long-Range Finance Plan (referenced above).

Federal, State, and Local Permits/Approvals

DWR is responsible for acquiring, maintaining and complying with numerous Federal and State permits for operation of the SWP.

- July 26, 1983, CVWD Negative Declaration, Whitewater River Spreading Area expansion Phase 1.
- February 1983, DWA Final EIR for the proposed extension of time for utilizing Colorado River water to recharge the upper Coachella Valley groundwater basins to the year 2035, Volume I and II, April 1983, Volume III
- September 2002, Final Program EIR for Coachella Valley Water Management Plan and State Water Project Entitlement Transfer as certified by CVWD on October 8, 2002

C. Semitropic Water Banking and Exchange Program

Source of Supply

The agreement between Semitropic Water Storage District (Semitropic) and Metropolitan was executed in February 1994. Semitropic obtains water from the SWP through its contracts with the Kern County Water Agency. SWP supplies irrigate an area of 161,200 acres within Semitropic's service area. When this surface water is not available, these growers withdraw water from the underlying aquifer. The agreement between Semitropic and Metropolitan allows Metropolitan to make use of 350 TAF of storage in Semitropic's groundwater basin. In years of plentiful supply, Metropolitan can deliver available SWP supplies to Semitropic through the California Aqueduct. During dry years, Metropolitan can withdraw this stored water. Five other banking partners participate in this Program and use 650 TAF of storage in Semitropic's groundwater basin.

Expected Supply Capability

The Semitropic-Metropolitan Program provides Metropolitan with the capacity to store up to 350 TAF of water under the current agreement. During dry years, Metropolitan can recover its stored water through a combination of direct pumping of the groundwater and delivery of Semitropic's SWP Table A water in the California Aqueduct. Based on the terms and conditions of the program agreements, the return of water to Metropolitan ranges from a minimum of 31.5 TAF per year (assuming the lowest groundwater return capacity available) up to 223 TAF (assuming the maximum capacity from the groundwater return and highest State Water Project Allocation). The average annual supply capability for a single dry year similar to 1977 is 125 TAF or multiple dry years similar to the period 1990-1992 is 107 TAF.

Rationale for Expected Supply

Historical Record

The Semitropic-Metropolitan Water Banking and Exchange Program has been operational since 1994. With existing agreements, it will continue to operate over the term of 41 years (1994-2035). At the end of 2009, Metropolitan had 45 TAF in its storage account. The program expects to have 45 TAF in its storage account by the end of 2010.

Written Contracts or Other Proof

- 1992 Turn-in/out Construction, Operation and Maintenance Agreement. This Agreement was executed in 1992 by the Department of Water Resources and Semitropic to allow construction, operation and maintenance of the Semitropic California Aqueduct Turn in/out.
- 1993 Temporary Semitropic-Metropolitan Water Banking Agreement. This Agreement was executed in February 1993 by Semitropic and Metropolitan to allow the storage of available Metropolitan supplies in advance of execution of the long-term agreement.
- 1994 Semitropic/Metropolitan Water Banking and Exchange Agreement. This Agreement was executed in December 1994 by Semitropic and Metropolitan to implement the program for a 41-year term (1994-2035).
- 1995 Point of Delivery Agreement. This agreement, with the Department of Water Resources, Kern County Water Agency and Metropolitan, allows Metropolitan to divert water from the California Aqueduct into Semitropic's service area.
- 1995 Introduction of Local Water into the California Aqueduct. This agreement, with the Department of Water Resources, Kern County Water Agency and Semitropic, allows Metropolitan to receive water from the program into the California Aqueduct.

Financing

Metropolitan's O&M budget (referenced above) includes payments for the Semitropic Program.

Federal, State and Local Permits/Approvals

- Final EIR. Semitropic acting as the lead agency under CEQA and Metropolitan acting as a responsible agency jointly completed the Environmental Impact Report for the Program. The EIR was certified by Semitropic in July 1994 and adopted by Metropolitan in August 1994.
- Regulatory Approvals. All regulatory approvals are in place and the program is operational.

D. Arvin-Edison Water Management Program

Source of Supply

The Arvin-Edison Water Storage District (Arvin-Edison) manages the delivery of local groundwater and water imported into its service area from the Central Valley Project's (CVP) Millerton Reservoir via the Friant-Kern Canal. The surface water service area consists of 132,000 acres of predominantly agricultural land, and to a minor degree, municipal and industrial uses. It is situated in Kern County. Arvin-Edison operates its supplies conjunctively, storing water in the underlying aquifer when imported supplies are available and withdrawing that water when the availability of imported supplies is reduced. In 1997, Metropolitan entered into an agreement with the Arvin-Edison Water Storage District. The agreement allows Metropolitan to store available water in Arvin-Edison's groundwater basin, either through direct spreading operations, or through deliveries to growers in Arvin-Edison's service area. Similar to Arvin-Edison's own usage, this previously stored water could be withdrawn when the availability of imported supplies to Metropolitan is reduced.

Expected Supply Capability

The Arvin-Edison/Metropolitan Program provides Metropolitan with the capacity to store up to 350 TAF of water under the current agreement. During dry years, Metropolitan can recover its stored water either through direct pumping of the groundwater or through exchange. Based on the terms and conditions of the program agreement, the return of water to Metropolitan ranges from a minimum of 40 TAF per year (peak 4-month summer period) up to 110 TAF (over a 12-month period). The average annual supply capability for this program is 75 TAF for either a single dry year similar to 1977 or for each year of a multiple dry year period similar to the period 1990-1992.

Rationale for Expected Supply

Historical Record

The Arvin-Edison/Metropolitan Water Management Program has been operational since 1997. With existing agreements, it will continue to operate over the term of 38 years (1997-2035). At the end of 2009, Metropolitan had 95 TAF in its storage account. The program expects to have 95 TAF in its storage account by the end of 2010.

Written Contracts or Other Proof

- 1997 Arvin-Edison/Metropolitan Water Management Agreement. This Agreement was executed in December 1997 by Arvin-Edison and Metropolitan to implement the program for a 30-year term (1997-2027).
- 1998 Turn-in/out Construction and Maintenance Agreement. This Agreement was executed in 1998 by the Department of Water Resources, Kern County Water Agency, Arvin-Edison and Metropolitan to allow construction, operation and maintenance of the Arvin-Edison California Aqueduct Turn in/out.
- 1998-2002 Water Delivery and Return Agreements. These agreements, with the Department of Water Resources, Kern County Water Agency, Arvin-Edison and Metropolitan, allow Metropolitan to divert water from, and introduce water to, the California Aqueduct.

- 2004 Point of Delivery Agreement. This agreement, with the Department of Water Resources, Kern County Water Agency and Metropolitan, allows Metropolitan to divert water from the California Aqueduct into Arvin-Edison's service area.
- 2004 Introduction of Water into the California Aqueduct. This agreement, with the Department of Water Resources, Kern County Water Agency and Arvin-Edison, allows Metropolitan to receive water from the program into the California Aqueduct.
- 2007 First Amended and Restated Agreement Between Arvin-Edison Water Storage District and The Metropolitan Water District of Southern California for a Water Management Program. This amendment increased the maximum storage level to 350 TAF, extended the agreement term to 2035, and provided for the construction of the South Canal Improvement Project. The project increases the reliability of Arvin-Edison returning higher water quality to the California Aqueduct.

Financing

Metropolitan's O&M budget (referenced above) includes payments for the Arvin-Edison Program.

Federal, State and Local Permits/Approvals

- All regulatory approvals are in place.
- Environmental Status: A Negative Declaration was completed in 1996.
- An Addendum to the 1996 Negative Declaration was completed in 2003.
- A Negative Declaration for the Arvin-Edison South Canal Improvement Project was completed in 2007.
- Regulatory Approvals. All regulatory approvals are in place and program is operational.

E. San Bernardino Valley Municipal Water District Program

Source of Supply

The San Bernardino Valley Municipal Water District Program allows Metropolitan to purchase a dependable annual supply, as well as, an additional supply for dry year needs. Under this program, Metropolitan purchases water provided to San Bernardino Valley Municipal Water District (Valley District) from its annual State Water Project (SWP) water allocation. Valley District delivers the purchased supplies to Metropolitan's service area through the coordinated use of facilities and interconnections within the water conveyance system of the two districts.

The purchased SWP supply is provided to Metropolitan as direct deliveries of annual SWP water through the California Aqueduct to Metropolitan's service area, as well as through deliveries of recaptured SWP water previously stored in the San Bernardino groundwater basin to Metropolitan's service area. Under this program, Metropolitan purchases a minimum of 20 TAF per year of SWP allocation every year. In addition, Metropolitan has the option to purchase Valley District's additional SWP allocation, if available, and the first right-of-refusal to purchase additional SWP supplies available beyond the minimum and option amounts. In the event that Metropolitan's operational needs do not require all, or a portion of the minimum purchased water, that unused amount may be carried forward up to a total of 50 TAF for later delivery. Finally, the program establishes a critical dry year supply account for Metropolitan that could provide additional amounts of dry year supplies. During any year designated by DWR as a critically dry year, Valley District could deliver from this account up to 50 TAF of recaptured SWP water previously stored in the San Bernardino groundwater basin.

To facilitate the transfer, the program also provides the coordinated use of existing facilities, including the Valley District's Foothill Pipeline and the Inland Feeder, to improve the conveyance capabilities of the delivery of SWP water to the service areas of both districts. The intertie between the Foothill Pipeline and the Inland Feeder has been constructed and was operational as of December 2002. This intertie allows Metropolitan to move SWP water from the East Branch of the California Aqueduct through the Foothill Pipeline and Inland Feeder, into Diamond Valley Lake and the Colorado River Aqueduct. As a result of this intertie, Metropolitan has an alternative conveyance capacity of 260 cfs into Metropolitan's system should an outage occur on the upper section of the Inland Feeder.

Expected Supply Capability

The average annual supply capability for a single dry year similar to 1977 is 70 TAF. For multiple dry years similar to the period 1990-1992, the expected supply capability is 37 TAF.

Rationale for Expected Supply

Historical Record

The San Bernardino Valley Municipal Water District Program began operations in 2001 and is expected to be renewed continually in the future. Since its inception in 2001, this program has delivered 103 TAF to Metropolitan. There was no water remaining in the carryover account in 2009. Deliveries in 2010 have been suspended by mutual agreement.

Written Contracts or Other Proof

Metropolitan's dependable annual and dry-year supplies from the San Bernardino Valley Municipal Water District Program are based on Metropolitan Board actions and agreements.

- 2000 Board Approval of Coordinated Operating Agreement. In June 2000, Metropolitan's Board authorized entering into a Coordinated Operating Agreement between Metropolitan and Valley District to develop projects that could provide benefits to both districts through the coordinated use of facilities and SWP supplies.
- 2000 Coordinated Operating Agreement. The Coordinated Operating Agreement between Metropolitan and Valley District was executed in July 2000.
- 2001 Board Approval of the Coordinated Use Agreement. In April 2001, Metropolitan's Board authorized entering into the Coordinated Use Agreement for Conveyance Facilities and SWP Water Supplies between Metropolitan and Valley District for the purchase of dependable annual and dry year supplies by Metropolitan.
- 2001 Coordinated Use Agreement. The Coordinated Use Agreement for Conveyance Facilities and SWP Water Supplies between Metropolitan and Valley District for the purchase of dependable annual and dry year supplies by Metropolitan was executed May 2001. The Agreement is effective as of July 1, 2001, for an "evergreen" term (10-years with automatic annual extensions unless otherwise notified).

Financing

Metropolitan's O&M budget (referenced above) includes the funds to purchase Program water.

Federal, State, and Local Permits/Approvals

The Program became effective as of July 1, 2001. An environmental review process and regulatory approval supported implementation.

- Final EIR. Final Regional Water Facilities Master Plan Environmental Impact Report dated February 1, 2001 was certified by Valley District, as lead agency, and by Metropolitan, as responsible agency. Notices of determinations were filed by Valley District and Metropolitan on May 29, 2001, and April 18, 2001, respectively.

- State Water Contractors' Review. In May 2001 the State Water Contractors reviewed and issued a letter supporting the program.
- DWR Review. The California Department of Water Resources agreed to the program in December 2001.

F. Bay-Delta Improvements

Source of Supply

Improving the water supply reliability of the State Water Project (SWP) is a primary focus of Metropolitan's long-term planning efforts. Metropolitan's strategy is to reduce its dependence on SWP supplies during dry years, when risks to the Bay-Delta ecosystem are greatest, and to maximize its deliveries of available SWP water during wetter years to store in surface reservoirs and groundwater basins for later use during droughts and emergencies.

Restoring and stabilizing the environmental health and supply reliability of the Bay-Delta through the implementation of CALFED's Bay-Delta Program and the Sacramento Valley Water Management Agreement are important steps to accomplishing this objective. These improvements are necessary for Metropolitan to attain its goal of 650 TAF of supply yield from the Bay-Delta in dry years by 2020. This yield is 200 TAF to 250 TAF over estimates of existing available dry-year supplies, as described above. This goal means that Metropolitan will rely on only 32.5 percent of its total SWP contract amount of 2.0 MAF per year in dry years. In addition, Metropolitan policy objectives for Bay-Delta improvements include an average of 1.5 MAF of supply yield to Metropolitan over all year types.

The SWP conveys water from the western slope of the Sierra Nevada to water users both north and south of the Bay-Delta. Specifically, SWP is delivered to Metropolitan's service area through a system of reservoirs, the Bay-Delta, pumping plants and the California Aqueduct. Owned and operated by the California Department of Water Resources (DWR), the SWP provides municipal and agricultural water to 29 State Water Contractors. Annual deliveries for the SWP average about 2.5 MAF. Municipal uses account for about 60 percent of annual deliveries, with the remaining 40 percent going to agriculture.

In January 2010, DWR released a draft of the biannual update of its Reliability Report. The report shows that future SWP deliveries will be impacted by two significant factors. The first is significant restrictions on SWP and Central Valley Project (CVP) Delta pumping required by the biological opinions issued by the U.S. Fish and Wildlife Service (December 2008) and National Marine Fisheries Service (June 2009). The second is climate change, which is altering the hydrologic conditions in the State. The 2009 draft report shows greater reductions in water deliveries on average when compared to the 2007 report. Over multiple-year dry periods, average annual Table A deliveries vary from 32% to 38% of the maximum Table A amount, while average annual deliveries over multiple-year wet periods range from 72 to 93% of the maximum Table A amount. Under future conditions, annual SWP Article 21 deliveries average 60 TAF, ranging from 1 TAF to 540 TAF over the 82-year simulation period.

The Bay Delta Conservation Plan

The Bay Delta Conservation Plan (BDCP) is being prepared through a collaboration of state, federal, and local water agencies, state and federal fish agencies, environmental organizations, and other interested parties. These organizations have formed the BDCP Steering Committee. The plan will identify a set of water flow and habitat restoration actions to contribute to the recovery of endangered and sensitive species and their habitats in California's Sacramento-San Joaquin Delta. The goal of the BDCP is to provide for both species/habitat protection and improved reliability of water supplies.

In order to select the most appropriate elements of the final conservation plan, the

BDCP will consider a range of options for accomplishing these goals using information developed as part of an environmental review process. Potential habitat restoration and water supply conveyance options included in the BDCP will be assessed through an Environmental Impact Report (EIR)/Environmental Impact Statement (EIS). The BDCP planning process and the supporting EIR/EIS process is being funded by state and federal water contractors.

Lead agencies for the EIR/EIS are the California Department of Water Resources, the Bureau of Reclamation, the U.S. Fish and Wildlife Service, and NOAA's National Marine Fisheries Service, in cooperation with the California Department of Fish and Game, the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers. MWD is on the steering committee.

Metropolitan also has been working with Bay-Delta watershed users toward settling the question of how all Bay-Delta water users would bear some of the responsibility of meeting Delta flow requirements. In December 2002, all of the parties signed a settlement agreement known as "The Sacramento Valley Water Management Agreement" or "Phase 8 Settlement Agreement." The agreement resulted from the SWRCB Bay-Delta Water Rights Phase 8 proceedings. It includes work plans to develop and manage water resources to meet Sacramento Valley in-basin needs, environmental needs under the SWRCB's Water Quality Control Plan, and export supply needs for both water demands and water quality. The agreement specifies about 60 water supply and system improvement projects by 16 different entities in the Sacramento Valley. Its various conjunctive use projects will yield approximately 185 TAF per year in the Sacramento Valley, and approximately 55 TAF of this water would come to Metropolitan through its SWP allocation. The Agreement specifies a supply breakdown of 110 TAF (60 percent) to the SWP and 75 TAF (40 percent) to the CVP.

Based on the work plans for CALFED's Bay-Delta Program and the Sacramento Valley Management Agreement, expected dry-year supply capabilities are projected to be 55 TAF for the period 2010 through 2015, and 110 TAF beyond 2015.

Rationale for Expected Supply

<u>Implementation Status</u>

Expected supplies are projected in accordance with the approved implementation plan for CALFED's Bay-Delta Program and with the work plans for the Sacramento Valley Water Management Agreement.

<u>Written Contracts or Other Proof</u>

Metropolitan's projected dependable annual and dry-year supplies from planned Bay-Delta improvements are based on Metropolitan Board actions and agreements.

- CALFED's Bay-Delta Program.
  - Bay-Delta Accord approved in December 1994.[17]
  - Proposition 204 funds approved by voters in November 1996.
  - Metropolitan policy direction regarding CALFED's Bay-Delta Program adopted in July 1999. This policy direction established water supply goals.
  - Proposition 13 funds approved by voters in March 2000.
  - CALFED Framework announced in June 2000[18].
  - Final implementation plans for the first phase of CALFED's Bay-Delta Program approved in August 2000, in conjunction with the approval of the Program and conclusion of the environmental review process.

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[17] A copy of this agreement can be found at http://calwater.ca.gov/Archives/GeneralArchive/SanFranciscoBayDeltaAgreement.shtml.

[18] California's Water Future: A Framework for Action can be found at http://calwater.ca.gov/Archives/GeneralArchive/adobe_pdf/new_final_framework.pdf.

- Proposition 50 funds approved by voters in November 2002.
- Annual Federal appropriations.

- Sacramento Valley Water Management Agreement[19]
  - Work plans detailing projects that could provide benefits by the 2002 and 2003 water years were developed in October 2001.
  - Statement of settlement policy principles recommended in December 2001 by negotiators for approval.
  - Statement of settlement policy principles approved by Metropolitan's Board in January 2002.
  - A Sacramento Valley Water Management Agreement was signed and approved by settlement parties in December 2002.

Financing

Funding for BDCP will come from federal, state, and local water supplier sources.

Phase 8 funding is structured as follows. The agreement calls for 185 TAF per year to be produced in below normal, dry and critical years with the ability of Central Valley water agencies to preclude delivery in above-normal years if it impairs their ability to perform in other years. The water is divided equally into two blocks: Block 1 is for local use in the Central Valley and if not needed, it becomes available to exporters (the predominant expectation of all); Block 2 is settlement water, available to meet flow standards/exports, except as noted above. Exporters have to buy an equal amount of Block 1 and Block 2 water if it is made available. Capital expenditures for infrastructure needed to deliver this water are assumed to be financed with public/bond funds. O&M expenses are shared for Block 2 on a 50-50 basis. For Block 1 water the price schedule is fixed at $50/AF in above normal, $75 in below normal, $100 in dry and $125 in critical years. This price schedule is indexed to a cost-of-living index.

Federal, State, and Local Permits/Approvals

- CALFED's Bay-Delta Program.
  - Programmatic Environmental Impact Report/Statement finalized in July 2000.
  - Record of Decision issued in August 2000 for the final Programmatic Environmental Impact Report/Statement regarding the CALFED Bay-Delta Program.
- Sacramento Valley Water Management Agreement.
  - Settlement parties approved Sacramento Valley Management Agreement in December 2002.
  - Environmental review will be conducted by the applicable lead agencies on the various work plan projects to comply with the California Environmental Quality Act, and as appropriate the National Environmental Policy Act.

G. Kern Delta Water Management Program

Source of Supply

In December 1999, Metropolitan advertised a request for proposals for participation in "The California Aqueduct Dry-year Transfer Program." As a result of this request for proposals, four programs, including one from the Kern Delta Water District (Kern Delta), were selected for further consideration. In 2001, Metropolitan entered into Principles of Agreement with Kern Delta for the development of a dry-year supply program. Kern Delta serves 125,000 acres of actively farmed highly productive farmland located in the San Joaquin Valley portion of southern Kern County. Kern Delta has under contract 180 TAF per year of good quality, highly reliable pre-1914 Kern River water and 25.5 TAF per year of SWP Table A contract

[19] A copy of this agreement can be found at http://www.norcalwater.org/pdf/agreementfinal.pdf

right (under contract with Kern County Water Agency).

The dry-year supply program between Kern Delta and Metropolitan involves the storage of water with Kern Delta. In years of plentiful supply the agreement allows Metropolitan to store water in Kern Delta's groundwater basin, either through direct spreading operations or through deliveries to growers in Kern Delta's service area. Metropolitan has the ability to store up to 250 TAF of water. Agreement provisions may allow for storage beyond this amount. When needed, Metropolitan can recover its stored water either through direct pumping of the groundwater or exchange at a rate of 50 TAF per year. The program duration will be from 2002 to 2027 with provisions that allow the water to be withdrawn until 2033.

Expected Supply Capability

The Kern Delta/Metropolitan Program provides Metropolitan with the capacity to store up to 250 TAF of water at any one time. When needed, Metropolitan can recover its stored water either through direct pumping of the groundwater or exchange at a rate of 50 TAF per year.

Rationale for Expected Supply

Implementation Status

Expected supplies are projected in accordance with accepted detailed groundwater modeling that has been accomplished for the program. In addition, the Kern Delta/Metropolitan Water Management Program was operational and accepting water for storage by fall of 2003. Metropolitan had 10 TAF in storage as of the end of 2009 and expects to recover all stored water by the end of 2010.

Written Contracts or Other Proof

- 2001 Kern Delta/Metropolitan Principles of Agreement. Principles of agreement were entered into between Kern Delta and Metropolitan in June 2001, covering program costs, operational aspects and risks/responsibilities.
- 2002 Kern Delta and Metropolitan Boards of Directors Approval. These actions approved execution of the long-term agreement, which delineates program operations, costs, and risks/responsibilities

Financing

Metropolitan's O&M budget (referenced above) includes payments for the Kern Delta/Metropolitan Program.

Federal, State and Local Permits/Approvals

Kern Delta, acting as lead agency under CEQA has prepared a full Environmental Impact Report. As part of this EIR, Kern Delta published a Notice of Preparation, and held meetings with the general public, interested agencies and resource agencies. In November 2002, the Final EIR certified by Kern Delta and adopted by Metropolitan.

H. Central Valley Water Transfers

Source of Supply

Up to 27 MAF of water (80 percent of California's developed water) is delivered for agricultural use every year. Over half of this water is used in the Central Valley; and much of it is delivered by, or adjacent to, SWP and Central Valley Project (CVP) conveyance facilities. This allows for the voluntary transfer of water to many urban areas, including Metropolitan, via the California Aqueduct.

In recent years, a portion of this agricultural water supply has been secured by Metropolitan through mutually beneficial transfer agreements:

- The Governor's Water Bank (Bank) in 1991, 1992, 1994, and 2009 secured 75 to 820 TAF per year of water supply. Further, the DWR's Dry Year Water Purchase Program (Purchase Program) in 2001, 2002 and 2003 secured a total of 162 TAF. The DWR established and administered the Bank and the Purchase Program by facilitating purchasing water from willing sellers and transferring the water to those with critical needs using the State Water Project (SWP) facilities. Sellers, such as farmers and water districts, made water available for the Bank and Purchase Program by fallowing crops, shifting crops, releasing surplus reservoir storage, and by substituting groundwater for surface supplies.

- Under the Central Valley Improvement Act, passed by Congress in October 1992, water agencies that are not contractors with the Central Valley Project (CVP), such as Metropolitan, may for the first time be able to acquire a portion of the CVP's 7.8 MAF per year of supply.
- In 2003, Metropolitan secured options to purchase approximately 145 TAF of water from willing sellers in the Sacramento Valley during the irrigation season. Using these options, Metropolitan purchased approximately 125 TAF of water for delivery to the California Aqueduct.
- In 2005, Metropolitan, in partnership with three other State Water Contractors, secured options to purchase approximately 130 TAF of water from willing sellers in the Sacramento Valley during the irrigation season, of which Metropolitan's share was 113 TAF. Metropolitan also had the right to assume the other State Water Contractors options if they chose not to exercise their options. Due to improved hydrologic conditions, Metropolitan and the other State Water Contractors did not exercise these options.
- In December 2007, Metropolitan entered into a long-term agreement with DWR providing for Metropolitan's participation in the Yuba Dry Year Water Purchase Program between Yuba County Water Agency and DWR that was approved by the SWRCB as part of the Yuba River Accord. This program provides for transfers of water from the Yuba County Water Agency during dry years through the year 2025 and Metropolitan has purchased 26.4 TAF and 42.9 TAF of Yuba transfer supplies in 2008 and 2009, respectively.
- In 2008, Metropolitan, in partnership with eight other State Water Contractors, purchased approximately 40 TAF of water from willing sellers in the Sacramento Valley during the irrigation season, of which Metropolitan's share was approximately 27 TAF.
- In 2009, Metropolitan participated in the Governor's Water Bank, which purchased approximately 47.5 TAF, of which Metropolitan's share was approximately 36.9 TAF.

Expected Supply Capability

Metropolitan's recent water transfer activities demonstrate Metropolitan's ability to develop and negotiate water transfer agreements working either directly with the agricultural districts that are selling the water or with DWR acting as an intermediary via a Drought Water Bank. As discussed in the State Water Project section of this document, significant restrictions on SWP and Central Valley Project (CVP) Delta pumping required by the biological opinions issued by the U.S. Fish and Wildlife Service (December 2008) and National Marine Fisheries Service (June 2009) will reduce anticipated SWP deliveries and therefore increase Metropolitan's need for Central Valley water transfer supplies. Unfortunately, these biological opinions result in SWP deliveries being shifted to the summer months thereby restricting the ability to pump water transfer supplies through the Delta pumping plants. On average, in dry years when Delta pumping capacity is available, Metropolitan expects to be able to purchase 125 TAF for delivery via the California Aqueduct.

Rationale for Expected Supply

<u>Historical Record</u>

Metropolitan has made rapid progress in developing Central Valley transfer programs. This progress may be attributed to several factors, including Metropolitan dedicating additional staff to identify, develop, and implement Central Valley transfer programs; increased willingness of Central Valley agricultural interests to enter into transfer programs with Metropolitan; and Metropolitan staff's ability to work with California Department of Water Resources and USBR staff to facilitate Central Valley storage and transfer programs. The availability of dry year supplies has been demonstrated in 1991, 1992, 1994, 2001, 2002, 2003, 2005, 2008, and 2009.

The historical record for purchases from the Bank, Purchase Program, and Metropolitan-initiated Central Valley programs, as well as the number of sellers and buyers participating in these Programs, are strong indicators that there are significant amounts of water that can be purchased through spot market water transfers during dry years. This historical record is summarized in Table A.3-1 below.

A portion of these transfers from north of the Delta were lost in its conveyance across the Delta to the Banks Pumping Plant (20 percent) and in its conveyance through the California Aqueduct System to Metropolitan's service area (3 percent).

Written Contracts or Other Proof

- Executive Orders. In response to the extended 1987-92 drought, Governor Wilson issued an executive order establishing a Drought Action Team. This team, made up of state and federal officials, developed an action plan to lessen the impacts of the continuing drought (State 1991). One of the proposed actions was the formation of an emergency water bank managed by DWR. The purpose of the bank would be to help California's urban, agricultural, and environmental interests meet their critical water supply needs. In June 2008, Governor Schwarzenegger issued an executive order establishing a 2009 Drought Water Bank.

Table A.3-1
Historical Record of MWD Central Valley Water Transfers

Program	Purchases (AF per year)		Participants	
	Total	Metropolitan	Seller	Buyers
1991 Governor's Water Bank	820,000	215,000	351	13
1992 Governor's Water Bank	193,246	10,000	18	16
1994 Governor's Water Bank	220,000	100	6	15
2001 Dry-Year Purchase Program	138,806	80,000	9	8
2003 MWD Water Transfer Program	146,230[1]	126,230	11	1
2005 SWC Water Transfer Program	127,275[2]	0	3	4
2008 SWC Water Transfer Program	39,152	26,621	4	8
2009 Governor's Water Bank	47,505	36,900	10	9

[1] Quantities denote options Metropolitan secured, of which 20,000 AF were not exercised due to improved hydrologic conditions.
[2] Quantities denote options Metropolitan secured, but not exercised due to improved hydrologic conditions.

- Agreements Between Sellers and Buyers. Since 1991, Metropolitan has entered into Central Valley water transfer agreements in eight years with sellers, or DWR acting in an intermediary capacity for the Drought Water Banks. The essential terms and conditions for negotiating purchases, including maximum offering price, quantity of water needed, and the timing of delivery, were established in these agreements.
- 1999 Board Directive. Metropolitan's Board has authorized water transfers in accordance with the Water Surplus and Drought Management Plan (WSDM Plan) adopted in April 1999. The WSDM Plan is a comprehensive policy guideline for managing Metropolitan's water supply during periodic surplus and shortage conditions. During shortage conditions, the plan specifies the type, priority and timing of drought actions, including the purchase of transfers on the spot market that could be taken in order to prevent or mitigate negative impacts on retail demands.

Financing

Funds for Central Valley water transfers are included in the O&M budget.

Federal, State, and Local Permits/Approvals

- Environmental documentation for the Drought Water Banks. In November 1993, DWR prepared and finalized a programmatic Environmental Impact Report for the operation of the drought water banks during future drought events. In 2009, an emergency CEQA exemption was issued to support the Drought Water Bank.
- Individual CEQA and NEPA documents for Metropolitan's 2003, 2005, and 2008 Central Valley water transfer programs. Individual sellers prepared CEQA documentation to support their transfers. In addition, the U.S. Bureau of Reclamation prepared NEPA documentation for those transfers requiring federal approval.

I. Yuba Accord Dry Year Purchase Program

Source of Supply

As part of a comprehensive settlement of a State Water Resources Control Board (SWRCB) proceeding in which the Yuba County Water Agency (YCWA) is required to increase Yuba River fishery flows, referred to as the "Yuba River Accord" (Accord), YCWA reached agreement with DWR and the United States Bureau of Reclamation to sell a portion of the water it would be required to release, plus additional water made available by reoperation of YCWA's storage reservoirs and groundwater substitution. DWR entered into a purchase agreement with YCWA under which one-half of the water available for purchase would be available to SWP contractors that elected to participate in the purchase program.

Under this 25-year program Metropolitan is obligated to purchase transfer water when the Table A allocation is 40 percent or less and has the option to purchase transfer water when the Table A allocation is greater than 40 percent but less than or equal to 60 percent. The price for water is set by the agreement between DWR and the Yuba County Water Agency. There are four categories of water the price for which varies depending on hydrology.

Expected Supply Capability

Metropolitan's share of the water made available under the Yuba Accord Dry Year Purchase Program is approximately 25 percent. Should other participating contractors decline to purchase their respective shares, that water is allocated to the remaining interested participating contractors. Metropolitan's likely share of assured YCWA transfer water would be at least 13,750 AF in dry years and up to 35,000 AF or more in other years. These volumes are as provided by YCWA north-of-the-Delta. Conveyance losses through the Delta to the Banks Pumping Plant

(20 percent) and down the California Aqueduct (3 percent) results in net delivery to Metropolitan ranging from approximately 11,000 AF in dry years to 27,000 AF or more in other years.

Rationale for Expected Supply

Historical Record

Actual volumes purchased and net deliveries to Metropolitan during the first two years of this program were as follows:

Year	Purchased Volume (AF)	Net Delivery (AF)
2008	26,430	20,510
2009	42,915	33,302

Written Contracts or Other Proof

- DWR-YCWA Purchase Agreement. This December 4, 2007, agreement provides the annual determination of the amount of water to be made available by YUBA and purchased by DWR. The agreement also specifies the costs of various categories of water to be made available under a variety of hydrologic conditions.
- DWR-Metropolitan Participation Agreement. This December 21, 2007, agreement provides Metropolitan's election to purchase water made available by YCWA to DWR and the scheduling delivery of the purchased water. The agreement provides for mechanisms for Metropolitan payments to DWR that are due to YCWA under the DWR-YCWA Purchase Agreement.

Financing

Funds for purchases of water from the Yuba Accord Dry Year Purchase Program are included in the O&M budget.

Federal, State, and Local Permits/Approvals

- SWRCB Order WR 2008-0014. Approval of YCWA's petition to modify revised Water Right Decision 1644 related to Water Right Permits 15026, 15027, and 15030 (Applications 5632, 15204, and 15574), and petition for long-term transfer of up to 200,000 AF of water per year from YCWA to the Department of Water Resources and the United States Bureau of Reclamation under Permit 15026 (Application 5632) - Lower Yuba River in Yuba County.

J. Programs Under Development as Part of the Five Year Supply Plan

- *Two-Gate System:* This project is in addition to the Bay-Delta improvements described under section F above. The proposed system includes the installation of new temporary gates in central Delta channels that would be operated in real time to reduce fish take, minimize water supply restrictions at the State and Federal export facilities, and improve Delta water quality. A review by the State Water Contractors (SWC) and Central Valley Project contractors suggests that the Two-Gate System can operate within the discretionary provisions of the Biological Opinion (BiOp) to reduce water supply restrictions. This would beneficially affect Delta smelt salvage, help maintain Delta smelt and their preferred habitats further downstream from the export pumps, and provide improved water supply benefits. The installation of the Two-Gate System is estimated to be completed by Fall 2012 and is anticipated to be fully operational in 2013.
- *North of Delta Transfers:* (covered under section H above)
- *In-Delta Transfers*: In January 2009, the Board authorized staff to enter into a water transfer agreement with Delta Wetlands Properties. Metropolitan entered into the water transfer agreement in late January to secure up to 18 TAF of new supply prior to any losses. The program is estimated to provide 8 TAF in 2009, depending on the amount of land fallowed and the conveyance losses. Metropolitan only pays for water that is made available for transfer. For 2010 and beyond, additional transfer agreements

like this one could yield up to 20 TAF per year.

- *North Kern / DWA Exchange*: In this agreement, Desert Water Agency (DWA) will purchase water from North Kern and deliver it to Metropolitan in exchange for Colorado River water delivered to DWA. In 2008, DWA purchased over 8 TAF from North Kern and delivered it to Metropolitan. In future years, DWA will buy additional water for delivery to Metropolitan. Metropolitan is scheduled to return all water received from DWA uniformly over the next 30 years, but may return it sooner if desired.

- *Semitropic Agricultural Water Reuse Demonstration Project*: This project provides a new water supply through the recovery of agricultural water in the San Joaquin Valley with an expected yield of about 11 TAF per year. In November 2009, Metropolitan and Semitropic Water District finalized an agreement to complete environmental review and technical studies for this project. Currently work is underway to complete the characterization of the groundwater, develop documents for environmental permits, and define facility design. Assuming this project moves forward as planned, it could begin operation in late 2011.

A.3.3 In-Basin Storage Deliveries

A. Surface Storage

Source of Supply

Surface storage is a critical element of Southern California's water resources strategy. Because California experiences dramatic swings in weather and hydrology, surface storage is important to regulate those swings and mitigate possible supply shortages. Surface storage provides a means of storing water during normal and wet years for later use during dry years, when imported supplies are limited. Since the early twentieth century, DWR and Metropolitan have constructed surface water reservoirs to meet emergency, drought/seasonal and regulatory water needs for Southern California. These reservoirs include Pyramid Lake, Castaic Lake, Elderberry Forebay, Silverwood Lake, Lake Perris, Lake Skinner, Lake Mathews, Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, Orange County Reservoir and Metropolitan's Diamond Valley Lake. Some reservoirs such as Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, and Orange County Reservoir, which have a total combined capacity of about 3,500 AF, are used solely for regulatory purposes. The remaining surface reservoirs are primarily used to meet emergency, drought and seasonal requirements. The total gross storage capacity for these larger remaining reservoirs is 1,768,100 AF. However, not all of the gross storage capacity is available to Metropolitan; dead storage and storage allocated to others reduce the amount of storage that is available to Metropolitan to 1,669,100 AF.

Expected Supply Capability

Surface storage reservoirs are an important tool that allows Metropolitan to meet the water needs of its service area. As discussed in the Final Environmental Impact Report for the Eastside Reservoir (DVL) Project dated October 1991and Metropolitan's IRP, the allocation of available surface storage can be divided into two primary components: emergency and drought/seasonal. As specified by Metropolitan's Board of Directors in the Final EIR for DVL, "Metropolitan shall maintain sufficient water reserves within its service area to supplement local production during an emergency or severe water shortage." With DVL in operation, Metropolitan can now re-operate the surface reservoirs and meet the Board's stated objectives.

<u>Updated Emergency Storage Requirements:</u> Metropolitan's criteria for determining emergency storage requirements, which was approved by Metropolitan's Board, was established in the Final EIR for DVL and further discussed in the IRP. Emergency Storage requirements are based on the potential for a major earthquake to damage the Colorado River Aqueduct, Los Angeles Aqueduct, and both branches of the California Aqueduct that could force the aqueducts out of service for six months. During this period, all interruptible service deliveries would be suspended, a mandatory reduction in water use of 25 percent from normal-year demand levels would be instituted, water stored in surface reservoirs and groundwater basins under Metropolitan's interruptible program would be made available, and full local groundwater production would be sustained.

The storage reserved in system reservoirs for emergency purposes changes over the next 20 years in accordance with the projected demands on Metropolitan as shown in Table A.3-2. The residual storage available to meet other needs, dry-year/seasonal, is also shown and discussed in greater detail in this appendix.

<u>Updated Storage Requirements for Dry-Year Supply and Seasonal Needs:</u> Storage capacity in system reservoirs, including DVL, is also earmarked for dry-year supply and system regulation purposes. Dry-year supply storage within Metropolitan's service area is required to meet the additional water demands that occur during single-year and extended droughts. As specified in the Final EIR for DVL and further discussed in the IRP, this storage requirement is defined as the difference between average-year demand

Table A.3-2
Surface Storage Utilization
(acre-feet per year)

Forecast Year	2015	2020	2025	2030	2035
MWD Dry-Year/Seasonal Surface Storage					
DVL, Mathews, Skinner	794,203	765,773	773,380	756,073	734,180
Flexible Storage in Castaic & Perris	219,000	219,000	219,000	219,000	219,000
Subtotal of Dry-Year/Seasonal Storage	***1,013,203***	***984,773***	***992,380***	***975,073***	***953,180***
MWD Emergency Storage					
DVL, Mathews, Skinner	238,097	266,527	258,920	276,227	298,120
Emergency Storage in DWR Reservoirs	334,000	334,000	334,000	334,000	334,000
Subtotal of Emergency Storage	***572,097***	***600,527***	***592,920***	***610,227***	***632,120***
Total MWD Surface Storage	**1,585,300**	**1,585,300**	**1,585,300**	**1,585,300**	**1,585,300**

and above average demand during dry years. In addition to dry-year storage, seasonal storage is required to meet seasonal peak demands, which are defined as the difference between average winter demands and average summer demands. The dry-year supply and seasonal storage also provides sufficient reserves to permit approximately five percent downtime for rehabilitation, repair, and maintenance of raw water transmission facilities.

Historical Record

Metropolitan has a contract with the Department of Water Resources that allows use of DWR's terminal reservoirs, such as Lake Castaic on the West Branch and Lake Perris on the East Branch of the California Aqueduct (see Section A.3.3.B for a discussion of Metropolitan's contractual rights to storage in these DWR reservoirs). In addition, Metropolitan owns and operates surface reservoirs such as Lake Skinner, Lake Mathews and Diamond Valley Lake to enhance water supply reliability for its Member Agencies.

Written Contracts or Other Proof of Usage

The Surface Reservoirs used by Metropolitan are available either by contract (in the case of the DWR terminal reservoirs) or by construction of its own facilities. The following historical record is provided:

November 1960 Contract between the State of California Department of Water Resources and the Metropolitan Water District of Southern California for a Water Supply. This Contract and its numerous amendments describe Metropolitan's legal access to and obligations for the operation of the State Water Project for the benefit of its Contractors. Metropolitan has an entitlement to 1,911,500 AF of water each year subject to availability. The terms of this Contract describe Metropolitan's rights to and obligations for the terminal surface reservoirs for water supply purposes.

November 1974 Memorandum of Understanding and Agreement on Operation of Lake Skinner. This MOU, signed by Metropolitan and other affected parties, governs Metropolitan's operations of Lake Skinner in Riverside County. The DWR Division of Safety and Dams also reviews monitoring data on the safety of the dam annually.

November 1999 Memorandum of Understanding on Operation of Diamond Valley Lake. This MOU, signed by Metropolitan and other affected parties, governs Metropolitan's operations of Lake Skinner in Riverside County. The DWR

Division of Safety and Dams also reviews monitoring data on the safety of the dam annually.

Elderberry Forebay Contract for Conditions for Use. Conditions for use of storage are described in the Contract between the Department of Water Resources, State of California, and the Department of Water and Power, City of Los Angeles, for Cooperative Development, West Branch, California Aqueduct; Amendment No. 1, July 3, 1969; and Amendment No. 4, June 27, 1985.

June 2002 Division of Safety of Dams Certificate of Approval. The Department of Water Resources, Division of Safety of Dams issued the Certificate of Approval for operation of Diamond Valley Lake in early 2000, with three conditions. These conditions were: (1) Satisfactory operation of the butterfly valves and emergency gate in the inlet/outlet tower, (2) completion of the Tank Saddle Cutoff remediation and (3) completion of the Signal Spillway. Metropolitan completed these conditions in 2001 and the Diamond Valley Lake is currently operational in accordance with the Certificate of Approval.

October 1991 Final Environmental Impact Report for the Eastside Reservoir Project (DVL). The EIR established criteria for integrating the operations of Metropolitan's reservoirs and DWR's southern reservoirs for emergency purposes. These criteria also provided that Metropolitan reservoirs could be expected to withdraw all drought storage water within a two-year period.

B. Flexible Storage Use of Castaic Lake and Lake Perris

Source of Storage

Metropolitan's flexible storage accounts in Castaic Lake and Lake Perris, SWP reservoirs, is 153,940 AF and 65,000 AF, respectively. These accounts provide Metropolitan with dry-year supply that is independent of the Table A allocation. Metropolitan can withdraw water from these reservoirs in addition to their allocated supply in any year on an as-needed basis. Withdrawn water must be replaced from supplies available to Metropolitan within five years of each withdrawal. This "flexible storage" is available in Castaic Lake to Metropolitan, Ventura County Flood Control and Water Conservation District, and to the Castaic Lake Water Agency. It is available in Lake Perris to Metropolitan only.

Expected Supply Capability

The dry year supply available to Metropolitan from the flexible storage use of Castaic Lake and Lake Perris totals 218,940 AF, made up of 153,940 AF in Castaic Lake and 65,000 AF in Lake Perris. Table A.3-3 shows the use of this available supply in accordance with Metropolitan's operating criteria.

In 2005, Seismic concerns arose regarding the Lake Perris Dam. In response, DWR plans to reduce the storage amount at Lake Perris by half until those concerns can be studied and addressed. In the long-term, the reduction in storage may potentially impact the amount of flexible storage available to Metropolitan from Lake Perris, and also impact the total amount of emergency storage available. However, since 2005 Metropolitan has continued to withdraw and replace water from the reservoir, which is operating at a lower level. In January 2010, DWR issued a Draft EIR for the repair of the Dam. Discussions are ongoing regarding the ultimate disposition of the reservoir as it related to costs allocated to the SWP contractors.

Rationale for Expected Supply

Implementation Status
Express provisions related to flexible storage have been incorporated in Metropolitan's SWP contract since 1995. The operating options have been available for use since that time and will continue to be in effect indefinitely as a part of the SWP contracts.

Historical Record
Metropolitan has exercised the flexible storage provision on numerous occasions through and including calendar year 2010. Its use is based on existing contract provisions.

Table A.3-3
Estimated Water Supplies Available for Metropolitan's Use Under the Flexible Storage Use of Castaic Lake and Lake Perris *
(TAF per year)

Year	Multiple Dry-Years (1990-1992)	Single Dry Year (1997)
2015	73	219
2020	73	219
2025	73	219
2030	73	219
2035	73	219

* Source: Metropolitan's operating criteria.

DWR Bulletin 132-94. The use of Castaic Lake and Lake Perris is determined in accordance with the proportionate use factors from Bulletin 132-94, Table B, upon which capital cost repayment obligations are based. Based on its capital repayment obligations, Metropolitan's proportionate use of Castaic Lake is 96.2 percent and of Lake Perris is 100 percent. Per its SWP contract, Metropolitan has express rights to use certain portions of the SWP southern reservoirs independently of DWR to supply water in amounts in addition to approved SWP deliveries.

Metropolitan's SWP Contract. Metropolitan's SWP contract was amended in 1995 to include Article 54, "Usage of Lakes Castaic and Perris." This article provides flexible storage to contractors participating in repayment of the capital costs of Castaic Lake and Lake Perris. Each contractor shall be permitted to withdraw up to a Maximum Allocation from Castaic Lake and Lake Perris. These contractors may withdraw a collective Maximum Allocation up to 160 TAF in Castaic Lake and 65 TAF in Lake Perris, which shall be apportioned among them pursuant to the respective proportionate use factors, as shown in Table A.3-4 below.

Table A.3-4
Flexible Storage Allocations

Participating Contractor	Proportionate Use Factor	Maximum Flexible Storage Allocation (AF)
Castaic Lake		
Metropolitan	.96212388	153,940
Ventura County Flood Control and Water Conservation District	.00860328	1,376
Castaic Lake Water Agency	.02927284	4,684
Total Castaic Lake	1.00000000	160,000
Lake Perris[1]	1.00000000	65,000
Metropolitan		

[1]The 2003 Exchange Agreement among Metropolitan, CVWD, and DWA, among other things, transferred to CVWD and DWA a portion of Metropolitan's capacity in the California Aqueduct and the East Branch including Lake Perris. However, Metropolitan's rights to the full 65,000 AF of Lake Perris flexible storage account was retained by Metropolitan.

Financing

The cost associated with the withdrawal and replacement of water in the flexible storage is included in Metropolitan's annual payments under the State Water Contract.

Federal, State, and Local Permits/Approvals

The flexible storage provision became effective in 1995. DWR has the approval authority to affect changes in the operations and usage of existing SWP facilities, including Castaic Lake and Lake Perris.

C. Metropolitan Surface Reservoirs

Source of Supply

Storage capacity in Metropolitan reservoirs, including Lake Skinner, Lake Mathews, Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, Orange County Reservoir and Metropolitan's Diamond Valley Lake, is earmarked to meet emergency, dry-year/ seasonal and system regulation needs, as these have been defined above.

Expected Supply Capability

The total available storage capacity for all Metropolitan-controlled surface reservoirs (Metropolitan-owned and DWR terminal reservoirs) is 1,585,300 AF. As discussed earlier, approximately 570 TAF in 2015 rising to 630 TAF in 2035 has been set aside to meet the emergency storage requirements of the service area. After accounting for emergency storage, the surface storage available in Metropolitan-owned reservoirs to meet dry-year/seasonal requirements is presented in Table A.3-5.

Rationale for Expected Supply

Program Facilities

Major facilities for Lake Mathews include an earthen dam to impound water and a recently completed new outlet tower. Major facilities for Lake Skinner include an earthen dam to impound water, an outlet tower, a inlet from the San Diego Canal to deliver water into the reservoir, a water treatment filtration facility, and recreational facilities consisting of a marina, parks, swimming areas, golf course, and hiking trails. Major facilities at Diamond Valley Lake include three earthen dams to impound water, an inlet/outlet tower, a secondary inlet from the Inland Feeder, a large pumping station to deliver water into the reservoir, and power generating facilities. Recreational facilities consisting of a marina, parks, swimming areas, golf course, hiking trails, equestrian trails and lodging are planned.

Historical Record

The Diamond Valley Lake has been operational for 10 years and is currently half full. Lake Mathews and Lake Skinner have been in service for over 30 years and are currently available for full operations.

- November 1974 Memorandum of Understanding and Agreement on Operation of Lake Skinner. This MOU, signed by Metropolitan and other affected parties, governs Metropolitan's operations of Lake Skinner in Riverside County. The DWR Division of Safety and Dams also reviews monitoring data on the safety of the dam annually.
- October 1991 Final Environmental Impact Report for the Eastside Reservoir Project (DVL). The EIR established criteria for integrating the operations of Metropolitan's reservoirs and DWR's southern reservoirs for emergency purposes. These criteria also provided that Metropolitan reservoirs could be expected to withdraw all drought storage water within a two-year period.
- November 1999 Memorandum of Understanding on Operation of Diamond Valley Lake. This MOU, signed by Metropolitan and other affected parties, governs Metropolitan's operations of Lake Skinner in Riverside County. The DWR Division of Safety and Dams also reviews monitoring data on the safety of the dam annually.

Table A.3-5
Estimated Supplies Available from Metropolitan Surface Storage
Program Capabilities
(acre-feet per year)

Forecast Year	Multiple Dry Years (1990-92)	Single Dry Year (1977)
2015	171,000	514,000
2020	239,000	716,000
2025	277,000	832,000
2030	237,000	712,000
2035	192,000	576,000

Source: Metropolitan analysis

- June 2002 Division of Safety of Dams Certificate of Approval. The Department of Water Resources, Division of Safety of Dams issued the Certificate of Approval for operation of Diamond Valley Lake in early 2000, with three conditions. These conditions were: (1) satisfactory operation of the butterfly valves and emergency gate in the inlet/outlet tower, (2) completion of the Tank Saddle Cutoff remediation and (3) completion of the Signal Spillway. Metropolitan completed these conditions in 2001 and the Diamond Valley Lake is currently operational in accordance with the Certificate of Approval.

Financing

The capital cost of Diamond Valley Lake, Lake Mathews and Lake Skinner was financed by a combination of revenue bonds and operating revenues. Annual operating costs, including maintenance and pumping, are included in Metropolitan's annual O&M budget (referenced above).

Federal, State, and Local Permits/Approvals

All necessary permits have been obtained. A permit to generate and sell power has been acquired from the Federal Energy Regulatory Commission. No further regulatory permits are required.

D. Groundwater Conjunctive Use Programs

Source of Supply

Metropolitan's IRP established the strategy to store imported water that is most available during wet years in surface reservoirs or groundwater aquifers for later use during droughts and emergencies. In this way, Metropolitan can reduce its reliance on direct deliveries from the SWP and the Colorado River during dry years when competing demands by other users and risks to the watershed ecosystems are greatest.

Groundwater basins in Metropolitan's service area have potential to store more than 3.0 MAF of additional water supplies. In 2000, the Association of Ground Water Agencies (AGWA) published Groundwater and Surface Water in Southern California: A Guide to Conjunctive Use which estimated a substantial potential for developing dry-year or long term conjunctive use within Metropolitan's service area. In 2007, Metropolitan published the Groundwater Assessment Study which estimated 3.2 MAF of space in groundwater basins available for storage. Based on these studies, Metropolitan continues to pursue a resource objective to develop dry-year supply from in-basin groundwater storage of 300 TAF per year by 2020.

Rationale for Expected Supply

Implementation Status:

The status of implementation for the groundwater conjunctive use programs has been described in the body of this report.

Historical Record

- Long-term Replenishment Program. In years of surplus imported supply, Metropolitan has delivered discounted water for groundwater storage under the Long-Term Replenishment Program in order to maintain groundwater production during the summer season and dry years. In recent years, Metropolitan has sold an average of 200 to 225 TAF per year of water under this program. The Replenishment Program was interrupted in 2007 due to imported water shortages.
- The Main San Gabriel Cyclic Storage Agreement. The Cyclic Storage Agreement with Upper San Gabriel Valley MWD was originally signed in 1975 for a term of five years and has been extended in five year increments. In 2009, the agreement was extended for two years. Currently expires in 2009, but is expected to be renewed repeatedly in future. The Cyclic Storage Agreement with Three Valleys MWD was originally signed in 1991 for a term of five years and has been extended in five year increments. This agreement was also extended for two years in 2009.
- Chino Basin Cyclic Storage Agreement. The Cyclic Storage Agreement with Inland Empire Utilities Agency was first signed in 1979 and extended in five year increments through 2012.
- North Las Posas Groundwater Storage Program. Two phases of the program's ASR wells (18 wells) have been constructed, providing approximately 8 TAF per year of replenishment capacity and 12 TAF per year of withdrawal capacity until fully integrated into Calleguas MWD's distribution system. At such time, the wellfields will be fully operational and able to pump 47 TAF per year of stored water from the basin. This agreement is in place for forty years, through 2035.

As of July 1, 2007, approximately 230 TAF of water had been stored in contractual dry-year storage programs in the North Las Posas, Chino, Orange County, Live Oak, Central, and Raymond groundwater basins. As of January 1, 2010, 117 TAF had been produced to offset imported water shortages leaving a balance of about 113 TAF in these storage accounts.

Written Contracts or Other Proof

Metropolitan's dry-year supply from the ground water conjunctive use programs is based on Metropolitan's Board actions and agreements.

- Approval of Long-term Replenishment Program. Beginning in fiscal year 1989/90, Metropolitan implemented the Long-term Replenishment Program. The continuation of this program was reaffirmed as part of the new rate structure that was approved by Metropolitan's Board in April 2009.
- Agreements for North Las Posas Groundwater Storage Program. An Agreement between Metropolitan and Calleguas Municipal Water District (Calleguas) was executed in June 1995 and amended in May 1998 and in March 2008. The term of the Agreement extends to 2035.
- Proposition 13 Groundwater Conjunctive Use Programs Operational by 2010.
  - Association of Ground Water Agencies (AGWA) published Groundwater and Surface Water in Southern California: A Guide to Conjunctive Use in 2000 identifying the potential storage capacity for groundwater basins.

- Metropolitan Water District published the Groundwater Assessment Study Report in 2007 in collaboration with its member agencies and groundwater basin managers documenting existing use and development of groundwater resources in Metropolitan's service area and estimating additional groundwater basin storage potential.
- Principles for groundwater storage adopted by the Metropolitan Board in January 2000.
- Resolution for Proposition 13 Funds adopted by the Metropolitan Board in October 2000.
- Agreement executed with the California Department of Water Resources for Interim Water Supply Construction Grant Commitment Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection (Proposition 13, Chapter 9, Article 4) providing for Metropolitan to administer $45 million in state Proposition 13 grant funds for groundwater reliability programs; October 2000
- Agreement executed for Long Beach Conjunctive Use Project, July 2002
- Agreement executed for Live Oak Conjunctive Use Project, October 2002
- Agreement executed for Foothill Area Groundwater Storage Project, February 2003
- Agreement executed for Chino Basin Programs, June 2003
- Agreement executed for Orange County Groundwater Storage Program, June 2003
- Agreement executed for Compton Conjunctive Use Program, February 2005
- Agreement executed for Long Beach Conjunctive Use Project — Expansion in Lakewood, July 2005
- Agreement executed for Upper Claremont Basin Groundwater Storage Program, September 2005
- Agreement executed for Elsinore Basin Conjunctive Use Program, May 2008

All of these programs have an initial 25-year term, with provision for renewal or extension after that period.

Financing

Financing has been supplied from multiple sources as discussed below:

- Financing for Long-Term Replenishment Program. No capital or O&M costs are associated with the implementation of the Long-term Replenishment Program. Rather, Metropolitan provides a discounted water rate to encourage member agencies to take delivery of surplus water for storage purposes.
- Financing for North Las Posas Groundwater Storage Program.
  - Metropolitan's Board appropriated $6 million to construct wells and appurtenant facilities in Phase 1 of the program in June 1995.
  - Metropolitan's Board appropriated $25 million to construct wells and appurtenant facilities Phase 2 of the program in January 1998.
  - Metropolitan has reimbursed Calleguas MWD for over $28 million for capital facilities for this program.
- Financing for Proposition 13 and Additional Groundwater Storage Programs.
  - Metropolitan's Board appropriated $210,000 to conduct initial environmental, engineering and planning studies for the Raymond Basin storage program in January 2000. In May 2006, Metropolitan's Board appropriated $480,000 to conduct preliminary engineering and complete CEQA environmental

documentation for the proposed storage program.

- Proposition 13 funds ($45 million) were allocated to Metropolitan by the state in May 2000 for the development of local groundwater storage projects.
- Metropolitan has executed groundwater storage funding agreements for nine storage programs, expended $45 million of the Proposition 13 funds, and appropriated over $35 million of Metropolitan capital funds for the storage programs in the Orange County and Chino groundwater basins. All nine storage programs have completed facilities and are on-line. Metropolitan has called for production of stored water beginning in 2007.

Table A.3-6 provides details of funding for specific groundwater storage programs.

Federal, State, and Local Permits/Approvals

- Final EIR for North Las Posas Groundwater Storage Program. Environmental Impact Report for the North Las Posas Groundwater Storage Program was certified by Calleguas Municipal Water District, lead agency, and by Metropolitan, responsible agency, in April 1995 and June 1995, respectively.
- Long Beach Conjunctive-use Storage Project. Environmental documentation for the Long Beach Conjunctive-use Storage Project was certified by the City of Long Beach in August 2001.
- Live Oak Basin Conjunctive-use Storage Project. Environmental documentation for the Live Oak Basin Conjunctive-use Storage Project was certified by Three Valleys MWD in January 2002.
- Foothill Area Groundwater Storage Project. Environmental documentation for the Foothill Area Groundwater Storage Project was certified by Foothill Municipal Water District in January 2003.
- Chino Basin Programs Groundwater Storage Project. Environmental documentation for the Chino Basin Programs Groundwater Storage Project was certified by Inland Empire Utility Agency in December 2002.
- Long Beach Conjunctive Use Storage Project — Expansion in Lakewood. Environmental documentation for the project was certified by the City of Lakewood in May 2005.
- City of Compton Conjunctive Use Program. Environmental documentation for the project was certified by the City of Compton in December 2004.
- Orange County Groundwater Conjunctive Use Program. Environmental documentation for the project was certified by Orange County Water District in March 1999 and in July 2002.
- Upper Claremont Basin Groundwater Storage Program. Environmental documentation for the project was certified by Three Valleys MWD in July 2005.
- Elsinore Basin Conjunctive Use Program. Environmental documentation for the project was certified by Elsinore Valley MWD in February 2004

E. Programs under Development as Part of the Five Year Supply Plan

LADWP Groundwater Demonstration Project: Treatment facilities were installed at the Tujunga Well Field to produce about 12 TAF per year. In December 2008, Metropolitan entered into an agreement with LADWP and in April 2009, a contract was awarded to Siemens Water Technologies Corporation. The facilities were on line and production began in May 2010. Metropolitan's partnership with LADWP brought the treatment facilities on-line nearly two years ahead of the original schedule.

F. IRP Development Targets

20% x 2020 Regional Consistency: Achieving regional consistency on water use efficiency with the legislative goal of 20 percent reduction for the region as a whole would result in a total reduction of potable demand by 580 TAF by 2020. This estimate for regional compliance requires a 200 TAF of additional savings over the 380 TAF estimated retail level reduction already included in the demand projections for the 2010 RUWMP. The additional 200 TAF savings target by 2020 would be an important part of the region's future supply and is included in the water supply forecast tables as part of IRP Development Targets presented in Appendix A.3-7. Achieving an annual demand reduction of 580 TAF by 2020 will require additional local and regional investments in both conservation and recycled water.

Local Supply Augmentation: Included as part of the IRP Development Target are additional supplies obtained through Local Supply Augmentation. Appendix A.5 presents a list of recycling, groundwater recovery, and seawater desalination projects within Metropolitan's service area that could be developed to achieve this future supply goal. Metropolitan collected information on the ultimate yields of each project and potential project on-line dates through various technical workgroups and collaborative efforts with the member agencies. These local projects are in various stages of development and Metropolitan anticipates continued partnership with its member agencies in augmenting local water supplies.

The following Table A.3-7 shows the detailed water supply forecasts by water source, in five-year increments and for single dry-year, multiple dry years, and average years.

In developing the supply capabilities for the 2010 RUWMP, Metropolitan assumed a simulated median storage level going into each of the five-year increments based on the balances of supplies and demands. Under the median storage condition, there is an estimated 50 percent probability that storage levels would be higher than the assumption used, and a 50 percent probability that storage levels would be lower than the assumption used. All storage capability figures shown in the 2010 RUWMP reflect actual storage program conveyance constraints. In addition, SWP supplies are estimated using the draft 2009 SWP Delivery Reliability Report distributed by DWR in December 2009. The draft 2009 reliability report presents the current DWR estimate of the amount of water deliveries for current (2009) conditions and conditions 20 years in the future. DWR estimates are based on current facilities and incorporate restrictions on SWP and CVP operations in accordance with the biological opinions of the U.S. Fish and Wildlife Service and National Marine Fishery Service issued on December 15, 2008, and June 4, 2009, respectively.

Table A.3-6
Metropolitan's In-Region Groundwater Storage Programs

Program	Metropolitan Agreement Partners	Agreement Execution Date	Max Storage AF	Dry-Year Yield AF/Yr	Capital Funding
Long Beach Conjunctive Use Storage Project (Central Basin)	Long Beach	June 2002	13,000	4,300	$4.5 million – Prop. 13 funds
Foothill Area Groundwater Storage Program (Monkhill/ Raymond Basin)	Foothill MWD	February 2003	9,000	3,000	$1.7 million – Prop. 13 funds
Orange County Groundwater Conjunctive Use Program	MWDOC OCWD	June 2003	66,000+	22,000	$31.7million: $15.0 million – Prop 13 $16.7million – Met CIP*
Chino Basin Programs	IEUA TVMWD Watermaster	June 2003	100,000	33,000	$27.5 million: $9.0 million – Prop 13 $18.5 million – Met CIP*
Live Oak Basin Conjunctive Use Project (Six Basins)	TVMWD City of La Verne	October 2002	3,000	1,000	$3.3 million – Prop 13
City of Compton Conjunctive Use Project (Central Basin)	Compton	February 2005	2,289	763	$2.43 million – Prop 13
Metropolitan – Calleguas MWD Groundwater Storage Project (North Las Posas Basin)	Calleguas MWD	1995, amended 1999	210,000	47,000	$31 million – Met CIP* $28.2 million expended.
Long Beach Conjunctive Use Program Expansion in Lakewood (Central Basin)	Long Beach	July 2005	3,600	1,200	$3.1 million – Prop 13

Table A.3-6 (Contd)
Metropolitan's In-Region Groundwater Storage Programs

Program	Metropolitan Agreement Partners	Agreement Execution Date	Max Storage AF	Dry-Year Yield AF/Yr	Capital Funding
Upper Claremont Basin Groundwater Storage Program (Six Basins)	TVMWD	Sept. 2005	3,000	1,000	$1.23 million – Prop 13
Elsinore Basin Conjunctive Use Storage Program (Elsinore Basin)	Western MWD Elsinore Valley MWD	May 2008	12,000	4,000	$4.74 million - Prop 13
Total			**421,889**	**117,263**	**$45 million – Prop 13** **$63.4 million – Met CIP***

* Metropolitan's Capital Investment Plan

Table A.3-7
Colorado River Aqueduct
Program Capabilities
Year 2015
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Basic Apportionment – Priority 4	550,000	550,000	550,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment (Surplus)	0	0	91,000
PVID Land Management, Crop Rotation, and Water Supply Program	133,000	133,000	133,000
Lower Colorado Water Supply Project	6,000	6,000	6,000
Lake Mead Storage Program	341,000	400,000	400,000
Quechan Settlement Agreement Supply	7,000	7,000	7,000
Forbearance for Present Perfected Rights	(42,000)	(47,000)	(47,000)
CVWD SWP/QSA Transfer Obligation	(35,000)	(35,000)	(35,000)
DWCV SWP Table A Obligation	(60,000)	(54,000)	(127,000)
DWCV SWP Table A Transfer Callback	32,000	29,000	67,000
DWCV Advance Delivery Account	28,000	25,000	60,000
Drop 2 Reservoir Funding	22,000	66,000	66,000
SNWA Agreement	40,000	40,000	40,000
Expand SNWA Agreement	15,000	15,000	15,000
Subtotal of Current Programs	***1,122,000***	***1,220,000***	***1,311,000***
Programs Under Development			
Additional PVID Transfers (Crop Stressing/Fallowing)	62,000	62,000	62,000
Arizona Programs - CAP	50,000	50,000	50,000
California Indians / Other Ag	10,000	10,000	10,000
ICS Exchange	25,000	25,000	25,000
Agreements with CVWD	35,000	35,000	35,000
Hayfield Groundwater Extraction Project	5,000	5,000	5,000
Subtotal of Proposed Programs	***187,000***	***187,000***	***187,000***
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	100,000	100,000	100,000
Coachella & All-American Canal Lining			
To SDCWA	80,000	80,000	80,000
To San Luis Rey Settlement Parties1	16,000	16,000	16,000
Subtotal of Non-Metropolitan Supplies	***196,000***	***196,000***	***196,000***
Maximum CRA Supply Capability[2]	**1,505,000**	**1,603,000**	**1,694,000**
Less CRA Capacity Constraint (amount above 1.25 MAF)	*(255,000)*	*(353,000)*	*(444,000)*
Maximum Expected CRA Deliveries[3]	**1,250,000**	**1,250,000**	**1,250,000**
Less Non-Metropolitan Supplies[4]	*(196,000)*	*(196,000)*	*(196,000)*
Maximum Metropolitan Supply Capability[5]	**1,054,000**	**1,054,000**	**1,054,000**

[1] Subject to satisfaction of conditions specified in agreement among Metropolitan, the United States, and the San Luis Rey Settlement Parties
[2] Total amount of supplies available without taking into consideration CRA capacity constraint.
[3] The Colorado River Aqueduct delivery capacity is 1.250 MAF annually.
[4] Exchange obligation for the SDCWA-IID transfer and the Coachella and All American Canal Lining projects.
[5] The amount of CRA water available to Metropolitan after meeting its exchange obligations.

Table A.3-7
Colorado River Aqueduct
Program Capabilities
Year 2020
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Basic Apportionment – Priority 4	550,000	550,000	550,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment (Surplus)	167,000	356,000	61,000
PVID Land Management, Crop Rotation, and Water Supply Program	133,000	133,000	133,000
Lower Colorado Water Supply Project	6,000	6,000	6,000
Lake Mead Storage Program	400,000	400,000	400,000
Quechan Settlement Agreement Supply	7,000	7,000	7,000
Forbearance for Present Perfected Rights	(47,000)	(47,000)	(47,000)
CVWD SWP/QSA Transfer Obligation	(35,000)	(35,000)	(35,000)
DWCV SWP Table A Obligation	(60,000)	(54,000)	(127,000)
DWCV SWP Table A Transfer Callback	32,000	29,000	67,000
DWCV Advance Delivery Account	28,000	25,000	60,000
Drop 2 Reservoir Funding	22,000	25,000	25,000
SNWA Agreement	40,000	40,000	40,000
Expand SNWA Agreement	15,000	15,000	15,000
Subtotal of Current Programs	***1,343,000***	***1,535,000***	***1,240,000***
Programs Under Development			
Additional PVID Transfers (Crop Stressing/Fallowing)	62,000	62,000	62,000
Arizona Programs - CAP	50,000	50,000	50,000
California Indians / Other Ag	10,000	10,000	10,000
ICS Exchange	25,000	25,000	25,000
Agreements with CVWD	35,000	35,000	35,000
Hayfield Groundwater Extraction Project	5,000	5,000	5,000
Subtotal of Proposed Programs	***187,000***	***187,000***	***187,000***
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	161,000	193,000	193,000
Coachella & All-American Canal Lining			
To SDCWA	80,000	80,000	80,000
To San Luis Rey Settlement Parties1	16,000	16,000	16,000
Subtotal of Non-Metropolitan Supplies	***257,000***	***289,000***	***289,000***
Maximum CRA Supply Capability[2]	**1,787,000**	**2,011,000**	**1,716,000**
Less CRA Capacity Constraint (amount above 1.25 MAF)	*(537,000)*	*(761,000)*	*(466,000)*
Maximum Expected CRA Deliveries[3]	**1,250,000**	**1,250,000**	**1,250,000**
Less Non-Metropolitan Supplies[4]	*(257,000)*	*(289,000)*	*(289,000)*
Maximum Metropolitan Supply Capability[5]	**993,000**	**961,000**	**961,000**

[1] Subject to satisfaction of conditions specified in agreement among Metropolitan, the United States, and the San Luis Rey Settlement Parties
[2] Total amount of supplies available without taking into consideration CRA capacity constraint.
[3] The Colorado River Aqueduct delivery capacity is 1.250 MAF annually.
[4] Exchange obligation for the SDCWA-IID transfer and the Coachella and All American Canal Lining projects.
[5] The amount of CRA water available to Metropolitan after meeting its exchange obligations.

Table A.3-7
Colorado River Aqueduct
Program Capabilities
Year 2025
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Basic Apportionment – Priority 4	550,000	550,000	550,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment (Surplus)	0	250,000	53,000
PVID Land Management, Crop Rotation, and Water Supply Program	133,000	133,000	133,000
Lower Colorado Water Supply Project	6,000	5,000	5,000
Lake Mead Storage Program	400,000	400,000	400,000
Quechan Settlement Agreement Supply	7,000	7,000	7,000
Forbearance for Present Perfected Rights	(47,000)	(47,000)	(47,000)
CVWD SWP/QSA Transfer Obligation	(35,000)	(35,000)	(35,000)
DWCV SWP Table A Obligation	(77,000)	(60,000)	(155,000)
DWCV SWP Table A Transfer Callback	41,000	32,000	82,000
DWCV Advance Delivery Account	36,000	28,000	73,000
Drop 2 Reservoir Funding	22,000	25,000	25,000
SNWA Agreement	0	0	0
Expand SNWA Agreement	0	0	0
Subtotal of Current Programs	***1,121,000***	***1,373,000***	***1,176,000***
Programs Under Development			
Additional PVID Transfers (Crop Stressing/Fallowing)	62,000	62,000	62,000
Arizona Programs - CAP	50,000	50,000	50,000
California Indians / Other Ag	10,000	10,000	10,000
ICS Exchange	25,000	25,000	25,000
Agreements with CVWD	35,000	35,000	35,000
Hayfield Groundwater Extraction Project	5,000	5,000	5,000
Subtotal of Proposed Programs	***187,000***	***187,000***	***187,000***
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	200,000	200,000	200,000
Coachella & All-American Canal Lining			
To SDCWA	80,000	80,000	80,000
To San Luis Rey Settlement Parties1	16,000	16,000	16,000
Subtotal of Non-Metropolitan Supplies	***296,000***	***296,000***	***296,000***
Maximum CRA Supply Capability[2]	**1,604,000**	**1,856,000**	**1,659,000**
Less CRA Capacity Constraint (amount above 1.25 MAF)	*(354,000)*	*(606,000)*	*(409,000)*
Maximum Expected CRA Deliveries[3]	**1,250,000**	**1,250,000**	**1,250,000**
Less Non-Metropolitan Supplies[4]	*(296,000)*	*(296,000)*	*(296,000)*
Maximum Metropolitan Supply Capability[5]	**954,000**	**954,000**	**954,000**

[1] Subject to satisfaction of conditions specified in agreement among Metropolitan, the United States, and the San Luis Rey Settlement Parties
[2] Total amount of supplies available without taking into consideration CRA capacity constraint.
[3] The Colorado River Aqueduct delivery capacity is 1.250 MAF annually.
[4] Exchange obligation for the SDCWA-IID transfer and the Coachella and All American Canal Lining projects.
[5] The amount of CRA water available to Metropolitan after meeting its exchange obligations.

Table A.3-7
Colorado River Aqueduct
Program Capabilities
Year 2030
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Basic Apportionment – Priority 4	550,000	550,000	550,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment (Surplus)	0	0	13,000
PVID Land Management, Crop Rotation, and Water Supply Program	133,000	133,000	133,000
Lower Colorado Water Supply Project	5,000	5,000	5,000
Lake Mead Storage Program	400,000	400,000	400,000
Quechan Settlement Agreement Supply	7,000	7,000	7,000
Forbearance for Present Perfected Rights	(47,000)	(47,000)	(47,000)
CVWD SWP/QSA Transfer Obligation	(35,000)	(35,000)	(35,000)
DWCV SWP Table A Obligation	(77,000)	(60,000)	(155,000)
DWCV SWP Table A Transfer Callback	41,000	32,000	82,000
DWCV Advance Delivery Account	36,000	28,000	73,000
Drop 2 Reservoir Funding	22,000	25,000	25,000
SNWA Agreement	0	0	0
Expand SNWA Agreement	0	0	0
Subtotal of Current Programs	***1,120,000***	***1,123,000***	***1,136,000***
Programs Under Development			
Additional PVID Transfers (Crop Stressing/Fallowing)	62,000	62,000	62,000
Arizona Programs - CAP	50,000	50,000	50,000
California Indians / Other Ag	10,000	10,000	10,000
ICS Exchange	25,000	25,000	25,000
Agreements with CVWD	35,000	35,000	35,000
Hayfield Groundwater Extraction Project	0	0	0
Subtotal of Proposed Programs	***182,000***	***182,000***	***182,000***
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	200,000	200,000	200,000
Coachella & All-American Canal Lining			
To SDCWA	80,000	80,000	80,000
To San Luis Rey Settlement Parties1	16,000	16,000	16,000
Subtotal of Non-Metropolitan Supplies	***296,000***	***296,000***	***296,000***
Maximum CRA Supply Capability[2]	**1,598,000**	**1,601,000**	**1,614,000**
Less CRA Capacity Constraint (amount above 1.25 MAF)	*(348,000)*	*(351,000)*	*(364,000)*
Maximum Expected CRA Deliveries[3]	**1,250,000**	**1,250,000**	**1,250,000**
Less Non-Metropolitan Supplies[4]	*(296,000)*	*(296,000)*	*(296,000)*
Maximum Metropolitan Supply Capability[5]	**954,000**	**954,000**	**954,000**

[1] Subject to satisfaction of conditions specified in agreement among Metropolitan, the United States, and the San Luis Rey Settlement Parties
[2] Total amount of supplies available without taking into consideration CRA capacity constraint.
[3] The Colorado River Aqueduct delivery capacity is 1.250 MAF annually.
[4] Exchange obligation for the SDCWA-IID transfer and the Coachella and All American Canal Lining projects.
[5] The amount of CRA water available to Metropolitan after meeting its exchange obligations.

Table A.3-7
Colorado River Aqueduct
Program Capabilities
Year 2035
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Basic Apportionment – Priority 4	550,000	550,000	550,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment (Surplus)	0	0	10,000
PVID Land Management, Crop Rotation, and Water Supply Program	133,000	133,000	133,000
Lower Colorado Water Supply Project	5,000	5,000	5,000
Lake Mead Storage Program	400,000	400,000	400,000
Quechan Settlement Agreement Supply	7,000	7,000	7,000
Forbearance for Present Perfected Rights	(47,000)	(47,000)	(47,000)
CVWD SWP/QSA Transfer Obligation	(35,000)	(35,000)	(35,000)
DWCV SWP Table A Obligation	(77,000)	(60,000)	(155,000)
DWCV SWP Table A Transfer Callback	41,000	32,000	82,000
DWCV Advance Delivery Account	36,000	28,000	73,000
Drop 2 Reservoir Funding	22,000	25,000	25,000
SNWA Agreement	0	0	0
Expand SNWA Agreement	0	0	0
Subtotal of Current Programs	***1,120,000***	***1,123,000***	***1,133,000***
Programs Under Development			
Additional PVID Transfers (Crop Stressing/Fallowing)	62,000	62,000	62,000
Arizona Programs - CAP	50,000	50,000	50,000
California Indians / Other Ag	10,000	10,000	10,000
ICS Exchange	25,000	25,000	25,000
Agreements with CVWD	35,000	35,000	35,000
Hayfield Groundwater Extraction Project	0	0	0
Subtotal of Proposed Programs	***182,000***	***182,000***	***182,000***
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	200,000	200,000	200,000
Coachella & All-American Canal Lining			
To SDCWA	80,000	80,000	80,000
To San Luis Rey Settlement Parties1	16,000	16,000	16,000
Subtotal of Non-Metropolitan Supplies	***296,000***	***296,000***	***296,000***
Maximum CRA Supply Capability[2]	**1,598,000**	**1,601,000**	**1,611,000**
Less CRA Capacity Constraint (amount above 1.25 MAF)	*(348,000)*	*(351,000)*	*(361,000)*
Maximum Expected CRA Deliveries[3]	**1,250,000**	**1,250,000**	**1,250,000**
Less Non-Metropolitan Supplies[4]	*(296,000)*	*(296,000)*	*(296,000)*
Maximum Metropolitan Supply Capability[5]	**954,000**	**954,000**	**954,000**

[1] Subject to satisfaction of conditions specified in agreement among Metropolitan, the United States, and the San Luis Rey Settlement Parties
[2] Total amount of supplies available without taking into consideration CRA capacity constraint.
[3] The Colorado River Aqueduct delivery capacity is 1.250 MAF annually.
[4] Exchange obligation for the SDCWA-IID transfer and the Coachella and All American Canal Lining projects.
[5] The amount of CRA water available to Metropolitan after meeting its exchange obligations.

Table A.3-7
California Aqueduct
Program Capabilities
Year 2015
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
MWD Table A	469,000	107,000	1,026,000
DWCV Table A	60,000	54,000	127,000
San Luis Carryover [1]	48,000	145,000	145,000
Article 21 Supplies	0	0	3,000
San Bernardino Valley MWD Minimum Purchase	8,000	5,000	20,000
San Bernardino Valley MWD Option Purchase	11,000	13,000	20,000
Yuba River Accord Purchase	14,000	14,000	4,000
Central Valley Storage and Transfers			
Semitropic Program	41,000	39,000	60,000
Arvin Edison Program	47,000	75,000	75,000
San Bernardino Valley MWD Program	7,000	20,000	20,000
Kern Delta Program	47,000	50,000	50,000
Subtotal of Current Programs	***752,000***	***522,000***	***1,550,000***
Programs Under Development			
Delta Improvements	154,000	487,000	285,000
Mojave Groundwater Storage Program	5,000	2,000	30,000
North of Delta/In-Delta Transfers	33,000	33,000	33,000
SBVMWD Central Feeder	5,000	5,000	5,000
Shasta Return	18,000	18,000	18,000
Semitropic Agricultural Water Reuse	11,000	11,000	11,000
IRP SWP Target [2]	16,000	0	0
Subtotal of Proposed Programs	***242,000***	***556,000***	***382,000***
Maximum Supply Capability	**994,000**	**1,078,000**	**1,932,000**

[1] Includes DWCV carryover.

[2] Remaining supply needed to meet IRP target.

Table A.3-7
California Aqueduct
Program Capabilities
Year 2020
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
MWD Table A	469,000	107,000	1,026,000
DWCV Table A	60,000	54,000	127,000
San Luis Carryover [1]	69,000	208,000	208,000
Article 21 Supplies	0	0	3,000
San Bernardino Valley MWD Minimum Purchase	8,000	5,000	20,000
San Bernardino Valley MWD Option Purchase	11,000	13,000	20,000
Yuba River Accord Purchase	14,000	14,000	4,000
Central Valley Storage and Transfers			
Semitropic Program	41,000	39,000	60,000
Arvin Edison Program	63,000	75,000	75,000
San Bernardino Valley MWD Program	12,000	36,000	36,000
Kern Delta Program	47,000	50,000	50,000
Subtotal of Current Programs	***794,000***	***601,000***	***1,629,000***
Programs Under Development			
Delta Improvements	154,000	487,000	285,000
Mojave Groundwater Storage Program	5,000	2,000	31,000
North of Delta/In-Delta Transfers	33,000	33,000	33,000
SBVMWD Central Feeder	5,000	5,000	5,000
Shasta Return	18,000	18,000	18,000
Semitropic Agricultural Water Reuse	11,000	11,000	11,000
IRP SWP Target [2]	47,000	0	0
Subtotal of Proposed Programs	***273,000***	***556,000***	***383,000***
Maximum Supply Capability	**1,067,000**	**1,157,000**	**2,012,000**

[1] Includes DWCV carryover.

[2] Remaining supply needed to meet IRP target.

Table A.3-7
California Aqueduct
Program Capabilities
Year 2025
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
MWD Table A	469,000	107,000	1,026,000
DWCV Table A	77,000	60,000	155,000
San Luis Carryover [1]	80,000	239,000	239,000
Article 21 Supplies	0	0	52,000
San Bernardino Valley MWD Minimum Purchase	12,000	8,000	20,000
San Bernardino Valley MWD Option Purchase	12,000	11,000	29,000
Yuba River Accord Purchase	14,000	14,000	2,000
Central Valley Storage and Transfers			
Semitropic Program	46,000	41,000	69,000
Arvin Edison Program	63,000	75,000	75,000
San Bernardino Valley MWD Program	15,000	46,000	46,000
Kern Delta Program	47,000	50,000	50,000
Subtotal of Current Programs	***835,000***	***651,000***	***1,763,000***
Programs Under Development			
Delta Improvements	341,000	628,000	605,000
Mojave Groundwater Storage Program	11,000	5,000	43,000
North of Delta/In-Delta Transfers	33,000	33,000	33,000
SBVMWD Central Feeder	5,000	5,000	5,000
Shasta Return	18,000	18,000	18,000
Semitropic Agricultural Water Reuse	11,000	11,000	11,000
IRP SWP Target [2]	0	0	0
Subtotal of Proposed Programs	***419,000***	***700,000***	***715,000***
Maximum Supply Capability	**1,254,000**	**1,351,000**	**2,478,000**

[1] Includes DWCV carryover.

[2] Remaining supply needed to meet IRP target.

Table A.3-7
California Aqueduct
Program Capabilities
Year 2030
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
MWD Table A	469,000	107,000	1,026,000
DWCV Table A	77,000	60,000	155,000
San Luis Carryover [1]	69,000	208,000	208,000
Article 21 Supplies	0	0	52,000
San Bernardino Valley MWD Minimum Purchase	12,000	8,000	20,000
San Bernardino Valley MWD Option Purchase	12,000	11,000	29,000
Yuba River Accord Purchase	0	0	0
Central Valley Storage and Transfers			
Semitropic Program	46,000	41,000	69,000
Arvin Edison Program	63,000	75,000	75,000
San Bernardino Valley MWD Program	16,000	49,000	49,000
Kern Delta Program	47,000	50,000	50,000
Subtotal of Current Programs	***811,000***	***609,000***	***1,733,000***
Programs Under Development			
Delta Improvements	341,000	628,000	605,000
Mojave Groundwater Storage Program	11,000	5,000	43,000
North of Delta/In-Delta Transfers	33,000	33,000	33,000
SBVMWD Central Feeder	5,000	5,000	5,000
Shasta Return	18,000	18,000	18,000
Semitropic Agricultural Water Reuse	11,000	11,000	11,000
IRP SWP Target [2]	0	0	0
Subtotal of Proposed Programs	***419,000***	***700,000***	***715,000***
Maximum Supply Capability	**1,230,000**	**1,309,000**	**2,448,000**

[1] Includes DWCV carryover.

[2] Remaining supply needed to meet IRP target.

Table A.3-7
California Aqueduct
Program Capabilities
Year 2035
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
MWD Table A	469,000	107,000	1,026,000
DWCV Table A	77,000	60,000	155,000
San Luis Carryover [1]	69,000	208,000	208,000
Article 21 Supplies	0	0	52,000
San Bernardino Valley MWD Minimum Purchase	12,000	8,000	20,000
San Bernardino Valley MWD Option Purchase	12,000	11,000	29,000
Yuba River Accord Purchase	0	0	0
Central Valley Storage and Transfers			
Semitropic Program	46,000	41,000	69,000
Arvin Edison Program	63,000	75,000	75,000
San Bernardino Valley MWD Program	17,000	50,000	50,000
Kern Delta Program	47,000	50,000	50,000
Subtotal of Current Programs	***812,000***	***610,000***	***1,734,000***
Programs Under Development			
Delta Improvements	341,000	628,000	605,000
Mojave Groundwater Storage Program	11,000	5,000	43,000
North of Delta/In-Delta Transfers	33,000	33,000	33,000
SBVMWD Central Feeder	5,000	5,000	5,000
Shasta Return	18,000	18,000	18,000
Semitropic Agricultural Water Reuse	11,000	11,000	11,000
IRP SWP Target [2]	0	0	0
Subtotal of Proposed Programs	***419,000***	***700,000***	***715,000***
Maximum Supply Capability	**1,231,000**	**1,310,000**	**2,449,000**

[1] Includes DWCV carryover.

[2] Remaining supply needed to meet IRP target.

Table A.3-7
In-Region Storage and Programs
Program Capabilities
Year 2015
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Metropolitan Surface Storage			
(DVL, Mathews, Skinner)	134,000	403,000	403,000
Flexible Storage in Castaic & Perris	37,000	111,000	111,000
Groundwater Storage			
Conjunctive Use	56,000	115,000	115,000
Cyclic Storage	19,000	56,000	56,000
Subtotal of Current Programs	***246,000***	***685,000***	***685,000***
Programs Under Development			
Raymond Basin Groundwater Conjunctive Use	9,000	22,000	22,000
LADWP Groundwater Recovery Project	12,000	12,000	12,000
IRP Development Targets			
20% by 2020 Regional Consistency	80,000	100,000	100,000
Local Supply Augmentation	61,000	72,000	72,000
Subtotal of Proposed Programs	***162,000***	***206,000***	***206,000***
Maximum Supply Capability	**408,000**	**891,000**	**891,000**

Table A.3-7
In-Region Storage and Programs
Program Capabilities
Year 2020
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Metropolitan Surface Storage			
(DVL, Mathews, Skinner)	186,000	557,000	557,000
Flexible Storage in Castaic & Perris	53,000	159,000	159,000
Groundwater Storage			
Conjunctive Use	101,000	115,000	115,000
Cyclic Storage	33,000	100,000	100,000
Subtotal of Current Programs	***373,000***	***931,000***	***931,000***
Programs Under Development			
Raymond Basin Groundwater Conjunctive Use	16,000	22,000	22,000
LADWP Groundwater Recovery Project	12,000	12,000	12,000
IRP Development Targets			
20% by 2020 Regional Consistency	180,000	200,000	200,000
Local Supply Augmentation	72,000	72,000	72,000
Subtotal of Proposed Programs	***280,000***	***306,000***	***306,000***
Maximum Supply Capability	**653,000**	**1,237,000**	**1,237,000**

Table A.3-7
In-Region Storage and Programs
Program Capabilities
Year 2025
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Metropolitan Surface Storage			
(DVL, Mathews, Skinner)	216,000	648,000	648,000
Flexible Storage in Castaic & Perris	61,000	184,000	184,000
Groundwater Storage			
Conjunctive Use	115,000	115,000	115,000
Cyclic Storage	43,000	129,000	129,000
Subtotal of Current Programs	***435,000***	***1,076,000***	***1,076,000***
Programs Under Development			
Raymond Basin Groundwater Conjunctive Use	20,000	22,000	22,000
LADWP Groundwater Recovery Project	12,000	12,000	12,000
IRP Development Targets			
20% by 2020 Regional Consistency	200,000	200,000	200,000
Local Supply Augmentation	82,000	102,000	102,000
Subtotal of Proposed Programs	***314,000***	***336,000***	***336,000***
Maximum Supply Capability	**749,000**	**1,412,000**	**1,412,000**

Table A.3-7
In-Region Storage and Programs
Program Capabilities
Year 2030
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Metropolitan Surface Storage			
(DVL, Mathews, Skinner)	184,000	552,000	552,000
Flexible Storage in Castaic & Perris	53,000	160,000	160,000
Groundwater Storage			
Conjunctive Use	115,000	115,000	115,000
Cyclic Storage	46,000	137,000	137,000
Subtotal of Current Programs	***398,000***	***964,000***	***964,000***
Programs Under Development			
Raymond Basin Groundwater Conjunctive Use	22,000	22,000	22,000
LADWP Groundwater Recovery Project	12,000	12,000	12,000
IRP Development Targets			
20% by 2020 Regional Consistency	200,000	200,000	200,000
Local Supply Augmentation	102,000	102,000	102,000
Subtotal of Proposed Programs	***336,000***	***336,000***	***336,000***
Maximum Supply Capability	**734,000**	**1,300,000**	**1,300,000**

Table A.3-7
In-Region Storage and Programs
Program Capabilities
Year 2035
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Metropolitan Surface Storage			
(DVL, Mathews, Skinner)	148,000	444,000	444,000
Flexible Storage in Castaic & Perris	44,000	132,000	132,000
Groundwater Storage			
Conjunctive Use	115,000	115,000	115,000
Cyclic Storage	46,000	139,000	139,000
Subtotal of Current Programs	***353,000***	***830,000***	***830,000***
Programs Under Development			
Raymond Basin Groundwater Conjunctive Use	22,000	22,000	22,000
LADWP Groundwater Recovery Project	12,000	12,000	12,000
IRP Development Targets			
20% by 2020 Regional Consistency	200,000	200,000	200,000
Local Supply Augmentation	102,000	102,000	102,000
Subtotal of Proposed Programs	***336,000***	***336,000***	***336,000***
Maximum Supply Capability	**689,000**	**1,166,000**	**1,166,000**

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APPENDIX A.4

WATER SUPPLY ALLOCATION PLAN

AND

WATER SURPLUS AND DROUGHT MANAGEMENT PLAN

Water Supply Allocation Plan

Revised June 2009

Southern California

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Inside cover: Photo courtesy of Cora Edmonds/ArtXchange for the Healing Planet

Water Supply Allocation Plan

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List of Acronyms:

AF- Acre-feet
CWD- County Water District
DWP- Drought Management Plan
IAWP-Interim Agricultural Water Program Reductions and Rates
IICP- Incremental Interruption and Conservation Plan
IRP- Integrated Resources Plan
M&I- Municipal and Industrial
MWD- Municipal Water District
RUWMP- Regional Urban Water Management Plan
SWP - State Water Project
WSDM- Water Surplus and Drought Management

Definitions:

Extraordinary Increases in Production- Local water production efforts that increase local supplies, including purchasing water transfers or overproducing groundwater yield.

Groundwater Recovery- The extraction and treatment of groundwater making it usable for a variety of applications by removing high levels of chemicals and/or salts.

In-lieu deliveries- Metropolitan-supplied water bought to replace water that would otherwise be pumped from the groundwater basins.

Overproducing groundwater yield- Withdrawal (removal) of groundwater over a period of time that exceeds the recharge rate of the supply aquifer. Also referred to as overdraft or mining the aquifer.

Seasonal Shift- Water requested in a period of low demand for use in high demand periods. This water will not be available beyond 2009.

Seawater Barrier- The injection of fresh water into wells along the coast to protect coastal groundwater basins from seawater intrusion. The injected fresh water acts like a wall, blocking seawater that would otherwise seep into groundwater basins as a result of pumping.

Surface Storage Operating Agreement Demand- Deliveries made to the San Diego County Water Authority under the Surface Storage Operating Agreement. Water delivered under this program is used by San Diego County Water Authority to offset peak period delivery requirements.

Section 1: Introduction

Calendar Year 2007 introduced a number of water supply challenges for The Metropolitan Water District of Southern California (Metropolitan) and its service area. Critically dry conditions affected all of Metropolitan's main supply sources. In addition, a ruling in the Federal Courts in August 2007 provided protective measures for the Delta smelt in the Sacramento-San Joaquin River Delta which brought uncertainty about future pumping operations from the State Water Project. This uncertainty, along with the impacts of dry conditions, raised the possibility that Metropolitan would not have access to the supplies necessary to meet total firm demands[1] and would have to allocate shortages in supplies to the member agencies[2].

In preparing for this possibility, Metropolitan staff worked jointly with the member agency managers and staff to develop a Water Supply Allocation Plan (Plan). This Plan includes the specific formulas for calculating member agency supply allocations and the key implementation elements needed for administering an allocation should a shortage be declared. Ultimately, the Plan will be the foundation for the urban water shortage contingency analysis required under Water Code Section 10632 and will be incorporated into Metropolitan's Regional Urban Water Management Plan (RUWMP).

Section 2: Development Process

Member Agency Input

Between July 2007 and February 2008, Metropolitan staff worked cooperatively with the member agencies through a series of member agency manager meetings and workgroups to develop a formula and implementation plan to allocate supplies in case of shortage. These workgroups provided an arena for in-depth discussion of the objectives, mechanics, and policy aspects of the different parts of the Plan. Metropolitan staff also met individually with 15 member agencies for detailed discussions of the elements of the recommended proposal. Metropolitan introduced the elements of the proposal to many nonmember retail agencies in its service area by providing presentations and feedback to a number of member agency caucuses, working groups, and governing boards. The discussions, suggestions, and comments expressed by the member agencies during this process contributed significantly to the development of this Plan.

Board of Directors Input

Throughout the development process Metropolitan's Board of Directors was provided with regular progress reports on the status of this Plan, with oral reports in September, October, and December 2007, an Information Board of Directors Letter with a draft of the Plan in November 2007, and a Board of Directors Report with staff recommendations in January 2008. Based on Water Planning and Stewardship Committee discussion of the staff recommendations and further review of the report by

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[1] Firm demands are also referred to as uninterruptable demands; likewise non-firm demands are also called interruptible demands.

[2] See Appendix A for list of member agencies.

the member agencies, refinements were incorporated into the Plan for final consideration and action in February 2008. The Plan was adopted at the February 12, 2008 Board of Directors meeting[3].

Section 3: Review of Historical Shortage Plans[4]

The Plan incorporates key features and principles from the following historical shortage allocation plans but will supersede them as the primary and overarching decision tool for water shortage allocation.

Interruptible Water Service Program

As part of the new rate structure implemented in 1981, Metropolitan's Board of Directors adopted the Interruptible Water Service Program (Interruptible Program) which was designed to address short-term shortages of imported supplies. Under the Interruptible Program, Metropolitan delivered water for particular types of use to its member agencies at a discounted rate. In return for this discounted rate, Metropolitan reserved the right to interrupt delivery of this Interruptible Program water so that available supplies could be used to meet municipal and industrial demands.

Incremental Interruption and Conservation Plan

The ability to interrupt specific deliveries was an important element of Metropolitan's strategy for addressing shortage conditions when it adopted the Incremental Interruption and Conservation Plan (IICP) in December 1990. Reductions in IICP deliveries were used in concert with specific objectives for conservation savings to meet needs during shortages. The IICP reduced Interruptible Service deliveries in stages and provided a pricing incentive program to insure that reasonable conservation measures were implemented.

1995 Drought Management Plan

The 1995 Drought Management Plan (DMP) was a water management and allocation strategy designed to match supply and demand in the event that available imported water supplies were less than projected demands. Adopted by the Metropolitan Board of Directors in November 1994, the 1995 DMP was a short-term plan designed to provide for the 1995 calendar year only. The primary objective of the 1995 DMP was to identify methods to avoid implementation of mandatory reductions. The 1995 DMP included various phases and a step-by-step strategy for evaluating supply and demand conditions and utilizing Metropolitan's available options, with the final phase being implementation of the revised IICP.

1999 Water Surplus and Drought Management Plan

Metropolitan staff began work on the Water Surplus and Drought Management (WSDM) Plan in March 1997 as part of the Integrated Water Resources Plan (IRP), which was adopted by Metropolitan's Board of Directors in January 1996. The IRP established regional water resource targets, identifying the need for developing resource management policy to guide annual operations. The WSDM Plan defined Metropolitan's resource management policy by establishing priorities for the use of regional resources

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[3] A complete listing of member agency meetings and Board of Directors reporting activities is contained in Appendix B of this report.

[4] A summary of the key elements in the following allocation plans is found in Appendix C.

to achieve the region's reliability goal identified in the IRP. In April 1999, Metropolitan's Board of Directors adopted the WSDM Plan.

The WSDM Plan also included a set of principles and considerations for staff to address when developing specific allocation methods. The WSDM Plan stated the following guiding principle to be followed in developing any future allocation scheme:

> *"Metropolitan will encourage storage of water during periods of surplus and work jointly with its member agencies to minimize the impacts of water shortages on the region's retail consumers and economy during periods of shortage."*[5]

This principle reflects a central desire for allocation methods that are both equitable and minimize regional hardship to retail water consumers. The specific considerations postulated by the WSDM Plan to accomplish this principle include the following:[6]

- The impact on retail customers and the economy
- Allowance for population and growth
- Change and/or loss of local supply
- Reclamation/Recycling
- Conservation
- Investment in local resources
- Participation in Metropolitan's interruptible programs
- Investment in Metropolitan's facilities.

Section 4: Water Supply Allocation Formula

Based on the guiding principle and considerations described in the WSDM Plan, Metropolitan staff and the member agencies developed a specific formula for allocating water supplies in times of shortage. The formula seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level, and takes into account growth, local investments, changes in supply conditions and the demand hardening[7] aspects of non-potable recycled water use and the implementation of conservation savings programs. The formula, described below[8], is calculated in three steps: base period calculations, allocation year calculations, and supply allocation calculations. The first two steps involve standard computations, while the third section contains specific methodology developed for this Plan.

Step 1: Base Period Calculations

The first step in calculating a water supply allocation is to estimate water supply and demand using a historical base period with established water supply and delivery data. The base period for each of the different categories of demand and supply is calculated using data from the three most recent non-shortage years, 2004-2006.[9]

[5] WSDM Plan, p. 1. Emphasis added.
[6] WSDM Plan, p. 2.
[7] Demand hardening is the effect that occurs when all low-cost methods of decreasing overall water demand have been applied (e.g., low-flow toilets, water recycling) and the remaining options to further decrease demand become increasingly expensive and difficult to implement.
[8] Detailed operational elements of these objectives and a numerical example are discussed in Appendix D of this report.
[9] Exceptions to this methodology are noted in the descriptions of base period calculations.

(a) Base Period Local Supplies: Local supplies for the base period are calculated using a three-year average of groundwater production, groundwater recovery, Los Angeles Aqueduct supply, surface water production, and other imported supplies. Non-potable recycling production is not included in this calculation due to its demand hardening effect.

(b) Base Period Wholesale Demands: Firm demands on Metropolitan for the base period are calculated using a three-year average of full-service, seawater barrier, seasonal shift, and surface storage operating agreement demand.

(c) Base Period Retail Demands: Total retail-level municipal and industrial (M&I) demands for the base period are calculated by adding the Base Period Wholesale Demands and the Base Period Local Supplies. This estimates an average total demand for water from each agency.

(d) Base Period In-lieu Deliveries: Base period in-lieu deliveries to member agency storage are calculated using a three-year average of in-lieu deliveries to long-term groundwater replenishment, conjunctive use, cyclic, and supplemental storage programs.

(e) Base Period Interim Agricultural Water Program Deliveries: Through discussions with the member agencies, fiscal year 2003/04 was established as the base period for Interim Agricultural Water Program (IAWP) deliveries. This baseline will remain in place for the period in which the IAWP Reduction is in effect and for droughts continuing into successive years.

(f) Base Period Conservation: Conservation savings for the base period are calculated using modeled estimates of the most recent year's savings from active programs, code-based savings, and system losses. This is different than other base period calculations because, for demand hardening purposes, it is preferable to use the most recent estimate of installed water savings as opposed to a three-year average. Modeled estimates are generated using device-based savings and decay rates provided by California Urban Water Conservation Council and other recognized sources. These estimates currently include savings accumulated from Metropolitan funded programs. Agencies with verified conservation device installations from conservation efforts funded without Metropolitan assistance can be added through an appeals process.

(g) Qualifying Conservation Rate Structure: An additional consideration will be given to agencies whose retail-level water use is subject to a qualifying water rate structure. A qualifying rate structure is defined as one with at least two tiers of volumetric rates, with a price differential between the bottom and top tiers of at least 10 percent. Agencies with a qualifying rate structure will be given a credit of .five percent of the qualified Base Period Retail Demand to be added to the Base Period Conservation estimate listed above.

Step 2: Allocation Year Calculations

The next step in calculating the water supply allocation is estimating water needs in the allocation year. This is done by adjusting the base period estimates of retail demand for population or economic growth and changes in local supplies.

(a) Allocation Year Retail Demands: Total retail M&I demands for the allocation year are calculated by adjusting the Base Period Retail Demands for growth. The growth adjustment is calculated using the estimated actual annual rate of population growth at the county level, as generated by the California Department of Finance, whenever possible. For years without complete data, the growth rate is calculated using an average of the three most recent years available. On an appeals basis, member agencies may request that their adjustment be calculated using member agency level population growth. A weighted combination of actual population and actual employment growth rates may also be requested.

(b) Allocation Year Local Supplies: Allocation year local supplies are estimated using the Base Period Local Supplies plus Base Period In-Lieu Deliveries and adjusting for any local gain or loss in supply, including extraordinary increases in production. In-lieu deliveries are added to reflect the corresponding reduction in base year local production that was required to certify in-lieu deliveries to storage. Planned or scheduled increases in supply, which are not due to extraordinary increases in production over the base year, are added to the Base Period Local Supplies. Losses of local supply due to such things as hydrology or water quality are subtracted from the Base Period Local Supplies[10]. These adjustments are made to give a more accurate estimate of actual supplies in the allocation year and more accurately reflect an agency's demand for Metropolitan supplies.

(c) Allocation Year Wholesale Demands: Demands on Metropolitan for the allocation year are calculated by subtracting the Allocation Year Local Supplies from the Allocation Year Retail Demands.

Step 3: Supply Allocation Calculations

The final step is calculating the water supply allocation for each member agency based on the allocation year water needs identified in Step 2. The following table displays the elements that form the basis for calculating the supply allocation. Each element and its application in the allocation formula is discussed below.

[10] Losses of local supply that are not covered by this adjustment include groundwater losses that are less than or equal to base period replenishment deliveries (for a two year period following interruptions of replenishment deliveries) and supplies that were used to cover IAWP shortages and are no longer available to meet firm demands.

Table 1: Shortage Allocation Index					
(a) Regional Shortage Level	(b) Regional Shortage Percentage	(c) Extraordinary Increased Production Percentage	(d) Wholesale Minimum Percentage	(e) Maximum Retail Impact Percentage	(f) IAWP Reduction
1	5%	0%	92.5%	0.0%	30%
2	10%	0%	85.0%	0.0%	30%
3	15%	15%	77.5%	7.5%	40%
4	20%	20%	70.0%	10.0%	50%
5	25%	25%	62.5%	12.5%	75%
6	30%	30%	55.0%	15.0%	90%
7	35%	35%	47.5%	17.5%	100%
8	40%	40%	40.0%	20.0%	100%
9	45%	45%	32.5%	22.5%	100%
10	50%	50%	25.0%	25.0%	100%

(a) Regional Shortage Levels: The formula allocates shortages of Metropolitan supplies over ten levels.

(b) Regional Shortage Percentage: The total regional shortage is determined by dividing Metropolitan's available supplies by the sum of the Allocation Year Wholesale Demands and subtracting this amount from 1, presented as a percentage in five percent increments from five to 50.

(c) Extraordinary Increased Production Adjustment: This adjustment accounts for extraordinary increases in local supplies in times of shortage above the base period, including such efforts as purchasing water transfers or overproducing groundwater yield. In order not to discourage these efforts, only a percentage of the yield from these supplies is added back to Allocation Year Local Supplies, as seen in Table 1. This has the effect of "setting aside" the majority of the yield for the agency who procured the supply.

(d) Wholesale Minimum Allocation: The Wholesale Minimum Allocation ensures a minimum level of Metropolitan supplied wholesale water service to the member agencies equal to 100 percent of Allocation Year Wholesale Demand minus one-and-a-half times the Shortage Percent. The Wholesale Minimum Allocation ensures that member agencies will not experience shortages on the wholesale level that are greater than one-and-a-half times the Regional Shortage Percentage.

(e) Maximum Retail Impact Adjustment: The purpose of this adjustment is to ensure that agencies with a high level of dependence on Metropolitan do not experience disparate shortages at the retail level compared to other agencies when faced with a reduction in wholesale water supplies. The Maximum Retail Impact Percentage is calculated as the difference between the Regional Shortage Percentage and the Wholesale Minimum Percentage then prorated on a linear scale[11] based on each member agency's dependence on Metropolitan at the retail level. This percentage is then multiplied by the agency's Allocation Year Wholesale Demand to determine an additional allocation. For agencies that are 100 percent dependent on Metropolitan, this will result in a shortage equal to the Regional Shortage Percentage.

(f) **Interim Agricultural Water Program Reductions:** Certified Interim Agricultural Water Program (IAWP) allocation is calculated by decreasing the base year IAWP deliveries by the IAWP Reduction Percentage as seen in Table 1. Penalty rates for noncompliance with this reduction schedule shall be consistent with the rates described in Administrative Code Section 4907.

(g) **Conservation Demand Hardening Credit:** The Conservation Demand Hardening Credit addresses the increased difficulty in achieving additional water savings at the retail level that comes as a result of successful implementation of water conserving devices and conservation savings programs. This supply credit is calculated in two steps. First, an estimated retail shortage percentage is calculated by adding Wholesale Minimum Percentage, Retail Impact Allocation, and Allocation Year Local Supplies and dividing by Allocation Year Retail Demands and then subtracting this from 1. Finally, this retail shortage percentage is multiplied by the agency's quantified conservation savings to find the Conservation Demand Hardening Credit. This indicates the fraction of an agency's conservation savings that will be credited back to the agency as additional allocation.

(h) **Municipal & Industrial Allocation:** The allocation to an agency for its M&I retail demand is the sum of the Wholesale Minimum Allocation, the Retail Impact Adjustment, and the Conservation Demand Hardening Credit.

(i) **Total Allocation:** The total allocation of Metropolitan supplies to an agency is calculated by adding together the Municipal & Industrial Allocation and the Interim Agricultural Water Program Reductions. This is the total amount of water the agency will receive from Metropolitan at any given Regional Shortage Level, factoring in local production, wholesale allocation, retail allocation, IAWP allocation, and conservation[12].

Section 5: Plan Implementation

The Plan will take effect if a regional shortage is declared by the Board of Directors. The following implementation elements are necessary for administering the Plan during a time of shortage. These

[11] This pro-rated adjustment is only applied when Metropolitan Shortage Level is three or greater.
[12] See Appendix D for specific allocation formulae.

elements cover the processes needed to declare a regional shortage level as well as provide a penalty rate structure for enforcing each agency's allocation.

Allocation Period

The allocation period covers twelve consecutive months, from July of a given year through the following June. This period was selected to minimize the impacts of varying State Water Project (SWP) allocations and to provide member agencies with sufficient time to implement their outreach strategies and rate modifications.

Setting the Regional Shortage Level

Metropolitan staff is responsible for recommending a Regional Shortage Level for the Board of Directors' consideration. The recommendation shall be based on water supply availability, and the implementation of Metropolitan's water management actions as outlined in the WSDM Plan. Metropolitan staff will keep the Board of Directors apprised to the status of water supply conditions and management actions through monthly reports to the Water Planning and Stewardship Committee. To further facilitate staff in the development of a recommended regional shortage level, member agency requests for local supply adjustments shall be submitted by April 1st.
Metropolitan's Board of Directors, through the Water Planning and Stewardship Committee, is responsible for approving the final Regional Shortage Level at its April meeting. By the April meeting, the majority of the winter snowfall accumulation period will have passed and will allow staff to make an allocation based on more stable water supply estimates. Barring unforeseen large-scale circumstances, the Regional Shortage Level will be set for the entire allocation period, which will provide the member agencies an established water supply level for their planning.

Allocation Appeals Process

An appeals process is necessary for the administration of any changes or corrections to an agency's allocation. Metropolitan's General Manager will designate, subsequent to a declaration of an allocation by the Board of Directors, an Appeals Liaison as the official point of contact for all information and inquiries regarding appeals. All member agency General Managers will be notified in writing of the name and contact information of the Appeals Liaison. Only appeals that are made through the Appeals Liaison and in accordance with the provisions outlined in Appendix G will be evaluated. Basis for appeals claims can include but are not limited to:

- Adjusting erroneous historical data used in base period calculations
- Adjusting for unforeseen loss or gain in local supply
- Adjusting for extraordinary increases in local supply
- Adjusting for population growth rates
- Reviewing calculation of base period, allocation year and supply allocation figures for consistency with the standards outlined in the Plan

Additional details and a checklist for the appeals process are available in Appendix G and H.

Allocation Penalty Rates

Member agency allocations are enforced through a penalty rate structure. The applicable rates are based on Metropolitan's established tiered pricing structure[13]. Penalty rates and charges will only be assessed to the extent that an agency's total annual usage exceeds its total annual allocation. Any funds collected will be applied towards investments in conservation and local resources development within the service area of the member agency by which the penalties are incurred. No billing or assessment of penalty rates will take place until the end of the twelve-month allocation period.

(1) Standard Penalty Rates: The recommended penalty rate structure is an ascending block structure that provides a lower penalty for minor overuse of allocations and a higher penalty for major overuse of allocations. The structure and applicable rates are listed in Table 2. The penalty rates shall be based on the official Metropolitan water rates in effect the last day in June of the 12-month allocation period.

Table 2: Standard Penalty Rates

Water Use	Base Water Rate[14]	Penalty Rate[15]	Total Rate
100% of Allocation	Tier 1	0	Tier 1
Between 100% and 115%	Tier 1	2 x Tier 2	Tier 1 + (2 x Tier 2)
Greater than 115%	Tier 1	4 x Tier 2	Tier 1 + (4 x Tier 2)

(2) Penalty Rates in Recognition of Section 135 of the MWD Act[16]: Section 135 of the Metropolitan Water District Act declares that a member agency has the right to invoke its preferential right to water. Each year, Metropolitan calculates each agency's percentage of preferential rights based on a formula of collected cumulative revenues. Table 3 shows the preferential rights percentages as of July 2007.

[13] See Appendix E for tiered pricing rates as of January 10, 2008.
[14] The base water rate shall be the applicable water rate for the water being purchased. In most cases, it will be the Tier 1 rate (plus Treatment Surcharge for treated water deliveries). However, it is possible that the water being purchased would be in the amount that would put an agency beyond its Tier 1 limit. In that case, the base water rate will be the Tier 2 rate (plus Treatment Surcharge for treated water deliveries).
[15] Penalty rate is the fully loaded untreated Tier 2 rate.
[16] For further definition of Preferential Rights, see Appendix F.

Table 3: Preferential Water Rights by Member Agency[17]	
Member Agency	Preferential Right as Percent of Total
City of Anaheim	0.97%
City of Beverly Hills	1.01%
City of Burbank	0.94%
Calleguas MWD	3.85%
Central Basin MWD	7.48%
City of Compton	0.26%
Eastern MWD	3.11%
Foothill MWD	0.68%
City of Fullerton	0.59%
City of Glendale	1.29%
Inland Empire Utilities Agency	2.47%
Las Virgenes MWD	0.80%
City of Long Beach	2.54%
City of Los Angeles	20.97%
MWD of Orange County	13.99%
City of Pasadena	1.08%
San Diego CWA	16.73%
City of San Fernando	0.10%
City of San Marino	0.20%
City of Santa Ana	0.77%
City of Santa Monica	0.88%
Three Valleys MWD	2.62%
City of Torrance	1.17%
Upper San Gabriel MWD	3.74%
West Basin MWD	8.16%
Western MWD	3.60%

There is a discounted penalty rate schedule in recognition of these preferential rights. Using the regional supply amount used in the determination of a Regional Shortage Level, Metropolitan staff will also calculate an allocation to each member agency based on its most recent preferential right percentage. Member agencies that exceed allocations under the Plan formula but do not exceed an equivalent calculation using preferential rights will be subject to the penalty rate schedule described in Table 4.

[17] Calculated by Metropolitan staff and audited June 30 of each year.

Table 4: Preferential Right Penalty Rate[18]			
Water Use	Base Water Rate	Penalty Rate[19]	Total Rate
100% of Allocation	Tier 1	0	Tier 1
Between 100% and 115%	Tier 1	1 x Tier 2	Tier 1 + (1 x Tier 2)
Greater than 115%	Tier 1	3 x Tier 2	Tier 1 + (3 x Tier 2)

As previously stated, the penalty rates shall be based on the official Metropolitan water rates in effect the last day in June of the 12-month allocation period. Metropolitan staff will include equivalent preferential rights calculations in monthly reports of each member agency's water use compared to allocations.

(3) Qualifying Income-Based Rate Penalty Adjustment[20]: Any penalties incurred by a member agency under the Plan will be adjusted to reflect the extent to which retail customers within a member agency's service area are served under a "lifeline" or similar qualified discounted rate program based on income or ability to pay ("Income-Based Rate").

Any member agency who is assessed penalties under the Plan may submit an acre-foot equivalent of water used by retail customers served under a qualifying Income-Based Rate[21]. This amount of water use would be multiplied by the percentage of retail-level reduction in allocation year demand necessary for that member agency to avoid exceeding its allocation. The monetary penalties resulting from these acre feet are subtracted from the total monetary penalties incurred by an agency for exceeding its allocation. In the case that the monetary penalties associated with the Income-Based Rate are greater than the total penalties an agency incurs, no penalty will be incurred. The end result of this adjustment is that the member agency will not be subject to penalties for the use of water by their retail customers served under a qualifying Income-Based Rate.

Tracking and Reporting

Subsequent to a declared regional shortage by the Board of Directors, Metropolitan staff will produce monthly reports of each member agency's water use compared to its allocations based on monthly delivery patterns to be submitted by the member agency. In order to produce these reports, member agencies are requested to submit their local supply use on a monthly basis and certify end of allocation

[18] The base water rate shall be the applicable water rate for the water being purchased. In most cases, it will be the Tier 1 rate (plus Treatment Surcharge for treated water deliveries). However, it is possible that the water being purchased would be in the amount that would put an agency beyond its Tier 1 limit. In that case, the base water rate will be the Tier 2 rate (plus Treatment Surcharge for treated water deliveries).
[19] Penalty rate is the fully loaded untreated Tier 2 Rate.
[20] See Appendix E for specific penalty adjustment formulae and example.
[21] Appropriate documentation and certification will be required.

year local supply use. These reports and comparisons are to be used for the purposes of tracking and communicating potential underage/overage of an agency's annual allocations.

Key Dates for Water Supply Allocation Implementation

The timeline for implementation of an allocation is shown in Table 5. A brief description of this timeline follows:

January to March: Water Surplus and Drought Management reporting occurs at Metropolitan's Water Planning and Stewardship Committee meetings. These reports will provide updated information on storage reserve levels and projected supply and demand conditions.

April: Member agencies report their projected local supplies for the coming allocation year. This information is incorporated in staff analysis of storage reserves and projected supply and demand conditions in order to provide an allocation recommendation to the Board. Metropolitan's Board will consider whether an allocation is needed. A declaration of an allocation will include the level of allocation to be in effect for the allocation year.

June 30: The allocation year is complete.

July 1st: If the Board declared an allocation in April, then it will be effective starting July. The allocation level will be held through June 30, barring unforeseen circumstances. Member agencies will now be requested to submit their local supply use on a monthly basis and certify end of allocation year local supply use. Local production data must be reported to Metropolitan by the end of the month following the month of use (use in July must be reported by the end of August). This information will be combined with Metropolitan sales information in order to track retail water use throughout Metropolitan's service area. Each month Metropolitan will report on member agency water sales compared to their allocation amounts.

June 30: The allocation year is complete.

July: Member agency local supplies must be certified for the month of June, the last month of the previous allocation year.

August: Metropolitan will calculate each member agency's total potable water use based on local supply certifications and actual sales data for the allocation year of July through June. Penalties will be assessed for usage above a given member agency's final adjusted allocation (reflecting the actual local supply and imported water use that occurred in the allocation year).

Table 5: Board Adopted Allocation Timeline					
Year	Month	Year 1 Board Allocation Decision	Year 1 Allocation Year	Year 2 Board Allocation Decision	Year 2 Allocation Year
Year 1	January				
	February				
	March				
	April	Declaration *			
	May				
	June				
	July		**Effective Period** Continuous Tracking of Member Agency Local Supply and Imported Water Use		
	August				
	September				
	October				
	November				
	December				
Year 2	January				
	February				
	March				
	April			Declaration *	
	May				
	June				
	July				**Effective Period** Continuous Tracking of Member Agency Local Supply and Imported Water Use
	August		Assess Penalties		
	September				
	October				
	November				
	December				
Year 3	January				
	February				
	March				
	April				
	May				
	June				

* Member agency projections of local supplies are due on April 1st to assist Metropolitan staff in determining the need for an allocation in the coming allocation year.

Revisiting the Plan

There will be a formal revisit of the Plan commencing in February 2010. The scheduled revisit ensures the opportunity for Metropolitan staff and the member agencies to re-evaluate the plan and recommend appropriate changes to the Board of Directors. The Plan will also be reviewed twelve months following a Board of Directors implementation of the Plan to consider any immediate refinements that are necessary based on lessons learned.

Appendix A: Member Agency List as of November 2007

Table 6: Member Agencies		
City of Anaheim	City of Glendale	City of San Marino
City of Beverly Hills	Inland Empire Utilities Agency	City of Santa Ana
City of Burbank	Las Virgenes MWD	City of Santa Monica
Calleguas MWD	City of Long Beach	Three Valleys MWD
Central Basin MWD	City of Los Angeles	City of Torrance
City of Compton	MWD of Orange County	Upper San Gabriel MWD
Eastern MWD	City of Pasadena	West Basin MWD
Foothill MWD	San Diego CWA	Western MWD
City of Fullerton	City of San Fernando	

Source: http://mwdh2o.com/mwdh2o/pages/memberag/member04.html

Appendix B: Water Supply Allocation Plan Process Timeline

July 2007

- City of Long Beach Water Department staff briefing
- Member Agency Managers/Member Agency Workgroup meeting
- Northern Managers Group meeting
    - Foothill MWD, City of Pasadena, City of Long Beach, Calleguas MWD, City of Los Angeles, West Basin MWD, City of Burbank, Three Valleys MWD, City of Glendale, Upper San Gabriel MWD

August 2007

- Central Basin MWD staff briefing
- Eastern MWD staff briefing
- San Diego CWA staff briefing
- Member Agency Managers/Member Agency Workgroup meeting
- Western MWD staff briefing
- City of Beverly Hills staff briefing

September 2007

- Member Agency Subgroup meetings
    - MWD of Orange County, San Diego CWA, West Basin MWD, Central Basin MWD
- MWD of Orange County staff briefing
- Member Agency Workgroup meeting

- Member Agency Workgroup meeting
- MWD Board of Directors Oral Report

October 2007

- Inland Empire Utilities Agency staff briefing
- Central Basin MWD Caucus Meeting (included sub-agencies)
- Three Valleys MWD staff briefing
- MWD of Orange County staff briefing
- West Basin MWD staff briefing
- MWD Board of Directors Oral Report

November 2007

- West Basin MWD Caucus Meeting (included sub-agencies)
- West Basin Water Users Association presentation
- Walnut Valley MWD staff briefing (sub-agency of Three Valleys MWD)
- Foothill MWD Managers Meeting (included sub-agencies)
- Central Basin MWD staff briefing
- City of Claremont City Council (sub-agency of Three Valleys MWD)
- MWD Board of Directors Information Letter with Draft Proposal

December 2007

- Northern Managers Group Meeting
- California Department of Public Health staff briefing
- City of Long Beach Water Department staff briefing
- Santa Ana River Watershed Project Authority presentation
- Foothill MWD Managers Meeting (included sub-agencies)
- MWD Board of Directors Oral Report

January 2008

- Northern Managers Group Meeting
- Water Replenishment District Board of Directors presentation
- Three Valleys MWD staff briefing
- Member Agency Conservation Coordinator's Group presentation
- Member Agency Managers/Member Agency Workgroup meeting
- City of Chino Hills presentation (sub-agency of IEUA)
- Member Agency Workgroup meeting
- Hemet/San Jacinto Exchange Club presentation
- MWD Board of Directors Report with Staff Recommended Water Supply Allocation Plan

February 2008

- MWD of Orange County and Irvine Ranch WD staff briefing
- MWD Board of Directors Action Item
- San Gabriel Valley Water Association Meeting
- Orange County Water Policy Meeting
- SCAG Water Policy Task Force Meeting

Appendix C: Summary of Historical Shortage Plans

These five elements incorporated into the Plan have, in four out of five instances, been used in previous shortage plans. Both the IICP and the 1995 DMP used a historical base period calculation, adjusted for growth, made local supply adjustments, and used conservation hardening credits in their formulations. The retail impact adjustment is the only feature of the Plan that has not been used historically.

Table 7: Historical Shortage Plan Overview

Plan Element	1991 IICP	1995 DMP	Water Supply Allocation Plan
Historical Base Period	√	√	√
Growth Adjustment	√	√	√
Local Supply Adjustment	√	√	√
Conservation Hardening Credit	√	√	√
Retail Impact Adjustment			√

Appendix D: Water Supply Allocation Formula Example

The following example gives a step-by-step description of how the formula would be used to calculate an allocation of Metropolitan supplies for a hypothetical member agency. All numbers are hypothetical for the purpose of the example and do not reflect any specific member agency.

Step 1: Base Period Calculations

(a) Base Period Local Supplies: Calculated using a three-year average of groundwater (gw), groundwater recovery (gwr), Los Angeles Aqueduct supply (laa), surface water(sw), and other non-Metropolitan imported supplies(os).

$$[(gw^1+gwr^1+laa^1+sw^1+os^1)+(gw^2+gwr^2+laa^2+sw^2+os^2)+(gw^3+gwr^3+laa^3+sw^3+os^3)]\div 3=59{,}000\text{ AF}$$

(For the purpose of this example, assume that the three year average is 59,000 AF.)

(b) Base Period Wholesale Demands: Calculated using the same three-year time period as the Base Period Local Supplies. The Base Period Wholesale Demands include full-service (fs), seawater barrier (sb), seasonal shift (ss), and surface storage operating agreement (ssoa).

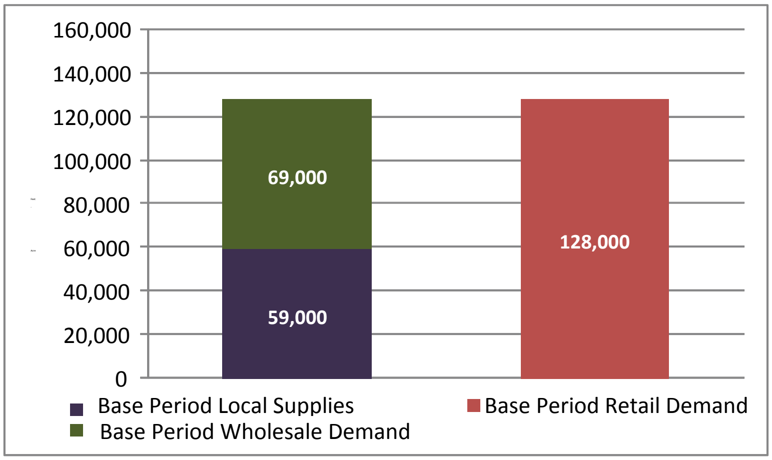
$$[(fs^1+sb^1+ss^1+ssoa^1)+(fs^2+sb^2+ss^2+ssoa^2)+(fs^3+sb^3+ss^3+ssoa^3)]\div 3=69{,}000\text{ AF}$$

(For the purpose of this example, assume that the three year average is 69,000 AF.)

(c) Base Period Retail Demands: Calculated as the sum of the Base Period Local Supplies and Base Period Wholesale Demand.

59,000 + 69,000 = 128,000 AF

Figure 1: Base Period Calculations



(d) Base Period In-lieu Deliveries: Calculated by averaging in-lieu deliveries from the same three-year period that was used to calculate the Base Period Local Supplies and Demands.

(4,000 AF +5,000 AF +4,500 AF)÷3=4,500 AF

(e) Base Period Interim Agricultural Water Program Deliveries: Fiscal year 2003/04 was established as the base period for Interim Agricultural Water Program (IAWP) deliveries

Base Period IAWP Deliveries = 6,000 AF

(f) Base Period Conservation: Calculated using a tool developed by Metropolitan staff that inputs the total amount of conservation savings devices and programs installed by each member agency and standardized water savings factors provided by the CUWCC and other recognized bodies.

Base Period Conservation=14,500 AF

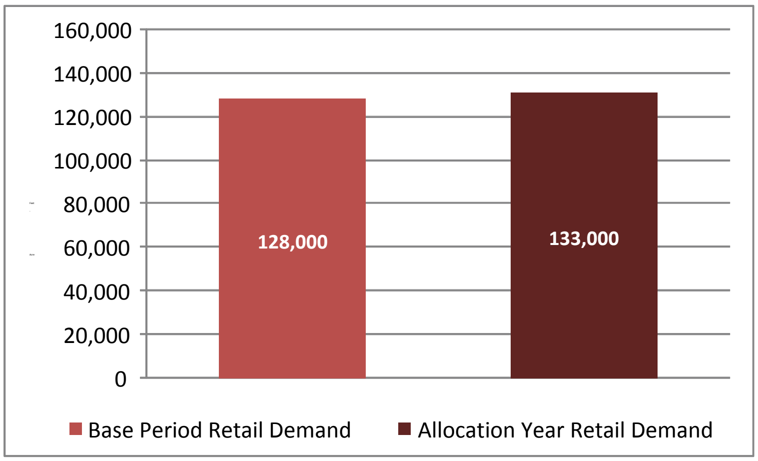
(g) Qualifying Conservation Rate Structure: Agencies that have retail use that is covered by a qualifying conserving water rates structure would be able to add .five percent of their covered Base Period Retail Demand to the Base Period Conservation.

Step 2: Allocation Year Calculations

(a) Allocation Year Retail Demand: Calculated by adjusting the Base Period Retail Demand for growth that occurred since the Base Period. Growth is estimated using the actual annual rate of county-level population growth whenever possible, or an average of the three most recent years if complete data in not available. Member agency level population or a weighted combination of population and employment growth rates may be used if an agency so requests through the appeals process.

128,000 AF + 5,000 AF (based on average annual growth rates)= 133,000 AF

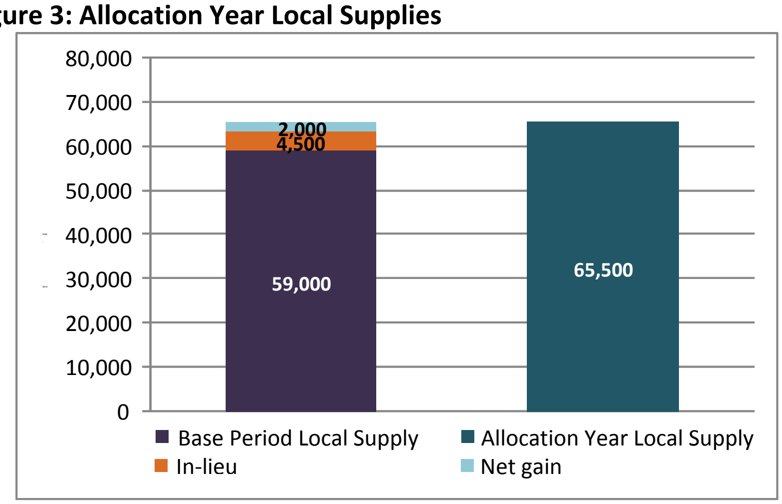
Figure 2: Allocation Year Retail Demand



(b) Allocation Year Local Supplies: Calculated by adding the Base Period Local Supplies (59,000 AF), Base Year In-Lieu Deliveries (4,500 AF), and adjustments for gains or losses of local supply. For the purposes of this example a net gain in local supply of 2,000 AF is assumed.

59,000 AF + 4,500 AF + 2,000 AF =65,500 AF

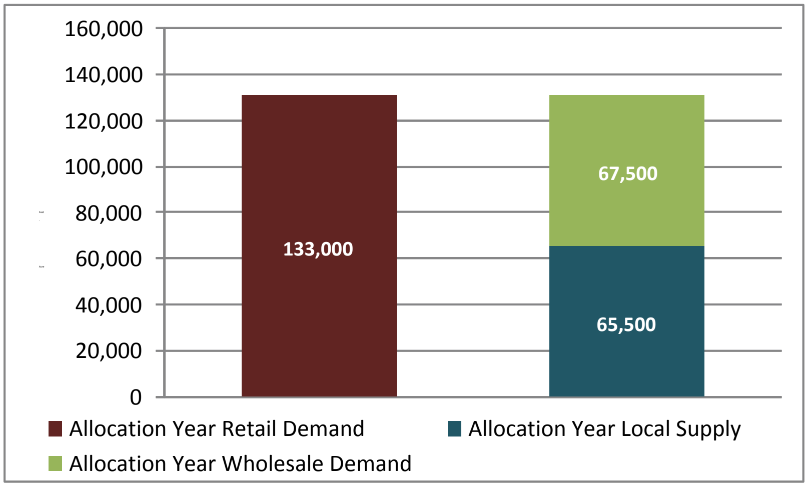
Figure 3: Allocation Year Local Supplies



(c) **Allocation Year Wholesale Demands:** Calculated by subtracting the Allocation Year Local Supplies (65,500 AF) from the Allocation Year Retail Demands (133,000 AF).

133,000 AF - 65,500 AF= 67,500 AF

Figure 4: Allocation Year Wholesale Demand



Step 3: Supply Allocation Calculations

Regional Shortage Levels 1 &2: For regional shortages of 10 percent or less, the allocation is an across-the-board reduction in wholesale supplies to all agencies with adjustments for conservation demand hardening. There is no adjustment to address disparate retail level shortages in Regional Shortage Levels 1 & 2.

(a) **Regional Shortage Levels:** For the example, we will use calculations from Table 1 for Regional Shortage Level 2.

Table 1: Shortage Allocation Index					
(a) Regional Shortage Level	(b) Regional Shortage Percentage	(c) Extraordinary Increased Production Percentage	(d) Wholesale Minimum Percentage	(e) Maximum Retail Impact Percentage	(f) IAWP Reduction
2	10%	0%	85.0%	0.0%	30%

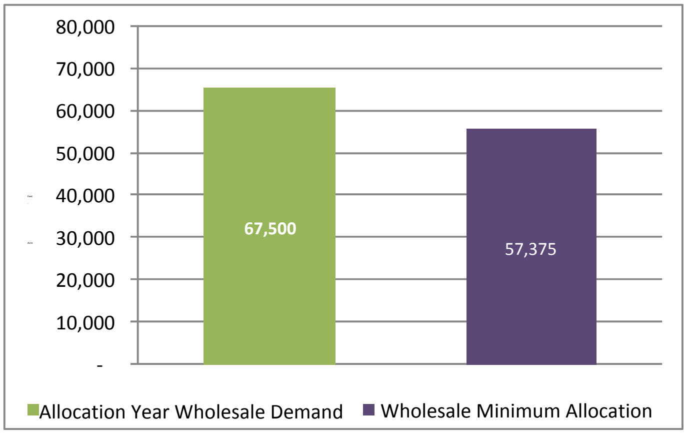
(b) **Regional Shortage Percentage:** The Regional Shortage Percentage at Regional Shortage Level 2 = 10%

(c) **Extraordinary Increased Production Adjustment:** There is no increase in Allocation Year Local Supplies for Extraordinary Increased Production in Regional Shortage Levels 1 and 2.

(d) Wholesale Minimum Allocation: Calculated by multiplying the agency's Allocation Year Wholesale Demand (67,500 AF) by the Wholesale Minimum Percentage (85%) from the Table 1 for Regional Shortage Level 2.

67,500 AF*.85 = 57,375 AF

Figure 5: Wholesale Minimum Allocation Shortage Level 2



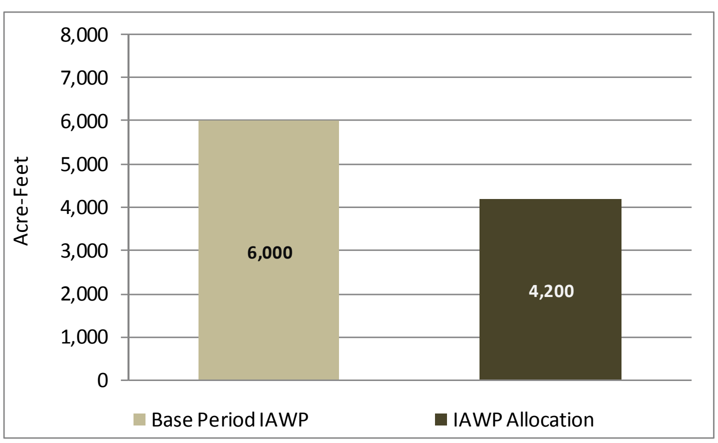
(e) Maximum Retail Impact Adjustment: There is no adjustment for Maximum Retail Impact Adjustment for Regional Shortage Levels 1 and 2.

(f) Interim Agricultural Water Program Reductions: Calculated by reducing the Base Year IAWP deliveries (6,000 AF) by the IAWP Reduction Percentage (30%). At Regional Shortage Level 2 this agency would see a 30 percent reduction in IAWP deliveries in the allocation year.

6,000 AF x .30 = 1,800 AF reduction

6,000 AF- 1,800 AF= 4,200 AF IAWP Allocation

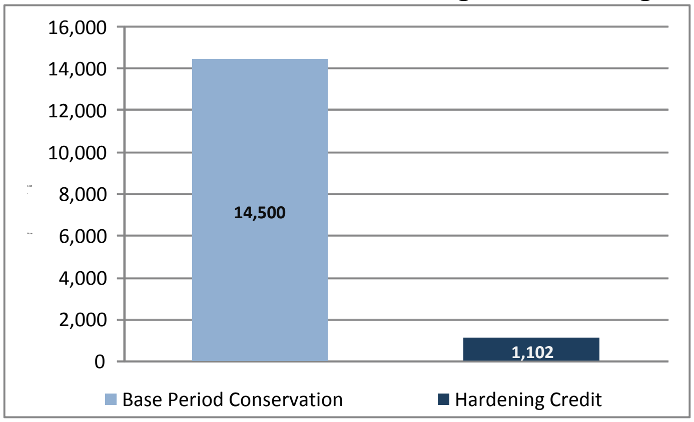
Figure 6: Interim Agricultural Water Program Reductions Shortage Level 2



(g) Conservation Demand Hardening Credit: Calculated by multiplying the agency's quantified conservation savings in acre-feet (14,500 AF) by its estimated retail shortage percentage. The retail shortage percentage is calculated by adding Wholesale Minimum Allocation (57,375 AF) and Allocation Year Local Supplies (65,500 AF), dividing by Allocation Year Retail Demands (133,000 AF) and then subtracting this from 1. .

1- ((57,375 + 65,500) ÷ 133,000) = .076 = 7.6%.
14,500 AF*.076= 1,102 AF

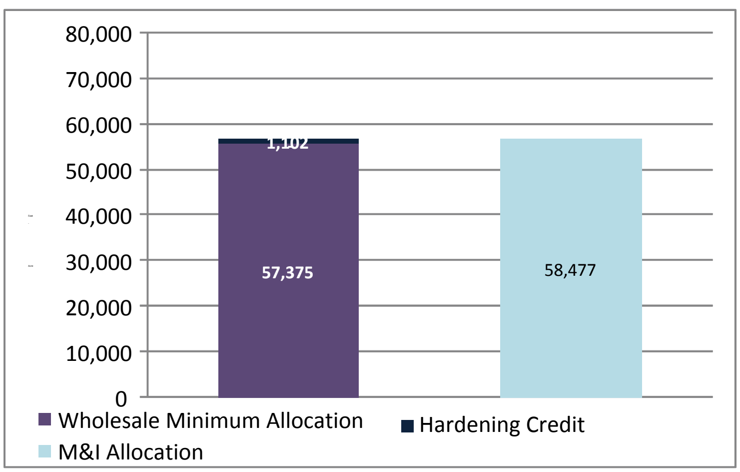
Figure 7: Conservation Demand Hardening Credit Shortage Level 2



(h) Municipal & Industrial Allocation: Calculated by adding the Wholesale Minimum Allocation (57,375 AF) and the Conservation Hardening Credit (1,102 AF).

57,375 AF + AF+1,102 AF= 58,477 acre-feet.

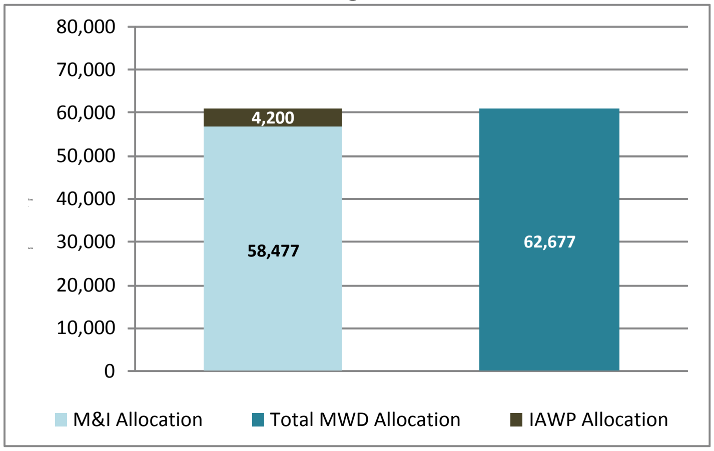
Figure 8: Municipal and Industrial Allocation Shortage Level 2



(i) Total Allocation: Add Municipal & Industrial Allocation (58,477 AF) and Interim Agricultural Water Program (4,200 AF) totals.

58,477 AF + 4,200 AF = 62,677 AF

Figure 9: Total Allocation Shortage Level 2



Regional Shortage Levels 3-10: For deeper regional shortages greater than 10 percent, the Allocation Plan formula includes a Retail Impact Adjustment Allocation to address disparate retail level shortages. This example will follow the allocation formula through a Regional Shortage Level 4.

(a) Regional Shortage Levels: Calculate from Table 1 for Regional Shortage Level 4.

Table 1: Shortage Allocation Index					
(a) Regional Shortage Level	(b) Regional Shortage Percentage	(c) Extraordinary Increased Production Percentage	(d) Wholesale Minimum Percentage	(e) Maximum Retail Impact Percentage	(f) IAWP Reduction
4	20%	20%	70.0%	10.0%	50%

(b) Regional Shortage Percentage: The Regional Shortage Percentage at Regional Shortage Level 4 is 20%

(c) Extraordinary Increased Production Adjustment: Let us assume that the agency has produced 3,700 AF of extraordinary production of local supplies in a shortage year. This is calculated by multiplying the extraordinary production (3,700 AF) and the Extraordinary Increase Percentage (20%).

3,700 AF*.20=740 AF

This is then added to the Allocation Year Local Supply (65,500 AF).

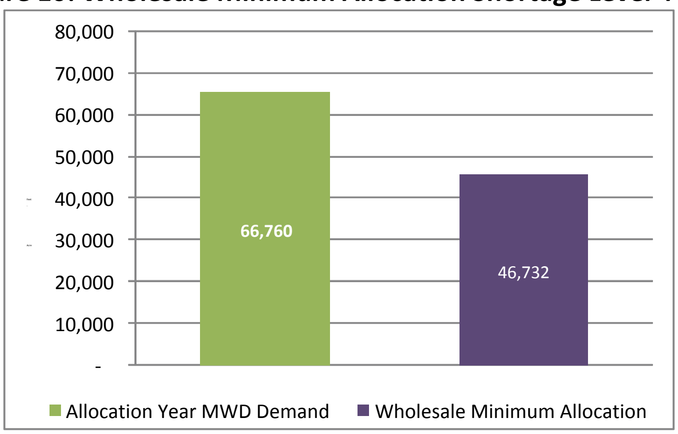
65,500 AF + 740 AF = 66,240 AF

The **Allocation Year Wholesale Demand** (67,500 AF) is then decreased by the extraordinary local supply production (740 AF) because Allocation Year Retail Demands (133,000 AF) remain unchanged.

133,000 AF- 66,240 AF = 66,760 AF   or
67,500 AF-740 AF=66,760 AF

(d) Wholesale Minimum Allocation: Calculated by multiplying the agency's Allocation Year Wholesale Demand (66,760 AF) by the Wholesale Minimum Percentage (70%) from the Table 1 for Regional Shortage Level 4.
66,760 AF*.70 = 46,732 AF

Figure 10: Wholesale Minimum Allocation Shortage Level 4



(e) Maximum Retail Impact Adjustment: Calculated first by determining the agency's dependence on Metropolitan by dividing the Allocation Year Wholesale Demand (66,760 AF) by the Allocation Year Retail Demand (133,000 AF) and multiplying by 100.

(66,760 AF/ 133,000 AF)*100=50.2%

Next, this percentage dependence on Metropolitan (50.2%) is multiplied by the Maximum Retail Impact Percentage for Shortage Level 4 (10%).

.502 * .10 =.050=5%

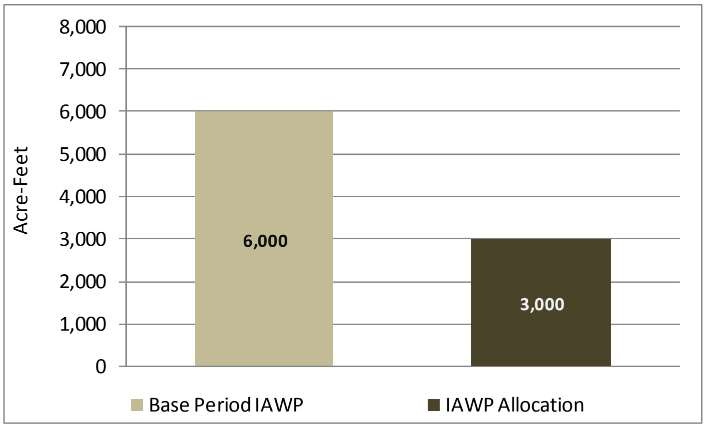
This percentage is now multiplied by the Allocation Year Wholesale Demand (66,760 AF) for the Maximum Retail Impact Adjustment.

66,760 AF*.050=3,351 AF

(f) Interim Agricultural Water Program Reductions: Calculated by reducing the Base Year IAWP deliveries by the IAWP Reduction Percentage. Under a Regional Shortage Level 4 the agency would see 50% reduction in IAWP deliveries in the allocation year. We will assume the agency has 6,000 AF IAWP water.

6,000 AF * .50 = 3,000 AF

Figure 11: Interim Agricultural Water Program Reductions Shortage Level 4



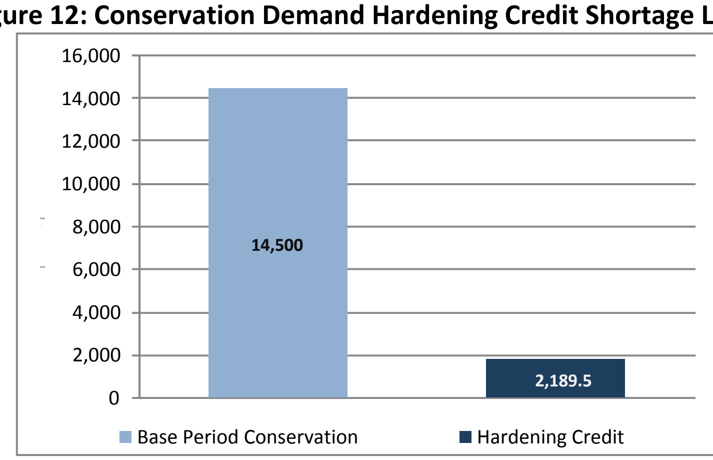
(g) Conservation Demand Hardening Credit: Calculated by adding Wholesale Minimum Allocation (46,732 AF) and Allocation Year Local Supplies (66,240 AF), dividing by Allocation Year Retail Demands (133,000 AF) and then subtracting this from 1.

1- ((46,732 + 66,240) ÷ 133,000) = .151 = 15.1%.

Next, multiply the agency's quantified conservation savings in acre-feet (14,500 AF) by its estimated retail shortage percentage calculated in the step above.

14,500 AF*.151= 2,189.5 AF

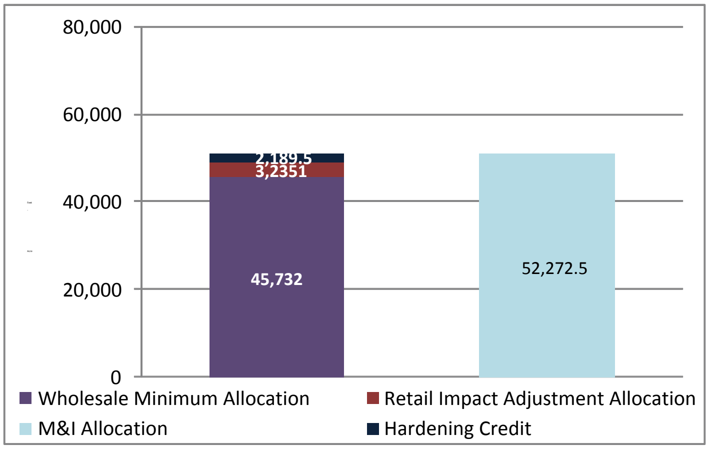
Figure 12: Conservation Demand Hardening Credit Shortage Level 4



(h) Municipal & Industrial Allocation: Calculated by adding the Wholesale Minimum Allocation (46,732 AF), the Maximum Retail Impact Adjustment (3,351 AF), and the Conservation Hardening Credit (2,189.5 AF).

46,732 AF + 3,351 AF+ 2,189.5 AF= 52,272.5 AF

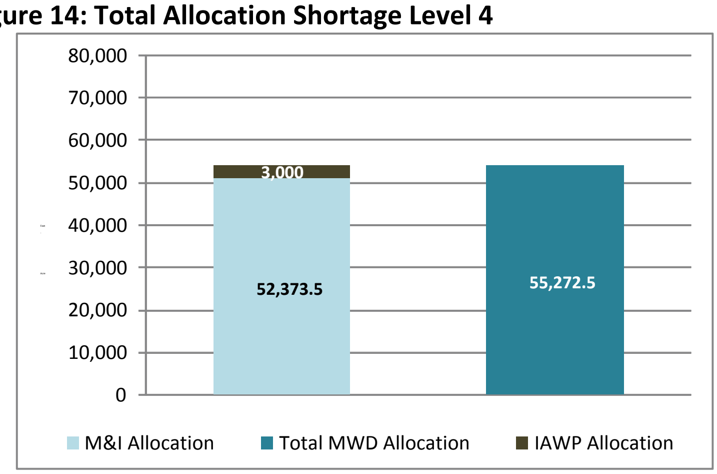
Figure 13: Municipal and Industrial Allocation Shortage Level 4



(i) Total Allocation: Calculated by adding the Municipal and Industrial Allocation (52,272.5 AF) and the Interim Agricultural Water Program Allocation (3,000 AF).

52,272.5 AF + 3,000 AF= 55,272.5 AF

Figure 14: Total Allocation Shortage Level 4



Appendix E: Qualifying Income-Based Rate Penalty Adjustment Example

The following example provides a step by step description of how the qualifying income-based rate penalty adjustment is calculated.

The following table summarizes the allocation year demands, local supplies and allocation as calculated in Appendix D for a hypothetical agency under a Level 1 or 2 Regional Shortage Level. For detailed instructions on how to calculate these figures, reference Appendix D of the Plan.

Allocation Year Retail Demand	133,000 AF
Allocation Year Local Supplies	65,500 AF
Wholesale Municipal & Industrial Allocation	58,477 AF

Step 1: Penalty Calculation

(a) Water Use above Allocation: The first step in calculating the income-based rate penalty adjustment is to calculate the agency's total penalty under the Plan. If the agency did not incur any penalties from the allocation year, the income-based rate penalty adjustment would not apply. For the purpose of this example, the agency used 67,600 acre-feet of MWD supplies in the allocation year. This represents 9,123 acre-feet of use above the water supply allocation.

Total MWD Water Supply Allocation	58,477 AF
Actual MWD Water Use	67,600 AF
Use Above Water Supply Allocation	**9,123 AF**

(b) Total Penalty: In this example the agency used 115.6% of its water supply allocation. Assuming that the preferential right penalty rate does not apply to this agency, 8,772 of the 9,123 acre-feet of use above the allocation would be penalized at a rate of two times the untreated Tier 2 rate and 351 of the 9,123 acre-feet of use above the allocation would be penalized at a rate of four times the untreated Tier 2 rate. Note that this calculation is based on the 2008 rates found in Appendix F; the actual rate will be based on the rate in effect at the end of the allocation year.

Between 100% and 115% of Allocation	8,772 AF	2 x Tier 2 = $898/AF	$7,877,256
Greater than 115% of Allocation	351 AF	4 x Tier 2 = $1796/AF	$630,396
Total	**9,123 AF**		**$8,507,652**

Step 2: Effective Income-Based Rate Cutback

(a) Calculate Retail Cutback: The second step in calculating the income-based rate penalty adjustment is to calculate the amount of supply cutback that would have been expected from qualifying income-based rate customers under the WSAP. Using the water supply allocation that was calculated above, the total retail level impact on the agency can be determined. In this example the agency receives a retail level cutback of 9,023 acre-feet, or 6.8% of their retail level demand.

Wholesale Municipal & Industrial Allocation + Allocation Year Local Supplies	123,977 AF
Allocation Year Retail Demand	133,000 AF
Effective Cutback	**9,023 AF (6.8%)**

(b) Income-based Rate Customer Retail Cutback: To calculate the effective income-based rate cutback, the amount of demand covered by a qualifying income-based rate is multiplied by the effective retail level cutback.

Qualifying Income-Based Rate Demand	7,690 AF
Effective Cutback Percentage	6.8%
Effective Income-Based Rate Cutback	**523 AF**

(c) Income-based Rate Cutback Penalty: Once the effective cutback has been calculated, the amount of penalty that is associated with qualifying income-based rate customers can be determined.

Between 100% and 115% of Allocation	172 AF	2 x Tier 2 = $898/AF	$154,456
Greater than 115% of Allocation	351 AF	4 x Tier 2 = $1796/AF	$630,396
Total	**523 AF**		**$784,852**

(d) Adjusted Penalty Calculation: Finally, the penalty attributable to qualifying income-based rate customers is subtracted from the total penalty that was calculated above to determine the qualifying income-based rate adjusted penalty. In the case that the monetary penalties associated with the Income-Based Rate are greater than the total penalties an agency incurs, no penalty will be incurred.

Total Penalty	$8,507,652
Qualifying Income-Based Rate Penalty	$784,852
Qualifying Income-Based Rate Adjusted Penalty	**$7,722,800**

Appendix F: Water Rates, Charges, and Definitions

Table 8: Tiered Water Pricing Rates and Charges		
Rate	**2007**	**2008**
Tier 1 Supply Rate (dollars per acre-foot)	$73	$73
Tier 2 Supply Rate (dollars per acre-foot)	$169	$171
System Access Rate (dollars per acre-foot)	$143	$143
Water Stewardship Rate (dollars per acre-foot)	$25	$25
System Power Rate (dollars per acre-foot)	$90	$110
Full Service Untreated Volumetric Cost ($/AF)		
Tier 1	$331	$351
Tier 2	$427	$449
Replenishment Water Rate: untreated (dollars per acre-foot)	$238	$258
Interim Agricultural Water Program: untreated (dollars per acre-foot)	$241	$261
Treatment Surcharge (dollars per acre-foot)	$147	$157
Full Service Treated Volumetric Cost ($/AF)		
Tier 1	$478	$508
Tier 2	$574	$606
Treated Replenishment Water Rate (treated dollars per acre-foot)	$360	$390
Treated Interim Agricultural Water Program (dollars per acre-foot)	$364	$394
Readiness-to-Serve Charge (millions of dollars)	$80	$82
Capacity Charge (dollars per cubic foot second)	$6,800	$6,800

Definitions:

(1) **Tier 1 Supply Rate -** recovers the cost of maintaining a reliable amount of supply.
(2) **Tier 2 Supply Rate** - set at Metropolitan's cost of developing additional supply to encourage efficient use of local resources.
(3) **System Access Rate** – recovers a portion of the costs associated with the delivery of supplies.
(4) **System Power Rate** – recovers Metropolitan's power costs for pumping supplies to Southern California.
(5) **Water Stewardship Rate** – recovers the cost of Metropolitan's financial commitment to conservation, water recycling, groundwater clean-up and other local resource management programs.
(6) **Replenishment Water Rate** – a discounted rate for surplus system supplies available for the purpose of replenishing local storage.
(7) **Treated Replenishment Water Rate** – a discounted rate for surplus system supplies available for the purpose of replenishing local storage.
(8) **Interim Agricultural Water Rate** – discounted rate for surplus system supplies available for the purpose of growing agricultural, horticultural, or floricultural products.
(9) **Treated Interim Agricultural Water Program Rate** – discounted rate for surplus system supplies available for the purpose of growing agricultural, horticultural, or floricultural products.
(10) **Treatment Surcharge** – recovers the costs of treating imported water.
(11) **Readiness-to-Serve Charge -** a fixed charge that recovers the cost of the portion of system capacity that is on standby to provide emergency service and operational flexibility.
(12) **Capacity Charge** – the capacity charge recovers the cost of providing peak capacity within the distribution system.

http://www.mwdh2o.com/mwdh2o/pages/finance/finance_03.html

Appendix G: Preferential Rights

Any review of Metropolitan's methods for allocating supplies during shortages must recognize Section 135 of the 1927 Metropolitan Water District Act (Act). Under Section 135, each member agency has a preferential right to a percentage of Metropolitan's available water supplies based on a legislatively established formula. That percentage is equal to the ratio of each member agency's total accumulated payments to Metropolitan's capital costs and operating expenses compared to the total of all member agencies' payments toward those costs, exempting payments for water purchases. As a result, a member agency's preferential right roughly equals it's pro rata share of all tax assessments and other payments.

In the event of a water supply shortage or drought, any Metropolitan member agency can request that its preferential right be invoked; however, Metropolitan's Board of Directors has never exercised this provision of the Act, even in response to the two statewide droughts in 1976-77 and 1987-92.

Appendix H: Allocation Appeals Process

Step 1: Appeals Submittal:

All appeals shall be submitted to the Appeals Liaison in the form of a written letter signed by the member agency General Manager. Each appeal must be submitted as a separate request, submittals with more than one appeal will not be considered. The appeal request is to include:

- A designated member agency staff person to serve as point of contact.
- The type of appeal (erroneous baseline data, loss of local supply, etc.).
- The quantity (in acre-feet) of the appeal.
- A justification for the appeal which includes supporting documentation.

A minimum of 60 days are required to coordinate the appeals process with Metropolitan's Board process.

Step 2: Notification of Response and Start of Appeals Process

The Appeals Liaison will phone the designated member agency staff contact within three business days of receiving the appeal to provide an initial receipt notification, and schedule an appeals conference. Subsequent to the phone call, the Liaison will send an e-mail to the Agency General Manager and designated staff contact documenting the conversation. An official notification letter confirming both receipt of the appeal submittal, and the date of the appeals conference, will be mailed within two business days following the phone contact

Step 3: Appeals Conference

All practical efforts will be made to hold an appeals conference between Metropolitan staff and member agency staff at Metropolitan's Union Station Headquarters within 15 business days of receiving the appeal submittal. The appeals conference will serve as a forum to review the submittal materials, and ensure that there is consensus understanding as to the spirit of the appeal. Metropolitan staff will provide an initial determination of the size of the appeal (small or large), and review the corresponding steps and timeline for completing the appeals process.

Steps 4-7 of the appeals process differ depending upon the size of the appeal

Small Appeals

Small appeals are defined as those that would change an agency's allocation by less than 10 percent, or are less than 5,000 acre-feet in quantity. Small appeals are evaluated and approved or denied by Metropolitan staff.

Step 4: Preliminary Decision

Metropolitan staff will provide a preliminary notice of decision to the member agency within ten business days of the appeals conference. The Appeals Liaison will mail a written letter to the member agency staff contact and General Manager, stating the preliminary decision and the rationale for approving or denying the appeal.

Step 5: Clarification Conference

Following the preliminary decision the Appeals Liaison will schedule a clarification conference. The member agency may choose to decline the clarification conference if they are satisfied with the preliminary decision. Declining the clarification conference serves as acceptance of the preliminary decision, and the decision becomes final.

Step 6: Final Decision

Metropolitan staff will provide a final notice of decision to the member agency within ten business days of the clarification conference. The Appeals Liaison will mail a written letter to the member agency staff contact and General Manager, stating the final decision and the rationale for the decision. A copy of the letter will also be provided to Metropolitan executive staff.

Step 6a: Board Resolution of Small Appeal Claims

Member agencies may request to forward appeals that are denied by Metropolitan staff to the Board of Directors through the Water Planning and Stewardship Committee for final resolution. The request for Board resolution shall be submitted to the Appeals Liaison in the form of a written letter signed by the member agency General Manager, this request will be administered according to Steps 6 and 7 of the large appeals process.

Step 7: Board Notification

Metropolitan staff will provide a report to the Board of Directors, through the Water Planning and Stewardship Committee, on all submitted appeals including the basis for determination of the outcome of the appeal.

Large Appeals

Large appeals are defined as those that would change an agency's allocation by more than 10 percent, and are larger than 5,000 acre-feet. Large appeals are evaluated and approved or denied by the Board of Directors.

Step 4: Preliminary Recommendation

Metropolitan staff will provide a preliminary notice of recommendation to the member agency within 10 business days of the appeals conference. The Appeals Liaison will mail a written letter to the member agency staff contact and General Manager, stating the preliminary recommendation and the rationale for the recommendation. A copy of the draft recommendation will also be provided to Metropolitan executive staff.

Step 5: Clarification Conference

Following the preliminary recommendation the Appeals Liaison will schedule a clarification conference. The member agency may choose to decline the clarification conference if the satisfied with preliminary recommendation. Declining the clarification conference signifies acceptance of the preliminary recommendation, and the recommendation becomes final.

Step 6: Final recommendation

Metropolitan staff will provide a final notice of recommendation to the member agency within 10 business days of the clarification conference. The Appeals Liaison will mail a written letter to the member agency staff contact and General Manager, stating the final recommendation and the rationale for the recommendation. A copy of the final recommendation will also be provided for Metropolitan executive review.

Step 7: Board Action

Metropolitan staff shall refer the appeal to the Board of Directors through the Water Planning and Stewardship Committee for approval.

Appendix I: Appeals Submittal Checklist

Appeal Submittal

- ☐ Written letter (E-mail or other electronic formats will not be accepted)
- ☐ Signed by the Agency General Manager
- ☐ Mailed to the appointed Metropolitan Appeals Liaison

Contact Information

- ☐ Designated staff contact
  - Name
  - Address
  - Phone Number
  - E-mail Address
- ☐ General Manager
  - Name
  - Address
  - Phone Number
  - E-mail Address

Type of Appeal

- ☐ State the type of appeal
  - Erroneous historical data used in base period calculations
    - Metropolitan Deliveries
    - Local Production
    - Growth adjustment
    - Conservation savings
  - Unforeseen loss or gain in local supply
  - Extraordinary increases in local supply

Quantity of Appeal

- ☐ State the quantity in acre-feet of the appeal

Justification and Supporting Documentation

- ☐ State the rationale for the appeal
- ☐ Provide verifiable documentation to support the stated rationale
  - Examples of verifiable documentation Include, but are not limited to:
    - Billing Statements
    - Invoices for conservation device installations
    - Basin Groundwater/Watermaster Reports
    - CA Department of Finance economic or population data
    - Department of Public Health reports

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

WATER SURPLUS AND DROUGHT MANAGEMENT PLAN

REPORT NO. 1150

AUGUST 1999

ACKNOWLEDGMENTS

The consensus reached in the Water Surplus and Drought Management Plan would not have been possible without the dedication and participation of the Rate Refinement Process Workgroup, comprises made by the General Manager, staff from Metropolitan's member agencies, Metropolitan staff, and the dedication and work of the consultants.

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WATER SURPLUS AND DROUGHT MANAGEMENT PLAN

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

TABLE OF CONTENTS

EXECUTIVE SUMMARY

INTRODUCTION

The Water Surplus and Drought Management (WSDM) Plan for the Metropolitan Water District of Southern California (Metropolitan) is a ten-year plan that will be used to direct Metropolitan's resource operations to help attain the region's 100% reliability goal. The WSDM Plan recognizes the interdependence of surplus and shortage actions and is a coordinated plan that utilizes all available resources to maximize supply reliability. The overall objective of the WSDM Plan is to ensure that shortage allocation of Metropolitan's imported water supplies is not required.

The central effort in developing the WSDM Plan was a participatory process involving Metropolitan and its member agencies. Metropolitan staff and member agency representatives coordinated the Plan's development during a series of meetings of the Rate Refinement Team.

To lay a foundation for the WSDM Plan, participants in the Rate Refinement Process developed a set of proposed WSDM Principles and Implementation Goals which were subsequently adopted by the Metropolitan Board of Directors in September 1998. These Principles and Implementation Goals outline fundamental policies for guiding surplus and shortage management and establish a basis for dealing with shortages in an equitable and efficient manner.

WSDM PRINCIPLES AND IMPLEMENTATION GOALS

Guiding Principle

- Metropolitan will encourage storage of water during periods of surplus and work jointly with its Member Agencies to minimize the impacts of water shortages on the region's retail consumers and economy during periods of shortage.

Supporting Principles

- Maintain an ongoing coordinated effort among Metropolitan and its Member Agencies to encourage efficient water use, develop cost-effective local resource programs, and inform the public on water supply and reliability issues

- Encourage local and regional storage during periods of surplus and use of storage during periods of shortage

- Manage and operate Metropolitan's regional storage and delivery system in coordination with local facilities to capture and store surplus water in local groundwater and surface reservoirs

- Arrange for secure sources of additional water from outside the region for use during periods of shortage

- Call upon sources of additional water from outside the region and water stored locally to meet the needs of consumers and protect the economy during periods of shortage

WSDM Plan Implementation Goals

- Avoid mandatory import water allocations to the extent practicable

- Equitably allocate imported water on the basis of agencies' needs

  Considerations to create an equitable allocation of imported water may include:

  - Impact on retail consumers and economy
  - Reclamation/Recycling
  - Conservation
  - Population and economic growth
  - Investment in local resources
  - Change and/or loss of local supply
  - Participation in Metropolitan's Non-firm (interruptible) programs
  - Investment in Metropolitan's facilities

- Encourage storage of surplus supplies to mitigate shortages and improve water quality

SURPLUS AND SHORTAGE ACTIONS

The region's ability to implement a long-term WSDM Plan results from the significant investments Metropolitan and its member agencies have made in a variety of resources since 1991. These additional resources include increased local conservation and water recycling, improvements in the reliability of imported supplies, increased regional storage, and increased conjunctive use groundwater programs. Together these improvements allow a comprehensive approach to water management.

The growing variety of resources available to the region is transforming Metropolitan from an agency with relatively modest storage capacity to one that will have storage sufficient to manage many shortages without impacts to its member agencies or retail customers. To attain this level of reliability, all storage programs and facilities, along with conservation, recycling, and other programs, must be managed as an integrated set of regional resources. To accomplish this, the WSDM Plan establishes the linkage between surplus and shortage resource management actions.

When imported supplies exceed projected demands for imported water within Metropolitan's service area, Metropolitan can operate available storage facilities to maximize the benefits of stored water to its member agencies. A number of factors affect Metropolitan's ability to divert surplus water into storage. Some of these factors include facility outages, system capacity, water quality (including requirements for managing total dissolved solids), and varying supply and demand patterns. The WSDM Plan provides a description of storage options available to Metropolitan and a framework for storing water in these programs and facilities when surplus supplies are available.

Except in severe or extreme shortages (defined in the Introduction) or emergencies, Metropolitan's resource management will allow shortages to be mitigated without impacting retail Municipal and Industrial (M&I) customers. A list of resource management actions and their descriptions are provided below. This list emphasizes critical storage programs and facilities, and conservation programs that make up part of Metropolitan's response to shortages. The order in which these actions are presented does not imply the exact operational management of resources that would occur during a shortage, rather it represents a general framework and guide. In fact, several actions are likely to be taken concurrently. Many factors will dictate the exact order in which these actions will be taken during shortages. One action, however, will have an assigned prioritization: the curtailment of Full Service (firm) deliveries will be last. The following summarizes the drought actions:

- Draw on storage in the Eastside Reservoir Project
- Draw on out-of-region storage in Semitropic and Arvin-Edison
- Reduce/suspend long-term seasonal and groundwater replenishment deliveries
- Draw on contractual groundwater storage programs in the region
- Draw on State Water Project (SWP) terminal reservoir storage (per Monterey Agreement)
- Call for extraordinary drought conservation and public education
- Reduce Interim Agricultural Water Program (IAWP) deliveries
- Call on water transfer options contracts
- Purchase transfers on the spot market
- Implement the allocation of Metropolitan's imported supplies to its member agencies

For the ten-year period addressed by the WSDM Plan, 1999-2008, the majority of shortage contingencies will be managed by withdrawals from storage, groundwater management and options transfers. Shortages managed using these actions would not impact the quantity of water delivered to member agencies for consumptive uses. In fact, when coupled with other drought actions such as extraordinary conservation and reduction of agricultural deliveries, it is fully expected that an allocation of firm imported water supplies will not be necessary during the next ten years. Under this worse-case scenario, an approach to allocate Metropolitan's firm imported water supplies in a fair and equitable manner will be developed.

The overall policy objective of the allocation method will be to minimize the impacts to any one agency and the region as a whole. To meet that objective, the method of allocating firm imported supply will account for:

- Each agency's demands on Metropolitan,
- Each agency's local resources
- Each agency's total retail demands.

The WSDM Plan allocation method would address each of these supply and demand components and account for each agency's conservation and recycled water programs. A pricing structure will be coupled with the WSDM allocation method to accomplish two goals:

- Encourage conservation and water recycling
- Ensure that the regional impact of the shortage is as small as possible

To provide as much water as possible without changing wholesale prices, the allocation of all available supplies will be made at the prevailing rates for firm deliveries. In order to encourage conservation to the level of allocation, the rate for agency usage from 100-102% of its allocation will be the Full Service rate plus $175. Usage above 102% of allocated supply will be charged at three times the Full Service rate. Any substantial change in Metropolitan's water rate structure may require these rates to be revised.

During severe or extreme shortage conditions, public outreach will play a critical role in shaping consumer response. Public information campaigns will send clear signals if extraordinary drought conservation is required. An effective public information campaign requires a joint effort among Metropolitan and its member agencies. Under this Plan, the administration of the Public Information and Government Affairs program will be the responsibility of a Drought Program Officer (DPO). The DPO will be responsible for integrating the various activities in these areas, coordinating efforts with Metropolitan's Board of Directors and member agencies, and designing the region-wide messages for the general public and various target audiences. Important constituencies are residential users, industrial and institutional users, business interests, agricultural users, elected officials, officials of various agencies such as the Department of Water Resources, and the media.

INTEGRATED RESOURCES MANAGEMENT

Throughout the Integrated Resources Planning process and the development of the WSDM Plan, extensive analysis of resource management strategies focused on maximizing supply reliability while minimizing overall resource costs. Various management strategies were analyzed trader shortage scenarios based on historical hydrologic data. The WSDM Plan presents a resource management framework to guide Metropolitan's integrated approach to supply management.

The resource management framework does not dictate a scripted response to shortage or surplus. The framework recognizes the complexity and variety of conditions that require action. Supporting this framework are general rules that describe the actions to be taken in each stage of surplus or shortage. These rules depend on shortage stage, account for monthly delivery requirements, and depend on when various supplies would be available.

One of the fundamental trade-offs in dealing with supply shortages is the need to maintain flexibility while providing supply certainty to member agencies and consumers. A central focus of the WSDM Plan is the analysis of information about supplies and demands. When do various pieces of information about the supply/demand balance become more certain? When should this information impact policy-making and trigger various resource actions? The WSDM Plan addresses these questions and the actual implementation of the Plan during a shortage.

Appendix A of this report provides a ten-year simulation of projected demands and supplies showing an example of how the region can maintain 100% reliability.

INTRODUCTION

The Metropolitan Water District of Southern California (Metropolitan) provides water to a service area covering approximately 5,200 square miles. Over 16.5 million people live within the service area, which supports a $500 billion economy. Metropolitan provides supplemental supplies to twenty-seven member agencies, both retail and wholesale agencies, who in turn provide water to over three hundred cities and local agencies providing supplies at the retail level. In recent years Metropolitan supplemental deliveries have accounted for about one-half to two-thirds of the region's total water demands. With supplies from its Colorado River Aqueduct (CRA) and the State Water Project (SWP), Metropolitan delivers water for municipal and industrial (M&I) uses, agricultural uses, and augmentation of local storage.

As part of the implementation of the regional Integrated Resources Plan (IRP), Metropolitan and its member agencies have developed the Water Surplus and Drought Management (WSDM) Plan for Southern California. This ten-year plan will direct Metropolitan's resource operations to help attain the region's 100% reliability goal. Over this ten-year period, the WSDM Plan will be updated to account for changes impacting supplies from the Colorado River and California's Bay-Delta. In the past, Metropolitan has developed drought management plans that simply addressed shortage actions and primarily focused on issues of short-term conservation and allocation of imported water. The WSDM Plan recognizes the interdependence of surplus and shortage actions and is a coordinated plan that utilizes all available resources to maximize supply reliability. The overall goal of the WSDM Plan is to ensure that shortage allocation of Metropolitan's imported water supplies is no---At required.

Because it addresses both surplus and shortage contingencies, the WSDM Plans draws clear distinctions among the terms *surplus, shortage, severe shortage,* and *extreme shortage.*

Surplus*: Supplies are sufficient to allow Metropolitan to meet Full Service demands, make deliveries to all interruptible programs (replenishment, long-term seasonal storage, and agricultural deliveries), and deliver water to regional and local facilities for storage.*

Shortage*: Supplies are sufficient to allow Metropolitan to meet Full Service demands and make partial or full deliveries to interruptible programs, sometimes using stored water and voluntary water transfers.*

Severe Shortage*: Supplies are insufficient and Metropolitan is required to make withdrawals from storage, call on its water transfers, and possibly call for extraordinary drought conservation and reduce deliveries under the IAWP.*

Extreme Shortage*: Supplies are insufficient and Metropolitan is required to allocate available imported supplies.*

WSDM PRINCIPLES AND IMPLEMENTATION GOALS

The central effort in developing the WSDM Plan was a participatory process involving Metropolitan and its member agencies. Metropolitan staff and member agency representatives coordinated the Plan's development during a series of meetings of the Rate Refinement Team and the Integrated Resources Planning Workgroup. To lay a foundation for the WSDM Plan, participants in the Rate Refinement Process developed a set of "WSDM Principles and Implementation Goals."

Guiding Principle

- Metropolitan will encourage storage of water during periods of surplus and work jointly with its Member Agencies to minimize the impacts of water shortages on the region's retail consumers and economy during periods of shortage.

Supporting Principles

- Maintain an ongoing coordinated effort among Metropolitan and its Member Agencies to encourage efficient water use and cost-effective local resource programs and to inform the public on water supply and reliability issues

- Encourage local and regional storage during periods of surplus and use of storage during periods of shortage

- Manage and operate Metropolitan's regional storage and delivery system in coordination with local facilities to capture and store surplus water in local groundwater and surface reservoirs

- Arrange for secure sources of additional water from outside the region for use during periods of shortage

- Call upon sources of additional water from outside the region and water stored locally to meet the needs of consumers and protect the economy during periods of shortage

WSDM Plan Implementation Goals

- Avoid mandatory import water allocations to the extent practicable

- Equitably allocate imported water on the basis of agencies' needs

  Considerations to create an equitable allocation of imported water may include:
  - Impact on retail consumers and economy
  - Reclamation/Recycling
  - Conservation
  - Population and economic growth
  - Investment in local resources
  - Change and/or loss of local supply
  - Participation in Metropolitan's Non-firm (interruptible) programs
  - Investment in Metropolitan's facilities.

- Encourage storage of surplus supplies to mitigate shortages and improve water quality

REGIONAL RESOURCES AND DEMANDS

Southern California receives its water supplies from a variety of different sources, both local to the region and imported from outside the region. These sources are summarized below.

Local Supplies

Local supplies include groundwater pumping of local aquifers, surface reservoir production, recycled water, and supplies imported through wheeling arrangements or through the Los Angeles Aqueduct, which is owned and operated by the City of Los Angeles. Local supplies have, in the past, provided as much as 2.1 million acre-feet (maf) of water to meet the region's water demands. By far the largest component of local supplies is groundwater pumping, providing over 75% of historical local supplies.

Colorado River Supplies

The distribution and management of Colorado River water is governed by a complex body of laws, court decrees, compacts, agreements, regulations, and an international treaty collectively known as the "Law of the River." Metropolitan's entitlement is established by the fourth and fifth priorities of California's Seven Party Agreement, included in Metropolitan's 1931 and 1946 contracts with the Secretary of the Interior. These priorities provide 550,000 acre-feet (af) per year and 662,000 af per year, respectively. In addition, Metropolitan holds a surplus water contract for delivery of 180,000 af. The physical capacity of the CRA is slightly in excess of 1.3 maf per year, based on a pumping capacity of 1,800 cubic feet per second (cfs). Metropolitan's long-held objective is to maximize the availability of Colorado River water, up to the maximum capacity of the CRA, subject to environmental, contractual, legal, political, financial, and institutional constraints. A California 4.4 Plan is being developed among California parties that will help ensure that full CRA deliveries are maintained, while addressing the concerns of the other Colorado River basin states that rely on the river. The California 4.4 Plan includes core transfers (such as the IID/MWD conservation agreement and the proposed IID/SDCWA transfer), system conservation (such as the lining of the All American Canal), offstream storage (such as the Arizona groundwater storage program), dry year option transfers (such as PVID land fallowing), and river re-operations.

State Water Project

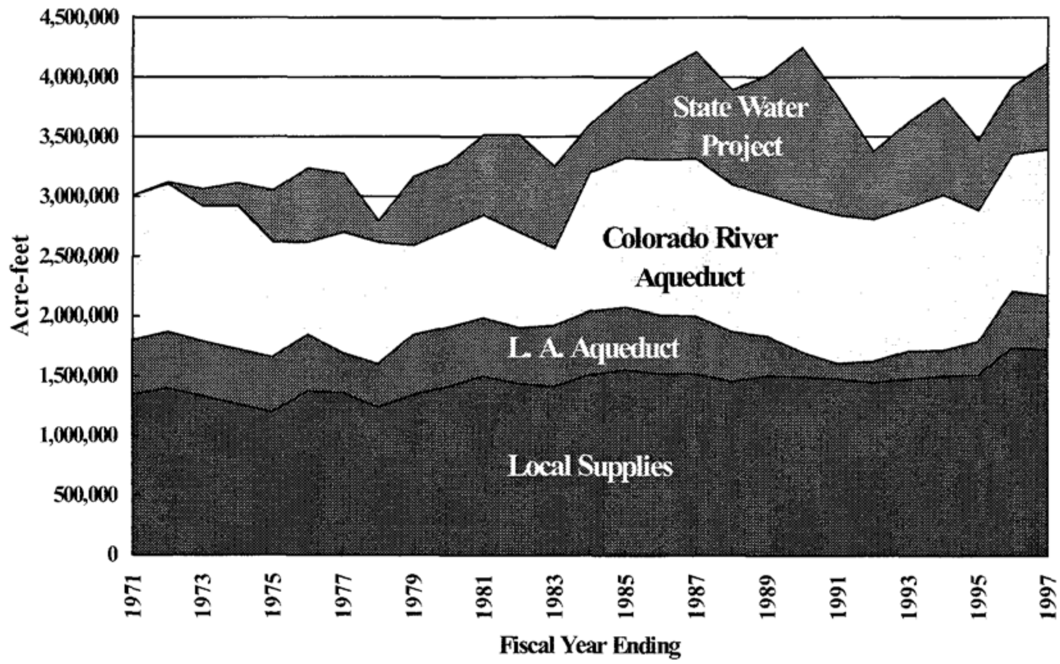
Metropolitan is one of 29 water agencies that have contracted with the State of California, through the Department of Water Resources (DWR), for water deliveries from the SWP system. Metropolitan's contracted entitlement is for 2.01 maf per year, or about 48 percent of the total contracted entitlement of 4.2 maf per year. SWP deliveries to Metropolitan are made via the SWP's California Aqueduct.

Initial SWP facilities, completed in the early 1970's, have produced average supply yields adequate to meet just over half of the total contracted entitlement. While it was intended that additional SWP facilities would be constructed as SWP contractor demands increased up to their contracted entitlements, few facilities have been constructed since that time.

The SWP obtains its supplies primarily from the Sacramento River Basin. About half of the total supply diverted from the Delta for the SWP is regulated flow from the Feather River (a tributary to the Sacramento River), while the other half is unregulated flow from runoff downstream of Sacramento River reservoirs and from other rivers that flow into the Delta. The Sacramento River watershed is subject to wide annual variations in total runoff. The Sacramento River Index (SRI), which measures runoff in the watershed, has averaged about 18 maf per year over the last 90 years. However, runoff varies widely from year to year. For example, the SRI measured 7.8 mafin 1994 and 32.5 mafin 1995.

Figure 1 shows the historical total regional supply production by type. As shown in Figure 1, water supplies were as high as 4.25 mafin 1990 and within two years dropped to 3.4 mar, a 20% decrease.

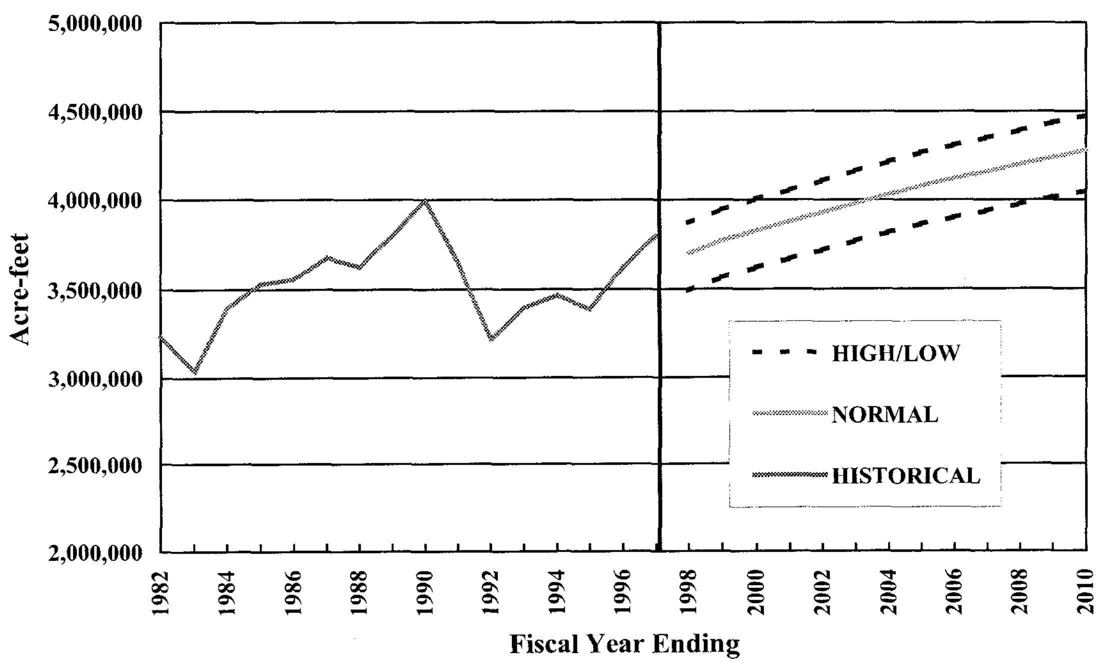
Figure 1. Historical Supply Production by Type of Supply



RETAIL DEMANDS

From 1982 through 1995, the region experienced retail water demands averaging 3.5 mar. In dry years retail demands are approximately 5 to 7% greater than normal years, while demands in wet years are about 6 to 8% below normal demands. Under normal weather conditions, assuming full implementation of conservation best management practices, total regional retail demands are projected to increase from about 3.7 mar in 1997 to almost 4.3 mar in 2010. Without conservation, demands in 2010 would be about 10 to 12% greater than projected. Increases in retail demand are driven by demographics and economics, including changes in population, housing, employment, and income. Figure 2 shows the historical and projected retail demands in Metropolitan's service area.

Figure 2. Regional Retail Water Demands



The historical variability in demands from 1982 to 1997 is mainly due to weather and the economy. In 1983, extreme wet weather caused a significant drop in retail demands. During the period from 1985 to 1990, hot and dry weather coupled with a strong economy resulted in increased demand from 3.5 maf to 4.0 maf, a 14% increase. In 1991, the 5th year of a prolonged drought, conditions forced many communities to implement mandatory supply reductions. These mandatory reductions coupled with extraordinary drought conservation caused a 10 to 15% decrease in retail demands for the region. In addition, the period between 1992 and 1995 was very wet (with the exception of 1994, which was dry), and was a period of severe economic recession. Southern California alone lost some 700,000 jobs from 1990 through 1995. The combination of wet weather, economic recession, and conservation resulted in demands decreasing by over 17%.

DEMANDS ON METROPOLITAN

For many member agencies, Metropolitan's water deliveries represent a supplemental supply. Most member agencies have local water supplies, but agencies differ in how much their supplies alone can meet their respective retail demands. Local supplies are often base-loaded (maximized subject to various constraints) and purchases from Metropolitan are used to meet remaining demands. In addition, to meeting consumptive demands, Metropolitan's deliveries are used to replenish local groundwater and surface reservoirs. To project demands on Metropolitan, projections of member agency's retail water demands and local water supplies are made. Local supplies are then subtracted from retail demands to get consumptive demands on Metropolitan. A projection of Metropolitan's long-term seasonal and replenishment deliveries are made based on safe groundwater yield and weather/hydrology.

Metropolitan forecasts its demands for three different broad categories: Full Service, Seasonal (reservoir storage and groundwater replenishment delivered for shift or long-term storage purposes and sold at a discount), and Agricultural (deliveries of water sold at a discount for agricultural use). Overall, demands on Metropolitan can vary -+ 11 to 18% from normal conditions due to weather and hydrology.

The following four figures show historical and projected demands on Metropolitan by category. Figure 3 shows Basic Water Deliveries, Figure 4 shows Seasonal Water Deliveries, Figure 5 shows Interim Agricultural Water Program (IAWP) Deliveries, and Figure 6 shows Total Water Deliveries for Metropolitan.

Figure 3. MWD Basic Water Deliveries

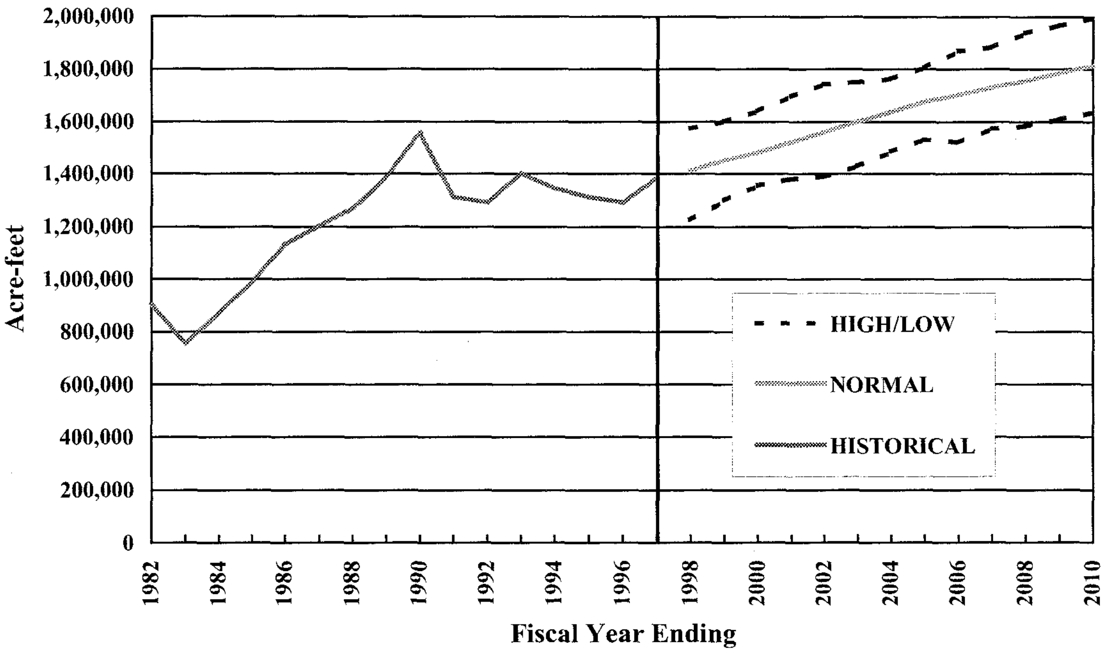


Figure 4. MWD Seasonal Water Deliveries

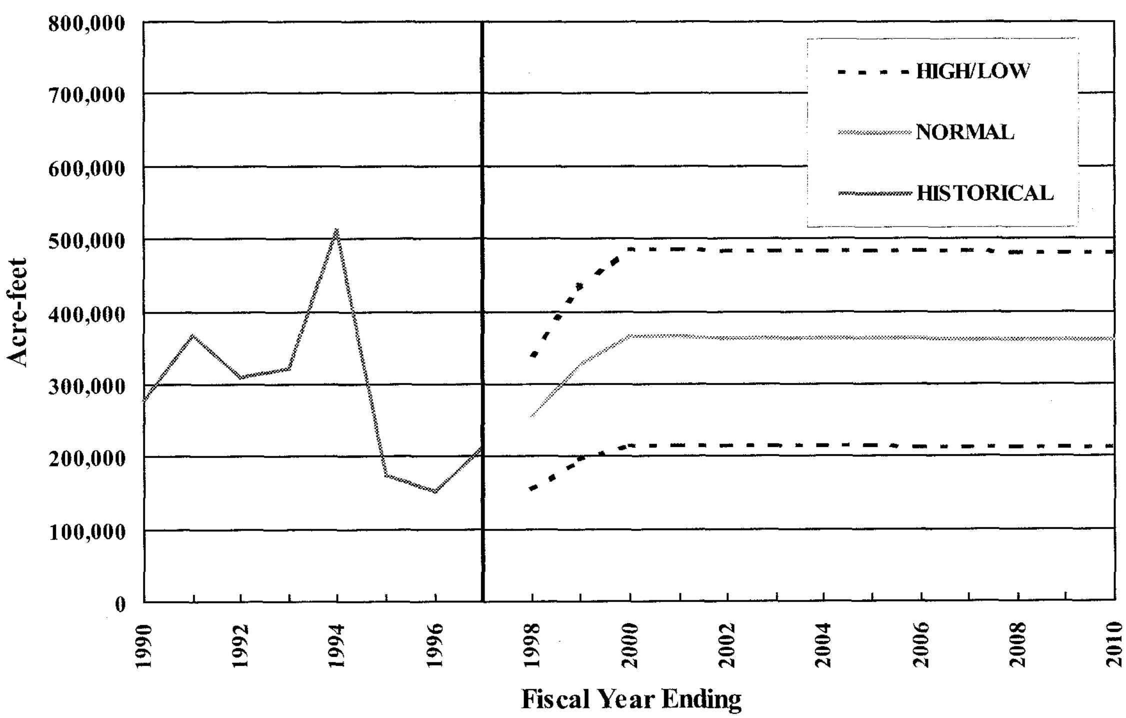


Figure 5. MWD Interim Agricultural Water Program (IAWP) Deliveries

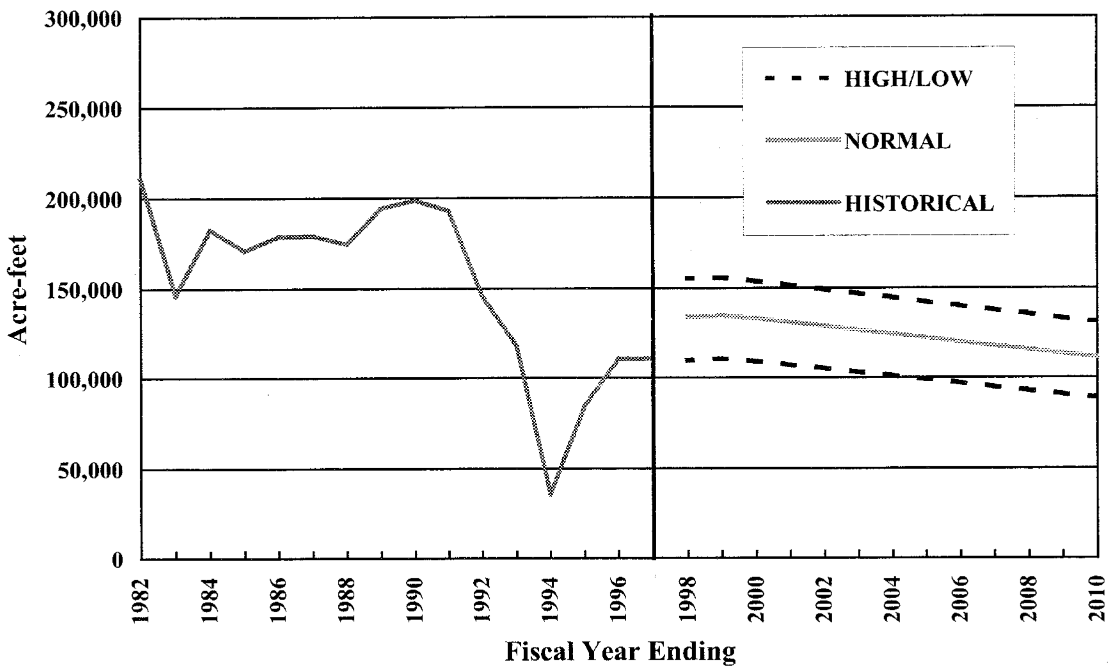
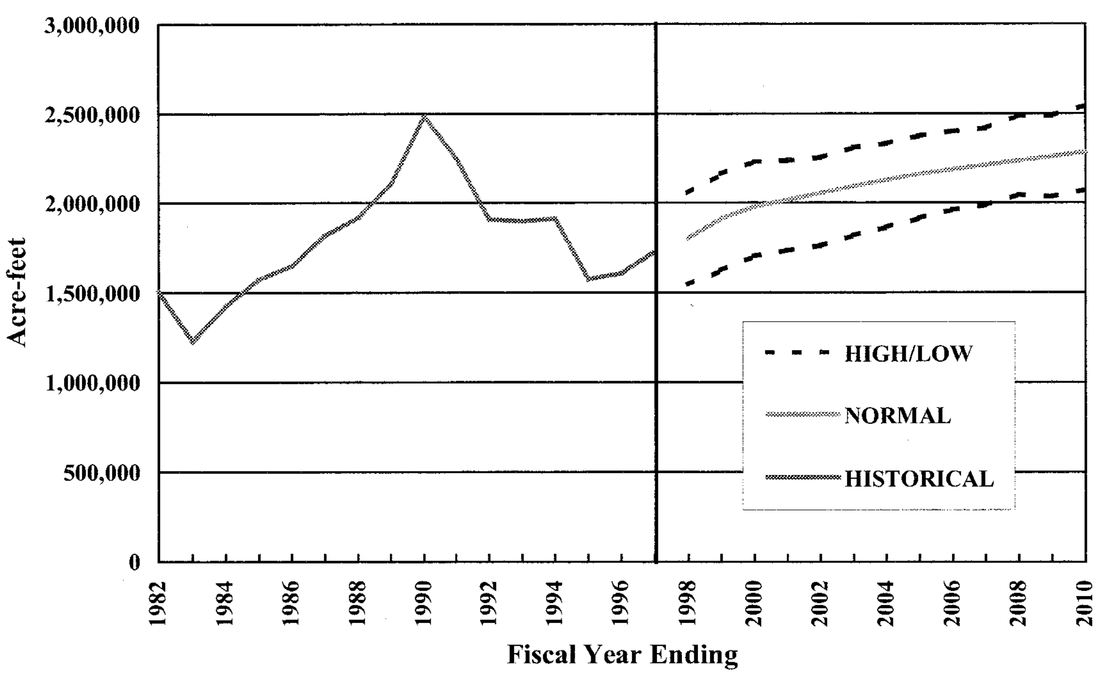


Figure 6. MWD Total Water Deliveries



INTEGRATED RESOURCES PLANNING

To ensure supply reliability under various drought conditions, Metropolitan and its member agencies developed an Integrated Resources Plan (IRP). The IRP, adopted by Metropolitan's Board of Directors in January 1996 and periodically updated, guides Metropolitan's resource and capital improvements investments. The region's ability to develop a long-term WSDM Plan results from the significant investments Metropolitan and its member agencies have made in resources since 1991. To date, these investments include:

- Local supplies: Metropolitan co-funded over 23 local projects and 200 conservation programs that will yield a total of 160,000 af per year.

- **Colorado River Aqueduct:** Metropolitan developed transfers and storage programs to help ensure a full aqueduct. The landmark Metropolitan/Imperial Irrigation District Conservation Program (IID), will result in a savings of 107,000 af per year. Storage programs in Arizona and California, combined with the IID savings, yield a total of 280,000 af of annual core, dry year options, and storage supply.

- **State Water Project:** Metropolitan and other parties negotiated the Bay-Delta Accord and the Monterey Amendment. The Bay-Delta Accord and subsequent efforts will increase the reliability of Metropolitan's entitlement deliveries. The Monterey Amendment provides access to 220,000 af of SWP storage.

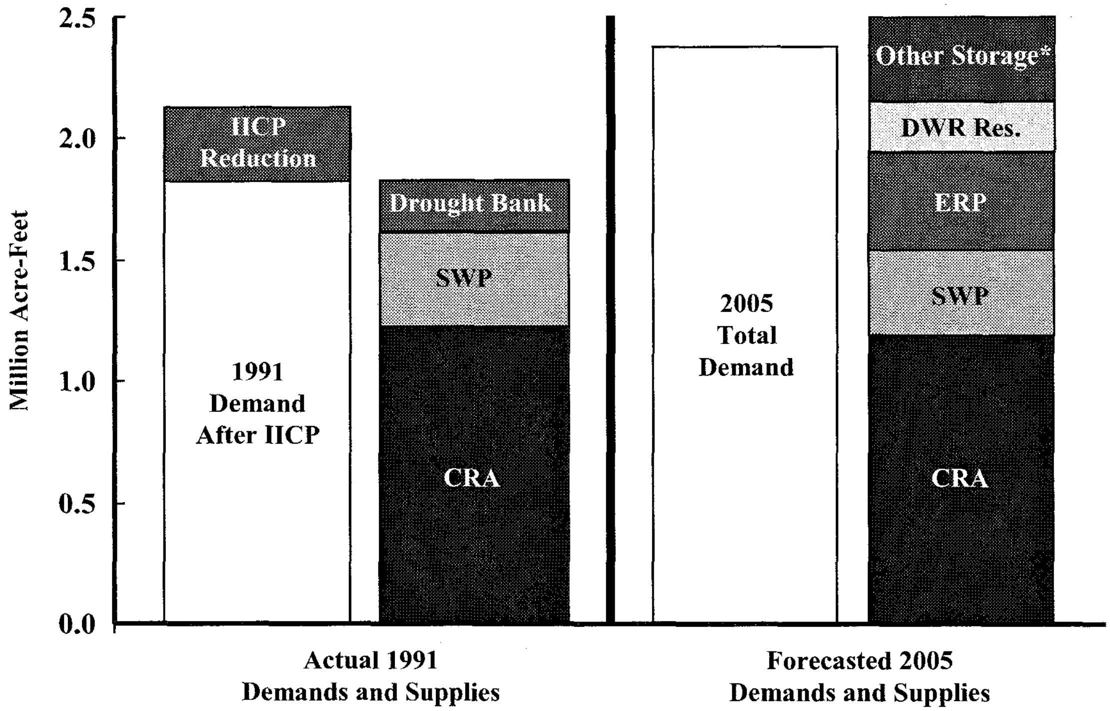
- **In-Basin Storage:** Metropolitan is constructing the Eastside Reservoir Project, with 800,000 af of storage (400,000 af of which is emergency storage for use in case of facility failure as a result of earthquake or other event).

- **Groundwater Conjunctive Use Storage:** Metropolitan developed a conjunctive use storage program in the North Las Posas Basin in Ventura County with an anticipated capacity of 210,000 af and a dry-year withdrawal rate of up to 70,000 af.

- **Transfers and Storage:** Metropolitan developed the Semitropic Storage Program, with 350,000 af of storage and dry-year withdrawals averaging about 60,000 af. Metropolitan also approved the Arvin-Edison Storage and Transfer Program, with 250,000 af of storage and dry-year withdrawals averaging about 70,000 af. Metropolitan is also exploring storage and transfer programs with the Coachella Valley Water District and the Cadiz Land Company.

As a result of these investments, it is anticipated that Metropolitan and its member agencies will be 100% reliable over the next 10 years even under a repeat of the 1991 drought condition. Figure 7 compares actual Metropolitan demands and supplies during 1991 (the last year in a multiyear severe drought) and projected demands and supplies in year 2005 (assuming a repeat of 1991 conditions). In 1991, the region faced shortages that required Metropolitan to allocate water under the Incremental Interruption and Conservation Plan (IICP). The reduction in deliveries came after demands had already been reduced as a result of local conservation. In addition, water had to be purchased from the Governor's drought emergency water bank. By the year 2005 with the investments made to date, Metropolitan's additional water supplies will be more than adequate to meet demands under a repeat of the 1991 drought event--even with increased demands due to growth.

Figure 7. Historical and Projected Metropolitan Supplies and Demands Under Drought Conditions



*** Groundwater management, Semitropic Storage Program, and Arvin-Edison Storage Program**

SURPLUS AND SHORTAGE RESOURCE ACTIONS

Metropolitan's investments in water resources, facilities, and programs has transformed it from an agency with relatively modest storage capacity to one that will have storage sufficient to manage many shortages without negative impacts to its member agencies or retail customers. To attain this level of reliability, storage programs and facilities, along with conservation, recycling, and other programs, must be managed as an integrated set of regional resources. To accomplish this, the WSDM Plan recognizes the linkage between surplus and shortage resource management actions.

SURPLUS ACTIONS

The combination of Metropolitan's regional storage facilities, such as Lake Mathews, Lake Skinner, the future Eastside Reservoir Project, and the storage capacity available to Metropolitan in Castaic Lake and Lake Perris as a result of the Monterey Amendment, allows Metropolitan great flexibility in managing its water resources. The development of storage programs both outside and within the service area provides even greater flexibility in storing surplus water. Each of the storage facilities and programs plays an important role in achieving Metropolitan's reliability goal.

When imported supplies exceed projected demands for imported water within Metropolitan's service area, Metropolitan can operate storage facilities to maximize stored water to benefit its member agencies. A number of factors affect Metropolitan's ability to divert surplus water into storage. Some of these factors include facility outages, system capacity, water quality (including requirements for managing total dissolved solids), and varying supply and demand patterns. This section provides a description of storage options available to Metropolitan and a framework for storing water in these programs and facilities when surplus supplies are available.

Storage of Colorado River Supplies

Metropolitan has participated in a number of programs to maximize the reliability of supplies from the Colorado River. The landmark Metropolitan/Imperial Irrigation District Conservation Program will result in a savings of 107,000 af per year. These supplies will increase the reliability of Metropolitan's entitlement of Colorado River water. Other programs yield shortage benefits by increasing amounts of water stored for use during shortages. Between August 1992 and July 1994, Metropolitan and the Palo Verde Irrigation District conducted a Test Land Fallowing Program. Approximately 20,000 acres of farmland in the Palo Verde Valley were not irrigated, saving 186,000 af of water which was stored in Lake Mead for later use by Metropolitan. With Arizona and Nevada water agencies, Metropolitan is participating in a Central Arizona Groundwater Storage Demonstration Program that has encouraged the storage of water. To date, 139,000 af of supplies have been stored in groundwater basins in Central Arizona. The Desert Coachella program is an exchange and storage program with agencies situated along the Colorado River Aqueduct. Metropolitan releases Colorado River water for storage in the Coachella Groundwater Basin. Metropolitan then exchanges these supplies for the participating agencies' SWP supplies. These programs serve as models for future programs that could increase the reliability of Colorado River supplies. Metropolitan continues to explore other possible options that would increase the reliability of supplies. The California 4.4 Plan is being developed among California parties to increase storage programs for Colorado River supplies. In addition to core transfers and conservation programs, the California 4.4 Plan includes offstream storage (such as the Arizona groundwater storage program), dry year option transfers (such as PVID land fallowing), and river re-operations. These programs, in conjunction with favorable supply determinations by the Secretary of Interior, will ensure the highest possible reliability of Colorado River supplies.

In addition to the programs mentioned above, the Colorado River system itself contributes to the high reliability of Metropolitan's Colorado River supplies. Currently, the average Colorado River runoff exceeds basin-wide demands by over 1.0 maf per year. The Colorado River system also contains a great deal of reservoir storage capacity. The total storage capacity in the Colorado River Basin is approximately 60 maf, almost four times the Colorado River's average annual flow. For much of 1997, system storage levels were at 80% or more of total capacity. These factors allow the Bureau of Reclamation, operators of the Colorado River system, to store significant supplies for use during shortages.

Storage of State Water Project Supplies

Total storage capacity is a critical factor in comparing the operations of the Colorado River system with the SWP. On average, both systems have similar amounts of water available on an annual basis. The SWP's watersheds in the Sacramento River Basin have produced about 18 maf per year over the long term, as represented by the Sacramento River Index (SRI.) Long-term runoff on the Colorado River has averaged more than 16 maf annually since 1906. However, the ability to carry over unused water from a wet year for use in a dry year differs substantially between the two systems. State Water Project storage facilities have storage capacity of about 4.5 maf, while system storage in the Colorado River Basin totals nearly 60 maf. This gives the operators of the Colorado River reservoirs much more flexibility in storing unused water from a wet year for use in a subsequent dry year.

When water from the SWP cannot be put to immediate use in Metropolitan's service area, the water may be stored for future use. Provided storage capacity is available, the water may remain in either Oroville Reservoir (as SWP storage for delivery to all contractors the following year) or San Luis Reservoir (as carryover storage assigned to Metropolitan). Through the carryover storage program, as amended by the Monterey Amendment, Metropolitan can place a maximum of 200,000 af per year of allocated supplies in SWP surface reservoirs. The program also allows for carryover storage in non-project facilities, including surface reservoirs and groundwater basins. In the case of carryover storage in San Luis Reservoir, SWP supplies allocated to but unused by a contractor may, under certain conditions, be assigned as carryover if storage capacity is available at the end of the calendar year. However, carryover water stored for a contractor has lower priority than storage of SWP water and consequently "spills" first as San Luis Reservoir fills.

Also, in a wet year such as 1995, low demands may allow DWR to operate San Luis Reservoir nearly full, eliminating any possibility of contractor carryover storage into the following year. As a result, carryover storage on the SWP may not be possible, and even when possible, is subject to spilling.

Due to these carryover storage limitations, Metropolitan has invested a great deal to expand its ability to store surplus SWP supplies. Metropolitan has entered into a number of water transfer and storage agreements. The Semitropic Water Banking and Exchange program allows Metropolitan to store up to 350,000 afin the groundwater basin underlying the Semitropic Water Storage District. The storage and withdrawal capacities of the program are shared with other participants in the storage program, with Metropolitan's share equaling 35%. Dry-year withdrawals will average about 60,000 af.

Metropolitan and the Arvin-Edison Water Storage District have developed a program that allows Metropolitan to store water in the groundwater basin in the Arvin-Edison service area. The program would allow the storage and withdrawal of 250,000 af of supplies over the next 25430 years. Dry-year withdrawals will average about 70,000 af.

Storage in Regional Facilities

In addition to the storage of Colorado River and SWP supplies outside the region, Metropolitan has established a number of programs for storing supplies within the region. Metropolitan owns and operates two main surface reservoirs, Lake Mathews and Lake Skinner, which have a combined storage of about 226,000 af. Only a small portion of this capacity is available for shortages, with the balance being used to regulate flows in Metr0Politan's delivery system. The Eastside Reservoir Project, currently under construction, will have a total capacity of 800,000 af, with approximately 400,000 af of operational drought and seasonal storage and 400,000 af of emergency storage. Through the Monterey Amendment, Metropolitan obtained the fight to use up to 220,000 af of water stored in the SWP terminal reservoirs. However, withdrawals from these terminal reservoirs must be replaced within five years.

Metropolitan and its member agencies have established the cyclic storage program to increase storage in groundwater basins within the service area. Regional groundwater basins offer an economical way for Metropolitan to improve supply reliability by storing water within the service area. This makes water readily accessible in times of need, either in emergency situations or during shortages. Some limitations are imposed by the fact that such water can generally only be used through pumping from the groundwater basin by an overlying member agency or local agency. Storage in groundwater basins takes place either by direct replenishment (spreading or injection), or through in-lieu means. Spreading (or injection) is desirable because direct measurement of the amount of stored water is a relatively simple, verifiable transaction. The main disadvantage to direct spreading is that spreading can occur only under certain conditions. For example, spreading cannot occur when spreading facilities are being used to capture local storm runoff for flood control purposes, or when the amount of local runoff precludes the need for imported water to replenish the basins. Also, spreading basins require frequent maintenance to assure maximum efficiency. These and other conditions can limit the ability to deliver water for spreading at a time when surplus supplies are available.

In-lieu replenishment allows most member agencies to participate in groundwater replenishment without needing direct access to replenishment facilities. Their wells, in effect, become their replenishment facilities. Both direct and in-lieu replenishment from 1986 through 1990 served the region well during the critical drought years from 1991 through 1993.

The overall objective of the various storage programs is to maximize the availability of imported water during times of need by storing surplus water in a strategic manner and utilizing the storage available within the region. Many factors affect the availability of storage capacity and Metropolitan's ability to move water to and from various facilities. After reviewing the full range of shortage actions available to Metropolitan, a framework for prioritizing the full range of surplus and shortage actions will be presented.

In addition to pricing incentives used to encourage local agencies to store water in groundwater basins, Metropolitan has developed a conjunctive use contractual storage program with the Calleguas MWD in the North Las Posas Basin. Metropolitan will fund the construction of wells which will be called upon to meet demands during dry years. This program will yield a dry year supply of about 70,000 af.

SHORTAGE ACTIONS

Except in severe or extreme shortages or emergencies, Metropolitan's management of available resources will allow shortages to be mitigated without negatively impacting retail M&I demands. Below is a list of drought actions that will be taken during periods of shortage. The goal of these actions is to avoid, to the extent practicable, the allocation of Metropolitan's firm supplies. The order in which these actions are presented does not imply the exact operational management of resources that would occur. In fact, several actions are likely to be taken concurrently. Many factors dictate the particular order in which actions will be taken during an actual shortage, although it is clear that the last action will be the curtailment of firm deliveries to the member agencies.

- Draw on storage in the Eastside Reservoir Project
- Draw on out-of-region storage in Semitropic and Arvin-Edison
- Reduce/suspend long-term seasonal and groundwater replenishment deliveries
- Draw on contractual groundwater storage programs in the region
- Draw on SWP terminal reservoir storage (per Monterey Agreement)
- Call for extraordinary drought conservation and public education
- Reduce IAWP deliveries
- Call on water transfer options contracts
- Purchase transfers on the spot market
- Implement an allocation of Metropolitan's imported supplies to its member agencies

Even with dedicated programs to meet the reliability goal for the region, proper management and operations of these resources is critical to ensure reliability. The prioritization of both surplus and shortage actions need to account for several important criteria. It is also important to recognize that these criteria will need to be balanced. The criteria include:

Location: Out-of-region storage is more vulnerable than in-basin-storage due to the risks of seismic events. To only maximize out-of-region storage will put reliability at risk.

Take capacity: Surface reservoirs generally have the ability to be filled and drawn down very quickly. Certain groundwater storage programs have limited take capacities--requiring several years at full take capacity to withdraw **all** available storage. Stored water will be balanced so that dry year supplies are maximized.

Cost: Programs vary with respect to their marginal operating costs. Program actions will be taken to maximize supply reliability while minimizing cost.

Flexibility: Not all storage programs and transfers offer the same flexibility to Metropolitan. Some programs can only meet specific overlying demands, while others can meet demands anywhere in the system.

DESCRIPTIONS OF RESOURCE ACTIONS

Draw on storage in the Eastside Reservoir Project: Withdrawals from the Eastside Reservoir Project would provide a flexible supply for meeting a shortage. Eastside Reservoir Project supplies can be drawn upon quickly. The amount of water drawn from the Eastside Reservoir Project before exercising other shortage actions will depend on the severity of the shortage and the overall condition of other resources available to Metropolitan.

Draw on out-of-region storage in Semitropic and Arvin-Edison programs: Out-of-region programs such as Semitropic and Arvin-Edison provide cost-effective shortage supplies. These supplies also provide flexibility, as they can be distributed as effectively as any SWP supplies coming into Metropolitan's service area. Exercising these programs relatively early in the order of actions reduces the risk of leaving supplies out-of-region. Based upon the ratio of storage capacity to take capacity, these programs will generally provide supplies over several years. This provides the rationale for calling on these programs relatively early in a shortage.

Reduce Long-Term Seasonal and Replenishment Deliveries, and call on cyclic storage accounts: Certain interruptible supply programs provide benefits during shortage. Reducing deliveries to interruptible programs established for storage purposes, while continuing expected levels of groundwater production, allows limited supplies to go toward meeting direct consumptive uses. In addition, calling on cyclic storage accounts can extend the replenishment needs for several years. Most replenishment supplies would be expected to be interruptible for a minimum of two years before agencies would be allowed to claim a local supply adjustment on such supplies. Some programs have longer interruption requirements. For example, most Groundwater Recovery Programs are governed by contracts that require supply production through a three-year interruption in service.

Draw on contractual groundwater storage programs: In-region contractual groundwater programs provide cost-effective supplies that would be drawn upon during shortages. These programs are also limited by their take capacities and generally have several years of withdrawals in storage. For this reason, these programs might be called upon before withdrawing heavily from surface reservoir storage.

Draw on SWP terminal reservoir storage: The storage available in the SWP terminal reservoirs provides a flexible and cost-effective shortage supply. Supplies withdrawn from this program must be replaced within five years of withdrawal. For this reason, the storage in these reservoirs would be reserved for more serious shortage conditions and would be utilized after the programs and facilities listed above were used to meet the shortage.

Call for extraordinary drought conservation: Voluntary conservation programs have historically been effective in reducing water demand during drought. However, voluntary conservation programs are not without impact to the retail customer and can be perceived as a failure of water agencies to properly plan for shortages. Therefore, the call for extraordinary drought conservation will only be taken with the consent of Metropolitan's Board of Directors.

Reduce agricultural deliveries: The Interim Agricultural Water Program (IAWP) offers interruptible water to southern California's agricultural industry at discounted rates. These supplies will be interrupted as part of Metropolitan's shortage actions. Metropolitan will work with IAWP participants to provide as much advance warning of interruption as possible. The IAWP reflects current policies toward agricultural water users. The policies underlying this program are due to be reviewed during the ten-year period of the WSDM Plan. The WSDM Plan will be changed accordingly.

Call on water transfer option contracts: Transfer options programs provide cost-effective supplies when the region is faced with reducing deliveries to meet consumptive demands. These programs might also be used to increase storage levels in Metropolitan storage facilities. Replenishment of these facilities reduces the risk of leaving available supplies outside the region and helps to protect the region during extended shortages.

Purchase transfers on the spot market: During the 1987-92 drought, the Drought Water Bank proved to be one mechanism for California to reduce the overall impacts of the shortage. However, the cost of spot market supplies may cause Metropolitan to use them as a last increment of supply before the region implements reductions in M&I deliveries. It is likewise possible that availability and cost will make spot market options more favorable under certain conditions. If this occurs then spot market supplies will be sought prior to calls on option transfers. However, participation in the spot market may be restricted to those agencies that have already taken significant actions in response to the shortage.

Implement allocation plan: As the final stage in responding to shortages, Metropolitan will implement an allocation plan to deliver reduced supplies to its member agencies. The issues of allocation and the methods of allocation are outlined in the following section.

ALLOCATION OF SUPPLY FOR M&I DEMANDS

The equitable allocation of supplies is addressed by the Implementation Goals established for the WSDM Plan, with the first goal being to "avoid mandatory import water allocations to the extent practicable." The second fundamental goal is to "equitably allocate imported water on the basis of agencies' needs." Factors for consideration in establishing the equitable allocation include retail and economic impacts, recycled water production, conservation levels, growth, local supply production, and participation and investment in Metropolitan's system and programs. In the event of an extreme shortage an allocation plan will be adopted in accordance with the principles of the WSDM Plan.

INTEGRATED RESOURCE MANAGEMENT STRATEGY

Throughout the Integrated Resources Planning process and the development of the WSDM Plan, extensive analysis of resource management strategies focused on maximizing supply reliability while minimizing overall resource costs. Various management strategies were analyzed under shortage scenarios based on historical hydrologic data. Certain strategies yield high reliability but incur very high costs. This is the case for strategies that utilize relatively costly transfer programs early in a shortage while maintaining high storage levels. If a shortage is short, this results in high transfer costs and shortage storage programs that are not fully utilized. Other strategies draw more heavily on storage early in a shortage and do not use options transfer programs. Later in a shortage, the yields from these transfer programs, combined with low yields from depleted storage facilities, might not make up for continuing or deepening shortages. Overall, such approaches may be inexpensive to pursue at the wholesale level but have high costs associated with retail level impacts. The resource management framework presented results from extensive analysis of various strategies for managing available resources under a variety of surplus and shortage conditions. Although the extent to which various actions are exercised may still vary depending on specific shortage conditions, the ordering presented does reflect Metropolitan's anticipated order of actions during shortages.

RESOURCE MANAGEMENT FRAMEWORK

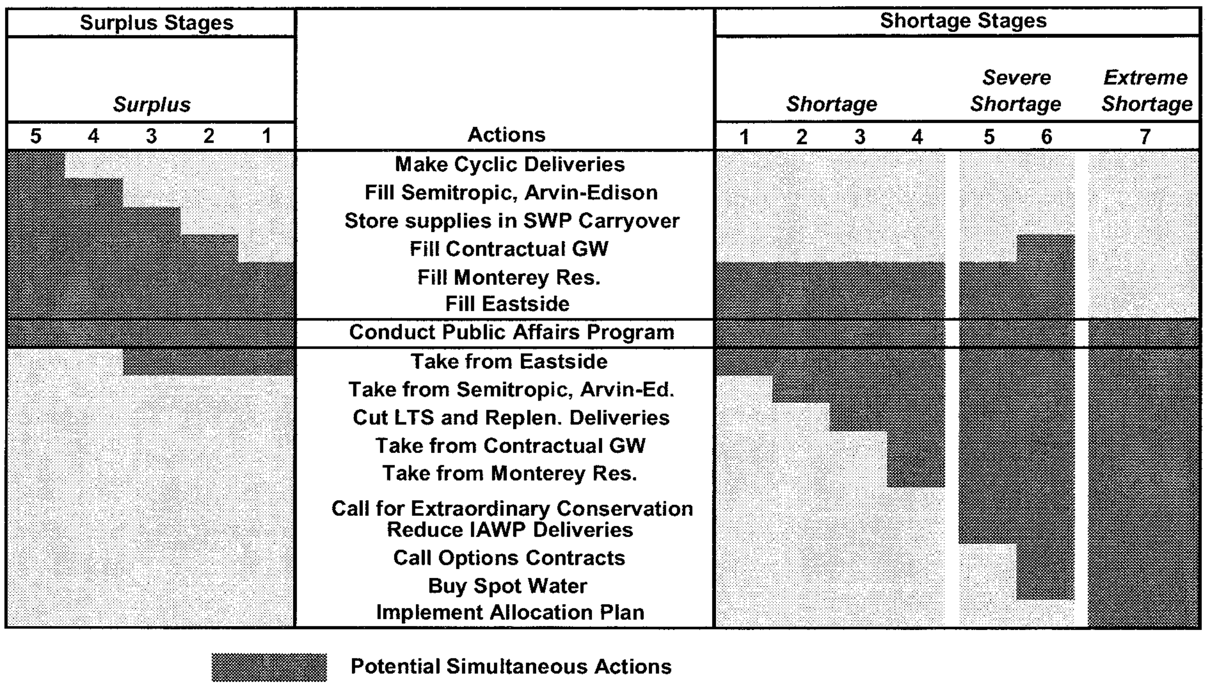
The analysis of surplus and shortage actions yields a water management framework that accounts for the degree or "stage" of surplus and shortage. These stages are defined by parameters such as storage levels and expected SWP supplies. Each stage has associated actions that could be taken as part of the response to prevailing shortage conditions. For example, Surplus Stage 1 might have as associated actions to place water in the highest-priority storage resources. Figure 8 shows the mapping between actions and stages. The darkly shaded diagonal area identifies actions that can be undertaken concurrently, while the lightly shaded areas show actions that will not be taken. For example, Metropolitan will not withdraw water from most storage resources during a surplus.

Figure 8 highlights several aspects of the WSDM Plan's approach to supply management. First and most importantly, it does not dictate a response to shortage or surplus. The framework recognizes the complexity and variety of conditions that could require various responses. Supporting this framework are general "rule curves" that dictate the extent to which particular actions are taken in various stages of surplus or shortage. For example, the rule curves indicate approximately how much water should be taken from the Eastside Reservoir Project before calling on supplies from the Semitropic or Arvin-Edison storage programs. If a shortage were greater than the desired initial withdrawal from the Eastside Reservoir Project, then Stage 2 actions would be taken. The rule curves for a particular resource would take into account shortage stage, monthly delivery requirements, and when various supplies are available.

Surplus and Shortage Stages are determined by the total amount of water that would be stored or produced by exercising the actions in that Stage. Overall storage levels in each stage are determined by the extent to which storage is increased or reduced by earlier actions. Therefore, each Stage is defined by supplies (stored or produced) and an approximate overall level of storage remaining in all resources. Up through Shortage Stage 4, the actions taken will not result in negative impacts to any consumptive uses. Shortage Stages 1 through 4 constitute shortage management without retail level impacts. The conservation efforts and reductions in IAWP deliveries in Shortage Stage 5 will result in retail impacts.

Action by the Metropolitan Board of Directors would be required before actions corresponding to Stages 5, 6, and 7.

Figure 8. Resource Stages and Actions Matrix



The Stages and Actions Matrix (Figure 8) is read from the center moving outward. Moving from the center to the left, are actions that Metropolitan will take during surplus conditions. For instance, in a Stage 3 Surplus, Metropolitan will be adding water to the Eastside Reservoir Project, the Monterey Reservoirs (if any water is due for repayment), Contractual Groundwater Programs, and carryover storage on the State Water Project. Moving from the center to the right are actions that Metropolitan will take during periods of shortage. For instance, in a Stage 3 Shortage, Metropolitan will be pulling water from the Eastside Reservoir Project, the Semitropic and Arvin Edison programs, and interrupting deliveries of Long-Term Seasonal and Replenishment program water. In addition, the Stages and Actions Matrix allows for surplus actions to be taken during shortages and vice versa, but these actions are strictly a result of prudent water management. For example, in a Stage 6 Shortage, Figure 8 shows Metropolitan potentially filling the Eastside Reservoir Project, the Monterey Reservoirs, and contractual groundwater programs while calling on spot transfers and buying spot water. Through these actions Metropolitan will be ensuring that water supply opportunities during a drought are realized--ultimately adding to the drought reserves of southern California.

Figure 8 also highlights the on-going efforts by Metropolitan and its member agencies in the conduct of public outreach and active conservation programs. Through all conditions, effective pubilc outreach and conservation programs are an integral part of Metropolitan's management of resources. In addition to ongoing conservation and water efficiency programs, Stage 5 of the Stages and Actions Matrix calls for participation of the citizens of southern California to take extraordinary conservation measures to cut water demand during droughts.

As with the listing of shortage actions earlier in the report, the Stages/Actions matrix in Figure 8 only highlights certain programs and response actions. However, unlike the discussion of actions earlier, Figure 8 is intended to convey Metropolitan's currently anticipated ordering for those actions listed. As the supply and demand outlooks, programs, and other factors continue to change, the analysis of the ordering of actions will continue during the ten-year period of the WSDM Plan.

SUPPLY CERTAINTY AND THE TIMING OF RESOURCE ACTIONS

One of the fundamental trade-offs in dealing with supply shortages is the need to maintain flexibility while providing supply certainty to member agencies and consumers. A central focus of the WSDM Plan is the analysis of information about supplies and demands. When do various pieces of information about the supply/demand balance become more certain? When should this information impact policy-making and trigger various resource actions? The WSDM Plan addresses these questions and the actual implementation of the Plan during a shortage.

Figure 9 shows a hypothetical shortage year. With respect to the supply and demand outlook, a typical shortage year will have periods of certainty and stability, and other periods of relative uncertainty and transition. Important supply components--such as the SWP, CRA, Los Angeles Aqueduct (LAA), and local supplies--are closely monitored through the early part of the year. These supplies and demands are fairly well-known through the April-September period. Storage is assessed in the post-summer period and decisions about certain programs, such as long-term (LT) seasonal deliveries could be made at this time.

Figure 9. Water Supply Outlook Throughout the Year

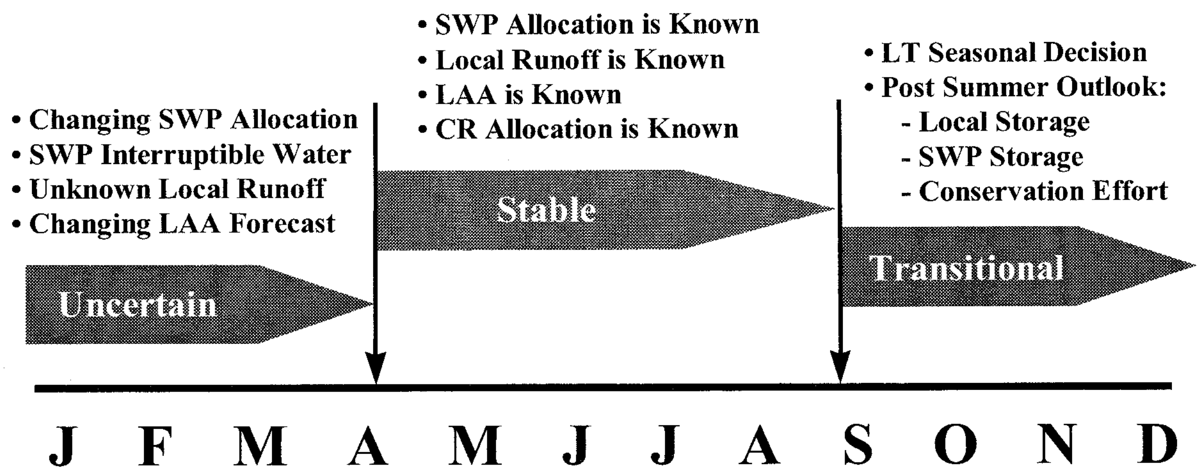
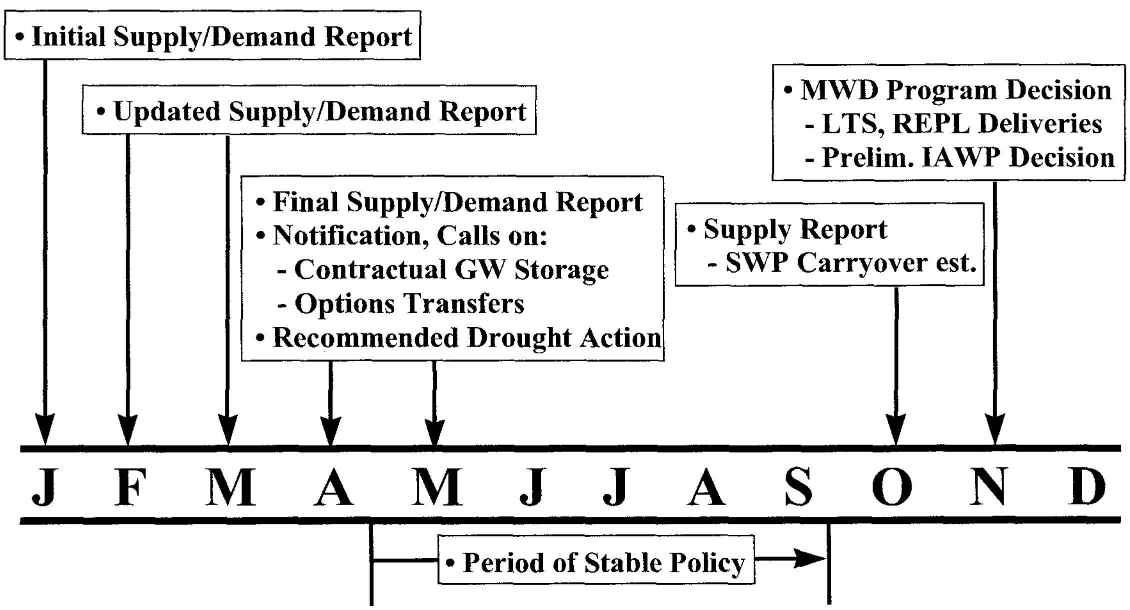


Figure 10 presents the annual schedule for actions taken in response to shortage conditions. Starting in January, an initial supply/demand report will be presented to the Metropolitan Board of Directors. SWP allocations are still only estimates in January and become more certain towards April and May. Demands for Metropolitan deliveries depend in part on how the winter hydrology develops and the condition of local supplies. These factors start to become known during the February-March period and will be reported to the Board in the Supply Report Update. By April-May, the outlook for imported supplies is known to a fairly high degree of certainty and a Final Supply Report will be produced. The May-September period will be one in which the import supply situation does not change drastically and drought policies can be implemented. Demands can be more or less than anticipated as a result of unusually hot or cool weather. At the end of summer, carryover SWP storage will be determined. October through December is a transitional period during which early assessments of available supplies for the following year will be made. During this period, Board actions would determine the management of various Metropolitan programs such as long-term seasonal (LTS) and IAWP deliveries. The following list presents major information and decision points during the year.

Month	Information/Action
January	Initial Supply/Demand Reports
February, March	Updated Supply/Demand Reports
April, May	Final Supply/Demand Report
	Notification on Contractual GW and Options Transfer Programs
	Recommended Drought Actions
May-September	Stable Policy Period
October	Supply and Carryover Storage Report
November	MWD Program Decisions - LT Seasonal, Replenishment, IAWP

Figure 10. One Year of a Hypothetical Shortage - Supply and Demand Reports and Response Actions



PUBLIC OUTREACH AND CONSERVATION

Mechanisms are already in place to implement most of the water management actions and programs that are addressed in the WSDM Plan. Under the majority of supply and demand conditions, the actions of Metropolitan's Board of Directors, the General Manager, the operational activities of Metropolitan, and its member agencies would constitute all actions necessary to mitigate the shortage. Several aspects of the WSDM Plan, however, require additional attention to the administration of programs and actions. In particular, a shortage contingency requires special programs in the areas of public and governmental affairs and conservation. Metropolitan maintains an on-going public information program to encourage efficient water use. Public outreach programs are conducted at all times under both surplus and shortage conditions (see Figure 8). The actions discussed in this section constitute special actions in times of shortage.

During shortage conditions, public outreach will play a critical role in shaping consumer response. Public information campaigns need to send clear signals if extraordinary drought conservation is to achieve needed reductions in demands. Given Metropolitan's diverse set of customers and the varying impacts that shortages can have on different consumer groups, an effective public information campaign will require a joint effort among Metropolitan and its member agencies. Under this Plan, the administration of the Public Information and Government Affairs programs will be the responsibility of a Drought Program Officer (DPO). The DPO will be responsible for integrating the various activities in these areas, coordinating efforts with Metropolitan's Board of Directors and member agencies, and designing the region-wide messages for the general public and various target audiences. Important constituencies that have been identified in the process are residential users, business interests, agricultural users, elected officials, officials of various agencies (such as the Department of Water Resources), and the media.

Many conservation programs, such as Metropolitan's ultra-low flush toilet rebate program, are driven by member agency requests. Based on history, Metropolitan expects member agency requests to increase during droughts. Metropolitan is committed to increasing overall conservation program funding to meet member agency requests during droughts and attain higher levels of savings. These programs will be implemented by Metropolitan and member and local agency conservation staff. As many of the short-term conservation objectives during a shortage would be dependent upon an effective public information program, the Drought Program Officer will also be responsible for monitoring the effectiveness of the augmented conservation programs. A monthly conservation reporting process will be implemented. Quarterly estimates of regional conservation will be developed to track the progress of various actions in mitigating the shortage.

APPENDIX A: RESOURCE AND STORAGE SIMULATION

The Water Surplus and Drought Management Plan (WSDM Plan) uses the Stages and Actions Matrix (Figure 8) as a guide for the operation of storage and transfers for the next ten years, 1999-2008**.** Metropolitan asserts that the investments that Metropolitan and its member agencies have made in water supply and storage, managed in a coordinated manner as presented in the WSDM Plan, will be sufficient to assure that retail firm water demands will be met 100% of the time through the year 2008. Metropolitan performed an extensive analysis of projected water demands, current and expected water supplies, along with hydrologic variations to support this assertion. Appendix A presents a summary of this analysis which includes statistical probabilities of actions under the WSDM Plan and two illustrative examples of how supply resources may be used in the future under worst-case drought events. Although the WSDM Plan is intended to be in effect through 2008, for the purposes of analysis the planning horizon was extended through 2010.

The WSDM Plan seeks to define the operational envelope for the Metropolitan system into the near future. Although the WSDM Plan only looks out ten years, it nonetheless involves the operation of some storage and water transfer projects that have not yet become fully operational. This makes the estimation of storage and transfers operations difficult. Compounding this problem is the lack of certainty around future demands, economic conditions, or even the weather over the next ten years. To manage these uncertainties, Metropolitan has developed a computer based simulation model called the Integrated Resources Planning Simulation Model or IRPSIM.

IRPSIM uses a modeling method known as sequentially indexed monte-carlo simulation. Simply put, the model looks at projected regional retail demand and supplies of water over the next twelve years and adjusts each, up or down, based on an assumed pattern of future weather. For instance, if Metropolitan expected the weather over the next twelve years (1999-2010) to be the same as the last twelve years (1987-1998), then IRPSIM would adjust the projected 1999 demands and supplies based on the historical 1987 hydrology, and adjust the projected 2000 demands and supplies using the historical 1988 hydrology, and so on. One obvious drawback to this approach is that Metropolitan does not know what future weather will be. Therefore, Metropolitan runs the models over and over again until all recorded hydrologies, 70 in all, have been tried. In this way, Metropolitan can look at probabilistic results of being in shortage year by year through 2010.

Although the projections of water supplies used in this analysis required certain assumptions to be made, they were based on most likely or probable outcomes. In most cases, projected water supplies represented projects that are currently operational, under construction, or in the final stages of negotiations. The following represents a summary of these assumptions:

- Local recycling and groundwater recovery: assumes currently operational projects with expected increases in supply yield as demand increases

- Conjunctive use groundwater storage: assumes Las Posas (under final stages of construction) and implementation of similar programs which are under negotiation (such as Raymond, Orange, and Chino Basins)

- Semitropic and Arvin-Edison storage: assumes use of both programs which are operational with water already stored

- Eastside Reservoir Project: assumes use of non-emergency storage from the reservoir currently under construction and an initial fill projected to start in approximately one year

- The Monterey Reservoirs: assumes use of State Water Project terminal reservoir supplies, Castaic and Perris Reservoirs, per the Monterey Amendment

- Colorado River Aqueduct: assumes a full aqueduct through the implementation of the California Plan (including lining of All American and Coachella canals, SD/IID water transfer/exchange, conjunctive use off-aqueduct storage, and river re-operations)

- State Water Project: assumes continuance of Bay-Delta Accord (with only current facilities)

One way of viewing the result of Metropolitan's WSDM Plan analyses is by summary statistics. Table A- 1 gives the probabilities of shortage actions over the next twelve years.

Table A-1. Probability of Shortage Stage[1] by Forecast Year

1999	13%	13%	11%	7%	3%	0%	O%
2000	13%	13%	11%	9%	3%	O%	0%
2001	19%	17%	13%	10%	6%	O%	0%
2002	19%	17%	13%	10%	4%	1%	0%
2003	19%	19%	14%	11%	4%	0%	0%
2004	20%	19%	16%	13%	4%	0%	0%
2005	21%	19%	17%	13%	6%	O%	O%
2006	21%	19%	19%	13%	6%	0%	0%
2007	23%	20%	19%	13%	4%	0%	0%
2008	26%	21%	19%	16%	6%	1%	0%
2009	26%	24%	19%	17%	6%	1%	0%
2010	26%	26%	19%	19%	6%	1%	O%

Table A-1 can be read in one of two ways, by column or row. The Stage 7 column indicates that there are no historical weather conditions that require allocation over the next twelve years. This is the single most important conclusion of the WSDM Plan analysis. The Stage 6 column indicates that only in a few years--2002, and 2008 through 2010--would Metropolitan need have a need for option or spot transfer water. Read by row, Table A-1 indicates that in the year 2008 there is a 21% likelihood of taking some water from the Eastside Reservoir Project, a 19% likelihood of taking water from Semitropic or Arvin-Edison storage programs, a 17% likelihood of interrupting long-term seasonal and replenishment deliveries for two years, and so on. It should be noted that these probabilities represent the best current estimates by Metropolitan, but are based entirely on historical weather conditions. Conditions that fall outside of historical ranges, either in duration or severity, are not represented by this data.

Another way to view the WSDM Plan analysis is by observing the operation of a single hydrology. Table A-2 provides an example of resource operations for the period 1999 through 2010 assuming a repeat of the 1923 through 1934 hydrology. The table provides descriptions of hydrologic conditions to aid in understanding the example.

[1] Stage 1 consists of withdrawal from the Eastside Reservoir Project. Stage 2 consists of the above plus withdrawals from the Semitropic and Arvin-Edison water storage and transfer projects. Stage 3 consists of the above plus an interruption of Long-Term Seasonal and Replenishment discount water. Stage 4 consists of the above plus withdrawal from contractual groundwater programs and the Monterey Reservoirs. Stage 5 consists of the above plus a call for extraordinary drought conservation and interruption in agricultural discount water. Stage 6 consists of the above plus calls on option contract water and purchases of water on the open market. Stage 7 consists of the above plus allocation of remaining shortages. For a full description of stages and action, see Surplus and Shortage Resource Actions section and Figure 8 above.

For instance, 1923 was considered to be a dry year in southern California (defined as less than 9 inches of rain at the Los Angeles Civic Center) and is categorized by the California Department of Water Resources (DWR) as a below normal year for State Water Project deliveries. In this example, 1923 weather increases southern California's demand for water and decreases imported State Water Project supplies. The Colorado River Aqueduct supplies are influenced by yet another hydrologic indicator, but for the next ten year Metropolitan expects the Aqueduct to be full.

Table A-2 indicates that retail water demands in 1999, assuming a 1923 hydrology, will be 3.979 million acre-feet (maf). Adding expected long-term seasonal and replenishment demands of 0.165 maf gives a regional total water demand of 4.144 maf. After subtracting local supplies of 2.192 maf, which are also adjusted for 1923 weather, Metropolitan expects to see a demand of 1.952 maf. In 1999, under a 1923 hydrology, Metropolitan expects to see 2.954 maf of supply. This is enough to meet all expected demands and put over 1.0 maf into storage.

The 1923 through 1934 hydrology is significant because it starts and ends dry with little recovery in the middle. However, even in these most adverse conditions the actions proposed by the WSDM Plan provides the region with enough water to avoid shortage allocation. Again the most important result of this example is read from the last line, which indicates that there are no remaining shortages through 2008

Table A-3 provides a second example of using the 1980 through 1991 hydrology. This hydrology contains the most significant drought in recent record, ending with a critically dry year on the State Water Project that is expected to yield a mere 0.389 maf. However, even under these conditions the WSDM Plan provides a method to avoid firm water allocation.

The analyses performed using the prioritized action of the Stages and Actions Matrix support Metropolitan's assertion that water supply reliability can be attained through the use of regional storage, interruption of discounted water supplies, and transfers. And, through the implementation of the WSDM Plan, Metropolitan does not expect to allocate firm water deliveries for at least the next ten years.

Table A-2. A Simulation of Water Supplies and Demands 1923-1934 Hydrology

Forecast Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hydrology Year	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Hydrologic Conditions												
Southern California Year Type	Dry	Dry	Dry	Wet	Wet	Dry	Dry	Normal	Wet	Normal	Wet	Normal
Sacramento River Index D1630 Year Type	Below Normal	Critically Dry	Dry	Dry	Wet	Above Normal	Critically Dry	Dry	Critically Dry	Dry	Critically Dry	Critically Dry
Demands												
Retail Demand	3.979	4.152	4.149	4,018	4.005	**4.249**	4.237	4.223	4.280	4.280	4.407	4.500
Long-term/Replenishment Demand	0.165	0.182	0.226	0.188	0.149	0.176	0,213	0.203	0.164	0.175	0.141	0.163
Total Demand	4.144	4.334	4.375	4.205	4.154	4.425	4.450	4.426	4,443	4.455	4.548	4,663
Local Supplies												
Groundwater Production	1.529	1.545	1.537	1.288	1.299	1.575	**1.568**	1.434	1.307	1.439	1.318	1.454
L. A. Aqueduct Production	0.383	0,287	0.304	0.316	0.392	0.302	0,245	0.235	0.174	0,324	0.251	0.220
Recycling Production	0.152	0.162	0.174	0.186	0,197	0.207	0.217	0.230	0,242	0.254	0.266	0.277
Surface Production	0,128	0,089	0,076	0.116	0.154	0.147	0.108	0.094	0,133	0,136	0.151	0.145
Total Local Supply	2,192	2.084	2.091	1.905	2,043	2.231	2,139	1.993	1.856	2.153	1.986	2,097
Total MWD Demand	1.952	2.250	2,284	2,300	2.112	2.194	2.311	2.433	2.587	2.302	2.562	2.566
MWD Supply Sources												
Colorado River Aqueduct Supply	1.200	1.200	1.200	1.200	1.200	**1.200**	1.200	1.200	1.200	1.200	1.200	1.200
State Water Project Supply	1.754	0.812	0.783	1.280	1.678	1.438	0,764	1.163	0,589	0.843	0.559	0.620
MWD Cyclic Groundwater Deliveries	0.000	0.060	0.060	0.000	0.000	0,000	0.060	0,060	0.060	0.059	0.000	0.000
Eastside Reservoir	0.000	0.066	0.058	0.000	0.000	0.000	0,060	0.010	0.425	0.023	0.219	0.041
Arvin/Semitropic Groundwater Storage	0.000	0.111	0.115	0,000	0.000	0,000	0,119	0,000	0.115	0.117	0.059	0.041
Longterm Seasonal Demand Cuts	0.000	0,000	0,166	0.000	0.000	0.000	0.153	0.000	0.104	0,116	0.000	0.000
Cyclic Benefits	0.000	0.000	0.000	0.000	0.000	0.000	0,000	0,000	0,000	0,000	0.060	0.060
Contractual Groundwater Storage	0.000	0.000	0.000	0,000	0.000	0.000	0.000	0,000	0.095	0.000	0.095	0.084
DWR Reservoirs (Monterey Agreement)	0.000	0.000	0,000	0.000	0.000	0.000	0.000	0.000	0,000	0,000	0.131	0.088
Voluntary Conservation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0,000	0.000	0.206	0.210
MWD Ag Cuts	0.000	0.000	0.000	0.000	0.000	0,000	0.000	0.000	0.000	0.000	0.033	0.031
Central Valley Transfers	0.000	0.000	0,000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.193
Storage Puts	1.003	0.000	0.097	0.180	0.549	0.438	0.045	0.000	0,000	0.056	0.000	0.000
Remaining Shortage	0,000	0,000	0.000	0,000	0.000	0.000	0.000	0,000	0.000	0.000	0.000	0.000

Table A-3. A Simulation of Water Supplies and Demands 1980-1991 Hydrology

Forecast Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hydrology Year	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Hydrologic Conditions												
Southern California Year Type	Wet	Normal	Normal	Wet	Dry	Dry	Wet	Normal	Normal	Dry	Dry	Normal
Sacramento River Index D1630 Year Type	Above Normal	Dry	Wet	Wet	Wet	Dry	Wet	Dry	Critically Dry	Dry	Critically Dry	Critically Dry
Demands												
Retail Demand	3.781	4.170	3.930	3.647	4.308	4.250	4.151	4.281	4.380	4.550	4.663	4.497
Lon£1-term/Replenishment Demand	0.105	0.141	0.171	0.101	0.136	0.187	0.183	0.201	0.191	0.219	0.224	0.214
Total Demand	3.886	4.311	4.101	3.748	4.444	4.437	4.334	4.483	4.572	4.769	4.887	4.712
Local Supplies												
Groundwater Production	1.292	**1.440**	**1.381**	1.248	1.546	1.565	1.275	1.413	1.438	1.588	1.600	1.446
L. A. Aqueduct Production	0.462	0.372	0.499	0.529	0.516	O.367	0.472	0.400	0.326	0.278	0.213	0.223
Recycling Production	0.152	0.162	0.174	0.186	0.197	0.207	0.217	0.230	0.242	0.254	0.266	0.277
Surface Production	0.225	0.175	0.154	0.194	0.195	0.151	0.115	0.116	0.115	0.081	0.068	0.081
Total Local Supply	2.131	2.149	2.208	2.156	2.455	2.290	2.081	2.159	2.122	2.200	2,146	2.027
Total MWD Demand	1.755	2.162	1.894	1.591	1.989	2.147	2.253	2.324	2.450	2.569	2.741	2.684
MWD Supply Sources												
Colorado River Aqueduct Supply	1.200	1.200	1.200	1,200	1.200	1.200	1.200	1.200	**1.200**	1.200	1.200	1.200
State Water Project Supply	1.561	1.441	1.725	1.886	1.643	1.590	1.441	1.292	0.611	1.285	0.877	0.389
MWD Cyclic Groundwater Deliveries	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.060	0.060	0.060	0.060
Eastside Reservoir	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.199	0.024	0.222	0.209
Arvin/Semitropic Groundwater Storage	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.115	0.000	0.122	0.104
Long-term Seasonal Demand Cuts	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.131	0.000	0.164	0.154
Cyclic Benefits	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Contractual Groundwater Storage	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.133	0.000	0.095	0.085
DWR Reservoirs (Monterey Agreement)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.216
Voluntary Conservation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.235
MWD Ag Cuts	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.032
Central Valley Transfers	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Storage Puts	1.006	0.260	0.344	0.240	0.200	0.200	0.388	0.168	0.000	0.000	0.000	0.000
Remaining Shortage	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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APPENDIX A.5
Local Projects

Table A.5-1

Groundwater Recovery Projects

Existing	Ultimate Yield/Capacity Acre-Feet	Online Date
City of Beverly Hills		
Beverly Hills Desalter Project	2,600	
City of Burbank		
Burbank Lake Street GAC Plant	2,744	
Burbank Operable Unit/Lockheed Valley Plant	14,517	
Central Basin Municipal Water District		
Water Quality Protection Project	5,807	
Eastern Municipal Water District		
Menifee Basin Desalter	3,360	
Perris Desalter	4,500	
Foothill Municipal Water District		
Glenwood Nitrate	1,600	
City of Glendale		
San Fernando Basin - Glendale Operable Units	7,300	
Verdugo Basin - Verdugo Wells A & B	2,750	
Inland Empire Utilities Agency		
Chino Basin Desalter 1	6,000	
Chino Basin Desalter 2	8,000	
Municipal Water District of Orange County		
Arlington Basin Groundwater Desalter Project	2,000	
IRWD DATS Potable (Exempt)	8,000	
IRWD Irvine Desalter Project	11,200	
Mesa Colored Water Treatment Facility	11,300	
SJC San Juan Desalter GRP Project	4,800	
So Coast WD Capistrano Beach Desalter	1,300	
Tustin Desalter 17th St.	3,200	
Tustin Main Street Nitrate	2,000	
Well 28	4,300	
San Diego County Water Authority		
Lower Sweetwater Desalter	3,600	
Oceanside Mission Basin Desalter	6,500	
Three Valleys Municipal Water District		
City of Pomona VOC Plant	4,678	
Pomona Well #37	1,100	
City of Torrance		
Madrona Desalter (Goldsworthy)	2,400	
West Basin Municipal Water District		
West Basin Brewer Desalter No. 1	1,524	
Western Municipal Water District of Riverside County		
Arlington Basin Groundwater Desalter Project	4,100	
Chino Basin Desalter 1	2,000	
Chino Basin Desalter 2	8,000	
Temescal Basin Desalting Facility Project	10,000	

Table A.5-1

Groundwater Recovery Projects

Full Design & Appropriated Funds	Ultimate Yield/Capacity Acre-Feet	Online Date
Inland Empire Utilities Agency		
Chino Basin Desalter 2	11,760	2016
San Diego County Water Authority		
Lower Sweetwater Desalter	5,200	2020

Advanced Planning (EIR/EIS Certified)	Ultimate Yield/Capacity Acre-Feet	Online Date
Calleguas Municipal Water District		
Oxnard GREAT Program	15,500	2016
City of Los Angeles		
Tujunga Well Treatment	24,000	2014
Municipal Water District of Orange County		
SJC San Juan Desalter GRP Project	3,363	2014
Tustin Legacy Well # 1	2,200	2014
Wells 21 & 22	7,900	2014
San Diego County Water Authority		
Middle Sweetwater River Basin Groundwater Well System (Capacity)	1,000	2018
Rancho del Rey Well Desalination	500	2016

Feasibility	Ultimate Yield/Capacity Acre-Feet	Online Date
Municipal Water District of Orange County		
IRWD Wells 51,52,53, 21& 22 Potable (Non-exempt)	12,700	2018
Mesa Colored Water Treatment Facility	5,650	2018
San Diego County Water Authority		
Mission Valley Brackish Groundwater Recovery Project	1,760	2016
Oceanside Mission Basin Desalter	5,600	2016
Otay Mesa Lot 7 Well Desalination	400	2016
San Diego Formation / Balboa Park Pilot Production Well	1,300	2018
San Diego Formation / Diamond BID Pilot Production Well	1,600	2015
San Dieguito Reservoir Seepage Recovery Feasibility Study	150	2015
San Paqual Brackish Groundwater Recovery Project	3,360	2016
San Vicente & El Capitan Seepage Recovery	1,400	2015
Sweetwater Authority/Otay WD San Diego Formation Recovery	3,900	2020
City of San Marino		
San Marino GWR Project	2,500	2018
West Basin Municipal Water District		
West Basin Brewer Desalter No. 1	156	2018
Western Municipal Water District of Riverside County		
Chino Basin Desalter 3	10,000	2018

Table A.5-1

Groundwater Recovery Projects

Conceptual	Ultimate Yield/Capacity Acre-Feet	Online Date
City of Beverly Hills		
Shallow Groundwater Development	500	2020
Calleguas Municipal Water District		
Camarillo (City of) Groundwater Treatment Facility	4,000	2020
Camrosa Brackish Water Reclamation Project (CSUCI)	1,050	2020
Camrosa Santa Rosa Basin Desalter	5,040	2020
Golden State Desalter	1,668	2020
Somis Desalter (District 19)	2,800	2020
South Las Posas Desalter	5,000	2020
West Simi Desalter (District 8)	2,800	2020
Eastern Municipal Water District		
Perris Desalter	5,585	2020
Municipal Water District of Orange County		
So Coast WD Capistrano Beach Desalter	700	2020
City of Pasadena		
Sunset Reservoir Well Treatment,IX	1,500	2020
San Diego County Water Authority		
San Dieguito River Basin Brackish GW Recovery and Treatment	500	2015
City of Torrance		
Madrona Desalter (Goldsworthy)	2,600	2020
Western Municipal Water District of Riverside County		
Arlington Basin Groundwater Desalter Project	8,000	2020

Table A.5-2

Recycled Water Projects

Existing	Ultimate Yield/Capacity Acre-Feet	Online Date
City of Burbank		
Burbank Reclaimed Water System Project	850	
Caltrans and BWP Power Plant	1,520	
Calleguas Municipal Water District		
Camrosa Water District Recycling System	1,680	
City of Simi Vally/VCWWD No. 8 Reclaimed Water Distribution System	1,100	
Conejo Creek Diversion Project	14,000	
Lake Sherwood Reclaimed Water System	250	
Oak Park/North Ranch Water Reclamation Project	1,300	
VCWWD No. 1/Moorpark WWTP Reclaimed Water Distribution System	5,040	
Central Basin Municipal Water District		
Century/Rio Hondo Reclamation Program	10,500	
Cerritos Reclaimed Water Project	4,000	
Lakewood Water Reclamation Project	440	
Montebello Forebay	50,000	
Eastern Municipal Water District		
Eastern Regional Reclaimed Water System	56,000	
EMWD Recycled Water Pipeline Reach 1 Phase II	1,700	
EMWD Recycled Water Pipeline Reach 16	820	
Rancho California Reclamation	6,450	
Foothill Municipal Water District		
La Canada-Flintridge Country Club	224	
City of Glendale		
Glendale Forest Lawn Water Reclamation Expansion Project	500	
Glendale Grayson Power Plant Project	600	
Glendale Verdugo-Scholl Brand Park Reclaimed Water Project	2,225	
Inland Empire Utilities Agency		
Carbon Canyon/IEUA Regional Recycled Water Distribution System	38,500	
Las Virgenes Municipal Water District		
Calabasas System	4,700	
Decker Canyon Recycled Water Line Extension Project	300	
Las Virgenes Reclamation Project	2,700	
Las Virgenes Valley Reclaimed Water System	500	
City of Long Beach		
Alamitos Barrier Reclaimed Water Project	3,025	
Long Beach Reclamation Project	6,550	
THUMS	1,429	
City of Los Angeles		
Environmental Use	28,500	
Griffith Park and MCA/Universal	2,920	
Hansen Area Water Recycling Project Phase 1	2,500	
Harbor Water Recycling Project	3,600	
Los Angeles Greenbelt Project	900	
Sepulveda Basin Water Reclamation Project	1,500	
West Basin Water Reclamation Program	1,000	

Table A.5-2

Recycled Water Projects

Existing	Ultimate Yield/Capacity Acre-Feet	Online Date
Municipal Water District of Orange County		
El Toro WD Recycling	375	
Green Acres Reclamation Project	6,200	
Irvine Ranch Reclamation Project	10,000	
IRWD Los Alisos Water Reclamation Plant	1,500	
IRWD Michelson & LAWRP Reclamation Upgrades	8,500	
IRWD Michelson Reclamation Project	8,200	
MNWD Moulton Niguel Water Reclamation Project	9,746	
OCWD Groundwater Replenishment System	72,000	
San Clemente Water Reclamation Project	1,610	
SJC Capistrano Valley Non-Domestic Water System Expansion	3,460	
SMWD Chiquita Reclamation Project	2,772	
SMWD Oso Reclamation Expansion Project	3,600	
SMWD purchase from IRWD	321	
South Coast WD South Laguna Reclamation Project	1,450	
Trabuco Canyon Reclamation Expansion Project	1,330	
San Diego County Water Authority		
Camp Pendleton	1,700	
Carlsbad MWD Encina Basin Water Reclamation Program - Phases I and II	5,000	
Escondido Regional Reclaimed Water Project	2,800	
Fairbanks Ranch	308	
Fallbrook Reclamation Project	1,200	
North City Water Reclamation Project	17,500	
Oceanside Water Reclamation Project	200	
Olivenhain Recycled Project - SE Quadrant	1,888	
Otay Recycled Water System	7,500	
Padre Dam Reclaimed Water System	850	
Ramona MWD - San Vicente Water Pollution Control Facility	585	
Ramona MWD - Santa Maria Water Reclamation Project	400	
Rancho Santa Fe Water Pollution Control Facility	500	
RDDMWD Recycled Water Program	4,074	
San Diego Wild Animal Park	168	
San Elijo Water Reclamation System	1,600	
Skyline Ranch	28	
South Bay Water Reclamation Project	1,670	
Valley Center MWD - Lower Moosa Canyon	476	
Valley Center MWD - Woods Valley Ranch	300	
Whispering Palms	448	
City of Santa Ana		
Green Acres Reclamation Project	800	
City of Santa Monica		
Santa Monica Urban Runoff Recycling Facility (SMURRF)	280	
Three Valleys Municipal Water District		
City of Industry Regional Water System	2,584	
Pomona Reclamation Project	9,320	

Table A.5-2

Recycled Water Projects

Existing	Ultimate Yield/Capacity Acre-Feet	Online Date
Three Valleys Municipal Water District (contd)		
Rowland Reclamation Project	2,000	
Walnut Valley Reclamation Project	4,234	
City of Torrance		
West Basin Water Reclamation Program	7,800	
Upper San Gabriel Valley Municipal Water District		
Direct Reuse	3,258	
Los Angeles County Sanitation District Projects	4,375	
Norman's Nursery	100	
West Basin Municipal Water District		
West Basin Water Reclamation Program	46,700	
Western Municipal Water District of Riverside County		
Elsinore Valley/Horse Thief Reclamation	560	
Elsinore Valley/Railroad Canyon Reclamation	730	
March Air Force Base Reclamation Project	896	
Rancho California Reclamation	4,950	
Western Riverside County Regional Water Authority	8,950	

Under Construction	Ultimate Yield/Capacity Acre-Feet	Online Date
Inland Empire Utilities Agency		
Carbon Canyon/IEUA Regional Recycled Water Distribution System	25,000	2015
Three Valleys Municipal Water District		
City of Industry Regional Water System	2,164	2011
Upper San Gabriel Valley Municipal Water District		
City of Industry Regional Water System	3,720	2013
Western Municipal Water District of Riverside County		
March Air Force Base Reclamation Project	448	2012

Full Design & Appropriated Funds	Ultimate Yield/Capacity Acre-Feet	Online Date
Las Virgenes Municipal Water District		
Thousand Oaks Boulevard Extension	176	2010
City of Los Angeles		
Hansen Dam Golf Course Water Recycling Project	500	2011
Municipal Water District of Orange County		
SMWD Canada Gobernadora	725	2013
West Basin Municipal Water District		
West Basin Water Reclamation Program	1,710	2011

Table A.5-2

Recycled Water Projects

Advanced Planning (EIR/EIS Certified)	Ultimate Yield/Capacity Acre-Feet	Online Date
City of Burbank		
Burbank Reclaimed Water System Project	974	2013
Calleguas Municipal Water District		
VCWWD No. 1/Moorpark WWTP Reclaimed Water Distribution System	1,179	2014
Eastern Municipal Water District		
Eastern Regional Reclaimed Water System	12,900	2015
Inland Empire Utilities Agency		
Carbon Canyon/IEUA Regional Recycled Water Distribution System	50,000	2020
City of Long Beach		
Long Beach Reclamation Project	450	2014
City of Los Angeles		
LA-Glendale Storage & Distribution System Water Recycling Project	2,600	2014
Municipal Water District of Orange County		
IRWD Michelson Reclamation Project	11,200	2011
OCWD Groundwater Replenishment System	20,000	2013
San Clemente Water Reclamation Project	1,400	2012
SMWD Arroyo Trabuco Sump	270	2013
SMWD Chiquita Reclamation Project	3,360	2014
San Diego County Water Authority		
Padre Dam Reclaimed Water System	3,304	2015
Upper San Gabriel Valley Municipal Water District		
Direct Reuse	620	2020
Western Municipal Water District of Riverside County		
Elsinore Valley/Summerly	1,380	2011
Elsinore Valley/Wildomar (Phase 1)	300	2011
Elsinore Valley/Tuscany (Phase 1A)	1,225	2013

Feasibility	Ultimate Yield/Capacity Acre-Feet	Online Date
Calleguas Municipal Water District		
City of Simi Vally/VCWWD No. 8 Reclaimed Water Distribution System	50	2018
Eastern Municipal Water District		
EMWD Indirect Potable Reuse	15,000	2018
City of Long Beach		
Alamitos Barrier Reclaimed Water Project	5,000	2018
City of Los Angeles		
Elysian Park Tank & Pumping Station Water Recycling Project	500	2014
Harbor Water Recycling Project	15,500	2015
LA Zoo Water Recycling Project	500	2014
LAX Cooling Towers	240	2018
Terminal Island AWTF and Distriubtion System Expansion Water Recyclng Project	10,000	2019
Tillman Groundwater Replenishment System	15,000	2019

Table A.5-2

Recycled Water Projects

Feasibility	Ultimate Yield/Capacity Acre-Feet	Online Date
Municipal Water District of Orange County		
El Toro AWT Joint project (MNWD, ETWD & IRWD)	400	2018
IRWD Michelson Reclamation Project	5,600	2014
LBCWD Laguna Canyon Blended Recycled Water	100	2014
MNWD Moulton Niguel Water Reclamation Project	600	2014
OCWD Groundwater Replenishment System	30,000	2018
SMWD Chiquita Reclamation Project	5,600	2012
SOCWA J.B. Latham AWT Joint project	7,841	2012
San Diego County Water Authority		
Carlsbad MWD - Mahr Reservoir	151	2015
Olivenhain Northwest Quadrant Recycled Water Project	1,000	2015
Otay Recycled Water System	1,200	2015
Otay WD - North District Recycled Water System	1,100	2020
Ramona MWD - Santa Maria Water Reclamation Project	430	2020
Shadowridge Reclaimed Water System	1,100	2020
Valley Center - Welk WRF	140	2020
Valley Center MWD - Lilac Ranch WRF	60	2020
Upper San Gabriel Valley Municipal Water District		
Direct Reuse	7,000	2018
West Basin Municipal Water District		
Joint Water Pollution Control Plant (JWPCP)	17,500	2012
West Basin Water Reclamation Program	25,540	2012
Western Municipal Water District of Riverside County		
Rancho California Reclamation	13,800	2018

Conceptual	Ultimate Yield/Capacity Acre-Feet	Online Date
City of Anaheim		
Anaheim Water Recycling Demonstration Project	110	2020
Calleguas Municipal Water District		
Thousand Oaks-Camrosa Interconnect	314	2020
Central Basin Municipal Water District		
Joint Water Pollution Control Plant (JWPCP)	45,000	2020
Eastern Municipal Water District		
Hemet Citrus In Lieu Project	5,000	2020
Foothill Municipal Water District		
Arroyo Seco - Flint Wash Project	240	2020
Eaton Canyon Project	500	2025
Verdugo Basin Project	400	2020
Las Virgenes Municipal Water District		
Hidden Hills Outdoor Residential Pilot Project	273	2020
Thousand Oaks Boulevard Extension	250	2020

Table A.5-2

Recycled Water Projects

Conceptual	Ultimate Yield/Capacity Acre-Feet	Online Date
Las Virgenes Municipal Water District (contd)		
Woodland Hills Golf Course Extension	316	2020
City of Los Angeles		
San Fernando Valley/Central City Water Recycling and Reliability Project	1,500	2019
Satellite Plant & Distribution System	4,500	2019
Westside Tier 2A Expansion Water Recycling Project	5,000	2019
Municipal Water District of Orange County		
MWDOC West OC Recycling	6,000	2020
City of Pasadena		
Joint Water Pollution Control Plant (JWPCP)	15,000	2020
San Diego County Water Authority		
Carlsbad MWD Encina Basin Water Reclamation Program - Phases I and II	3,658	2020
Escondido Regional Reclaimed Water Project	1,200	2020
Oceanside Water Reclamation Project	1,300	2020
Olivenhain Joint RW Transmission Project with SFID and OMWD	500	2020
Olivenhain Northwest Quadrant Recycled Water Project	300	2020
Olivenhain Wanket Reservoir RW Conversion	300	2020
Santa Fe ID Evaluating Multiple Options	500	2015
Valley Center MWD - Lower Moosa Canyon	672	2016
Valley Center MWD - North Village WRF	150	2015
Three Valleys Municipal Water District		
Thompson Creek	3,000	2020
City of Torrance		
Joint Water Pollution Control Plant (JWPCP)	5,000	2020
Upper San Gabriel Valley Municipal Water District		
Direct Reuse	4,900	2020
Groundwater Reliability Improvement Project	25,000	2020
Joint Water Pollution Control Plant (JWPCP)	35,000	2020
West Basin Municipal Water District		
Joint Water Pollution Control Plant (JWPCP)	5,000	2020
West Basin Water Reclamation Program	1,008	2015
Western Municipal Water District of Riverside County		
City of Riverside Recycled Water Program	41,400	2015

Table A.5-3

Seawater Desalination Projects

Advanced Planning (EIR/EIS Certified)	Ultimate Yield/Capacity Acre-Feet	Online Date
Municipal Water District of Orange County		
Huntington Beach Seawater Desalination Project	56,000	2012
San Diego County Water Authority		
Carlsbad Seawater Desalination Project	56,000	2012

Feasibility	Ultimate Yield/Capacity Acre-Feet	Online Date
San Diego County Water Authority		
Camp Pendleton Seawater Desalination Project	56,000	2019
Rosarito Beach Seawater Desalination Feasibility Study	28,000	2020
West Basin Municipal Water District		
West Basin Seawater Desalination Project	20,000	2025

Conceptual	Ultimate Yield/Capacity Acre-Feet	Online Date
City of Long Beach		
Long Beach Seawater Desalination Project	10,000	2025
Municipal Water District of Orange County		
South Orange Coastal Ocean Desalination Project	16,000	2015

APPENDIX A.6
RECENT CUWCC FILINGS

Water Supply & Reuse

Reporting Unit:	Year:
Metropolitan Water District of SC	**2005**

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type
CRA	611128	Imported
SWP	1575911	Imported
	Total AF: 2187039	

Purchaser Information

Name of Agency	Quantity (AF) Supplied	Retailer or Wholesaler
Anaheim	28073.9	retail
Beverly Hills	11917.8	retail
Burbank	13764.8	retail
Calleguas MWD	113539.8	wholesale
Central Basin MWD	88790.2	wholesale
Compton	2978.8	retail
Eastern MWD	6221.2	wholesale
Eastern MWD	97465.9	retail
Foothill	11651.4	wholesale
Fullerton	17486.5	retail
Glendale	22678.2	retail
Inland Empire UA	97157.2	wholesale
Las Virgenes MWD	21734	retail
Long Beach	47565.2	retail
Los Angeles	250666.6	retail
MWD of Orange County	266938.6	wholesale
Pasadena	21982	retail
San Diego CWA	531535.7	wholesale
San Fernando	500	retail
San Marino	1422.3	retail
Santa Ana	19177.8	retail
Santa Monica	13195.8	retail
Three Valleys	76610.5	wholesale
Torrance	29045.5	retail
Upper San Gabriel Valley MWD	51951.8	wholesale
West Basin MWD	140841.8	wholesale
Western MWD	112991.9	wholesale
	Total AF: 2097885.2	

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2005**

A. Implementation		
	1. Does your agency own or operate a water distribution system?	yes
	2. Has your agency completed a pre-screening system audit for this reporting year?	yes
	3. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
	a. Determine metered sales (AF)	2060111.1
	b. Determine other system verifiable uses (AF)	0
	c. Determine total supply into the system (AF)	2109000.9
	d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.98
	4. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
	5. Did your agency complete a full-scale audit during this report year?	yes
	6. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	yes
	7. Does your agency operate a system leak detection program?	yes
	a. If yes, describe the leak detection program: Metropolitan's system is monitored by 10+ patrols who also collect WQ samples, pilots flying the CRA and pipeline staff in the normal course of their duties. If evidence of leaking water is detected near any of our facilities, we analyze a water sample to determine if it's our water leaking. Normally it is not. If it is, we may hire a leak detection firm to locate the leak.	
B. Survey Data		
	1. Total number of miles of distribution system line.	1017
	2. Number of miles of distribution system line surveyed.	1017
C. "At Least As Effective As"		
	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	
D. Comments		

BMP 07: Public Information Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2005**

A. Implementation

1. How is your public information program implemented?
   Wholesaler implements program (none or minimal retailer participation)

2. Describe the program and how it's organized:
   Major advertising and public relations campaign promoting outdoor water use efficiency and California Friendly landscaping. Educational brochures and campaign artwork including bill-stuffers available for retailer and sub-agency use.

3. Indicate which and how many of the following activities are included in your public information program:

Region-Wide Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	3205
b. Public Service Announcement	yes	48
c. Bill Inserts / Newsletters / Brochures	yes	15
d. Bill showing water usage in comparison to previous year's usage	no	
e. Demonstration Gardens	yes	31
f. Special Events, Media Events	yes	8
g. Speaker's Bureau	yes	0
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

1. Annual Expenditures (Excluding Staffing)	2000000

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."
NA

D. Comments

NA

BMP 08: School Education Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2005**

A. Implementation

1. How is your public information program implemented?
   Wholesaler and retailer both participate in program

2. Please provide information on your region-wide school programs (by grade level):

Grade	Are grade- appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	7	25010	337
Grades 4th-6th	yes	21	33346	450
Grades 7th-8th	yes	12	12104	165
High School	yes	12	12909	171

4. Did your Agency's materials meet state education framework requirements?	yes
5. When did your Agency begin implementing this program?	11/1/1983

B. School Education Program Expenditures

1. Annual Expenditures (Excluding Staffing)	605050

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2005**

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	yes	70000	61298	**8**	No		0
2	yes	350000	373532	**9**	yes	2000000	1901119
3	No		0	**10**	No		0
4	No		0	**11**	No		0
5	yes	60000	57438	**12**	No		0
6	yes	275000	2664241	**13**	No		0
7	No		0	**14**	yes	5500000	5548600

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	No
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	No
c. Has your agency conducted or funded workshops addressing:	
1) ULFT replacement	No
2) Residential retrofits	No
3) Commercial, industrial, and institutional surveys	yes
4) Residential and large turf irrigation	yes
5) Conservation-related rates and pricing	No

3. Staff Resources by BMP

BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP	BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP
1	yes	.45	**8**	No	
2	yes	.45	**9**	yes	2
3	No		**10**	yes	2.2
4	No		**11**	No	
5	yes	2.7	**12**	No	
6	yes	1.4	**13**	No	
7	No		**14**	yes	1.2

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	No	**8**	yes
2	No	**9**	yes

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2005**

3	No	**10**	No
4	No	**11**	No
5	yes	**12**	No
6	yes	**13**	No
7	yes	**14**	No

B. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No
a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

C. Comments

BMP 11: Conservation Pricing

Reporting Unit:	Form Status:	Year:
Metropolitan Water District of SC	**CUWCC Reviewed**	**2005**

A. Implementation

	Water Service Rate Structure Data by Customer Class		
	Number of schedules:	**Use of classification :**	**Rate structure:**
	For the following accounts, how many rate schedules does agency offer/use?	This agency:	Click link for each rate schedule:
	1. Single-family residential: 0	Does not offer	
	2. Multi-family residential: 0	Does not offer	
	3. Commercial: 0	Does not offer	
	4. Industrial: 0	Does not offer	
	5. Institutional/ government: 0	Does not offer	
	6. Dedicated irrigation (potable water): 0	Does not serve	
	7. Other: 0	Does not offer	
	8. Recycled-reclaimed water: 0	Does not offer	
	9. Raw water (urban use): 0	Uses class	
	10. Wholesale (urban use): 1	Uses class	RATES ENTERED

	Sewer Service	
	11. Does your agency provide sewer service to your water customers?	no
	12. Does all sewer service use conservation rate structures?	no
	13. Has your agency made the required efforts (as prescribed in BMP 11) to have sewer services billed on conservation rates?	no
	14. What water agency activities have been undertaken during the reporting period to achieve waste water agency volumetric billing in your water agency service area?	None

B. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

C. Comments

BMP 12: Conservation Coordinator

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2005**

A. Implementation		
	1. Does your Agency have a conservation coordinator?	yes
	2. Is a coordinator position supplied by another agency with which you cooperate in a regional conservation program ?	no
	a. Partner agency's name:	
	3. If your agency supplies the conservation coordinator:	
	a. What percent is this conservation coordinator's position?	80%
	b. Coordinator's Name	Andy Hui
	c. Coordinator's Title	Unit Manager V
	d. Coordinator's Experience and Number of Years	3 years managing unit
	e. Date Coordinator's position was created (mm/dd/yyyy)	8/8/1988
	4. Number of conservation staff (FTEs), including Conservation Coordinator.	10
B. Conservation Program Expenditures		
	1. Staffing Expenditures (In-house Only)	1811000
	2. BMP Program Implementation Expenditures (Total of all BMPs)	10606226
C. "At Least As Effective As"		
	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	no
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	
D. Comments		
	RSU Labor (including travel, training, materials, etc)(minus 45400-45550)+ $500,000 (to cover AH and TB whose salary expenses are under AS's budget) x 0.65 = BMP staff expenses	

Water Supply & Reuse

Reporting Unit:	Year:
Metropolitan Water District of SC	**2006**

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type
CRA	611972	Imported
SWP	1625990	Imported

Total AF: 2237962

Purchaser Information

Name of Agency	Quantity (AF) Supplied	Retailer or Wholesaler
Anaheim	31271.4	retail
Beverly Hills	12045.7	retail
Burbank	13031.7	retail
Calleguas MWD	112681.6	wholesale
Central Basin MWD	87261.8	wholesale
Compton	2808.1	retail
Eastern MWD	11850.5	wholesale
Eastern MWD	104225.1	retail
Foothill	10518.3	wholesale
Fullerton	17794.7	retail
Glendale	22317.3	retail
Inland Empire UA	86428.2	wholesale
Las Virgenes MWD	22689.4	retail
Long Beach	44252.7	retail
Los Angeles	208864.1	retail
MWD of Orange County	284399.1	wholesale
Pasadena	21593.5	retail
San Diego CWA	572771.4	wholesale
San Fernado	801.9	retail
San Marino	1208.6	retail
Santa Ana	22007.3	retail
Santa Monica	12885.4	retail
Three Valleys MWD	63447.7	wholesale
Torrance	21337.8	retail
Upper San Gabriel Valley MWD	75565.5	wholesale
West Basin MWD	143485.1	wholesale
Western MWD	89024	wholesale

Total AF: 2096567.9

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2006**

A. Implementation		
	1. Does your agency own or operate a water distribution system?	yes
	2. Has your agency completed a pre-screening system audit for this reporting year?	yes
	3. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
	a. Determine metered sales (AF)	2039602.2
	b. Determine other system verifiable uses (AF)	0
	c. Determine total supply into the system (AF)	2357014.2
	d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.87
	4. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
	5. Did your agency complete a full-scale audit during this report year?	yes
	6. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	yes
	7. Does your agency operate a system leak detection program?	yes
	a. If yes, describe the leak detection program: Metropolitan's system is monitored by 10+ patrols who also collect WQ samples, pilots flying the CRA and pipeline staff in the normal course of their duties. If evidence of leaking water is detected near any of our facilities, we analyze a water sample to determine if it's our water leaking. Normally it is not. If it is, we may hire a leak detection firm to locate the leak.	
B. Survey Data		
	1. Total number of miles of distribution system line.	1017
	2. Number of miles of distribution system line surveyed.	1017
C. "At Least As Effective As"		
	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	
D. Comments		

BMP 07: Public Information Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2006**

A. Implementation

1. How is your public information program implemented?
   Wholesaler implements program (none or minimal retailer participation)

2. Describe the program and how it's organized:
   Major advertising and public relations campaign promoting outdoor water use efficiency and California Friendly landscaping. Educational brochures and campaign artworkincluding bill-stuffers available for retailer and sub-agency use.

3. Indicate which and how many of the following activities are included in your public information program:

Region-Wide Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	6308
b. Public Service Announcement	yes	0
c. Bill Inserts / Newsletters / Brochures	yes	12
d. Bill showing water usage in comparison to previous year's usage	no	
e. Demonstration Gardens	yes	30
f. Special Events, Media Events	yes	10
g. Speaker's Bureau	yes	0
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

1. Annual Expenditures (Excluding Staffing)	3800000

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."
NA

D. Comments

NA

BMP 08: School Education Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2006**

A. Implementation

1. How is your public information program implemented?
   Wholesaler and retailer both participate in program

2. Please provide information on your region-wide school programs (by grade level):

Grade	Are grade- appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	11	28917	378
Grades 4th-6th	yes	22	38556	503
Grades 7th-8th	yes	13	13494	186
High School	yes	14	15	192

4. Did your Agency's materials meet state education framework requirements?	yes
5. When did your Agency begin implementing this program?	11/1/1983

B. School Education Program Expenditures

1. Annual Expenditures (Excluding Staffing)	509450

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2006**

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	yes	70000	31780	**8**	No	0	0
2	yes	350000	225460	**9**	yes	25000000	2679214
3	No	0	0	**10**	No	0	0
4	No	0	0	**11**	No	0	0
5	yes	250000	195213	**12**	No	0	0
6	yes	3000000	3047545	**13**	No	0	0
7	No	0	0	**14**	yes	4500000	4159840

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	No
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	No
c. Has your agency conducted or funded workshops addressing:	
1) ULFT replacement	No
2) Residential retrofits	No
3) Commercial, industrial, and institutional surveys	yes
4) Residential and large turf irrigation	yes
5) Conservation-related rates and pricing	No

3. Staff Resources by BMP

BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP	BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP
1	yes	.45	**8**	No	
2	yes	.45	**9**	yes	2
3	No		**10**	yes	2.2
4	No		**11**	No	
5	yes	2.7	**12**	No	
6	yes	1.4	**13**	No	
7	No		**14**	yes	1.2

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2006**

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	No	**8**	yes
2	No	**9**	yes
3	No	**10**	No
4	No	**11**	No
5	yes	**12**	No
6	yes	**13**	No
7	yes	**14**	No

B. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

C. Comments

BMP 11: Conservation Pricing

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2006**

A. Implementation

	Water Service Rate Structure Data by Customer Class		
	Number of schedules:	**Use of classification:**	**Rate structure:**
	For the following accounts, how many rate schedules does agency offer/use?	This agency:	Click link for each rate schedule:
	1. Single-family residential: 0	Does not offer	
	2. Multi-family residential: 0	Does not offer	
	3. Commercial: 0	Does not offer	
	4. Industrial: 0	Does not offer	
	5. Institutional/ government: 0	Does not offer	
	6. Dedicated irrigation (potable water): 0	Does not offer	
	7. Other: 0	Does not offer	
	8. Recycled-reclaimed water: 0	Does not offer	
	9. Raw water (urban use): 0	Does not offer	
	10. Wholesale (urban use): 2	Uses class	RATES ENTERED
	Sewer Service		
	11. Does your agency provide sewer service to your water customers?		no
	12. Does all sewer service use conservation rate structures?		no
	13. Has your agency made the required efforts (as prescribed in BMP 11) to have sewer services billed on conservation rates?		no
	14. What water agency activities have been undertaken during the reporting period to achieve waste water agency volumetric billing in your water agency service area?		None

B. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

C. Comments

BMP 12: Conservation Coordinator

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2006**

A. Implementation		
	1. Does your Agency have a conservation coordinator?	yes
	2. Is a coordinator position supplied by another agency with which you cooperate in a regional conservation program ?	no
	a. Partner agency's name:	
	3. If your agency supplies the conservation coordinator:	
	a. What percent is this conservation coordinator's position?	80%
	b. Coordinator's Name	Andy Hui
	c. Coordinator's Title	Unit Manager V
	d. Coordinator's Experience and Number of Years	4 years managing unit
	e. Date Coordinator's position was created (mm/dd/yyyy)	8/8/1988
	4. Number of conservation staff (FTEs), including Conservation Coordinator.	10
B. Conservation Program Expenditures		
	1. Staffing Expenditures (In-house Only)	1811000
	2. BMP Program Implementation Expenditures (Total of all BMPs)	10891889
C. "At Least As Effective As"		
	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	no
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	
D. Comments		
	RSU Labor (including travel, training, materials, etc)(minus 45400-45550)+ $500,000 (to cover AH and TB whose salary expenses are under AS's budget) x 0.65 = BMP staff expenses	

Water Supply & Reuse

Reporting Unit:	Year:
Metropolitan Water District of SC	**2007**

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type
CRA	662539	Imported
SWP	1788579	Imported

Total AF: 2451118

Purchaser Information

Name of Agency	Quantity (AF) Supplied	Retailer or Wholesaler
Anaheim	23741.1	retail
Beverly Hills	12775.5	retail
Burbank	13401.4	retail
Calleguas MWD	130688.5	wholesale
Central Basin MWD	119236.9	wholesale
Compton	3694.7	retail
Foothill	12520.8	wholesale
Glendale	23828.8	retail
Inland Empire UA	77717.9	wholesale
Las Virgenes	25372.6	retail
Long Beach	43644.9	retail
Los Angeles	291375	retail
MWD of Orange County	322021.4	wholesale
Pasadena	25309.2	retail
San Diego CWA	609396.6	wholesale
San Fernando	902	retail
San Marino	1572.9	retail
Santa Ana	18427.4	retail
Santa Monica	13472.5	retail
Three Valleys MWD	68454	wholesale
Torrance	21100.3	retail
Upper San Gabriel MWD	15271.7	wholesale
West Basin MWD	149226.4	wholesale
Western MWD	117924.8	wholesale
Eastern MWD	125051.7	retail
Eastern MWD	5210.5	wholesale
Fullerton	16276.6	retail

Total AF: 2287616.1

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2007**

A. Implementation		
	1. Does your agency own or operate a water distribution system?	yes
	2. Has your agency completed a pre-screening system audit for this reporting year?	yes
	3. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
	a. Determine metered sales (AF)	2287617.1
	b. Determine other system verifiable uses (AF)	0
	c. Determine total supply into the system (AF)	2357014.2
	d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.97
	4. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
	5. Did your agency complete a full-scale audit during this report year?	yes
	6. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	yes
	7. Does your agency operate a system leak detection program?	yes
	a. If yes, describe the leak detection program: Metropolitan's system is monitored by 10+ patrols who also collect WQ samples, pilots flying the CRA and pipeline staff in the normal course of their duties. If evidence of leaking water is detected near any of our facilities, we analyze a water sample to determine if it's our water leaking. Normally it is not. If it is, we may hire a leak detection firm to locate the leak.	
B. Survey Data		
	1. Total number of miles of distribution system line.	1017
	2. Number of miles of distribution system line surveyed.	1017
C. "At Least As Effective As"		
	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	
D. Comments		

BMP 07: Public Information Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2007**

A. Implementation

1. How is your public information program implemented?
   Wholesaler implements program (none or minimal retailer participation)

2. Describe the program and how it's organized:
   Major advertising and public relations campaign promoting outdoor water use efficiency and California Friendly landscaping. Educational brochures and campaign artworkincluding bill-stuffers available for retailer and sub-agency use.

3. Indicate which and how many of the following activities are included in your public information program:

Region-Wide Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	5769
b. Public Service Announcement	yes	300
c. Bill Inserts / Newsletters / Brochures	yes	25
d. Bill showing water usage in comparison to previous year's usage	no	
e. Demonstration Gardens	yes	22
f. Special Events, Media Events	yes	13
g. Speaker's Bureau	yes	14
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

1. Annual Expenditures (Excluding Staffing)	1522124

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 08: School Education Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2007**

A. Implementation

1. How is your public information program implemented?
   Wholesaler implements program (none or minimal retailer participation)

2. Please provide information on your region-wide school programs (by grade level):

Grade	Are grade- appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	14	8991	86
Grades 4th-6th	yes	25	42958	418
Grades 7th-8th	yes	19	25975	253
High School	yes	16	21978	214

4. Did your Agency's materials meet state education framework requirements?	yes
5. When did your Agency begin implementing this program?	11/1/1983

B. School Education Program Expenditures

1. Annual Expenditures (Excluding Staffing)	488000

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2007**

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	yes	50000	49288	**8**	No		
2	yes	30000	29040	**9**	yes	6000000	5265935
3	No			**10**	No		
4	No			**11**	No		
5	yes	2000000	1318574	**12**	No		
6	yes	3000000	2262078	**13**	No		
7	No			**14**	yes	7000000	6485726

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	No
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	No
c. Has your agency conducted or funded workshops addressing:	
1) ULFT replacement	No
2) Residential retrofits	No
3) Commercial, industrial, and institutional surveys	yes
4) Residential and large turf irrigation	yes
5) Conservation-related rates and pricing	No

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2007**

3. Staff Resources by BMP

BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP	BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP
1	yes	.5	**8**	No	
2	yes	.5	**9**	yes	2
3	No		**10**	yes	2.5
4	No		**11**	No	
5	yes	2.5	**12**	No	
6	yes	1.5	**13**	No	
7	No		**14**	yes	1.25

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	No	**8**	yes
2	No	**9**	yes
3	No	**10**	No
4	No	**11**	No
5	yes	**12**	No
6	yes	**13**	No
7	yes	**14**	No

B. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

C. Comments

BMP 12: Conservation Coordinator

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2007**

A. Implementation		
	1. Does your Agency have a conservation coordinator?	yes
	2. Is a coordinator position supplied by another agency with which you cooperate in a regional conservation program ?	no
	a. Partner agency's name:	
	3. If your agency supplies the conservation coordinator:	
	a. What percent is this conservation coordinator's position?	80%
	b. Coordinator's Name	Andy Hui
	c. Coordinator's Title	Unit Manager V
	d. Coordinator's Experience and Number of Years	5 years managing unit
	e. Date Coordinator's position was created (mm/dd/yyyy)	8/8/1988
	4. Number of conservation staff (FTEs), including Conservation Coordinator.	14
B. Conservation Program Expenditures		
	1. Staffing Expenditures (In-house Only)	2605400
	2. BMP Program Implementation Expenditures (Total of all BMPs)	17581628
C. "At Least As Effective As"		
	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	no
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	
D. Comments		
	RSU Labor (including travel, training, materials, etc)(minus 45400-45550)+ $500,000 (to cover AH and TB whose salary expenses are under AS's budget) x 0.65 = BMP staff expenses	

Water Supply & Reuse

Reporting Unit:	Year:
Metropolitan Water District of SC	**2008**

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type
SWP	1312397	Imported
CRA	801018	Imported

Total AF: 2113415

Purchaser Information

Name of Agency	Quantity (AF) Supplied	Retailer or Wholesaler
Anaheim	15271.9	retail
Beverly Hills	12179.3	retail
Burbank	14596.6	retail
Callegua MWD	131364.2	wholesale
Central Basin MWD	59053.6	wholesale
Compton	2237.3	retail
Eastern MWD	104691.5	retail
Eastern MWD	4362.2	wholesale
Foothill	12305.5	wholesale
Fullerton	9224.8	retail
Glendale	21880.6	retail
Inland Empire UA	69040.8	wholesale
Las Virgenes MWD	27064.5	wholesale
Long Beach	35330.1	retail
Los Angeles	422313.8	retail
MWD of Orange County	229682.4	wholesale
Pasadena	25517	retail
San Fernando	.2	retail
San Diego CWA	562208.1	wholesale
San Marino	895.1	retail
Santa Ana	8520.8	retail
Santa Monica	12563.6	retail
Three Valleys MWD	72828.6	wholesale
Torrance	19306.2	retail
Upper San Gabriel MWD	70998.4	wholesale
West Basin MWD	135546.9	wholesale
Western MWD	105945	wholesale

Total AF: 2184929

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:	Form Status:	Year:
Metropolitan Water District of SC	**CUWCC Reviewed**	**2008**

A. Implementation

	1. Does your agency own or operate a water distribution system?	yes
	2. Has your agency completed a pre-screening system audit for this reporting year?	yes
	3. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
	a. Determine metered sales (AF)	2184929
	b. Determine other system verifiable uses (AF)	0
	c. Determine total supply into the system (AF)	2206548
	d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.99
	4. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
	5. Did your agency complete a full-scale audit during this report year?	yes
	6. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	yes
	7. Does your agency operate a system leak detection program?	yes
	a. If yes, describe the leak detection program: Metropolitan's system is monitored by 10+ patrols who also collect WQ samples, pilots flying the CRA and pipeline staff in the normal course of their duties. If evidence of leaking water is detected near any of our facilities, we analyze a water sample to determine if it's our water leaking. Normally it is not. If it is, we may hire a leak detection firm to locate the leak.	

B. Survey Data

	1. Total number of miles of distribution system line.	1017
	2. Number of miles of distribution system line surveyed.	1017

C. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

D. Comments

Voluntary Questions (Not used to calculate compliance)

E. Volumes

		Estimated	Verified
	1. Volume of raw water supplied to the system		
	2. Volume treated water supplied into the system		
	3. Volume of water exported from the system		
	4. Volume of billed authorized metered consumption		
	5. Volume of billed authorized un-metered consumption		

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**			Year: **2008**
	6. Volume of unbilled authorized metered consumption			
	7. Volume of unbilled authorized unmetered consumption			
F. Infrastructure and Hydraulics				
	1. Are system input (source or master meter) volumes metered at the entry to the:			
	2. How frequently are system input volumes tested and calibrated:		# months	
	3. Length of mains			
	4. What % distribution of mains are rigid pipes (metal, ac, concrete)			
	5. Number of service connections			
	6. What % of service connections are rigid pipes (metal)			
	7. Are residential properties fully metered?			
	8. Are non-residential properties fully metered?			
	9. Provide an estimate of customer meter under-registration:			
	10. Average length of customer service line from the main to the point of the meter:			
	11. Average system pressure:			
	12. Range of system pressures:			
	13. What percentage of the system is fed from gravity feed:			
	14. What percentage of the system is fed by pumping and re-pumping:			
G. Maintenance Questions				
	1. Who is responsible for providing, testing, repairing and replacing customer meters?			
	2. Does your agency test, repair and replace your meters on a regular timed schedule?			
	a. If yes, does your agency test by meter size or customer category?			
	b. If yes to meter size, please provide the frequency of testing by meter size:			
	• Less than or equal to 1"			# years
	• 1.5" to 2"		# years	
	• 3" and Larger		# months	
	c. If yes to customer category, provide the frequency of testing by customer category:			
	• SF residential		# years	
	• MF residential		# years	

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**		Year: **2008**
	• Commercial	# months	
	• Industrial & Institutional	# months	
	3. Who is responsible for repairs to the customer lateral or customer service line?:		
	4. Who is responsible for service line repairs downstream of the customer meter?:		
	5. Does your agency proactively search for leaks using leak survey techniques or does your utility reactively repair leaks which are called in, or both?		
	6. What is the utility budget breakdown for:		
	• Leak Detection	$	
	• Leak Repair	$	
	• Auditing and Water Loss Evaluation	$	
	• Meter Testing	$	

BMP 07: Public Information Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2008**

A. Implementation

1. How is your public information program implemented?
   Wholesaler implements program (none or minimal retailer participation)

2. Describe the program and how it's organized:
   Major advertising and public relations campaign promoting outdoor water use efficiency and California Friendly landscaping. Educational brochures and campaign artwork including bill-stuffers available for retailer and sub-agency use.

3. Indicate which and how many of the following activities are included in your public information program:

Region-Wide Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	27329
b. Public Service Announcement	yes	531
c. Bill Inserts / Newsletters / Brochures	yes	26
d. Bill showing water usage in comparison to previous year's usage	no	
e. Demonstration Gardens	yes	8
f. Special Events, Media Events	yes	17
g. Speaker's Bureau	yes	37
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

1. Annual Expenditures (Excluding Staffing)	5958089

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 08: School Education Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2008**

A. Implementation

1. How is your public information program implemented?
   Wholesaler implements program (none or minimal retailer participation)

2. Please provide information on your region-wide school programs (by grade level):

Grade	Are grade- appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	12	7594	69
Grades 4th-6th	yes	23	36281	326
Grades 7th-8th	yes	16	21937	198
High School	yes	11	18562	160

4. Did your Agency's materials meet state education framework requirements?	yes
5. When did your Agency begin implementing this program?	11/1/1983

B. School Education Program Expenditures

1. Annual Expenditures (Excluding Staffing)	495000

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2008**

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	yes	10000	7363	**8**	No		
2	yes	10000	12543	**9**	yes	6000000	6381198
3	No			**10**	No		
4	No			**11**	No		
5	yes	2000000	3602141	**12**	No		
6	yes	3000000	3456924	**13**	No		
7	No			**14**	yes	6000000	4639325

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	No
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	No
c. Has your agency conducted or funded workshops addressing:	
1) ULFT replacement	No
2) Residential retrofits	No
3) Commercial, industrial, and institutional surveys	yes
4) Residential and large turf irrigation	yes
5) Conservation-related rates and pricing	No

3. Staff Resources by BMP

BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP	BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP
1	yes	.5	**8**	No	
2	yes	.5	**9**	yes	2
3	No		**10**	yes	2.5
4	No		**11**	No	
5	yes	2.5	**12**	No	
6	yes	1.5	**13**	No	
7	No		**14**	yes	1.25

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2008**

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	No	**8**	yes
2	No	**9**	yes
3	No	**10**	No
4	No	**11**	No
5	yes	**12**	No
6	yes	**13**	No
7	yes	**14**	No

B. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

C. Comments

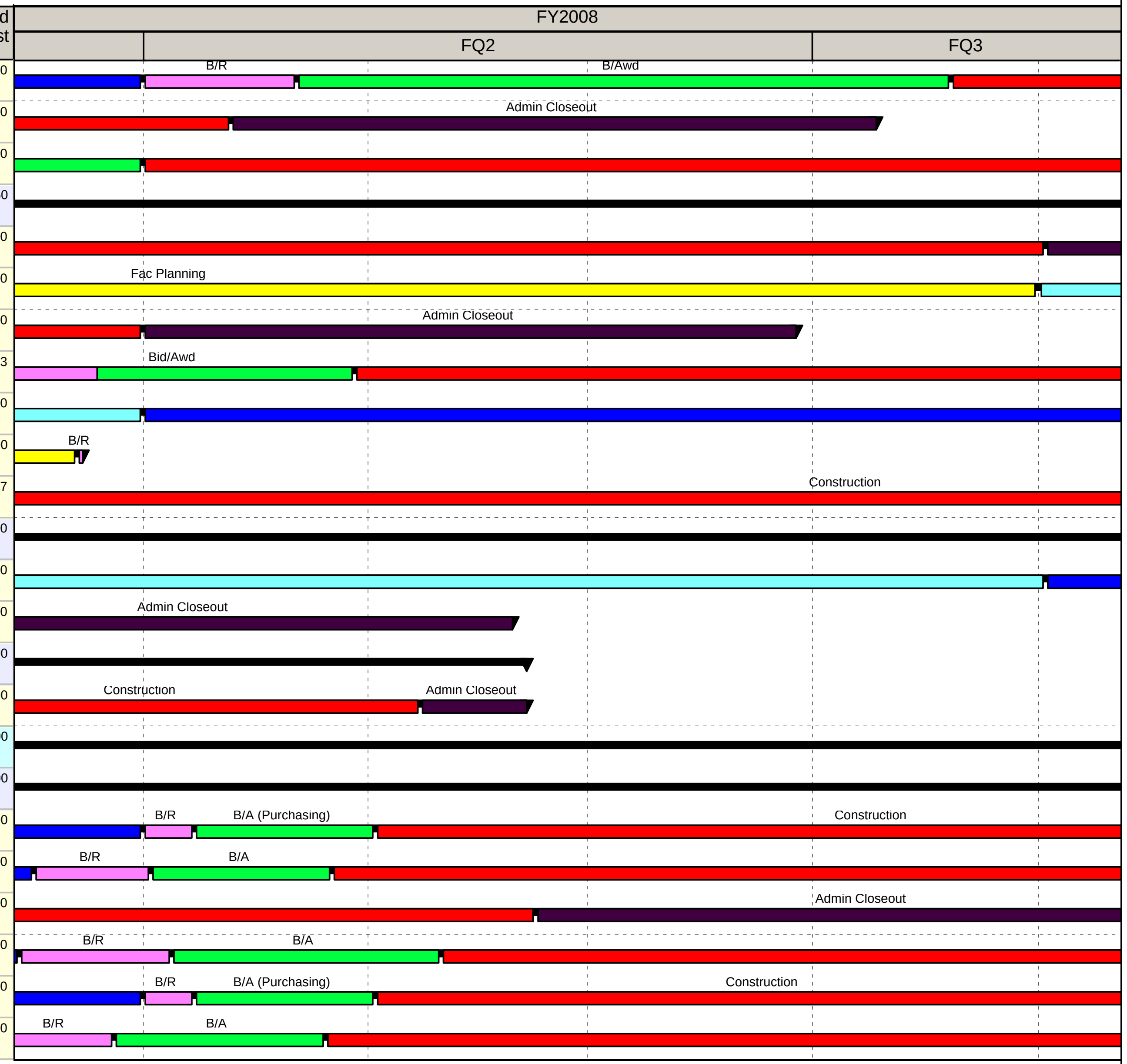
BMP 12: Conservation Coordinator

Reporting Unit: **Metropolitan Water District of SC**	Form Status: **CUWCC Reviewed**	Year: **2008**

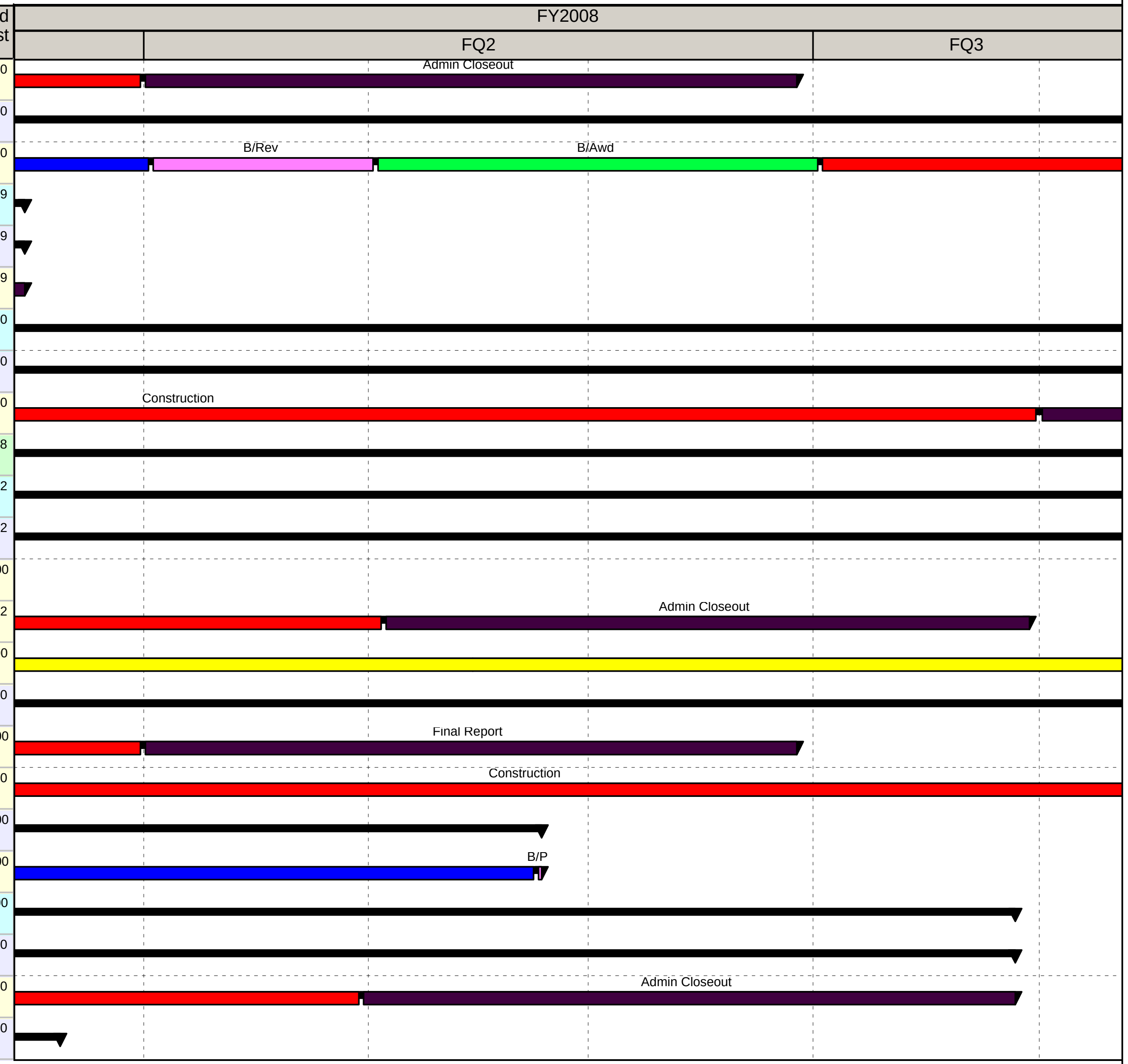
A. Implementation		
	1. Does your Agency have a conservation coordinator?	yes
	2. Is a coordinator position supplied by another agency with which you cooperate in a regional conservation program?	no
	a. Partner agency's name:	
	3. If your agency supplies the conservation coordinator:	
	a. What percent is this conservation coordinator's position?	80%
	b. Coordinator's Name	Andy Hui
	c. Coordinator's Title	Unit Manager V
	d. Coordinator's Experience and Number of Years	6 years managing unit
	e. Date Coordinator's position was created (mm/dd/yyyy)	8/8/1988
	4. Number of conservation staff (FTEs), including Conservation Coordinator.	17
B. Conservation Program Expenditures		
	1. Staffing Expenditures (In-house Only)	2521325
	2. BMP Program Implementation Expenditures (Total of all BMPs)	13554507
C. "At Least As Effective As"		
	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	no
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	
D. Comments		

Activity ID	Activity Name	Start	Finish	Budgeted Total Cost
W	**WATER**	01-Dec-00 A	26-Apr-11	$237,203,515
GD	**GENERAL DISTRICT**	06-Jan-03 A	15-Nov-09	$68,284,350
	Expansion	06-Jan-03 A	15-Nov-09	$68,207,250
	BARTON & NANDINA INTERAGENCY CONNECTION PIPELINE	09-Oct-06 A	26-Apr-08	$227,000
	HEMET WATER FILTRATION PLANT	06-Jan-03 A	03-Aug-07 A	$45,000,000
	MENIFEE WEST WATER STUDY	16-Oct-06 A	27-Oct-07	$108,000
	OLEANDER PUMP STATION TRANSMISSION PIPELINES	20-Jun-06 A	28-Aug-09	$14,502,250
	WATER FACILITIES MASTER PLAN UPDATE (2005/06)	03-Nov-05 A	12-Feb-08	$1,370,000
	WESTERN WAY BOOSTER STATION	15-Sep-06 A	15-Nov-09	$7,000,000
	Replacement	29-Jan-07 A	15-Dec-07	$77,100
	MILLS PUMP STATION MODIFICATIONS PRE-DESIGN STUDY	29-Jan-07 A	15-Dec-07	$77,100
41	**Moreno Valley / Perris / Menifee**	01-Dec-00 A	26-Apr-11	$130,917,576
	Expansion	15-Sep-03 A	26-Apr-11	$107,598,826
	CACTUS AVENUE FEEDER P/L IMPROVEMENT	06-Sep-05 A	26-Aug-08	$8,000,000
	CACTUS AVENUE FEEDER/PUMP STATION	01-Sep-05 A	21-Nov-08	$8,000,000
	CHAMBERS II POTABLE TANK	19-Jun-07 A	21-Dec-09	$1,163,700
	ELLIS TANK (GOODHOPE II) REPL. 0.25MG W/2.5MG TANK	03-Aug-04 A	25-Jul-09	$4,220,100
	NUEVO RD/I-215 WTR TRANS P/L CROSS	01-Jan-04 A	10-Nov-07	$796,700
	ORANGE ZONE TK REPL. 0.15MG W/0.55 MG TK	03-Aug-04 A	11-Oct-09	$2,308,800
	PERRIS DESALTER II	03-Aug-05 A	26-Apr-11	$30,000,000
	PERRIS DESALTER IRON/MANGANESE REMOVAL FAC	03-Jan-05 A	17-Apr-09	$7,944,726
	PERRIS DESALTER WELL PUMPING FAC, PH II (3 WELLS)	01-Jun-04 A	12-Sep-07	$4,375,000
	PERRIS WATER FILTRATION PLANT, PH II	15-Sep-03 A	19-Dec-07	$24,525,000
	PERRIS WFP/SPW SUPPLY P/L	24-Feb-05 A	07-Apr-09	$5,613,100

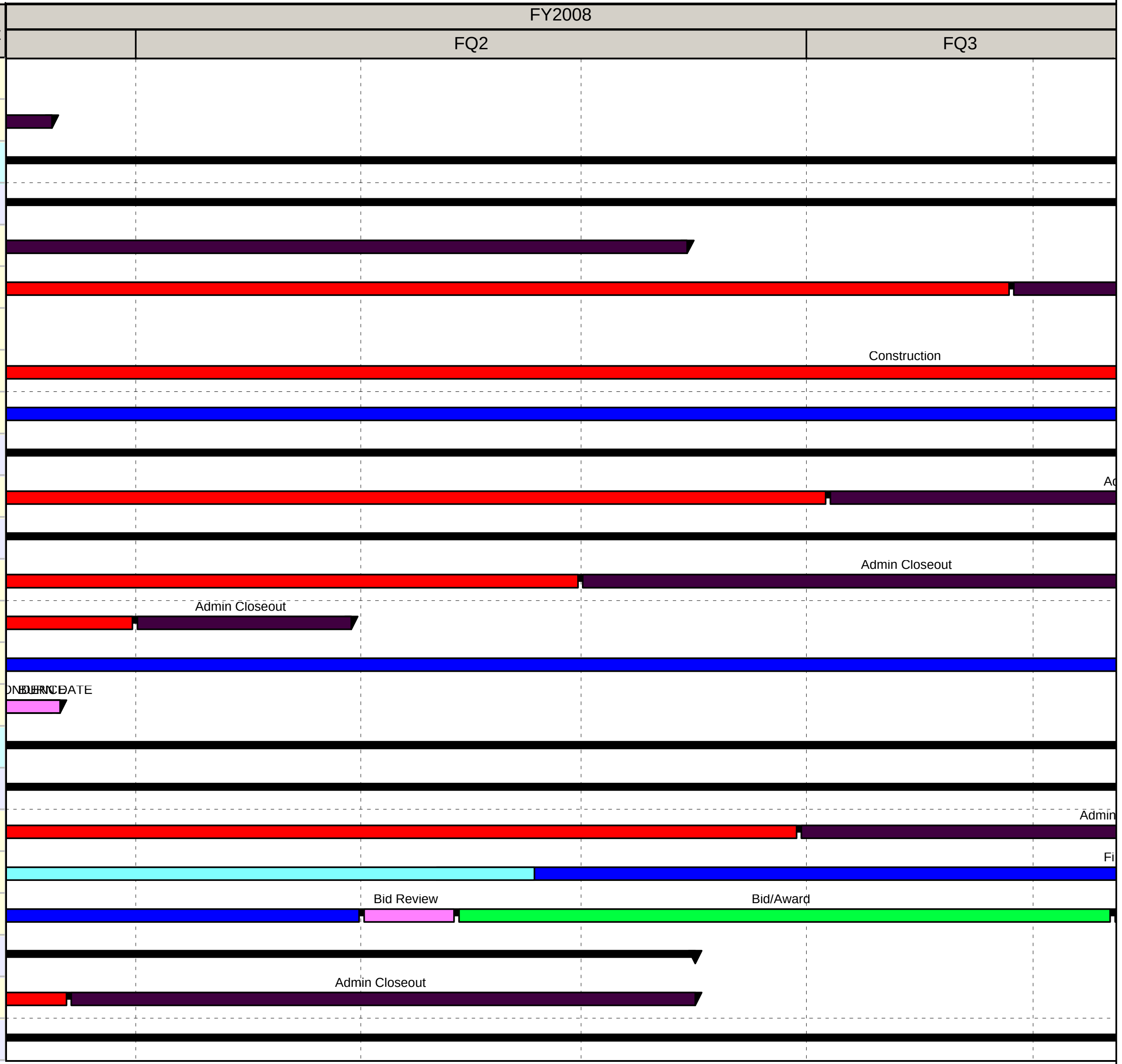
Activity ID	Activity Name	Start	Finish	Budgeted Total Cost
	SCOTT ROAD BOOSTER STATION	02-May-05 A	01-Oct-08	$4,104,200
	SCOTT ROAD TRANSMISSION PIPELINE	01-Mar-07 A	09-Jan-08	$3,375,000
	TALLY RD TANK SITE (ANTELOPE II)	01-Aug-04 A	22-Dec-08	$3,172,500
	Replacement	01-Dec-00 A	26-Mar-11	$19,037,450
	36" POTABLE & 18" RECYCLED WATER P/Ls IN LINDENBERGE...	16-Mar-05 A	02-May-08	$5,313,200
	ELDER BOOSTER STATION RELOCATION	08-Jun-07 A	18-Mar-10	$1,243,700
	HWY 74 - GOOD HOPE WTR P/L RELOC.	01-Dec-00 A	29-Dec-07	$2,144,100
	LEAKY PIPE REPLACEMENT 2003/2004	01-Jun-03 A	26-Jan-09	$1,947,553
	MEAD VALLEY II BOOSTER UPGRADE	17-Aug-03 A	26-Mar-11	$1,706,650
	QUAIL VALLEY AREA LOW PRESSURE ANALYSIS	28-Dec-06 A	22-Sep-07	$112,000
	SUNNYMEAD BLVD PIPELINE REPLACEMENT	01-May-06 A	14-Oct-08	$6,570,247
	Syst Betterment	14-Sep-03 A	20-Oct-10	$4,170,000
	NASON & DRACEA BOOSTER STA. RELOCATION	01-Sep-05 A	20-Oct-10	$2,000,000
	OLD ELSINORE ROAD - 8"/12" WATER P/L REPL.	14-Sep-03 A	20-Nov-07	$2,170,000
	No CONST COST FUND:	20-Jun-07 A	22-Nov-07	$111,300
	MANZANITA II TANK DRAINAGE IMPROVEMENTS	20-Jun-07 A	22-Nov-07	$111,300
	42 Hemet / San Jacinto	01-Mar-01 A	31-May-09	$27,046,400
	Expansion	01-Mar-01 A	20-Apr-09	$22,555,800
	HSJIRRP - PH I MONITORING WELLS (3)	20-Nov-06 A	15-Jun-08	$314,000
	HSJIRRP - PH I PIPELINES (FOR WELLS & RECHARGE PONDS)	20-Nov-06 A	07-Sep-08	$2,902,700
	HSJIRRP - PH I PRODUCTION WELL (3)	20-Nov-06 A	21-Feb-08	$3,356,800
	HSJIRRP - PH I PRODUCTION WELL PUMPING FACS (3)	20-Nov-06 A	20-Apr-09	$6,320,000
	HSJIRRP - PH I RECHARGE PONDS	20-Nov-06 A	16-May-08	$3,430,000
	HSJIRRP - WARREN RD & COMMONWEALTH P.S. MODS.	20-Nov-06 A	06-Oct-08	$4,232,300



Activity ID	Activity Name	Start	Finish	Budgeted Total Cost
	NORTH SAN JACINTO RAW WATER PUMP STATION	01-Mar-01 A	29-Dec-07	$2,000,000
	Replacement	01-Oct-05 A	31-May-09	$4,490,600
	EAST VALLEY PIPELINE PROJECTS 2005/06	01-Oct-05 A	31-May-09	$4,490,600
43	**Murrieta / Temecula**	30-Nov-01 A	14-Sep-07	$5,155,189
	Expansion	30-Nov-01 A	14-Sep-07	$5,155,189
	RANCHO GLENOAKS AD-19 P/L, PS, & TANK	30-Nov-01 A	14-Sep-07	$5,155,189
	No SUB SERV AREA	11-Jun-07 A	30-Apr-08	$5,800,000
	Expansion	11-Jun-07 A	30-Apr-08	$5,800,000
	IE ENERGY CENTER NON-RECLAIMABLE WASTE P/L	11-Jun-07 A	30-Apr-08	$5,800,000
S	**SEWER**	02-Jul-01 A	28-Jul-13	$943,885,668
GD	**GENERAL DISTRICT**	11-Jan-05 A	28-May-08	$6,147,292
	Expansion	11-Jan-05 A	01-Mar-08	$2,353,992
	BRINE STORAGE PONDS AT SCRWRF	28-Mar-07 A	11-Sep-07	$89,000
	DE ANZA LIFT STATION UPGRADE	11-Jan-05 A	30-Jan-08	$1,794,992
	WASTEWATER FACILITIES MASTER PLAN UPDATE - 2006	23-Dec-05 A	01-Mar-08	$470,000
	Syst Betterment	21-Nov-05 A	28-May-08	$3,768,100
	EVALUATION OF CHEMICAL CONTAINMENT CAPABILITIES AT ...	01-May-07 A	29-Dec-07	$20,000
	MVRWRF TERTIARY EFFLUENT EMERGENCY DIVERSION	21-Nov-05 A	28-May-08	$3,748,100
	No CONST COST FUND:	21-Apr-06 A	24-Nov-07	$25,200
	SEWAGE LIFT STATION STANDARDS	21-Apr-06 A	24-Nov-07	$25,200
M	**Multiple**	02-Jul-01 A	28-Jan-08	$14,280,000
	Expansion	01-Apr-04 A	28-Jan-08	$7,240,000
	MV & SJV & TVRWRF's CENTRIFUGE INSTALL.	01-Apr-04 A	28-Jan-08	$7,240,000
	Replacement	02-Jul-01 A	19-Sep-07	$7,040,000



Activity ID	Activity Name	Start	Finish	Budgeted Total Cost
	MV & SJV & TVRWRF's DIGESTER HEATING SYS	02-Jul-01 A	01-Aug-07 A	$5,600,000
	MVRWRF CHLORINE SCRUBBER REPL.	01-Feb-05 A	19-Sep-07	$1,440,000
31	**SJVRWRF**	14-Apr-03 A	05-Sep-12	$299,305,375
	Expansion	14-Apr-03 A	05-Sep-12	$84,339,000
	NORTH SAN JACINTO SEWER, PHASE I	14-Apr-03 A	15-Dec-07	$13,800,000
	NORTH SAN JACINTO SEWER, PHASE II	01-Oct-03 A	28-Apr-08	$10,409,000
	NORTH SAN JACINTO SEWER, PHASE III	18-May-06 A	09-Sep-07	$4,800,000
	SJV INTERCEPTOR SEWER, PHASE I	10-Nov-04 A	06-Dec-08	$18,000,000
	SJVRWRF TITLE 22 UPGRADE FOR TERTIARY EXPANSION	01-Dec-04 A	05-Sep-12	$37,330,000
	Replacement	01-Dec-04 A	01-Apr-08	$8,342,875
	MV & SJV & TVRWRF's DIGESTER GAS, MIXING & FLARE SYS ...	01-Dec-04 A	01-Apr-08	$8,342,875
	Syst Betterment	01-Dec-04 A	22-Aug-12	$206,623,500
	SJVRWRF CHLORINE BUILDING MAINTENANCE PROJECT	15-Jan-07 A	28-Feb-08	$146,500
	SJVRWRF EQ BASINS	25-Jun-05 A	30-Oct-07	$8,867,000
	SJVRWRF EXP. FOR ENHANCED BNR TO 14 MGD, PLANT 2	01-Dec-04 A	22-Aug-12	$197,360,000
	SJVRWRF WETLANDS CONVERSION TO RECEIVE TERTIARY ...	01-May-07 A	20-Sep-07	$250,000
32	**MVRWRF**	01-Dec-04 A	27-Jan-13	$173,737,970
	Expansion	28-Apr-05 A	27-Jan-13	$160,471,000
	MV & TVRWRF'S WAS THICKENING	16-Jun-05 A	29-Mar-08	$7,171,000
	MVRWRF EXPANSION TO 18 MGD	28-Apr-05 A	27-Jan-13	$100,477,000
	MVRWRF SCATT PROJECT	28-Apr-05 A	10-Aug-10	$52,823,000
	Replacement	01-Dec-04 A	16-Dec-07	$2,431,970
	MVRWRF PLANT I IMPRVS & REHAB.	01-Dec-04 A	16-Dec-07	$2,431,970
	Syst Betterment	12-May-06 A	16-Jul-08	$10,835,000



Activity ID	Activity Name	Start	Finish	Budgeted Total Cost
	MV & TVRWRF'S HEADWORKS REHABILITATION	12-May-06 A	29-May-08	$2,710,000
	MVRWRF FUEL CELL	21-Feb-07 A	16-Jul-08	$8,125,000
	33 SCRWRF	03-Nov-03 A	10-Aug-10	$71,205,000
	Expansion	03-Nov-03 A	30-Dec-07	$1,205,000
	SCRWRF EFFLUENT PONDS MODIFICATIONS	03-Nov-03 A	30-Dec-07	$1,205,000
	Syst Betterment	01-Dec-05 A	10-Aug-10	$70,000,000
	QUAIL VALLEY SEWER IMPRVS	01-Dec-05 A	10-Aug-10	$70,000,000
	34 TVRWRF	01-Jul-02 A	28-Jul-13	$146,766,831
	Expansion	01-Jul-02 A	28-Jul-13	$137,411,831
	DIAZ FORCEMAIN REPLACEMENT PROJECT	16-Apr-07 A	04-Apr-08	$3,000,000
	DIAZ SEWAGE LIFT STATION REPLACEMENT	10-Apr-04 A	12-May-11	$11,049,632
	FRENCH VALLEY SEWER - PH I & II	20-Oct-03 A	07-Nov-07	$13,570,000
	MURRIETA AREA SEWER IMPROV'T PH-I	01-Jul-02 A	17-Jun-09	$2,864,799
	TVRWRF EXPANSION TO 23 MGD	09-Apr-07 A	28-Jul-13	$105,729,100
	WARM SPRINGS L.S. INTERIM EXPANSION	15-Apr-04 A	14-May-08	$1,198,300
	Replacement	04-Apr-06 A	03-May-09	$3,605,000
	DIAZ ROAD 36" SEWER RELOC & 36" RECYC WTR REINFORCE...	04-Apr-06 A	07-Nov-07	$2,700,000
	MURRIETA CREEK SEWER IMPROVEMENTS	15-Jan-08	03-May-09	$905,000
	Syst Betterment	26-Jul-06 A	31-Mar-09	$5,750,000
	DEL RIO SEWER IMPROVEMENTS	02-Aug-07 A	31-Mar-09	$4,200,000
	TVRWRF PLANT I PRIMARY CLARIFIER INFLUENT CHANNEL R...	26-Jul-06 A	20-Apr-08	$1,550,000
	35 PVRWRF	01-Nov-03 A	14-May-12	$232,443,200
	Expansion	01-Nov-03 A	14-May-12	$232,324,200
	PATTERSON AVE., NANDINA AVE., & WESTERN WAY SEWER I...	21-Jun-06 A	18-Dec-07	$1,973,600

Activity ID	Activity Name	Start	Finish	Budgeted Total Cost	FY2008 (FQ2, FQ3)
	PVRWRF EXPANSION TO 22 MGD, PLANT 3	01-Nov-03 A	14-May-12	$191,345,000	
	PVRWRF PLANT 1 TERTIARY CONVERSION	03-Feb-06 A	21-Dec-07	$2,859,000	Admin Closeout
	PVRWRF TERTIARY EXPANSION, 2005	01-Apr-04 A	29-Mar-08	$36,146,600	Admin
	Syst Betterment	16-Jan-05 A	14-Dec-07	$119,000	
	PERRIS VALLEY CHANNEL SEWER IMPROVEMENTS	16-Jan-05 A	14-Dec-07	$119,000	Admin Closeout
R	**RECYCLED**	10-Mar-04 A	09-Jul-09	$17,123,000	
H	**RECYCLED**	10-Mar-04 A	09-Jul-09	$17,123,000	
	Expansion	10-Mar-04 A	30-Jul-08	$12,558,600	
	DIAMOND VALLEY (1719 ZONE) RECYCLED TANK SOUTH HEM...	01-Jul-07 A	01-Nov-07	$15,000	B/R
	MENIFEE LAKES 18" RECYCLED WTR TRANS P/L	02-Aug-04 A	30-Jul-08	$1,968,700	Construction
	REACH 16 RECYCLED WTR P/L, PH II	10-Mar-04 A	25-Oct-07	$6,364,900	Admin Closeout
	SAN JACINTO AG. IN-LIEU PROJECT	05-Apr-06 A	21-Jun-08	$3,210,000	Construction
	WINCHESTER PONDS EXPANSION	09-Feb-05 A	26-Mar-08	$1,000,000	Admin Closeout
	Syst Betterment	14-Jul-05 A	09-Jul-09	$4,564,400	
	NANDINA PUMP STATION	01-Nov-05 A	22-Nov-08	$1,731,000	B/Rev; Bid/Award
	REACH 4 RECLAIMED & BRINELINE A/V & B/L UPGRADES	14-Jul-05 A	24-May-08	$1,333,400	Construction
	SIMPSON/LA VENTANA RECYCLED WATER BOOSTER	25-Jun-06 A	09-Jul-09	$1,500,000	B/R; B/A
G	**GENERAL**	15-Jan-06 A	07-Feb-10	$17,516,039	
GD	**GENERAL DISTRICT**	15-Jan-06 A	07-Feb-10	$17,516,039	
	Syst Betterment	15-Jan-06 A	07-Feb-10	$17,516,039	
	ADMINISTRATIVE CENTER EXPANSION	15-Jan-06 A	07-Feb-10	$17,516,039	Final Design