Calleguas Municipal Water District
2005 Urban Water Management Plan

Black & Veatch Corporation
B&V Project 140898.100
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List of Acronyms

ac-ft	acre-feet
ASR	aquifer storage and recovery
Bay-Delta	San Francisco Bay/Sacramento-San Joaquin Bay Delta
BMP	Best Management Practices
Brineline	Calleguas Regional Salinity Management Project
Ca	calcium
$CaCO_3$	calcium carbonate
CALFED	CALFED Bay-Delta Program
CCDP	Conejo Creek Diversion Project
cfs	cubic feet per second
CII	commercial, industrial, and institutional
Cl	chlorine
CMWD	Calleguas Municipal Water District
CRA	Colorado River Aqueduct
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
DWR	California Department of Water Resources
ESA	Endangered Species Act
GMA	Groundwater Management Agency
GREAT	Groundwater Recovery Enhancement and Treatment

GSP	Groundwater Storage Program
HCO_3	carbonate
HDPE	high density polyethylene (HDPE)
IRP	Integrated Resources Plan
LAS	Lower Aquifer System
LRP	Competitive Local Resources Program
Mg	magnesium
mgd	million gallons per day
mg/L	milligrams per liter
MOU	Memorandum of Understanding
MWD	Metropolitan Water District of Southern California
Na	sodium
NO_3	nitrate
PHWA	Port Hueneme Water Authority
RO	reverse osmosis
ROD	Record of Decision
SCAG	Southern California Association of Government
SDP	Seawater Desalination Program
SO_4	sulfate
SWP	State Water Project
TDS	total dissolved solids
TOC	total organic carbon

UAS	Upper Aquifer System
ULFT	Ultra Low Flush Toilet
UWCD	United Water Conservation District
UWMP	Urban Water Management Plan
VCOG	Ventura Council of Regional Governments
VCWWD	Ventura County Waterworks District
WSDM Plan	Water Surplus and Drought Management Plan
WTP	water treatment plant

Chapter 1

Introduction

Chapter 1
Introduction

A. Purpose and Need

This Urban Water Management Plan (UWMP) was prepared for the Calleguas Municipal Water District (CMWD) and submitted to the California Department of Water Resources (DWR) to meet requirements of the 1984 Urban Water Management Planning Act and all subsequent amendments adopted through December 2004. The act requires urban water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet (ac-ft) of water annually to prepare and adopt an UMWP every five years.

The intent of this plan is to provide DWR with information on present and future water sources and demands and provide an assessment of CMWD's water resource needs. Specifically, the UWMP must provide water supply planning for a 20-year planning period in 5-year increments, identify and quantify adequate water supplies for existing and future demands during normal, dry and drought years, and implement conservation and efficient use of urban water supplies.

CMWD has coordinated its UWMP planning efforts with a number of agencies to ensure that data and issues are presented accurately. To minimize reporting redundancy, water management activities undertaken by CMWD's purveyors are not discussed in detail in this document, as they are addressed in the individual UWMPs of the purveyors that are required to prepare plans. Table 1-1 lists the agencies that have provided coordination with the development of this UWMP.

To improve the readability of this UWMP, the document has been organized differently than the structure laid out in DWR's guidance manual. Appendix A lists the required elements as defined in DWR's guidance manual, and the associated section where that topic can be found in this report.

Table 1-1

Agency Coordination

Agency	Participated in UWMP Development	Received Draft Report and Public Hearing Notice	Attended Public Meetings	Received Final Report
Berylwood Mutual Water Co.	X	X		X
Brandeis Mutual Water Co.	X	X		X
Butler Ranch Mutual Water Co.		X		X
California American Water Co.	X	X		X
California DWR		X		X
California Water Service Co.	X	X		X
Camrosa Water District	X	X		X
Camarillo Library		X		X
Camarillo Sanitary District	X			
Capehart Housing (U.S. Navy)	X	X		X
City of Camarillo	X	X		X
City of Moorpark		X		X
City of Oxnard	X	X	X	X
City of Simi Valley (VCWWD No. 8)	X	X		X
City of Thousand Oaks	X	X		X
Crestview Mutual Water Co.	X	X		X
Fox Canyon Groundwater Management Agency	X			X
Lake Sherwood Community Services District	X			
Metropolitan Water District of Southern California	X	X	X	X
Moorpark Library		X		X
Newbury Park Academy Water	X	X		X
Oxnard Library		X		X
Port Hueneme Library		X		X
Pleasant Valley Mutual Water Co.	X	X		X
Simi Valley Library		X		X
Solano Verde Mutual Water Co.	X	X		X
Southern California Association of Governments		X		X
Southern California Water Co.	X	X		X
Thousand Oaks Library		X		X
Ventura Council of Governments		X		X
Ventura County Watershed Protection District	X			X
Ventura County Waterworks Districts Nos. 1 and 19 (VCWWD No. 1 and VCWWD No. 19)	X	X		X
Ventura County Regional Sanitation District (Oak Park Water/Triunfo Sanitation District)	X	X		X
Zone Mutual Water Co.	X	X		X

B. Background

CMWD is an enterprise special district that was formed by the voters of southern Ventura County in 1953 for the purpose of providing a safe, reliable water supply. Named for the watershed in which it is located, the district is a public agency established under the Municipal Water District Act of 1911. It is governed by a five-member board of directors elected by voters to represent each of the five divisions within the District.

In 1960, voters authorized CMWD to join Metropolitan Water District of Southern California (MWD) to gain access to MWD's water supply system. MWD is comprised of 26 member agencies. MWD provides wholesale water from the Colorado River via the Colorado Aqueduct and northern California via the State Water Project (SWP). CMWD is the fifth largest member agency in terms of average annual water deliveries.

CMWD currently supplies high quality drinking water to over 550,000 people. Three-quarters of Ventura County residents depend on CMWD for all or part of their water. The water supplied by CMWD currently represents approximately 70 percent of the total municipal and industrial water demand within its service area. It is important to note that a large portion of the water use in Ventura County serves agricultural demands. These other demands are met by other agencies or private entities using untreated surface water, recycled wastewater, and groundwater produced from various groundwater basins underlying the area.

CMWD distributes water on a wholesale basis to 20 local purveyors, which in turn deliver water to area residents, businesses, and agriculture customers. These purveyors are grouped by CMWD and are listed in Table 1-2.

Table 1-2

CMWD Purveyors by Region

Region	Purveyors
Conejo Valley	California-American Water Company California Water Service City of Thousand Oaks Newbury Park Academy Water Company Lake Sherwood CSD
Camarillo	City of Camarillo Capehart Housing (U.S. Navy) Crestview Mutual Water Company Pleasant Valley Mutual Water Company Camrosa Water District
Moorpark	Berylwood Heights Mutual Water Company Butler Ranch Mutual Water Company VCWWD No. 1 VCWWD No. 19 Solano Verde Mutual Water Company[(1)] Zone Mutual Water Company
Simi Valley	Brandeis Mutual Water Company Southern California Water Company City of Simi Valley (VCWWD No. 8)
Oak Park	Oak Park Water Service
Oxnard	City of Oxnard

[(1)]Potential future CMWD purveyor.

Since the 2000 UWMP, there have been some minor changes to the list of purveyors. In 2003, the Port Hueneme Water Authority (PHWA), the City of Oxnard, and CMWD signed the “Three Party Agreement”. Under this agreement, CMWD sells water directly to the City of Oxnard, and they in turn supply water to PHWA, which serves the City of Port Hueneme, Naval Base Ventura County and Channel Islands Beach Community Services District. Therefore, CMWD no longer lists PHWA as a member purveyor. Similarly, VCWWD No. 17, which provides water to Bell Canyon, is served indirectly by CMWD via VCWWD No. 8, and thus is no longer listed as a member purveyor.

Mesa Water Company was the nominal retail purveyor for a proposed development called Ahmanson Ranch. This development is no longer anticipated to occur as the land has been sold to the State of California to become a state park. Since there is no need to serve the area, Mesa Water Company is no longer included as a CMWD member purveyor. The Solano Verde Mutual Water Company was served in the past by wells, but these have been rendered inoperable and they are currently being served by VCWWD No. 19. There is a possibility that Solano Verde will become a CMWD purveyor when the Bradley Road Lateral and pump station is constructed. This is expected to occur in late 2005 or early 2006.

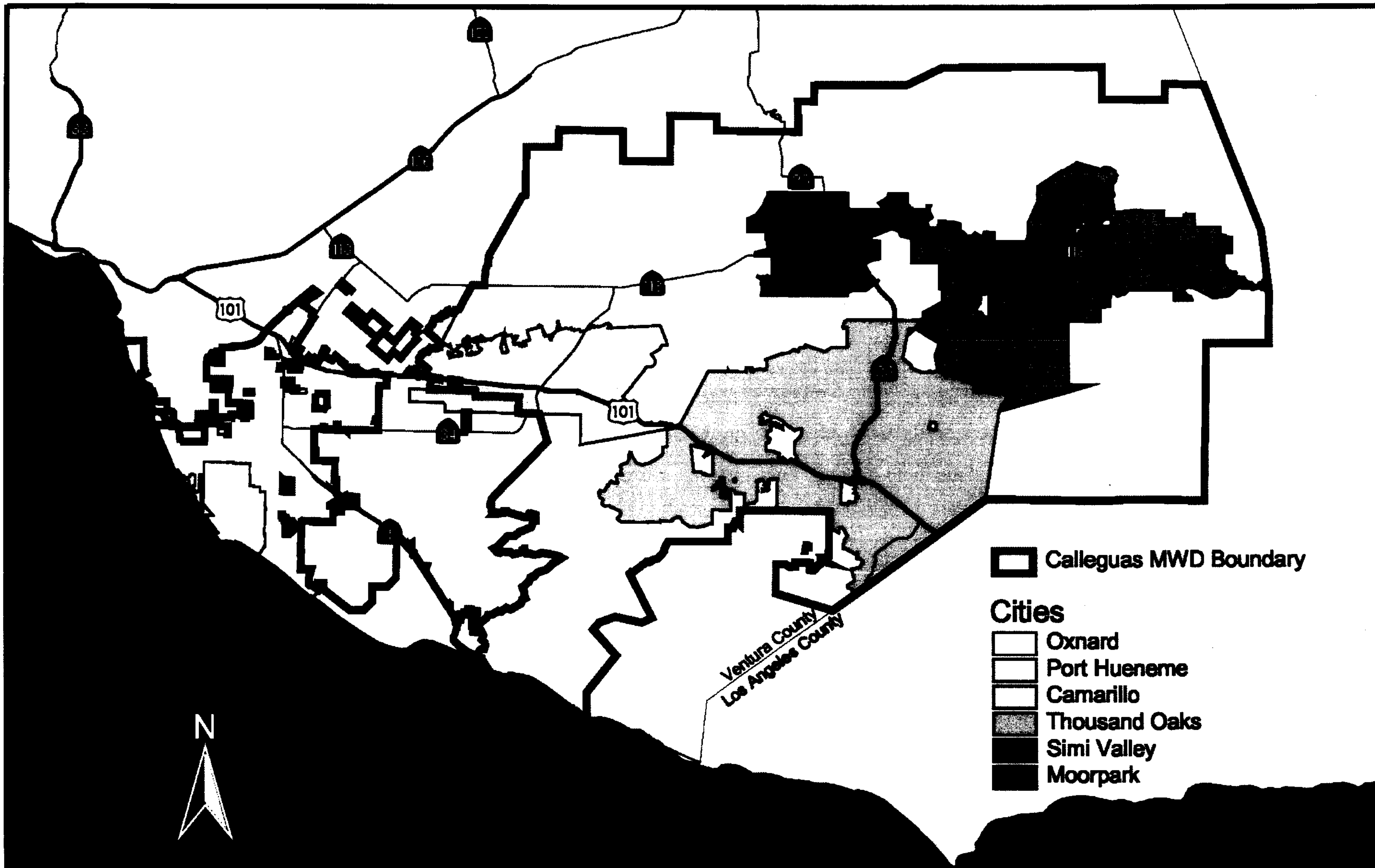
Figures 1-1 and 1-2 show CMWD's service area and purveyor boundaries, respectively. CMWD's service area encompasses approximately 375 square miles in southern Ventura County. Land use in the area includes mostly residential, commercial, industrial, and irrigated cropland.

C. Demographics

Population, dwelling unit, and employment projections are all tools utilized to project municipal and industrial water demands. The following sections provide discussion on each of these demographics.

1. Population Projections

Table 1-3 lists population projections for the CMWD service area through the year 2030. These projections are also shown graphically on Figure 1-3. Population projections were obtained from MWD, Ventura Council of Regional Governments (VCOG), and Southern California Association of Governments (SCAG). The VCOG projections are based on the sum of the population projections for both growth and non-growth sections of the following areas: Camarillo, Las Posas, Moorpark, Oak Park, Oxnard, Port Hueneme (including Channel Islands Beach and Naval Base Ventura County), Simi Valley, and Thousand Oaks. These areas are located within CMWD's service area and currently comprise approximately 74 percent of the total population projections for Ventura County. This percentage is not expected to change significantly in the near future, and therefore, this same percentage was used to forecast



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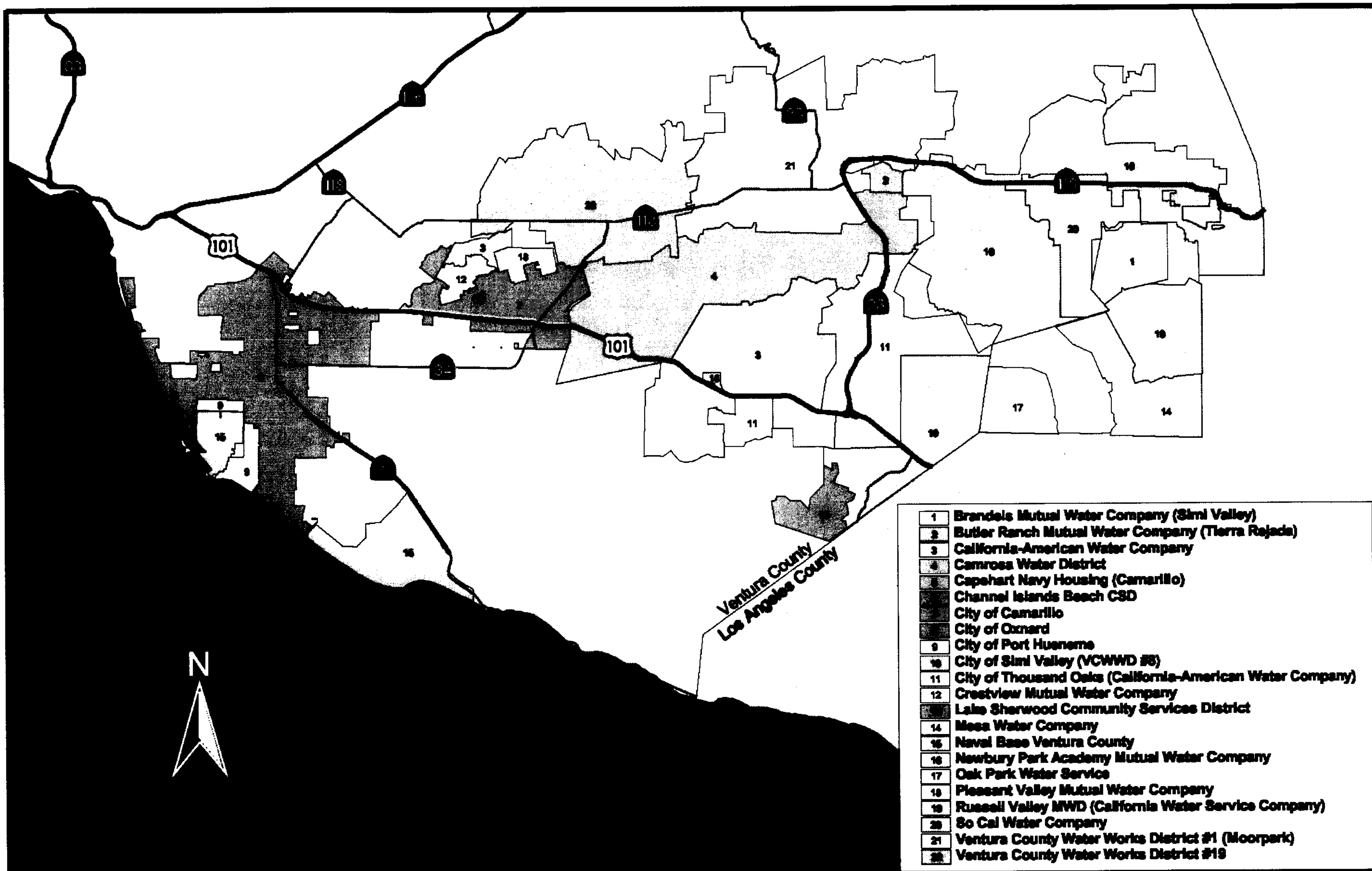
CMWD 2005 Urban Water Management Plan
CMWD Service Area

Figure
1-1



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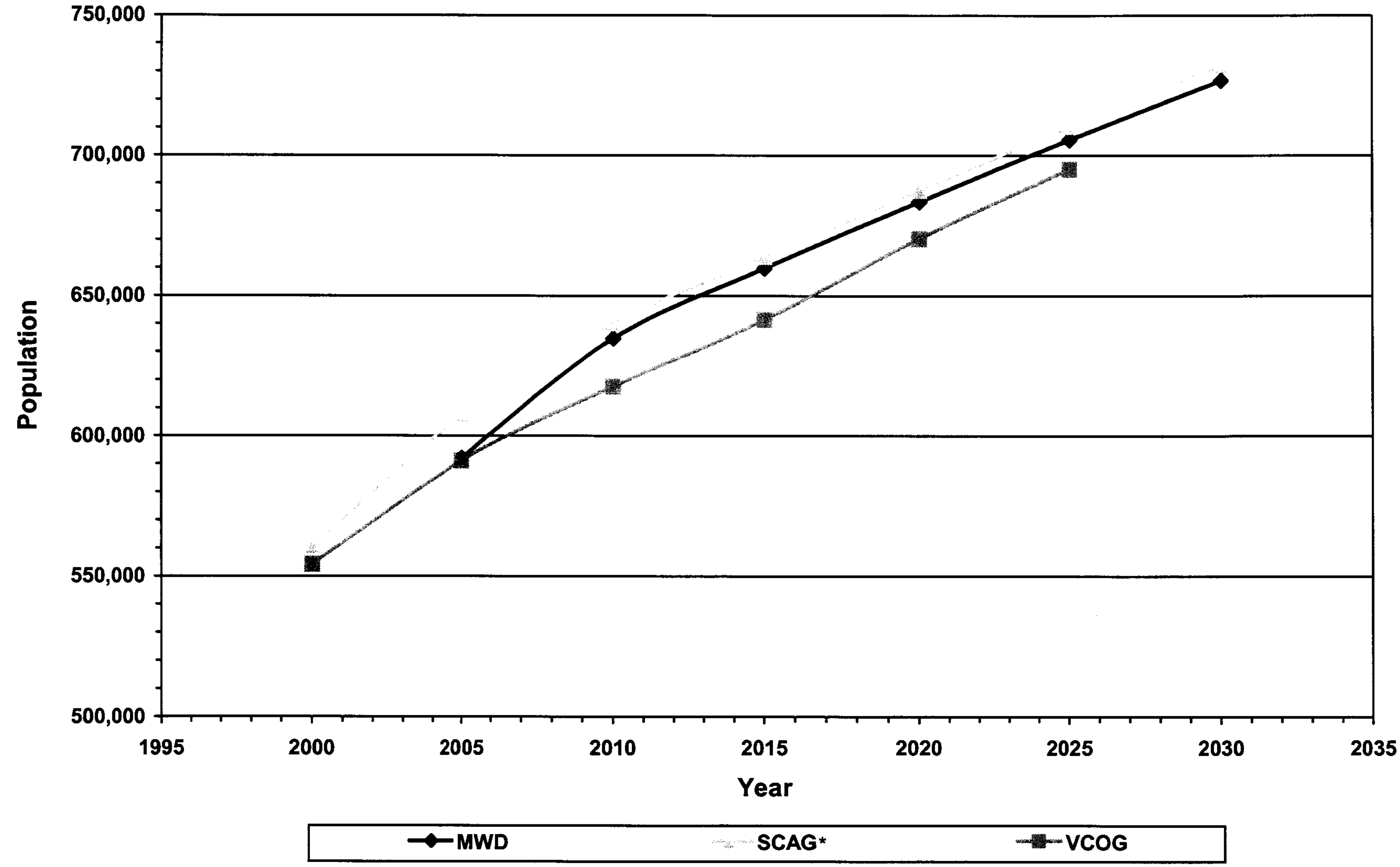
CMWD 2005 Urban Water Management Plan
CMWD Purveyor Boundaries

Figure 1-2



*Based on 74 percent of SCAG projections for Ventura County

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CMWD 2005 Urban Water Management Plan
Population Projections

Figure 1-3

population within CMWD's service area utilizing SCAG's projections for all of Ventura County. MWD population projections are based on computer modeling that considers social and economic trends as well as locations of planned transportation infrastructure. The MWD MAIN computer program uses population forecasts as a key indicator of future water demand.

Table 1-3

CMWD Service Area Population Projections

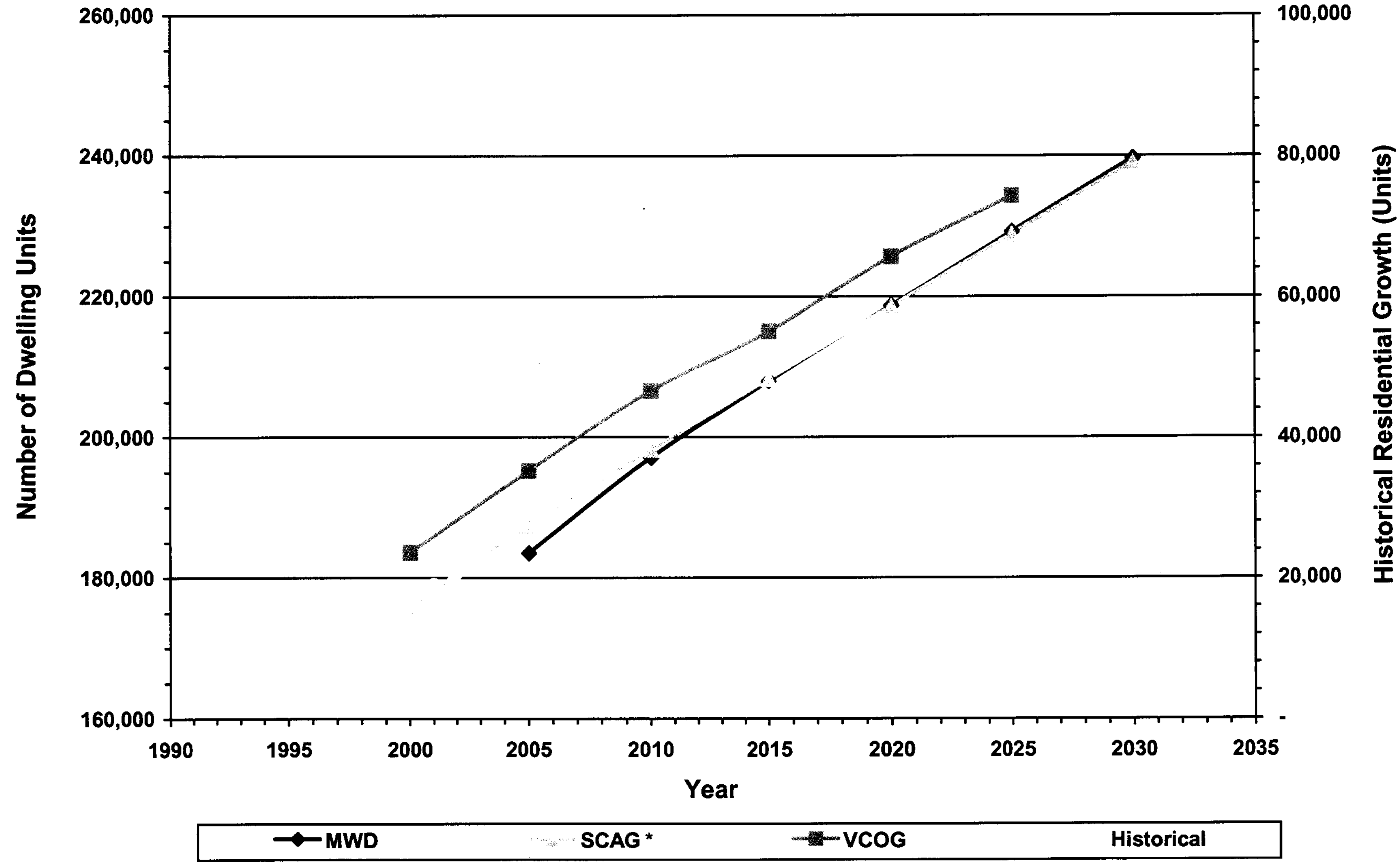
Year	MWD	SCAG[(1)]	VCOG[(2)]
2000	-	560,960	554,103
2005	592,100	607,573	591,030
2010	634,800	640,210	617,662
2015	659,900	663,998	641,329
2020	683,500	687,594	670,358
2025	705,700	710,419	695,141
2030	726,800	732,426	-
Average Annual Increase	0.8%	0.9%	0.9%

(1)Projections based on 74 percent of SCAG projections for Ventura County.

(2)Based on the sum of VCOG projections of both growth and non-growth areas of Camarillo, Las Posas, Moorpark, Oak Park, Oxnard, Port Hueneme, Simi Valley, and Thousand Oaks.

2. Dwelling Unit Projections

Dwelling unit projections for the CMWD service area through 2030 are listed in Table 1-4 and shown graphically on Figure 1-4. As with the population projections, dwelling unit projections were obtained from MWD, VCOG, and SCAG. Historic residential growth since 1995 is also shown on Figure 1-4. The VCOG projections are based on the sum of the dwelling unit projections for the following areas: Camarillo, Las Posas, Moorpark, Oak Park, Oxnard, Port Hueneme (including Channel Islands Beach and Naval Base Ventura County), Simi Valley, and Thousand Oaks. These areas are located within CMWD's service area and comprise approximately 72 percent of the total dwelling



Based on 72 percent of SCAG projections for Ventura County

CALLEGUAS	BLACK & VEATCH building a world of difference™	**CMWD 2005 Urban Water Management Plan** **Dwelling Projections**	**Figure 1-4**

projections for Ventura County. This same percentage was used to estimate CMWD's service area dwelling unit projections utilizing SCAG's projections for all of Ventura County. MWD projections are based on the same computer modeling used to forecast population.

Table 1-4

CMWD Service Area Dwelling Unit Projections

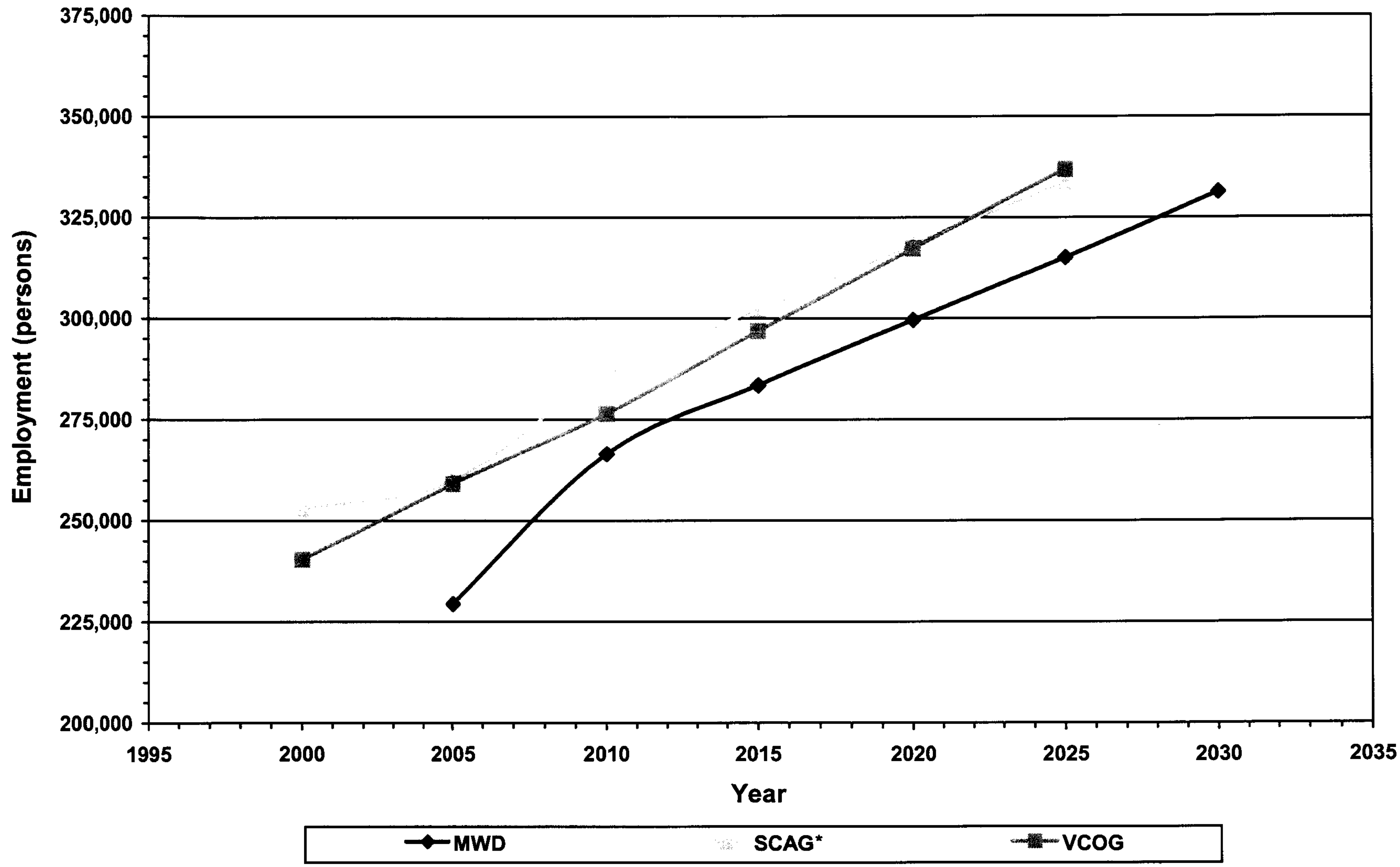
Year	MWD	SCAG(1)	VCOG(2)
2000	-	176,023	183,591
2005	183,500	187,457	195,180
2010	197,100	198,253	206,610
2015	208,000	208,309	215,019
2020	218,700	218,589	225,642
2025	229,200	228,838	234,273
2030	239,600	239,118	-
Average Annual Increase	1.1%	1.0%	1.0%

(1)Projections based on 72 percent of SCAG projections for Ventura County.

(2)Based on the sum of VCOG projections of both growth and non-growth areas of Camarillo, Las Posas, Moorpark, Oak Park, Oxnard, Port Hueneme, Simi Valley, and Thousand Oaks.

3. Employment Projections

Ventura County maintains a skilled labor force. Major industries within the County include agriculture, oil, aerospace, pharmaceutical, tourism, automotive, and military testing and development. Table 1-5 lists the employment projections for the CMWD service area through 2030. These projections are also shown graphically on Figure 1-5. As with the previous projections, employment projections were obtained from MWD, VCOG, and SCAG. The VCOG projections are based on the sum of the employment projections for the following areas: Camarillo, Las Posas, Moorpark, Oak Park, Oxnard, Port Hueneme (including Channel Islands Beach and Naval Base Ventura County), Simi Valley, and Thousand Oaks. These areas are located within CMWD's service area and



*Based on 75 percent of SCAG projections for Ventura County

CALLEGUAS	BLACK & VEATCH building a world of difference	CMWD 2005 Urban Water Management Plan Employment Projections	Figure 1-5

comprise approximately 75 percent of the total employment projections for Ventura County. This same percentage was used to estimate CMWD's service area employment projections utilizing SCAG's projections for all of Ventura County. MWD projections are based on the same computer model as population and dwelling units.

Table 1-5

CMWD Service Area Employment Projections

Year	MWD	SCAG[1]	VCOG[2]
2000	-	252,935	240,285
2005	229,300	260,078	258,987
2010	266,400	286,260	276,369
2015	283,500	302,250	296,789
2020	299,600	318,353	317,199
2025	315,100	333,895	336,814
2030	331,300	349,100	-
Average Annual Increase	1.5%	1.1%	1.4%

(1)Projections based on 75 percent of SCAG projections for Ventura County.

(2)Based on the sum of VCOG projections of both growth and non-growth areas of Camarillo, Las Posas, Moorpark, Oak Park, Oxnard, Port Hueneme, Simi Valley, and Thousand Oaks.

D. Climate

Residents of Ventura County enjoy warm summers and mild winters. High temperatures average 85 degrees Fahrenheit in the summer and low temperatures can drop to 40 degrees Fahrenheit in the winter. Table 1-6 lists the monthly average climatic data for the CMWD service area. The service area receives an average of almost 18 inches of precipitation annually. The majority of this rainfall occurs during the winter months.

Table 1-6

Monthly Average Climatic Data

Month	Monthly Average Evapotranspiration Rate	Monthly Average Maximum Temperature (degrees F)	Monthly Average Minimum Temperature (degrees F)	Monthly Average Total Precipitation (in)
January	1.83	66.5	40.7	4.02
February	2.2	67.9	42.2	4.17
March	3.42	69.1	43.4	2.95
April	4.49	71.8	46.0	1.22
May	5.25	73.4	49.6	0.29
June	5.67	77.0	52.9	0.05
July	5.86	81.6	56.2	0.02
August	5.61	82.5	56.6	0.05
September	4.49	81.4	55.0	0.25
October	3.42	48.2	50.3	0.43
November	2.36	72.7	44.7	1.94
December	1.83	67.6	40.8	2.50
Total	**46.43**	**N/A**	**N/A**	**17.89**

Source: Western Regional Climate Center website www.wrcc.dri.edu.

Chapter 2

Water Supplies and Quality

Chapter 2
Water Supplies and Quality

Southern California's water supply is subject to natural and man-made forces, ranging from drought and earthquakes to environmental regulations and water rights determinations. Some of the challenges facing Southern California with respect to water include:

- Population and resulting urban water demands are increasing.
- A major earthquake could damage the California Aqueduct or the Colorado River Aqueduct (or both), interrupting water supply to the region for up to six months.
- New and increasingly stringent drinking water standards are being promulgated and could further impact the use of local surface and groundwater supplies.
- The demand for water used for environmental purposes is increasing, especially in the San Francisco Bay/Sacramento-San Joaquin Bay Delta (Bay-Delta), reducing the ability to convey water to Southern California.
- California, like much of the west, is susceptible to long periods of drought.
- Recent litigation has reduced Colorado River supplies available to MWD due to Arizona and Nevada using their full allocations.
- Several of the groundwater basins within CMWD's service area are in an overdraft condition.
- Questionable integrity of the levee system within the Bay-Delta.

The economic vitality of Ventura County is contingent upon a dependable water supply. It is therefore imperative to develop a strategy to ensure reliable sources of water supply. This chapter discusses both imported and local supplies of water available to CMWD, as well as the water quality associated with each type of supply.

A. Imported Water

Due to the geographic location of CMWD's service area, CMWD receives SWP water exclusively under normal MWD operating conditions. The SWP is a 600 mile network of reservoirs, aqueducts, and pumping facilities that convey water from the northern Sierra Mountain Range to Southern California. Water is treated by MWD at the Joseph Jensen Filtration Plant in Granada Hills and is delivered to CMWD through MWD's West Valley Feeder No. 2 Pipeline. CMWD's sole connection to MWD is located in the City of Chatsworth at CMWD's East Portal Facility. From this point, water is conveyed 1.3 miles through the Perliter Tunnel into Simi Valley, and then distributed through CMWD's transmission system, injected into the Las Posas aquifer, or stored in Lake Bard.

Water stored in Lake Bard is treated at the Lake Bard Water Treatment Plant (WTP), which has a capacity of 65 million gallons per day (mgd), which is equivalent to 100 cubic feet per second (cfs). The WTP is used during the summer months to supplement imported MWD deliveries to the western part of the CMWD system, and could supply the entire system for short durations if service from MWD is interrupted or reduced due to routine maintenance or emergency.

1. Water Quantity Challenges

The initial facilities of the SWP, completed in the early 1970s, were designed to meet the original needs of the SWP contractors. It was anticipated that additional SWP facilities would be built over time to meet projected increases in contractor delivery needs. However, as decisions on these additional facilities were repeatedly deferred, public attitudes and environmental regulations changed. In addition, the contracted needs for water from the SWP have increased. As a result, the project is not capable of delivering full contractor entitlement each and every year.

The focal point of SWP supplies is the Bay-Delta, the largest estuary on the west coast through which 60 percent of the freshwater used in the State must pass. Years of environmental neglect to this area and political gridlock has resulted in significant environmental damage. In recent years, the Delta smelt, winter-run Chinook salmon, spring-run Chinook salmon, and splittail were added as threatened or endangered species under the federal Endangered Species Act

(ESA). These actions taken to protect the ecosystem of the Bay-Delta, along with others, have placed additional restrictions on SWP operations.

As mentioned previously, CMWD's sole connection to MWD is the West Valley Feeder No. 2 Pipeline. The West Valley Feeder No. 2 Pipeline is capable of delivering up to 300 cfs of water to the East Portal of the Perliter Tunnel. This capacity is insufficient during peak summer demands and Lake Bard is utilized to supplement water demand during these periods. Optimizing local supplies can postpone or eliminate the need for new imported water supply facilities. The reliability of MWD's supply is evaluated in Chapter 5 and contingency planning is discussed in Chapter 6.

2. Water Quality Challenges

SWP water is generally of high quality. Total dissolved solids (TDS) concentrations average 325 milligrams per liter (mg/L). The quality of SWP water as a drinking water source is affected by a number of factors, most notably by seawater intrusion and agricultural drainage from peat soil islands in the Bay-Delta. The water quality parameters of most concern are total organic carbon (TOC), bromide, and salinity. Levels of TOC and bromide increase significantly as water moves through the Bay-Delta. These constituents combine with chemicals used in the water treatment process to form disinfection by-products which are carcinogenic. Wastewater discharged from cities and towns surrounding the Bay-Delta also add salts and pathogens to the water, which affect its suitability for drinking and recycling.

Moreover, actions to protect Bay-Delta fisheries have exacerbated existing water quality problems by forcing SWP diversions to shift from the spring to the fall, when salinity and bromide levels are highest. Closure of the Delta Cross Channel gates to protect migrating fish has also degraded the quality of SWP supplies by reducing the flow of higher quality Sacramento River water.

B. Groundwater

Groundwater has been used in Ventura County for many years, primarily for irrigation, but also for municipal and industrial water supply. The aquifer system has been overdrafted, mostly in the Lower Aquifer System (LAS), which has led to seawater intrusion. Overdrafting of the Upper Aquifer System (UAS) has been significantly reduced in the past few decades through the use of spreading grounds and revised groundwater management policies such as shifting pumping away from the UAS. Two recent reports that discuss regional overdraft conditions are:

- *Simulation of Groundwater / Surface Water Flow in the Santa Clara – Calleguas Groundwater Basin, Ventura County, California*, United States Geological Service, Sacramento Division, 2003.
- *Calleguas Creek Watershed Management Plan, Phase 1 Report*, Rick Alexander Company, November 2004.

1. Fox Canyon Groundwater Management Authority

The Fox Canyon Groundwater Management Agency (GMA) is an independent special agency created in 1983 to oversee Ventura County's groundwater resources. Fox Canyon's boundary is located largely within CMWD's service area. Groundwater pumping outside of Fox Canyon's service area, but within CMWD's service area is not managed or monitored by the GMA, and therefore, pumping records are not available. However, Fox Canyon staff estimates that groundwater outside of Fox Canyon's management area accounts for less than 10 percent of the pumped groundwater in CMWD's service area.

Table 2-1 lists the groundwater basins under management by Fox Canyon and the associated pumping allocation of each basin.

Table 2-1

Fox Canyon GMA
Groundwater Basin Pumping Allocations

Basin Name	Pumping Allocation (acre feet)
East Las Posas	13,109
Oxnard Forebay	10,239
Oxnard Plain	44,805
Pleasant Valley	20,698
Santa Rosa	313
South Las Posas	1,505
West Las Posas	8,815

It is important to note that actual pumping can vary from allocation and credit amounts based on agreements between Fox Canyon GMA and the well owners.

The Fox Canyon GMA has adopted a number of ordinances in an effort to eliminate historic groundwater overdraft, and to combat the ongoing threat of seawater intrusion in both the UAS and LAS within its boundaries. A copy of Ordinance 8.1 is included in Appendix B. These ordinances and resolutions help to regulate, conserve, and manage the use and extraction of groundwater within the region. In addition, the Fox Canyon GMA has developed and implemented a management plan with the objective of balancing the groundwater supply and demand within its jurisdiction by 2010.

2. Groundwater Storage Programs and Transfer Agreements

CMWD utilizes groundwater credits through specific programs and agreements, as discussed below. These include:

- Grimes Allocation
- Groundwater Storage Program (GSP)
- Conejo Creek Diversion Project (CCDP)
- Port Hueneme Agreement
- Oxnard Agreement
- VCWWD No. 19 Groundwater Conservation Agreement

The Grimes Allocation is an annual allocation of groundwater given to CMWD by the Fox Canyon GMA specifically for the District's well field property.

The GSP is intermittently available to participating CMWD purveyors who take imported water from MWD in-lieu of pumping groundwater. The groundwater that is not pumped is then transferred as a credit to CMWD and MWD. In this way, the groundwater can be stored and pumped when it is needed more, such as during peak demand or drought periods. A copy of the approval letter from Fox Canyon GMA for this operation is included in Appendix B.

The CCDP consists of a diversion structure and pipelines that were jointly constructed by CMWD and the Camrosa Water District. The project is owned and operated by Camrosa Water District. Reclaimed wastewater from the City of

Thousand Oaks is diverted from Conejo Creek and used for agricultural and landscape irrigation within the boundaries of the Camrosa Water District. Water that is not used within the Camrosa Water District is provided to Pleasant Valley County Water District for agricultural irrigation in-lieu of groundwater pumping. In return, CMWD receives groundwater credits which are transferred to United Water Conservation District (UWCD) and pumped at a later date for the benefit of municipal and industrial customers on the Oxnard Plain.

When the PHWA annexed into CMWD's service area, PHWA agreed to transfer 700 acre feet in groundwater credits to CMWD each year.

The Oxnard Agreement (also known as the Three Party Agreement) called for a one-time transfer of 2,400 acre feet of groundwater credits to Oxnard by CMWD. It also provided for the 700 acre feet per year to be transferred from PHWA to Oxnard rather than to CMWD.

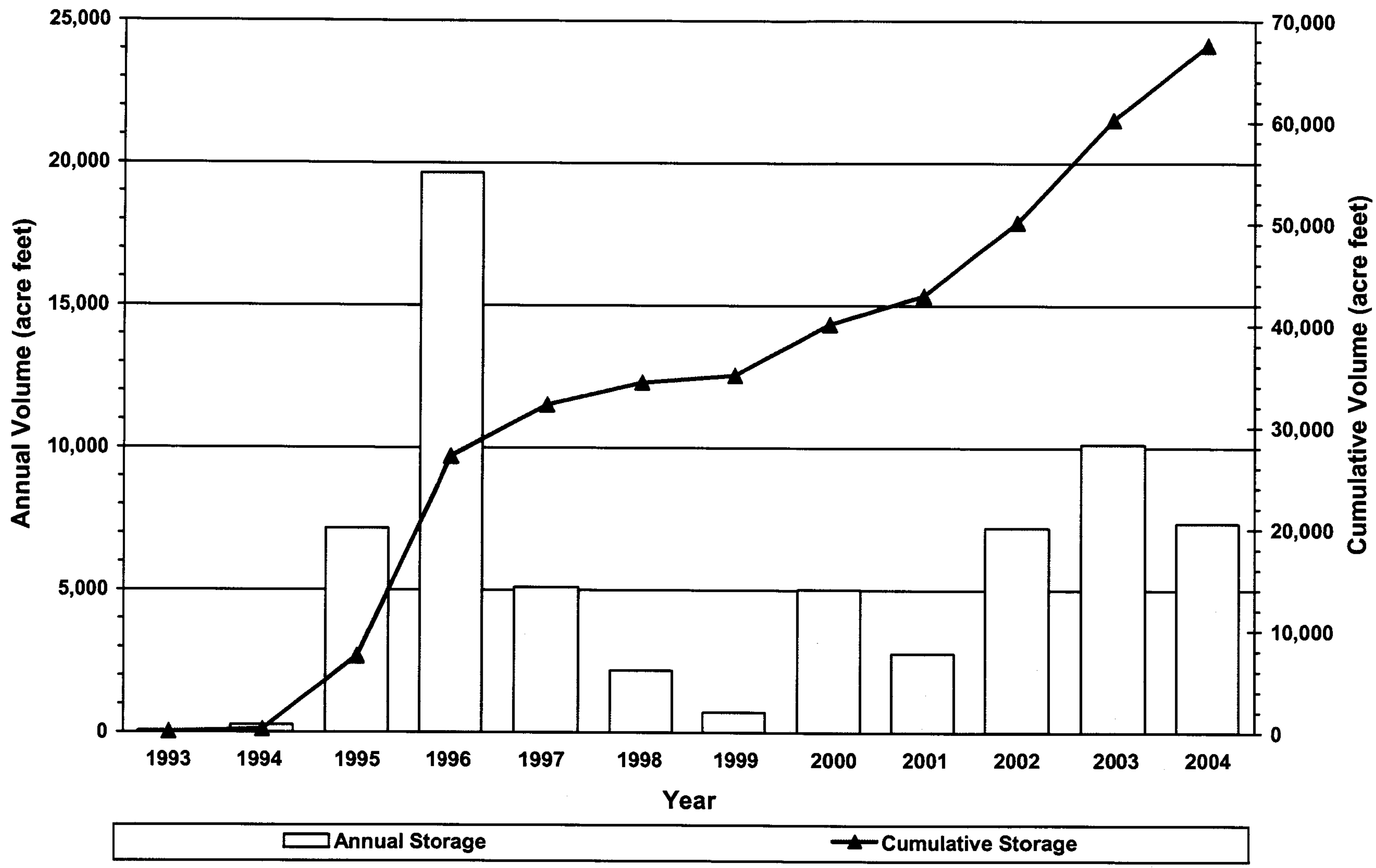
The District 19 Agreement is between VCWWD No. 19 and CMWD. CMWD provides water to District 19 at a discount in exchange for groundwater credits of an equal amount of water.

Figure 2-1 shows the CMWD's accumulated groundwater storage and credits since 1993. Some of this water was injected into Las Posas Wellfield. The majority represents credits gained from a variety of transfers and conjunctive use agreements. As illustrated on Figure 2-1, CMWD's amount of groundwater storage has steadily increased over the recent years.

Further discussion of the Las Posas Wellfield can be found on page 5-9. A description of the groundwater basin utilized by the wellfield is included in Appendix B.

3. Groundwater Quality

Table 2-2 summarizes the groundwater quality by basin in CMWD's service area. This information was obtained from Fox Canyon GMA's website. Groundwater in CMWD's service area is generally high in TDS and occasionally high in nitrate concentrations. It is important to note that water quality within the basins can vary by the location of the sample well, condition of the sample well, and groundwater conditions on the day the sample is taken.



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CMWD 2005 Urban Water Management Plan
Historical Groundwater Data

Figure 2-1

Table 2-2

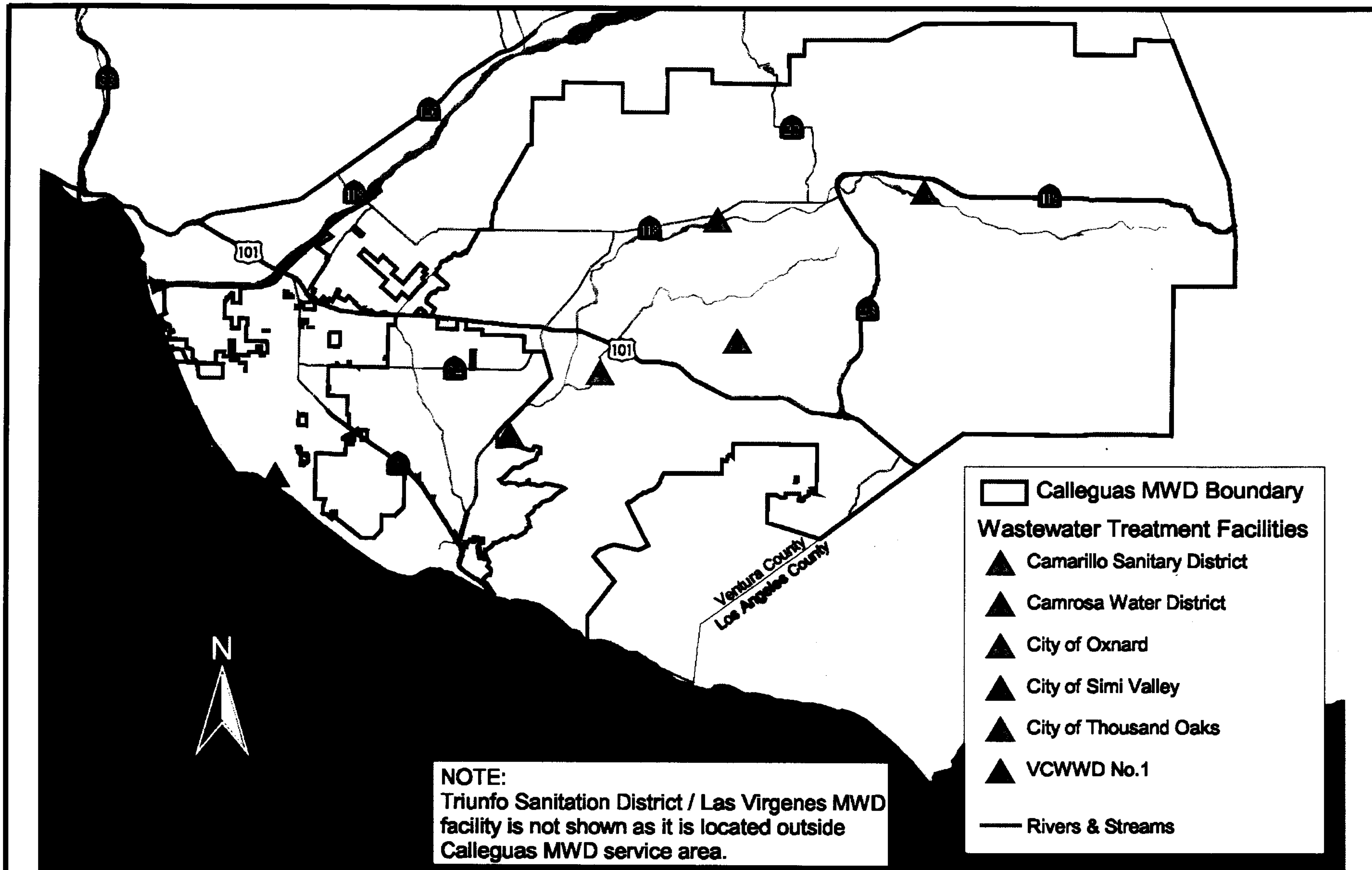
Groundwater Basin Water Quality Summary

Groundwater Basin	Average/ Maximum TDS Level (mg/L)	Maximum Nitrate (NO_3) Level (mg/L)	Main Cations	Main Anions	General Notes
Arroyo Santa Rosa	817 / 1,385	286	Ca Mg	Cl HCO_3 SO_4	High pH (8.2 – 8.6) indicates alkaline or "hard" water.
South Las Posas	709 / 2,318	144	Ca Na	SO_4 HCO_3	Main groundwater recharge is Simi WWTP.
North (East/West) Las Posas	752 / 2,135	186	Ca $CaCO_3$	HCO_3 SO_4	Iron tends to form nodules on well casings and inhibit yield.
Pleasant Valley	1,110 / 3,490	192	Ca Na	Cl SO_4 HCO_3	$CaSO_4$ high in shallow wells, and $CaCO_3$ high in deeper wells.
Oxnard Forebay	N/A / 2,460	222	Ca Mg Na	HCO_3 SO_4 NO_3	High nitrogen and SO_4 levels due to fertilizer applications and high density septic systems.
Oxnard Plain	N/A / 3,535	226	Na Ca Mg	SO_4 HCO_3	Perched water leaking between aquifers. Several wells show TDS levels of 4,000 to 5,000.

N/A – Information not available.

C. Reclaimed Wastewater

There are seven wastewater service providers located in CMWD's service area, as shown on Figure 2-2. It is important to note that CMWD does not treat any wastewater. These service providers are independent of CMWD and therefore, the entire service area of each provider may or may not be within CMWD's service area. Many of these service providers treat wastewater so that it can be reclaimed for non-potable uses such as irrigation of golf courses, street



CALLEGUAS

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CMWD 2005 Urban Water Management Plan
Wastewater Service Providers
in CMWD's Service Area

Figure 2-2

medians, and school athletic fields, and dust abatement. There are a number of issues that local agencies must consider when developing reclaimed water projects. These include economic, financial, institutional, regulatory considerations, water quality, seasonal demands, and public acceptance.

Table 2-3 lists the wastewater service providers located in CMWD's service area, the level of treatment provided, the disposal method for non-reclaimed wastewater effluent, uses of reclaimed wastewater, and methods currently utilized by the service providers to encourage reclaimed wastewater use, as reported by service providers.

Table 2-3

Reclaimed Wastewater in CMWD's Service Area

Wastewater Service Provider	Treatment Level	Method of Disposal for Non-Reclaimed Wastewater	Uses of Reclaimed Wastewater	Methods to Encourage Use
City of Simi Valley	Tertiary	Arroyo Simi	Irrigation, washwater, dust abatement	None
VCWWD No. 1 (Moorpark WWTP)	Tertiary	Percolation Ponds or Arroyo Las Posas(1)	Irrigation	Reuse Water Priced Lower
City of Thousand Oaks (Hill Canyon WWTP)	Tertiary	North Fork of Arroyo Conejo	Irrigation	Reuse Water Priced Lower
Camarillo Sanitary District	Secondary	Conejo Creek	Irrigation	Not applicable
Camrosa Water District	Tertiary	Calleguas Creek(2)	Irrigation	Reuse Water Priced Lower
City of Oxnard	Secondary	Ocean	None	Not applicable
Triunfo Sanitation District/ Las Virgenes MWD	Tertiary	Los Angeles River or Malibu Creek(3)	Irrigation	Reuse Water Priced Lower

(1)Discharge to Arroyo Las Posas is rare and generally only occurs during wet-weather events.

(2)Treated effluent is normally discharged to storage ponds and used for irrigation. Discharge to Calleguas Creek is rare and generally only occurs during wet-weather events.

(3)Triunfo Sanitation District/Las Virgenes are not permitted to discharge into Malibu Creek between April 15th and November 15th.

Although CMWD does not operate any wastewater treatment facilities, it does own and operate some small reclaimed water pipelines. CMWD purchases reclaimed water from Triunfo and Simi Valley and delivers the water to a limited number of customers for irrigation. Additionally, CMWD supports the use of reclaimed wastewater as a financial participant in the CCDP.

Table 2-4 lists the wastewater service providers located in CMWD's service area and their historic and projected wastewater flows through 2030. This information was obtained from the service providers. Detailed quantities of reclaimed water by use type are provided in the individual purveyor's UWMPs.

Table 2-4

Wastewater Treatment in CMWD's Service Area

Wastewater Service Provider	Annual Average Wastewater Flows (acre-feet)						
	2000	2005	2010	2015	2020	2025	2030
City of Simi Valley	10,190	10,300	11,790[1]	13,270[1]	14,760[1]	16,240	N/A
VCWWD No. 1	0	1,680	3,360	3,360	3,360	3,360	3,360
City of Thousand Oaks	11,200	13,440	14,190[1]	14,930[1]	15,680	N/A	N/A
Camarillo Sanitary District	4,140	4,260	5,600	6,160	6,720	N/A	N/A
Camrosa Water District	1,460	1,570	1,870[1]	2,160[1]	2,460	N/A	N/A
City of Oxnard	23,070	26,320	N/A	N/A	N/A	N/A	N/A
Triunfo Sanitation District/ Las Virgenes MWD	9,500	10,000	N/A	N/A	N/A	N/A	N/A

[1]Values based on interpolation.

N/A – Information not available.

Table 2-5 lists the historic and projected available reclaimed wastewater for each service provider through the year 2030. The cities of Simi Valley and Oxnard do not currently have plans to provide significant amounts of reclaimed water to retail customers. However, the City of Oxnard plans to implement its Groundwater Recovery Enhancement and Treatment (GREAT) program. The program will involve the construction of a new regional groundwater desalination facility to serve Oxnard and PHWA, and a recycled water system to serve agricultural water users in the Pleasant Valley area and protection against seawater intrusion. In addition, Oxnard will receive groundwater credits from the Fox Canyon GMA for the injected water. Desalination concentrates will be conveyed through the Brineline to enhance wetlands in the Ormond Beach area.

VCWWD No. 1, the City of Thousand Oaks, the Camarillo Sanitary District, and the Camrosa Water District plan on recycling all of their wastewater, while the Triunfo Sanitary District plans to continue to reclaim a portion of their treated effluent.

Table 2-5

Available Reclaimed Wastewater in CMWD's Service Area

Wastewater Service Provider	Approximate Annual Wastewater Flows (acre-feet)						
	2000	2005	2010	2015	2020	2025	2030
City of Simi Valley	30	60	110	110	110	110	110
VCWWD No. 1	2,310	2,690	4,150	5,600	5,600	5,600	5,600
City of Thousand Oaks[1]	11,200	13,440	14,190[2]	14,930[2]	15,680	N/A	N/A
Camarillo Sanitary District	1,680	1,680	5,600	6,160	6,720	N/A	N/A
Camrosa Water District[1]	1,460	1,570	1,870[2]	2,160[2]	2,460	N/A	N/A
City of Oxnard	0	0	4,029	8,059	12,088	16,117	16,117
Triunfo Sanitation District/ Las Virgenes MWD	6,000	6,500	N/A	N/A	N/A	N/A	N/A

(1)All wastewater is recycled, except what is required to maintain an instream flow of 6 cfs.

(2)Values based on interpolation.

N/A – Information not available.

The information listed above is intended to give an overview of reclaimed wastewater facilities in CMWD's service area. Specific reclaimed water uses and amounts can be found in the UWMPs of CMWD's member purveyors.

D. Projected Water Supplies

Water supply projections have been developed based on two general categories; imported water and local supplies. Local supplies include untreated surface water, groundwater and reclaimed wastewater. Water supply projections were projected for three hydrological scenarios; normal year, dry year, and multiple dry years. The normal year is the expected demand under average hydrologic conditions (based on historic average year conditions from 1922 through 2004), the dry year is the expected demand under the single driest hydrologic year (based on conditions experienced in 1977), and the multiple dry year is the expected demand during a period of three consecutive dry years (based on conditions experienced from 1990 through 1992).

1. Regional Supply Projections

As a regional water wholesaler, MWD evaluates the long term availability of both imported and local water supplies for the entire region. In order to make accurate projections of available water supplies, MWD utilizes a variety of resources including computer models, hydrology information, and input from regional agencies and stakeholders. The following sections present MWD's most recent regional projections for imported and local water supplies.

a. *Imported Supply Projections for MWD's Service Area*

MWD has projected imported water supplies for the region under average, dry, and multiple dry year hydrologic conditions. Table 2-6 summarizes these projections for all three conditions, as well as the percent of supply compared to the average year condition for each year. The imported supplies are provided by a mix of water sources including the State Water Project California Aqueduct and the Colorado River Aqueduct. The supply projections presented in Table 2-6 do not include local water supplies developed from resources located within MWD's service area or water imported by others.

Table 2-6

Imported Supply Projections for MWD Service Area[1]

Hydrologic Condition	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Average Year[2]	2,468,000	2,668,000	2,600,000	2,654,000	2,654,000	2,654,000
Dry Year[3]	2,104,000	2,842,000	3,056,300	3,021,400	3,396,600	2,997,800
% of Average Year	85.3	106.5	117.6	113.8	128.0	113.0
Multiple Dry Years[4]	2,410,000	2,618,100	2,833,300	2,810,900	2,797,100	2,797,100
% of Average Year	97.6	98.1	109.0	105.9	105.4	105.4

(1)Supply projections do not include water from the Los Angeles Aqueduct. MWD considers this water a local supply.

(2)Based on historic average year conditions from 1922 through 2004.

(3)Based on conditions experienced in 1977.

(4)Based on conditions experienced from 1990 through 1992.

Table 2-6 highlights the availability of imported water during dry years. MWD anticipates that in the years 2005 through 2009, only 85 percent of the average year water supply may be available to import during a single dry year, and 98 percent of the average year water supply may be available to import during multiple dry years. MWD anticipates that this may also be true during multiple dry year events from 2010 through 2014. However, between 2005 and 2015, new facilities will be operational and will allow MWD to import more than 100 percent of the average year supply during dry and multiple dry years. As shown in the subsequent demand sections, this additional supply will be needed to meet increased imported water demands that are forecasted during dry periods.

b. Local Supply Projections within MWD's Service Area

In addition to imported water supplies, regional water demands are also met with local water sources including groundwater, captured surface water, reclaimed water, and desalinated water. Imported water from the Los Angeles Aqueduct is also considered a local water supply because it reduces the total imported demand on MWD. Table 2-7 presents MWD's local supply projections for average year hydrologic conditions. Local supply projections for dry and multiple dry years were not provided by MWD.

Table 2-7

Local Supply Projections for MWD Service Area[1]

Hydrologic Condition	(Acre Feet Per Year)					
	2005	2010	2015	2020	2025	2030
Average Year	2,107,600	2,377,400	2,465,900	2,593,300	2,613,500	2,612,100

[1]Includes imported water from the Los Angeles Aqueduct.

Note: Local supply projections for dry and multiple dry year conditions were not provided by MWD.

2. Supply Projections for CMWD's Service Area

Tables 2-6 and 2-7 present the supplies available to the entire region served by MWD. This section focuses on the projected water supplies available to CMWD.

a. Imported Supply Projections for CMWD's Service Area

Table 2-8 lists the quantity of water MWD estimates will be available to CMWD during average, dry and multiple dry year scenarios. Average imported demands were supplied by MWD. Dry and multiple dry year demands were estimated based on the percentage of imported water that MWD anticipates being able to supply to its service area, as listed in Table 2-6.

It is important to note that MWD is committed to meeting demands and therefore equates supplies to match demands for each member agency. However, to ensure adequate supplies are available to meet demands, potential reserve supplies are also presented in all MWD regional supply projections. Potential quantities of reserves are discussed in more detail in Chapter 5.

Table 2-8

MWD's Imported Supply Projections for CMWD's Service Area

Hydrologic Condition	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Average Year	125,800	138,200	146,300	155,600	162,800	170,100
Dry Year(1)	107,300	147,200	172,000	177,100	208,400	192,200
Multiple Dry Years(1)	122,800	135,600	159,500	164,800	171,600	179,300

(1)Based on the percentage of imported water MWD anticipates being able to supply to its service area, as listed in Table 2-6.

b. Local Supply Projections within CMWD Service Area

Table 2-9 presents local supply projections estimated by MWD for the CMWD service area. MWD projections are based on computer modeling that considers both existing and potential future local supplies. When predicting future local water supplies, MWD considers that not all water supply projects being contemplated will become an actual water source and the projections take into account variables such as allocated funding, engineering status, and environmental documentation. Local supply projections for dry and multiple dry years were not provided by MWD.

Table 2-9

MWD's Local Supply Projections for CMWD's Service Area

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Average Year	38,300	44,000	43,600	43,000	43,000	43,000

Note: Local supply projections for dry and multiple dry year conditions were not provided by MWD.

Tables 2-10 through 2-12 list CMWD's local supply projections by source for each hydrologic condition. CMWD projections were developed in conjunction with the CMWD purveyors and consider the historic yield of existing local supplies and the anticipated yield of future local supplies.

Table 2-10

CMWD's Local Supply Use and Projections for Average Year Conditions[1]

Hydrologic Condition	(Acre Feet Per Year)						
	2004	2005	2010	2015	2020	2025	2030
CMWD Sources							
Imported Reclaimed Wastewater[2]	1,555	1,544	1,550	1,581	1,597	1,619	1,635
Member Purveyor Sources							
Potable Groundwater	39,417[3]	32,914	25,306	25,941	26,117	18,744	23,883
Desalinated Brackish Groundwater	[3]	4,750	16,050	19,775	20,500	28,700	28,950
Reclaimed Wastewater	677	2,132	7,321	11,500	15,683	19,864	20,021
Untreated Surface Water	2,375	2,150	2,703	3,409	4,115	5,190	6,265
Non-Potable Groundwater	[3]	6,772	7,649	8,135	8,656	8,797	8,976
Total	44,024	50,262	60,579	70,341	76,668	82,914	89,730

[1]Includes reclaimed wastewater and groundwater pumping associated with the CCDP.

[2]Reclaimed wastewater purchased from Triunfo and Simi Valley and delivered for irrigation.

[3]2004 data was not broken out between potable, desalinated brackish, and non-potable groundwater. Amount listed under potable groundwater is the total of all three categories.

As discussed previously, CMWD is a financial participant in the CCDP. The City of Thousand Oaks discharges treated wastewater effluent from the Hill Canyon Wastewater Treatment Plant (WWTP) into Conejo Creek. It is captured a few miles downstream at the Conejo Creek diversion structure. Camrosa Water District distributes some of the diverted water through its reclaimed water distribution system and that portion of the recaptured water is reflected in Camrosa's projected supply of untreated surface water. The balance of the diverted water flows through a CMWD pipeline to agricultural customers outside of CMWD's service area where it is used in lieu of groundwater pumping. In return, Fox Canyon GMA provides groundwater credits to CMWD equal to the amount of water delivered by the pipeline. By agreement, those credits are transferred to the City of Oxnard and when needed, the water is pumped for Oxnard from wells operated by UWCD. This component of the water captured by the Conejo Creek Diversion is accounted for in the City of Oxnard's projections of groundwater supplies.

Table 2-11

CMWD's Local Supply Projections for Dry Year Conditions(1)

Hydrologic Condition	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
CMWD Sources						
Imported Reclaimed Wastewater	1,609	1,620	1,646	1,677	1,694	1,719
Member Purveyor Sources						
Potable Groundwater	32,862	25,301	25,931	26,097	18,719	23,820
Desalinated Brackish Groundwater	4,750	16,050	19,775	20,500	28,700	28,950
Reclaimed Wastewater	2,117	7,301	11,485	15,663	19,849	20,001
Untreated Surface Water	2,150	2,703	3,409	4,115	5,190	6,265
Non-Potable Groundwater	5,572	6,370	6,741	7,111	7,111	7,111
Total	49,060	59,345	68,987	75,163	81,263	87,866

(1)Includes reclaimed wastewater and groundwater pumping associated with the CCDP.

Table 2-12

CMWD's Local Supply Projections for Multiple Dry Year Conditions[1]

Hydrologic Condition	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
CMWD Sources						
Imported Reclaimed Wastewater	1,609	1,620	1,646	1,677	1,694	1,815
Member Purveyor Sources						
Potable Groundwater	32,252	25,998	28,133	28,304	20,921	26,050
Desalinated Brackish Groundwater	4,750	15,490	19,180	19,870	28,070	28,320
Reclaimed Wastewater	2,117	7,301	11,485	15,663	19,849	20,001
Untreated Surface Water	2,150	2,703	3,409	4,115	5,190	6,265
Non-Potable Groundwater	6,592	7,548	8,110	8,631	8,772	8,926
Total	49,470	60,660	71,963	78,260	84,496	91,377

(1)Includes reclaimed wastewater and groundwater pumping associated with the CCDP.

In 2004, CMWD purveyors utilized approximately 44,000 acre feet of local water supplies. Comparing Table 2-9 to Table 2-10 indicates that CMWD's purveyors expect to utilize more local supply sources than what is projected by MWD. This may be due to differences in what MWD and CMWD consider proposed local supply projects.

E. Regional Water Supply Programs

MWD's strategy for meeting increasing water demands in its service area includes the implementation of both regional and local supply augmentation and demand management programs. CMWD's Board of Directors recognizes that these programs are essential to reduce the reliance on imported water deliveries.

In 1995, MWD and its member agencies developed an Integrated Resources Plan (IRP) to meet the region's present and future needs for dependable supplies of high quality water. The primary goal of the IRP was to identify a preferred resource mix of local water resources, imported supplies, and demand-side management programs to meet the region's reliability objectives. It is anticipated that water shortages similar to those experienced in 1991 will occur less than once every 50 years once the IRP is fully implemented.

A description of current MWD efforts to develop new and alternative water supplies is given below.

1. Recycling

In the 1990s, the United States Bureau of Reclamation, in conjunction with MWD, the California Department of Water Resources, and six other Southern California water agencies, studied the feasibility of regional water reclamation projects in Southern California. This study identified 34 potential regional projects within MWD's service area with an estimated yield for 450,000 acre feet per year. Approximately 30 percent of the reclaimed water in MWD's service area is used for groundwater replenishment and seawater barriers.

2. Seawater Desalination

MWD's IRP Update includes a target of up to 150,000 acre feet per year of seawater desalination by 2025. As a first step, MWD has issued a competitive request for proposals through its Seawater Desalination Program (SDP), targeting 50,000 acre feet per year of desalinated seawater. This proposal includes financial assistance from MWD of up to $250 per acre foot per year for up to 25 years.

3. Competitive Local Resources Program

The primary goal of the Competitive Local Resources Program (LRP) is to support the development of cost-effective water recycling and groundwater recovery projects that reduce demands for imported supplies. Thirteen projects were selected in 2004 for financial incentives of up to $250 per acre foot per year for up to 25 years. These projects will yield approximately 65,000 acre feet per year.

4. Storage and Groundwater Management Programs

Diamond Valley Lake was constructed in 1999 and holds 800,000 acre feet of water. Some of this water will be used for dry year storage and the remainder for emergency storage. In addition, MWD has operational control of approximately 219,000 acre feet of water in reservoirs at the southern terminals of the California Aqueduct, which provide greater flexibility in handling supply shortages.

In addition to surface water storage, MWD delivers replenishment water to member agencies. The member agency then delivers this water in-lieu of utilizing water from local sources. The deferred local production allows water to be left in local storage for future use. MWD also delivers water directly to water storage facilities, including spreading sites and injection wells for groundwater replenishment. These programs increase supply availability and improve MWD's operational flexibility, thus allowing it to better manage out-of-region supply and storage programs to meet dry year needs.

MWD has an agreement with CMWD to store up to 210,000 acre feet of water in the North Las Posas Groundwater Basin for aquifer storage and recovery (ASR). The intent of this project is that this water will be used exclusively by CMWD. The remaining 90,000 acre feet of capacity may be used by CMWD. Phase 1 has been completed and 18 wells are currently online.

Through Proposition 13, MWD received $45 million to help fund the Southern California Water Supply Reliability Projects Program. This money is being used to fund eight conjunctive use projects that will provide approximately 195,000 acre feet of additional storage. In addition, a conjunctive use program in Raymond Basin is expected to yield 25,000 acre feet of water per year by 2010.

5. Central Valley Transfer and Storage

MWD currently has eight Central Valley Project (CVP)/SWP transfer and storage programs, and three more under development. The agencies involved in these programs include Semitropic Water Storage District, Arvin-Edison Water Storage District, San Bernardino Valley Municipal Water District, Kern-Delta Water District, Desert Water Agency, and Coachella Valley Water District. These programs are expected to provide approximately 396,000 acre feet of dry-year water supply.

6. Colorado River Aqueduct

MWD has implemented several programs related to the Colorado River Aqueduct (CRA), including:

- A conservation agreement between MWD and the Imperial Irrigation District, which guarantees MWD at least 80,000 acre feet of water per year.
- The Coachella and All-American Canal Lining Projects, which are expected to conserve 26,000 and 67,700 acre feet of water per year, respectively.
- A 35-year land management, crop rotation, and water supply program with the Palo Verde Irrigation District that is estimated to provide up to 111,000 acre feet of water per year, when the program is fully implemented.
- The Hayfield Groundwater Storage Program will eventually allow approximately 500,000 acre feet of CRA water to be stored in the Hayfield Groundwater Basin for future withdrawal.

F. Local Supply Programs

CMWD has focused its planning efforts on more efficient use of existing supplies and maximization of local water resources. Working cooperatively with local agencies, CMWD supports a number of local recycling and groundwater recovery projects to offset increasing imported water demands. The projects described below include a combination of wastewater reclamation, brackish groundwater recovery, and regional salinity management programs. It is important to note that the effect of each of these projects on groundwater resources and environmental compliance must be evaluated and approved before they can be implemented.

1. Regional Recycling Projects

CMWD is working with local agencies to implement a regional water recycling program. As discussed above, reclaimed wastewater is used for beneficial use applications including agricultural and non-agricultural irrigation, industrial use, and groundwater recharge.

a. Simi Valley Regional Recycled Water System

The Simi Valley Regional Recycled Water System would involve the construction of new reclaimed water distribution facilities including pipelines and two new reservoirs that would serve major users within the District's service area. The project would connect with the existing reclaimed water infrastructure. The proposed facilities would deliver tertiary effluent from the Simi Valley Water Quality Control Plant. It is estimated that almost 2,000 acre feet per year of reclaimed water could be delivered upon completion of the project for both existing and planned future users.

b. VCWWD No. 1 Reclaimed Water Distribution System Expansion

The Moorpark Wastewater Treatment Plant is operated by VCWWD No. 1 and has a secondary treatment capacity of 3.0 mgd and tertiary treatment capacity of up 1.5 mgd. Currently, reclaimed water is being provided to one golf course.

The proposed project is intended to expand District's reclaimed water distribution system to provide reclaimed water for agricultural and/or additional landscape irrigation. The proposed project includes construction of a single reservoir and pipelines to distribute reclaimed water in lieu of potable water, where possible.

2. Calleguas Regional Salinity Management Project (Brineline)

CMWD, working with other agencies and stakeholders, initiated the implementation of the Calleguas Regional Salinity Management Project (Brineline) to manage the use of both treated municipal wastewater and high salinity groundwater. This project will facilitate the beneficial use of up to 45,000 acre feet of local water resources per year for domestic and agricultural use, thus reducing the need to import water to the region.

The Brineline will consist of a pipeline system to collect treated wastewater and brine concentrates from municipal wastewater treatment plants, groundwater treatment facilities (both municipal and agricultural), and industrial operations located within the Calleguas Watershed, and convey the effluent to other areas for direct use (e.g., suitable agricultural uses and wetland applications) or an existing ocean outfall. Operation of the facilities will substantially reduce the amount of salts released into the watershed, and over time, reduce salt concentrations in surface waters and groundwaters within the watershed.

The alignment of the proposed pipeline system will extend approximately 32 miles from its upstream end in the City of Simi Valley to its downstream terminus near Ormond Beach in the City of Oxnard. The pipeline will pass through the cities of Simi Valley, Moorpark, Camarillo, Oxnard, and portions of unincorporated Ventura County. Along its route, the Brineline will receive discharges of tertiary treated effluent from several wastewater treatment plants (Camrosa Wastewater Reclamation Facility, Camarillo Sanitary District Water Reclamation Plant, Moorpark WWTP, and Hill Canyon Wastewater Treatment Plant), and brine waste from several proposed desalters (including the Camarillo Groundwater Treatment Facility, South Las Posas Basin Desalter, Somis Desalter, West Simi Desalter, and two in the Renewable Water Resource Management Program for the Southern Reaches of Calleguas Creek Watershed).

To date, Calleguas has constructed approximately 20,000 linear feet of 54-inch high density polyethylene (HDPE) pipe, which comprises Phase 1A. Phase 1B, which includes another 9,000 linear feet of 54-inch HDPE pipe, is currently under design. Phase 1C will connect Phases 1A and 1B with an existing ocean outfall at the Reliant Energy Ormond Beach Power Plant for ocean discharge. Future phases will extend the Brineline up through the watershed, roughly paralleling Calleguas Creek, to enable additional facilities to connect to the Brineline for discharge.

3. Brackish Groundwater Recovery Projects

Brackish groundwater recovery projects reclaim poor water quality groundwater. A major benefit of the recovery projects is that they use groundwater that would otherwise remain unusable. As a result, these projects will increase the availability and reliability of the regional local water supply.

a. Camarillo Groundwater Treatment Facility

Camarillo currently delivers a combination of local groundwater and imported water to its customers. Despite the availability of groundwater extraction rights, the relatively high TDS, chloride, iron, and manganese concentrations in the groundwater require that it be blended with imported water before it can be used for potable purposes. Declining water quality in the Pleasant Valley Groundwater Basin has reduced the effectiveness of blending, such that Camarillo has removed one of its wells from regular service and decreased pumping from the remaining two wells. As a result, Camarillo has not pumped its full Fox Canyon GMA allocation over the past few years and has increased its use of imported water.

The Camarillo Groundwater Treatment Facility would treat brackish water that is currently unusable, thus increasing water supply reliability. The facility would provide reverse osmosis (RO) treatment and have a capacity of 4 mgd. Brine waste, containing concentrated salts from the RO process, would be discharged to the Brineline and disposed of via an ocean outfall.

In addition, Camarillo has proposed to construct two booster pumping stations. These pumping stations would enable Camarillo to serve areas that currently can only be supplied with imported water with treated groundwater from the new facility instead. This could reduce Camarillo's reliance on imported water by up to 1,000 acre feet per year.

b. South Las Posas Basin Regional Desalter

The South Las Posas Groundwater Basin has been virtually full since 1983. Despite the availability of water and the presence of potential users, the relatively high TDS and chloride concentrations in the groundwater require that the water be treated before it can be for potable purposes.

The South Las Posas Basin Regional Desalter would be a 5 mgd brackish groundwater treatment facility. RO treatment technology would be used to produce potable quality water. Brine waste would be discharged to the Brineline and disposed of via an ocean outfall.

c. West Simi Desalter

VCWWD No. 8 operates five dewatering wells in the western portion of the City of Simi Valley to lower the groundwater table and relieve nuisance water to houses and other occupied structures. Approximately 3 mgd are pumped and discharged to the Arroyo Simi. Due to its saline quality, the Simi Valley Groundwater Basin has never been utilized as a potential source of potable water by the City. Despite the availability of water and the presence of potential users, the relatively high TDS and chloride concentrations in the groundwater require that the water be treated before it can be used for potable purposes.

With construction of the West Simi Desalter, VCWWD No. 8 could capture this brackish water for treatment (desalination) and beneficial use as potable water.

The West Simi Desalter would be a brackish groundwater treatment facility with a capacity of 3 mgd. Groundwater pumped from the five dewatering wells would be conveyed to a central location, where the desalter would use RO treatment technology to produce potable quality water. Brine waste would be discharged to the Brineline and disposed of via an ocean outfall.

d. Somis Desalter

This Somis Desalter would be a brackish groundwater treatment facility, similar to the South Las Posas Basin Regional Desalter. The Somis Desalter would have a capacity of 2 mgd and be owned and operated by VCWWD No. 19. The Somis Desalter is expected to be constructed after the South Las Posas Basin Regional Desalter is completed. RO treatment technology would be used to produce potable quality water. Brine waste would be discharged to the Brineline and disposed of via an ocean outfall.

4. Renewable Water Resources Management Program

The Renewable Water Resource Management Program for the Southern Reaches of Calleguas Creek Watershed (RWRMP) is an integrated set of facilities to reduce the reliance on imported water supplies while improving water quality through the managed transport of salts out of the watershed. There are three major elements to the project: water resource reclamation, salts management, and adaptive management. This project seeks to increase water resources while moving toward a net daily salts balance. The RWRMP is a joint effort among the Camrosa Water District, Camarillo Sanitary District, and the City of Thousand Oaks.

The RWRMP reduces reliance on imported water and overdrafted confined groundwater aquifers by expanding water recycling and reclaiming poor quality, unconfined groundwater supplies. The RWRMP facilities will also improve the quality of water supporting the riparian environment and groundwater recharge and increase the water quality options for agricultural users. The RWRMP seeks to manage salts through a systems approach. To the extent possible, the RWRMP will address the salt imbalance through the following:

- Reducing salts introduced into the watershed.
- Removing salts currently disposed into the watershed.
- Distributing water to move salts down-gradient and out of the watershed.
- Introducing high quality water to increase the watershed's capacity to carry salts that cannot otherwise be intercepted.
- Capturing and disposing of concentrated salts that would not otherwise move out of the watershed.

In order to evaluate the RWRMP's ongoing effect on sub-watershed salt balances, a monitoring and adaptive management element is included. The initial phase will include the establishment of automated monitoring points on Calleguas Creek to measure flow and salt concentrations. By collecting data on an ongoing basis, the agencies can track and evaluate how best to move additional salts out of the watershed. Data and analysis results and conclusions will be shared with stakeholders through the Calleguas Creek Watershed planning process. The RWRMP is designed to be implemented incrementally so that water quality impacts and future actions can be evaluated at each phase, as described below.

Phase 1 focuses on increasing reclaimed water use, reducing salt inputs to surface waters, and constructing facilities to transport salts out of the watershed. Phase 2 will expand groundwater treatment and recycled water distribution facilities, and initiate water releases to the Arroyo Conejo Creek system in anticipation of termination of discharge by the Hill Canyon WWTP to the North Fork of the Arroyo Conejo (Phase 3). Phase 3 will focus on terminating discharge of effluent from the Hill Canyon WWTP into Arroyo Conejo and introducing it directly into the Camrosa recycled/non-potable water distribution system for agricultural irrigation purposes. Finally, Phase 4 focuses on pumping brackish groundwater to transport salts out of the watershed.

Chapter 3

Water Use and Demands

Chapter 3
Water Use and Demands

This chapter addresses water use characteristics and projected imported water demands on CMWD.

A. Water Use

Figure 3-1 shows the distribution of the CMWD's purveyors with respect to projected average water deliveries. As illustrated on Figure 3-1, CMWD's largest customer is the City of Simi Valley, which accounts for approximately one-quarter of the water distributed by CMWD.

Municipal and industrial uses are expected to account for approximately 90 percent of the water distributed by CMWD's purveyors through the planning period. This percentage is forecasted to increase slightly through the planning period, from 89 to 93 percent as a result of continual urban growth. Agricultural uses are expected to account for approximately 10 percent of the water distributed by CMWD's purveyors. This percentage is forecasted to decrease slightly through the planning period, from 11 to 7 percent due to the impact of urban growth.

MWD has also estimated water use by four different sectors for CMWD's service area as listed in Table 3-1.

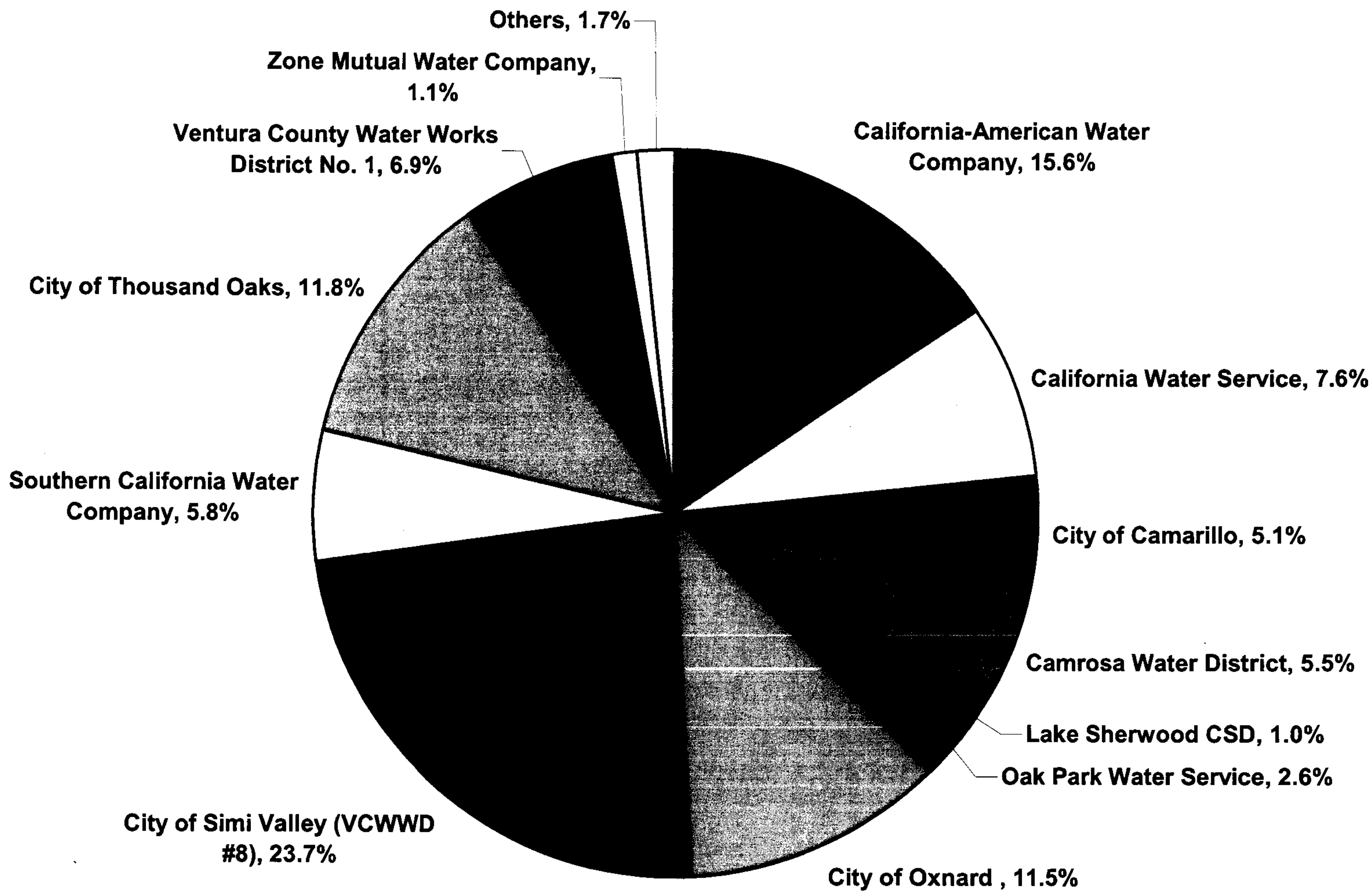
Table 3-1

CMWD's Water Use by Sector (Estimated by MWD)[1]

Sector	Percentage
Single Family	56.6
Multi-Family	7.9
Non-Residential	27.7
Unmetered and System Losses[2]	7.8

[1]A detailed breakdown of water use by sector is provided in individual purveyor UWMPs.

[2]Includes system losses in CMWD's and its purveyor's systems.



Distribution based on normal year demands

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CMWD 2005 Urban Water Management Plan
Approximate Purveyor Distribution

Figure 3-1

B. Demand Projections

This section discusses demand projections for the CMWD service area. Demand projections were developed by both MWD and CMWD in conjunction with their member purveyors.

1. Total Demand Projections for CMWD's Service Area

Similar to the local supply projections, water demand for the CMWD service area were projected for three hydrological scenarios; normal year, dry year, and multiple dry years. The normal year is the expected demand under average hydrologic conditions, the dry year is the expected demand under the single driest hydrologic year, and the multiple dry year is the expected demand during a period of three consecutive dry years.

MWD projections were developed utilizing the MWD-MAIN Water Use Forecasting System and are shown in Table 3-2. This model incorporates demographic and economic projections from regional planning agencies, along with conservation and end uses. Demand projections for dry and multiple dry years were not provided by MWD.

Table 3-2

MWD's Total Demand Projections for CMWD's Service Area(1), (2)

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Average Year	164,100	182,100	189,900	198,600	205,800	213,100

(1)Considers demand reduction due to conservation.

(2)Includes an allotment of 1,900 acre feet per year for groundwater replenishment.

CMWD's demand projections represent a summary of forecasts by individual member purveyors. Each purveyor has considered expected population growth and planned land use in its service area. These projections are listed in Table 3-3. Individual purveyor projections are listed in Appendix C.

Data from 2000 through 2004 indicate that water loss through CMWD's distribution system is approximately 0.05 percent. This amount of water loss is below the threshold of metering accuracy and is considered negligible when looking at CMWD's demand projections.

Table 3-3

CMWD's Total Demand Projections[1]

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Average Year[2]	173,127	186,041	200,570	212,239	222,795	234,267
Dry Year	177,004	190,612	205,449	217,504	228,256	239,973
Multiple Dry Years	179,388	193,599	208,874	221,353	232,515	244,606

[1]Considers demand reduction due to conservation.

[2]Includes an allotment of 1,900 acre feet per year for groundwater replenishment.

As expected, demands increase slightly during dryer years. Demands increase approximately 3 percent during single dry year scenarios and 5 percent during multiple dry year scenarios. Similar to the average year demands, the dry year demands will be met with a combination of local supplies and imported water supplies.

The projected demands presented in Tables 3-2 and 3-3 consider the on-going and future benefits from water conservation-related programs. CMWD is a member of the California Urban Water Conservation Council (CUWCC) and has been implementing water conservation Best Management Practices (BMPs) since the early 1990s. These BMPs are discussed in more detail in Chapter 4. CMWD's recent CUWCC reports are also shown in Appendix D.

MWD total demand projections for CMWD's service area are less than CMWD's projections. The discrepancy between the water demands shown in Tables 3-2 and 3-3 may help explain the discrepancy in local supply projections shown in Tables 2-9 and 2-10. It is possible that there are water demands in CMWD's service area that are not included in the MWD demand projections and that these demands are met with local water supplies that are not included in the MWD local supply projections. However, as shown in the following section, imported water demands for CMWD's service area are similar for both MWD's and CMWD's projections.

2. Imported Demand Projections for CMWD's Service Area

Both MWD and CMWD have estimated CMWD's need for imported water based on the following formula:

CMWD Imported Demand = Total CMWD Demands – Local Supplies in CMWD Service Area

The imported water demands are the local demands for the CMWD region minus the local supplies. Tables 3-4 and 3-5 present the estimated imported water demands based on MWD and CMWD projections for average year conditions.

Table 3-4

MWD's Imported Demand Projections for CMWD's Service Area For Average Year Conditions

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Total Demand[1]	164,100	182,100	189,900	198,600	205,800	213,100
Local Supply	38,300	44,000	43,600	43,000	43,000	43,000
Imported Demand[2]	125,800	138,200	146,300	155,600	162,800	170,100

[1]Includes an allotment of 1,900 acre feet per year for groundwater replenishment.

[2]Equals the imported water supply allocated to CMWD, as shown in Table 2-8 and as presented in MWD's 2005 Draft UWMP.

Table 3-5

CMWD's Imported Demand Projections For Average Year Conditions[1]

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Total Demand	173,127	186,041	200,570	212,239	222,795	234,267
Local Supply	50,262	60,579	70,341	76,668	82,914	89,730
Imported Demand	122,865	125,462	130,229	135,571	139,881	144,537

[1]Includes an allotment of 1,900 acre feet per year for groundwater replenishment.

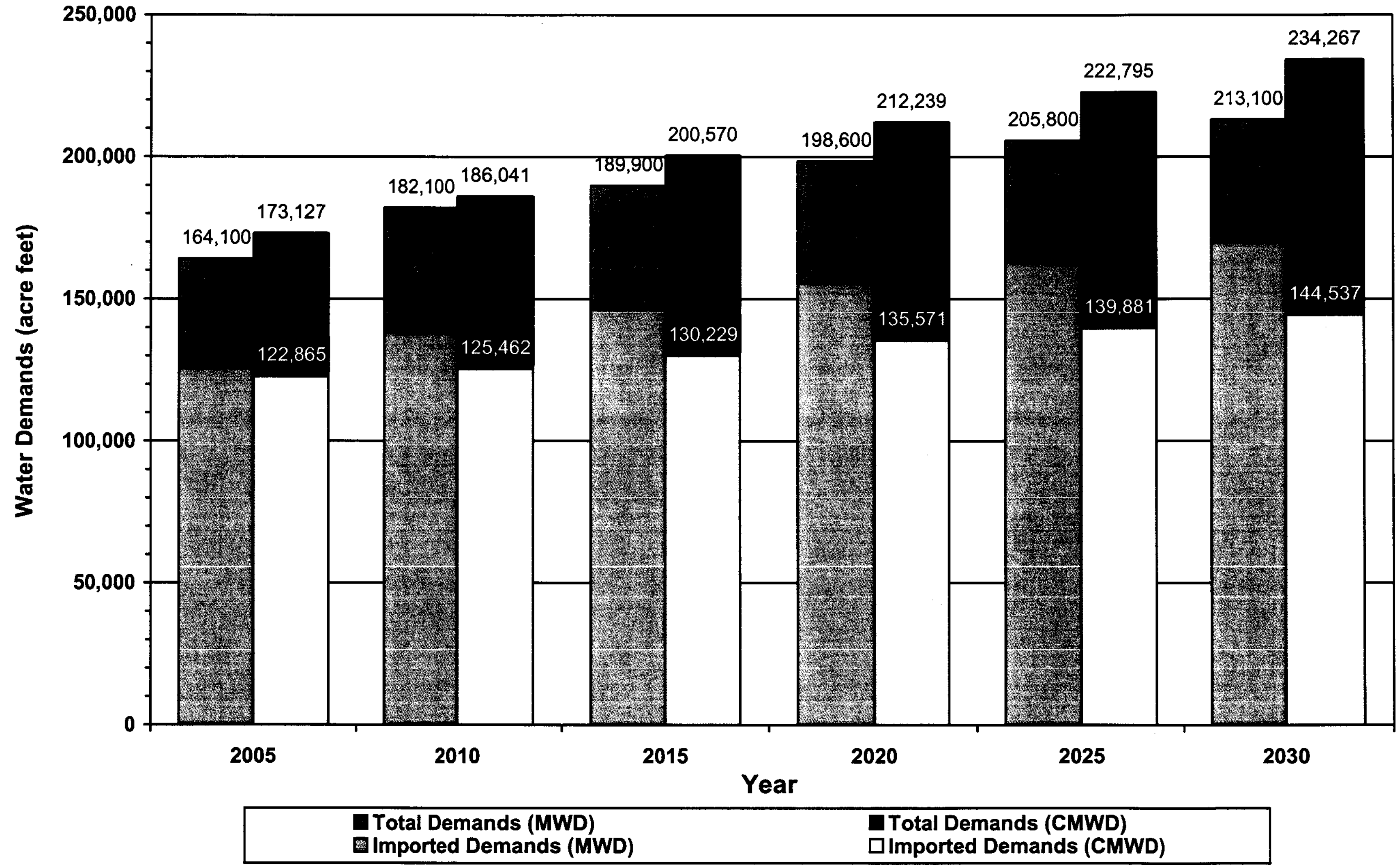
As shown in Tables 3-4 and 3-5, the higher CMWD demand projections are off-set by the higher local supply projections. As stated above, there are likely some water demands in CMWD's service area that are not included in the MWD demand projections. However, because these demands are met with local water supplies, the imported water demands predicted by both agencies are similar. These projections are shown graphically on Figure 3-2.

Tables 3-6 and 3-7 show CMWD's imported demand projections for single dry and multiple dry year conditions.

Table 3-6

CMWD's Imported Demand Projections For Single Dry Year Conditions

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Total Demand	177,004	190,612	205,449	217,504	228,256	239,973
Local Supply	49,060	59,345	68,987	75,163	81,263	87,866
Imported Demand	127,944	131,267	136,462	142,341	146,993	152,107



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CMWD 2005 Urban Water Management Plan
Total and Imported Average Year
Water Demand Projections

Figure 3-2

Table 3-7

CMWD's Imported Demand Projections For Multiple Dry Year Conditions

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Total Demand	179,388	193,599	208,874	221,353	232,515	244,606
Local Supply	49,470	60,660	71,963	78,260	84,496	91,377
Imported Demand	129,918	132,939	136,911	143,093	148,019	153,229

3. Comparison of CMWD's Imported Demand Projections

MWD demand projections shown in Table 3-4 are based on its MWD-MAIN model that considers social and economic data, as well as typical weather conditions. CMWD demand projections shown in Table 3-5 are based on information from CMWD's member purveyors. Table 3-8 shows how these projections compare to previous CMWD demand projections for average year conditions.

Table 3-8

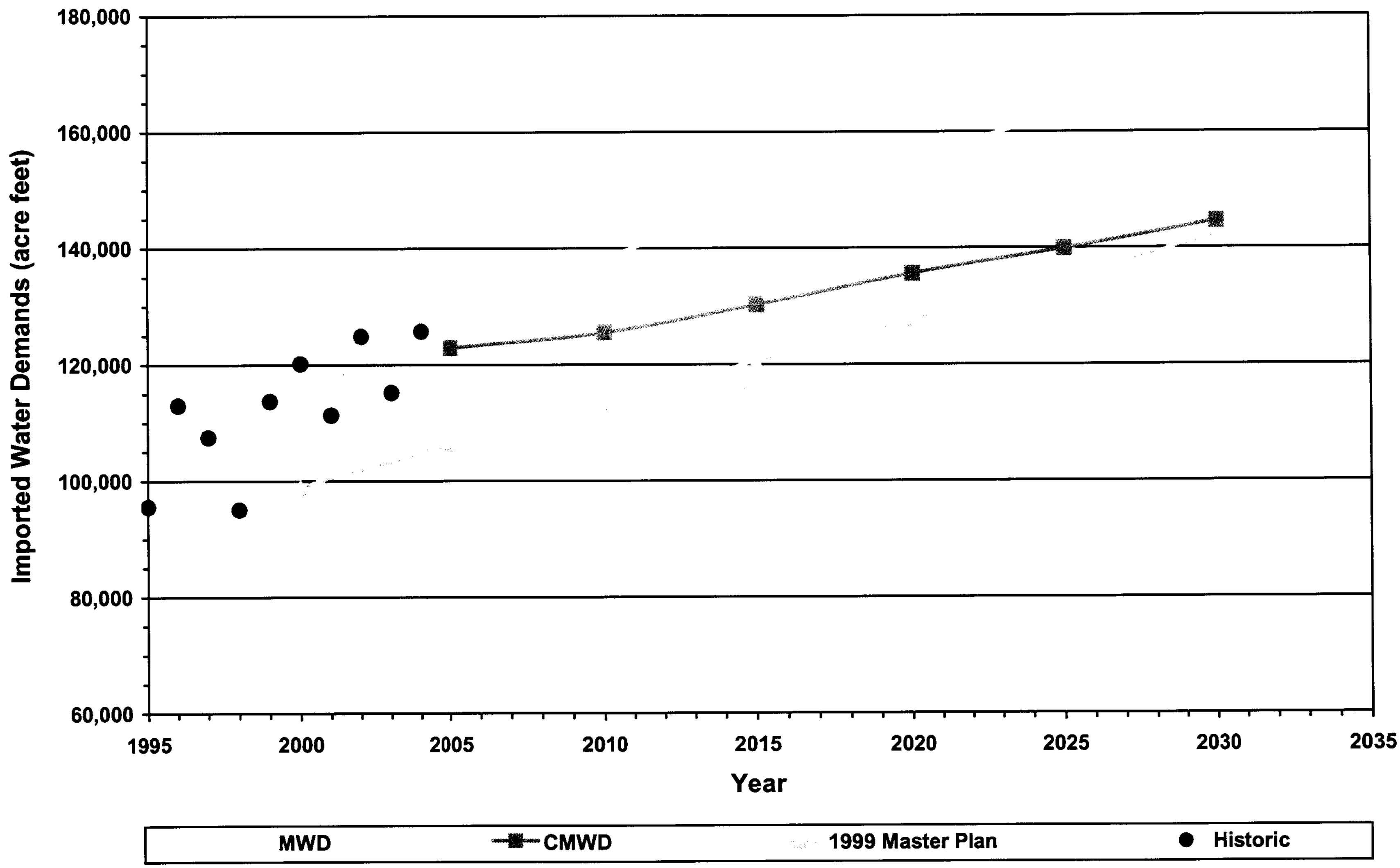
Comparison of CMWD Imported Water Demand Projections for Average Year Conditions

Year	MWD	CMWD	1999 Master Plan
2005	125,800	122,865	106,400
2010	138,200	125,462	113,600
2015	146,300	130,229	120,400
2020	155,600	135,571	127,800
2025	162,800	139,881	136,500(1)
2030	170,100	144,537	145,800(1)
Average Annual Increase	1.2%	0.7%	1.3%

(1)Based on extrapolation.

These projections are also shown graphically on Figure 3-3, along with historic water sales. The projected annual average increase for CMWD's service area is approximately 0.7 percent. The projections by CMWD and the 1999 Water Master Plan, prepared by Camp, Dresser and McKee closely match, especially at the end of the planning period (2030). This consistency between imported demand projections provides an added level of confidence, despite the differences in demand projection methodology.

It should also be noted that the imported demands calculated by MWD always exceed the projected imported water need by CMWD. This provides a small contingency for CMWD because MWD will be prepared to supply slightly more water than the CMWD projects it may need.



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CMWD 2005 Urban Water Management Plan
Imported Water Demand Projections

Figure
3-3

Chapter 4

Water Demand Management

Chapter 4
Water Demand Management

This section evaluates the current demand management measures that CMWD employs to reduce the demand for imported water.

A. Demand Management Measures

The CUWCC developed a Memorandum of Understanding (MOU) in the early 1990s to provide guidance for implementing conservation measures as a way to manage water demands. CMWD is a member of the CUWCC and was a signatory of the MOU. The MOU included a list of BMPs that define industry standards for implementing demand management measures. Table 4-1 lists these BMPs.

Table 4-1

CUWCC Demand Management Program BMPs

BMP	Applicability	
	Retailers	Wholesalers
1. Residential Water Surveys	Yes	No
2. Residential Plumbing Fixture Retrofits	Yes	No
3. System Water Audits, Leak Detection, and Repair	Yes	Yes
4. Metering and Commodity Rates	Yes	No
5. Large Landscape Audits	Yes	No
6. High Efficiency Washing Machine Rebates	Yes	No
7. Public Information Programs	Yes	Yes
8. School Education Programs	Yes	Yes
9. CII Conservation Programs	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 Ultra Low Flush Toilet (ULFT) Replacement	Yes	No

B. CMWD Conservation Programs

CMWD has worked closely with its purveyors and MWD to implement BMP programs. CMWD submits annual reports which summarize the status on implementation of BMP measures. The most recent annual reports submitted to the CUWCC are included in Appendix D of this report. Even though many of the BMPs listed in Table 4-1 are not applicable to wholesale agencies such as CMWD, CMWD is actively involved in their implementation. A description of each of CMWD's specific conservation programs is given below.

1. System Water Audits, Leak Detection and Repair (BMP-03)

Every water agency has some degree of unaccounted for water use, which can include system leaks, unmetered deliveries, or unmetered usage in locations such as water treatment plants. CMWD monitors the amount of unaccounted water use by comparing metered sales to the total supply delivered into the water system. In 2004, less than 1 percent of the water delivered into the CMWD system was unaccounted water. To help ensure this high level of accountability, the CMWD performs an annual audit of their 144 miles of transmission piping.

2. Public Information Programs (BMP-07)

CMWD has developed literature brochures and distributed this information at public events to help encourage the wise use of water. In 2004, approximately $47,000 was budgeted for public information programs and literature brochures were made available at an estimated 17 different public venues.

3. School Education Programs (BMP-08)

CMWD has work closely within the state recommended framework to implement a school information program. These programs include teacher inservice workshops and classroom presentations for grades kindergarten through 12. The primary focus of the various programs is to educate children on water resource issues including available water sources, water use and conservation. In 2004, CMWD allocated nearly $7,800 for school education programs, distributed conservation information materials to over 500 students, and made formal presentations to 25 student classes.

4. Wholesale Agency Assistance (BMP-10)

CMWD has worked closely with its purveyors and provided financial assistance in the implementation of several BMPs. In 2004, CMWD provided approximately $156,000 in assistance and has budgeted $85,000 in additional assistance for 2005.

CMWD supports its purveyors in promoting the installation of water efficient equipment. CMWD budgeted $2,500 for residential customer water surveys and $2,500 for plumbing retrofits in 2004. In 2004, CMWD contributed approximately $73,500 water efficient washing machine rebates. CMWD also provides financial assistance by providing rebates for the purchase of an ULFT when replacing a traditional toilet, as well as distributing ULFTs to customers at no charge through community-based organizations. In 2004, CMWD provided approximately $33,000 in assistance and has budgeted over $46,000 for 2005.

CMWD budgeted $20,000 in 2004 to assist large irrigation water users in the evaluation of potential water savings associated with improvements to irrigation practices. This program is designed to focus on dedicated landscape meters within residential areas. These types of meters are found in the common areas of apartment complex common areas and homeowners associations, golf courses, parks, and street medians. The program can provide assistance in retaining a landscape consultant to survey the area, provide a conservation plan, and potentially fund a pilot study to assess the potential savings.

CMWD has worked closely with MWD in recent years to focus on the replacement of fixtures commonly found at commercial, industrial, and institutional (CII) facilities that have the greatest potential for water savings. This new program will target sites having large water savings potential by marketing directly to their corporate headquarters. By focusing on the larger CII users, large water savings have been realized.

5. Conservation Pricing (BMP-11)

CMWD utilizes an inclining block rate structure, which means that the price of water increases with quantity.

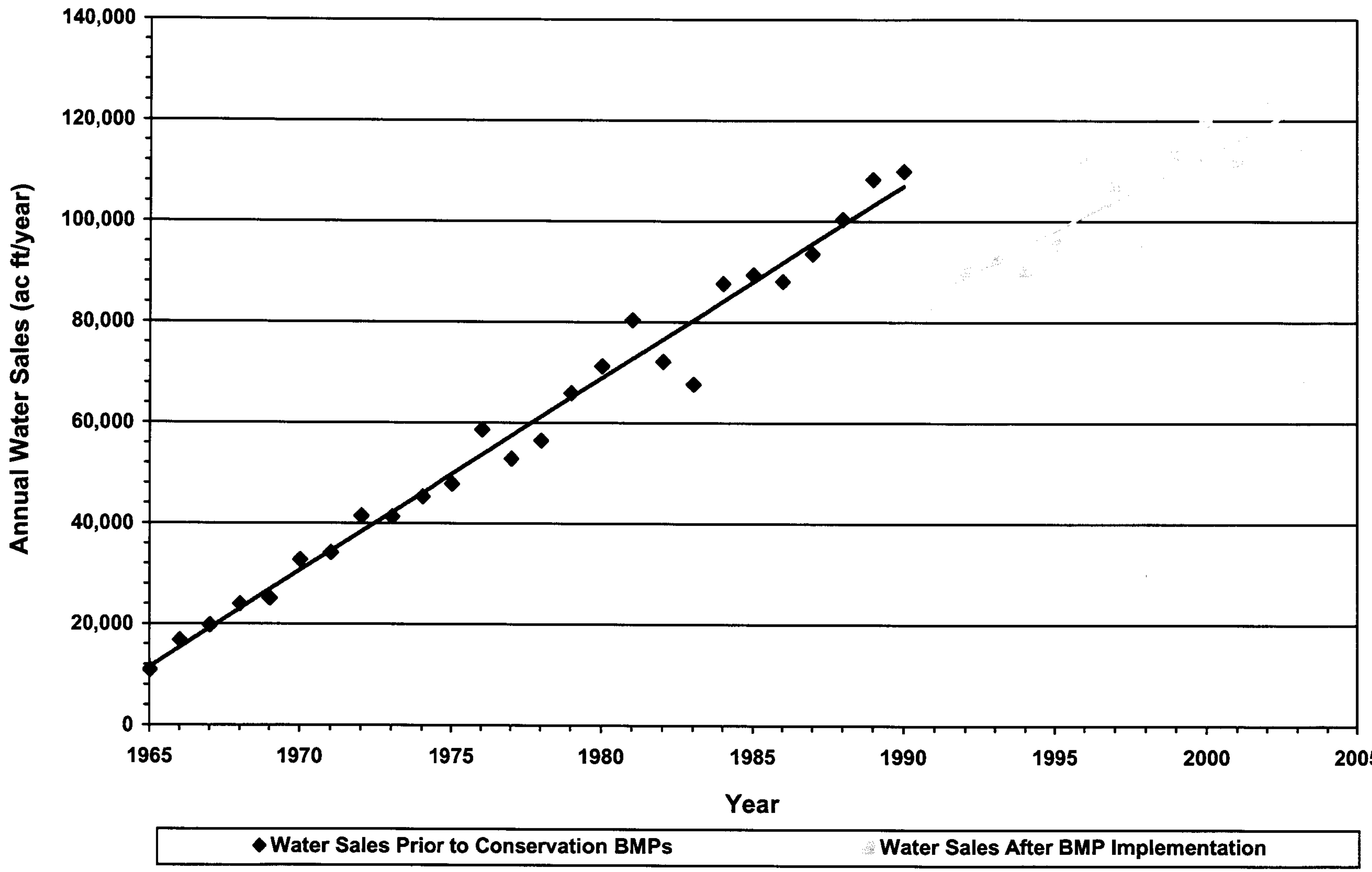
6. Conservation Coordinator (BMP-12)

CMWD has staff designated to the oversight and implementation of the conservation BMPs and the promotion of water conservation.

C. Effectiveness of Conservation Measures

In conjunction with MWD and CMWD purveyors, the implementation of cost-effective BMPs and the adoption of an increasing block rate structure provides mechanisms for both active conservation and financial incentives for reducing discretionary consumption.

CMWD will also continue to work with MWD and regional purveyors to identify new ways to control water consumption in a cost effective manner and will continue to measure and evaluate the effectiveness of the current conservation activities. Figure 4-1 presents historical water sales by CMWD and shows the effectiveness of the BMPs since they were implemented in the early 1990s. It is important to note that California experienced the most severe extended drought on record from 1990 through 1992. Many water providers were forced to increase their water rates, which resulted in decreased water sales. This impact is illustrated on Figure 4-1 by the significant drop in water sales between 1990 and 1991 and no doubt helped contribute to conservation, in addition to the implementation of BMPs.



CMWD 2005 Urban Water Management Plan
Historic Water Sales Before and After Implementation of Conservation BMPs

Figure 4-1

Chapter 5

Reliability Planning

Chapter 5
Reliability Planning

This chapter evaluates the reliability of available supplies to meet demands. Because the reliability of CMWD imported supplies are dependent upon MWD's delivery ability, this chapter evaluates the supply reliability of both MWD and CMWD.

A. Average Year Supply versus Demand Evaluation

The following section evaluates MWD's and CMWD's reliability with respect to projected average year hydrologic conditions.

1. MWD Average Year Reliability Evaluation

Table 5-1 shows the water supply versus demand evaluation for MWD's projected average year hydrologic conditions. As shown in Table 5-1, sufficient supplies are available to meet the projected average year demands.

Table 5-1

MWD Supply versus Demand for Average Year Conditions

	(Acre Feet Per Year)					
	2005	2010	2015	2020	2025	2030
MWD Available Supplies	2,468,000	2,668,000	2,660,000	2,654,000	2,654,000	2,654,000
Imported Demand on MWD[1]	2,019,000	2,073,000	2,095,000	2,131,000	2,258,000	2,390,000
Percent of Potential Reserves[2]	22%	22%	19%	20%	15%	10%

[1]Firm demands plus water banking program replenishment demands.

[2]Reserves not used to meet annual demands are used for additional system replenishment.

A potential reserve of at least 10 percent is anticipated during these conditions. Therefore, it is reasonable to utilize the total amount of MWD's available supply projections for CMWD when evaluating CMWD's reliability below.

2. CMWD Average Year Reliability Evaluation

Table 5-2 shows the water supply versus demand evaluation for CMWD's projected average year hydrologic conditions. As shown in Table 5-2, sufficient supplies are available for this condition. On average, there is projected to be a water supply surplus each year of approximately 12 percent.

Table 5-2

CMWD Supply versus Demand for Average Year Conditions

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Average Year Demand	173,127	186,041	200,570	212,239	222,795	234,267
Average Year Local Supply	50,262	60,579	70,341	76,668	82,914	89,730
Imported Demand on MWD	122,165	125,462	130,229	135,571	139,881	144,537
MWD Available Supplies	125,800	138,200	146,300	155,600	162,800	170,100
Percent Surplus	3%	10%	12%	15%	16%	18%

B. Dry Year Supply versus Demand Evaluation

The following section evaluates MWD's and CMWD's reliability with respect to projected dry year hydrologic conditions.

1. MWD Dry Year Reliability Evaluation

Table 5-3 shows the water supply versus demand evaluation for MWD's projected dry year hydrologic conditions, such as that experienced in 1977. As shown in Table 5-3, sufficient supplies are available to meet the projected dry year demands and a reserve of between 3 and 30 percent is anticipated during these conditions.

Table 5-3

MWD Supply versus Demand for Dry Year Conditions

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
MWD Available Supplies	2,104,000	2,842,000	3,056,300	3,021,400	2,997,800	2,997,800
Imported Demand on MWD (1)	2,042,000	2,326,000	2,342,000	2,377,000	2,504,000	2,631,000
Percent of Potential Reserves(2)	3%	22%	30%	27%	20%	14%

(1)Firm demands plus water banking program replenishment demands.

(2)Reserves not used to meet annual demands are used for additional system replenishment.

As with the average year condition, it is reasonable to utilize the total amount of MWD's available supply projections for CMWD when evaluating CMWD's reliability under dry year conditions, due to MWD's projected surplus.

2. CMWD Dry Year Reliability Evaluation

Table 5-4 shows the water supply versus demand evaluation for CMWD's projected dry year hydrologic conditions. As shown, the estimated allocation of water from MWD during a dry year is sufficient to meet the CMWD's projected dry year imported water demands from 2010 through 2030. This is a result of groundwater banking storage facilities that MWD will be constructing between 2005 and 2010 that will store large quantities of water during normal and wet years. This stored water will be extracted during dry years to meet anticipated dry year demands.

Table 5-4

CMWD Supply versus Demand for Dry Year Conditions

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Dry Year Demand	177,004	190,612	205,449	217,504	228,256	239,973
Dry Year Local Supply	49,060	59,345	68,987	75,163	81,263	87,866
Imported Demand on MWD	127,944	131,267	136,462	142,341	146,993	152,107
MWD Dry Year Allocation(1)	107,300	147,200	172,000	177,100	208,400	192,200
Surplus	-16%(2)	12%	26%	24%	42%	26%

(1)Based on the percentage of imported water MWD anticipates being able to supply to its service area in a dry year, as listed in Table 2-6.

(2)Deficit could be met by the available reserves shown in Table 5-3 or by using water stored by the Las Posas ASR facilities.

For the dry year condition, Table 5-4 shows a deficit between 2005 and 2010 before the completion of the MWD groundwater banking projects. If a dry year equivalent to the 1977 hydrologic condition is experienced during this time, the additional needed water could be supplied by MWD from the estimated available reserves shown in Table 5-3 or by using water stored by the Las Posas ASR facilities. Chapter 6 provides additional details on the how the Las Posas ASR facilities can provide CMWD flexibility in meeting short term supply shortfalls.

C. Multiple Dry Year Supply versus Demand Evaluation

The following section evaluates MWD's and CMWD's reliability with respect to projected multiple dry year hydrologic conditions.

1. MWD Multiple Dry Year Reliability Evaluation

Table 5-5 shows the water supply versus demand evaluation for MWD's projected multiple dry year hydrologic conditions, such as those experienced in

1990 through 1992. As shown in Table 5-5, sufficient supplies are available to meet MWD's projected multiple dry year demands.

Table 5-5

MWD Supply versus Demand for Multiple Dry Year Conditions

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
MWD Available Supplies	2,410,000	2,618,100	2,833,300	2,810,900	2,797,100	2,797,100
Imported Demand on MWD [1]	N/A	2,410,000	2,431,000	2,459,000	2,596,000	2,729,000
Percent of Potential Reserves[2]	N/A	9%	17%	14%	8%	2%

[1]Firm demands plus water banking program replenishment demands.

[2]Reserves not used to meet annual demands are used for additional system replenishment.

N/A – Information not available.

A potential reserve of between 2 percent and 17 percent is anticipated during these conditions. Therefore, it is reasonable to utilize the total amount of MWD's available supply projections for CMWD when evaluating CMWD's reliability under multiple dry year conditions.

2. CMWD Multiple Dry Year Reliability Evaluation

Table 5-6 shows the water supply versus demand evaluation for CMWD's projected multiple dry year hydrologic conditions, which shows a similar condition to the dry year evaluation presented in Table 5-4. Sufficient imported water is projected to be available for the years 2010 through 2030 to meet demands. However, as with the dry year scenario, there could be a shortfall until 2010 is multiple dry conditions are experienced. The five percent shortfall could be provided by MWD from the estimated available reserves shown in Table 5-5 or by utilizing water stored water in the Las Posas ASR facilities.

Table 5-6

CMWD Supply versus Demand for Multiple Dry Year Conditions

	(Acre Feet Per Year)					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Multiple Dry Year Demand	179,388	193,599	208,874	221,353	232,515	244,606
Multiple Dry Year Local Supply	49,470	60,660	71,963	78,260	84,496	91,377
Imported Demand on MWD	129,918	132,939	136,911	143,093	148,019	153,229
MWD Available Supplies[(1)]	122,800	135,600	159,500	164,800	171,600	179,300
Surplus	-5%[(2)]	2%	16%	15%	16%	17%

[(1)]Based on the percentage of imported water MWD anticipates being able to supply to its service area, as listed in Table 2-6.

[(2)]Deficit could be met by the available reserves shown in Table 5-3 or by using water stored by the Las Posas ASR facilities.

D. Supply Reliability Strategies

This section discusses supply reliability strategies for SWP water.

1. DWR Strategies for SWP Supplies

The California DWR delivers water to Southern California using the SWP facilities. In years past, operation of the SWP facilities has been hampered by environmental and water management problems.

The CALFED Bay-Delta Program (CALFED), a cooperative effort among state and federal agencies and California's environmental, urban and agricultural communities, was initiated in 1995 to reduce conflicts by developing a sustainable, long-term solution to water management and environmental problems associated with the Bay-Delta system. The CALFED program is a comprehensive plan that will restore ecological health, improve water supply reliability for beneficial uses, improve water quality, and improve levee stability in the Bay-Delta estuary.

In August of 2000, CALFED issued a Programmatic Record of Decision (ROD), reflecting the long-term plan for the Bay-Delta, which includes the following major program elements:

a. ***Water Management***

The Plan identified actions that could increase California water supplies by nearly 3 million acre-feet by: 1) maximizing conservation, water recycling, and water quality improvements, 2) increasing flexibility through improvements in conveyance, storage and operations, and 3) developing new groundwater and surface water storage projects.

b. ***Storage***

New surface reservoirs and underground aquifers can restore ecosystems, improve water quality, and provide needed storage and flexibility. This is being accomplished by 1) providing financial and technical assistance to implement 0.5 to 1 million acre-feet of new, locally managed, groundwater storage, and 2) pursuing opportunities for new off-stream storage sites and expansion of existing on-stream storage sites.

c. ***Conveyance***

Efforts are being made to move water through the Bay-Delta as efficiently as possible to increase the system's flexibility, ecosystem health, and water quality.

d. ***Water Use Efficiency***

CALFED aims to generate significant water supply, water quality, and ecosystem benefits by implementing a competitive process that will fast-track water conservation and recycling projects.

e. ***Water Transfers***

Through development of an effective water transfer market, existing supplies will be stretched by promoting transfers from willing sellers to buyers while protecting other water users, local economies and the environment.

f. *Environmental Water Account*

The Environmental Water Account included water rights obtained by CALFED to benefit the environment and minimize water supply impacts on cities, farms and businesses.

g. *Drinking Water Quality*

Drinking water source protection, treatment, and distribution will be effectively integrated in order to improve public health protection, including comprehensive monitoring and assessment of water quality.

h. *Watershed Management*

The goal of the Watershed Program is to provide financial and technical assistance that promote collaboration and integration among community based watershed efforts.

i. *Levee System Integrity*

CALFED is acting to protect water supplies by reducing the threat of levee failure and seawater intrusion.

j. *Ecosystem Restoration*

Ecosystem restoration actions help restore and improve the health of the Bay-Delta system for all native species while reducing water management constraints.

k. *Science*

The long-term goal of the Science Program is to establish a body of knowledge covering program elements and communicated to the scientific community, CALFED agency managers, stakeholders, and the public.

2. MWD Strategies for SWP and Colorado River Supplies

MWD is also utilizing storage strategies to increase both SWP and Colorado River reliability. In addition to utilizing Diamond Valley Lake and shared portions of Lake Perris and Castaic Lake, MWD plans to have off-stream storage facilities developed along the SWP California Aqueduct and the CRA. More detail on all of MWD's strategies for providing water supply reliability can be found in Appendix 3 of the MWD 2005 Regional UWMP. As a result of investments made in conservation, water recycling, storage, and supply, MWD expects to be 100 percent reliable over the next 20 years and therefore, CMWD also expects to be 100 percent reliable with respect to imported water delivery over the next 20 years.

a. Kern Delta

The Kern Delta Water Management Program is a California Aqueduct off-stream storage project that will divert up to a total of 250,000 acre-feet of SWP water during wet years and store it in the local groundwater basin. During dry years, the stored water can be extracted using groundwater wells.

b. Chuckwalla

The Chuckwalla Groundwater Storage Program is a CRA off-stream storage project that will divert and store up to a total of 500,000 acre-feet per year of Colorado River water.

3. CMWD Strategies for Local Supplies

CMWD also operates local facilities to increase reliability within its service area. These facilities are discussed below.

a. Las Posas Aquifer Storage and Recovery

The Las Posas ASR Project is a joint project between MWD and CMWD. The project includes dual-purpose extraction and injection wells in three well fields in the Las Posas groundwater basin. The ASR project can store up to 300,000 AF of imported water for use during peak periods, droughts, scheduled shutdowns, or emergencies. The ASR project is approximately two thirds complete and has an extraction capacity of approximately 70 cfs. It is anticipated that a maximum replenishment rate of 80 cfs and maximum extraction rate of 100 cfs will be available upon completion of the project.

Also, when available, CMWD provides imported water to local purveyors who typically rely on groundwater pumping. Supplying imported water in-lieu of pumping groundwater provides CMWD a mechanism for obtaining groundwater storage credits in the Las Posas Basin.

b. Lake Bard Water Treatment Plant

The filtration plant capacity was recently expanded from 75 cfs to 100 cfs. Approximately 8,000 acre feet of water may be stored in the lake for use during emergencies and peak demand.

c. Standby Power

Recognizing that water supplies are only as dependable as the electrical supply that powers them, CMWD installed standby generators that can power the Conejo Pump Station and the Lake Bard Water Treatment Plant in the event of an interruption of power from Southern California Edison Company. Generators are also located at remote pumping stations to provide backup power.

d. Transfer Opportunities

CMWD, as a member agency to MWD, benefits from transfer agreements made through MWD. Therefore, CMWD does not currently pursue independent transfer agreements.

Chapter 6

Contingency Planning

Chapter 6
Contingency Planning

CMWD has proactively developed water shortage contingency plans in the event that MWD significantly reduces deliveries to its member agencies during severe water shortage conditions or in the event that a catastrophe results in interruption of water deliveries to CMWD from MWD. This section summarizes CMWD's water shortage contingency measures.

A. Severe Drought Planning

MWD has developed a Water Surplus and Drought Management Plan (WSDM Plan) that provides guidance for the management of regional water supplies to avoid imposing mandatory water restrictions during drought conditions. However, in the event that there is an extreme shortage in water available to MWD, the WSDM also identifies guidelines for implementing water restrictions and for allocating reduced supplies. MWD's WSDM Plan is also the blueprint for CMWD's actions in the event of a water shortage. The WSDM Plan is thoroughly discussed in MWD's Regional UWMP.

A copy of the draft resolution regarding CMWD's water shortage contingency procedures is included in Appendix E. To minimize the potential impact of imposed water restrictions, CMWD will continue to store water in local reservoirs and groundwater basins when surplus water is available. This stored water can then be extracted should there be a shortage in available imported water.

1. CMWD Water Shortage Stages of Action

Table 6-1 presents potential water management actions that could be implemented by CMWD during both surplus and shortage conditions. There are five CMWD surplus stages of actions that are intended to be consistent with the surplus stages defined in MWD's WSDM Plan. There are also seven CMWD shortage stages of actions. These stages are intended to be consistent with the shortage stages defined by MWD. In addition, CMWD's Ordinance No. 12 gives the Board of Directors authority to take actions necessary to manage available supplies, including passing through to member agencies allocations and penalties for exceeding allocated deliveries.

Table 6-1

CMWD Water Shortage Stages of Action Guidelines

Condition[1]	Percent Shortage	Action[2]
Stage 4 & 5 Surplus	-	Maximize in-lieu and injection deliveries.
Stage 3 Surplus	-	Store water in Las Posas.
Stage 2 Surplus	-	Continue in-lieu deliveries.
Stage 1 Surplus	-	Begin in-lieu deliveries.
Supply = Demand	0	No in-lieu or injection deliveries.[3]
Stage 1 Shortage	0 - 10	Continue to maximize deliveries from MWD.
Stage 2 Shortage	10 - 15	Begin withdrawals from Las Posas.
Stage 3 Shortage	15 - 33	Call on purveyors to maximize local supplies, promote voluntary conservation.
Stage 4 Shortage	33 - 40	Discontinue agricultural water deliveries.
Stage 5 & 6 Shortage	40 - 50	Call for extraordinary conservation efforts.
Stage 7 Shortage	50+	Enforce compliance with MWD reduced allocation requirements.[4]

[1]Stages of CMWD actions are intended to be consistent with action stages defined by MWD.

[2]As surplus or shortage conditions progress, these actions are additive.

[3]Deliveries will be reduced to just purveyor demands and regulatory deliveries to Lake Bard.

[4]CMWD will monitor consumption and asses penalties for excessive use.

Table 6-1 presents action guidelines that may be utilized by CMWD during surplus or shortage conditions. However, the CMWD system is complex and the ultimate actions made by CMWD will depend on the unique issues of each particular condition.

2. Three-Year Estimated Minimum Supply Evaluation

The UWMP Act requires that the minimum water supply be quantified based on the driest three-year historic sequence. The reliability of CMWD's water supply during multiple dry years is directly dependent on the reliability of MWD's supply during multiple dry years. As outlined in MWDs Draft 2005

UWMP, a diverse mix of water supplies is available to MWD. Utilizing a computer model that considers over 80 years of historical records for each water source, MWD has indicated that the years of 1990, 1991, and 1992 are representative of the driest three consecutive years for MWD supplies.

Based on review of MWD published average year supply capability in comparison to multiple dry-year supply capability, and assuming a repeat of 1990 through1992 hydrology, the driest three years would yield approximately 2.4 percent less supply than the average year. Table 6-2 assumes that the average year supply available to CMWD would also be reduced by 2.4 percent for years 2006, 2007, and 2008.

Table 6-2

Three-Year Estimated Minimum Water Supply for 2005 – 2010[(1)]

CMWD Source of Supply	2005 Average Year	2006	2007	2008
MWD Imported Supplies[(2)]	125,800	91,900	91,900	91,900
MWD In-Basin Supplies[(3)]	0	30,900	30,900	30,900
Total Supplies to CMWD	125,800	122,800	122,800	122,800
Imported Demand[(4)]	122,865	130,522	131,126	131,730
Surplus	2%	-6%[(5)]	-6%[(5)]	-7%[(5)]

[(1)]Based on a repeat of the hydrologic conditions experienced in 1990 through 1992.

[(2)]Based on the ratio of MWD's estimate of available water from the CRA and California Aqueduct during a multiple dry year event (approximately 65 percent).

[(3)]Estimated portion of in-basin storage needed to meet MWD's multiple dry year allocation to CMWD.

[(4)]Interpolated from CMWD's projected multiple dry year demands for 2005 and 2010.

[(5)]Shortfall could be met by utilizing in-basin storage from Las Posas, ordering a portion of MWD identified reserves, or implementing short-term conservation measures.

Table 6-3 presents a similar three-year estimated water supply to that presented in Table 6-2 for the 2010 through 2015 time period. As shown, any potential shortfalls between 2005 and 2010 are anticipated to be resolved due to additional available water supplies.

Table 6-3

Three-Year Estimated Minimum Water Supply for 2010 – 2015[(1)]

CMWD Source of Supply	2010 Average Year	2011	2012	2013
MWD Imported Supplies[(2)]	138,600	91,200	91,200	91,200
MWD In-Basin Supplies[(3)]	0	44,400	44,400	44,400
Total Supplies to CMWD	138,600	135,600	135,600	135,600
Imported Demand[(4)]	125,462	133,733	134,527	135,321
Surplus	10%	1%	0.7%	0.2%

[(1)]Based on a repeat of the hydrologic conditions experienced in 1990 through 1992.

[(2)]Based on the ratio of MWD's estimate of available water from the CRA and California Aqueduct during a multiple dry year event (approximately 66 percent).

[(3)]Estimated portion of in-basin storage needed to meet MWD's multiple dry year allocation to CMWD.

[(4)]Interpolated from CMWD's projected multiple dry year demands for 2010 and 2015.

Tables 6-4 through 6-6 show similar multiple dry year scenario evaluations for the time periods of 2015 through 2020, 2020 through 2025, and 2025 through 2030. As shown on these tables, even greater surplus are anticipated due to additional available water supplies.

Table 6-4

Three-Year Estimated Minimum Water Supply for 2015 – 2020[1]

CMWD Source of Supply	2015 Average Year	2016	2017	2018
MWD Imported Supplies[2]	146,300	96,200	96,200	96,200
MWD In-Basin Supplies[3]	0	63,300	63,300	63,300
Total Supplies to CMWD	146,300	159,500	159,500	159,500
Imported Demand[4]	128,329	138,147	139,383	140,619
Surplus	14%	15%	14%	13%

[1]Based on a repeat of the hydrologic conditions experienced in 1990 through 1992.

[2]Based on the ratio of MWD's estimate of available water from the CRA and California Aqueduct during a multiple dry year event (approximately 66 percent).

[3]Estimated portion of in-basin storage needed to meet MWD's multiple dry year allocation to CMWD.

[4]Interpolated from CMWD's projected multiple dry year demands for 2015 and 2020.

Table 6-5

Three-Year Estimated Minimum Water Supply for 2020 – 2025[1]

CMWD Source of Supply	2020 Average Year	2021	2022	2023
MWD Imported Supplies[2]	155,600	102,200	102,200	102,200
MWD In-Basin Supplies[3]	0	62,600	62,600	62,600
Total Supplies to CMWD	155,600	164,800	164,800	164,800
Imported Demand[4]	133,671	144,078	145,063	146,048
Surplus	16%	14%	14%	13%

(1)Based on a repeat of the hydrologic conditions experienced in 1990 through 1992.

(2)Based on the ratio of MWD's estimate of available water from the CRA and California Aqueduct during a multiple dry year event (approximately 66 percent).

(3)Estimated portion of in-basin storage needed to meet MWD's multiple dry year allocation to CMWD.

(4)Interpolated from CMWD's projected multiple dry year demands for 2020 and 2025.

Table 6-6

Three-Year Estimated Minimum Water Supply for 2025 – 2030[1]

CMWD Source of Supply	2025 Average Year	2026	2027	2028
MWD Imported Supplies[2]	162,800	107,000	107,000	107,000
MWD In-Basin Supplies[3]	0	64,600	64,600	64,600
Total Supplies to CMWD	162,800	171,600	171,600	171,600
Imported Demand[4]	137,981	149,061	150,103	151,145
Surplus	18%	15%	14%	14%

[1]Based on a repeat of the hydrologic conditions experienced in 1990 through 1992.

[2]Based on the ratio of MWD's estimate of available water from the CRA and California Aqueduct during a multiple dry year event (approximately 66 percent).

[3]Estimated portion of in-basin storage needed to meet MWD's multiple dry year allocation to CMWD.

[4]Interpolated from CMWD's projected multiple dry year demands for 2025 and 2030.

As shown on Tables 6-2 through 6-6, CMWD has developed water supply strategies to meet future multiple dry year events.

B. Catastrophe Planning

Although MWD and CMWD water delivery systems are very robust, these systems are still vulnerable. A natural event, such as an earthquake, could cause the complete and sudden failure of the facilities used by MWD to import water into the region. Similarly, the facilities used to import water from MWD into the CMWD region are susceptible to these same threats.

1. MWD Catastrophe Plan

The majority of Southern California's water is imported via three facilities, the California Aqueduct, Los Angeles Aqueduct, and the CRA. All three sources cross the San Andreas Fault. A catastrophic event that resulted in an unplanned interruption in supply from any of these facilities would have a significant impact on the ability to supply water. Consequently, MWD has invested heavily in emergency storage facilities located both in and out of the region to store a significant quantity of water. As a result, MWD anticipates that approximately 75 percent of average year demands could be delivered to its member agencies even if there was a disruption of service from a regional water supply.

2. CMWD Catastrophe Strategies

CMWD is one of only a few member agencies of MWD that imports 100 percent of its water from a single connection to MWD facilities. In the event that service from this supply is disrupted, CMWD would be required to meet local demands from water stored in Lake Bard and the Las Posas groundwater basin.

Lake Bard has a total storage capacity of 10,000 acre-feet; however, only 8,000 acre-feet are quantified as usable storage. The Lake Bard Water Treatment Plant extracts water stored in Lake Bard and can produce 100 cfs of potable water for a short period of time. Additionally, the Las Posas groundwater basin has an approximate storage capacity of 300,000 acre-feet. Currently the basin extraction facilities have a total capacity of approximately 80 cfs. However, upon ultimate completion in 2010, the basin extraction and treatment facilities will be capable of producing up to 100 cfs of potable water.

Utilizing a combination of Lake Bard and Las Posas facilities, CMWD can endure an extended disruption in service from MWD. Table 6-7 shows several strategies for meeting 2005 water demands during conditions of reduced deliveries from MWD.

Table 6-7

Strategies for Meeting 2005 Average Year Demands During Reduced MWD Deliveries

Source of Supply	25 Percent Reduction of Average Year Delivery (ac ft/yr)	50 Percent Reduction of Average Year Delivery (ac ft/yr)	Short-Term MWD Interruption (cfs)	Long-Term MWD Interruption (ac ft/yr)
MWD	94,400	62,900	0	0
Lake Bard(1)	0	0	100	0
Las Posas(2),(3)	22,965	54,465	65	58,000
Additional Local Supply(4)	5,500	5,500	5	20,700(5)
Total	122,865	122,865	170	78,700
Imported Demand	122,865	122,865	170	122,865
Conservation Required	0%	0%	0%	36%

(1)Lake Bard facilities can supply 100 cfs for between 10 and 35 days, depending on initial lake levels.

(2)Las Posas facilities can supply 80 cfs and has a maximum storage capacity is 300,000 ac-ft per year.

(3)Most of the water stored in Las Posas is owned by MWD a can only be extracted with MWD approval.

(4)During an extended MWD outage, CMWD would request local purveyors to maximize local supplies.

(5)Based on purveyor estimates of sustained pumping capacity for a three month period.

3. CMWD Emergency Pipeline Repair Protocol

The CMWD distribution system has proven highly reliable for over 30 years. However, its potential vulnerability was demonstrated by the 1994 Northridge Earthquake, which resulted in numerous pipeline separations and cracked joints, and again in 1997 by an intense pressure surge which lead to the rupture of a 20 linear-foot section of a 66-inch diameter pre-stressed concrete pipe in Simi Valley.

Recognizing the inherent vulnerability of water transmission systems, in 1998, the CMWD Board of Directors adopted an Emergency Pipeline Repair

Protocol as part of its continuing commitment to quality service. The intent of this protocol is to establish a state of preparedness and an organized, planned procedure to mobilize and begin work. The plan facilitates timely emergency response and assures that repairs will be performed in the most efficient manner.

Large diameter pipeline failures, if not addressed promptly and properly, can inconvenience thousands of customers and cause considerable property damage. Facility failures may be caused by construction activity, earthquakes, power failures, or other conditions such as pressure surges (i.e., water hammer). While failures can be expected, their locations are unknown until they occur, which dictates that a repair protocol be applicable to a broad range of situations and locations. Furthermore, the more quickly the failure can be repaired, the less likely it will cause debilitating damage or service outages.

In preparing the protocol, CMWD sought to identify factors that can enhance the efficiency with which emergency repairs are performed, and develop specific actions to improve emergency repair procedures. In an effort to learn from the experiences of others in the water industry, the study included meetings and discussions with pipeline suppliers and other vendors as well as with other large water providers including MWD and the San Diego County Water Authority.

Research indicated that the key to efficient repair procedures is a structured approach, in which specific procedures, responsible personnel and necessary equipment are identified and secured ahead of time. With this in mind, CMWD developed a protocol that includes a step-by-step procedure for responding to an emergency. The key elements of the protocol are:

- Establishment of emergency repair organizational structure.
- Identification of emergency contacts.
- Damage assessment.
- Materials and equipment assessment.
- Comprehensive repair procedures for various facility types.
- Ongoing maintenance of the protocol.

Since execution of the protocol depends on the direction of a designated Emergency Repair Manager, the establishment of a "chain of command" is critical to the success of this approach. Checklists for emergency contacts, damage assessment, assessment of materials, and equipment are included in the protocol, as well as specific repair and disinfection procedures, technical details, and applicable specifications.

Rapid mobilization of repair crews is dependent upon having equipment and replacement pipe and appurtenances at the ready. CMWD's plan contains recommendations for the stockpiling of a total of seven sizes of replacement pipe, in diameters ranging from 24 to 78 inches. This pipe has been purchased and is stored at CMWD's Lake Bard and well field properties. Having this inventory available gives CMWD the ability to quickly repair up to 98 percent of the pipelines in its distribution system.

C. Water Quality Contingency Planning

Changes in drinking water regulations, environmental litigation, or identification of a new contaminate could result in the loss of an existing water supply source. This section discusses how water quality concerns could impact the reliability of the regional water systems.

1. MWD Water Quality Contingency Planning

To reduce the potential impact from a decrease in water supply due to water quality, MWD has instituted a 10 percent planning buffer requirement. This buffer requires the identification of contingency supplies equal to 10 percent above that needed to meet 2025 demands. These supplies are to be used only if existing supplies become unavailable and allows for a more speedy response should existing water supplies become unavailable.

2. CMWD Water Quality Contingency Planning

CMWD manages two major local storage facilities, Lake Bard and the Las Posas ASR Facilities. Lake Bard is relatively small and is primarily intended to provide operational flexibility to CMWD rather than to serve as a regular water supply. Contamination of the lake is an unlikely event as the lake and its watershed are owned by CMWD and access is restricted. However, if the lake was deemed unusable due to water quality, only approximately 5 percent of CMWD's total annual demands would be affected. It is anticipated that this lost supply could be supplemented with additional imported water from MWD or by extracting water from the Las Posas groundwater basin.

Alternatively, the Las Posas groundwater basin is anticipated to have a storage capacity of approximately 300,000 acre-feet. During a severe drought condition, MWD may call upon this supply to meet a significant portion of CMWD's total water demands. Because this basin is an important part of both MWD's and CMWD's water resource mix, any potential water quality related issues with this basin would have a significant impact on the ability to meet demands during dry years.

Water quality problems in this basin are highly unlikely due to the fact that the basin is confined. If a water quality issue occurred in the Las Posas basin, it would likely be resolved with treatment upon extraction. In the event that the existing treatment facilities were not capable of removing the contaminant, CMWD would rely on MWD to deliver additional imported water until the facilities could be upgraded to remove the contaminant.

D. Provisions to Reduce Water Consumption

Under the most severe drought conditions and under almost any catastrophe condition, CMWD may call for mandatory reduction in water consumption. This section presents guidelines to reduce water consumption and identifies measures that could be utilized by CMWD to monitor and enforce reduced water consumption.

1. Guidelines for Meeting Reduced Consumption Mandates

In the event that a mandatory reduction in water consumption is required, one or all the following guidelines can be implemented to meet the water consumption goals:

- Disallow non-essential irrigation and limit water use for essential irrigation.
- Restrict irrigation hours to evening and early morning hours.
- Restrict or disallow the use of sprinklers during all hours.
- Limit or disallow the use of potable water for golf course and park irrigation.

- Disallow the use of water to fill ornamental lakes, ponds, pools, and fountains.
- Limit or disallow the washing of vehicles.
- Disallow the use of water for spraying of outdoor paved surfaces.
- Request that restaurants not serve water to customers unless specifically requested.
- Restrict the use of water from fire hydrants for construction purposes.
- Develop a rate structure for charges and penalties for water use restriction violations.

2. Monitoring and Enforcing Reduced Consumption Mandates

California Water Code Section 10632-f allows urban water suppliers to charge penalties for excessive water use in order to encourage consumption reduction during a water shortage. Under the current WSDM Plan adopted by MWD, any time a member agency takes 102 percent of their reduced allotment under a declared Stage 7 shortage condition, they will be assessed a surcharge equal to three times the MWD full service rate. To meet MWD reduced allotments during water shortages, CMWD may be required to reduce allotments in-kind.

CMWD can monitor daily water consumption and issue penalties for excessive use during declared shortage conditions using existing water metering facilities. Additionally, CMWD is currently in the design phase of the Turnout Automation Project. When complete, the system will provide monitoring of flow conditions at all turnouts and will provide real time flow data to both CMWD and its purveyors. The Turnout Automation Project will assist in more efficient operations during both water shortage conditions and normal operating conditions.

3. Fiscal Impacts from Reduced Water Deliveries

During periods of reduced consumption, revenue from water sales will decline while expenses remain relatively constant. A natural disaster may also entail unpredicted expenditures for repairs. Therefore, it is imperative that

CMWD have adequate reserves to cover operating and emergency repair expenses during these periods. CMWD maintains a minimum in its general fund reserves of $15,000,000, which is equivalent to eighteen months of operating expenses. In addition, CMWD maintains a minimum of $25,000,000 in construction reserves, which is sufficient to fund expected damage repairs. If periods of reduced consumption are prolonged, CMWD may be required to adjust rates to remain financially stable.