2015

URBAN WATER MANAGEMENT PLAN

Ventura County Waterworks District No. 1

June 2016

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ACRONYMS and ABBREVIATIONS

AB	Assembly Bill
AC	Acre
AF	Acre Feet
AFY	Acre Feet per Year
AMI	Area Median Income
ASR	Aquifer Storage and Recovery
AVEK	Antelope Valley-East Kern Water Agency
AWWA	American Water Works Association
Bay-Delta	Sacramento-San Joaquin Bay-Delta
BDCP	Bay Delta Conservation Plan
BMP	Best Management Practices
Calleguas	Calleguas Municipal Water District
CASGEM	California Statewide Groundwater Elevation Monitoring
CAWCD	Central Arizona Water Conservation District
CEQA	California Environmental Quality Act
CII	Commercial, Institutional, and Industrial
CIMIS	California Irrigation Management Information System
CRA	Colorado River Aqueduct
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CVWD	Coachella Valley Water District
CWC	California Water Code
CY	Calendar Year
Delta	San Joaquin River Delta
DMM	Demand Management Measure
DOF	Department of Finance
DU	Dwelling Unit
DWR	Department of Water Resources
DWCV	Desert Water Agency/Coachella Valley Water District
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPM	Emergency Procedures Manual
ESA	Endangered Species Act
ET	Evapotranspiration
Eto	Evapotranspiration From a Standardized Grass Surface
FCGMA	Fox Canyon Groundwater Management Agency
FY	Fiscal Year
GIS	Geographic Information System
gpcd	Gallons Per Capita Per Day
GPM	Gallons Per Minute
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HCD	Housing and Community Development

ICS	Intentionally Created Surplus
IID	Imperial Irrigation District
IRP	Integrated Resources Plan
KML	Keyhole Markup Language
LAS	Lower Aquifer System
MAF	Million Acre Feet
MCL	Maximum Contaminant Level
Metropolitan	Metropolitan Water District of Southern California
MGD	Million Gallons per Day
Mg/L	Milligrams per Liter
MOU	Memorandum of Understanding
MWELO	Model Water Efficient Landscape Ordinance
MWRF	Moorpark Water Reclamation Facility
MWD	Metropolitan Water District of Southern California
OWDDF	Ocean Water Desalination Demonstration Facility
PVID	Palo Verde Irrigation District
QMCP	Quagga Mussel Control Program
QSA	Quantification Settlement Agreement
RDM	Robust Decision-Making
RHNA	Regional Housing Needs Allocation
RTP	Regional Transportation Plan
RUWMP	Regional Urban Water Management Plan
SB	California Senate Bill
SCAG	Southern California Association of Governments
SDCWA	San Diego County Water Authority
SGMA	Sustainable Groundwater Management Act
SMP	Salinity Management Pipeline
SNWA	Southern Nevada Water Authority
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	Thousand Acre Feet
TDS	Total Dissolved Solids
TEA	Temporary Extraction Allocation
UAS	Upper Aquifer System
USBR	U.S. Bureau of Reclamation
UWMP	Urban Water Management Plan
VCWPD	Ventura County Watershed Protection District
VCWWD	Ventura County Waterworks District
WQCP	Water Quality Control Plan
WSA	Water Service Area
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WSDM	Water Surplus and Drought Management
WUCA	Water Utility Climate Alliance

1 INTRODUCTION AND OVERVIEW

1.1 BACKGROUND AND PURPOSE

Ventura County Waterworks District No. 1 (VCWWD No. 1 or District) has prepared the 2015 update of its Urban Water Management Plan (UWMP) to fulfill the requirements outlined in the California Urban Water Management Planning Act and the Water Conservation Bill of 2009.

1.2 UWMP UPDATE AND THE CALIFORNIA WATER CODE

This report has been prepared in compliance with Water Code Sections 10610 through 10656 of the Urban Water Management Planning Act (Act), which were added by Statute 1983, Chapter 1009, and became effective on January 1, 1984. This Act requires that "every urban water supplier shall prepare and adopt an urban water management plan" (Water Code § 10620(a)). An "urban water supplier" is defined as a supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually (Water Code § 10617).

These plans must be filed with the California Department of Water Resources (DWR) every five years. However, the 2015 plans must be submitted to DWR by July 1, 2016. The Act's requirements include:

- Detailed evaluation of the supplies necessary to meet demands over at least a 20-year period, in five-year increments, for a single dry water year, in multi-year droughts, and during average year conditions,
- Documentation of the stages of actions an urban water supplier would undertake to address up to a 50% reduction in its water supplies,
- Description of the actions to be undertaken in the event of a catastrophic interruption in water supplies, and
- Evaluation of reasonable and practical efficient water uses, recycling, and conservation activities.

1.2.1 Changes in the Act Since 2010

Since 2010, several amendments have been made to the Act. The following is a summary of the significant changes in the Act that have occurred from 2010 to the present:

- Changes the deadline for water suppliers to submit their 2015 UWMPs to DWR by July 1, 2016 (Water Code § 10621(d)).
- Adds "distribution system water loss" to the list of past, present, and projected future water uses that the UWMP is to quantify to the extent that records are available and over the same 5-year increments described in Water Code § 10631(a). (Water Code § 10631(e)(1)(J)). For the 2015 UWMP, the distribution system water loss must be quantified for the most recent 12-month period

available. For all subsequent updates, the distribution system water loss must be quantified for each of the 5 years preceding the plan update. (Water Code § 10631(e)(3)(A)). The distribution system water loss quantification must be reported in accordance with a worksheet approved or developed by DWR through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association (AWWA) (Water Code § 10631(e)(3)(B)).

- If available and applicable to an urban water supplier, water use projections may display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area (Water Code § 10631(e)(4)(A)). To the extent that an urban water supplier reports the information described in Water Code § 10631(e)(4)(A), an urban water supplier shall do both of the following: (1) provide citations of the various codes, standards, ordinances, or transportation and land use plans used in making the projections; and (2) indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall note that fact (Water Code § 10631(e)(4)(B)).
- Requires plans by retail water suppliers to include a narrative description that addresses the nature and extent of each water Demand Management Measure (DMM) implemented over the past 5 years. The narrative must describe the water DMMs that the supplier plans to implement to achieve its water use targets pursuant to Water Code § 10608.20 (Water Code § 10631(f)(1)(A)). The narrative must also include descriptions of the following water DMMs: water waste prevention ordinances, metering, conservation pricing, public education and outreach, programs to assess and manage distribution system real loss, water conservation program coordination and staffing support; and other DMMs that have a significant impact on water use as measured in gpcd, including innovative measures, if implemented (Water Code § 10631(f)(1)(B).
- Requires plans by wholesale water suppliers to include a narrative description of metering, public education and outreach, water conservation program coordination and staffing support, and other DMMs that have a significant impact on water use as measured in gpcd, including innovative measures, if implemented, as well as a narrative description of their distribution system asset management and wholesale supplier assistance programs (Water Code § 10631(f)(2)).
- Adds the voluntary reporting in the UWMP of any of the following information: an estimate of the amount of energy used: (1) to extract or divert water supplies; (2) to convey water supplies to water treatment plants or distribution systems; (3) to treat water supplies; (4) to distribute water supplies through the distribution system; (5) for treated water supplies in comparison to the amount used for non-treated water supplies; and (6) to place water into or to withdraw water from storage; and (7) any other energy-related information the urban water supplier deems appropriate (Water Code § 10631.2(a)). DWR included in its UWMP

guidance a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems (Water Code § 10631.2(b))

- Requires urban water suppliers to submit plans or amendments to plans electronically and to include any standardized forms, tables, or displays specified by DWR (Water Code § 10644(a)(2)).

1.2.2 Senate Bill 7 of the Seventh Extraordinary Session of 2009, Water Conservation in the Delta Legislative Package

In addition to changes to the Act, the California State Legislature passed Senate Bill 7 as part of the Seventh Extraordinary Session, referred to as SB X7-7, on November 10, 2009, which became effective February 3, 2010. This law was the water conservation component to the historic Delta legislative package, and seeks to achieve a 20% statewide reduction in urban per capita water use in California by December 31, 2020. This implements the Governor's similar 2008 water use reduction goals. The law requires each urban retail water supplier to develop urban water use targets to help meet the 20% goal by 2020, and an interim urban water reduction target by 2015.

The bill states that the legislative intent is to require all water suppliers to increase the efficiency of use of water resources and to establish a framework to meet the state targets for urban water conservation called for by the Governor. The bill establishes methods for urban retail water suppliers to determine targets to help achieve increased water use efficiency by the year 2020. The law is intended to promote urban water conservation standards consistent with the California Urban Water Conservation Council's adopted best management practices.

An urban retail water supplier may update its 2020 urban water use target in its 2015 UWMP (Water Code § 10608.20(g)).

2 PLAN PREPARATION

2.1 BASIS FOR PREPARING A PLAN

Per CWC 10617, "urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems. VCWWD No. 1 is a public water supplier that meets the definition of an urban water supplier with 10,944 municipal water service connections (as of the end of calendar year 2015) and a total 9,525 acre-feet (AF) of water supplied to customers in their water service area in 2015. See Table 2-1.

Table 2-1: Public Water Systems

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Water Supplied 2015 (AF)
1	Ventura County Waterworks District No. 1	10,944	9,525
Total		10,944	9,525

2.2 INDIVIDUAL OR REGIONAL PLANNING AND COMPLIANCE

VCWWD No. 1 has developed an individual UWMP (as opposed to a Regional UWMP) that reports solely on its service area; addresses all requirements of the CWC; and notifies and coordinates with appropriate regional agencies and constituents. See Table 2-2.

Table 2-2: Plan Identification

☑	Individual UWMP
☐	Regional UWMP (RUWMP)

2.3 FISCAL OR CALENDAR YEAR AND UNITS OF MEASURE

VCWWD No. 1 is a water retailer (as opposed to a water wholesaler). The District's 2015 UWMP has been prepared using calendar years (as opposed to fiscal years) and has been prepared using acre-feet (AF) as the units of water volume measure. See Table 2-3.

2.4 COORDINATION AND OUTREACH

Per CWC 10631(j), an urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is

available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan.

Table 2-3: Agency Identification	
Type of Agency	
☐	Agency is a wholesaler
☑	Agency is a retailer
Fiscal or Calendar Year	
☑	UWMP Tables are in Calendar Years
☐	UWMP Tables are in Fiscal Years
Units of Measure Used in UWMP	
Unit	AF

VCWWD No. 1 has provided Calleguas Municipal Water District (Calleguas), the District's water wholesaler, with projected water use in accordance with CWC 10631 and has relied upon water supply information provided by Calleguas, as well as Metropolitan Water District of Southern California (Metropolitan), Calleguas' water wholesaler, in fulfilling its 2015 UWMP.

Table 2-4: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name
Calleguas Municipal Water District

Development of the UWMP was led by the VCWWD No. 1 staff. District staff provided notification to the City of Moorpark and County of Ventura Planning Departments for development of the Plan and the County Clerk for the adoption of the Plan. Psomas coordinated with the City of Moorpark Planning Department for land use and population information. VCWWD No. 1 staff was responsible for distribution of the Plan with assistance from Psomas.

The intent of this Plan is to focus on specific issues unique to the VCWWD No. 1 water service area (WSA). While some regional UWMP issues are introduced in this Plan, more detailed regional information is presented in Metropolitan's and Calleguas' 2015 UWMPs.

To assist VCWWD No. 1 staff in preparation of their 2015 UWMP, Psomas attended the 2015 UWMP Workshop at the Irvine Ranch Water District, November 18, 2015, that was facilitated by DWR.

Table 2-4A lists the entities that District or Psomas coordinated with in the development of the District's 2015 UWMP. The City of Moorpark was notified of the District's preparation of an updated UWMP and public hearing for consideration of adoption of the UWMP at least 60 days prior to the public hearing.

Table 2-4A: VCWWD No. 1 Coordination and Public Involvement

Entities	Coordination and Public Involvement Actions					
	Participated in UWMP Preparation	Used Agency Data as an Information Resource	Sent and/or Available To: Copy of Draft UWMP	Commented on Draft UWMP	Sent Notice of Public Hearing	Attended Public Hearing
County Planning Department	X	X	X		X	
VCWWD No. 1	X	X	X	X		X
City of Moorpark Planning Department	X	X	X		X	
Calleguas		X	X		X	
Fox Canyon Groundwater Management Agency		X	X		X	
Metropolitan		X	X		X	
General Public			X		X	

The District also utilized information from the Final Calleguas 2015 Regional UWMP, the Metropolitan 2015 Final UWMP, and the *"Guidebook to Assist Urban Water Suppliers to Prepare a 2015 Urban Water Management Plan"* prepared by DWR in preparing the VCWWD No. 1 2015 UWMP. This UWMP details the specifics as they relate to the VCWWD No. 1 water service area and will refer to Metropolitan, Calleguas, Fox Canyon Groundwater Management Agency, and other agencies throughout.

The District's water supply planning considers the programs of local and regional water agencies. The County of Ventura Water and Sanitation Department staff manages and administers activities, projects, and programs to optimize the District's water supply.

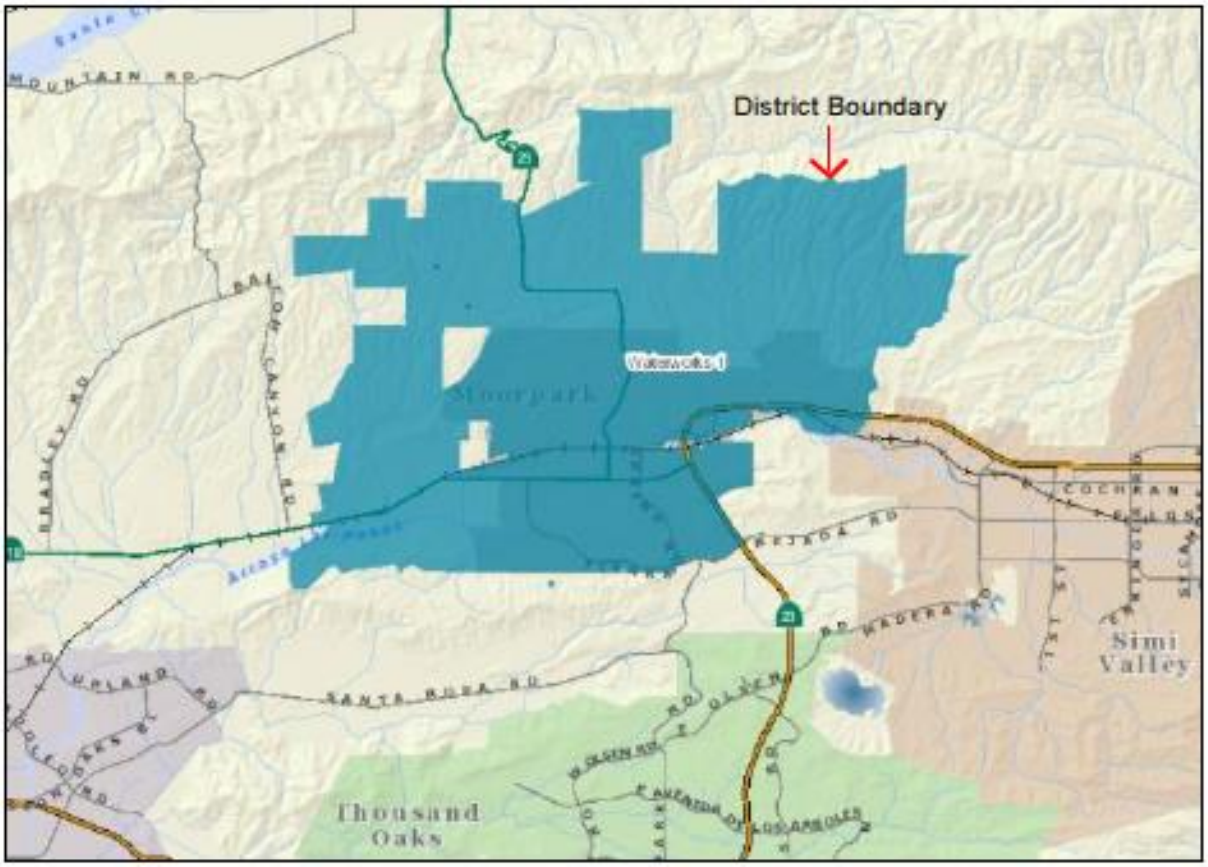
The UWMP is intended to serve as a general, flexible, and open-ended document that is updated every five years (or more often if necessary) to reflect changes in the District's water supply trends, and conservation and water use efficiency policies. The District's 2015 UWMP, along with other regional 2015 UWMPs and other County of Ventura (County) planning documents, will be used by VCWWD No. 1 staff to guide the water use and management efforts through the year 2015. The 2015 UWMP will require an update in 2020.

3 SYSTEM DESCRIPTION

3.1 GENERAL DESCRIPTION

VCWWD No. 1 was formed on November 22, 1921, and serves approximately 39,000 residents through 10,944 service connections, including 10,152 residential and commercial service connections and 170 agricultural service connections. The District encompasses approximately 33.7 square miles (21,567 acres) and consists of the City of Moorpark, which accounts for 12.8 square miles (38%) of the District's service area, and contiguous unincorporated areas (62%) in eastern Ventura County. The City of Moorpark is approximately five miles west of the City of Simi Valley and five miles north of the City of Thousand Oaks. A vicinity map of the District's water service area is shown on Figure 3-1.

Figure 3-1: VCWWD No. 1 Location and Water Service Area



Source: GIS CountyView at http://maps/countyview/

3.1.1 City Water System Description

Historically, the primary VCWWD No. 1 source of water supply has been potable water imported from Metropolitan through the local wholesale agency, Calleguas. The imported water, which is primarily State Water Project (SWP) water from the Sacramento-San Joaquin River Delta in Northern California, is treated at Metropolitan's Joseph Jensen

Filtration Plant. Groundwater production from District wells has been the next most prevalent source of water supply followed by Title 22 recycled water produced by the tertiary treatment facilities at the District's Moorpark Water Reclamation Facility (MWRF).

Groundwater is currently produced from the East Las Posas Groundwater Basin, which is managed by Fox Canyon Groundwater Management Agency (FCGMA), via five wells owned and operated by the District with production ranging from 600 gallons per minute (gpm) to 1,100 gpm, and an existing total system capacity of approximately 3,500 gpm. The groundwater is chlorinated at the well sites and two wells are treated for high iron and manganese before being pumped into the potable water distribution system (Well Nos. 15 and 20).

In 2015, the District supplied a total of 9,525 acre feet (AF) of potable water: 81% (7,717 AF) from imported water purchased from Calleguas, and 19% (1,808 AF) from District groundwater production.

The MWRF was originally constructed as a secondary treatment plant in 1965 and began supplying Title 22 recycled water for golf course irrigation in 2003 when tertiary treatment facilities were constructed at the plant. There are now eight active recycled water customers, including the plant itself, and the plant produced 599 AF of recycled water in 2015. The plant currently has a total treatment capacity of 5.0 mgd (5,600 AFY) and a tertiary treatment capacity of 1.5 mgd (1,680 AFY). The plant is required to annually discharge a minimum 0.76 million gallons per day (mgd) (850 AFY) of its treated effluent to percolation basins for groundwater recharge.

The District's potable water distribution system consists of approximately 138 miles of distribution and transmission pipelines, 10 booster pump stations, 20 pressure-reducing stations, 5 active production wells, 9 imported water turnouts, and 18 reservoirs.

Domestic, commercial, industrial, and fire protection customers accounted for approximately 72% of the total water use in 2015, with agricultural customers accounting for 25%, and system water losses accounting for 3%.

3.2 SERVICE AREA BOUNDARY MAPS

The District's water service area, which encompasses approximately 33.7 square miles (21,567 acres), is shown on Figure 3-1.

3.3 SERVICE AREA CLIMATE AND TERRAIN

In addition to the City of Moorpark, the District generally encompasses the surrounding agricultural lands in the valley area of the Arroyo Las Posas and State Highway 118. This area lies between the cities of Camarillo and Thousand Oaks to the south, and the Santa Clara River Valley to the north.

3.3.1 Service Area Climate

The District's service area is characterized by a "Mediterranean" climate that is a semi-arid environment with mild winters, warm summers, and light to moderate rainfall. The climate for the District is consistent with coastal Southern California. The general region lies in the semi-permanent, high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

As shown in Table 3-1A, the average monthly maximum temperature of 83°F occurs in August, and the average monthly minimum temperature of 41 °F occurs in December and January. The average annual maximum temperature for the service area is 75.3°F and the average annual minimum temperature is 48.3 °F. Approximately 75% of the area's average annual rainfall of 10.44 inches occurs between December and March. As shown in Table 3-1A, the average annual evapotranspiration is 55.14 inches

Table 3-1A Historical District Climate Characteristics

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg or Total
Avg. Max Temp (°F)	69	69	71	74	75	77	81	83	82	79	74	69	75.3 Avg
Avg. Min Temp (°F)	41	43	44	46	50	53	57	56	55	50	44	41	48.3 Avg
Avg. Rainfall (in.)[(a)]	1.65	1.61	1.89	0.64	0.20	0.03	0.13	0.01	0.12	0.59	0.84	2.72	10.44 Total
Std. Monthly ETo (in.)	2.17	2.80	4.03	5.10	5.89	6.60	7.44	6.82	5.70	4.03	2.70	1.86	55.14 Total

(a) Average rainfall based on average of 2010-2015 data collected at Stations 126A and 508 located in Moorpark, CA.

Sources:
Temperatures: http://www.weather.com/weather/monthly/l/USCA0728:1:US
Precipitation for Moorpark Station 126A: http://vcwatershed.net/hydrodata/php/getstation.php?siteid=126A#top
Precipitation for Moorpark Station 508: http://vcwatershed.net/hydrodata/php/getstation.php?siteid=508#top
Evapotranspiration: CIMIS Reference Evapotranspiration Zones – Zone 9 for Moorpark area:
http://wwwcimis.water.ca.gov/App_Themes/images/etozonemap.jpg

3.3.2 Service Area Terrain and Soils

The District is within the Ventura County Watershed Protection District (VCWPD). The area has hills to the north and south and increases in elevation from 500 feet to 1,000 feet, with a four-mile-wide valley in between. The District encompasses a portion of the hills to the north, yet the southern boarder only runs up to the base of the southern hills.

The soils in the area are mainly silty and sandy loam, which were formed from weathered alluvium, derived primarily from weathered sedimentary bedrock deposited as alluvial fans. Local soil characteristics are identified in Table 3-1B.

Table 3-1B: Local Soil Characteristics

Soil	Characteristics	Surface	Subsoil	Substratum	% of the District
Rincon	Well-drained, very slow permeability	Silty clay loam	Sandy clay and sandy clay loam that becomes more calcareous with depth	Calcareous, very fine sandy loam	35%
Huerhuero	Moderately well-drained, slow to very slow permeability, very high runoff	Sandy loam underlain by a thin layer of very fine sandy loam	Sandy clay and sandy clay loam	Sandy clay loam	30%
Azule	Well-drained to moderately well drained, slow to very slow permeability	Loam	Sandy clay	Sandy clay loam	20%
Chesterton	Well-drained, very slow permeability, medium runoff	*Unavailable*	*Unavailable*	*Unavailable*	15%
Soper	Well-drained, moderately slow permeability, rapid runoff	*Unavailable*	*Unavailable*	*Unavailable*	

Sources:
http://ceventura.ucanr.edu/Com_Ag/Soils/The_environamental_characteristics_of_Ventura_County_and_its_soils_/General_Soil_Map/
http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/cnmCA2013/cnmCA2013.pdf
http://www.simivalley.org/qcsearch.aspx?q=+Simi+Valley+General+Plan+Update+Technical+Background+Report

3.4 SERVICE AREA POPULATION AND DEMOGRAPHICS

3.4.1 Service Area Population

The District encompasses approximately 33.7 square miles (21,567 acres) and consists of the City of Moorpark, which accounts for 12.8 square miles (38%) of the District's water service area, and contiguous unincorporated areas (62%) in eastern Ventura County.

The DWR Population Tool developed for use on the 2015 UWMP estimates a water agency's water service area population from 1990 through 2015 based on inputting residential (single-family and multi-family) water service connections for the years 1990, 2000, 2010, and 2015 along with the water service area boundary in electronic (KML) format. A District WSA population of 35,782 was estimated for the year 2015 using the DWR Population Tool. The Population Tool worksheets are included in Appendix D for reference. Southern California Association of Government (SCAG) Regional

Transportation Plan (RTP) 2016 population projections for the City of Moorpark were used as the basis for projecting future District WSA populations through 2040, which are shown in Table 3-1. The WSA population is projected to increase 25.8% to 45,000 in the year 2040 relative to the 2015 population of 35,782.

Table 3-1: Population - Current and Projected

Service Area	2015	2020	2025	2030	2035	2040	Increase[(a)]
District WSA	35,782	38,000	40,000	41,700	43,300	45,000	25.8%

(a) Increase relative to 2015

3.4.2 Water-Use-Related Demographics

Of the 10,944 District water service connections in 2015, 10,152 were residential connections (92.8%). Of the 10,152 residential connections, 10,023 were single family (98.7%) and 129 were multi-family (1.3%).

The majority of the District WSA population, housing and development is located in the City of Moorpark. Accordingly, existing demographics, housing, and land use in the City, as well as future development planning in the City, significantly impact overall water use and water system planning for the District.

In 2015, the average number of people per dwelling unit inside the City of Moorpark was 3.33. Of the 10,966 housing units inside the City limits in 2015, 8,016 (73.1%) were single-detached houses, 1,455 (13.3%) were single-attached; 205 (1.9%) were 2- to 4-unit residences; 1,177 were five-plus units (10.7%); and 143 were mobile homes (1.3%). The vacancy rate in 2015 was only 2.4%.

For the City, significant land uses by area are Open Space 2, which allows for 1 dwelling unit (DU) per acre (1 DU/AC), and rural low density residential (1 DU/5 AC), located primarily and exclusively north of Poindexter Avenue and the California State Route 118, respectively. There is also significant medium-low density (2 DU/AC) and medium density residential (4/DU AC) located in the northeast in the vicinity of Campus Park Drive and in the south in the vicinity of Tierra Rejada Road with lower and higher density residential intermixed. The majority of commercial, industrial, and public/institutional land uses are located in the vicinity of Los Angeles Avenue in the center of the City.

The City has a number of specific plans in various stages of completion. Specific plans approved or submitted in the City are as follows:

Carlsberg Specific Plan

This approved and largely constructed specific plan is located on approximately 500 acres in the southeastern portion of the City, bounded generally by the Arroyo Simi and New Los Angeles Avenue on the north, Spring Road on the west, Tierra Rejada Road on the south, and State Highway 23 on the east. The plan includes 534 single-family homes on both sides of Miller Parkway, north of Tierra Rejada Road. The northerly portion of the site, along New Los Angeles Avenue, consists of 40 acres for commercial use, which includes the 29-acre Moorpark Marketplace. South of the Moorpark Marketplace, there are 33 acres for office/business park use, currently being developed as the Patriot Commerce Center. There is also a 29-acre school and seven acres for institutional use.

Moorpark Highlands - Specific Plan Two

The approved Moorpark Highlands Specific Plan includes up to 450 single-family residential lots and one multi-family neighborhood proposed for up to 102 units, on property located north of Charles Street, along the extension of Spring Road, east of Walnut Canyon Road (SR-23), and west of Happy Camp Canyon Regional Park. The project permanently preserves 169 acres of land in a Habitat Conservation Plan, providing open space that enhances the habitat within 94 of those acres, and provides multi-use trails for access to these areas by the public. The project also includes a 7-acre park and reserves land for State Route 23 and North Hills Parkway, a potential bypass route for California State Route 118, as well as an extension of Spring Road to Walnut Canyon Road.

Hitch Ranch - Specific Plan One

A request is currently in process for a 281-acre specific plan that would include development of up to 620 dwelling units and three acres of institutional use, located north of the Union Pacific Railroad, west of Walnut Canyon Road (California State Route 23), and generally east of Gabbert Road.

Downtown Specific Plan

The Downtown Specific Plan area is located in the center of the city limits and contains High Street as its core. Also included in the specific plan area are other parts of Old Town Moorpark, including the residential neighborhood north of High Street, the railroad right of way south of High Street and the properties along Moorpark Avenue north of Los Angeles Avenue. The Downtown Specific Plan furthers the vision for the overall revitalization of the downtown and implements design standards, guidelines, and a strategy for business attraction and development of the city-owned parcels in the downtown.

4 SYSTEM WATER USE

4.1 RECYCLED VERSUS POTABLE AND RAW WATER DEMAND

The primary source of water supply for the District has been imported Metropolitan water purchased through the local wholesale agency, Calleguas. The imported water, which is primarily State Water Project (SWP) water from the Sacramento-San Joaquin River Delta in northern California, is treated at Metropolitan's Joseph Jensen Filtration Plant to drinking (potable) water standards. In 2015, the District supplied a total of 7,717 AF from imported water purchased from Calleguas, which was 76.2% of the total water supply including recycled water.

The District produces groundwater from the East Las Posas Groundwater Basin via five wells owned and operated by the District with a total system capacity of approximately 3,500 gpm (2,170 AFY). The groundwater is chlorinated at the well sites before being pumped into the potable water distribution system. In 2015, the District supplied a total of 1,808 AF from groundwater production, which was 17.9% of the total water supply including recycled water.

The District is planning the Moorpark Desalter Project, which is a groundwater production and treatment system that could provide up to 5,000 AFY of potable water for customers in the District's water service area by the end of 2018. As part of the project, 10 to 18 extraction wells will be constructed to extract poor-quality, brackish groundwater from a shallow aquifer in the South Las Posas Basin and pump the groundwater via a new transmission pipeline to the proposed Moorpark Desalter Plant, where the water will be treated to drinking water standards through a membrane treatment process that includes filters, low-pressure reverse osmosis, disinfection, and chemical water conditioning.

The District's Moorpark Water Reclamation Facility (MWRF) produces Title 22 recycled water via tertiary treatment facilities. There are eight active recycled water customers, and the plant produced 599 AF of recycled water in 2015, which was 5.9% of the total water supply. The plant currently has a treatment capacity of 5.0 mgd (5,600 AFY) and a tertiary capacity of 1.5 mgd (1,680 AFY).

The recycled water supply will increase to approximately 1,100 AFY in 2017 with the addition of a new golf course to the recycled water customer base. It is projected that recycled water use in the District will increase to 2,200 AFY by 2040.

4.2 WATER USES BY SECTOR

Historical potable water service connections by customer sector are shown in Table 4-1A. The total number of water service connections increased by 6.6% between 2005 and 2010, and by 3.5% between 2010 and 2015. Residential (single-family plus multi-family) connections accounted for approximately 93% of total water service connections in 2015.

Table 4-1A: Historical Potable Water Service Connections			
Customer Sector	2005	2010	2015[a]
Single Family	8,981	9,572	10,023
Multi Family	125	125	129
Commercial	203	219	237
Industrial	72	70	65
Institutional	132	158	202
Agricultural	171	172	170
Other[b]	235	257	247
	9,919	10,573	10,944

(a) As of the end of CY 2015
(b) Construction and fire services

Historical metered and billed potable water use by customer sector is shown in Table 4-1B. Total potable water use including unaccounted-for (lost) water decreased from 11,872 AFY in 2005 to 10,197 AFY in 2010 (14.1% decrease); and to 9,525 AFY in 2015 (19.8% decrease relative to 2005). Per capita water use also decreased and is discussed in Section 4.4. System water losses has decreased from 4.0% in 2005 to 2.8% in 2015 and is discussed in Section 4.3. Residential water use has accounted for approximately 57 to 62% of total system water use over the past ten years.

District water system demands for potable water for 2015 are shown in Table 4-1. Projected District potable water demands (including water losses) for the planning period (2020-2040) by water use sector are shown in Table 4-2. The methodology for developing these projected demands is presented in Section 4-4. Total projected potable and recycled water demands for the District are shown in Table 4-3. The District's recycled water production and demands are discussed in Chapter 6.

4.3 DISTRIBUTION SYSTEM WATER LOSSES

In accordance with CWC 10631, distribution system water loss is to be quantified for the most recent 12-month period available for the 2015 Urban Water Management Plan update and is to be reported in accordance with a worksheet approved or developed by DWR through a public process. The water loss quantification worksheets are to be based on the water system balance methodology developed by the American Water Works Association (AWWA). The AWWA water loss worksheets used to calculate VCWWD No. 1 water losses are included in Appendix E.

The AWWA Water Audit Software Version 5.0 was used to quantify distribution water loss for the District for Calendar Year 2015. As shown in Table 4-4, a water loss volume of 144 AFY was calculated for the domestic water system, which is 1.5% of the water supplied assuming 1.25% of authorized consumption (119 AFY) was unbilled and unmetered water use, i.e. water typically used for fighting fires, flushing water mains, conducting fire flow tests, etc.

Table 4-1B: Historical Potable Water Use and Water Loss (AFY)						
	2005[a] Water Use/ Supply	2010[a] Water Use/ Supply	% Change (2005-2010)	2015[a] Water Use/ Supply	% Change (2010-2015)	% Change (2005-2015)
Single-Family Residential	6,555	5,866	-10.5%	5,718	-2.5%	-12.8%
Multi-Family Residential	161	144	-10.5%	151	4.7%	-6.3%
Total Residential	6,716	6,011	-10.5%	5,869	-2.4%	-12.6%
Population	33,702	35,351	4.9%	35,782	1.2%	6.2%
Residential Per Capita (gpcd)	177.9	151.7	-14.7%	146.4	-3.5%	-17.7%
Commercial	675	628	-7.0%	533	-15.1%	-21.0%
Industrial	248	154	-37.9%	135	-12.3%	-45.6%
Institutional	766	677	-11.6%	341	-49.6%	-55.5%
Agricultural	2,615	2,279	-12.8%	2,384	4.6%	-8.8%
Other	372	-	0.0%	-	0.0%	0.0%
Unaccounted	480	449	-6.5%	263	-41.4%	-45.2%
Total	11,872	10,197	-14.1%	9,525	-6.6%	-19.8%
Total Per Capita (gpcd)	314.4	257.4	-18.1%	237.6	-7.7%	-24.4%
Water Supply	11,872	10,197	-14.1%	9,525	-6.6%	-19.8%
Water Loss	480	449		263		
Water Loss %	4.0%	4.4%		2.8%		
Total Per Capita w/o Agricultural[b] (gpcd)	245.1	199.9	-18.4%	178.1	-10.9%	-27.3%

(a) 2005 is fiscal year and 2010 and 2015 are calendar year
(b) For comparison with SBx7-7 2015 and 2020 targets (gpcd), which exclude agricultural water use

Table 4-1: Demands for Potable Water – Actual			
Use Type	2015 Actual		
	Additional Description	Level of Treatment When Delivered	Volume (AFY)
Single Family		Drinking Water	5,718
Multi-Family		Drinking Water	151
Commercial		Drinking Water	533
Industrial		Drinking Water	135
Institutional/Governmental		Drinking Water	341
Agricultural irrigation		Drinking Water	2,384
Losses		Drinking Water	263
Total			9,525

Table 4-2: Demands for Potable Water Projected					
Use Type	Projected Water Use				
	2020	2025	2030	2035	2040
Single Family	6,602	6,897	7,031	7,133	7,244
Multi-Family	175	179	181	183	185
Commercial	617	631	640	647	654
Industrial	156	160	162	164	166
Institutional	395	404	410	414	419
Agricultural	2615	2615	2615	2615	2615
Losses	386	395	400	405	409
Total	10,945	11,280	11,440	11,560	11,693

Table 4-3: Total Water Demands						
	2015	2020	2025	2030	2035	2040
Potable Water Demand	9,525	10,945	11,280	11,440	11,560	11,693
Recycled Water Demand	599	1,400	1,600	1,800	2,000	2,200
Total Water Demand	10,124	12,345	12,880	13,240	13,560	13,893

Table 4-4: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss (AF)
(01/2015)	144

4.4 ESTIMATING FUTURE WATER SAVINGS

In September 2014, two legislative bills amending sections of the Act were approved and chaptered: AB 2067 and SB1420. Key among the changes to existing statutes was the addition of CWC Section 10631(e)(4). This specific addition provides the option for urban water suppliers to reflect its and its customer's efficiency efforts as part of its future demand projection. The new statutes added the following to CWC Section 10631(e):

> *(4) (A): If available and applicable to an urban water supplier, water use projections may display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.*

(B) To the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following:

(i) Provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections.
(ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.

4.4.1 Reduced District Water Use Since 2005

Through the implementation of District water conservation ordinances and measures discussed in Chapter 9, and as shown in Table 4-1B, total District per capita water use has decreased 7.7% since 2010 and 24.4% since 2005; and residential per capita water use has decreased 3.5% since 2010 and 17.7% since 2005.

In April 2015, Governor Edward G. Brown, Jr. issued an Executive Order requiring the State Water Resources Control Board to implement measures to cut the State's overall water usage by 25% due to the continuing drought. The Executive Order mandates a 25% reduction in supply to California's approximately 400 water control agencies and requires water agencies and cities to reduce water use 25% (on average) below 2013 levels by the end of February 2016, with usage reported to the State by water suppliers. Cities and water agencies were assigned various reduction goals, and the District's reduction goal was set at 30%. District water use has decreased a cumulative 26.3% for the first nine recording months (June 2015 through March 2016) relative to year 2013 water usage in response to the District's conservation goal set by the State, which has been extended to October 2016 or as long as the drought continues.

On May 9, 2016 Governor Brown issued Executive Order B-37-16 that builds on temporary statewide emergency water restrictions to establish longer-term water conservation measures, including permanent monthly water use reporting, new permanent water use standards in California communities and bans on clearly wasteful practices. Through a public process and working with partners such as urban water suppliers, local governments and environmental groups, DWR and the SWRCB will develop new water use efficiency targets as part of a long-term conservation framework for urban water agencies. These targets go beyond the 20% reduction in per capita urban water use by 2020 that was embodied in SB X7-7, and will be customized to fit the unique conditions of each water supplier.

4.4.2 Reduced Future District Water Use due to Existing and Future Conservation Measures

As shown in Table 4-1B, through the implementation of District water conservation ordinances and measures discussed in Chapter 9, total per-capita District water use (including agricultural water use) has significantly dropped from 314.4 gpcd in 2005 to 257.4 in 2010 to 237.4 in 2015 (a reduction of 24.4% relative to 2005). *Not including*

agricultural water use, total per capita District water use has dropped from 245.1 gpcd in 2005 to 199.9 in 2010 to 178.1 in 2015 (a reduction of 27.3%).

It is not known how long the current drought will last or when new droughts will start and end in the future. However, many of the water conservation measures already implemented and being implemented by District customers such as turf removal, conversion to drought resistance landscapes, conversion to more efficient irrigation systems and ET-based irrigation controllers, retrofits to high efficiency clothes washers and toilets, implementation of weather-based irrigation controllers, etc. will have permanent effects on water use (reduction) in the future.

It is anticipated that once the drought ends, some water conservation will end, and per capita water use will increase some relative to 2015 water use. However, it is also anticipated that a great deal of water conservation will remain due to permanent measures that have already been implemented for existing District residences and development.

As shown in Table 4-5A, it is estimated in this UWMP that total District per-capita water use (including agricultural water use) will increase from 237.6 gpcd in 2015 to 260.0 in 2020 (approximately a 9.4% increase) for existing houses and development after the end of the drought, which is similar to the water use in 2010. However, it is estimated that water conservation retrofits will continue for existing residences and development as aged plumbing and irrigation appurtenances are replaced over time, and that per-capita water use will decrease to 233.0 gpcd by 2040 (a reduction of approximately 10.4% relative to 2020). Water loss estimated at 3.5% for existing development areas and to range from 2.5 to 3.5% for new development areas.

Agricultural demand is estimated to remain constant at 2,615 AFY from 2020 through 2040, which is approximately the average for the past 10 years. The District will work to keep this demand from increasing in the future with enforced water conservation measures.

Lower per capita water use is projected for new housing development (relative to existing housing and development) due to new building codes and landscape ordinances. California's newly adopted green building code will have a direct impact on home building and water conservation in the State. The new code aims to cut indoor water consumption by at least 20%, primarily through more efficient indoor water fixtures. For a three-bedroom house, the saving is estimated to be about 10,000 gallons of water per year, on average.

The California Green Building program also includes outdoor water conservation by reducing the area devoted to high-water-use lawns and plants, emphasizing natural drought-tolerant plantings, and installing irrigation controls that respond to local weather conditions. This is consistent with the new Model Water Efficient Landscape Ordinance (MWELO), which was adopted by the State on July 15, 2015 and was adopted by the City of Moorpark (City Ordinance 10-383, Chapter 15.23) and County of Ventura on December 1, 2015 by default.

As shown in Table 4-5A, total per-capita water use (including agricultural water use) for new housing and development is estimated to range from 243.0 gpcd in 2020 to 228.0 gpcd in 2040. Residential per-capita water use is estimated to range from 146.0 to 142.0 gpcd. Water loss is estimated at 3.5% for existing development areas and to range from 2.5 to 3.5% for new development areas.

Table 4-5A: Historical & Projected Per-Capita Water Use

	2005	2010	2015	2020	2040
Existing Households					
Residential Per Capita (gpcd)	177.9	151.7	146.4	150.0	146.0
CII Per Capita[(a)] (gpcd)	54.5	36.9	25.2	37.0	25.0
Ag Per Capita[(b)] (gpcd)	69.3	57.5	59.5	61.0	52.0
Water Loss Per Capita[(c)](gpcd)	12.7	11.3	6.6	10.0	10.0
Total Per Capita (gpcd)	314.4	257.4	237.6	258.0	233.0
New Households					
Residential Per Capita (gpcd)	-	-	-	146.0	142.0
CII Per Capita[(a)] (gpcd)	-	-	-	28.0	24.0
Ag Per Capita[(b)] (gpcd)	-	-	-	61.0	52.0
Water Loss Per Capita[(c)](gpcd)	-	-	-	8.0	10.0
Total Per Capita (gpcd)	-	-	-	243.0	228.0

(a) Commercial, industrial and institutional per-capita water use
(b) Agricultural demand estimated at 2,615 AFY from 2020 through 2040
(c) Water loss estimated at 3.5% for existing development areas and to range from 2.5 to 3.5% for new development areas.

Based on per capita water use developed for existing and new housing and development in Table 4-5A, projected District water demands were developed and are shown in Table 4-5B. Based on a projected increase of approximately 3,000 new households by 2040, total water use is estimated to increase from 9,525 AFY in 2015 to 11,693 AFY in 2040 (an increase of approximately 22.8%), which is all attributable to new development. Total per capita water use is estimated to increase from 237.6 gpcd in 2015 to 259.0 in 2020, and then gradually decrease back to 231.9 gpcd in 2040.

Table 4-5B: Projected Potable Water Demands						
	2015	2020	2025	2030	2035	2040
Existing Households						
Population	35,782	35,664	35,545	35,427	35,308	35,190
Total Per Capita Water Use (gpcd)	237.6	258.0	253.3	246.5	239.8	233.0
Water Use (AFY)	9,526	10,309	10,086	9,785	9,485	9,187
New Households						
Population	0	2,336	4,455	6,273	7,992	9,810
Total Per Capita Water Use (gpcd)	0	243.0	239.3	235.5	231.8	228.0
Water Use (AFY)	0	636	1,194	1,655	2,075	2,506
Total Per Capita Water Use (gpcd)	237.6	257.0	251.7	244.8	238.3	231.9
Total Water Use (AFY)	9,526	10,945	11,280	11,440	11,560	11,693

Total per capita water use *not including agricultural water use* is estimated to increase from 178.1 gpcd in 2015 to 196.0 gpcd in 2020, and then gradually decrease back to 179.9 gpcd in 2040. The actual 2015 per capita water use of 178.1 gpcd is less than the 2015 SBx7-7 targets of 219.3 gpcd calculated for the District in this UWMP as detailed in Chapter 5. Also, the 2020 per capita water use projection of 196.0 gpcd matches very closely the 2020 SBx7-7 targets of 195.7 gpcd calculated for the District in this UWMP as detailed in Chapter 5. Note: SBx7-7 target per capita water use does not include agricultural water use.

4.5 WATER USE FOR LOWER INCOME HOUSEHOLDS

For planning and funding purposes, the State Department of Housing and Community Development (HCD) categorizes households into five income groups based on the County Area Median Income (AMI):

- Extremely Low-Income — up to 30% of AMI
- Very Low-Income - 31 to 50% of AMI
- Low-Income - 51 to 80% of AMI
- Moderate Income - 81 to 120% of AMI
- Above Moderate Income — greater than 120% of AMI

Combined, extremely low-, very low-, and low-income households are often referred to as lower-income household. State Housing Element law requires that a local jurisdiction accommodate a share of the region's projected housing needs for the planning period. This share, called the Regional Housing Needs Allocation (RHNA), is important because State law mandates that a jurisdiction provide sufficient land to accommodate a variety of housing opportunities for all economic segments of the community. Compliance with this requirement is measured by the jurisdiction's ability in providing adequate land with adequate density and appropriate development standards to accommodate the RHNA. The Southern California Association of Governments (SCAG) is responsible for allocating the RHNA to individual jurisdictions within the region.

The City of Moorpark accounts for approximately 97% of the water service area by population, with the majority of housing also located in the City. SCAG assigned a RHNA of 1,164 units to the City of Moorpark for the 2014-2021 RHNA period, in the income distribution shown in Table 4-5C.

Table 4-5C: City of Moorpark's 2014-2021 RHNA Assigned Units

Income Group	Number of Units	Percentage
Extremely/Very Low	289	24.8%
Low	197	16.9%
Moderate	216	18.6%
Above Moderate	462	39.7%
Total	1,164	100.0%

The lower-income households total 486 units for the City of Moorpark. Assuming all 486 lower-income housing units are built by 2025, and based on an estimated 3.28 people per dwelling unit, and a per capita water usage of 182.0 gpcd (not including agricultural water use), the water demand increase for these 486 lower income housing units is estimated at 325 AFY, which is included in all water demand projections in this UWMP.

Confirmation that future water savings and demands for lower-income households are included in demand projections is provided in Table 4-5.

Table 4-5: Inclusion in Water Use Projections

Are Future Water Savings Included in Projections?	Yes
If "Yes" to above, state the section where citations of the codes, ordinances, etc., utilized in demand projections are found.	Chapter 9 2015 UWMP
Are Lower Income Residential Demands Included in Projections?	Yes

4.6 CLIMATE CHANGE

As presented in Metropolitan's 2015 UWMP: Climate change adds its own uncertainties to the challenges of planning. Metropolitan's water supply planning has been fortunate in having almost one-hundred years of hydrological data regarding weather and water supply. This history of rainfall data has provided a sound foundation for forecasting both the frequency and the severity of future drought conditions, as well as the frequency and abundance of above-normal rainfall.

But, weather patterns can be expected to shift dramatically and unpredictably in a climate driven by increased concentrations of carbon dioxide in the atmosphere. These changes in weather significantly affect water supply planning, irrespective of the debate associated with the sources and cause of increasing concentrations of greenhouse gasses. As a major steward of the region's water supply resources, Metropolitan is committed to performing its due diligence with respect to climate change.

While uncertainties remain regarding the exact timing, magnitude, and regional impacts of these temperature and precipitation changes, researchers have identified several areas of concern for California water planners. These include:

- Reduction in Sierra Nevada snowpack;
- Increased intensity and frequency of extreme weather events; and
- Rising sea levels resulting in
    - Impacts to coastal groundwater basins due to seawater intrusion
    - Increased risk of damage from storms, high-tide events, and the erosion of levees; and
    - Potential pumping cutbacks on the SWP and Central Valley Project (CVP)

Other important issues of concern due to global climate change include:

- Effects on local supplies such as groundwater;
- Changes in urban and agricultural demand levels and patterns;
- Impacts to human health from water-borne pathogens and water quality degradation;
- Declines in ecosystem health and function; and
- Alterations to power generation and pumping regimes.

4.6.1 Metropolitan's Activities Related to Climate Change Concerns

Under the 2015 Integrated Resource Plan (IRP) Update, Metropolitan recognizes additional risks and uncertainties from a variety of sources:

- Water quality
- Climate change
- Regulatory and operational changes
- Project construction and implementation issues

- Infrastructure reliability and maintenance
- Demographic and growth uncertainty

Any of these risks and uncertainties, should they occur individually or collectively, may result in a negative impact to water supply reliability. While it is impossible to know how much risk and uncertainty to guard against, the region's reliability will be more secure with a long-term plan that recognizes risk and provides resource development to offset that risk. Some risk and uncertainty will be addressed by following the findings of the 2015 IRP Update. But there are other risks that may take longer to manifest, like climate change or shifts in demographic growth patterns that increase or move the demands for water.

Metropolitan has established an intensive, comprehensive technical process to identify key vulnerabilities. This Robust Decision-Making (RDM) approach was used with the 2010 IRP Update resource plan. The RDM approach can show how vulnerable the region's reliability is to longer-term risks and can also establish "signposts" that can be monitored to see when critical changes may be happening. Signposts include monitoring the direction of ever-changing impacts from improved Global Climate Models, and housing and population growth patterns. The RDM approach will be revisited with the new resource reliability targets identified in the 2015 IRP Update.

Initial 2015 IRP analysis indicated an additional 200,000 AF of water conservation and local supplies may be needed to address these risks. This additional supply goal will be considered when examining implementation polices and approaches as the IRP process continues.

Metropolitan is an active and founding member of the Water Utility Climate Alliance (WUCA). WUCA consists of ten nationwide water providers collaborating on climate change adaptation and greenhouse gas mitigation issues. As a part of this effort, WUCA pursues a variety of activities on multiple fronts.

Member agencies of WUCA annually share individual agency actions to mitigate greenhouse gas emissions to facilitate further implementation of these programs. WUCA also monitors development of climate change-related research, technology, programs, and federal legislation.

In addition to supporting federal and regional efforts, WUCA released a white paper entitled "Options for Improving Climate Modeling to Assist Water Utility Planning for Climate Change" in January 2010. The purpose of this paper was to assess Global Circulation Models, identify key aspects for water utility planning, and make seven initial recommendations for how climate modeling and downscaling techniques can be improved so that these tools and techniques can be more useful for the water sector. Another recent WUCA publication related to water planning entitled "Embracing Uncertainty: A Case Study Examination of How Climate Change is Shifting Water Utility Planning" (2015). A fundamental goal of this recent white paper is to provide water professionals with practical and relevant examples, with insights from their peers,

on how and why to modify planning and decision-making processes to better prepare for a changing climate.

In addition to these efforts, the member agencies of WUCA annually share individual agency actions to mitigate greenhouse gas emissions to facilitate further implementation of these programs. At a September 2009 summit at the Aspen Global Change Institute, WUCA members met with global climate modelers, along with federal agencies, academic scientists, and climate researchers to establish collaborative directions to progress climate science and modeling efforts. WUCA continues to pursue these opportunities and partnerships with water providers, climate scientists, federal agencies, research centers, academia and key stakeholders.

Metropolitan also continues to pursue knowledge sharing and research support activities outside of WUCA. Metropolitan regularly provides input and direction on California legislation related to climate change issues. Metropolitan is active in collaborating with other state and federal agencies, as well as non-governmental organizations, on climate change related planning issues. The following list provides a sampling of entities that Metropolitan has recently worked with on a collaborative basis:

- USBR
- U.S. Army Corps of Engineers
- AWWA Research Foundation
- National Center for Atmospheric Research
- California Energy Commission
- California Department of Water Resources
- Quantification of Current Research

Metropolitan continues to incorporate current climate change science into its planning efforts. A major component of the current IRP update effort is to explicitly reflect uncertainty in Metropolitan's future water management environment. This involves evaluating a wider range of water management strategies, and seeking robust and adaptive plans that respond to uncertain conditions as they evolve over time, and that ultimately will perform adequately under a wide range of future conditions. The potential impacts and risks associated with climate change, as well as other major uncertainties and vulnerabilities, will be incorporated into the update and accounted. Overall, Metropolitan's planning activities strive to support the Board adopted policy principles on climate change by:

- Supporting reasonable, economically viable, and technologically feasible management strategies for reducing impacts on water supply,
- Supporting flexible "no regret" solutions that provide water supply and quality benefits while increasing the ability to manage future climate change impacts, and
- Evaluating staff recommendations regarding climate change and water resources under the California Environmental Quality Act (CEQA) to avoid adverse effects on the environment.

Metropolitan has made great efforts to implement greenhouse gas mitigation programs and policies for its facilities and operations. To date, these programs and policies have focused on:

- Exploring water supply/energy relationships and opportunities to increase efficiencies;
- Participating in the Climate Registry, a nonprofit greenhouse gas emissions registry for North America that provides organizations with the tools and resources to help them calculate, verify, report, and manage their greenhouse gas emissions in a publicly transparent and credible way;
- Acquiring "green" fleet vehicles, and supporting an employee Rideshare program;
- Developing solar power at both the Skinner water treatment plant (completed) and the Weymouth water treatment plant (in progress); and
- Identifying and pursuing development of "green" renewable water and energy programs that support the efficient and sustainable use of water.

Metropolitan also continues to be a leader in efforts to increase regional water use efficiency. Metropolitan has worked to increase the availability of incentives for local conservation and recycling projects, as well as supporting conservation Best Management Practices for industry and commercial businesses.

5 SB X7-7 BASELINES AND TARGETS

Senate Bill x7-7 (SBx7-7) was enacted in November 2009 (Water Conservation Act of 2009), requiring all water suppliers to increase water use efficiency. The legislation set an overall goal of reducing per capita urban water use by 20% by December 31, 2020 and to make incremental progress towards this goal by reducing per capita water use by at least 10% by December 31, 2015.

In preparing the 2010 UWMP, each urban retail water supplier was required to develop baseline daily per-capita water use, minimum baseline daily per capita water use, and target daily per capita water use for 2015 and 2020 that were to be 10% and 20% less, respectively, than the baseline daily per capita water use based on utilizing one of four methods provided; with the target reduction for 2020 greater than the legislation's minimum water use reduction requirement. The four methods are:

- Method 1: 80% of the water supplier's baseline per capita water use
- Method 2: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscape area water use; and commercial, industrial, and institutional uses
- Method 3: 95% of the applicable state hydrologic region target as stated in the State's April 30, 2009, draft 20x2020 Water Conservation Plan
- Method 4: A BMP Option based on standards that are consistent with the California Urban Water Conservation Council's (CUWCC) best management practices (BMPs).

Baseline daily per capita water use is defined as a continuous 10 or 15 year base period (baseline) for water use ending no earlier than December 31, 2004 and no later than December 31, 2010.

If the average baseline daily per-capita water use is greater than 100 gpcd for a defined 5-year baseline period, the legislation's minimum water use reduction requirement must also be met as set in Section 10608.22 of Senate Bill No. 7 SBx7-7. Per SBx7-7, the minimum water use reduction baseline period must end no earlier than December 31, 2007, and no later than December 31, 2010, and the minimum reduction shall be no less than 5% of this 5-year base daily per capita water use.

For the 2015 UWMP, water agencies must demonstrate compliance with their established water use target for 2015, which will also demonstrate whether the agency is currently on track to achieve its 2020 target.

5.1 UPDATING CALCULATIONS FROM 2010 UWMP

In the 2010 UWMP, water agencies calculated a 2020 Urban Water Use Target through the use of a selected target method. In 2015 UWMPs, water agencies may update their

2020 Target and may make this calculation using a different target method than was used in 2010

DWR determined that significant discrepancies existed between Department of Finance (DOF) projected populations for 2010 (based on 2000 U.S. Census data) and actual populations for 2010 based on 2010 U.S. Census data. The average difference between projected and actual was approximately 3%, but the difference for some cities was as high as 9%.

Therefore, if an agency did not use 2010 Census data for their baseline population calculations in the 2010 UWMP (the full census data set was not available until 2012), DWR has determined that these agencies must recalculate their baseline population for the 2015 UWMPs using 2000 and 2010 Census data. This may affect the baseline and target gpcd values calculated in the 2010 UWMP, which must be modified accordingly in the 2015 UWMP. The District's 2010 UWMP did not use 2010 census data for its baseline population calculations and it is therefore recalculated in the 2015 UWMP to update SBx7-7 targets

5.2 BASELINE PERIODS

Recycled water use in the District was not at least 10% of total water deliveries in 2008, and therefore, a 10-year baseline period is used as opposed to a 15-year baseline period. The baseline period must end no earlier than December 31, 2004, and no later than December 31, 2010. The most advantageous sequence of years for calculating per capita water use is the sequence that generates the highest per capita water use, making subsequent water conservation easier to achieve. Accordingly, the 10-year period 2000 through 2009 was selected as the average per capita water use baseline for the 2015 UWMP, which is the same baseline period used in the 2010 UWMP, as shown in Table 5-1A.

Per SBx7-7, the minimum 5-year water use reduction baseline period must end no earlier than December 31, 2007, and no later than December 31, 2010. A 5-year minimum water use reduction baseline period between 2004 through 2008 was selected to calculate the most advantageous 5-year minimum water use reduction target as shown in Table 5-1B. The minimum 5-year water use reduction baseline period is used to calculate the legislation's minimum water use reduction requirement.

5.3 SERVICE AREA POPULATION

DWR developed a "Population Tool" that uses GIS and Census data to calculate population within the water supplier's service area, which can be used for the preparation of the 2015 UWMP. The Population Tool is particularly useful for agencies whose water service area boundaries do not match to a city boundary and cannot use DOF population data alone. The Population Tool utilizes US Census data and electronic maps of the agency's service area. Using the number of agency service connections, the tool will calculate the population for the non-census years.

The DWR Population Tool was used to estimate the District's water service area population from 1990 through 2015 based on inputting residential (single-family and multi-family) water service connections for the years 1990, 2000, 2010, and 2015 along with the District's water service area boundary in electronic format. The Population Tool worksheets are included in Appendix D for reference.

Table 5-1A: Baseline Daily Per Capita Water Use

Sequence Year	Year	Water Service Area Population	Daily System Gross Water Use (AFY)	Annual Daily Per Capita Water Use (gpcd)
1	2000	31,913	8,327	232.9
2	2001	32,272	8,001	221.3
3	2002	32,639	8,869	242.5
4	2003	33,002	8,756	236.8
5	2004	33,356	9,930	265.7
6	2005	33,702	9,258	245.2
7	2006	34,042	8,855	232.2
8	2007	34,376	9,164	237.9
9	2008	34,706	10,538	271.0
10	2009	35,026	9,577	244.0
Baseline Daily Per Capita Water Use:				242.9

Table 5-1B: Minimum Baseline Daily Per-Capita Water Use

Sequence Year	Year	Water Service Area Population	Daily System Gross Water Use (AFY)	Annual Daily Per Capita Water Use (gpcd)
1	2004	33,356	9,930	265.7
2	2005	33,702	9,258	245.2
3	2006	34,042	8,855	232.2
4	2007	34,376	9,164	237.9
5	2008	34,706	10,538	271.0
Minimum Baseline Daily Per Capita Water Use:				250.4

5.4 GROSS WATER USE

Gross water use for the baseline and minimum baseline periods are shown in Table 5-1A and 5-1B, respectively. Gross water use includes all potable water use within the District's water service area excluding agricultural water use.

5.5 BASELINE DAILY PER CAPITA WATER USE

As shown in Table 5-1A, the baseline per-capita water use is calculated to be 242.9 gpcd. In the 2010 UWMP, the baseline per capita water use was calculated to be 239.8 gpcd. As shown in Table 5-1B, the minimum baseline per capita water use is calculated to be 250.4 gpcd. In the 2010 UWMP, the minimum baseline per capita water use was calculated to be 239.6 gpcd.

5.6 2015 AND 2020 TARGETS

As shown in Table 5-1B, the minimum baseline water use averages 250.4 gpcd. The minimum per capita water use target for 2020 must therefore be 237.9 gpcd (95% of 250.4 gpcd). The calculation of the 2020 water use reduction target for the four methods are as follows:

- Method 1: Using a baseline per capita average of 242.9 gpcd (shown in Table 5-1A) the District's 2020 target would be 194.3 gpcd (80% of 242.9). Since the target water use for Method 1 is less than the one found using the legislation's minimum requirement criteria (237.9), no further adjustments to this water use target would be required, if this method is selected.
- Method 2: The District does not currently maintain records of lot size, irrigated landscaped area for each parcel, reference evapotranspiration for each parcel, etc. to split its residential, commercial, industrial, or institutional uses into inside and outside (landscape irrigation) uses. The use of Method 2 to calculate conservation targets is therefore not feasible.
- Method 3: The District falls within the South Coast Hydrologic Region (Hydrologic Region 4). According to the State's 20x2020 Water Conservation Plan, the 2020 Target for Hydrologic Region 4 is 149 gpcd. Using Method 3, the District's 2020 water use target would be 141.6 gpcd (95% of 149). Since the target water use generated by Method 3 is less than the one found using the minimum requirement, no further adjustments to this water use target would be required, if this method is selected.
- Method 4: DWR's Target Method 4 Calculator was utilized to calculate 2020 target water use for the District under this method based on standards consistent with CUWCC BMPs. The District currently meters all water services, so there is no projected metering savings. A default indoor residential water savings of 15 gpcd was assumed. CII savings was calculated to be 4.5 gpcd and landscape irrigation and water loss savings was calculated to be 27.7 gpcd. Using Method 4, the District's 2020 water use target would be 195.7 gpcd. Since the target water use generated by Method 4 is less than the one found using the minimum requirement, no further adjustments to this water use target would be required, if this method is selected.

The discussion and calculations above are summarized in Table 5-1C.

Table 5-1C: 2020 Targets by Method	
Method	2020
1	194.3
2	Not Applicable
3	141.6
4	195.7

As shown in Table 5-1, Method 4 results in the most favorable 2020 water use target level for the District: 195.7 gpcd. The 2015 interim target is calculated to be 219.3 gpcd (mid-point between baseline of 242.9 and 2020 target of 195.7). In the District's 2010 UWMP, the District's 2020 target water use was calculated to be 191.8 gpcd using Method 1 and the 2015 interim target was calculated to be 215.8 gpcd.

A baselines and target summary is shown in Table 5-1.

Table 5-1: Baselines and Targets Summary					
Baseline Period	Start Year	End Year	Average Baseline gpcd[(a)]	2015 Interim Target[(a)]	Confirmed 2020 Target[(a)]
10 year	2000	2009	242.9	219.3	195.7
5 Year	2004	2008	250.4		

(a) All values are in Gallons per Capita per Day (gpcd)

5.7 2015 COMPLIANCE DAILY PER CAPITA WATER USE

In 2015, the District's per capita water use was 178.1 gpcd, which is significantly lower than its 2015 target of 219.3 gpcd as demonstrated in Table 5-2. There were no adjustments to the 2015 target for extraordinary events, economic adjustment, or weather normalization.

Table 5-2: 2015 Compliance (GPCD)								
Actual 2015 gpcd	2015 Interim Target gpcd	**Optional Adjustments to 2015** Enter "0" for adjustments not used *From Methodology 8*					2015 gpcd	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		Extraordinary Events	Economic Adjustment	Weather Normal-ization	TOTAL Adjustments	Adjusted 2015 gpcd		
178.1	219.3	0	0	0	0	219.3	178.1	Yes

5.8 REGIONAL ALLIANCE

The District is not participating in a regional alliance and is submitting their 2015 UWMP individually.

6 SYSTEM SUPPLIES

The District's water supplies come from three sources:

1. Metropolitan imported water purchased through the local wholesale agency; Calleguas, which is treated at Metropolitan's Joseph Jensen Filtration Plant to drinking water standards;

2. Groundwater pumped from the East Las Posas Groundwater Basin via five wells owned and operated by the District. This groundwater is chlorinated at the well sites to potable water standards;

3. Title 22 recycled water produced at the District's Moorpark Water Reclamation Facility (MWRF).

6.1 PURCHASED IMPORTED WATER

The primary source of water supply for the District has been Metropolitan imported water through the local wholesale agency, Calleguas. The imported water, which is primarily State Water Project (SWP) water from the Sacramento-San Joaquin River Delta in Northern California, is treated at Metropolitan's Joseph Jensen Filtration Plant to drinking water standards. In 2015, the District supplied a total of 7,717 AF from imported water purchased from Calleguas, which was 76.2% of the total water supply including recycled water.

6.1.2 Calleguas Municipal Water District (Calleguas)

Calleguas 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, Calleguas 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 geographic divisions within the District. In 1960, Calleguas became a member agency of Metropolitan, which provides wholesale water from the Colorado River via the Colorado Aqueduct and Northern California via the State Water Project (SWP). Metropolitan is comprised of 26 member agencies, and Calleguas is the fifth largest member agency in terms of average annual water deliveries. The Calleguas water service area is shown in Figure 6-1.

Calleguas distributes high quality drinking water on a wholesale basis to 19 local purveyors, including VCWWD No. 1, who in turn deliver water to area residents, businesses, and agricultural customers. These 19 Calleguas purveyors are listed in Table 6-1A. Approximately three-quarters of Ventura County residents (roughly 630,000 people) depend on Calleguas for all or part of their water and the water supplied by Calleguas currently represents approximately 73% 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 is for agricultural purposes. Agricultural demands are met by the District or by groundwater provided by other private entities.

Figure 6-1
Calleguas Municipal Water District Service Area

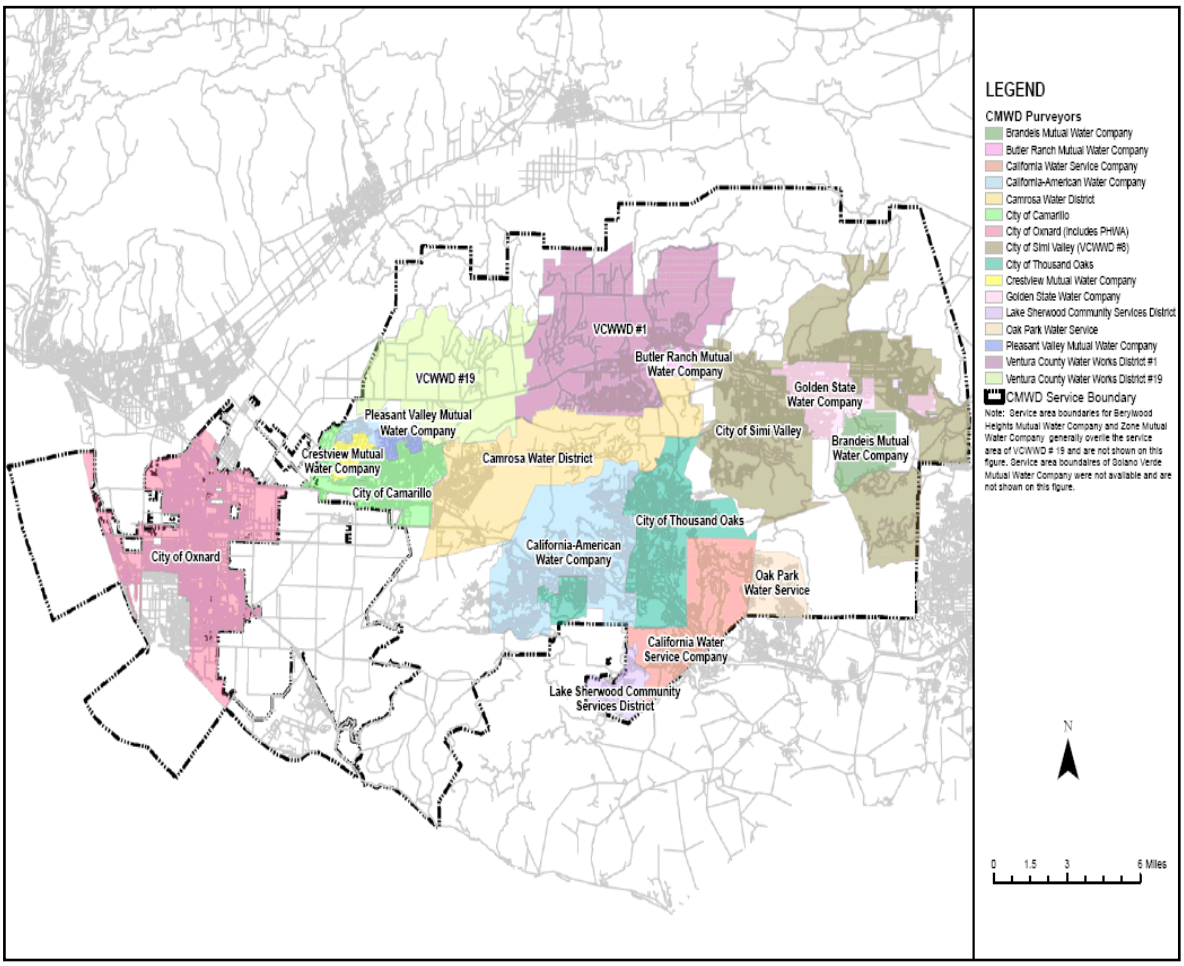


Table 6-1A: Calleguas Member Water Purveyors	
Berylwood Heights Mutual Water Company	Crestview Mutual Water Company
Brandeis Mutual Water Company	Golden State Water Company
Butler Ranch Mutual Water Company	VCWWD No. 38
California Water Service Company	Oak Park Water Service
California-American Water Company	Pleasant Valley Mutual Water Company
Camrosa Water District	Solano Verde Mutual Water Company
City of Camarillo	VCWWD No. 1
City of Oxnard	VCWWD No. 19
City of Simi Valley (VCWWD No. 8)	Zone Mutual Water Company
City of Thousand Oaks	

6.1.3 Metropolitan Water District of Southern California (Metropolitan)

Metropolitan is a wholesale water agency serving 19 million people in six Southern California counties. Metropolitan was formed in 1928 and is composed of 26 member agencies including Calleguas. As a wholesaler, Metropolitan has no retail customers, and distributes treated and untreated water directly to its 26 member agencies. Metropolitan's service area is shown on Figure 6-2.

Metropolitan provides water from the Colorado River and the State Water Project (San-Joaquin River Delta), and also obtains additional supplies from numerous storage, water transfers, exchanges, water banking, and fallowing projects.

Metropolitan has a legal entitlement to receive water from the Colorado River under a permanent service contract with the Secretary of the Interior. The Colorado River Aqueduct (CRA) transports water from Lake Havasu, at the border of the states of California and Arizona, approximately 242 miles to its terminus at Lake Mathews in Riverside County. The CRA is owned and operated by Metropolitan and has a capacity of 1.2 MAF a year.

Metropolitan also receives water from the San-Joaquin River Delta (Delta) in Northern California via the 444-mile-long California Aqueduct (State Water Project or SWP), which is managed by the Department of Water Resources (DWR). The SWP provides imported water to the Metropolitan service area and has provided from 25% to 50% of Metropolitan's water supplies. In accordance with its contract with the Department of Water Resources (DWR), Metropolitan has a Table A allocation of 1,911,500 AF per year under contract from the State Water Project. Calleguas and its member agencies primarily receive SWP water through Metropolitan with Colorado River water normally available as a backup imported water supply.

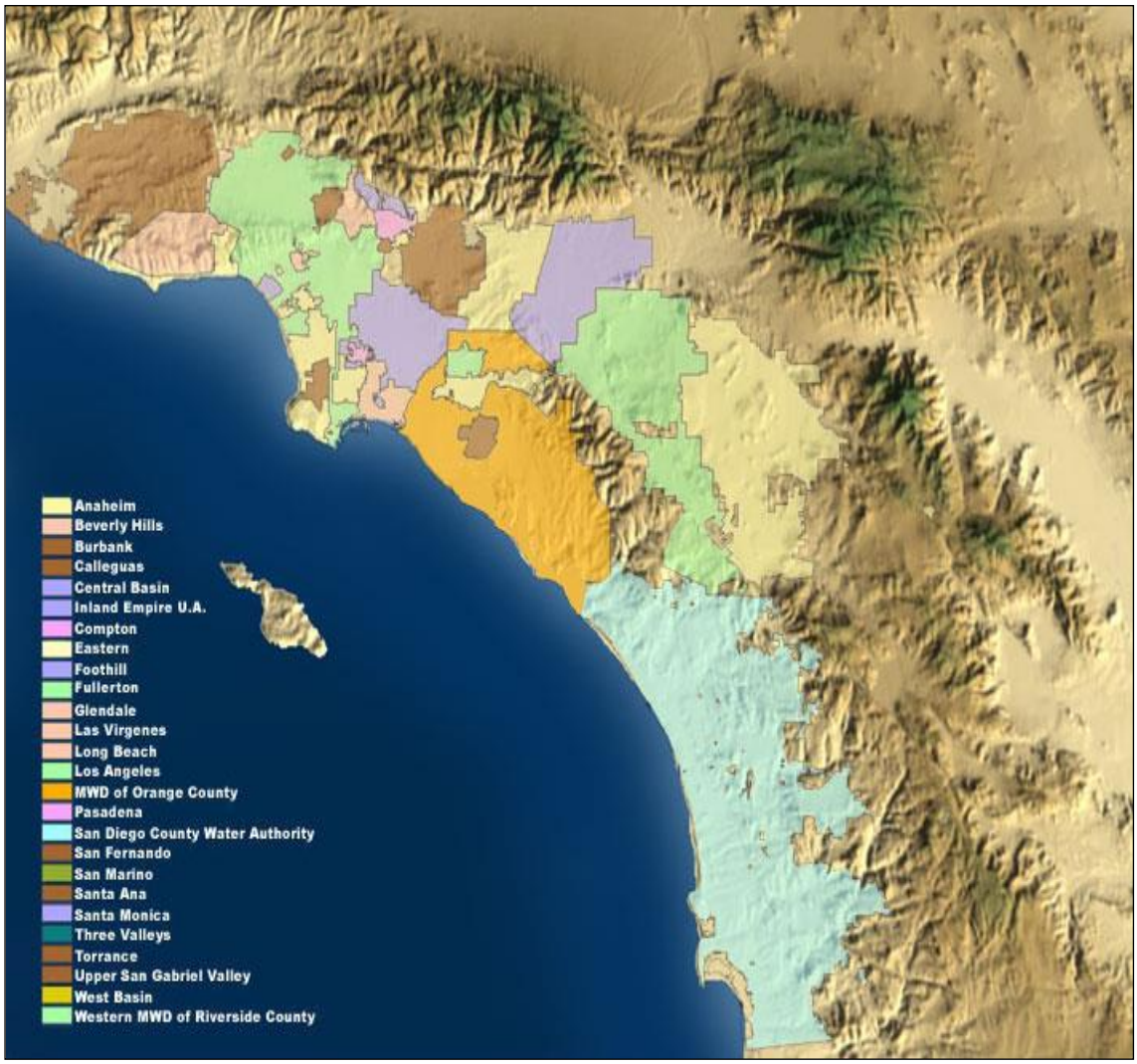
Metropolitan's total minimum supply, absent impacts of a major earthquake or other natural or man-made disaster, is approximately 1.2 million AFY.

6.1.4 Metropolitan Import Deliveries under Water Supply Allocation

In April 2015, citing continued drought conditions and reduced allocations from the State Water Project and Colorado River, the Metropolitan Board of Directors approved implementing their Water Supply Allocation Plan (WSAP) at a Regional Shortage Level 3 starting July 1, 2015, to cut imported water deliveries to its member agencies by 15%. Under a Level 3 WSAP, MWD could impose a surcharge, ranging from $1,480 to $2,960/AF of additional water for any member agency that failed to meet the 15% reduction. The allocation plan limits water usage for its 26 member agencies based on their dependency on MWD supplies, while considering local supply conditions and past water-saving actions. The Tier 1 threshold for Calleguas was set at 13.7%. Calleguas would pass the surcharge on to Calleguas' retail customers exceeding this water allocation threshold.

On May 10, 2016, the Metropolitan Board of Directors reduced the WSAP to a Level 2, which is a 10% reduction in imported water deliveries, effective immediately, due to lower demands achieved through the region's water saving efforts and improved supply conditions, particularly in Northern California; and declared there would be no WSAP set forth for FY 2017. Calleguas also rescinded their surcharge in May 2016.

Figure 6-2
Metropolitan Service Area



6.2 GROUNDWATER

The District's water service area overlies groundwater basins in Ventura County that are managed by Fox Canyon Groundwater Management Agency (FCGMA), whose jurisdictional area encompasses about 118,000 acres (185 square miles). The FCGMA was initially created to manage the groundwater in both over-drafted and potentially seawater-intruded areas within Ventura County. The prime objectives and purposes of the FCGMA are to preserve groundwater resources for agricultural, municipal, and industrial

uses in the best interests of the public. Protection of water quality and quantity along with maintenance of long-term water supply are included in those goals and objectives

The basins within the FCGMA are part of the Transverse Ranges geologic province, in which the mountain ranges and basins are oriented in an east-west rather than the typical northeast- southwest trend in much of California and the western United States. Active thrust faults border the basins of the Santa Clara River, causing rapid uplift of the adjacent mountains and down-dropping of the basins. The alluvial basins are filled with substantial amounts of Tertiary and Quaternary sediments deposited in both marine and terrestrial (non-marine) settings. The basins beneath the Oxnard Plain are filled with sediments deposited on a wide delta complex formed at the terminus of the Santa Clara River and was heavily influenced by alternating episodes of advancing or retreating shallow seas that varied with world-wide sea level changes over many millions of years.

There are seven main or significant groundwater basins within the FCGMA as shown in Figure 6-3. These groundwater basins include the Oxnard Plain, the Oxnard Plain Forebay, the Pleasant Valley, the Santa Rosa, and the Las Posas Valley (East, West and South) basins. These basins generally contain two major aquifer systems, the Upper Aquifer System (UAS) and the Lower Aquifer System (LAS).

Separate aquifers locally named within these systems include the Oxnard and Mugu aquifers (UAS) and the Hueneme, Fox Canyon, and Grimes Canyon aquifers (LAS). A shallower, unconfined aquifer is also present locally underlying rivers and creeks. Underlying the Oxnard Plain and Pleasant Valley basins are sand layers of the "semi-perched zone," which may locally contain poor-quality water. This zone extends from the surface to no more than 100 feet in depth. These sands overlie confining clay of the upper Oxnard Aquifer which generally protects the underlying aquifers from contamination from surface land uses. The Semi-perched zone is rarely used for water supply.

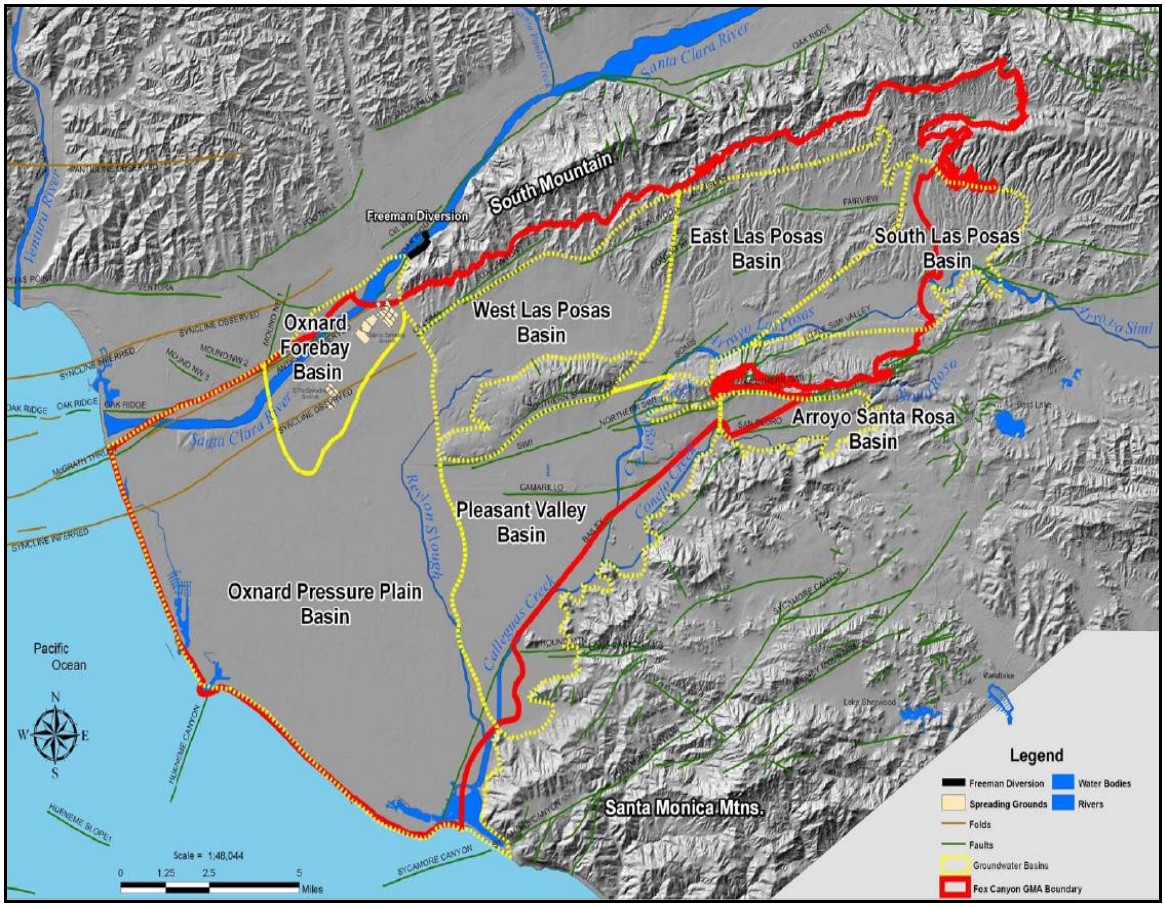
Historically, both the UAS and the LAS have been in a state of overdraft, which has led to seawater intrusion. Unfortunately, water in the UAS has elevated levels of chlorides and total dissolved solids (TDS). VCWWD No. 1 and other agencies are active participants in regional efforts to put some of this water to beneficial use by advancing groundwater desalter projects (groundwater recovery).

The Las Posas Valley Basin is bounded on the south by the Camarillo and Las Posas Hills and on the north by South Mountain and Oak Ridge (CSWRB, 1954). The Las Posas Valley Basin is not adjudicated, and based on the DWR official departmental bulletins (California's Groundwater Bulletin 118 Updated 2003, Bulletin 160, and the California Water Plan Update 2009), the Las Posas Valley Basin is not specifically identified as a basin in an overdraft condition.

However, subsidence and seawater intrusion are both common regional groundwater challenges facing the South Coast Hydrologic Region. FCGMA was formed primarily to manage water quality and managing extractions aids in this goal. FCGMA maintains that the Las Posas Valley Basin is in overdraft relative to the native water supply to the basin, yet has been sustained in some areas by non-native inflows from wastewater treatment

plant discharges, urban runoff, and shallow groundwater dewatering discharges from upstream areas. Since 1992, FCGMA has incrementally reduced groundwater allocations by 25%. On April 11, 2014, FCGMA further imposed a Temporary Extraction Allocation (TEA) reduction of 20% and implemented high penalties for over-pumping.

Figure 6-3
Fox Canyon Groundwater Management Agency Boundaries and Basins



The Las Posas Valley Basin has been subdivided into West, East, and South basins (e.g., Hanson, 1998). Productive aquifers in this basin include a shallow, unconfined aquifer that is most transmissive along the Arroyo Las Posas and a lower confined aquifer system that is considered to be the equivalent of the Lower Aquifer System on the Oxnard Plain. VCWWD No. 1 has historically produced groundwater from the East Las Posas Basin and is planning a groundwater production and treatment system (Moorpark Desalter Project), which is discussed later in this section, to produce groundwater from the South Las Posas Basin.

6.2.1 East Las Posas Basin

The District has historically produced groundwater from the East Las Posas Basin, which is separated from the West Las Posas Basin by a north-trending, unnamed fault running through Somis (CH2MHill, 1993; Hanson, 1998), across which groundwater levels differ

by as much as 400 feet. The fault also acts as a barrier to transport of saline waters from the East Las Posas basin to the West Las Posas basin (Bachman, 1999).

The source of recharge to the East Las Posas basin has changed significantly since urban development of the Simi Valley and Moorpark areas over the last 30 years. Prior to this time, recharge was predominantly from rainfall on outcrop areas and from percolation of winter floodwater along the Arroyo Las Posas. Geochemical studies show that groundwater in the central portion of the East Las Posas basin is hundreds to thousands of years old (Izbicki, 1996b), indicating a slow rate of historical recharge along the flanks of the basin.

As discussed for the South Las Posas basin, urban development has brought increased discharges of both treated wastewater (including treated discharges from the District's Moorpark Wastewater Treatment Plant) and shallow groundwater into Arroyo Las Posas, providing a year-round recharge source for the South and East Las Posas basins (CH2MHill, 1993; Bachman, 2002). This increased percolation from the arroyo has created a recharge mound that extends northward into the East Las Posas basin, where groundwater levels have risen by 125 feet to 200 feet during the past 30 years.

Conversely, pumping in the basin has resulted in falling groundwater levels in the eastern portion of the basin, away from the recharge mound. The largest drop in groundwater levels (190 feet) over the period 1973 to 1998 occurred in this region (Bachman, 1999). Groundwater levels have stabilized somewhat across the basin since the late 1990s, at least in part because of the addition of in-lieu and injected recharge by Calleguas as part of the Las Posas Basin Aquifer Storage and Recovery (ASR) project.

Increasing concentrations of salts (chloride, sulfate, sodium) in the portion of the basin along the Arroyo Las Posas continue to be a problem in the East Las Posas Basin. Chloride concentrations in the shallow aquifer beneath the arroyo can reach 360 mg/L, whereas chloride concentrations in the surface waters in the arroyo are in the range of 120-180 mg/L (Bachman, 2002). These increased chloride concentrations in the shallow aquifer are associated with historically-high groundwater levels (that apparently leach salts from previously-unsaturated sediments in the shallow aquifer along the arroyo).

The groundwater that contains these chloride-rich salts recharges the Lower Aquifer System by moving downward from the shallow aquifer into the LAS, then northward into the basin. This recharge has formed a chloride-rich recharge mound beneath the Arroyo Las Posas and northward into the main portion of the East Las Posas basin (Bachman, 2002). Individual wells along the south flank of the basin show a progression of filling of the shallow aquifer, with a coincident increase in chloride concentration.

The District produces groundwater from the East Las Posas Groundwater Basin via five wells owned and operated by the District with a total system capacity of approximately 3,500 gpm (2,170 AFY). The groundwater meets all State and Federal water quality standards for drinking water with the exception that treatment is required at one of the well sites (Well No. 20) to lower iron and manganese levels below the State Title 22 Secondary Maximum Contaminant Level (MCL) for these two minerals. The

groundwater is chlorinated at each well site before being pumped into the potable water distribution system. Groundwater produced by the five District wells from 2011 through 2015 is shown in Table 6-1B with a summary provided in Table 6-1. FCGMA, the groundwater sustainability agency (GSA), has allocated the District a maximum 1,756 AFY for groundwater pumping in 2016 (Ordinance E). Regardless of system capacity, the District will not be allowed to exceed 1,756 AFY for local potable water supply going forward.

Table 6-1B: Historical Groundwater Production for District Wells (AFY)

Well No. (Design gpm)	2011	2012	2013	2014	2015
15 (600)	416.4	419.5	627.8	445.1	0
20 (1,100)	769.5	1,208.8	1,335.6	767.0	670.4
95 (600)	332.6	162.2	410.7	318.1	522.2
97 (600)	577.9	357.7	423.6	479.6	273.0
98 (600)	250.4	429.6	565.9	488.2	342.1
Total	2,346.8	2,795.7	3,519.1	2,504.6	1,807.7

Table 6-1: Groundwater Volume Pumped

Groundwater Type	Basin Name	2011	2012	2013	2014	2015
Alluvial Basin	East Las Posas	2,346.8	2,795.7	3,519.1	2,504.6	1,807.7
Total		2,346.8	2,795.7	3,519.1	2,504.6	1,807.7

6.2.1 South Las Posas Basin

The South Las Posas Basin is separated from the East Las Posas Basin by an east-trending anticline (fold) that affects all but the shallowest alluvium. This fold may affect groundwater flow between the East and South Las Posas Basins at some aquifer depths, although recharge from the South Las Posas Basin flows readily into the East Las Posas Basin at Lower Aquifer System (LAS) depths. To the south, the Springville and Santa Rosa fault zones produce disrupted and tightly folded rocks along the edge of the basin, restricting groundwater flow to the south (CSWRB, 1956). There is a shallow alluvial aquifer that follows the trend of Arroyo Las Posas as it crosses the South Las Posas Basin; this shallow aquifer is in hydrologic connection with the underlying LAS and is the main source of recharge to the LAS.

There has been a significant change in average groundwater levels over the past 40 years in the South Las Posas Basin, with groundwater levels rising more than 100 feet during this period. The mechanism for this rise in groundwater elevations is the increased recharge from percolation beneath the Arroyo Las Posas as discharges from the Moorpark and Simi Valley wastewater treatment plants and dewatering wells in Simi

Valley have increase year-round flow in the arroyo. The entire alluvial aquifer near the arroyo has progressively filled to the elevation of the arroyo, starting in the easternmost portion of the basin in the 1960s and moving westward through the 1990s (Bachman, 2002). Water from the filled alluvial aquifer has percolated into the underlying Lower Aquifer System, creating a recharge mound in the Lower Aquifer System that extends from the arroyo northward into the East Las Posas Basin (CH2MHill, 1993; Bachman, 1999).

Salts (i.e., chloride, sulfate) in the groundwater have increased in the South Las Posas basin and the southwestern portion of the East Las Posas basin as the shallow aquifer filled along Arroyo Las Posas. These salts apparently were leached from the shallow aquifer as groundwater levels reached record highs, saturating sediments that have been unsaturated for the historic period. These salts apparently migrated vertically with percolating groundwater into the LAS and then laterally into the main portion of the East Las Posas Basin as the recharge mound developed. Some of this groundwater is unsuitable.

The District is planning the construction of a groundwater production and treatment system that will provide up to 5,000 AFY of potable water from the South Las Posas Basin.

6.2.1.1 Moorpark Desalter Project

The District is planning the Moorpark Desalter Project, which is a groundwater production and treatment system that could provide up to 5,000 AFY of potable water for customers in the District's water service area by the end of 2018. As part of the project, 10 to 18 extraction wells will be constructed within or near an active agricultural field east of Hitch Boulevard between Los Angeles Avenue and the Arroyo Las Posas/Arroyo Simi. The proposed Moorpark Desalter Treatment Plant will be located east of the existing Moorpark Water Reclamation Facility (MWRF), which is located at 9550 East Los Angeles Avenue just west of Moorpark City limits along California State Route118.

The wells will extract poor-quality, brackish groundwater from a shallow aquifer in the South Las Posas Basin and pump the groundwater via a new transmission pipeline to the proposed treatment plant, where the water will be treated to drinking water standards through a membrane treatment process that includes filters, low-pressure reverse osmosis, disinfection, and chemical water conditioning. Brine produced by the reverse osmosis process will be transported out of the watershed through the Salinity Management Pipeline (SMP), currently being constructed by Calleguas. The SMP will convey brine from Moorpark to the ocean discharge point at Point Hueneme.

The Project is a key element in the Northern Reach Renewable Water Management Plan which was developed as part of the Calleguas Creek Boron, Chloride, Total Dissolved Solids, and Sulfate Total Maximum Daily Load Compliance Plan. The Project will supplement imported water supplies, remove poor quality groundwater, allow higher quality storm flows to recharge the shallow unconfined groundwater basin, and improve the groundwater quality of the overall basin.

The Ventura County Public Works Agency's Water and Sanitation Department received a $7 million Proposition 84 grant from the State Department of Water Resources through the Watershed Coalition of Ventura County for the Moorpark Desalter Project.

The Project, which has an overall estimated cost of $50 million to complete, will remove up to 18 million pounds of salt per year from the Las Posas Basin and provide up to 5,000 acre-feet per year of high quality water for use by customers in the VCWWD No. 1 water service area. The projected completion date of the project is December 2018.

6.2.2 Sustainable Groundwater Management Act of 2014

Historically, California has never managed its groundwater supplies on a statewide basis. That has now changed. As of January 1, 2015, the Sustainable Groundwater Management Act (SGMA), signed by Governor Edmund G. Brown, Jr. in September 2014, now regulates the use of groundwater on a more universal scale.

The new law will have profound practical impacts, particularly on the state's agricultural community. Issues raised by the SGMA – some of which will doubtless play out in protracted court battles – will shape western water law and policy for years to come. At the same time, the SGMA's emphasis on local groundwater management should provide an unprecedented opportunity to shape California's future, for those whose livelihoods and involvement in the larger economy are fundamentally dependent on access to the state's groundwater resources.

Until now, the right to use groundwater in California has been viewed as a property right attached to overlying surface lands. In *City of Pasadena v. City of Alhambra*, for example, the California Supreme Court stated that the "overlying right," or right of the owner of the land to take water from the ground underneath for use on his overlying land "…is based on ownership of the land and is appurtenant thereto." Under the doctrine of correlative rights, land owners had a common right to the beneficial use of percolating waters underlying their property. When an underlying aquifer became overdrawn, courts could allocate pumping rights among overlying land owners through an adjudicatory procedure.

The SGMA adopts a fundamentally different strategy for managing the state's groundwater resources. At the heart of the new law is a requirement to implement sustainability plans for the majority of groundwater basins throughout the state, including many on which California's agricultural community are highly dependent. These plans can vary from simple basin-wide plans developed and implemented by individual local agencies, to multiple plans by different local agencies operating in the same basin, to state-imposed plans where no sufficient local plan exists.

While sustainability plans must contain a number of specific requirements, by far the most significant is that they be designed to meet what the SGMA calls the "sustainability goal" within 20 years of implementation. The sustainability goal is, in short, a stated objective to "achieve sustainable groundwater management" by ensuring that a given basin is "operated within its sustainable yield." In other words, the basin must be operated in such a way as not to cause "undesirable results."

The SGMA also contains procedural requirements for plan development and implementation, and exempts many activities involved in that process from the environmental review requirements of the California Environmental Quality Act ("CEQA").

While the SGMA will regulate California's groundwater on a statewide basis for the first time, it does not cover every groundwater basin within the state's jurisdiction, nor will it impacts be felt immediately. The statute generally does not apply to specified basins that have already been adjudicated under existing law, for example, and it does not require sustainability plans from basins considered to be low priority. Moreover, sustainability plans need not be implemented for several years, and affected basins are not required to attain sustainability goals until approximately 2040.

That said, the California Department of Water Resources (DWR) has estimated the SGMA will cover 96% of groundwater used in California. California water users cannot afford to wait to get involved in efforts now underway to shape the manner in which the statute is applied.

The Las Posas Valley Basin has been designated as a high priority under SGMA. The basin is unadjudicated and will require the formation of a Groundwater Sustainability Agency (GSA) and the development of a Groundwater Sustainability Plan (GSP).

6.2.2.1 FCGMA as Local Groundwater Sustainability Agency

In enacting the SGMA, the California legislature sought to "manage groundwater basins through the actions of local governmental agencies to the greatest extent feasible." For the most part, any local agency with water supply, water management, or land use responsibilities in a given groundwater basin (or a combination of such agencies) can become the groundwater sustainability agency for that basin.

The SGMA gives sustainability agencies a number of powers and authorities in addition to those they already may possess. Agencies are authorized (among other things) to conduct investigations; require registration of facilities that extract groundwater; require said facilities to measure the amount of water they extract; acquire property including water rights; regulate, limit or allocate groundwater extraction; and authorize transfers of groundwater allocations. They also have the power to "impose fees, including…permit fees and fees on groundwater extraction" to support their activities, and to bring enforcement actions seeking civil penalties for violations relating to rules implemented pursuant to the SGMA.

The SGMA's use of local planning and management—as opposed to purely centralized state control—should be viewed as valuable opportunities for informed and proactive water users to have a say in groundwater sustainability planning from the start.

As outlined in the California Water Code, Part 2.74, Sustainable Groundwater Management Act (Act), Section 10723 (c), the Fox Canyon Groundwater Management

Agency (FCGMA) shall be deemed the exclusive Groundwater Sustainability Agency (GSA) within its boundaries with powers to comply with Act.

On January 9, 2015 the FCGMA held a public hearing and passed Resolution 2015-01, Attachment 1, wherein the FCGMA elected to become the GSA for the Arroyo Santa Rosa Valley, Las Posas Valley (West, South, and East), Oxnard Forebay, Oxnard Plain and Pleasant Valley Basins within the FCGMA boundaries.

Per Section 10723.2 of the Act, the GSA shall consider the interests of all beneficial uses and users of groundwater, as well as those responsible for implementing groundwater sustainability plans. The FCGMA as enacted has a Board of Directors and operating structure that clearly represents the interests of all users and uses of groundwater and surface water within the FCGMA boundaries. The five member Board of the FCGMA is comprised as follows:

- One member shall be chosen by United Water Conservation District, the member's district or divisions must overlie at least in part the territory of the FCGMA;
- One member shall be chosen by the County of Ventura, the member's district must overlie at least in part the territory of the FCGMA;
- One member shall be chosen from the members of the city councils of the cities whose territory at least in part overlies the territory of the FCGMA;
- One member shall be chosen from the members of the governing boards of the following mutual water companies and special districts not governed by the County Board of Supervisors which are engaged in water activities and whose territory at least in part overlies the territory of the FCGMA: the Alta Mutual Water Company, the Anacapa Municipal Water District, the Berylwood Mutual Water Company, the Calleguas Municipal Water District, the Camrosa County Water District, the Del Norte Mutual Water Company, the Pleasant Valley County Water District, and the Zone Mutual Water Company; and
- The fifth member of the Board shall be chosen by the other four members from a list of at least five nominations from the Ventura County Farm Bureau and the Ventura County Agricultural Association acting jointly for a two-year term to represent agricultural interests within the territory of the FCGMA. The fifth member shall reside and be actively and primarily engaged in agriculture within the territory of the FCGMA.

FCGMA is currently preparing a draft GSP for its subject basins, which is estimated to be completed by June 2016.

6.2.1.3 State Oversight and Intervention

While the SGMA generally emphasizes local management of groundwater resources, it does provide for state involvement on a number of levels. For example, DWR must develop and publish best management practices for sustainable groundwater management, and it is responsible for reviewing sustainability plans every five years to

ensure compliance with the SGMA. In addition, the State Water Resources Control Board (SWRCB or State Board) can "designate a basin as a probationary basin" for failure to develop a groundwater sustainability plan where one is needed, or for implementation of an insufficient plan. If a local agency fails to remedy the problem that led to a designation, the State Board may adopt its own interim sustainability plan for the basin.

DWR is also tasked with establishing the initial priority for the state's groundwater basins, a job of considerable consequence given that many of the SGMA's requirements apply only to those basins designated as high or medium priority. DWR has announced that the basin designations it finalized under the California Statewide Groundwater Elevation Monitoring (CASGEM) program will serve as the initial prioritization required by the SGMA.

6.2.1.4 Timeline

Some of the more important milestones for past and future actions to implement the SGMA are as follows:

- September 16, 2014: Groundwater management legislation became law

  Governor Brown signed Senate Bill 1168, Assembly Bill 1739, and Senate Bill 1319, which made up the groundwater management legislation package.

- January 1, 2015: Legislation went into effect

  The SGMA became effective.

- January 31, 2015: DWR established initial groundwater basin priority

  DWR established the initial priority – high, medium, low or very low – or each groundwater basin in the state by the end of January 2015 (Water Code § 10722.4).

- January 1, 2016: DWR set emergency regulations for basin boundary revision

  DWR adopted emergency regulations for groundwater basin boundary revisions by January 1, 2016. The regulations included the methodology and criteria used to evaluate proposed boundary revisions, including the establishment of new sub-basins (Water Code § 10722.2).

- June 1, 2016: DWR must establish emergency regulations for evaluating plans

  DWR adopts emergency regulations for evaluating GSPs and their implementation and coordination agreements among local agencies for ground water sustainability planning. The regulations must identify GSP components and information to assist plan and coordination agreement development and implementation (Water Code § 10733.2).

- December 31, 2016: DWR estimate of water available for groundwater replenishment

  DWR publishes its estimate of the water available for groundwater replenishment on its website (Water Code § 10729(c)).

- January 1, 2017: Basin deadline to submit alternative to a GSP

  Medium- and high-priority basins choosing to meet sustainability objectives by ways other than groundwater sustainability planning (which includes not forming a GSA) must submit their alternatives to DWR (and then again every five years) (Water Code § 10733.6).

- January 1, 2017: DWR will establish best management practices for sustainable management

  DWR publishes best management practices for the sustainable management of groundwater on its website (Water Code § 10729(d)).

- June 30, 2017: Deadline to form a GSA

  A local agency or agencies in each high- or medium-priority groundwater basin must have officially formed one or more (GSAs) for the entire basin (Water Code §5 10724, 10735.2(a)(1))

- June 30, 2017: State Water Board can begin to put basins on probation

  The State Water Board can initiate probationary status to a medium- or high-priority basin if the basin lacks one or more GSA(s) that covers the entire basin or no alternative has been approved (Water Code § 10735.2(a)(1)).

- July 1, 2017: Those pumping in a probationary basin must report extractions

  Pumping groundwater in a basin that either has been designated as a probationary basin or lies outside a GSA's management area must be reported to the State Water Board. These reporting requirements do not apply to those extracting for domestic purposes 2 AFY or less, and some others (Water Code § 5202, 10724).

- January 31, 2020: GSPs required for critically over drafted basins

  Basins designated as high- or medium-priority and subject to critical conditions of overdraft must be managed under a GSP or GSPs. The State Water Board can initiate probationary status for all or part of a basin if there is no GSP, if the GSP is inadequate, or the GSP implementation will not likely achieve sustainability (Water Code § 10720.7(a)(1), 10735.2(a)(2), 10735.2(a)(3)).

- January 31, 2022: GSPs required for all remaining high- and medium- priority groundwater basins

  All remaining basins designated as high- or medium-priority must be managed under a GSP or GSPs. The State Water Board can initiate probationary status in 2022 for all or part of a basin if there is no GSP, if the GSP is inadequate, or the GSP implementation will not likely achieve sustainability except for basins where groundwater extractions result in significant depletion of interconnected surface waters (Water Code § 10720.7(a)(2), 10735.2(a)(4), and 10735.2(a)(5)(A)).

- January 31, 2025: State Water Board actions where extractions impact surface waters

  The State Water Board can initiate probationary status for those medium- or high-priority basin where the GSP is inadequate or implementation is not likely to achieve sustainability and the basin is in a condition where groundwater extractions result in significant depletion of interconnected surface waters (Water Code § 10735(a)(5)(B).

6.3 SURFACE WATER

The District does not use, or plan to use, self-supplied surface water as part of its supply.

6.4 STORMWATER

The District is currently not using stormwater to meet local water supply demands. At this time, there are no plans to utilize stormwater, but that could change in the future.

6.5 WASTEWATER AND RECYCLED WATER

The District collects sanitary wastewater flows within the District's water service area and conveys the flows to the Moorpark Water Reclamation Facility (MWRF). The District operates and maintains the wastewater collection system and the treatment plant. Metered wastewater flows averaged 2.0 mgd (2,240 AFY) for 2015.

Table 6-2: Wastewater Collected Within Service Area in 2015

Wastewater Collection			Recipient of Collected Wastewater		
Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AFY)	Wastewater Treatment Agency	Treatment Plant Name	Is WWTP Located Within UWMP Area?
VCWWD No. 1 Wastewater Division	Metered	2,240	VCWWD No. 1 Wastewater Division	MWRF	Yes
Total		2,240			

MWRF is located along California State Route118 just west of the Moorpark city limits. The plant, which provides advanced primary and secondary treatment, has a total treatment capacity of 5.0 mgd and a tertiary treatment capacity. The plant is required to discharge a portion of its treated effluent to percolation basins for groundwater recharge, which totaled 0.76 mgd (851 AFY) in 2015. The District provides recycled water to eight customers, including the plant itself, for facilities operations and landscape irrigation. In 2015, the plant provided 599 AFY (0.54 mgd) of recycled water for agricultural (lemon) irrigation, landscape irrigation, grading, and dust control uses. Wastewater treatment and discharge characteristics associated with the District are shown in Table 6-3.

Recycled water supply will increase to approximately 1,100 AFY in 2017 with the conversion of an existing golf course to the recycled water customer base. The District forecasts that customers will be added and recycled water supply will increase to 1,400 AFY by 2020, necessitating an expansion of the plant's tertiary treatment capacity, and to 2,020 AFY by 2040. Current and projected recycled water direct beneficial uses within the District's water service area are shown in Table 6-4. A comparison of projected recycled water use for 2015 compared with actual 2015 use is shown in Table 6-5. Methods to expand future recycled water use are shown in Table 6-6.

Table 6-3: Wastewater Treatment and Discharge Within Service Area in 2015

WW Treatment Plant	Method of Disposal	Does Plant Treat WW Outside Service Area?	Treatment Level	2015 Volumes			
				WW Treated	Discharged Treated WW	Recycled Within Service Area	Recycled Outside of Service Area
Moorpark[(a)]	Percolation Ponds/Recycled Water Use	No	Advanced /Tertiary	2,240	1,640	599	0
Total				2,240	1,640	599	0

(a) District required to discharge a portion of treated effluent (advanced secondary) to percolation basins for groundwater recharge, which totaled 851 AFY (0.76 mgd) in 2015

Table 6-4: Current & Projected Recycled Direct Beneficial Uses Within Service Area

Beneficial Use Type	Level of Treatment	2015	2020	2025	2030	2035	2040
Agricultural irrigation	Tertiary	64	100	100	100	100	100
Landscape irrigation	Tertiary	100	300	500	500	500	650
Golf course irrigation	Tertiary	356	900	900	1,050	1,200	1,200
Industrial[(a)]	Tertiary	79	100	100	150	200	250
Total	-	599	1,400	1,600	1,800	2,000	2,200

(a) Treatment plant operations and landscape irrigation

Table 6-5: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual

Use Type	2010 Projection for 2015	2015 Actual Use
Agricultural irrigation	75	64
Landscape irrigation	100	100
Golf course irrigation	850	356
Commercial use	0	0
Industrial use	75	79
Total	1,100	599

Table 6-6: Methods to Expand Future Recycled Water Use			
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Plant Capacity	Expand plant tertiary treatment facilities to 1,600 AFY	2018	0
Customers/Mains	Add/retrofit customers & construct transmission mains to users	2018 - 2025	500
Plant Capacity	Expand plant tertiary treatment facilities to 2,200 AFY	2025	0
Customers/Mains	Add/retrofit customers & construct transmission mains to users	2025 - 2040	600
Total			1,100

6.6 DESALINATED WATER OPPORTUNITIES

In 2015, Calleguas began exploring the feasibility of implementing seawater desalination as a baseline supply designed to meet essential water demands during a Stage 3 water shortage. A preliminary assessment indicates that the cost of a seawater desalination facility would be very high, in part because much of Calleguas' demand occurs over 20 miles inland and at an elevation up to 1,100 feet. Seawater desalination will be further evaluated by Calleguas along with other water supply alternatives to identify solutions that will meet Calleguas' reliability needs in the most cost-effective and environmentally-responsible manner.

6.7 EXCHANGES OR TRANSFERS

The District currently does not participate with other water agencies on water exchanges or transfers into or out of the District's water service area and none are planned for the future at this time.

6.8 FUTURE WATER PROJECTS

6.8.1 Moorpark Desalter Project

As discussed in Section 6.2.1.1, the District is planning the Moorpark Desalter Project, which is a groundwater production and treatment system that could provide up to 5,000 AFY of potable water for customers in the District's water service area by the end of 2018. As part of the project, 10 to 18 extraction wells will be constructed to extract poor-quality, brackish groundwater from a shallow aquifer in the South Las Posas Basin, and pump the groundwater via a new transmission pipeline to a proposed treatment plant, where the water will be treated to drinking water standards.

6.8.2 Expansions of Recycled Water System

As discussed in Section 6.5, recycled water supply, which was 599 AFY in 2015, will increase to approximately 1,100 AFY in 2017 with the conversion of an existing golf course to the recycled water customer base. The District forecasts that customers will be added and recycled water supply will increase to 1,400 AFY by 2020, necessitating an expansion of the plant's tertiary treatment capacity; and recycled water use will reach 2,200 AFY by 2040.

6.9 SUMMARY OF EXISTING AND PLANNED SOURCES OF WATER

The primary source of water supply for the District has been water imported from Metropolitan through the local wholesale agency, Calleguas. The imported water, which is primarily State Water Project (SWP) water from the Sacramento-San Joaquin River Delta in Northern California, is treated at Metropolitan's Joseph Jensen Filtration Plant to drinking water standards. In 2015, the District supplied a total of 7,717 AF from imported water purchased from Calleguas, which was 76.2% of the total water supply including recycled water.

The District also produces groundwater from the East Las Posas Groundwater Basin via five wells owned and operated by the District. The groundwater meets all State and Federal water quality standards for drinking water with the exception that treatment is required at one of the well sites (Well No. 20) to lower iron and manganese levels below the State Title 22 Secondary Maximum Contaminant Level (MCL) for these two minerals. The groundwater is chlorinated at each well site before being pumped into the potable water distribution system. In 2015, the District supplied a total of 1,808 AF from groundwater production, which was 17.9% of the total water supply including recycled water.

The District is planning the Moorpark Desalter Project, which is a groundwater production and treatment system that could provide up to 5,000 AFY of potable water for customers in the District's water service area by the end of 2018.

The District's Moorpark Water Reclamation (MWRP) produces Title 22 recycled water via tertiary treatment facilities. The plant produced 599 AF that was distributed as recycled water in 2015, which was 5.9% of the total water supply. The District forecasts that recycled water supply will increase to approximately 1,100 AFY in 2017; to 1,400 AFY by 2020, necessitating an expansion of the plant's tertiary treatment capacity; and to 2,200 AFY by 2040.

A summary of expected future water supply projects or programs for the District is shown in Table 6-7. The District's actual water supplies for 2015 and projected supplies for 2020 through 2040 are shown in Table 6-8 and Table 6-9, respectively.

6.10 CLIMATE CHANGE IMPACTS TO SUPPLY

Climate change impacts to Metropolitan water supplies and Metropolitan's activities related to climate change concerns are discussed in Section 4.6.

Table 6-7: Expected Future Water Supply Projects or Programs					
Name	Joint Project with other agencies?	Description	Year Planned	Planned Year-Type	Expected Supply (AFY)
Moorpark Desalter Project	No	Construct 10-18 wells, transmission main & treatment plant	2018	All Year Types	5,000
Expand Recycled Water System	No	Expand plant tertiary facilities/construct transmission mains	2018	All Year Types	500
Expand Recycled Water System	No	Expand plant tertiary facilities/construct transmission mains	2025	All Year Types	600

Table 6-8: Water Supplies — Actual			
Water Supply	Additional Detail on Water Supply	2015	
		Actual Volume	Water Quality
Purchased or Imported Water	Treated Metropolitan/Calleguas	7,717	Drinking Water
Groundwater	East Las Posas Basin/District Wells	1,808	Drinking Water
Recycled Water	MWRF	599	Recycled Water
Total		10,124	

Table 6-9: Water Supplies — Projected						
Water Supply	Additional Detail	**Projected Water Supply[a] (AFY)**				
		2020	2025	2030	2035	2040
Imported[b] Water	Treated Metropolitan Water	5,204	5,870	5,911	5,880	5,943
Groundwater	East Las Posas Basin/District Wells	1,756	1,756	1,756	1,756	1,756
Groundwater	Moorpark Desalter/South Las Posas Basin	5,000	5,000	5,000	5,000	5,000
Recycled Water	MWRF	1,400	1,600	1,800	2,000	2,200
Total		13,360	14,226	14,467	14,636	14,899

(a) Supply expected to be reasonable available
(b) Includes estimated surplus imported water supply from Calleguas based on the percentage surplus shown in Table 7-1D

7 WATER SUPPLY RELIABILITY ASSESSMENT

7.1 CONSTRAINTS ON WATER SOURCES AND RESPONSE PROGRAMS

Two of the most significant constraints on water supply for the District and for Southern California has been the drought that started in 2012 and has persisted into 2016, and Sacramento-San Joaquin River Delta ecosystem issues that affect imported water supply from the State Water Project. The water conditions that the region faced in 2015 were shaped by supply conditions and resource actions that occurred in the preceding years, including several extraordinary events, such as:

- An historic drought in California leading to record low contract supplies available from the State Water Project in 2014 (5% of contract supplies) and in 2015 (20% of contract supplies);
- An extended 16 year drought in the Colorado River watershed that has decreased storage levels in Lake Mead and Lake Powell to 38% and 51% of capacity respectively at the end of November 2015 and keeping storage below surplus levels despite an ease in drought conditions in 2014 and 2015;
- Groundwater basins and local reservoirs dropping to very low operating levels due to record dry hydrology in Southern California;
- Restrictions of SWP deliveries by federal court orders due to endangered delta smelt and salmon which resulted in the combined loss of approximately 3 MAF of SWP supplies between 2008 and 2014. These losses have impacted Metropolitan's ability to meet demands and refill regional storage;
- In 2014, Lake Oroville storage dropped within 10 TAF of its lowest operating level since the historic drought of 1977;
- Supply availability in the Los Angeles Aqueduct system continues to be affected by both the drought and environmental mitigation efforts related to Owens Lake and the Lower Owens River.

7.1.1 Imported Surface Water

As reported in their 2015 UWMP, Metropolitan faces a number of challenges in providing adequate, reliable and high-quality supplemental water supplies for Southern California. One of those challenges is dry hydrologic conditions that can have a significant impact on Metropolitan's imported water supply sources.

The peak of the snowpack season traditionally occurs on April 1; however, in 2015 the snowpack peaked in January at only 17% of the April 1 average measurement, resulting in the earliest and lowest snowpack peak in recorded history. The statewide snowpack was all but gone by April 1, 2015, and registered a record low of 5% of average for that day. This dry hydrology produced only 51% of average runoff for the water year and consequently kept state reservoirs below average storage levels. As a result, Metropolitan received only 20% of its contract water supplies from the State Water Project in 2015.

In 2015, the Upper Colorado River Basin snowpack peaked in March at 76% of normal. Runoff for that basin measured 94% of normal due to above normal rainfall in May, June and July, which averted Colorado River shortage conditions for 2016. This allowed Metropolitan to implement new water management programs and bolster supplies in 2015. The Colorado River, however, is experiencing a historic16-year drought causing total storage levels in that system to steadily decline increasing the likelihood of shortage in future years beyond 2016. The restrictions on water use generated a record demand for water-saving rebates and refocused efforts to increase development of local water resources.

These dry hydrologic conditions and reduced imported water supplies have led to significant withdrawals from Metropolitan's storage reserves, including Diamond Valley Lake (DVL) and its groundwater banking and conjunctive use programs to meet scheduled water deliveries. During the 2007-2009 drought, Metropolitan withdrew a combined 1.2 MAF from storage reserves to balance supplies and demands. In 2014 alone, Metropolitan withdrew 1.1 MAF from dry-year storage to balance supplies and demands because of the historic low final SWP allocation in that year.

In addition, challenges such as the detection of the quagga mussel in the Metropolitan's CRA supplies and increasingly stringent water quality regulations to control disinfection byproducts exacerbate the water supply condition and underscore the importance of flexible and adaptive regional planning strategies

7.1.1.1 Colorado River Water Supply Reliability Actions, Projects and Programs

The Colorado River Basin has been experiencing a prolonged drought where runoff above Lake Powell has been below average for twelve of the last sixteen years. Within those sixteen years, runoff in the Colorado River Basin above Lake Powell from 2000 through 2007 was the lowest eight-year runoff on record. While runoff returned to near normal conditions during 2008-2010, drought returned in 2012 with runoff in 2012 being among the four driest in history. During these drought conditions, Colorado River system storage has decreased to 50% of capacity.

In January 2007, Quagga mussels were discovered in Lake Mead and rapidly spread downstream to the Lower Colorado River. The presence and spawning of quagga mussels in the Lower Colorado River, and in reservoirs located in Southern California, poses an immediate threat to water and power systems serving more than 25 million people in the southwestern United States. Quagga mussels (Dreissena bugensis) are a related species to the better-known zebra mussels (Dreissena polymorpha) and indigenous to the Ukraine. They were introduced to the Great Lakes in the 1980s from fresh-water ballast of a transoceanic ship traveling from Eastern Europe. Although the introduction of these two species into drinking water supplies does not typically result in violation of drinking water standards, invasive mussel infestations can adversely impact aquatic environments and infrastructure. If unmanaged, invasive mussel infestations have been known to severely impact the aquatic ecology of lakes and rivers; clog intakes and raw water conveyance systems; reduce the recreational and aesthetic value of lakes and beaches; alter or destroy fish habitats; and render lakes more susceptible to deleterious algae blooms.

Metropolitan's planning strategy recognized explicitly that program development would play an important part in reaching the target level of deliveries from the CRA. The implementation approach explored a number of water conservation programs with water agencies that receive water from the Colorado River or are located in close proximity to the CRA. Negotiating the QSA was a necessary first step for all of these programs. On October 10, 2003, after lengthy negotiations, representatives from Metropolitan, Imperial Irrigation District (llD), and Coachella Valley Water District (CVWD) executed the QSA and other related agreements. Parties involved also included San Diego County Water Authority (SDCWA), the California Department of Water Resources (DWR), the California Department of Fish and Wildlife, the U.S. Department of the Interior, and the San Luis Rey Settlement Parties. One of those related agreements was the Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement which specifies to which agencies water will be delivered under priorities 3a and 6a of the Seven Party Agreement during its term.

Metropolitan has identified a number of programs that could be used to achieve the regional long-term development targets for the CRA. Metropolitan has entered into or is exploring agreements with a number of agencies.

Imperial Irrigation District / Metropolitan Water District Conservation Program

Under agreements executed in 1988 and 1989, Metropolitan has funded water efficiency improvements within IID's service area in return for the right to divert the water conserved by those investments. Under this program, IID implemented a number of structural and non-structural measures, including the lining of existing earthen canals with concrete, constructing local reservoirs and spill-interceptor canals, installing non-leak gates, and automating the distribution system. Other implemented programs include the delivery of water to farmers on a 12-hour rather than a 24-hour basis and improvements in on-farm water management through the installation of drip irrigation systems. Through this program, IID has conserved an additional 105 TAF per year on average upon completion of program implementation. Execution of the QSA and amendments to the 1988 and 1989 agreements resulted in changes in the availability of water under the program, extending the term to 2078 if the term of the QSA extends through 2077 and guaranteeing Metropolitan at least 85 TAF per year. The remainder of the conserved water is available to CVWD when needed.

Palo Verde Land Management, Crop Rotation, and Water Supply Program

In May 2004, Metropolitan's Board authorized a 35-year land management, crop rotation, and water supply program with PVID. Under the program, participating farmers in PVID are paid to reduce their water use by not irrigating a portion of their land. A maximum of 29% of the lands within the Palo Verde Valley can be hallowed in any given year. Under the terms of the QSA, water savings within the PVID service area are made available to Metropolitan. This program provides up to 133 TAF of water to be available to Metropolitan in certain years. In 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, and 2014 approximately 108.7, 105.0, 72.4, 94.3, 120.2, 116.3, 122.2, 73.7, 32.8, and 43.0 TAF of water, respectively, were saved and made available to Metropolitan. In March 2009, Metropolitan and PVID entered into a one-year supplemental Wallowing

program within PVID that provided for the Wallowing of additional acreage, with savings of 24.1 TAF in 2009 and 32.3 TAF in 2010.

Southern Nevada Water Authority and Metropolitan Storage and Interstate Release Agreement

SNWA has undertaken extraordinary water conservation measures to maintain its consumptive use within Nevada's basic apportionment of 300 TAF. The success of the conservation program has resulted in unused basic apportionment for Nevada. As SNWA expressed interest in storing a portion of the water with Metropolitan, the agencies, along with the United States and the Colorado River Commission of Nevada, entered into a storage and interstate release agreement in October 2004. Under the agreement, additional Colorado River water supplies are made available to Metropolitan when there is space available in the CRA to receive the water. SNWA will have stored approximately 330,000 AF with Metropolitan through 2015. SNWA is not expected to call upon Metropolitan to return water until after 2019.

Lower Colorado Water Supply Project

In March 2007, Metropolitan, the City of Needles, and the USBR executed a Lower Colorado Water Supply Project contract. Under the contract, Metropolitan receives, on an annual basis, Lower Colorado Water Supply Project water unused by Needles and other entities adjacent to the river that do not have rights or have insufficient rights to use Colorado River water. The water supply for the project comes from groundwater wells located along the All-American Canal. A portion of the payments made by Metropolitan to Needles are placed in a trust fund for potentially acquiring a new water supply for the Project should the groundwater pumped from the project's wells become too saline for use. In 2014, Metropolitan received 6.1 TAF from this project and is projected to receive 5.8 TAF in 2015.

Lake Mead Storage Program

In May 2006, Metropolitan and the USBR executed an agreement for a demonstration program that allowed Metropolitan to leave conserved water in Lake Mead that Metropolitan would otherwise have used in 2006 and 2007. USBR would normally make unused water available to other Colorado River water users, so the program included a provision that water left in Lake Mead must be conserved through extraordinary conservation measures and not simply be water that was not needed by Metropolitan in the year it was stored. This extraordinary conservation was accomplished through savings realized under the Palo Verde Land Management, Crop Rotation and Water Supply Program. Through the two-year demonstration program, Metropolitan created 44.8 TAF of "Intentionally Created Surplus" (ICS) water. In December 2007, Metropolitan entered into agreements to set both the rules under which ICS water is developed, stored in, and delivered from Lake Mead. The amount of water stored in Lake Mead, created through extraordinary conservation, that is available for delivery in a subsequent year is reduced by a one-time deduction of 5% resulting in additional system water in storage in the lake, and an annual evaporation loss of 3%, beginning in the year following the year the water is stored. Metropolitan created ICS water in 2009, 2010, 2011, and 2012 and withdrew

ICS water in 2008, 20a 3, and 2014. As of January 1, 2015, Metropolitan had a total of 61.8 TAF of Extraordinary Conservation ICS water in Lake Mead.

The December 2007 federal guidelines concerning the operation of the Colorado River system reservoirs provided the ability for agencies to create "System Efficiency ICS" through the development and funding of system efficiency projects that save water that would otherwise be lost from the Colorado River. To that end, in 2008 the Central Arizona Water Conservation District (CAWCD), SNWA, and Metropolitan contributed funds for the construction of the Drop 2 (Brock) Reservoir by the USBR. The purpose of the Drop 2 (Brock) Reservoir is to increase the capacity to regulate deliveries of Colorado River water at Imperial Dam reducing the amount of excess flow downstream of the dam by approximately 70 TAF annually. In return for its $25 million net contribution toward construction, operation, and maintenance, 100 TAF of water that was stored in Lake Mead was assigned to Metropolitan as System Efficiency ICS. Through 2014, Metropolitan has diverted 35 TAF of this amount, with 65 TAF remaining in storage.

In 2009, Metropolitan entered into an agreement with the United States, SNWA, the Colorado River Commission of Nevada, and CAWCD to have USBR conduct a one-year pilot operation of the Yuma Desalting Plant at one-third capacity. The pilot project operated between May 2010 and March 2011 and provided data for future decision making regarding long-term operation of the Plant and developing a near-term water supply. Metropolitan's contribution toward plant operating costs secured 24.4 TAF of System Efficiency ICS which was stored in Lake Mead as of January 1, 2015.

Quaqqa Mussel Control Program

The presence and spawning of quagga mussels in the lower Colorado River from Lake Mead through Lake Havasu poses a threat to Metropolitan and other Colorado River water users due to the potential to continuously seed water conveyance systems with mussel larvae. Chlorination is the most frequently used means to control mussel larvae entering water systems.

Metropolitan developed the Quagga Mussel Control Program (QMCP) in 2007 to address the long-term introduction of mussel larvae into the CRA from the lower Colorado River which is now heavily colonized from Lake Mead through Lake Havasu. The QMCP consists of surveillance activities and control measures. Surveillance activities are conducted annually alongside regularly scheduled 2 to 3 weeks long CRA shutdowns. Control activities consist of continuous chlorination at the outlet of Copper Basin Reservoir (5 miles into the aqueduct), a mobile chlorinator for control of mussels on a quarterly basis at outlet towers and physical removal of mussels from the trash racks at Whitsett Intake Pumping Plant in Lake Havasu. Since 2007, the CRA has had scheduled 2 to 3 week-long shutdowns each year for maintenance and repairs which provide the opportunity for direct inspections for mussels and the additions benefit of desiccating quagga mussels. Recent shutdown inspections have demonstrated that the combined use of chlorine and regularly scheduled shutdowns effectively control mussel infestation in the CRA since only few and small mussels have been found during these inspections.

In addition, Metropolitan has appropriated $9.55 million to upgrade chlorination facilities in the aqueduct and at two additional locations in its system, the outlets of Lakes Mathers

and Skinner. It is likely that additional upgrade costs will be incurred for these facilities. Chemical control (chlorination) at Copper Basin Reservoir, Lake Mathers, and the Lake Skinner Outlet costs approximately $3.0 million to $3.2 million per year depending on the amount of Colorado River water conveyed through the aqueduct.

Achievements to Date

Metropolitan has developed a number of supply and conservation programs to increase the amount of supply available from the CRA. However, other users along the River have rights that will allow their water use to increase as their water demands increases. The Colorado River faces long-term challenges of water demands exceeding available supply with additional uncertainties due to climate change. Because Metropolitan holds the lowest priority rights in California during a normal Lake Mead storage condition, future supply available could decrease.

7.1.1.2 State Water Project Supply Reliability Actions, Projects and Programs

Much of the SWP water supply passes through the Sacramento-San Joaquin Bay-Delta (Bay-Delta). The SWP consists of a series of pump stations, reservoirs, aqueducts, tunnels, and power plants operated by DWR. This statewide water supply infrastructure provides water to 29 urban and agricultural agencies throughout California. More than two-thirds of California's residents obtain some of their drinking water from the Bay-Delta system.

The Bay-Delta's declining ecosystem, caused by a number of factors that include agricultural runoff, predation of native fish species, urban and agricultural discharge, changing ecosystem food supplies, and overall system operation, has led to reduction in water supply deliveries. SWP delivery restrictions due to regulatory requirements resulted in the loss of about 1.5 MAF of supplies to Metropolitan from 2008 through 2014, reducing the likelihood that regional storage can be refilled in the near-term. Operational constraints will likely continue until a long-term solution to the problems in the Bay-Delta is identified and implemented.

In April 2015, the Brown Administration announced California WaterFix, as well as a separate ecosystem restoration effort called California EcoRestore. Together, the California WaterFix and California EcoRestore will make significant contributions toward achieving the coequal goals of providing a more reliable water supply for California and protecting, restoring and enhancing the Delta ecosystem established in the Sacramento-San Joaquin Delta Reform Act of 2009. In addition to enhancing the Delta Ecosystem there are a number major actions, projects, and programs Metropolitan has undertaken to improve SWP reliability.

The Bay Delta Conservation Plan

The Bay Delta Conservation Plan (BDCP) was prepared through a collaboration of state, federal, and local water agencies, state and federal fish agencies, environmental organizations, and other interested parties. At the outset of the BDCP process, a planning agreement was developed and executed among the participating parties and a Steering Committee was formed. The BDCP identified a set of conservation measures including water conveyance improvements and restoration actions to contribute to the recovery of endangered and sensitive species and their habitats in California's Sacramento-San Joaquin Delta. The BDCP was formulated to contribute to the state's co-equal goals of water supply reliability and ecosystem restoration.

Lead agencies for the EIR/EIS were the California Department of Water Resources, the USBR, the United States Fish and Wildlife Service, and National Oceanic and Atmospheric Administration's National Marine Fisheries Service, in cooperation with the California Department of Fish and Game, the United States Environmental Protection Agency and the United States Army Corps of Engineers. Metropolitan served on the steering committee. DWR and USBR are the lead agencies for the California WaterFix.

In order to select the most appropriate elements of the final conservation plan, the BDCP considered a range of options for accomplishing these goals using information developed as part of an environmental review process. Potential habitat restoration and water supply conveyance options included in the BDCP were assessed through an Environmental Impact Report (EIR)/Environmental Impact Statement (EIS). The BDCP planning process and the supporting EIR/EIS process is being funded by state and federal water contractors. The First Administrative Draft BDCP was released in March 2012, a Second Administrative Draft BDCP and EIR/S was released in March 2012 and the Public Draft BDCP and EIR/S was released December 2013. Each of the above draft documents were released to the public. The official public comment draft was released in December 2013.

A new permitting approach and associated new alternatives to the BDCP were announced in April 2015. The California WaterFix and California EcoRestore would be implemented under a different Endangered Species Act permitting process. This would fulfill the requirement of the 2009 Delta Reform Act to contribute toward meeting the coequal goals of providing a more reliable water supply for California and protecting, restoring and enhancing the Delta ecosystem. DWR and USBR serve as lead agencies for the California WaterFix. The new water conveyance facilities included in Alternative 4 (the BDCP) would be constructed and operated under the California WaterFix. Proposes changes to the design of the water conveyance facilities reduce the overall environmental/construction impacts to the environment, minimize disruptions to local communities, and increase long term operational and cost benefits.

Some of the engineering improvements configuration improvements would include moving the tunnel alignment away from local communities and environmentally sensitive areas. The elimination of pumping plants, reduction of permanent power lines and power use, and the reconfiguration of intake and pumping facilities sediment basins and reconfiguration/relocation of the construction staging sites in the North Delta will lessen construction and longer term operational impacts. If implemented, these would result in

reduced environmental and construction impacts and increase improved long-term operational and cost benefits.

The main objective under the EcoRestore Program is to pursue at least 30,000 acres of Delta habitats over the next five years. These restoration programs would include projects and actions that are in compliance with pre-existing regulatory requirements designed to improve the overall health of the Delta. Other priority restoration projects would also be identified by the Delta Conservancy and other local governments. Funding would be provided through multiple sources including state bonds and other state-mandated funds, State Water Project/Central Valley Project contractors' funds as part of existing regulatory obligations and from various local and federal partners.

As part of the new alternatives and the State's proposed project, the regulatory approach to obtaining state and federal endangered species compliance is shifting from the BDCP Habitat Conservation Plan/Natural Community Conservation Plan strategy to an approach that contemplates a Biological Opinion pursuant to Federal ESA Section 7 and a State 2081 Permit. This approach as well as the proposed revision to the new water facilities and ecosystem restoration actions is evaluated in the partially Recirculated Draft EIR/EIS released in July 2015.

The State Water Resources Control Board (SWRCB) is continuing its phased review and update of the 2006 Water Quality Control Plan (WQCP) for the Bay-Delta. The first phase focuses on the southern Delta salinity objectives for the protection of agriculture, San Joaquin River flow objectives for the protection of fish and wildlife, and a program of implementation for achieving those objectives. The second phase considers the comprehensive review of the other elements of the Bay-Delta WQCP, including but not limited to Sacramento River and Delta outflow objectives.

Metropolitan has been collaborating with water users and other stakeholders to develop sound science and technical analyses in support of the WQCP review process, including sharing results in technical forums and publishing findings in peer-reviewed scientific journals. Metropolitan has been meeting with Board members and staff to share findings as new science and analyses are developed and to encourage close coordination between BDCP and WQCP updates.

Monterey Amendment

The Monterey Amendment originated from disputes between the urban and agricultural SWP contractors over how contract supplies are to be allocated in times of shortage. In 1994, in settlement discussions in Monterey, the contractors and DWR reached an agreement to settle their disputes by amending certain provisions the long-term water supply contracts. These changes, known as the Monterey Amendment, altered the water allocation procedures such that both shortages and surpluses would be shared in the same manner for all contractors, eliminating the prior "agriculture first" shortage provision. In turn, the agricultural contractors agreed to permanently transfer 130 TAF to urban contractors and permanently retire 45 TAF of their contracted supply. The amendment facilitated several important water supply management practices including ground water banking, voluntary water marketing, and more flexible and efficient use of SWP facilities

such as borrowing from Castaic Lake and Lake Perris and using carryover storage in San Luis Reservoir to enhance dry-year supplies. It also provided for the transfer of DWR land to the Kern County Water Agency for development of the Kern Water Bank. The Monterey Amendment was challenged in court, and the original Environmental Impact Report (EIR) invalidated. Following a settlement, DWR completed a new EIR and concluded the CEQA review in May 2010.

However, the project has been challenged again in a new round of lawsuits. Central Delta Water Agency, South Delta Water Agency, California Water Impact Network, California Sportfishing Protection Alliance, and the Center For Biological Diversity filed a lawsuit against DWR in Sacramento County Superior Court challenging the validity of the EIR under CEQA and the validity of underlying agreements under a reverse validation action (the "Central Delta I" case). These same plaintiffs filed a reverse validation lawsuit against the Kern County Water Agency in Kern County Superior Court ("Central Delta II"). This lawsuit targets a transfer of land from Kern County Water Agency to the Kern Water Bank, which was completed as part of the original Monterey Agreement. The third lawsuit is an EIR challenge brought by Rosedale—Rio Bravo Water Storage District and Buena Vista Water Storage District against DWR in Kern County Superior Court ("Rosedale"). The Central Delta II and Rosedale cases were transferred to Sacramento Superior Court, and the three cases were consolidated for trial.

In January 2013, the Court ruled that the validation cause of action in Central Delta I was time-barred by the statute of limitations. On October 2, 2014, the court issued its final rulings in Central Delta I and Rosedale, holding that DWR must complete a limited scope remedial CEQA review addressing the potential impacts of the Kern Water Bank. However, the court's ruling also allows operation of the State Water Project to continue under the terms of the Monterey Agreement while the remedial CEQA review is prepared and leaves in place the underlying project approvals while DWR prepares the remedial CEQA review. The Central Delta II case was stayed pending resolution of the Central Delta I case. The plaintiffs have appealed the decision.

SWP Terminal Storage

Metropolitan has contractual rights to 65 TAF of flexible storage at Lake Perris (East Branch terminal reservoir) and 154 TAF of flexible storage at Castaic Lake (West Branch terminal reservoir). This storage provides Metropolitan with additional options for managing SWP deliveries to maximize yield from the project. Over multiple dry years, it can provide Metropolitan with 73 TAF of additional supply. In a single dry year like 1977, it can provide up to 219 TAF of additional supply to Southern California.

Yuba Dry Year Water Purchase Program

In December 2007, Metropolitan entered into an agreement with DWR providing for Metropolitan's participation in the Yuba Dry Year Water Purchase Program between Yuba County Water Agency and DWR. This program provides for transfers of water from the Yuba County Water Agency during dry years through 2025.

Desert Water Agency/Coachella Valley WD SWP Table A Transfer

Under the transfer agreement, Metropolitan transferred 100 TAF of its SWP Table A contractual amount to Desert Water Agency/CVWD (DWCV). Under the terms of the agreement, DWCV pays all SWP charges for this water, including capital costs associated with capacity in the California Aqueduct to transport this water to Perris Reservoir, as well as the associated variable costs. The amount of water actually delivered in any given year depends on that year's SWP allocation. Water is delivered through the existing exchange agreements between Metropolitan and DWCV, under which Metropolitan delivers Colorado River supplies to DWVC equal to the SWP supplies delivered to Metropolitan. While Metropolitan transferred 100 TAF of its Table A amount, it retained other rights, including interruptible water service; its full carryover amounts in San Luis Reservoir; its full use of flexible storage in Castaic and Perris Reservoirs; and any rate management credits associated with the 100 TAF.

In addition, Metropolitan is able to recall the SWP transfer water in years in which Metropolitan determines it needs the water to meet its water management goals. The main benefit of the agreement is to reduce Metropolitan's SWP fixed costs in wetter years when there are more than sufficient supplies to meet Metropolitan's water management goals, while at the same time preserving its dry-year SWP supply. In a single critically dry-year like 1977, the call-back provision of the entitlement transfer can provide Metropolitan about 5 TAF of SWP supply. In multiple dry years like 1990-1992, it can provide Metropolitan about 26 TAF of SWP supply.

Desert Water Agency/Coachella Valley WD Advance Delivery Program

Under this program, Metropolitan delivers Colorado River water to the Desert Water Agency and CVWD in advance of the exchange for their SWP Contract Table A allocations. In addition to their Table A supplies, Desert Water Agency and CVWD, subject to Metropolitan's written consent, may take delivery of SWP supplies available under Article 21 and the Turn-back Pool Program. By delivering enough water in advance to cover Metropolitan's exchange obligations, Metropolitan is able to receive Desert Water Agency and CVWD's available SWP supplies in years in which Metropolitan's supplies are insufficient without having to deliver an equivalent amount of Colorado River water. This program allows Metropolitan to maximize delivery of SWP and Colorado River water in such years.

Desert Water Agency/Coachella Valley WD Other SWP Deliveries

Since 2008, Metropolitan has provided Desert Water Agency and CVWD written consent to take delivery of non-SWP supplies separately acquired by each agency from the SWP facilities. These deliveries include water acquired from the Yuba Dry Year Water Purchase Program and the 2009 Drought Water Bank. Metropolitan has also consented to:

- 10 TAF of exchange deliveries to CVWD for non-SWP water acquired from the San Joaquin Valley from 2008 through 2010,

- 36 TAF of exchange deliveries to Desert Water Agency for non-SWP water acquired from the San Joaquin Valley from 2008 through 2015, and
- 16.5 TAF of exchange deliveries to CVWD from groundwater storage of Kern River flood flows or SWP water delivered from Kern County Water Agency provided by Rosedale Rio Bravo Water Storage District from 2012 through 2035.

7.1.1.3 Central Valley/State Water Project Storage and Transfer Programs

Metropolitan increases the reliability of supplies received from the California Aqueduct by developing flexible SWP storage and transfer programs. Over the years, Metropolitan has developed numerous voluntary SWP storage and transfer programs, to secure additional dry-year water supplies.

Metropolitan has a long history of managing the wide fluctuations of SWP supplies from year to year by forming partnerships with Central Valley agricultural districts along the California Aqueduct, as well as with other Southern California SWP Contractors. These partnerships allow Metropolitan to store its State Water Project (SWP) supplies during wetter years for return in future drier years. Some programs also allow Metropolitan to purchase water in drier years for delivery via the California Aqueduct to Metropolitan's service area.

In addition, the SWP storage and transfer programs have served to demonstrate the value of partnering, and increasingly, Central Valley agricultural interests see partnering with Metropolitan as a sensible business practice beneficial to their local district and regional economy.

Metropolitan is currently operating several SWP storage programs that serve to increase the reliability of supplies received from the California Aqueduct. Metropolitan is also pursuing a new storage program with Antelope Valley-East Kern Water Agency, which is currently under development. In addition, Metropolitan pursues SWP water transfers on an as needed basis.

Semitropic Storage Program

Metropolitan has a groundwater storage program with Semitropic Water Storage District located in the southern part of the San Joaquin Valley. The maximum storage capacity of the program is 350 TAF. The specific amount of water Metropolitan can store in and subsequently expect to receive from the programs depends upon hydrologic conditions, any regulatory requirements restricting Metropolitan's ability to export water for storage, and the demands placed on the Semitropic Program by other program participants. In 2014, Metropolitan amended the program to increase the return yield by an additional 13.2 TAF per year. The minimum annual yield available to Metropolitan from the program is currently 34.7 TAF, and the maximum annual yield is 236.2 TAF, depending on the available unused capacity and the State Water Project allocation. During wet years, Metropolitan has the discretion to use the program to store portions of its SWP water that are in excess of the amounts needed to meet Metropolitan's service area demand. In Semitropic, the water is delivered to local farmers who use the water in-lieu of pumping groundwater. During dry years, the district returns Metropolitan's

previously stored water to Metropolitan by direct groundwater pump-in return or by exchange of SWP water.

Arvin-Edison Storage Program

Metropolitan amended the groundwater storage program with Arvin-Edison Water Storage District in 2008 to include the South Canal Improvement Project. The project increases the reliability of Arvin-Edison returning higher water quality to the California Aqueduct. In addition, Metropolitan and Arvin-Edison often enter into annual operational agreements to optimize program operations in any given year. The program storage capacity is 350 TAF. The specific amount of water Metropolitan can expect to store in and subsequently receive from the programs depends upon hydrologic conditions and any regulatory requirements restricting Metropolitan's ability to export water for storage. The storage program is estimated to deliver 75 TAF.

During wet years, Metropolitan has the discretion to use the program to store portions of its SWP supplies which are in excess of the amounts needed to meet Metropolitan's service area demand. The water can be either directly recharged into the groundwater basin or delivered to district farmers who use the water in-lieu of pumping groundwater. During dry years, the district returns Metropolitan's previously stored water to Metropolitan by direct groundwater pump-in return or by exchange of surface water supplies. In 2015, Metropolitan funded the installation of three new wells at a cost of $3 million that will restore the return reliability by 2.5 TAF per year. The funding will ultimately be recovered through credits against future program costs.

San Bernardino Valley Metropolitan Storage Program

The San Bernardino Valley Metropolitan Storage program allows for the purchase of a portion of San Bernardino Valley Metropolitan's SWP supply. The program includes a minimum purchase provision of 20 TAF and the option of purchasing additional supplies when available. This program can deliver between 20 TAF and 70 TAF in dry years, depending on hydrologic conditions. The expected delivery for a single dry year similar to 1977 is 20 TAF should supplies be available. The agreement with San Bernardino Valley Metropolitan also allows Metropolitan to store up to 50 TAF of transfer water for use in dry years. The agreement can be renewed until December 31, 2035.

San Gabriel Valley Metropolitan Exchange Program

The San Gabriel Valley Metropolitan program allows for the exchange of up to 5 TAF each year. For each acre-foot Metropolitan delivers to the City of Sierra Madre, a San Gabriel Valley Metropolitan member agency, San Gabriel Valley Metropolitan provides two acre-feet to Metropolitan in the Main San Gabriel Basin, up to 5 TAF. The program provides increased reliability to Metropolitan by allowing additional water to be delivered to Metropolitan's member agencies, Three Valleys Metropolitan and Upper San Gabriel Valley Metropolitan.

Antelope Valley-East Kern Water Agency Exchange and Storage Program

The Antelope Valley-East Kern Water Agency (AVEK) exchange and storage program provides Metropolitan with additional supplies and increased reliability. Under the exchange program, for every two acre-feet Metropolitan receives, Metropolitan returns one acre-foot to AVEK to improve its reliability. The exchange program is expected to deliver 30 TAF over ten years, with 10 TAF available in dry years. Under the program, Metropolitan will also be able to store up to 30 TAF in the AVEK's groundwater basin, with a dry year return capability of 10 TAF.

Kern-Delta Water District Storage Program

This groundwater storage program has 250 TAF of storage capacity. The program is capable of providing up to 50 TAF of dry-year supply. In 2015, Metropolitan funded the cross river pipeline that, when completed, will help improve Metropolitan's return reliability by reducing losses during exchanges. Water for storage can be either directly recharged into the groundwater basin or delivered to district farmers who use the water in-lieu of pumping groundwater. During dry years, the district returns Metropolitan's previously stored water to Metropolitan by direct groundwater pump-in return or by exchange of surface water supplies.

Mojave Storage Program

Metropolitan entered into a groundwater banking and exchange transfer agreement with Mojave Water Agency on October 29, 2003. This agreement was amended in 2011 to allow for the cumulative storage of up to 390 TAF. The agreement allows for Metropolitan to store water in on exchange account for later return. Through 2021, and when the State Water Project allocation is 60% or less, Metropolitan can annually withdraw the Mojave Water Agency's State Water Project contractual amounts in excess of a 10% reserve. When the State Water Project allocation is over 60%, the reserved amount for Mojave's local needs increases to 20%. Under a 100% allocation, the State Water Contract provides Mojave Water Agency 82.8 TAF of water.

Central Valley Transfer Programs

Metropolitan secures Central Valley water transfer supplies via spot markets and option contracts to meet its service area demands when necessary. Hydrologic and market conditions, and regulatory measures governing Delta pumping plant operations, will determine the amount of water transfer activity occurring in any year. Recent transfer market activity, described below, provides examples of how Metropolitan has secured water transfer supplies as a resource to fill anticipated supply shortfalls needed to meet Metropolitan's service area demands.

In 2003, Metropolitan secured options to purchase approximately 145 TAF of water from willing sellers in the Sacramento Valley during the irrigation season. These options protected against potential shortages of up to 650 TAF within Metropolitan's service area that might have arisen from a decrease in Colorado River supply or as a result of drier-than-expected hydrologic conditions. Using these options, Metropolitan purchased approximately 125 TAF of water for delivery to the California Aqueduct.

In 2005, Metropolitan, in partnership with seven other State Water Contractors, secured options to purchase approximately 130 TAF of water from willing sellers in the Sacramento Valley, of which Metropolitan's share was 113 TAF. Metropolitan also had the right to assume the options of the other State Water Contractors if they chose not to purchase the transfer water. Due to improved hydrologic conditions, Metropolitan and the other State Water Contractors did not exercise these options.

In 2008, Metropolitan, in partnership with seven other State Water Contractors, secured approximately 40 TAF of water from willing sellers in the Sacramento Valley, of which Metropolitan's share was approximately 27 TAF.

In 2009, Metropolitan, in partnership with eight other buyers, participated in a statewide Drought Water Bank, which secured approximately 74 TAF, of which Metropolitan's share was approximately 37 TAF.

In 2010, Metropolitan, in partnership with three other State Water Contractors, secured approximately 100 TAF of water from willing sellers in the Sacramento Valley, of which Metropolitan's share was approximately 88 TAF. Metropolitan also purchased approximately 18 TAF of water from Central Valley Project Contractors located in the San Joaquin Valley. In addition, Metropolitan entered into an unbalanced exchange agreement that resulted in Metropolitan receiving approximately 37 TAF.

In 2015, Metropolitan, in partnership with eight other State Water Contractors, secured approximately 20 TAF of water from willing sellers in the Sacramento Valley, of which Metropolitan's share was approximately 14 TAF.

In addition, Metropolitan has secured water transfer supplies under the Yuba Accord, which is a long-term transfer agreement. To date, Metropolitan has purchased approximately 165 TAF.

Finally, Metropolitan has secured water transfer supplies under the Multi-Year Water Pool Demonstration Program. In 2013 and 2015, Metropolitan secured 30 TAF and 1.3 TAF, respectively.

Metropolitan's recent water transfer activities demonstrated Metropolitan's ability to develop and negotiate water transfer agreements either working directly with the agricultural districts who are selling the water or through a statewide Drought Water Bank. Because of the complexity of cross-Delta transfers and the need to optimize the use of both CVP and SWP facilities, DWR and USBR are critical players in the water transfer process, especially when shortage conditions increase the general level of demand for transfers and amplify ecosystem and water quality issues associated with through-Delta conveyance of water. Therefore, Metropolitan views state and federal cooperation to facilitate voluntary, market-based exchanges and sales of water as a critical component of its overall water transfer strategy.

Achievements to Date

Metropolitan has made rapid progress to date developing SWP storage and transfer programs. Most notably, Metropolitan has utilized approximately 457 TAF to supplement

its SWP supplies during the recent 2012-2015 unprecedented drought. Of this total, approximately 325 TAF are from SWP storage program extractions in Semitropic, Arvin, Kern Delta, and Mojave; 57 TAF are from the San Bernardino and SGV/Metropolitan programs; and 78 TAF of SWP transfer supplies were purchased from the SWC Buyers Group, Multi-Year Water Pool, and Yuba water purchase programs.

7.1.2 Groundwater

Groundwater has been used in Ventura County for many years, for agricultural irrigation, and for municipal and industrial water supply. Historically, the aquifer system in southern Ventura County has been in a state of overdraft, primarily in the Lower Aquifer System (LAS), which has led to seawater intrusion. The non-consumptive portion of imported water used by the majority of Calleguas purveyor customers is treated at local wastewater treatment facilities and discharged to the Calleguas Creek watershed. This water ultimately percolates into the Upper Aquifer System (UAS), increasing groundwater levels in the region.

Unfortunately, water in the UAS can have elevated levels of chlorides and TDS. Calleguas, VCWWD No. 1, and other Calleguas member agencies are active participants in regional efforts to put some of this water to beneficial use by advancing groundwater desalter projects for groundwater recovery.

The District is planning the Moorpark Desalter Project, which is a groundwater production and treatment system that could provide up to 5,000 AFY of potable water for customers in the District's water service area by the end of 2018. As part of the project, 10 to 18 extraction wells will be constructed to extract poor-quality, brackish groundwater from a shallow aquifer in the South Las Posas Basin, and pump the groundwater via a new transmission pipeline to a proposed treatment plant, where the water will be treated to drinking water standards.

7.2 RELIABILITY BY TYPE OF YEAR

7.2.1 Metropolitan Reliability by Type of Year

In their Draft 2015 UWMP, Metropolitan estimated supply capability and projected demands for an average (normal) year based on an average of hydrologies for the years 1922-2012; for a single dry-year based on a repeat of the hydrology in the year 1977; and for multiple dry years based on a repeat of the hydrology of 1990-1992. These estimates were summarized in Tables 2-4, 2-5, and 2-6 of their Draft 2015 UWMP, which are included in Appendix F of this report for reference.

Table 2-4 summarizes the sources of supply for the single dry year (1977 hydrology), while Table 2-5 shows the region's ability to respond in future years under a repeat of the 1990-92 hydrology. Table 2-5 provides results for the average of the three dry-year series rather than a year-by-year detail because most of Metropolitan's dry-year supplies are designed to provide equal amounts of water over each year of a three-year period. These tables show that the region can provide reliable water supplies under both the single

driest year and the multiple dry-year hydrologies. Table 2-6 reports the expected situation on the average over all historic hydrologies from 1922 to 2012.

A summary of the information provided in Metropolitan Tables 2-4, 2-5, and 2-6 is shown in Table 7-1A. For each of these scenarios there is a projected surplus of supply in every forecast year. Projected supply surpluses, based on the capability of current supplies, range from 3% to 102% of projected demands. With the inclusion of supplies under development, potential surpluses range from 8% to 121% of projected demands. Metropolitan's supply capabilities were developed using the following assumptions:

7.2.1.1 Assumptions for Colorado River Aqueduct Supplies

Colorado River Aqueduct supplies include supplies that would result from existing and committed programs and from implementation of the Quantification Settlement Agreement (QSA) and related agreements. The QSA establishes the baseline water use for each of the agreement parties and facilitates the transfer of water from agricultural agencies to urban uses. Colorado River Water Management Programs are potentially available to supply additional water up to the CRA capacity of 1.2 MAF on an as needed basis.

7.2.1.2 Assumptions for State Water Project Supplies

State Water Project (SWP) supplies are estimated using the 2015 SWP Delivery Capability Report distributed by DWR in July 2015. The 2015 Delivery Capability Report presents the current DWR estimate of the amount of water deliveries for current (2015) conditions and conditions 20 years in the future. These estimates incorporate restrictions on SWP and Central Valley Project (CVP) operations in accordance with the biological opinions of the U.S. Fish and Wildlife Service and National Marine Fisheries Service issued on December 15, 2008, and June 4, 2009, respectively.

Under the 2015 Delivery Capability Report with existing conveyance and low outflow requirements scenario, the delivery estimates for the SWP for 2020 conditions as percentage of Table A amounts, are 12%, equivalent to 230 TAF, under a single dry-year (1977) condition and 51%, equivalent to 975 TAF, under the long-term average condition.

In dry, below-normal conditions, Metropolitan has increased the supplies received from the California Aqueduct by developing flexible Central Valley/SWP storage and transfer programs.

Over the last two years under the pumping restrictions of the SWP, Metropolitan has worked collaboratively with the other contractors to develop numerous voluntary Central Valley/SWP storage and transfer programs. The goal of these storage/transfer programs is to develop additional dry-year supplies that can be conveyed through the California Aqueduct during dry hydrologic conditions and regulatory restrictions.

A key component of Metropolitan's water supply capability is the amount of water in Metropolitan's storage facilities. Storage is a major component of Metropolitan's dry-

year resource management strategy. Metropolitan's likelihood of having adequate supply capability to meet projected demands, without implementing the Water Supply Allocation Plan (WSAP), is dependent on its storage resources.

Table 7-1A: Metropolitan Supply Capability and Projected Demands (AFY)					
Single Dry Year MWD Supply Capability and Projected Demands (1977 Hydrology)					
Fiscal Year	**2020**	**2025**	**2030**	**2035**	**2040**
Capability of Current Supplies	2,584,000	2,686,000	2,775,000	2,905,000	2,941,000
Projected Demands	2,005,000	2,066,000	2,108,000	2,160,000	2,201,000
Projected Surplus	579,000	620,000	667,000	745,000	740,000
Projected Surplus %[(a)]	29%	30%	32%	34%	34%
Supplies under Development	63,000	100,000	316,000	358,000	398,000
Potential Surplus	642,000	720,000	983,000	1,103,000	1,138,000
Potential Surplus %[(a)]	32%	35%	47%	51%	52%
Multiple Dry Year MWD Supply Capability and Projected Demands (1990-1992 Hydrology)					
Fiscal Year	**2020**	**2025**	**2030**	**2035**	**2040**
Capability of Current Supplies	2,103,000	2,154,000	2,190,000	2,242,000	2,260,000
Projected Demands	2,001,000	2,118,000	2,171,000	2,216,000	2,258,000
Projected Surplus	102,000	36,000	19,000	26,000	2,000
Projected Surplus %[(a)]	5%	2%	1%	1%	0.1%
Supplies under Development	43,000	80,000	204,000	245,000	286,000
Potential Surplus	145,000	116,000	223,000	271,000	288,000
Potential Surplus %[(a)]	7%	5%	10%	12%	13%
Average Year MWD Supply Capability and Projected Demands (1922 - 2012 Hydrology)					
Fiscal Year	**2020**	**2025**	**2030**	**2035**	**2040**
Capability of Current Supplies	3,448,000	3,550,000	3,658,000	3,788,000	3,824,000
Projected Demands	1,860,000	1,918,000	1,959,000	2,008,000	2,047,000
Projected Surplus	1,588,000	1,632,000	1,699,000	1,780,000	1,777,000
Projected Surplus %[(a)]	85%	85%	87%	89%	87%
Supplies under Development	63,000	100,000	386,000	428,000	468,000
Potential Surplus	1,651,000	1,732,000	2,085,000	2,208,000	2,245,000
Potential Surplus %[(a)]	89%	90%	106%	110%	110%

(a) As a percentage of projected demand
Source – 2015 Metropolitan Urban Water Management Plan, June 2016

In developing the supply capabilities for the 2015 UWMP, Metropolitan assumed the current (2015) storage levels at the start of simulation and used the median storage levels

going into each of the five-year increments based on the balances of supplies and demands. Under the median storage condition, there is an estimated 50% probability that storage levels would be higher than the assumption used, and a 50% probability that storage levels would be lower than the assumption used.

All storage capability figures shown in Metropolitan's 2015 UWMP reflect actual storage program conveyance constraints. It is important to note that under some conditions, Metropolitan may choose to implement the WSAP in order to preserve storage reserves for a future year, instead of using the full supply capability. This can result in impacts at the retail level even under conditions where there may be adequate supply capabilities to meet demands.

7.2.2 Calleguas Reliability by Type of Year

In the Calleguas Draft 2015 UWMP, water supply and demand projections for the Calleguas service area were estimated for three hydrologic scenarios; normal year, single-dry year, and multiple-dry years. As summarized in Table 7-1, the normal year is the expected demand under average hydrologic conditions (based on historical average year conditions from 1922 through 2012); the single-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).

The available supplies (as a percentage of average supply) shown in Table 7-1 are those estimated for the Calleguas service area that includes VCWWD No. 1. Metropolitan and Calleguas develop independent supply/demand forecasts for the Calleguas service area. Metropolitan utilizes a top-down approach based on output from the Metropolitan-MAIN software model. This model incorporates demographic and economic projections from regional planning agencies, and considers conservation and end uses. Metropolitan's imported water demand projections for Calleguas are inferred to be equal to Metropolitan's supply projections for Calleguas. Calleguas demand projections are developed using a bottom-up approach based on demand projections developed by each Calleguas purveyor and include anticipated demand for both potable and recycled water service from Calleguas.

Table 7-1: Basis of Water Year Data

Year Type	Base Year	Available Supplies if Year Type Repeats
		% of Average Supply
Average Year	1922 to 2012	100%
Single-Dry Year	1977	101%
Multiple-Dry Years 1st Year	1990 to 1992	99%
Multiple-Dry Years 2nd Year	1990 to 1992	99%
Multiple-Dry Years 3rd Year	1990 to 1992	99%

As shown in Table 7-1B, the estimated supply of water as determined by Metropolitan during an average (normal) year, together with Calleguas' recycled water supply, is sufficient to meet the Calleguas' projected normal year water demands from 2020 through 2040. Also provided in Table 7-1B is the estimated demand on Calleguas during a normal year in the event new local water production facilities are not developed as forecasted by retail purveyors. These local projects include groundwater desalters and recycled water system start-ups or expansions such as the VCWWD No. 1 Moorpark Desalter Project and expansions to the MWRF recycled water system, respectively,

As shown in Table 7-1B, the estimated supply of water as determined by Metropolitan during an average (normal) year, together with Calleguas' recycled water supply, is sufficient to meet the Calleguas' projected normal year water demands from 2020 through 2040. Also provided in Table 7-1B is the estimated demand on Calleguas during a normal year in the event new local water production facilities, i.e. groundwater desalters and recycled water systems, are not developed as forecasted by retail purveyors.

Table 7-1B: Calleguas Supply Capability and Projected Demands (AFY)

Normal Year Supply and Demand Comparison (1977 Hydrology)						
		2020	2025	2030	2035	2040
	Supply totals	123,695	126,959	126,764	125,973	126,614
With Planned Local Projects	Demand totals	99,744	97,634	100,247	102,746	105,016
	Surplus	23,951	29,325	26,517	23,227	21,958
Without Planned Local Projects	Demand totals	115,729	120,119	122,932	125,631	128,101
	Surplus/(Deficit)	7,966	6,840	3,832	342	(1,487)
Single Dry Year Supply and Demand Comparison (1990 – 1992 Hydrology)						
		2020	2025	2030	2035	2040
	Supply totals	124,575	127,864	127,675	126,887	127,538
	Demand totals[a]	111,228	108,347	110,724	113,642	116,321
	Surplus	13,347	19,517	16,951	13,245	11,217
Multiple Dry Year Supply and Demand Comparison (1990 – 1992 Hydrology)						
		2020	2025	2030	2035	2040
First year	Supply totals	123,004	130,040	130,609	129,933	130,362
	Demand totals[a]	105,006	101,439	103,744	106,518	107,786
	Surplus	17,998	28,601	26,865	23,415	22,576
Second year	Supply totals	123,004	130,040	130,609	129,933	130,362
	Demand totals[a]	105,006	101,439	103,744	106,518	107,786
	Surplus	17,998	28,601	26,865	23,415	22,576

Multiple Dry Year Supply and Demand Comparison (1990 – 1992 Hydrology) cont.						
		2020	2025	2030	2035	2040
Third year	Supply totals	123,004	130,040	130,609	129,933	130,362
	Demand totals[(a)]	105,006	101,439	103,744	106,518	107,786
	Surplus	17,998	28,601	26,865	23,415	22,576

(a) Demands will be higher if planned local production projects by Calleguas purveyors not constructed

As shown in Table 7-1B, the estimated allocation of water from Metropolitan during a dry year is sufficient to meet the Calleguas' projected dry year imported water demands from 2020 through 2040. Table 7-1B also shows the water supply versus demand evaluation under multiple dry year hydrologic conditions. Sufficient supplies are projected to be available for the years 2020 through 2040. As noted in Table 7-1B, estimated demands for dry and multiple-dry year conditions will be higher if planned local water production projects by Calleguas purveyors are not constructed

The surpluses shown in Table 7-1B are a result of the different methodologies used to develop demand projections, including the level of conservatism applied regarding potential local supply projects. Specifically, purveyor-based projections include annual yield from planned local projects. For example, Calleguas may opt to store water in Lake Bard or the Las Posas wellfield when surplus imported water is available.

Based on the estimates made in Table 7-1B, estimated increases in Calleguas WSA demands as a percentage of normal demands assuming planned local production projects by Calleguas purveyors are constructed for dry-year and multiple-dry year conditions are shown in Table 7-1C. Based on the estimates made in Table 7-1B, estimated Calleguas supply capability, which is available Metropolitan supply to Calleguas as a percentage of estimated Calleguas WSA demands assuming planned local projects are implemented, for normal-year, dry-year and multiple-dry year conditions are shown in Table 7-1D.

Table 7-1C: Estimated Increases in Calleguas WSA Demands (%)					
Demand-Type Year	2020	2025	2030	2035	2040
Single-Dry Year[(a)]	11.5%	11.0%	10.5%	10.6%	10.8%
Multiple-Dry Years [(a)]	5.3%	3.9%	3.5%	3.7%	2.6%

(a) Assuming planned local projects are implemented

Table 7-1D: Estimated Calleguas Supply Capability (%)					
Demand-Type Year	2020	2025	2030	2035	2040
Normal Year	124.0%	130.0%	126.5%	122.6%	120.6%
Single-Dry Year[(a)]	112.0%	118.0%	115.3%	111.7%	109.6%
Multiple-Dry Years [(a)]	117.1%	128.2%	125.9%	122.0%	120.9%

(a) Available Metropolitan supply to Calleguas WSA as a % of estimated Calleguas demands assuming planned local projects are implemented

7.3 SUPPLY AND DEMAND ASSESSMENT

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

Projected normal-year District supplies and demands as developed in Table 6-9 and Table 4-3, respectively, are shown in Table 7-2, which includes estimated surplus imported water supply from Calleguas based on the percentage surplus shown in Table 7-1D.

Table 7-2: Normal-Year Supply and Demand Comparison

	2020	2025	2030	2035	2040
Supply totals *(from Table 6-9)*	13,440	14,226	14,467	14,636	14,899
Demand totals *(from Table 4-3)*	12,345	12,881	13,239	13,561	13,892
Difference	1,095	1,345	1,228	1,075	1,007

The District's imported water demands are estimated to increase by 11.0% during single dry-year and by 5.0% during multiple dry-year supply scenarios consistent with the estimated increase in Calleguas WSA demands shown in Table 7-1D. Groundwater and recycled water demands are not projected to increase due to finite supply. Projected single-dry-year and multiple-dry-year District supplies and demands are shown in Table 7-3 and Table 7-4, respectively, which includes estimated surplus imported water supply from Calleguas based on the percentage surplus shown in Table 7-1D.

Table 7-3: Single-Dry Year Supply and Demand Comparison

	2020	2025	2030	2035	2040
Supply totals	12,932	13,687	13,950	14,115	14,365
Demand totals	12,890	13,373	13,750	14,084	14,431
Difference	42	314	200	31	-66

7.4 REGIONAL SUPPLY RELIABILITY

Calleguas distributes imported water on a wholesale basis to 19 local purveyors, including VCWWD No. 1, who in turn deliver water to area residents, businesses, and agricultural customers. These 19 Calleguas purveyors are listed in Table 6-1. Approximately three-quarters of Ventura County residents (roughly 630,000 people) depend on Calleguas for all or part of their water and the water supplied by Calleguas currently represents approximately 73% of the total municipal and industrial water demand within its service area.

As mentioned above, Calleguas WSA demand projections are developed using a bottom-up approach based on demand projections developed by each Calleguas purveyor and include anticipated demand for both potable and recycled water service from Calleguas. If new local water supply projects are constructed by Calleguas purveyors *as planned*, Calleguas projects a supply surplus for every 5-year year increment through 2040 for normal, single-dry, and multiple-dry year demand conditions.

These local projects include groundwater desalters and recycled water system start-ups or expansions such as the VCWWD No. 1 Moorpark Desalter Project and expansions to the MWRF recycled water system, respectively,

VCWWD's Moorpark Desalter Project is projected to provide up to 5,000 AFY of potable water for customers in the District's water service area by the end of 2018. The District is planning recycled water system expansions that will increase recycled water use from 599 AFY in 2015 to 2,200 AFY by 2040. As a result of these projects, District imported water demand as furnished through Calleguas is projected to decrease from 7,017 AFY in 2015 to 4,9893 AFY in 2040.

Table 7-4: Multiple Dry Years Supply and Demand Comparison

		2020	2025	2030	2035	2040
First year	Supply totals	13,149	14,143	14,442	14,606	14,918
	Demand totals	12,636	13,104	13,472	13,798	14,138
	Difference	513	1,039	970	808	780
Second year	Supply totals	13,149	14,143	14,442	14,606	14,918
	Demand totals	12,636	13,104	13,472	13,798	14,138
	Difference	513	1,039	970	808	780
Third year	Supply totals	13,149	14,143	14,442	14,606	14,918
	Demand totals	12,636	13,104	13,472	13,798	14,138
	Difference	513	1,039	970	808	780

8 WATER SHORTAGE CONTINGENCY PLANNING

California's extensive system of water supply infrastructure, its reservoirs, groundwater basins, and inter-regional conveyance facilities, mitigate the effect of short-term dry periods. Defining when a drought begins is a function of drought impacts to water users. Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Droughts occur slowly, over a multi-year period. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline.

The District's Water Shortage Contingency Plan (WSCP) is documented in *Ventura County Waterworks District Nos. 1, 16, 17, and 19 Rules and Regulations, Part 1 - Section K – Water Shortages*, which is included in Appendix G. The District's WSCP will come into effect if a water supply shortage or threatened shortage exists, and a consumer demand reduction is necessary to make more efficient use of water, and appropriately respond to existing water conditions. The following discussion presents the various stages and basis for implementation.

8.1 STAGE OF ACTION

The District's WSCP will be implemented in congruence with Metropolitan's and Calleguas' water shortage/drought policies and activities. Calleguas' policy is based on Metropolitan's adopted Water Surplus and Drought Management Plan (WSDM Plan) as well as Metropolitan's Water Supply Allocation Plan as revised in June 2009. The WSDM Plan is designed to guide management of regional water supplies to achieve reliability goals for Southern California. The Water Supply Allocation Plan is designed to provide a framework for administering an allocation should a water shortage be declared.

In the event of a water shortage, the Director of the County of Ventura Public Works Agency (Agency Director) is authorized and directed by to implement provisions of the Water Shortage Plan, subject to ratification by the District Board at its first regularly scheduled meeting. The Agency Director determines the extent of conservation or water use efficiency required through the implementation and/or termination of particular conservation stages or levels consisting of three levels for the District to prudently plan for and supply water to its customers. However, in the case of local emergencies, the Director of the Water and Sanitation Department has the authority to order the implementation of the appropriate stage of water conservation. The three stages of the District's WSCP are shown in Table 8-1 and described in Section 8.1.1. It is important to note that agricultural water service is interruptible.

8.1.1 Ventura County Water District No. 1 – Water Supply Shortage Levels

Level 1 Water Supply Shortage

A Level 1, a water supply shortage is declared when the Engineer determines in his or her sole discretion that due to drought or other water supply conditions, a water supply

shortage or threatened shortage exists, and a consumer demand reduction is necessary to make more efficient use of water and appropriately respond to existing water conditions.

Table 8-1: Stages (Levels) of Water Shortage Contingency Plan

Level	Percent Supply Reduction[a]	Water Supply Condition
1	NA	A water supply shortage or threatened shortage exists, and a consumer demand reduction is necessary to make more efficient use of water
2	NA	A water supply shortage or threatened shortage exists, and a consumer demand reduction is necessary to make more efficient use of water. Additional prohibited water uses are identified relative to Level 1 prohibitions
3	NA	A significant reduction in consumer demand is necessary to maintain sufficient water supplies for public health and safety

(a) A percent supply reduction is not used by the District to signal a level of the WSCP; rather, it is up to the discretion of the Engineer to determine the severity of the water shortage and the appropriate level of the WSCP

Level 2 Water Supply Shortage

A Level 2, a water supply shortage is declared when the Engineer determines in his or her sole discretion that due to drought or other water supply conditions, a water supply shortage or threatened shortage exists, and a consumer demand reduction is necessary to make more efficient use of water and appropriately respond to existing water conditions. Additional prohibited water uses are identified relative to Level 1 prohibitions.

Level 3 Water Supply Shortage

A Level 3 water supply shortage condition is also referred to as an "Emergency" condition. A Level 3 condition is declared when the Engineer determines that a significant reduction in consumer demand is necessary to maintain sufficient water supplies for public health and safety. The Agency Director declares a water shortage emergency and notifies District residents and businesses of the emergency.

8.1.2 Calleguas Municipal Water District

Calleguas has developed water shortage contingency measures in the event that Metropolitan significantly reduces deliveries to its member agencies due to severe water shortage conditions or in the event that a catastrophe interrupts water deliveries. The following discussion summarizes these measures.

Stages of Action

Ordinance No. 12 gives the Calleguas Board of Directors authority to take actions necessary to manage available supplies, including passing through to purveyors

allocations and penalties for exceeding allocated deliveries. It is important to note that the Calleguas system is complex and the ultimate actions taken by Calleguas will depend on the unique issues of each particular condition. With exception of a catastrophic failure of the Perliter Tunnel or other infrastructure failure of similar magnitude, Calleguas does not foresee imposing allocations except under Metropolitan's direction and according to Metropolitan's WSAP schedule.

Consumption Reduction Methods by Agencies

Under the most severe drought conditions and under almost any catastrophe condition, and consistent with Calleguas' Ordinance No. 12 Section 6(a), Calleguas may "apportion the available water supply among Member Agencies in an equitable manner with due regard to public health and safety, and in accordance with the provisions of the Municipal Water District Act of 1911, as amended." In the event that a mandatory reduction in water consumption is required, following are examples of measures that purveyors may implement to meet water consumption goals:

- Restrict irrigation hours to evening and early morning hours.
- Disallow non-essential irrigation (i.e., golf courses and parks) and limit water use for essential irrigation.
- Restrict or disallow irrigation entirely.
- Disallow the use of water to fill ornamental lakes, ponds, pools, and fountains.
- Limit or disallow the washing of vehicles.
- Disallow the spraying of outdoor paved surfaces and using potable water for street cleaning.
- Restrict the use of water from fire hydrants for construction purposes.
- Implement a rate structure for charges and penalties for water use restriction violations.

Determining Water Shortage Reductions

As discussed previously, with exception of a catastrophic failure of the Perliter Tunnel, Calleguas does not foresee imposing allocations except under Metropolitan's direction and according to Metropolitan's WSDM Plan and WSAP schedule.

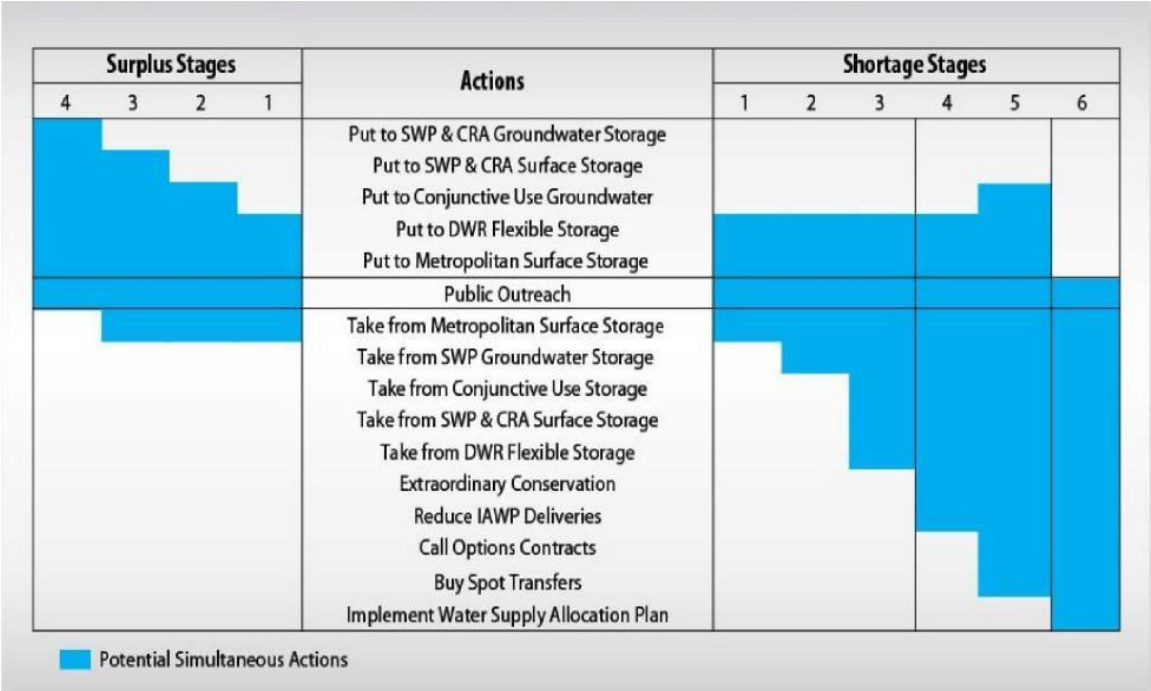
As shown in Figure 8-1, the WSDM Plan defines six shortage management stages to guide resource management activities. These stages are not defined merely by shortfalls in imported water supply, but also by the water balances in Metropolitan's storage programs. Thus, a 10 percent shortfall in imported supplies could be a stage one shortage if storage levels are high. If storage levels are already depleted, the same shortfall in imported supplies could potentially be defined as a more severe shortage.

When Metropolitan must make net withdrawals from storage to meet demands, it is considered to be in a shortage condition. Under most of these stages, Metropolitan is still able to meet all end use demands for water. For shortage stages 1 through 3, Metropolitan

will meet demands by withdrawing water from storage. At shortage stages 4 and 5, Metropolitan may undertake additional shortage management steps, including issuing public calls for extraordinary conservation and exercising water transfer options, or purchasing water on the open market.

The WSAP is enacted at shortage stage 6 and provides a formula for allocating available water supplies to the member agencies in case of extreme water shortages within Metropolitan's service area. The WSAP formula seeks to balance the impacts of a shortage at the retail level for shortages of Metropolitan supplies of up to 50 percent.

Figure 8-1. Metropolitan Resource Stages, Anticipated Actions & Supply Declarations



8.2 PROHIBITIONS ON END USES

A summary of restrictions and prohibitions on end uses for each stage of the VCWWD No. 1 WSCP is shown in Table 8-2 and is discussed as follows:

Level 1 Water Supply Shortage

A Level 1 Water Supply Shortage necessitates the following District water use restrictions:

> Exterior Water Use: The District will establish allocations and water rates, and implement water schedules to achieve the desired reduction in exterior water use.

Table 8-2: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	Landscape - Other landscape restriction or prohibition	The District will establish allocations and water rates to achieve the desired reduction in exterior water use	Yes
2	Landscape - Other landscape restriction or prohibition	The District will establish allocations and water rates to achieve the desired reduction in exterior water use	Yes
2	Water Features - Restrict water use for decorative water features, such as fountains	Filling or re-filling ornamental lakes or ponds is prohibited, except to the extent needed to sustain aquatic life	Yes
2	Other - Prohibit vehicle washing except facilities using recycled or recirculating water	Except by use of a hand-held bucket or container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, by high pressure/low volume wash systems, or at a commercial car washing facility that utilizes a re-circulating water system to capture or reuse water	Yes
2	Other water feature or swimming pool restriction	Re-filling of more than one foot and initial filling of residential swimming pools or outdoor spas with potable water is prohibited	Yes
3	Other	All restrictions stated for Level 2	Yes
3	Landscape - Prohibit all landscape irrigation	Watering or irrigating of lawn, landscape or other vegetated area with potable water is prohibited	Yes
3	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	All leaks, breaks or other malfunctions in the water user's plumbing or distribution system must be repaired within twenty-four (24) hours of notification.	Yes
3	Other	No new potable water service will be provided, no new temporary meters or permanent meters will be provided.	Yes

Level 2 Water Supply Shortage

In addition to the restrictions indicated for Level 1, the following restrictions shall apply:

Exterior Water Use: District will establish allocations and water rates to achieve the desired reduction in exterior water use.

Limits on Filling Ornamental Lakes or Ponds: Filling or re-filling ornamental lakes or ponds is prohibited, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to the declaration of a supply shortage level under these Rules and Regulations.

Limits on Washing Vehicles: Using water to wash or clean a vehicle is prohibited, except by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, by high pressure/low volume wash systems, or at a commercial car washing facility that utilizes a re-circulating water system to capture or reuse water.

Limits on Filling Residential Swimming Pools and Spas**:** Re-filling of more than one foot and initial filling of residential swimming pools or outdoor spas with potable water is prohibited.

Level 3 Water Supply Shortage

A Level 3 Water Supply Shortage condition is also referred to as an "emergency" condition. In addition to the restrictions indicated for Levels 1 and 2, the following restrictions shall apply:

Irrigation Restrictions: Watering or irrigating of lawn, landscape or other vegetated area with potable water is prohibited. This restriction does not apply to the following categories of use, unless it is determined by the Director that recycled water is available and may be applied to the use:

a. Maintenance of vegetation, including trees and shrubs, that are watered using a hand-held bucket or similar container or handheld hose equipped with a positive self-closing water shutoff nozzle or device.
b. Maintenance of existing landscape necessary for fire protection.
c. Maintenance of existing landscape for soil erosion control.
d. Maintenance of plant materials identified to be rare or essential to the well-being of protected species.
e. Maintenance of landscape within active public parks and playing fields, day-care centers, golf course greens, and school grounds, provided that such irrigation does not exceed two (2) days per week according to the schedule established in rules and regulations.
f. Actively irrigated environmental mitigation projects.

Obligations to Fix Leaks, Breaks or Malfunctions: All leaks, breaks or other malfunctions in the water user's plumbing or distribution system must be repaired within twenty-four (24) hours of notification as set forth in Rule 1-L-2b unless other arrangements are made with the District.

No New Potable Water Service: Upon declaration of a Level 3 Water Supply Shortage Emergency, no new potable water service will be provided, no new temporary meters or permanent meters will be provided, and no statements of immediate ability to serve or provide potable water service (such as will-serve letters, certificates, or letters of availability) will be issued, except under the following circumstances:

a. A valid, unexpired building permit has been issued for the project; or
b. The project is necessary to protect the public health, safety, & welfare; or
c. The applicant provides substantial evidence of an enforceable commitment that water demands for the project will be offset prior to the provision of a new water meter(s) to the satisfaction of the District.

No New Annexations: Upon the declaration of a Level 3 Water Supply Shortage condition, the District will suspend consideration of annexations to its service area. This subsection does not apply to boundary corrections and annexations that will not result in any increased use of water.

8.3 PENALTIES, CHARGES, OTHER ENFORCEMENT OF PROHIBITIONS

The District's WSCP is detailed in the District's Rules and Regulations (Part 1 - Section K). Penalties are imposed for violations of the WSCP as described in Part 1 - Section L of the District's Rules and Regulations (see Appendix G). The penalties are based upon the number and frequency of violations and are discussed below:

a. For the first violation a written notice will be given to the customer.
b. For the second violation within the preceding twelve (12) calendar months, a penalty of one hundred dollars ($100.00) shall be imposed by written notice to the customer.
c. For the third violation within the preceding twelve (12) calendar months a penalty of two hundred and fifty dollars ($250.00) shall be imposed by written notice to the customer.
d. For the fourth violation within the preceding twelve (12) calendar months, a penalty of five hundred dollars ($500.00) shall be imposed by written notice to the customer. The District may also give written notice to the customer indicating that it will install a flow restricting device of 1 gpm capacity for services up to one and one half inch meter size, and comparatively sized restrictors for larger services, on the service of the customer at the premises at which the violation occurred for a period of not less than forty-eight (48) hours. The charge for installing such a flow restricting device will be based upon the size of the meter and the actual

cost of installation. The charge for removal of the flow restricting device and restoration of normal service shall be based on the actual cost involved.

e. If there are five violations within twelve (12) consecutive calendar months, the District may discontinue water service to the customer at the premises at which the violation occurred.

8.4 CONSUMPTION REDUCTION METHODS

A summary of consumption reduction methods undertaken by the District to reduce water demand within their service area in association with water shortage contingency planning is shown in Table 8-3.

Table 8-3: Stages of WSCP - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
1,2,3	Expand Public Information Campaign	The District in concert with Ventura County maintains a website titled SlowYourH2O.org which provides information on methods to reduce water, water use restrictions, water rules & regulations, and tips regarding water use & conservation
1,2,3	Improve Customer Billing	District has a tiered rate structure which does not encourage increased water usage
1,2,3	Provide Rebates on Plumbing Fixtures and Devices	Calleguas Municipal Water District in the past has provided this service and is currently being revised

Public Information Campaign

The District, in concert with the County of Ventura Water and Sanitation Department maintains a website titled SlowYourH2O.org which provides water conservation information. Calleguas also maintains a water conservation section on their website (www.calleguas.com). Calleguas provides the following additional resource links that includes water conservation, rebate programs, water saving incentives and other information sources related to water conservation

Education: http://mwdh2o.com/mwdh2o/pages/education/h2o/h2o.html
Rebates: http://socalwatersmart.com/
Innovative Conservation Program: http://www.bewaterwise.com/icp.html
California Native Plant Society: http://www.cnps.org/
Gardening Classes: http://www.bewaterwise.com/training01.html:
WaterSaving:http://www.mwdh2o.com/mwdh2o/pages/yourwater/cpp/cpp.html

Customer Billing

The District has developed conservation pricing to provide economic incentives to customers to use water efficiently. The District has a tiered rate structure for water service within its service area.

Rebates or Giveaways of Plumbing Fixtures and Devices

Calleguas has made water conservation a priority and as such they have long offered rebate programs for water conservation devices. Metropolitan and Calleguas continue to try and find the best way to get these devices and rebates to the customers and end users.

Reduction of Water System Loss

The District regularly conducts water system audits, leak detection and repairs as part of its overall operations. These activities are conducted by water operations/maintenance staff, these programs aim at reducing water losses through a water agency's mains.

Implementation of Drought Rate Structure or Surcharge

The District has a tiered rate structure for water service within its service area. The tiered rate structure discourages high water use. Surcharges imposed by Calleguas may be passed through to customers.

8.5 DETERMINING WATER SHORTAGE REDUCTIONS

Under normal conditions, potable water production figures are recorded daily. Weekly and monthly reports are prepared and monitored. This data is used to measure the effectiveness of any water shortage contingency stage that may be implemented.

As stages of water shortage are declared by Metropolitan and Calleguas, the District will follow implementation of those stages and continue to monitor water demand levels. It is not until Metropolitan declares a Shortage Stage 5 that Metropolitan may call for extraordinary conservation. During this stage, Metropolitan's Drought Program Officer will coordinate public information activities with Calleguas and monitor the effectiveness of ongoing conservation programs. Monthly reporting on estimated conservation water savings will be provided.

The District will participate in member agency manager meetings with Calleguas to monitor and discuss water allocation charts. This will enable the District to be aware of imported water use on a timely basis.

8.6 REVENUE AND EXPENDITURE IMPACTS

The District receives water revenue from a commodity charge and a tiered rate structure for water service. The rates have been designed to recover the bulk of the cost of water

service in the commodity charge. An assessment of the revenue impacts as a result of the various stages of conservation previously showed that with the use of the Rate Stabilization Fund, the District would have sufficient funds to cover a water shortage without the need to increase water rates.

8.7 RESOLUTIONS OR ORDINANCE

To meet short-term water demand deficiencies, and short- or long-term drought requirements, the District has included a Water Shortage Plan, which is included as Section K of their Rules and Regulations. The District has also adopted permanent water conservation measures included in Section L of their Rules and Regulations. These two sections of the District's Rules and Regulations are included in Appendix G. In addition, the City of Moorpark has adopted the State's Model Water Efficient Landscape Ordinance that sets forth standards for landscape irrigation during drought and non-drought times, and acknowledges the constant need to establish long-term water efficiency (City Ordinance 10-383, Chapter 15.23). This ordinance covers all landscaping within new developments as well as rehabilitated landscape.

8.7.1 Permanent Water Conservation Measures

The District has passed rules and regulations that prohibit water wasting. Specifically, the District has implemented the following requirements:

Water Saving Devices: All new customers shall install and use the following water efficient plumbing fixtures:

a. Ultra-low volume toilets (1.6 gallons per flush or less).
b. Low-flow shower heads (2.0 gallons per minute or less).

Water Waste Prohibited: No person shall use or permit the use of District water as follows:

a. Watering of turf, ornamental landscape, open ground crops and trees, in a manner or to an extent which allows water to run to waste.
b. In any manner such that the escape of water through leaks, breaks, or malfunctions within the water user's plumbing or distribution system occurs for any period of time beyond which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight hours after the water user discovers such leak, break, or malfunction, or receives notice from the District of such condition, whichever occurs first, is a reasonable time within which to correct such condition.
c. Using water to wash or clean a vehicle, including but not limited to washing automobiles, trucks, trailers, boats, or other types of mobile equipment, without the use of a hand-held bucket or similar container or a hand-held hose equipped with a positive self-closing water shut-off nozzle

or device. This subsection does not apply to any commercial car washing facility.

d. Operating any ornamental fountain, or similar structures, unless water for such is recycled for lawful reuse without substantial loss.

e. Washing down hard or paved surfaces, including but not limited to washing of sidewalks, walkways, driveways, parking lots or any other hard-surfaced areas by hose or flooding, except as otherwise necessary to prevent or eliminate conditions dangerous to the public health and safety or for other legitimate uses approved by the District, and then only by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, a low-volume high-press cleaning machine equipped to recycle any water used, or a low-volume high-pressure water broom.

f. Serving water in eating or drinking establishments, including but not limited to restaurants, hotels, cafés, bars or other public places where food or drinks are sold or served, to customers without first being expressly requested by the customer.

g. For any indiscriminate running of water or washing with water not otherwise prohibited above which is wasteful and without reasonable purpose.

h. Watering of residential, commercial, industrial, and governmental outdoor irrigation from 9:00 a.m. to 4:00 p.m. except for a short duration, not to exceed 3 minutes per station, for the limited purpose of testing or making repairs to the irrigation system. Agricultural customers are exempt from this irrigation schedule, but must comply with agricultural irrigation schedules determined by the District (currently a 3 day/week watering schedule is in effect).

i. Running of water or spraying of water onto other properties.

j. Watering or irrigating of lawn, landscape or other vegetated area with potable water using a landscape irrigation system or a watering device that is not continuously attended for more than ten (10) minutes watering per day per station. This rule does not apply during the establishment period, as determined by the District, for new landscaping.

k. For laundry purposes by hotels, motels and other commercial lodging establishments, except where customers are given the option of not having towels and linens laundered daily through the prominent display of written notice of such option in each bathroom using clear and easily understood language.

l. Through the installation of single pass cooling systems in buildings requesting new water service.

m. Through the installation of non-recirculating water systems in new commercial conveyor car wash and new commercial laundry systems.

n. Through the use of non-water conserving dish wash spray valves by food preparation establishments, such as restaurants and cafes.

o. Through a commercial conveyor car wash operating without a re-circulating water system, or without first securing a waiver of this requirement from the Director.

8.8 CATASTROPHIC SUPPLY INTERRUPTION

A water shortage emergency could be the result of a catastrophic event such as result of drought, failures of transmission facilities, a regional power outage, earthquake, flooding, supply contamination from chemical spills, or other adverse conditions. These emergencies and the District's method for handling them are described below.

8.8.1 Earthquakes or Other Natural Disasters

The District is located in an earthquake zone. In the event of an earthquake or natural disaster, the District has the potential of losing its imported water supply. If such a loss occurs, the District could temporarily increase its groundwater production to meet water demand until the imported water supply facilities were repaired and the supply restored. In the event of a prolonged loss of imported water, the District could implement their established Water Shortage Plan from the Rules and Regulations to substantially reduce demands until supply is restored, as discussed below.

8.8.2 Contamination

Contamination of water supply can result from a number of different events including a water main break, cross-connection condition, water source pollution, or covert action. Water supplies for the District are generally of good quality and no foreseeable permanent contamination issues are anticipated. In the event of a toxic spill or major contamination, the District would isolate the problem and reduce the impact to the water supply. Once the problem has been isolated, the contamination would be cleaned up using chlorination or other necessary procedures and the water supply returned to service as soon as possible. In the meantime, alternative supply would be utilized to meet demand. Implementation of additional demand management measures could also be utilized if the outage is anticipated to be of longer duration.

8.8.3 Emergency Power Outage

In the event of a regional power outage, the District would follow the procedures outlined in their Emergency Procedures Manual (EPM) Section VII. The District's EPM identifies various levels of emergencies and provides examples of actions for a number of given emergencies, including power failure. Standby generators are available at each of the District's well and pump station sites to maintain operation should an interruption of power occur. Section IX of the EPM lists all of the stationary and mobile generators located at the various District facilities, with model numbers, kilowatt rating, and fuel tank capacity. In addition, the District would implement the procedures outlined in the

Rules and Regulations regarding water shortages (see Appendix G) which includes actions for any event which results in loss of supply.

8.9 MINIMUM SUPPLY NEXT THREE YEARS

The UWMP Act requires that water agencies provide an estimate of the minimum water supply available during each of the next three water years, 2016, 2017, and 2018. Table 8-4A shows the minimum water supply (imported water and recycled water) availability as estimated by Calleguas in their Draft 2015 UWMP for their water service area in 2016, 2017, and 2018. In making these estimates, Calleguas assumed that Metropolitan would continue a Level 3 WSAP allocation (15% cutback) through FY 2016 and assumed a Level 4 WSAP allocation (20% cutback) for FY 2017 and FY 2018, conservatively assuming that drought conditions would persist.

However, these estimates now appear to be even more conservative as the Metropolitan Board of Directors reduced the WSAP to a Level 2 on May 10, 2016, which is a 10% reduction in imported water deliveries, effective immediately, due to lower demands achieved through the region's water saving efforts and improved supply conditions, particularly in Northern California; and declared there would be no WSAP set forth for FY 2017.

Based on the minimum supply projections made by Calleguas in their 2015 UWMP, minimum water supply projections for VCWWD No. 1 are shown in Table 8-4. The small decrease in imported water supply estimated for VCWWD No. 1 in 2017 and 2018 (in going to an assumed worst-case 20% Level 4 reduction) is made up by the District in expanding the recycled water system from approximately 600 AFY in 2016 to 1,100 in 2017.

The District is planning the Moorpark Desalter Project, which is a groundwater production and treatment system that could provide up to 5,000 AFY of potable water for customers in the District's water service area by the end of 2018; as such, it is conservatively not included as a supply for 2018 in Table 8-4, but would be available in the next year (2019).

Table 8-4A: Minimum Supply Next Three Years for Calleguas WSA (AFY)

	2016	2017	2018
Available Water Supply	91,349	88,741	88,741

Table 8-4: Minimum Supply Next Three Years for VCWWD No. 1 WSA (AFY)

	2016	2017	2018
Available Water Supply	10,100	10,200	10,200

9 DEMAND MANAGEMENT MEASURES

The goal of the Demand Management Measures (DMM) section in a UWMP is to provide a comprehensive description of the water conservation programs that the District has implemented, is currently implementing, and plans to implement in order to meet its urban water use reduction targets. Calleguas implements many of the urban water conservation DMMs on behalf of its member agencies, including VCWWD No. 1.

9.1 DEMAND MANAGEMENT MEASURES FOR RETAIL AGENCIES

9.1.1 Water Waste Prevention Ordinances

The District has passed rules and regulations that prohibit water wasting. Specifically, the District has implement the following requirements:

Water Saving Devices: All new customers shall install and use the following water efficient plumbing fixtures:

a. Ultra-low-volume toilets (1.6 gallons per flush or less).
b. Low-flow shower heads (2.0 gallons per minute or less).

Water Waste Prohibited: No person shall use or permit the use of District water as follows:

a. Watering of turf, ornamental landscape, open ground crops and trees, in a manner or to an extent which allows water to run to waste.
b. In any manner such that the escape of water through leaks, breaks, or malfunctions within the water user's plumbing or distribution system occurs for any period of time beyond which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight hours after the water user discovers such leak, break, or malfunction, or receives notice from the District of such condition, whichever occurs first, is a reasonable time within which to correct such condition.
c. Using water to wash or clean a vehicle, including but not limited to washing automobiles, trucks, trailers, boats, or other types of mobile equipment, without the use of a hand-held bucket or similar container or a hand-held hose equipped with a positive self-closing water shut-off nozzle or device. This subsection does not apply to any commercial car washing facility.
d. Operating any ornamental fountain, or similar structures, unless water for such is recycled for lawful reuse without substantial loss.
e. Washing down hard or paved surfaces, including but not limited to washing of sidewalks, walkways, driveways, parking lots or any other hard-surfaced areas by hose or flooding, except as otherwise necessary to prevent or eliminate conditions dangerous to the public health and safety or for other legitimate uses approved by the District, and then only by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or

device, a low-volume high-press cleaning machine equipped to recycle any water used, or a low-volume high-pressure water broom.

f. Serving water in eating or drinking establishments, including but not limited to restaurants, hotels, cafés, bars or other public places where food or drinks are sold or served, to customers without first being expressly requested by the customer.

g. For any indiscriminate running of water or washing with water not otherwise prohibited above which is wasteful and without reasonable purpose.

h. Watering of residential, commercial, industrial, and governmental outdoor irrigation from 9:00 a.m. to 4:00 p.m. except for a short duration, not to exceed 3 minutes per station, for the limited purpose of testing or making repairs to the irrigation system. Agricultural customers are exempt from this irrigation schedule, but must comply with agricultural irrigation schedules determined by the District (currently a 3 day/week watering schedule is in effect).

i. Running of water or spraying of water onto other properties.

j. Watering or irrigating of lawn, landscape or other vegetated area with potable water using a landscape irrigation system or a watering device that is not continuously attended for more than ten (10) minutes watering per day per station. This rule does not apply during the establishment period, as determined by the District, for new landscaping.

k. For laundry purposes by hotels, motels and other commercial lodging establishments, except where customers are given the option of not having towels and linens laundered daily through the prominent display of written notice of such option in each bathroom using clear and easily understood language.

l. Through the installation of single pass cooling systems in buildings requesting new water service.

m. Through the installation of non-recirculating water systems in new commercial conveyor car wash and new commercial laundry systems.

n. Through the use of non-water conserving dish wash spray valves by food preparation establishments, such as restaurants and cafes.

o. Through a commercial conveyor car wash operating without a re-circulating water system, or without first securing a waiver of this requirement from the Director.

9.1.2 Metering

The District maintains water meters on all residential, commercial, industrial and municipal connections to the District's water distribution system. The District has an aggressive meter replacement program. Meters are re-built on a multi-year cycle to ensure accuracy and proper functioning. The District's water system is fully metered. Therefore, the District completes annual checks on the accuracy and operation of production meters by either recalibrating and reinstalling, or by replacing meters that do not fall within the required operating range of AWWA standards.

9.1.3 Conservation Pricing

The District has a tiered rate structure for water service within its service area. The tiered rate structure does not encourage high water use.

9.1.4 Public Education and Outreach

Ventura County Public Works Agency Water and Sanitation Department staff maintains a website (www.SlowYourH2O.org) that provides information regarding:

- Methods to reduce water use;
- Water use restrictions;
- Rules and regulations including fines associated with violation of watering restrictions; and
- Tips regarding water use and conservation

In addition, Calleguas maintains a website (www.calleguas.com) containing conservation information. Calleguas has made water conservation a priority and as such they have long offered rebate programs for water conservation devices. Over the years water saving technologies have advanced in both quality and effectiveness and these advancements have necessitated changes in the way they run rebate programs. Customer rebate records obtained from Calleguas showing total rebates paid to customers within the District's WSA for the period from 2010 to 2015 broken down by commercial, industrial and institutional (CII) customers and residential customers for both turf removal rebates and device rebates (low-flush toilets, clothes washers, etc.) are shown in Table 9-1A. These rebates are a combination of both Calleguas and Metropolitan funds.

Table 9-1A: Rebates Paid to VCWWD No. 1 Customers (2010-2015)

CII Devices	$168,929
CII Turf	$147,270
Residential Devices	$777,252
Residential Turf	$553,077

Metropolitan and Calleguas continue to try and find the best way to get these devices and rebates to the customers and end users. Currently, the conservation program is undergoing a makeover. Calleguas expects to have a more streamlined approach to pass rebates and rebate information on to customers in the future.

Calleguas provides the following additional resource links that includes water conservation, rebate programs, water saving incentives and other information sources related to water conservation

Education: http://mwdh2o.com/mwdh2o/pages/education/h2o/h2o.html
Rebates: http://socalwatersmart.com/
Innovative Conservation Program: http://www.bewaterwise.com/icp.html
California Native Plant Society: http://www.cnps.org/
Gardening Classes: http://www.bewaterwise.com/training01.html:
WaterSaving:http://www.mwdh2o.com/mwdh2o/pages/yourwater/cpp/cpp.html

9.1.5 Programs to Assess and Manage Distribution System Real Loss

The District is currently using a wide range of operational policies and practices to ensure the efficient use of its water supply. The District conducts monthly monitoring of all water services. In addition, daily inspection of all facilities such as pump stations, wells, reservoirs, valve vaults, etc., is completed. On an annual basis, visual inspection of all easements and pipeline alignments is accomplished.

The District accomplishes water audits and leak detection through various District activities focused on finding and correcting water losses. Field crews visually survey the system as they travel the throughout the district service area on a daily basis. The District's telemetry system also enhances the ability to locate and correct large leaks expeditiously. Leak monitoring is accomplished by all operations field personnel. In the event of a leak, prompt response and investigation is communicated to the District by customers and other entities.

The District works diligently to confirm that the appropriate parties are billed for water loss resulting from damaged fire hydrants, air-vacuums, blow offs, dig-ins, etc. In addition, monthly monitoring of "unaccounted-for" water losses assists in identifying leaks. The AWWA Water Audit Software Version 5.0 was used to quantify distribution water loss for the District for 2015 and a water loss volume of 144 AFY was calculated for the domestic water system, which is 1.5% of the water supplied assuming 1.25% of authorized consumption (119 AFY) was unbilled and unmetered water use, i.e. water typically used for fighting fires, flushing water mains, conducting fire flow tests, etc.

The District implements programs on leak detection and repair, metering, meter replacement, system flushing, reservoir cleaning and maintenance, valve maintenance and mapping. The District proposes to review distribution system operational procedures and maintenance practices with appropriate field and administrative staff. These measures will ensure system reliability. The hydrant flushing program will be reviewed for its scope and timing, as well as to determine how much water is lost during flushing.

9.1.6 Water Conservation Program Coordination and Staffing Support

The District has designated the Water Superintendent responsible for the position of Water Conservation Coordinator. The District continues to be involved in water conservation programs and coordinates with Calleguas and MWD on an as needed basis.

9.2 IMPLEMENTATION OVER THE PAST FIVE YEARS

The District is a member of the California Urban Water Conservation Council (CUWCC). The District's 2011 and 2012 Best Management Practice (BMP) annual reports are included in Appendix H to document examples of implementation of DMMs over the past 5 years.

9.3 PLANNED IMPLEMENTATION TO ACHIEVE WATER USE TARGETS

Through the implementation of District water conservation ordinances and measures, total per-capita District water use (including agricultural water use) has significantly dropped from 314.4 gpcd in 2005 to 257.4 in 2010 to 237.4 in 2015 (a reduction of 24.4% relative to 2005). Many of the water conservation measures already implemented and being implemented by District customers such as turf removal, conversion to drought resistance landscapes, conversion to more efficient irrigation systems and ET-based irrigation controllers, retrofits to high efficiency clothes washers and toilets, implementation of weather-based irrigation controllers, etc. will have permanent effects on water use (reduction) in the future.

Lower per-capita water use is projected for new housing development (relative to existing housing and development) due to new building codes and landscape ordinances. California's newly adopted green building code will have a direct impact on home building and water conservation in the State. The new code aims to cut indoor water consumption by at least 20%, primarily through more efficient indoor water fixtures. For a three-bedroom house, the saving is estimated to be about 10,000 gallons of water per year, on average.

The California Green Building program also includes outdoor water conservation by reducing the area devoted to high-irrigation lawns and plants, emphasizing natural drought-tolerant plantings, and installing irrigation controls that respond to local weather conditions. This is consistent with the new Model Water Efficient Landscape Ordinance (MWELO), which was adopted by the State on July 15, 2015 and was adopted by the City of Moorpark (City Ordinance 10-383, Chapter 15.23) and by Ventura County on December 1, 2015, by default.

9.4 MEMBERS OF THE CALIFORNIA URBAN WATER CONSERVATION COUNCIL

On July 30, 1991, the District elected to become Signatory to the Memorandum of Understanding (MOU) Regarding Best Management Practices (BMPs) for Urban Water Conservation with the California Urban Water Conservation Council (CUWCC). As Signatory to the MOU, the District has committed to a good faith effort in implementing cost-effective BMPs. "Implementation" means achieving and maintaining the staffing, funding, and in general, the priority levels necessary to achieve the level of activity called for in each BMP's definition, and to satisfy the commitment by the signatories to use good faith efforts to optimize savings from implementing BMPs as described in the MOU.

A BMP as defined in the MOU is a "practice for which sufficient data are available from existing water conservation practices to indicate that significant conservation or conservation related benefits can be achieved; that the practice is technically and economically reasonable and not environmentally or socially unacceptable; and that the practice is not otherwise unreasonable for most water agencies to carry out."

The District's 2011 and 2012, Best Management Practice (BMP) annual reports are included in Appendix H to document examples of implementation of DMMs over the past 5 years. The submitted reports include documentation from the CUWCC that the District has met the Memorandum of Understanding (MOU) coverage requirements and is in full compliance with the MOU.

10 PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

10.1 INCLUSION OF ALL 2015 DATA

The District's 2015 UWMP consists of water use and planning data for the entire year of 2015. The District is reporting on a 2015 calendar year basis.

10.2 NOTICE OF PUBLIC HEARING

The District will hold a public hearing prior to adopting the 2015 UWMP. The public hearing will provide an opportunity for the public to provide input to the plan before it is adopted. The District will consider all public input.

There are two audiences to be noticed for the public hearing; cities and counties, and the public.

10.2.1 Notice to Cities and Counties

CWC 10621

(b) Every urban water supplier required to prepare a plan shall… at least 60 days prior to the public hearing on the plan … notify any city or county within which the supplier provides waters supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

CWC 10642

…The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area…

VCWWD No. 1 supplies water to the City of Moorpark and to unincorporated area of Ventura County as shown in Table 10-1.

Table 10-1 Retail: Notification to Cities and Counties

City Name	60 Day Notice	Notice of Public Hearing
Moorpark	☑	☑
County Name	**60 Day Notice**	**Notice of Public Hearing**
Ventura County	☑	☑

The City of Moorpark and Ventura County will be notified that VCWWD No. 1 will be reviewing the UWMP and considering amendments to the Plan. This notice will be sent at least 60 days prior to the public hearing. VCWWD No. 1 will provide notice of the time and place of the public hearing.

10.2.1 Notice to the Public

CWC 10642

…Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection…Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code…

Government Code 6066

Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including therein the first day.

The District's public notice of the public hearing was published in a local newspaper on May 31 and June 7, 2016. A copy of the proof of publication is included in Appendix C.

10.3 PUBLIC HEARING AND ADOPTION

As part of the public hearing, the District will provide information on their baseline values, water use targets, and implementation plan required in the Water Conservation Act of 2009. The public hearing on the UWMP will take place before the adoption of the UWMP, which will allow the District the opportunity to modify the UWMP in response to public input before adoption. The District will formally adopt the UWMP before submitting the UWMP to DWR. A copy of the District's adoption resolution is included in Appendix C.

10.4 PLAN SUBMITTAL

The District's 2015 UWMP will be submitted to DWR within 30 days of adoption and by July 1, 2016. UWMP submittal will be done electronically through WUEdata, an online submittal tool. After the UWMP has been submitted, DWR will review the plan and make a determination as to whether or not the UWMP addresses the requirements of the CWC. The DWR reviewer will contact the water supplier as needed during the review process. Upon completion of the Plan review, DWR will issue a letter to the agency with the results of the review.

Not later than 30 days after adoption, the District will submit a CD or hardcopy of the adopted 2015 UWMP to the California State Library.

10.5 PUBLIC AVAILABILITY

Not later than 30 days after filing a copy of its plan with DWR, the District will make the plan available for public review during normal business hours by placing a copy of the

UWMP at the front desk of the District's office, and by posting the UWMP on the District's website for public viewing.

10.6 AMENDING AN ADOPTED UWMP

If the District amends the adopted UWMP, each of the steps for notification, public hearing, adoption, and submittal will also be followed for the amended plan.