California Water Service Company

2010 Urban Water Management Plan

Hermosa-Redondo District

ADOPTED

June 2011

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California Water Service Company
2010 Urban Water Management Plan
Contact Sheet

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1 Plan Preparation

California Water Service Company (Cal Water) is an investor-owned public utility supplying water service to 1.7 million Californians through 435,000 connections. Its 24 separate water systems serve over 63 communities from Chico in the north to the Palos Verdes Peninsula in Southern California. California Water Service Group, Cal Water's parent company, is also serving communities in Washington, New Mexico and Hawaii. Rates and operations for districts located in California are regulated by the California Public Utilities Commission (CPUC). Rates are set separately for each of the systems. Cal Water has been in continuous operation in California since 1926 and has provided water service to the Hermosa-Redondo community since 1926.

1.1 Purpose

California Water Code §10644(a) requires urban water suppliers to file with the Department of Water Resources, the California State Library, and any city or county within which the supplier provides water supplies, a copy of its Urban Water Management Plan (UWMP), no later than 30 days after adoption. Cal Water will follow the California Water Code and file an UWMP at least once every five years on or before December 31, in years ending in five and zero.

All urban water suppliers as defined in Section 10617 (including wholesalers), 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 annually are required to prepare an UWMP.

This UWMP is a foundation document and source of information for a Water Supply Assessment and a Written Verification of Water Supply. An UWMP also serves as:

- A long-range planning document for water supply,
- Source data for development of a regional water plan, and
- A source document for cities and counties as they prepare their General Plans.
- A key component to Integrated Regional Water Management Plans.

1.2 Coordination

Cal Water completed a draft of the UWMP for the Hermosa-Redondo District on April 1, 2011. The draft was sent to the Cities and County listed in Table 1.3-1 for review and comment. Copies of the draft plan were available at the Cal Water Corporate Office in San Jose and at the District office for public review and comment.

Table 1.2-1 summarizes Cal Water's attempts to include various agencies in the planning process of this UWMP. The agencies listed have also been sent a copy of the final version of this report.

Table 1.2-1: Coordination with Appropriate Agencies (Table 1)

Agency	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft plan	Was sent a notice of intention to adopt	Not involved/ No information
City of Hermosa Beach		✓		✓	✓	✓	
City of Redondo Beach				✓	✓	✓	
City of Torrance				✓	✓	✓	
County of Los Angeles				✓	✓	✓	
West Basin Municipal Water District				✓	✓	✓	

Cal Water conducted a public meeting to present information on this Hermosa-Redondo District UWMP on June 8, 2011, from 3:00-5:00 at p.m. at the following location:

California Water Service Compnay
Rancho Dominguez Customer Service Center
2632 W. 237th Street
Torrance, CA 90505

Proof of the public meeting is presented in Appendix A.

1.3 Plan Adoption

The deadline for final comments was June 15, 2011. The final plan was adopted by the Vice President of Engineering & Water Quality on June 24, 2011 and was submitted to California Department of Water Resources within 30 days of approval. Appendix A presents a copy of the signed Resolution of Plan Adoption. In addition to the resolution, Appendix A also contains the following:

- Any comments received during the public review of this plan.
- Minutes from the public hearing.
- Correspondence between Cal Water and participating agencies.

1.4 Water Management Tools

Cal Water uses the following water management tools to optimize management of water resources for the District:

- Computerized Hydraulic Model for analysis of various operating conditions within the water distribution network and for planning operational and facility improvements. For smaller systems, a simple model is maintained that only models trunk lines, key sources, and major delivery points.
- Supervisory Control and Data Acquisition (SCADA) system that provides information as to how the water system is operating, provides operational control functions, and maintains a historical record of selected data.
- Revenue Management Solutions (RMS) is an information system that Cal Water uses to maintain detailed historical records including the water sales and customer service connections.
- District Report on Production (DROP) is a database that maintains water production data for wells and purchased amounts from wholesale service connections.
- Geographical Information Systems (GIS) that combines multiple sources of information and allows data to be electronically mapped for analysis and understanding of growth and constraints on land development and water use.
- Laboratory Information Management System (LIMS) provides water quality data for detailed constituent analysis of raw and finished water, determination of compliance with state and federal drinking water standards, and trends in water quality changes.
- Water Supply and Facilities Master Plan for identification of near and long term capital improvement projects for water system facilities and equipment using all of the above tools and Cal Water experience in design and construction.
- Computerized Maintenance Management System (CMMS) is a computerized database system that tracks asset data, assigns and schedules maintenance work orders, and reports on maintenance related activities. A CMMS allows a business to manage maintenance work more effectively and is a stepping stone towards Asset Management (AM).
- Groundwater Level Monitoring Program tracks groundwater fluctuations over time and is used to inform resource management and well maintenance decisions.

1.5 Plan Organization

This plan is organized as described in the following outline. The corresponding provisions of the California Urban Water Management Planning Act are included as references. Tables in this plan have cross-references to the tables as listed in the "Guidebook to Assist Water Suppliers to Prepare a 2010 Urban Water Management Plan" prepared by the California Department of Water Resources.

Section	Table 1.5-1: Plan Organization	Act Provision
Contact Sheet	List of Contact Persons	-
Section 1	Plan Preparation This section describes the requirement and the purpose of the Urban Water Management Planning Act, coordination, plan adoption, schedule, and management tools.	§10620 (d)(2) §10621(a -b) §10635(b) §10642 §10643 §10644 (a) §10645
Section 2	System Description This section describes the District service area and includes area information, population estimate, and climate description.	§10631 (a)
Section 3	System Demands This section describes the water supply projection methodology used to estimate water demands and supply requirements to 2040. It also includes a discussion of SBx7-7 baselines and targets.	§10631 §10608.20(e)
Section 4	System Supplies This section includes a detailed discussion of the water supply sources.	§10631 §10633 §10634
Section 5	Water Supply Reliability and Water Shortage Contingency Planning This section includes a discussion of the water supply reliability and describes the District's planning for water shortages during drought and emergency situations.	§10620 §10631 (d) §10632 §10634 §10635 (a)
Section 6	Demand Management Measures This section describes Cal Water's conservation programs.	§10631
Section 7	Climate Change This section contains a discussion of climate change.	
Section 8	DWR Checklist This section includes the completed DWR UWMP Checklist.	
Appendix A	Resolution To Adopt The Urban Water Management Plan This section includes the following: 1) Resolution 2) Letters to and comments from various agencies 3) Minutes from the public hearing 4) Correspondence between Cal Water and participating agencies	§10621 (b) §10642 §10644 (a)
Appendix B	Service Area Map This appendix includes the service area map of the District as filed with the Public Utilities Commission.	-
Appendix C	Water Supply, Demand, And Projection Worksheets This section includes the spreadsheets used to estimate the water demand for the District.	-

Section	Table 1.5-1: Plan Organization	Act Provision
Appendix D	DWR Groundwater Bulletin 118 Sections from the Department of Water Resources Bulletin 118 are included as reference and provide details of the basin for the District.	§10631 (b)(1-4)
Appendix E	Tariff Rule 14.1 Water Conservation And Rationing Plan, and Local Conservation Ordinances This section contains the tariff rule and local water conservation ordinances for reference.	-
Appendix F	Water Efficient Landscape Guidelines This section contains the Guideline for Water Efficient Landscape that Cal Water uses at its properties, including renovations.	-
Appendix G	Conservation Master Plan This section contains the District's Conservation Master Plan.	§10631 (j)
Appendix H	Purchase Agreement with West Basin Municipal Water District A copy of the Purchase Agreement with West Basin Municipal Water District is attached for reference.	-
Appendix I	Adjudication Order The adjudication order for the West Coast Basin is attached for reference.	§10631 (b)(1-4)
Appendix J	WRD Strategic Plan This section contains the groundwater management plan.	§10631

1.6 Implementation of Previous UWMP

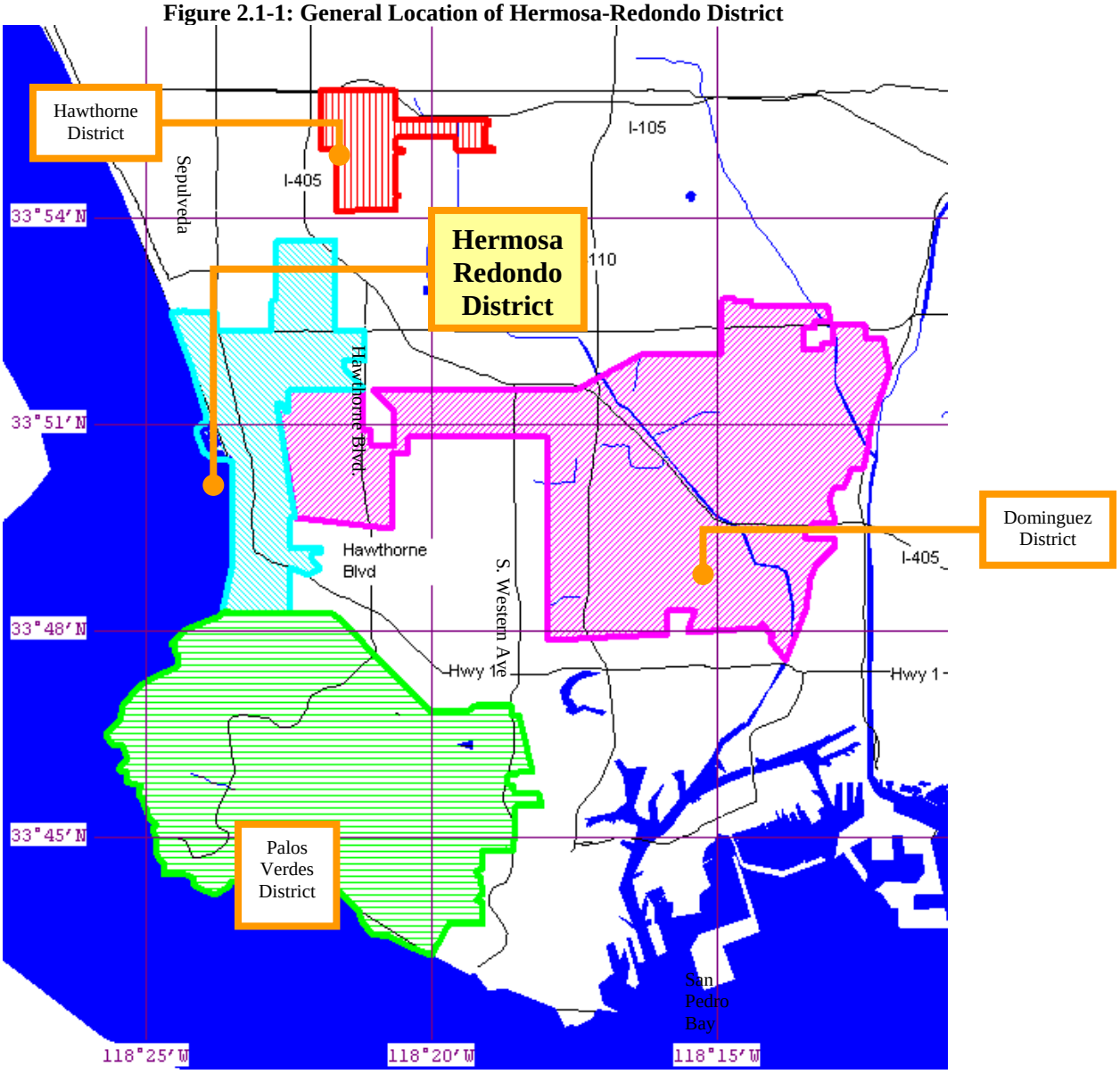
Cal Water will follow the California Water Code and file an UWMP at least once every five years on or before December 31, in years ending in five and zero. Since Cal Water operates 24 separate service districts the UWMP for each district has historically been submitted every third year to coincide with its California Public Utilities Commission (CPUC) general rate case (GRC) schedule. This method divided the districts into three sets that followed an established three-year schedule. The Plan for Hermosa-Redondo was last submitted as part of the 2005 grouping. Cal Water has since eliminated these groupings and will now file a GRC for all districts every third year and an UWMP every fifth year.

2 System Description

2.1 Service Area Description

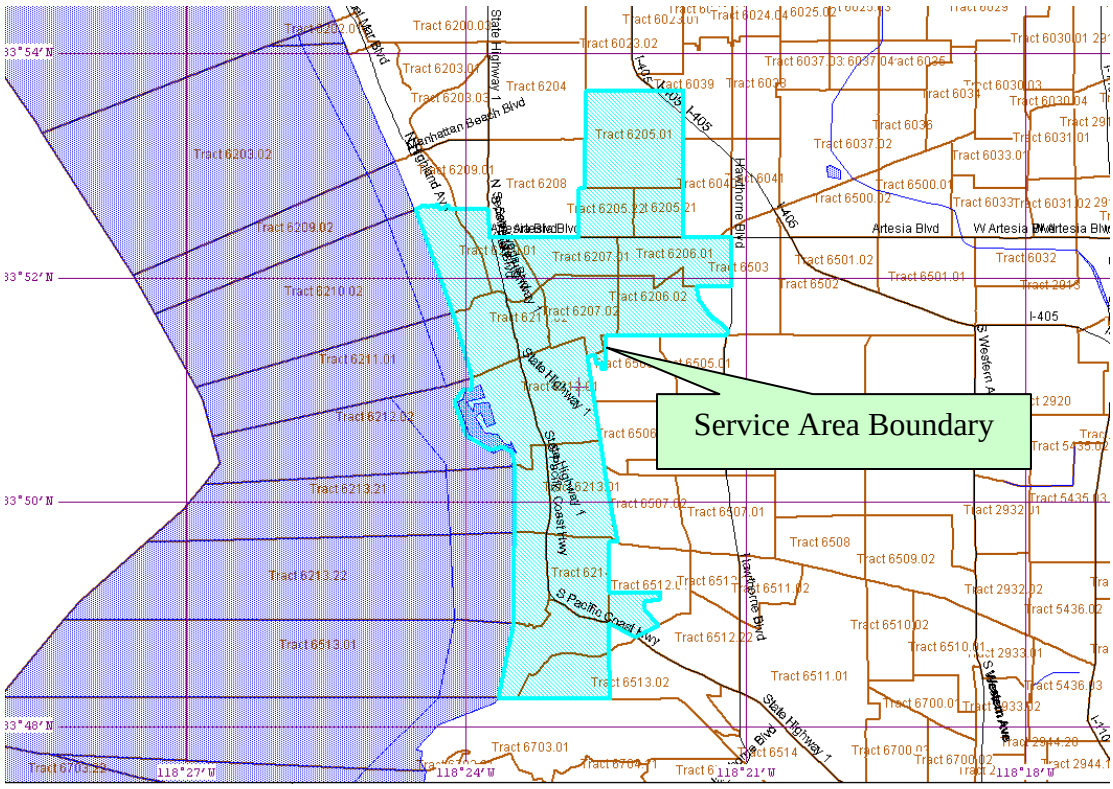
The Hermosa-Redondo District is located at the southwest corner of the Los Angeles coastal plain, approximately 15 miles from downtown Los Angeles. The general location of the Hermosa-Redondo District is shown in the Figure 2.1-1.

Figure 2.1-1: General Location of Hermosa-Redondo District



Its service area, built on coastal dunes facing the Santa Monica Bay, encompasses the cities of Hermosa Beach and Redondo Beach and approximately 5 percent of Torrance. The system is bounded on the north by the cities of Manhattan Beach and Lawndale, on the east by Gardena and Torrance, on the south by Palos Verdes Estates, and on the west by the Pacific Ocean. The general service area boundary is shown in Figure 2.1-2.

Figure 2.1-2: General Service Area of Hermosa-Redondo District

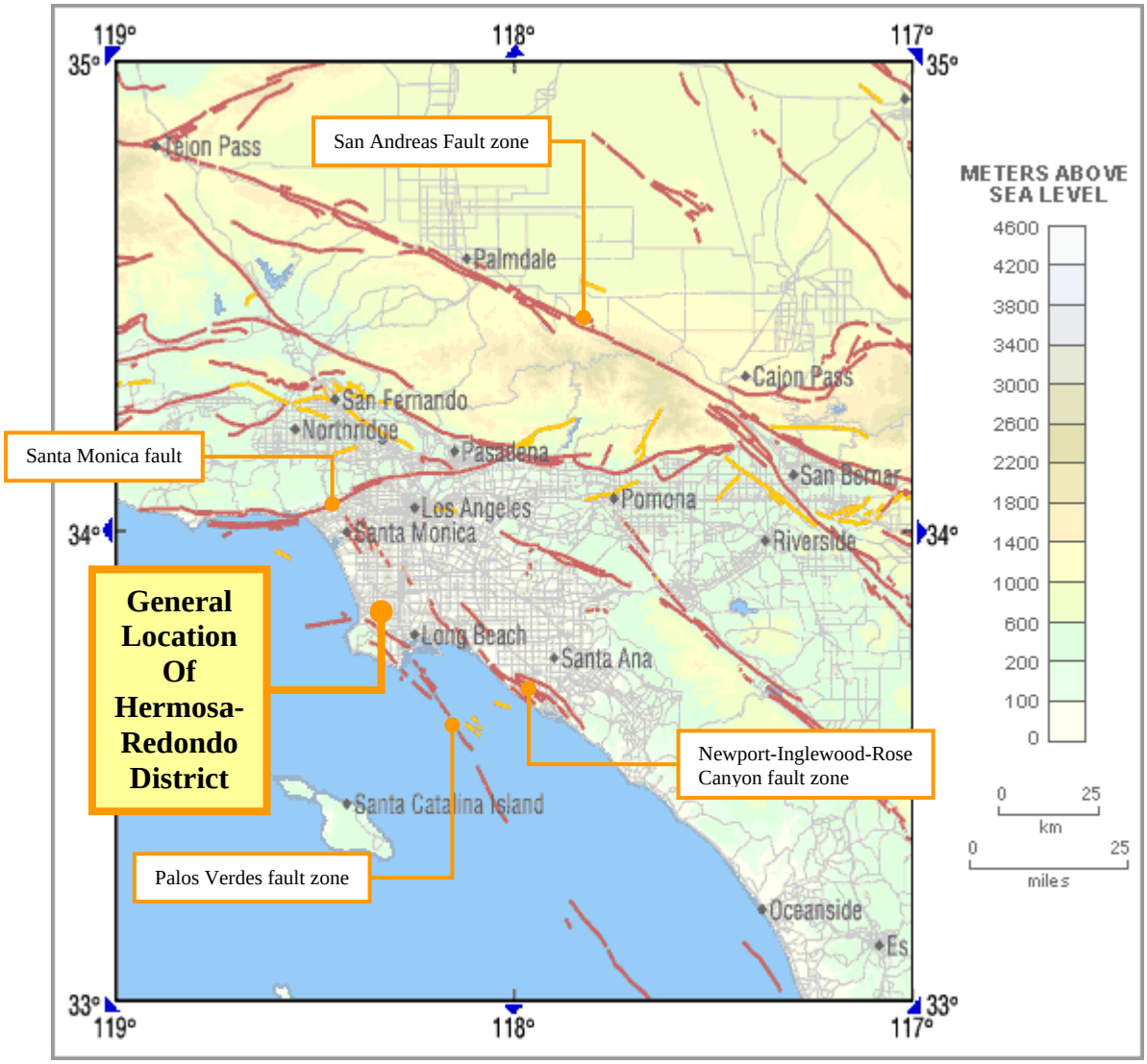


The City of Manhattan Beach provides retail water service to that community; Southern California Water Company serves Gardena; and both Cal Water's Rancho Dominguez District and the City of Torrance Water Department serve Torrance. Cal Water's Palos Verdes District provides retail water service to Palos Verdes Estates.

Major transportation links in the district include the San Diego Freeway (Interstate 405); the Pacific Coast Highway; Torrance, Hawthorne, Manhattan Beach, Aviation, Artesia and Sepulveda Boulevards; and Prospect Avenue. The Los Angeles International Airport (LAX) is about seven miles north of the heart of the district. King Harbor serves the recreational and sport fishing boats in these communities.

Major geological features of the region include the Palos Verdes Fault Zone, which, along with the Cabrillo Fault, is responsible for the uplift of base rock that forms the Palos Verdes Peninsula adjacent to and south of Hermosa-Redondo, Figure 2.1-3.[1] The Newport-Inglewood Fault, which has been identified as one of the most dangerous faults in the Los Angeles area, lies five miles east of the District. Major earthquakes on any of these faults may disrupt water service.

Figure 2.1-3: Active Fault Lines



[1]U.S. Geological Survey, Earthquake Hazards Program, http://quake.wr.usgs.gov/info/faultmaps/index.html

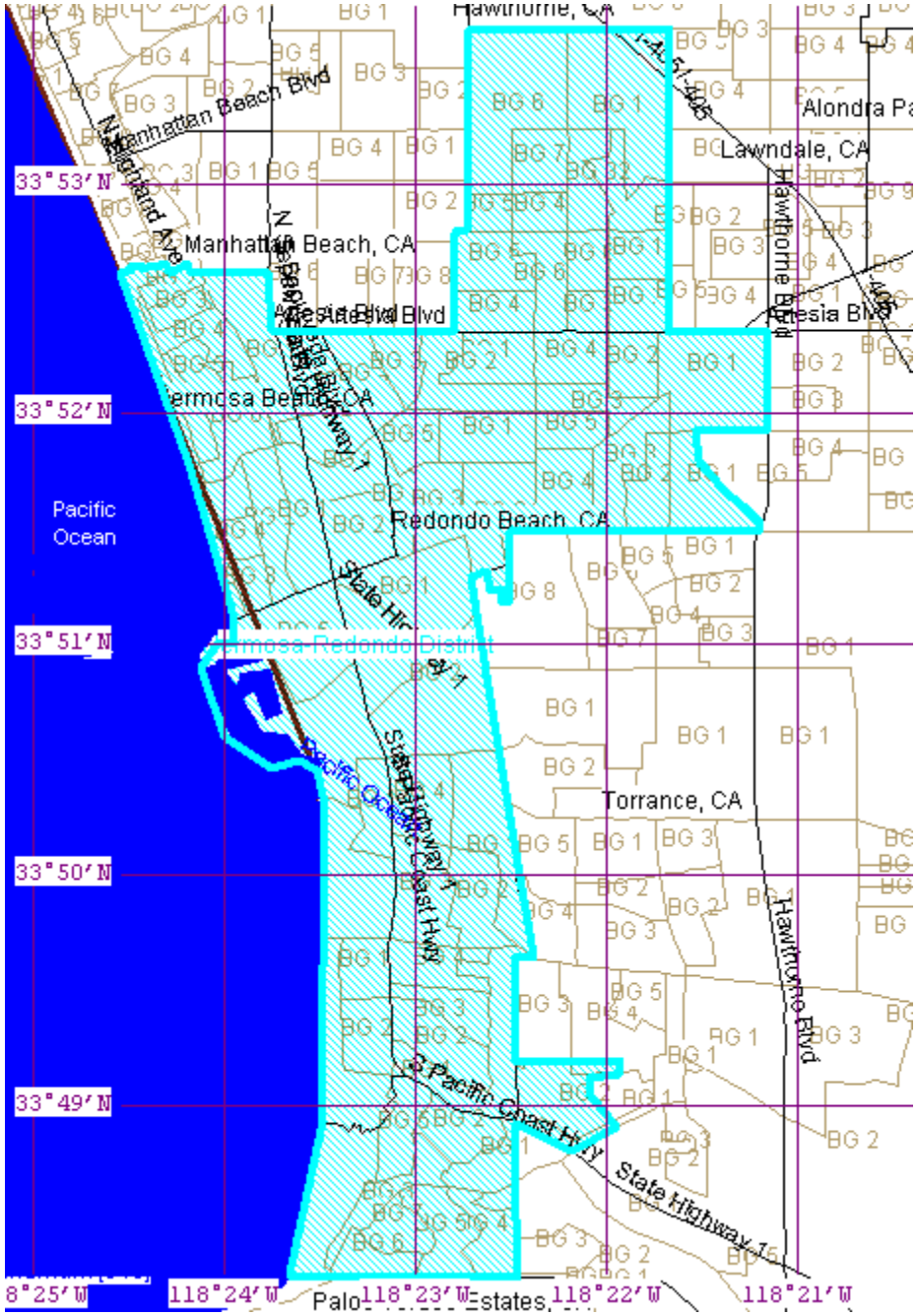
2.2 Service Area Population

The growth rate in Cal Water's Hermosa-Redondo District has progressed at a relatively gradual rate. Growth in total services has averaged 0.36 percent per year over the past five years while the ten year average was 0.43 percent per year.

Based on 2000 U.S. Census data, considering actual service connection growth and assuming that density has remained unchanged since the census was conducted, Cal Water estimates that, as of December 2009, the district's population is approximately 94,070. A density of 2.51 persons per residential service (single family services plus multifamily units) was used for this estimate.

The process for estimating population in the Hermosa-Redondo District began by overlaying the U.S. Census 2000 Block data with the Cal Water service area map (SAM), as shown in Figure 2.2-1.

Figure 2.2-1: Approximated SAM with US Census 2000 Tract Map



A summary of the census data for the Year 2000 is shown in Table 2.2-1. LandView 5 and MARPLOT ® software were used to generate the data.

Table 2.2-1: Summary of Census 2000 Data

	Census Tract Blocks	Population	Housing Units
Hermosa-Redondo Service Area	1,003	89,637	43,084

This data was used as a baseline for estimating population starting in 2000. To calculate estimated population after 2000, the Census 2000 population was then divided by the total number of dwelling units served by Cal Water in 2000 to produce a population density value. This value was then multiplied by the number of Cal Water dwelling units in each future year.

To establish a range of future service counts the past five and ten-year growth rates for each service type were continued to estimate future service counts through 2040. The projection using the ten-year growth rate had the strongest correlation with past growth and was used to calculate these service counts. A comparison of service connection growth rates is shown in Figure 2.2-2.

Figure 2.2-2: Historical & Projected Services

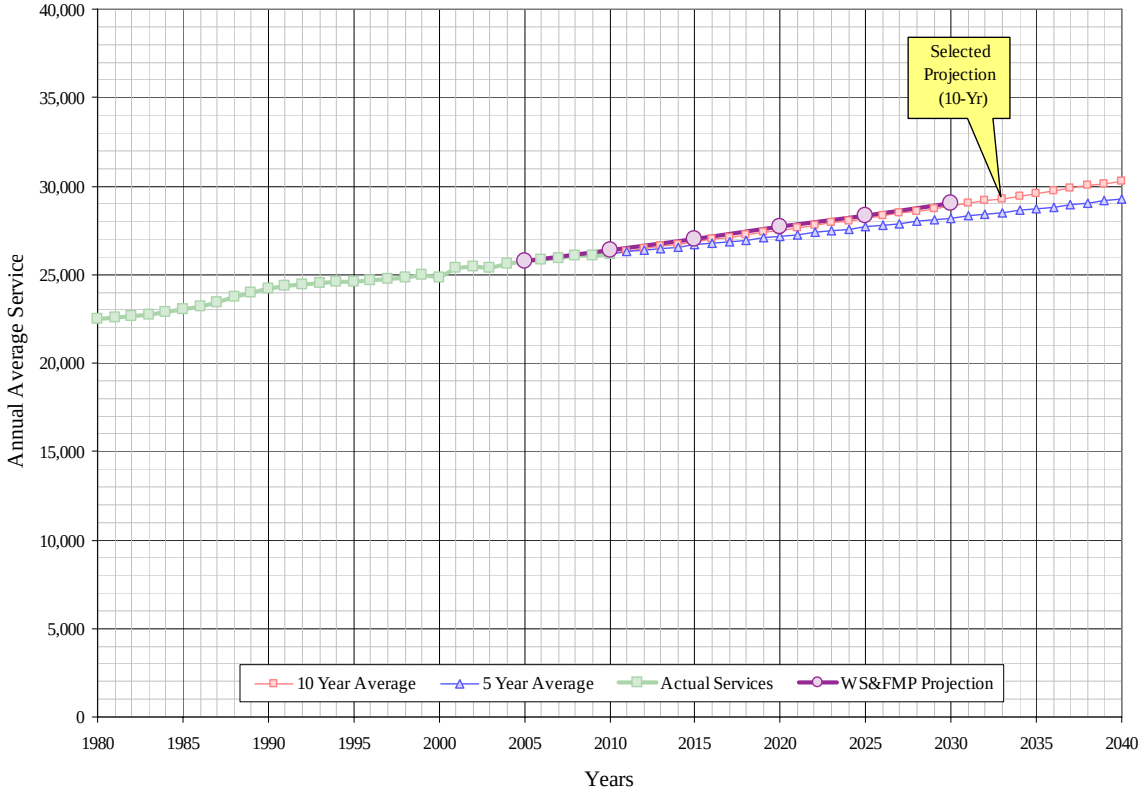


Figure 2.2-2 also shows the service connection growth rate used in the Water Supply and Facilities Master Plan for the District. As indicated on the graph, the Master Plan projection is in line with the ten-year average.

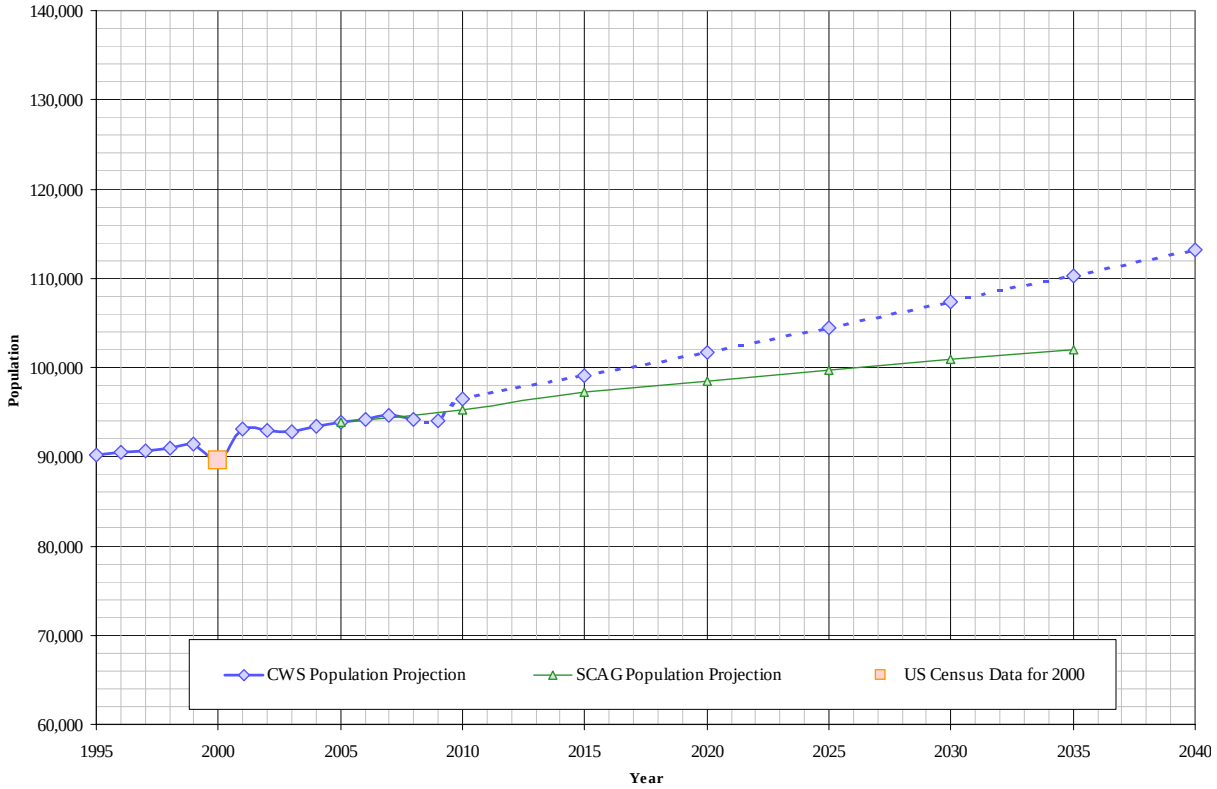
Cal Water estimates the service area's population could reach 113,200 by 2040. Table 2.2-2 lists the population growth in 5-year increments.

Table 2.2-2: Population - Current and Projected (Table 2)

	2005	2010	2015	2020	2025	2030	2035	2040
Service Area Population	93,880	96,430	99,050	101,740	104,500	107,320	110,230	113,200

This estimate is compared with the projection from the Southern California Association of Governments (SCAG). These two projections are presented in Figure 2.2-3.

Figure 2.2-3: Estimated Population Comparison



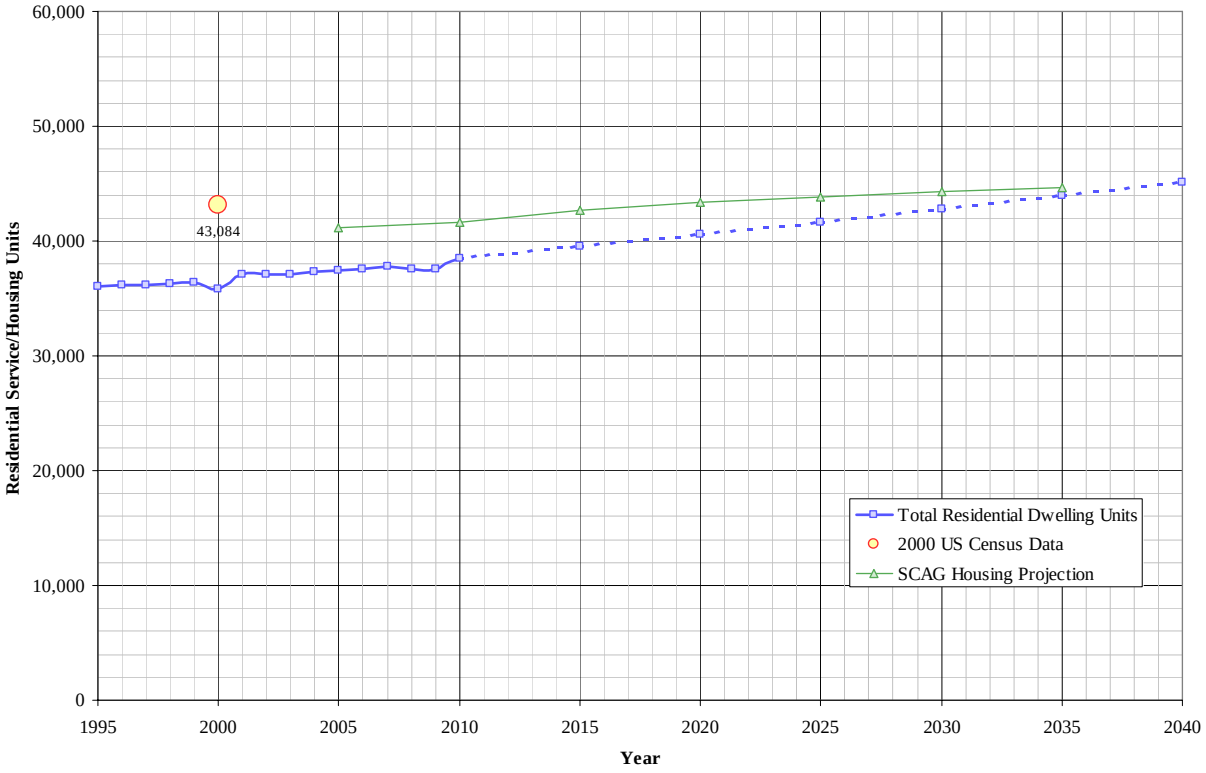
The population projections using the SCAG data assumed that Cal Water serves the following percentages of each city:

- 100% of Hermosa Beach city
- 100% of Redondo Beach city
- 5% of Torrance city

From the graph above, it is shown that the growth rate projected by Cal Water is similar to that the projected rate of increase from SCAG.

Similarly, the housing count was estimated by comparing the US Census 2000 data and the service counts for the Hermosa-Redondo District, Figure 2.2-4. The service count for the year 2000 is lower than the US Census 2000 housing units estimate. This may be the result of district service connections including one meter that serves several housing units, such as duplexes or apartments, whereas the US Census combines all of the housing units (single and multifamily residences). The US Census 2000 housing units was established by summarizing the individual census blocks enclosed within the service area of the District.

Figure 2.2-4: Estimated Housing Comparison



2.3 Service Area Climate

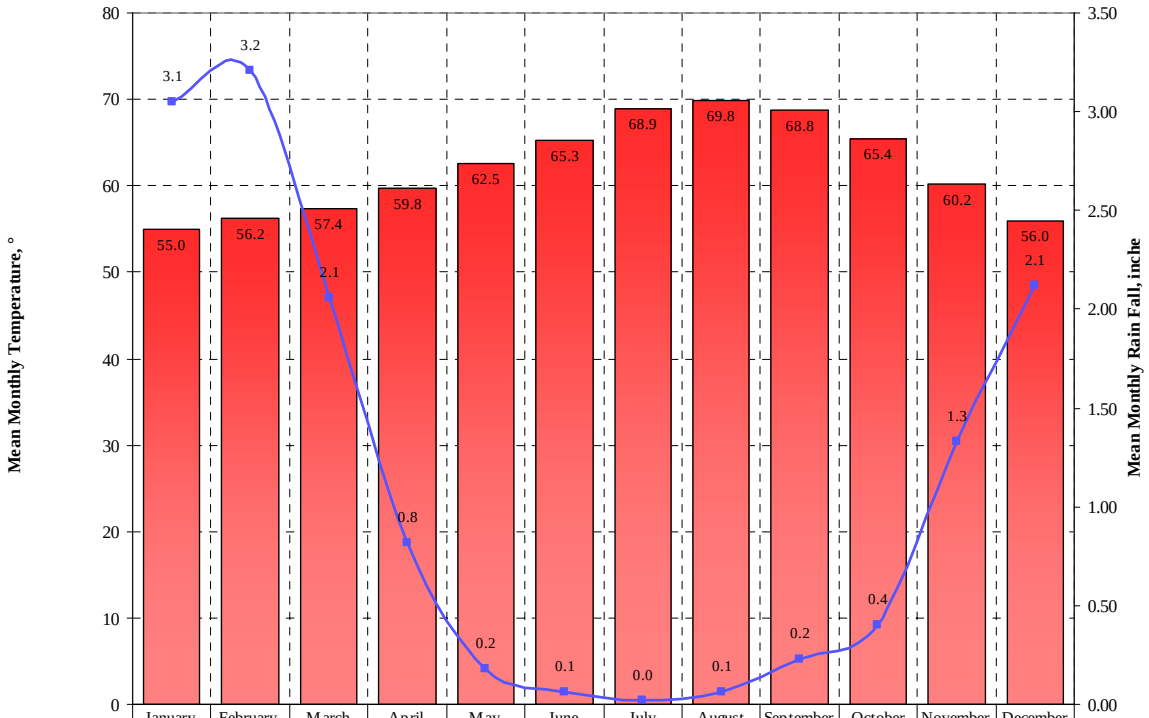
The Hermosa-Redondo District enjoys a Mediterranean climate with warm dry summers and wet cool winters. Table 2.3-1 lists the average annual conditions for Torrance, which is the closest weather station to the Hermosa-Redondo District. Additional climate data is provided in the Appendix C, worksheet 18.

Table 2.3-1: Average Annual Climate (Table 3)

Average Temperature	Average Rainfall	Annual Total Evapo-transpiration
62.1°F	13.5 inches	46.6 inches/month

Figure 2.3-1 displays the average monthly temperature and rainfall.

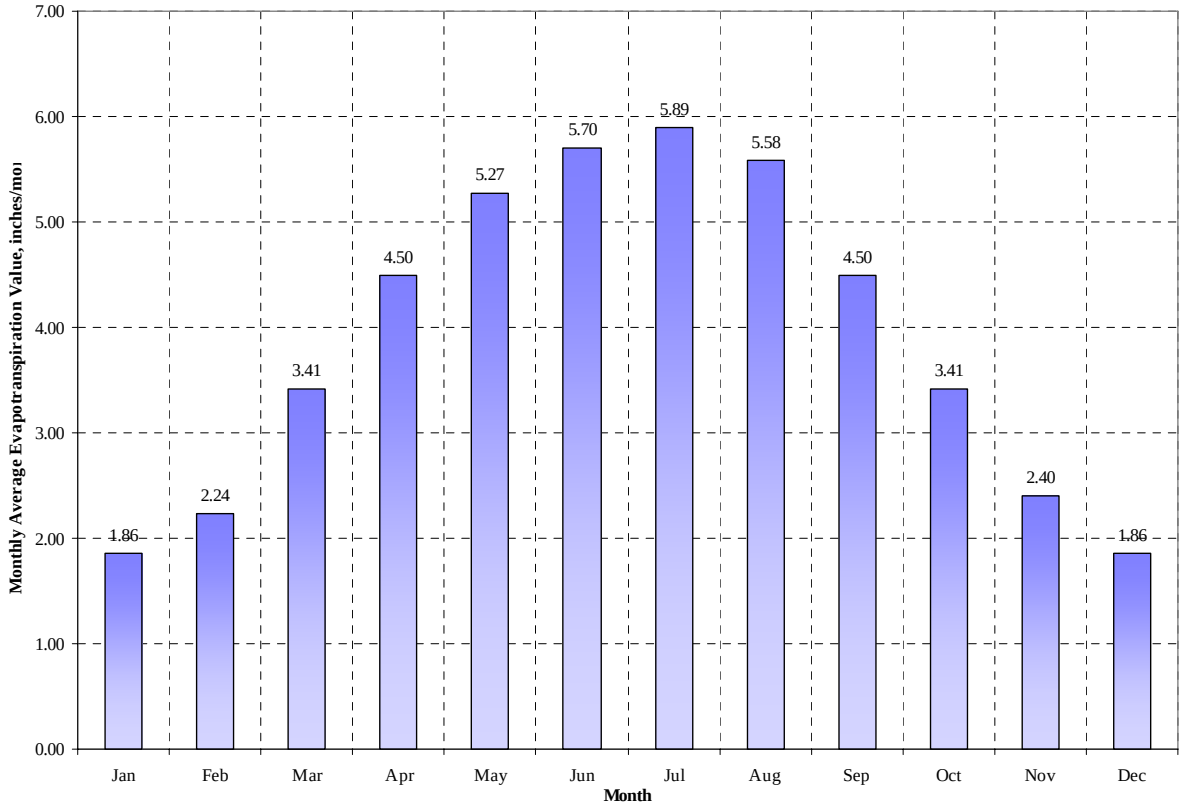
Figure 2.3-1: Average Monthly Temperature and Rainfall



	January	February	March	April	May	June	July	August	September	October	November	December
Temperature	55	56.2	57.4	59.8	62.5	65.3	68.9	69.8	68.8	65.4	60.2	56
Rainfall	3.05	3.21	2.06	0.82	0.18	0.06	0.02	0.06	0.23	0.4	1.33	2.12

Figure 2.3-2 displays the monthly average evapotranspiration values for the area of the District. Evapotranspiration is the sum of water loss from a watershed because of the processes of evaporation from the earth's surface and transpiration from plant leaves. The annual estimated transpiration for Dominguez is 46.6 inches. The average annual rainfall of 13.5 inches is only 35 percent of the annual total evapotranspiration value. This indicates that the Hermosa-Redondo District is located in a water-deficient environment.

Figure 2.3-2: Monthly Average ETo Values



3 System Demands

3.1 Distribution of Services

Cal Water classifies the different customer connection categories as follows:

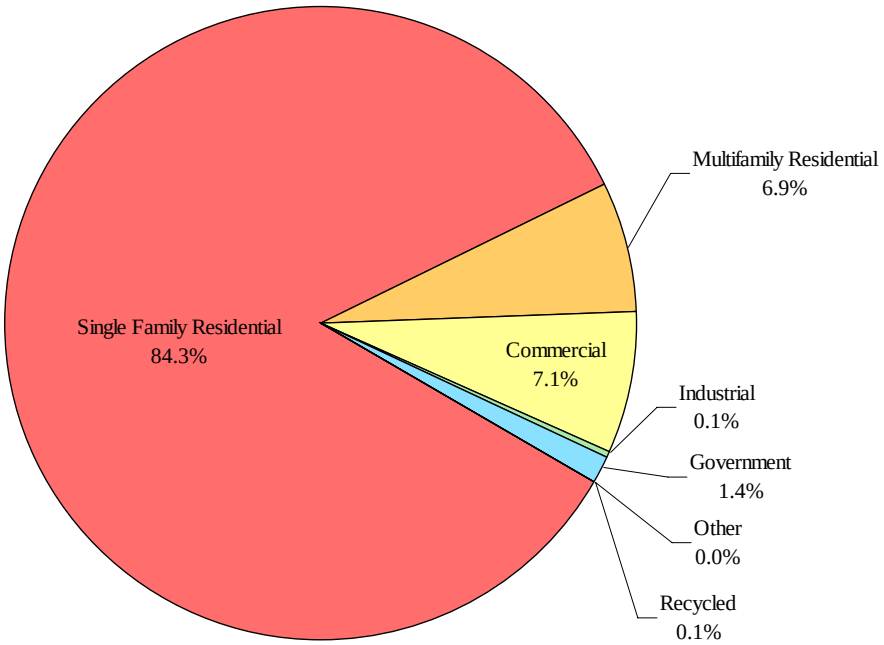
- Single Family Residential
- Multifamily Residential
- Commercial
- Industrial
- Government
- Other

The residential sector of service customers includes permanent single and multifamily connections. Service for seasonal customers was not considered.

The trend for property redevelopment in the Hermosa-Redondo District is for small beach resort cottages on large urban lots to be converted into large single family homes or multifamily properties with few units. Service counts during the 1980s verify this trend. In 1980, there were 11.7 multifamily units per multifamily residential service, in 1990 this number declined to 10.5 units per service, in 2000 it was 10.3 and in 2009 it had dropped to 8.6 units per service.

The average annual service count for the calendar year 2010 was 26,176. Single family residential services totaled 22,066 or 84.3 percent of all services; multifamily residential services totaled 1,806 or 6.9 percent; and commercial totaled 1,882 or 7. percent. All other customer classes comprised the remaining 1.6 percent. The distribution of services for the year 2010 is shown in Figure 3.1-1.

Figure 3.1-1: Distribution of Services (2010)



3.2 Historical and Current Water Demand

Historical sales values are illustrated in Figure 3.2-1. Historical service counts for the district are illustrated in Figure 3.2-2.

Figure 3.2-1: Historical Sales

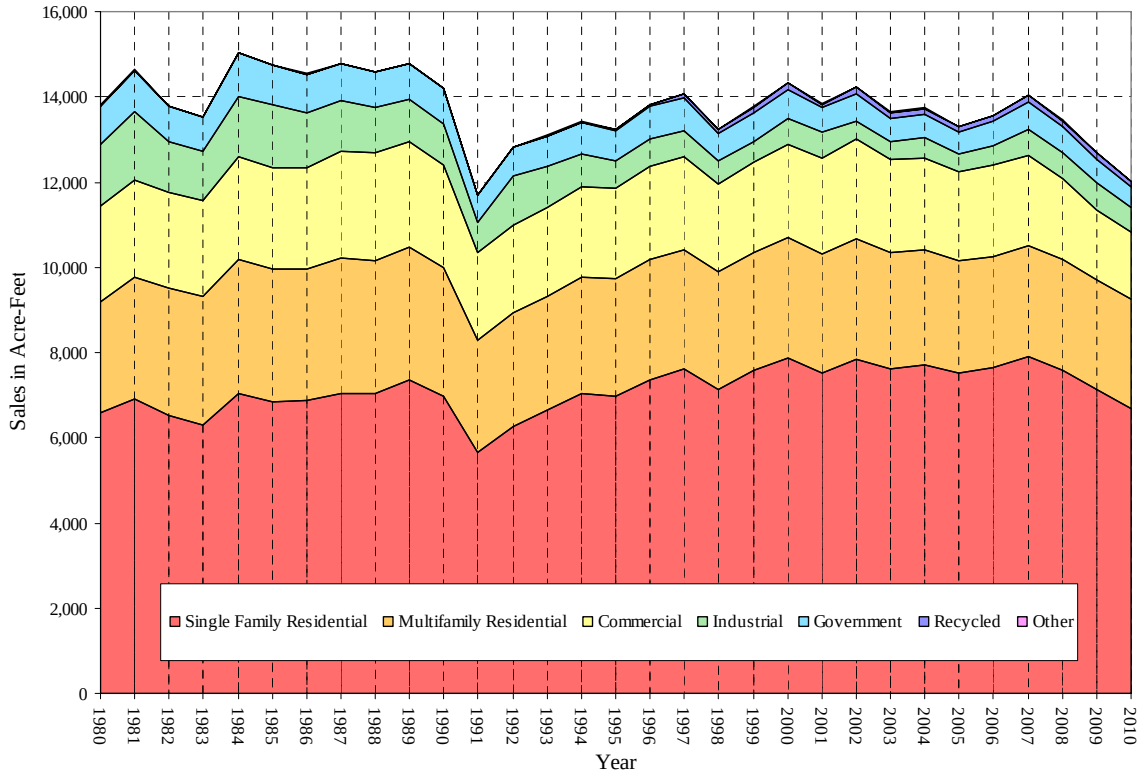
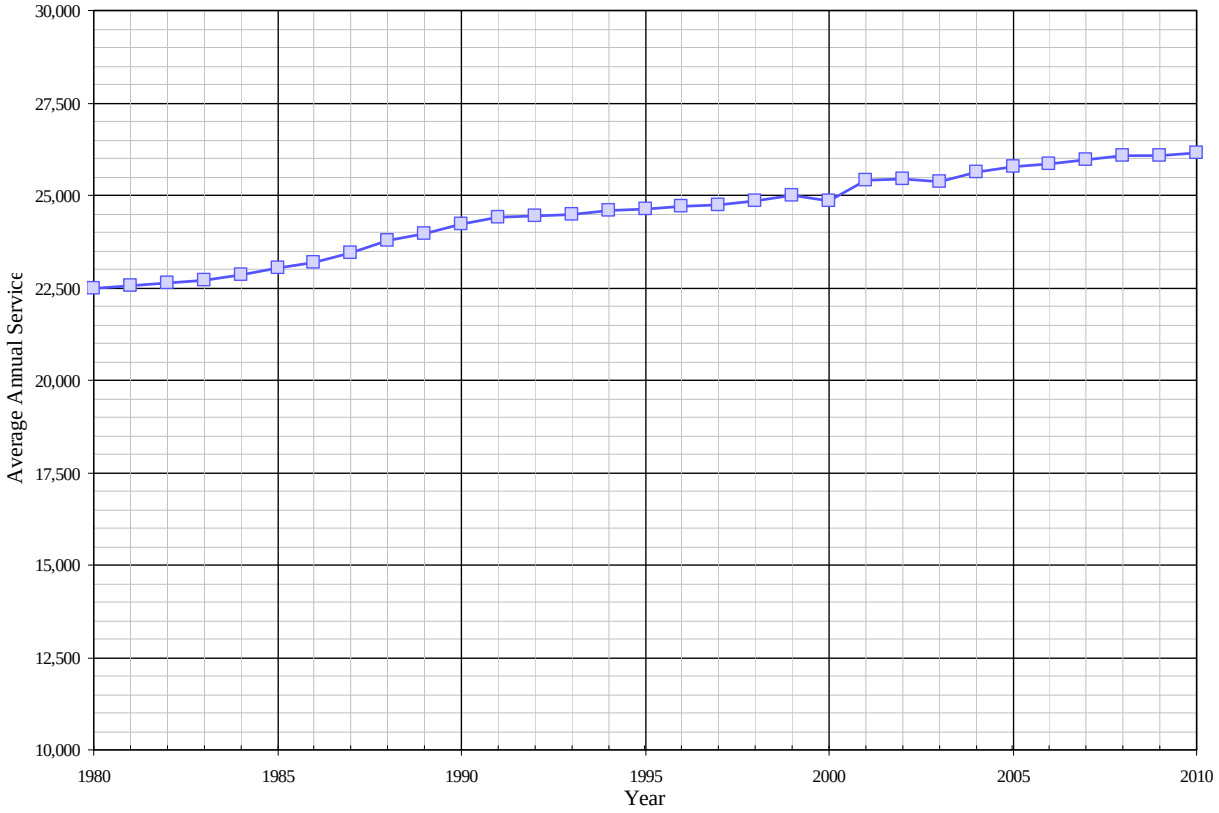
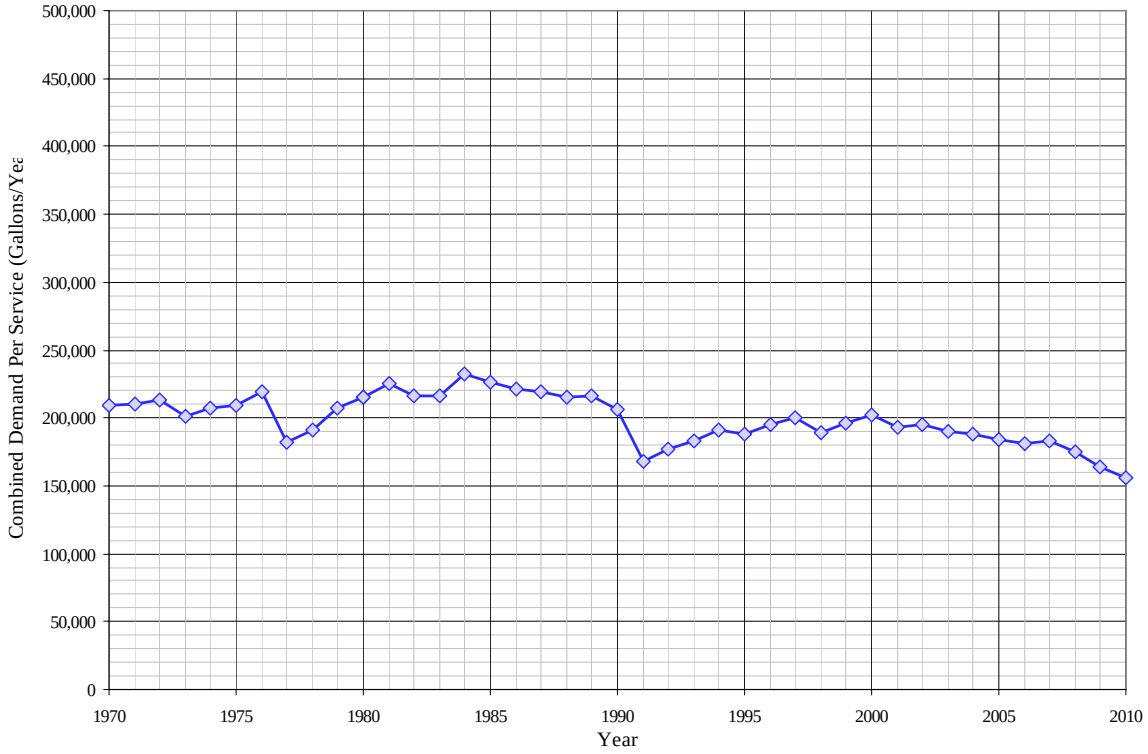


Figure 3.2-2: Historical Service Counts



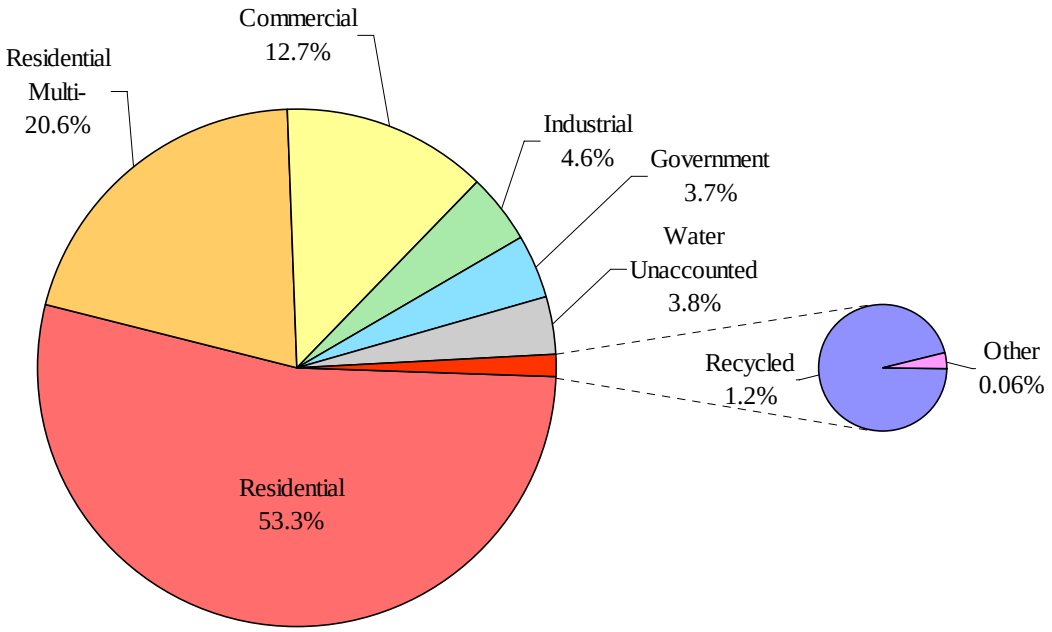
Prior to the drought years of 1989 to 1991, the combined demand per service for all services remained fairly stable at an annual average of 220,000 gallons per service, Figure 3.2-3. After the drought, demand has gradually increased, but has remained below pre-drought levels. Over the past ten years there has been a gradual reduction in demand per service, with the low point occurring in 2010 at the end of a three year drought. The reason for this consistent reduction in demand per service is due to the installation of conservation hardware. Cal Water's previous conservation goal of a 10 percent reduction in demand (based on pre-drought levels) has been accomplished. Implementation of Best Management Practices has and will continue to enable the District to achieve this goal. This reduction in demand is particularly apparent in the multifamily residential customer class where an aggressive regional program to replace inefficient toilets has been underway.

Figure 3.2-3: Combined Historical Demand per Service



Total system demand was projected by multiplying the number of services by the demand for each customer class. Single family residential water use represents the smallest demand per service, yet this category uses 53.3 percent of the total demand. Multifamily residential use accounts for 20.6 percent of the total demand, for a combined residential total of 73.9 percent. Unaccounted for water was 3.8 percent of total demand, which is within acceptable levels.

Figure 3.2-4: Percent of Total Demand by Type of Use (2010)



3.3 Water Demand Projections

Cal Water has historically made its water demand projections by first calculating individual growth rates for each of its service connection types. These growth rates were based on five or ten year averages of service count data, and were extended over the planning horizon resulting in projected service counts. A set of three demand per service values (low, average, high), which were based on past customer usage records, were then applied to the projected service counts to calculate projected water demands for each service type. Due to the passage of Senate Bill 7 (SBx7-7) this method is no longer used as the primary method for calculating projected demands. However, these calculations are still used as the basis for calculating projected services, population, and the distribution of demand amongst service connection types.

The method used in this UWMP to determine future water demands is a response to SBx7-7 requirements. It results in two demand projections; the unadjusted baseline demand, and the target demand. The unadjusted baseline water demand projection is the total demand expected without any achieved conservation. It is equal to forecasted population multiplied by the 2005-09 average, or 133 gpcd.

The target water demand projection includes conservations savings due to both passive and active demand management, which are described in Section 6. The target demand is calculated by multiplying SBx7-7 target gpcd values and projected population. These conservation savings are illustrated in the comparison of projected demands shown in Figure 3.3-1.

Figure 3.3-1: Historical & Projected Demand

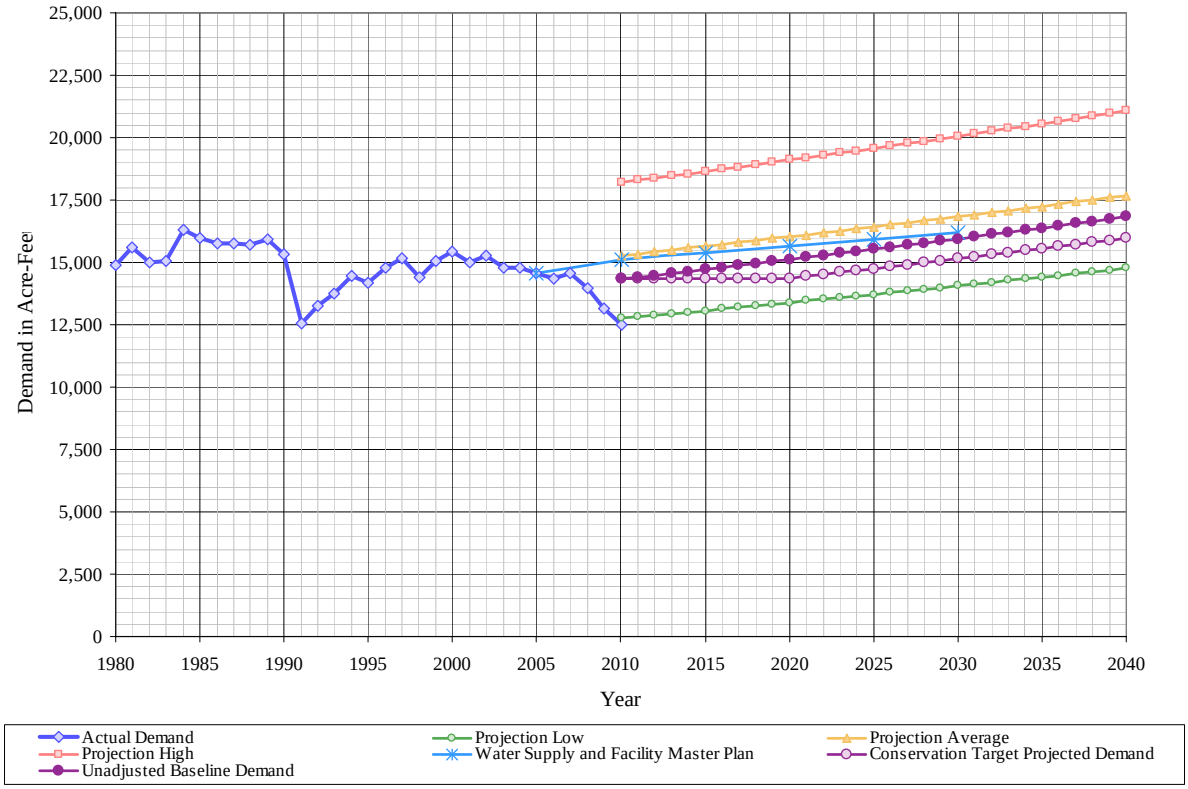


Figure 3.3-1 also shows the demand projection developed in Cal Water's Water Supply and Facilities Master Plan for the Hermosa Redondo District. In this case water demands were projected using a unit demand methodology based on land uses in the City's General Plan. It is included here to provide a comparison to demands calculated for the purposes of SBx7-7 compliance.

The water demand projection calculation used for SBx7-7 compliance relies only on future population and gpcd target values. Projected water deliveries separated by customer type can not be determined by this method alone. To get a breakdown of future deliveries Cal Water used the ratio of individual deliveries for each class to the total

amount that was developed for the previously used water demand projection. This ratio was applied to the total adjusted baseline demand, which resulted in the projected deliveries listed in Tables 3.3-1 through 3.3-6. These demands include the conservation savings associated with the demand management measures described in Section 6.

Table 3.3-1: Actual 2005 Water Deliveries – AF (Table 3)

	2005				
	Metered		Not Metered		Total
Water Use Sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	21,699	7,508	-	-	7,508
Multi-family	1,464	2,632	-	-	2,632
Commercial	2,191	2,102	-	-	2,102
Industrial	40	413	-	-	413
Institutional/government	349	522	-	-	522
Landscape	-	-	-	-	-
Recycled*	19	-	-	-	-
Other	12	11	-	-	11
Total	25,774	13,189	0	0	13,189

*Note: Recycled water deliveries are listed separately in Table 3.4-1 (Table 10)

Table 3.3-2: Actual 2010 Water Deliveries – AF (Table 4)

	2010				
	Metered		Not Metered		Total
Water Use Sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	22,057	6,672	-	-	6,672
Multi-family	1,804	2,576	-	-	2,576
Commercial	1,869	1,585	-	-	1,585
Industrial	25	574	-	-	574
Institutional/government	366	469	-	-	469
Landscape	-	-	-	-	-
Recycled*	20	-	-	-	-
Other	9	7	-	-	7
Total	26,150	11,882	0	0	11,882

*Note: Recycled water deliveries are listed separately in Table 3.4-1 (Table 10)

Table 3.3-3: Projected 2015 Water Deliveries – AF (Table 5)					
	2015				
	Metered		Not Metered		Total
Water Use Sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	22,638	7,187	-	-	7,187
Multi-family	1,847	3,223	-	-	3,223
Commercial	1,916	1,687	-	-	1,687
Industrial	26	460	-	-	460
Institutional/government	395	756	-	-	756
Landscape	-	-	-	-	-
Recycled*	21	-	-	-	-
Other	10	10	-	-	10
Total	26,853	13,323	-	-	13,323
*Note: Recycled water deliveries are listed separately in Table 3.4-1 (Table 10)					

Table 3.3-4: Projected 2020 Water Deliveries - AF (Table 6)					
	2020				
	Metered		Not Metered		Total
Water Use Sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	23,187	7,190	-	-	7,190
Multi-family	1,887	3,215	-	-	3,215
Commercial	1,957	1,684	-	-	1,684
Industrial	26	449	-	-	449
Institutional/government	420	785	-	-	785
Landscape	-	-	-	-	-
Recycled*	21	-	-	-	-
Other	10	10	-	-	10
Total	27,508	13,333	-	-	13,333
*Note: Recycled water deliveries are listed separately in Table 3.4-1 (Table 10)					

Table 3.3-5: Projected 2025 and 2030 Water Deliveries - AF (Table 7)				
	2025		2030	
	Metered		Metered	
Water Use Sectors	# of accounts	Volume	# of accounts	Volume
Single family	23,749	7,382	24,324	7,578
Multi-family	1,927	3,292	1,969	3,370
Commercial	1,999	1,724	2,042	1,765
Industrial	26	450	26	451
Institutional/government	446	837	474	891
Landscape	-	-	-	-
Recycled*	21	-	22	-
Other	11	10	11	11
Total	28,179	13,695	28,868	14,066
*Note: Recycled water deliveries are listed separately in Table 3.4-1 (Table 10)				

Table 3.3-6: Projected 2035 and 2040 Water Deliveries - AF (Table 7)				
	2035		2040	
	Metered		Metered	
Water Use Sectors	# of accounts	Volume	# of accounts	Volume
Single family	24,913	7,778	25,517	7,983
Multi-family	2,011	3,450	2,054	3,531
Commercial	2,086	1,806	2,130	1,849
Industrial	26	452	26	453
Institutional/government	504	949	536	1,011
Landscape	-	-	-	-
Recycled*	22	-	23	-
Other	11	11	11	11
Total	29,574	14,447	30,297	14,838
*Note: Recycled water deliveries are listed separately in Table 3.4-1 (Table 10)				

3.3.1 Senate Bill No. 7 Baselines and Targets

Cal Water is in the process of expanding current conservation programs and developing new programs for its 24 service districts. Over the next five years, Cal Water conservation program expenditures are likely to increase significantly due in large measure to recently adopted state policies requiring significant future reductions in per capita urban water use. These include the passage of Senate Bill No. 7 (SBx7-7) in November 2009, which mandated a statewide 20 percent reduction in per capita urban water use by 2020, as well as recent decisions by the California Public Utilities Commission (CPUC) directing Class A and B water utilities to adopt conservation programs and rate structures designed to achieve reductions in per capita water use, and the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU), of which Cal Water has been a signatory since 1991. In preparing for this program expansion, Cal Water has spent the past year developing five-year conservation program plans for each of its service districts. The complete Hermosa-Redondo District Conservation Master Plan is included as Appendix G.

SBx7-7, which was signed into law in November 2009, amended the State Water Code to require a 20 percent reduction in urban per capita water use by December 31, 2020. Commonly known as the 20x2020 policy, the new requirements apply to every retail urban water supplier subject to the Urban Water Management Planning Act (UWMPA).

The state is required to make incremental progress toward this goal by reducing per capita water use by at least 10 percent on or before December 31, 2015. SBx7-7 requires each urban retail water supplier to develop interim and 2020 urban water use targets in accordance with specific requirements. They will not be eligible for state water grants or loans unless they comply with those requirements.

The law provides each water utility several ways to calculate its interim 2015 and ultimate 2020 water reduction targets. In addition, water suppliers are permitted to form

regional alliances and set regional targets for purposes of compliance. Under the regional compliance approach, water suppliers within the same hydrologic region can comply with SBx7-7 by either meeting their individual target or being part of a regional alliance that meets its regional target. For all Cal Water districts falling within the same hydrologic region, Cal Water intends to enter regional alliances as listed in Table 3.3-7. The Hermosa-Redondo District lies within the South Coast hydrologic region, along with Dominguez, East Los Angeles, Palos Verdes, and Westlake Districts.

Table 3.3-7: Cal Water Districts Sorted by Hydrologic Region

Hydrologic Region	Cal Water Districts in Region
North Coast	Redwood Valley
San Francisco Bay Area	Bear Gulch, Livermore, Los Altos, Mid- Peninsula, South San Francisco
Central Coast	King City, Salinas
South Coast	Dominguez, East LA, **Hermosa-Redondo**, Palos Verdes, Westlake
Sacramento River	Chico, Dixon, Marysville, Oroville, Willows
San Joaquin	Stockton
Tulare Lake	Bakersfield, Kern River Valley, Selma, Visalia
North Lahontan	None
South Lahontan	Antelope Valley
Colorado River	None

District-specific and regional targets for Cal Water districts within the South Coast hydrologic region are shown in Table 3.3-8. The 2015 and 2020 district-specific targets for Hermosa-Redondo District are 134 and 126 gpcd, respectively. Over the last five years district demand, net of recycled water use, has averaged about 128 gpcd. Thus, current per capita demand is already below the 2015 target and on par with the 2020 target. This gives them two ways to comply with SBx7-7 – they will be in compliance as long as their per capita demand is less than or equal to the district-specific target or the weighted average per capita demand of the regional alliance is less than or equal to the regional target. As shown in Table 3.3-8, this means that Hermosa-Redondo District will be in compliance in 2015 if its per capita demand is less than or equal to 134 gpcd, or average per capita demand for the regional alliance is less than or equal to 176 gpcd.

Table 3.3-8: Regional SBx7-7 Targets for Cal Water Districts in South Coast Hydrologic Region

District	Population	2015 Target	2020 Target
Dominguez	144,190	193	171
East Los Angeles	148,740	121	115
Hermosa-Redondo	94,070	134	126
Palos Verdes	67,620	253	225
West Lake	16,740	442	393
Regional Targets[1]		**176**	**160**

[1] Regional targets are the population-weighted average of the district targets.

The following analysis presents the individual SBx7-7 compliance targets for the Hermosa-Redondo District.

Under SBx7-7, an urban retail water supplier may adopt one of four different methods for determining the 2020 gpcd target:

1. Set the 2020 target to 80 percent of average GPCD for any continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

2. Set the 2020 target as the sum of the following:

    a. 55 GPCD for indoor residential water use.

    b. 90 percent of baseline CII water uses, where baseline CII GPCD equals the average for any contiguous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

    c. Estimated per capita landscape water use for landscape irrigated through residential and dedicated irrigation meters assuming water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Section 2.7 of Division 2 of Title 23 of the California Code of Regulations.

3. Set the 2020 target to 95 percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009).

4. A method determined by DWR through the urban stakeholder process.

For district-specific SBx7-7 compliance, targets were set to either 80 percent of baseline gpcd (Method 1) or 95 percent of the District's hydrologic region target (Method 3), whichever was greater. An analysis for Method 2 was not performed due to a lack of data necessary for this method. Method 4 was also not considered because it was not available when the Conservation Master Plan process began.

Under Method 1, the 2015 and 2020 targets are set to 90 percent and 80 percent of baseline water use, respectively. Baseline water use is the average water use for any continuous 10-year period ending between 2004 and 2010. For the Hermosa-Redondo District, the 10-year base period 1995-2004 yielded the maximum target under this method. The 2015 target is 127 gpcd and a 2020 target is 113 gpcd. Table 3.3-9 summarizes the base period ranges and Table 3.3-10 lists the per capita demand over the ten-year base period.

Table 3.3-9: Base Period Ranges (Table 13)			
Base	**Parameter**	**Value**	**Units**
10-15-year base period	2008 total water deliveries	13,447	AF
	2008 total volume of delivered recycled water	139	AF
	2008 recycled water use as a percent of total deliveries	1.0	%
	Number of years in base period	10	years
	Year beginning base period range	1995	
	Year ending base period range	2004	
5-year base period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range	2007	

Table 3.3-10: Daily Base Per Capita Water Use-10-Year Range (Table 14)				
Base Period Year		**Distribution System Population**	**Daily System Gross Water Use (mgd)**	**Annual Daily Per Capita Water Use (gpcd)**
Sequence Year	**Calendar Year**			
Year 1	1995	90,230	12.64	140
Year 2	1996	90,530	13.14	145
Year 3	1997	90,660	13.33	147
Year 4	1998	90,910	12.63	139
Year 5	1999	91,360	13.10	143
Year 6	2000	89,637	13.08	146
Year 7	2001	93,080	12.82	138
Year 8	2002	92,890	13.12	141
Year 9	2003	92,830	12.55	135
Year 10	2004	93,440	12.64	135
			Base Daily Per Capita Water Use	141

Under Method 3, the 2015 and 2020 targets are set to 95 percent of the 2015 and 2020 targets for the hydrologic region in which the district is located. Because the Hermosa-Redondo District is located in the South Coast hydrologic region the Hermosa-Redondo District's 2015 target is 134 gpcd and the 2020 target is 126 gpcd.

The SBx7-7 target for 2020 cannot exceed 95 percent of the District's five-year baseline water use, where the baseline period ends no earlier than December 31, 2007 and no later than December 31, 2010. The District's 2020 target cannot exceed this level, regardless of which method is used to calculate it. The maximum allowable target in the Hermosa-Redondo District is 126 gpcd, as shown in Table 3.3-11. In this case, neither target calculation method results in a target exceeding the maximum allowable target, so no adjustment is necessary.

Table 3.3-11: Daily Base Per Capita Water Use-5-Year Range (Table 15)

Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	92,830	12.55	135
Year 2	2004	93,440	12.64	135
Year 3	2005	93,880	12.47	133
Year 4	2006	94,120	12.31	131
Year 5	2007	94,590	12.32	130
			Base Daily Per Capita Water Use	133

Based on the results of this analysis as shown in Table 3.3-12, the Method 3 targets were chosen for the Hermosa-Redondo District. Average per capita demand, net of recycled water use, for the previous five years is already below the 2015 target. Thus, if per capita demand stays near this average, the district will meet its 2015 per capita water use target. Moreover, the district's 2020 target is close to the average per capita demand in the district over the prior five years. Thus, if per capita demand stays near its current level the district will be well positioned to meet its 2020 target as well.

Table 3.3-12. Hermosa-Redondo District SBx7-7 Targets

Maximum Allowable Target	
Base Period:	2003-2007
Per Capita Water Use:	133
Maximum Allowable 2020 Target:	126
Method 1: 80% of Baseline Per Capita Daily Water Use	
Base Period:	1995-2004
Per Capita Water Use:	141
2015 Target:	127
2020 Target:	113
Method 3: 95% of Hydrologic Region Target	
Hydrologic Region:	South Coast
2015 Target:	134
2020 Target:	126
Selected District Target	
2015 Target:	134
2020 Target:	126

3.3.2 Low Income Housing Projected Demands

California Senate Bill No. 1087 (SB 1087), Chapter 727, was passed in 2005 and amended Government Code Section 65589.7 and Water Code Section 10631.1. SB 1087 requires local governments to provide a copy of their adopted housing element to water and sewer providers. In addition, it requires water providers to grant priority for service allocations to proposed developments that include housing units for lower income families and workers. Subsequent revisions to the Urban Water Management Planning Act require water providers to develop water demand projections for lower income single and multi-family households.

Cal Water does not maintain records of the income level of its customers and does not discriminate in terms of supplying water to any development. Cal Water is required to serve any development that occurs within its service area, regardless of the targeted income level of the future residents. It is ultimately the City's or County's responsibility to approve or not approve developments within the service area.

For the purposes of estimating projected demand from low income households, Cal Water used data from the Housing Elements of the cities that make up the Hermosa-Redondo District. The City of Redondo Beach's Housing Element states that 4.7 percent of the households are in the lowest income category.[2] The City of Torrance's Housing Element states that 6.6 percent of the households are in the lowest income category.[3] And Hermosa Beach's Housing Element estimates that 3.4 percent of total households are in this group.[4]

An aggregate of the above percentages, 4.9 percent, was applied to the total projected residential demand in the District to estimate low income demands, as shown in Table 3.3-12.

Table 3.3-13: Low-income Projected Water Demands (Table 8)

Low Income Water Demands	2015	2020	2025	2030	2035	2040
Single-family residential	352	352	362	371	381	391
Multi-family residential	158	158	161	165	169	173
Total	510	510	523	536	550	564

As a benefit to our customers, Cal Water offers its Low Income Rate Assistance Program (LIRA) in all of its service districts. Under the LIRA Program qualified customers are able to receive a discount on their monthly bills.

[2] "City of Redondo Beach, 2008-2014 Housing Element", Redondo Beach Planning Department, March 2009, Page 18
[3] "City of Torrance, General Plan - Housing Element", City of Torrance, August 24, 2010, Page H-14
[4] "City of Hermosa Beach Housing Element, Draft", Conexus, June 2009, Page II-6

3.4 Total Water Use

Cal Water does not currently sell water to other agencies, nor does it provide water for saline barriers, groundwater recharge, conjunctive use, or recycling. The potential additional water uses within Cal Water's service area are discussed and quantified in Section 4. For the purposes of this UWMP it is assumed that the only water sales to customers and distribution system losses are included in the total demand. The system losses are summarized in Table 3.4-1.

Table 3.4-1: Additional Water Uses and Losses - AFY (Table 9 and 10)

Water Use	2010	2015	2020	2025	2030	2035	2040
Sales to Other Agencies	-	-	-	-	-	-	-
Saline barriers	-	-	-	-	-	-	-
Groundwater recharge	-	-	-	-	-	-	-
Conjunctive use	-	-	-	-	-	-	-
Raw water	-	-	-	-	-	-	-
Recycled	153	155	159	162	166	169	173
Unaccounted-for system losses	481	1,027	1,028	1,055	1,083	1,112	1,142
Total	634	1,182	1,186	1,217	1,249	1,281	1,315

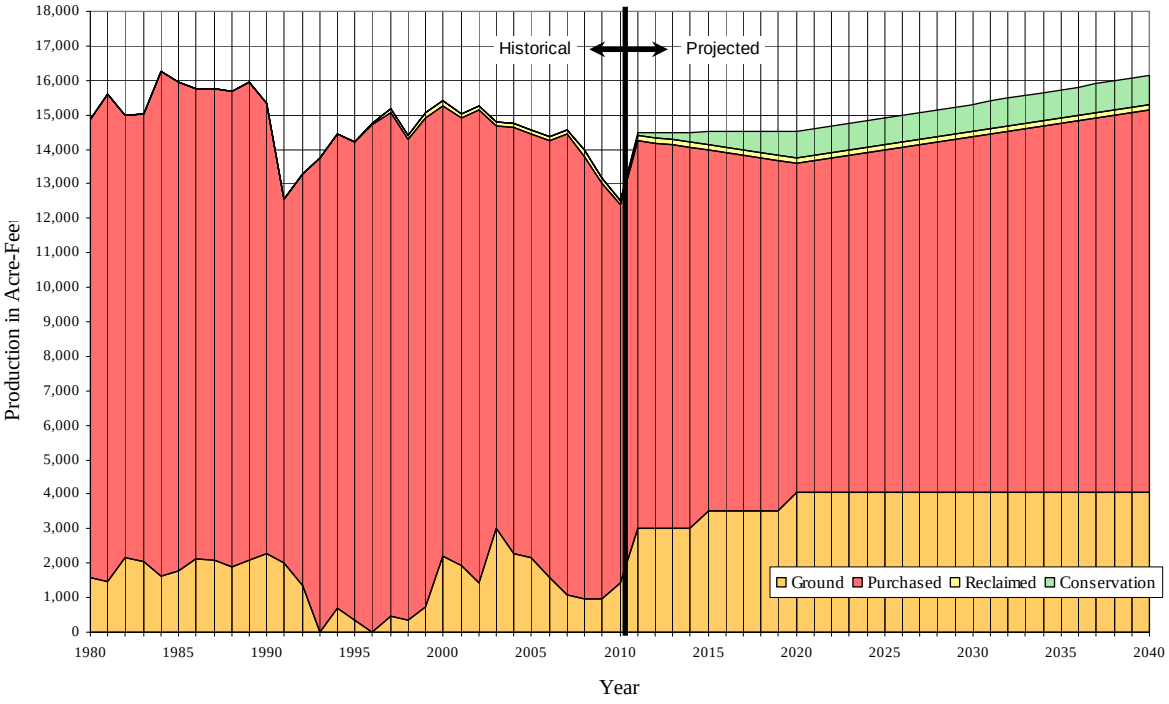
Actual and projected water use through 2040 is shown in Table 3.4-2. The values represent the total target demand projection based on SBx7-7 gpcd targets, including unaccounted for water.

Table 3.4-2: Total Water Use – Actual and Projected AFY (Table 11)

	2005 (Actual)	2010 (Actual)	2015	2020	2025	2030	2035	2040
Water Use	14,563	12,516	14,506	14,519	14,912	15,315	15,728	16,152

Figure 3.4-1 shows the planned sources of supply based on these demands through 2040. At this time only groundwater and conservation are included as sources of supply. Cal Water's efforts to secure alternative supplies are discussed in the following section.

Figure 3.4-1: Historical & Projected Sources



The projected demand to be supplied by WBMWD is shown in Table 3.4-3. Purchased water amounts were calculated by subtracting the projected groundwater pumping and recycled water demand from the SBx7-7 target demand.

Table 3.4-3: Demand projections provided to wholesale suppliers – AFY (Table 12)

Wholesaler	2010	2015	2020	2025	2030	2035	2040
West Basin Municipal Water District-Imported	10,958	10,482	9,535	9,904	10,282	10,670	11,069
West Basin Municipal Water District-Recycled	153	155	159	162	166	169	173
Total Supply	11,092	10,638	9,693	10,066	10,448	10,839	11,241

4 System Supplies

4.1 Water Sources

The Hermosa-Redondo District uses groundwater, imported surface water, and recycled supplies. Groundwater extracted from the West Coast Basin's Silverado aquifer satisfies 10 to 15 percent of the District's water demand. Cal Water's adjudicated right of the safe yield of the groundwater basin is 4,070 AFY. However, Cal Water does not currently have the ability to sustain production and delivery of this quantity and normally produces approximately 2,000 AFY of groundwater. The remaining groundwater is either sold to other entities or left for basin recharge. A portion of the unused adjudicated right can also be carried over into the following year. Cal Water intends to construct new wells and maximize groundwater production in the future.

Cal Water maintains several short term water lease agreements with various municipalities and private companies. Under these agreements Cal Water leases the right to produce a portion of its APA so that it does not go unused. There is a total of 2,774 AF leased in Hermosa Redondo in the 2009-2010 water year. When Cal Water begins producing its full adjudicated right these leases will not be required.

Purchased water from West Basin Municipal Water District (WBMWD), one of twenty-seven member agencies of Metropolitan Water District of Southern California (MWDSC), satisfies 85 to 90 percent of the District's water demand. WBMWD serves as the regional wholesaler and developer of local supplies. They also provide the recycled water. The projected water supply source and volumes are summarized in Table 4.1-1.

Table 4.1-1: Planned Water Supplies (Table 16)
(AFY)

Water Supply Sources	2010 Actual	2015	2020	2025	2030	2035	2040
West Basin Municipal Water District	10,958	10,482	9,535	9,904	10,282	10,670	11,069
Supplier produced groundwater	1,424	3,500	4,070	4,070	4,070	4,070	4,070
Supplier surface diversions	-	-	-	-	-	-	-
Transfers in or out	-	-	-	-	-	-	-
Exchanges In or out	-	-	-	-	-	-	-
Recycled Water (projected use)	134	155	159	162	166	169	173
Desalination	-	-	-	-	-	-	-
Total	12,516	14,138	13,763	14,136	14,518	14,909	15,311

Recycled water generally makes up approximately 1 percent of the total water served to the customers in the Hermosa-Redondo District. The supply amounts listed in Table 4.1-1 are the projected demands from this source

Purchased water imported through WBMWD will provide the balance of supply not coming from groundwater or recycled water. The available supply of imported water is discussed in the following section.

4.2 Imported Water

Imported water is delivered through four WBMWD service connections from two MWDSC distribution feeders: the West Basin Feeder and the Palos Verdes Feeder. Because the four connections are located on these feeders, the District is completely reliant on these two MWDSC feeders. Two other MWDSC feeders, the West Coast Feeder and the Sepulveda Feeder, also serve the region, and could be used as additional connection to improve system reliability. The total rated capacity of the four service connections is 26,930 gpm (38.8 mgd).

MWD classifications of service and rate structure have gone under considerable change in recent years. Key to the changes is the establishment of Purchase Agreements for imported water provided by WBMWD. This agreement establishes several important new concepts with respect to water sales within MWD's service area, see Appendix J. The agreement sets a Base Allocation for each Purchaser, which is essentially their share of the supply MWD has made available to the WBMWD. The Base Allocation was based on that Purchaser's five year average non-surplus purchases during fiscal years ending 1997 through 2001. Over the term of the agreement, the Purchaser commits to purchase at least the amount of 60 percent of the Base Allocation times five, which is known as the Purchase Commitment. If a Purchaser does not purchase during the term of the agreement, the full Purchase Commitment, then they must pay for the balance at the average Tier 1 Supply Rate.

A two-tier rate and annual allocation is another aspect of these agreements. The agreement sets a Tier 1 Annual Maximum at 90 percent of the Base Allocation. All water purchased in any year in an amount that is equal to or less than the Tier 1 Maximum will be purchased at the Tier 1 Rate. Any amount of water purchase in excess of the Tier 1 Annual Maximum will be sold at the Tier 2 Rate.

In the Imported Water Purchase Agreement for Cal Water with the WBMWD, the Base, Tier Allocations, and Purchase Commitment are established as a combined allocation of all four Cal Water Districts. The Hermosa-Redondo District shares in the combined allocations with the three other California Water Service districts. The agreement was initially adopted to be effective on January 1, 2003; a later amendment became effective January 1, 2008. The amended agreement adjusted Cal Water's Tier 1 Annual Maximum to 70,000 acre-feet and the Purchase Commitment to 210,000 acre-feet. Cal Water has developed an allocation that distributes the Tier 1 Annual Maximum to each of its four

West Basin districts, so that if the total Tier 1 Maximum is exceeded the applicable Tier 2 charges can be assessed to the appropriate district. The allocations are as follows: Dominguez 22,400 AF, Hawthorne 4,900 AF, Hermosa-Redondo 16,800 AF, and Palos Verdes 25,900.

In-Lieu Seasonal Storage currently remains a valid economic incentive program, but purchases of this class of water do not count toward the Purchase Commitment. Shift Seasonal Storage and Emergency service classifications were eliminated. Seasonal Storage Service is a classification for water that is available for delivery during the winter (October through April) in years of adequate supply. Monthly certification is required to receive this reduced-price Seasonal Storage Service.

To qualify for In-Lieu Seasonal Storage Service water rates, a purveyor must reduce the demand for supplemental water from MWD in the summer months (May to September) and shift production of groundwater from winter to summer. The baseline production ratio between local groundwater supply and total demand verifies that this shift has been accomplished. Under the In-Lieu classification the groundwater not pumped is left in the ground in order to augment groundwater replenishment efforts. This retirement results in a rebate or compensation for this action by the Water Replenishment District.

This program benefits MWD by reducing the summer peak flows that were beginning to tax MWD's treatment facilities and distribution system, and enables MWD to maximize water importation during the winter when surplus flows are abundant in the areas of origin. Elimination of the In Lieu Rebate provided by WRD resulted in the program not being favorable to Cal Water. Cal Water’s participation in this conjunctive use program in the future will depend on the makeup of the economic incentives provided.

4.3 Surface Water

Cal Water does not divert any local surface water for the Hermosa-Redondo District. Surface water is ultimately the source for the imported water, which is transported through the Colorado River Aqueduct system, and from Northern California through the State Water Project.

4.4 Groundwater

In 1961 the West Coast Sub-basin was adjudicated, with the Department of Water Resources as Watermaster. The adjudication order is attached as Appendix J. The Department of Water Resources’ Annual Summary of Watermaster Service reports on groundwater status in the basin. This summary includes historical fluctuation of water level elevation in wells throughout the basin. These references indicate that, since the reduction in pumping began in 1954 and the adjudication was implemented in 1961, groundwater levels in the West Coast Basin have risen some 20 to 60 feet, depending on location. However, many groundwater elevations in the basin remain below sea level, requiring the maintenance of seawater intrusion barriers.

The West Coast basin is a pressurized aquifer groundwater basin with three primary aquifers: the 200-foot Sands, the Silverado Aquifer, and the Lower San Pedro Aquifer. These aquifers have continuity with the Pacific Ocean in Santa Monica Bay. Overdraft of the basin was caused by excessive pumping due to population growth and rapid industrialization of the Los Angeles Coastal Plain beginning in the 1930s. This overdraft caused lowering of the piezometric head of the aquifers, which increased pumping cost and resulted in seawater intrusion. The adjudication of the West Coast Basin began in 1945 when Cal Water, along with the City if Torrance and the Palos Verdes Water Company filed a lawsuit in Superior Court, Los Angeles County, to quiet title to the groundwater rights and control pumping in the basin. As part of the effort to resolve the overdraft condition, the West Basin Municipal Water District was formed in 1947 to distribute supplemental water to the major water purveyors imported into the region by the Metropolitan Water District of Southern California (MWD). In 1955 when pumpers realized the severity of the overdraft, groundwater pumping was limited under an interim agreement. In 1961, the Court rescinded the interim agreement and signed the West Coast Basin Judgment.

The Hermosa-Redondo District exercises an annual adjudicated right of 4,070 AF, Table 4.4-1. This right is comprised of 3,071 AF issued to the District as part of the adjudication and 999 AF acquired when Cal Water purchased the Palos Verdes District from the Palos Verdes Water Company. Cal Water is active in leasing its unused annual water rights.

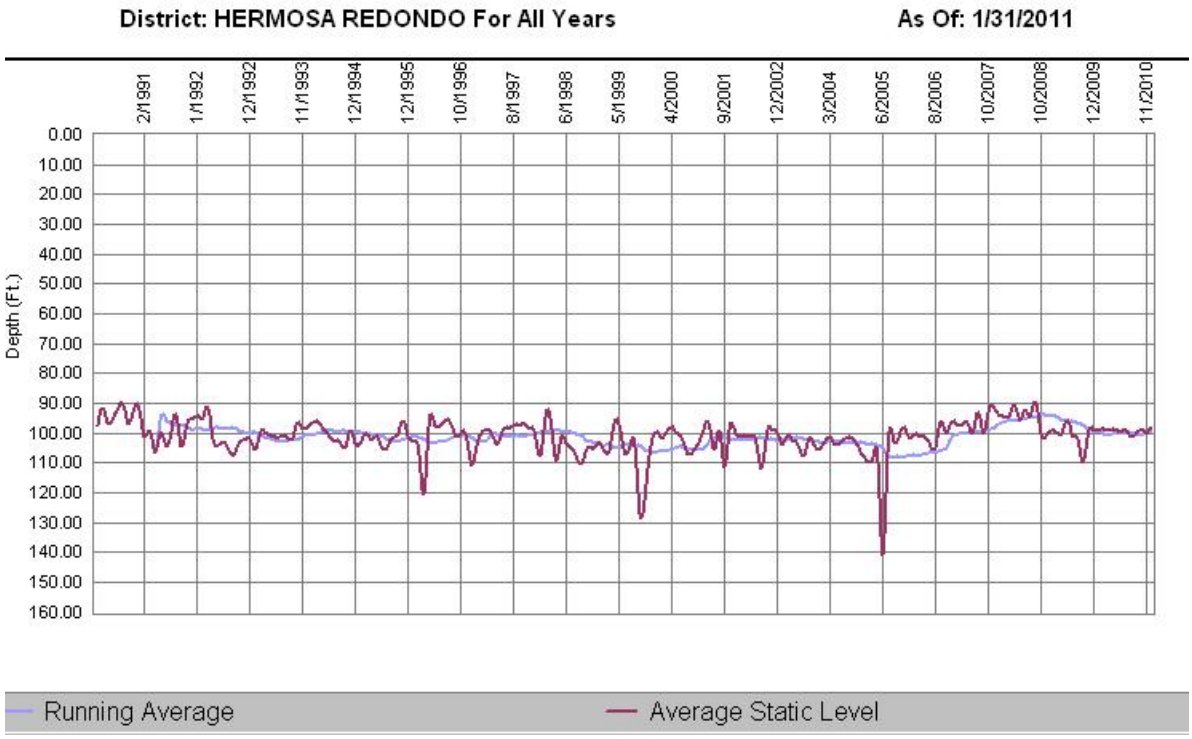
Table 4.4-1: Groundwater Pumping Rights AF Year

Basin Name	Pumping Right - AFY
West Coast Basin	4,070
Total	4,070

District wells can produce 2,510 gpm or 3.6 mgd. If operated non-stop daily, this pumping capacity could produce 4,048 AF per year, slightly less than the annual adjudicated right. Cal Water has lost production capacity due to the saline contamination of local groundwater but is working to replace this lost capacity

Figure 4.4-1 shows that the average groundwater level for the District has remained between 90-110 feet below surface since 1990.

Figure 4.4-1: District Average Well Level



The historical volume of the groundwater pumped is shown in Table 4.4-2 and the projected volume is presented in Table 4.4-3.

Table 4.4-2: Amount of Groundwater Pumped – AFY (Table 18)					
Basin Name	**2006**	**2007**	**2008**	**2009**	**2010**
West Coast Basin	1,579	1,073	961	962	1,424
% of Total Water Supply	11%	7%	7%	7%	11%

Table 4.4-3: Amount of Groundwater projected to be pumped – AFY (Table 19)						
Basin Name	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
West Coast Basin	3,500	4,070	4,070	4,070	4,070	4,070
% of Total Water Supply	24%	28%	27%	27%	26%	25%

As the District participated in the In-Lieu Replenishment Program, Hermosa-Redondo has not produced its full adjudicated rights in any year during the past twenty-three years. All water not produced by the district is stored in groundwater aquifers replenishing the basin.

Seawater intrusion has been a problem in the West Coast Basin since the 1930's. Two seawater intrusion barriers, the West Coast Basin Barrier and the Dominguez Gap Barrier, have addressed the threat of losing the basin to salt water. The Los Angeles County Department of Public Works operates both barriers and the Water Replenishment District buys the water used in these facilities from WBMWD. The West Coast Basin Barrier, comprised of 149 injection wells situated approximately parallel with the Santa Monica Bay coastline, has a greater impact on the operations of the Hermosa-Redondo District than does the Dominguez Gap Barrier, a much smaller facility, providing protection along the San Pedro Bay in the southern portion of the basin.

The West Coast Basin Barrier has effectively halted the intrusion of seawater along the coastline adjacent to the district; however, the timing and location of the installation allowed a plume of saline water to become entrapped inland of the barrier. This plume has been responsible for the closure of at least six wells in the Hermosa-Redondo District.

The plume has continued to migrate inland, driven by groundwater elevations that are at or above sea level. Such elevations are intensified by water injections designed to prevent further intrusion and a pumping depression resulting from heavy groundwater production by oil refineries in the Wilmington area. Estimates indicate that this plume originally contained 300,000 AF of brackish water making it difficult to site new groundwater wells.

Dominguez Water Corporation, with the support of the West Basin Municipal Water District, the Water Replenishment District of Southern California, Metropolitan Water District of Southern California and the United States Bureau of Reclamation, established a seawater desalinization demonstration project in July of 1993. Their effort has demonstrated that this plume can be extracted, treated, and put to beneficial use in an economical manner. That cost is further reduced through an incentive program offered by MWDSC so that the unit cost to the customer is less than the imported service from MWDSC. Following the merger of Cal Water and Dominguez in 2000, Cal Water has operated this desalination facility.

WRDSC is a public agency responsible for eliminating annual overdraft, reducing historical overdraft in both the West Coast and Central Basins, and protecting these basins from seawater intrusion or other contamination. Additionally, the WRDSC manages various groundwater quality cleanup programs. To finance its designated responsibilities the WRDSC levies a Replenishment Assessment on every acre-foot of groundwater produced in the Central and West Coast Basins.

The Los Angeles County Department of Public Works owns and operates all groundwater recharge facilities as a county funded activity through a longstanding inter-agency agreement. As a result, the costs associated with the capture and recharge of storm runoff water is not directly accountable in the cost of water replenishment. All other water used

for replenishing the groundwater of the Central and West Coast Basins is funded by the WRDSC through the Replenishment Assessment.

The principle mechanisms for recharge in the West Coast Basin are the injection of water into the seawater intrusion barriers, in-lieu replenishment, and inflow to the West Coast Basin from the Central Basin. The Central Basin is recharged through percolation of water applied to surface spreading ponds in the Montebello Forebay.

4.4.1 Basin Boundaries and Hydrology

The West Coast Subbasin is bounded on the north by the Ballona Escarpment, an abandoned erosional channel from the Los Angeles River. On the east it is bounded by the Newport-Inglewood fault zone and on the south and west by the Pacific Ocean and consolidated rocks of the Palos Verdes Hills. The surface of the sub-basin is crossed in the south by the Los Angeles River through the Dominguez Gap, and the San Gabriel River through the Alamitos Gap, both of which then flow into San Pedro Bay.

The District is situated on the following basin:

- South Coast Hydrologic Region
- Coastal Plain of Los Angeles Basin
- West Coast Sub-basin
- Groundwater Basin Number: 4-11.03

A detailed description of the basin is given in the California's Ground Water Bulletin 118, see Appendix D.

4.4.2 Groundwater Management Plan

As the regional groundwater management agency for two of the most utilized groundwater basins in the state of California, the WRD plays an integral role in overall water resource management in southern Los Angeles County. The WRD manages groundwater for nearly four million residents in 43 cities of southern Los Angeles County. The 420 square mile service area uses about 250,000 acre-feet of groundwater per year, which equates to nearly 40 percent of the total demand for water. The WRD ensures that a reliable supply of high quality groundwater is available through its clean water projects, water supply programs, and effective management principles. A copy of the 2003 WRD Strategic Plan is included as Appendix J.

4.5 Recycled Water

The recycling of wastewater offers several potential benefits to Cal Water and its customers. Perhaps the greatest of these benefits is to help maintain a sustainable groundwater supply either through direct recharge, or by reducing potable supply needs by utilizing recycled water for appropriate uses (e.g., landscape, irrigation) now being served by potable water. The potential amount of recycled water that can be produced is proportional to the amount of wastewater that is generated by the District, and is discussed in the following sections.

The Hermosa and Redondo Beach service area currently receives recycled water from the West Basin Municipal Water District (WBMWD). WBMWD acquires, controls, distributes, and sells recycled water to several cities and agencies in the greater Los Angeles area.

WBMWD has constructed what will ultimately be one of the largest water reuse projects in the United States. In the Phase I User Report, HYA Consulting Engineers identified over 105 economically feasible recycled water users with a combined estimated average annual demand of 19,100 AF. The project, when fully constructed, has the potential to deliver nearly 70,000 AF of tertiary treated recycled water per year. Following treatment at the Hyperion Water Treatment Plant owned by the city of Los Angeles and located near the Los Angeles airport, recycled water is being used for injection at the seawater intrusion barriers, for industrial operations and for landscape irrigation. Since 1995 the injection of recycled into the West Coast Basin Barrier has totaled over 95,000 AF.

4.5.1 Wastewater Collection

The Los Angeles County Sanitation District (LACSD) owns, operates, and maintains the sewer system consisting of gravity sewers, pumping stations, and force mains to collect wastewater in the Hermosa and Redondo Beach service area. The collected wastewater is discharged to trunk sewers and interceptors owned and operated by the LACSD. The wastewater is conveyed to the LACSD's Joint Water Pollution Control Plant in Carson, where it receives secondary treatment prior to discharge in an ocean outfall. Although this plant does not currently produce recycled water, it is being considered as a potential source of recycled water in the future.

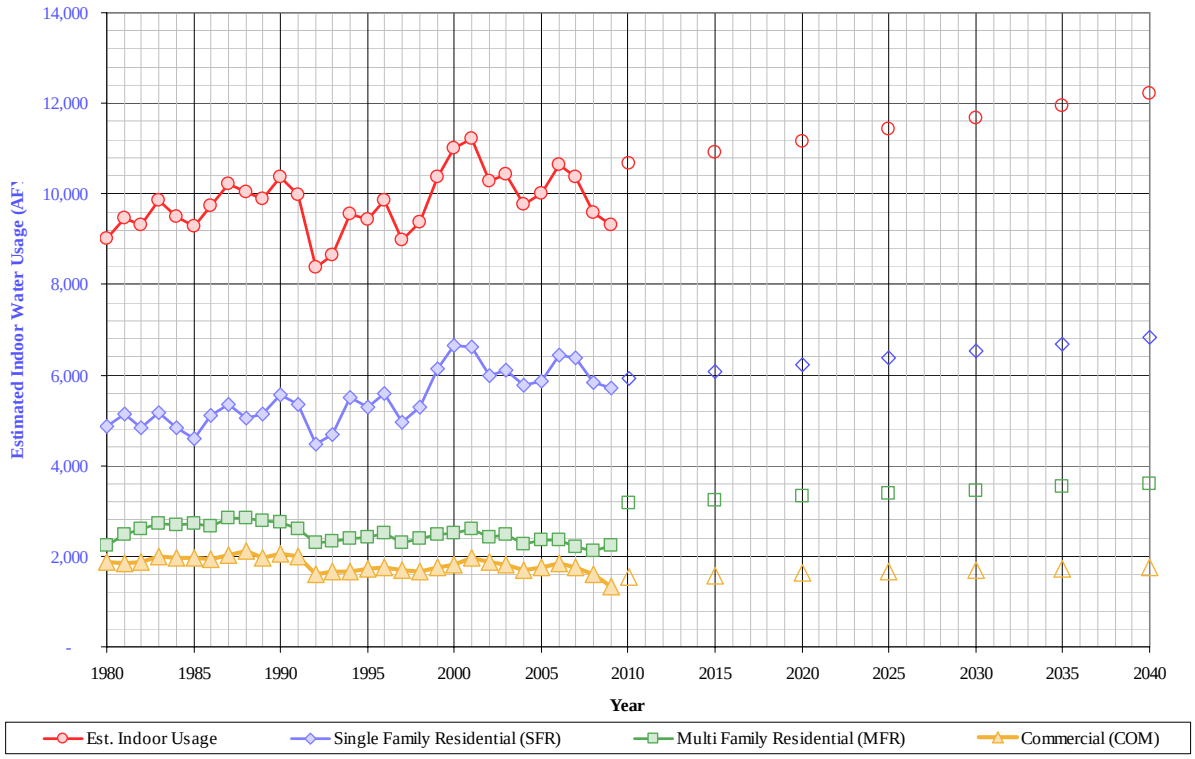
4.5.2 Estimated Wastewater Generated

Municipal wastewater is generated in the Hermosa-Redondo service area by a combination of residential, commercial, and industrial sources. The quantity of wastewater generated is proportional to the population and the water use in the service area. Assuming that most indoor water use results in wastewater generation, projected wastewater flows were calculated using the percentage of indoor residential water use and Cal Water's water demand projections. Estimates of the wastewater flows for the future conditions are presented in Table 4.5-1. The estimates were obtained by annualizing 90 percent of residential January water use in the Cal Water's service area.

The historical data from 1980 to the present is shown in Figure 4.5-1 with a linear projection of the data shown to the year 2040.

Table 4.5-1: Recycled Water-- Wastewater Collected and Treated-AFY (Table 21)								
Type of Wastewater	**Treatment Level**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Total Collected and Treated	Secondary	10,663	10,908	11,519	11,415	11,678	11,946	12,221

Figure 4.5-1: Estimated District Annual Wastewater Generated



Because the wastewater generated in Cal Water's service area is received by a plant that does not produce recycled water, it is assumed that all of the collected wastewater is disposed.

Table 4.5-2: Disposal of wastewater (non-recycled) AFY (Table 34)								
Method of Disposal	**Treatment Level**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Ocean outfall	Secondary Treatment	10,663	10,908	11,519	11,415	11,678	11,946	12,221

As discussed in the following section, the recycled water used in the Hermosa-Redondo District is collected from communities outside of the District.

4.5.3 Wastewater Treatment and Recycling

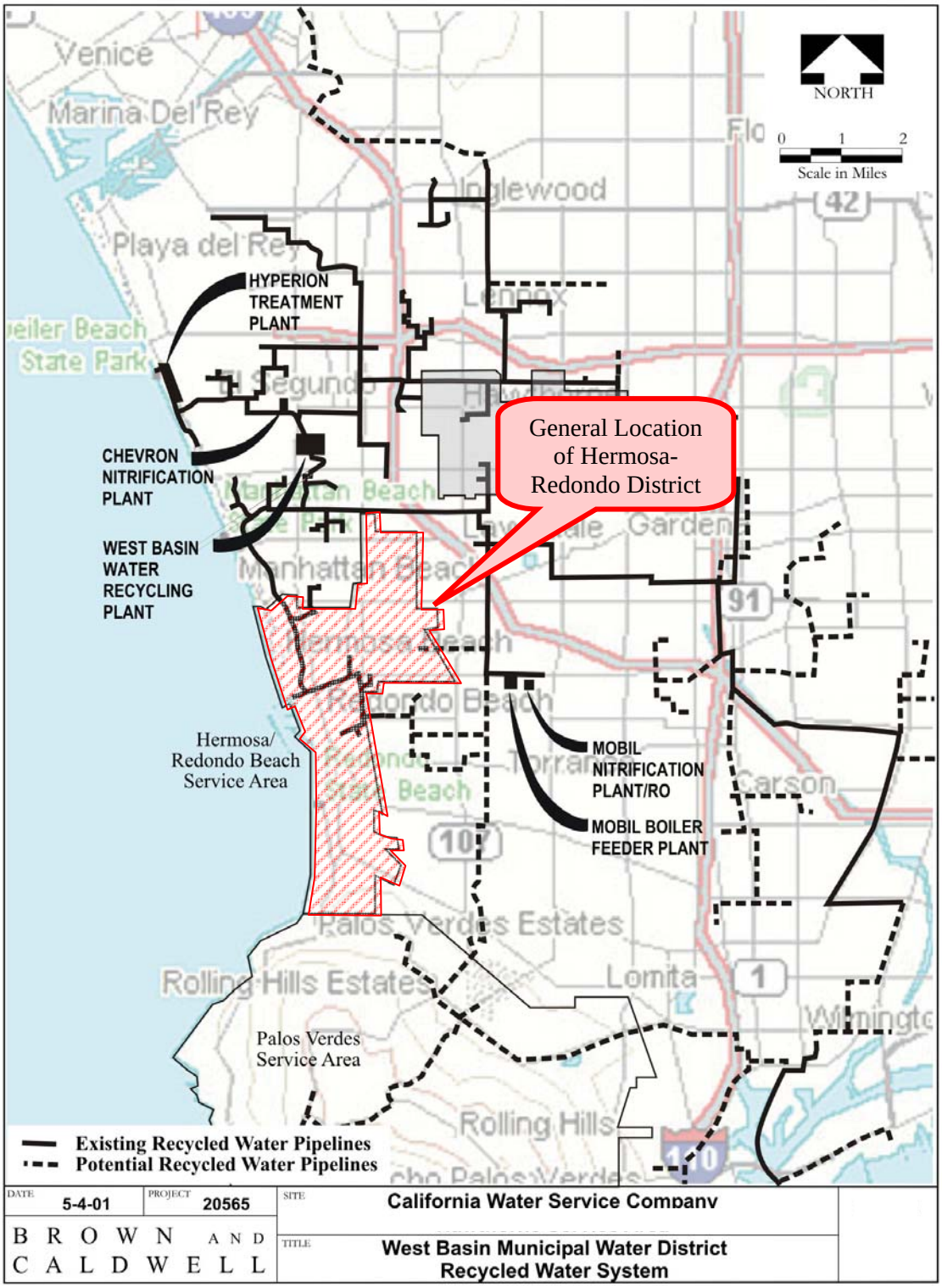
Although the LACSD's Joint Water Pollution Control Plant provides the wastewater service for the Hermosa and Redondo Beach service area, recycled water is provided to the Hermosa and Redondo Beach service area by the West Basin Water Recycling Facility (WBWRF). The source of the recycled water is treated effluent from the city of Los Angeles' Hyperion Wastewater Treatment Plant. The Hyperion Wastewater Treatment Plant provides secondary treatment using the activated sludge process. Most of the treated effluent is disposed of through an ocean outfall, but approximately 6 percent of the treated effluent is sent to the West Basin Water Recycling Facility in El Segundo where it undergoes chemical clarification, recarbonation, microfiltration, and chlorination.

Recycled water from the WBWRF is used for several purposes: 1) groundwater replenishment through more than 100 wells, 2) landscape irrigation and 3) industrial process water. The WBWRF serves more than 140 sites including areas in Manhattan Beach, Torrance, Hermosa Beach, and Inglewood. The biggest customers are the oil refineries. In Cal Water's Hermosa and Redondo Beach service area, the recycled water customers include parks, one school, and businesses.

The Joint Water Pollution Control Plant is the largest of the LACSD's wastewater treatment plants. It provides advanced primary and secondary treatment for 350 million gallons of wastewater per day and serves a population of approximately 3.5 million people. The treated wastewater is disinfected with chlorine and sent to the Pacific Ocean through a network of outfalls that extends two miles off the Palos Verdes Peninsula to a depth of 200 feet. As the demand for recycled water increases this plant could be upgraded to include tertiary treatment.

The main features of the piping system for distributing the recycled wastewater in Cal Water's Hermosa and Redondo Beach service area are shown on Figure 4.5-2.

Figure 4.5-2: Recycled Water System



4.5.4 Potential Water Recycling

The 2000 WBMWD Water Recycling Program (Kennedy/Jenks Consultants, 2000) identified potential customers in Cal Water's Hermosa and Redondo Beach service area. Commercial and industrial customers are currently utilizing recycled water and are projected to remain steady for the future. Table 4.5-3 summarizes the projected recycled water supply in Cal Water's Hermosa and Redondo Beach service area through the year 2040.

Table 4.5-3:: Projected Recycled Water Supply for Hermosa-Redondo (Table 23) (AFY)

User type	Treatment Level	2005	2010	2015	2020	2025	2030	2035	2040
Agriculture	Chemical clarification, recarbonation, micro filtration, and chlorination.	-	-	-	-	-	-		
Landscape		-	-	-	-	-	-		
Wildlife Habitat		-	-	-	-	-	-		
Wetlands		-	-	-	-	-	-		
Industrial/Commercial		105	134	155	159	162	166	169	173
Groundwater Recharge		-	-	-	-	-	-	-	-
	Total	105	134	155	159	162	166	169	173

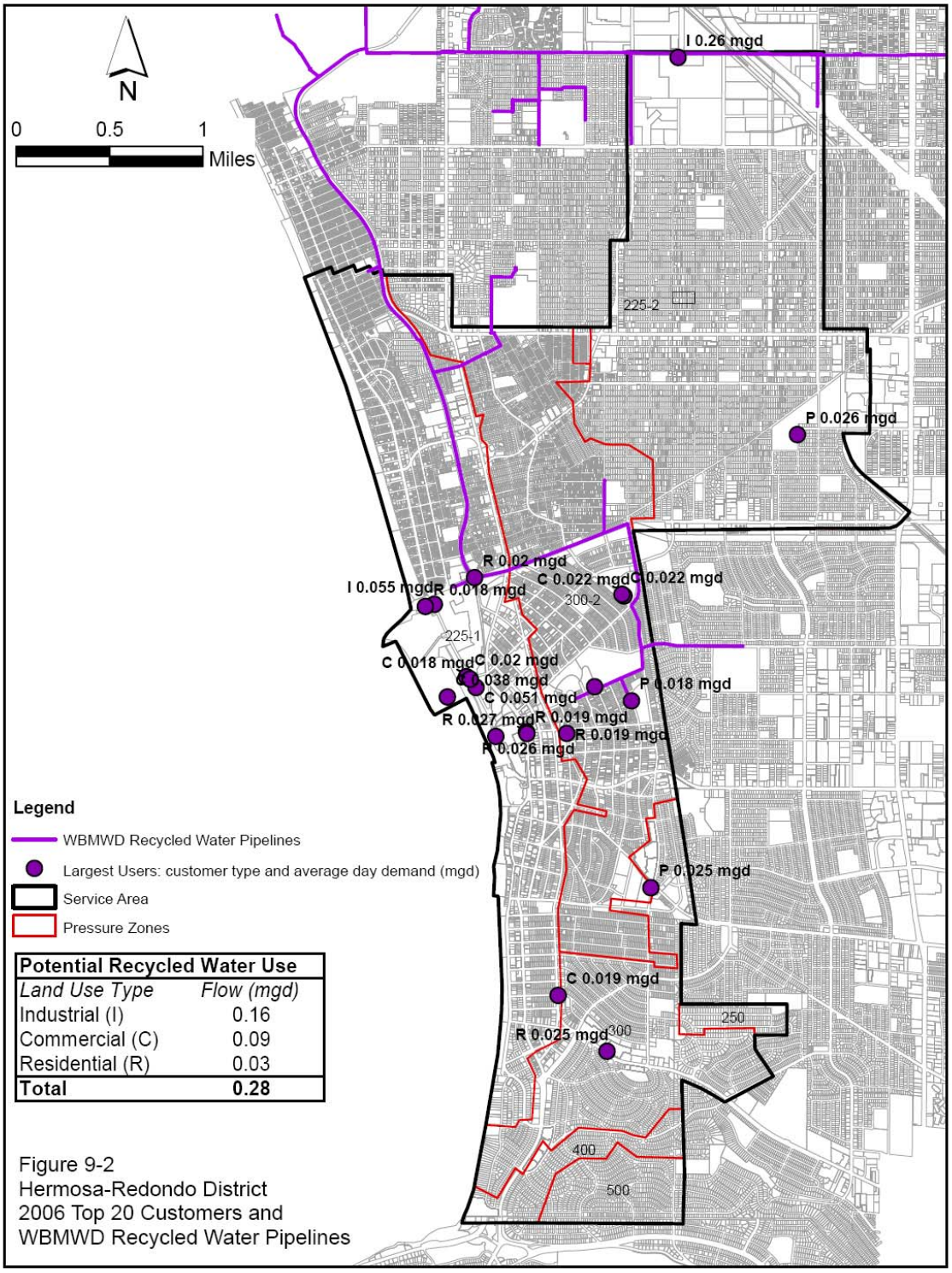
WBMWD is responsible for:

- Determining the technical and economic feasibility of supplying recycled water to the District
- Encouraging the use of and optimizing the use of recycled water in the District
- Extension of recycled water lines within the District

Cal Water encourages the use of recycled water by offering the recycled water at a reduced cost. Additional recycled water customers are expected to be added over time as the distribution system grows and the price difference between recycled and potable water grows.

Cal Water's Water Supply and Facilities Master Plan (WSFMP) for the Hermosa-Redondo District identified potential customers for recycled water with a total demand of 0.28 MGD. The general location and potential demands are shown in Figure 4.5-3.

Figure 4.5-3: Potential Recycled Water Customers



4.6 Desalinated Water

The Hermosa-Redondo District's location immediately on the coast makes it a good candidate for the use of desalinated water, if it was warranted. A desalination facility could be located in the Hermosa-Redondo service area and could be used to supply water to other Cal Water Districts. Desalination would provide an increase in reliability of overall supplies in the area. Cal Water is no current plan to develop this source, we have proposed to conduct a feasibility study to determine the potential to do so. However, as a regulated utility Cal Water is required to obtain approval from California Public Utilities Commission prior to conducting such an investigation.

In June 2005, West Basin was awarded approximately $1.7 million for its desalination program by the California Department of Water Resources under Proposition 50. The goal of West Basin's Temporary Ocean-Water Desalination Demonstration Project is to conduct research and develop data for the permitting, design, construction, and operation of West Basin's proposed full-scale desalination facility. In contrast to the Pilot Project, West Basin's Demonstration Facility will utilize limited quantities of full-scale equipment to refine operating parameters, perform additional water quality testing, evaluate source intake methodologies, and assess energy efficiency. West Basin's temporary Demonstration project will be constructed in, and adjacent to, an existing pump house at the L.A. Conservation Corps' SEA Lab facility in Redondo Beach.

If the Pilot Project is successful and West Basin proceeds to build a large scale desalination plant in this location, Cal Water will have access to this alternative supply.

4.7 Transfer or Exchange Opportunities

As noted earlier, Cal Water often leases a portion of its groundwater rights to other agencies and private entities. As well capacity increases or if surface supplies become less abundant, Cal Water will discontinue this practice and take full advantage of its APA.

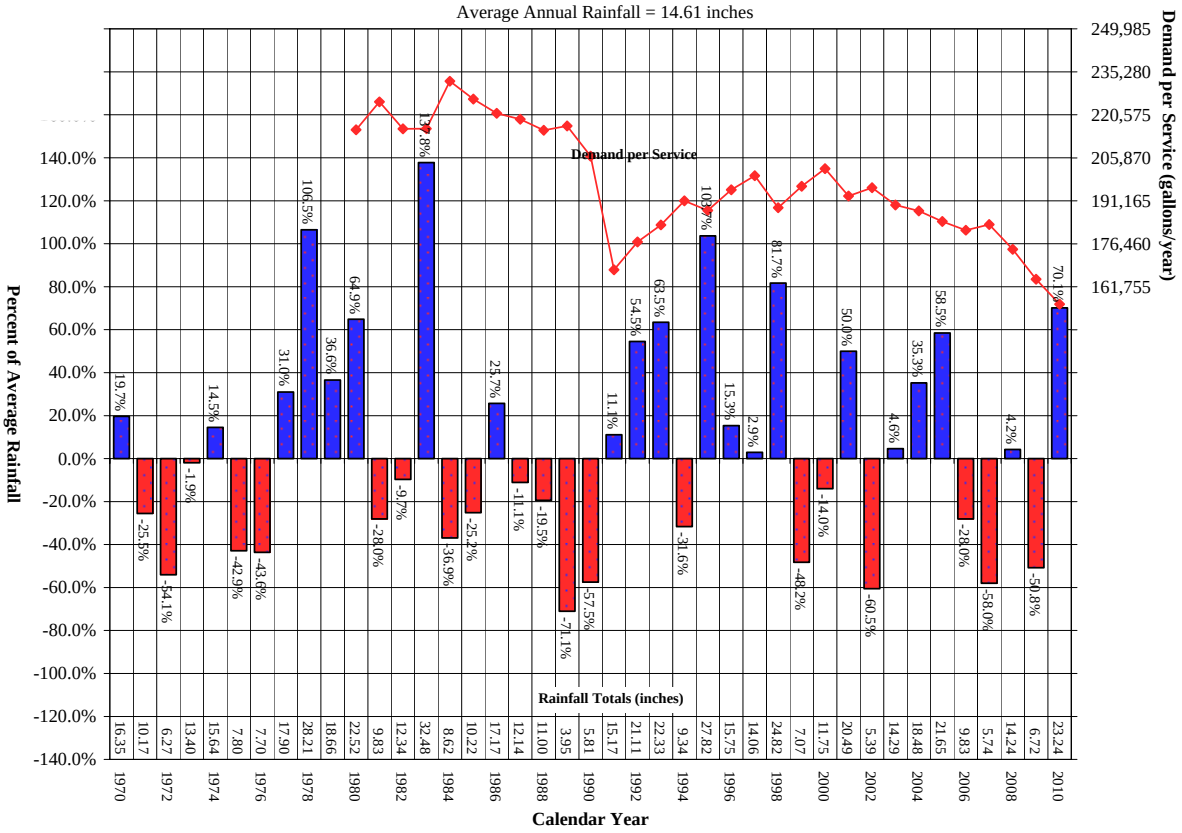
5 Water Supply Reliability and Water Shortage Contingency Planning

5.1 Water Supply Reliability

The water supply for the Dominguez District is ultimately reliant on annual precipitation in the watersheds of the Feather and Colorado Rivers that supply the main aqueducts in Southern California. Local weather has less of an effect on annual supplies. However, it has a large impact on customer demands.

A chart comparing annual rainfall since 1970 to the historic average is shown in Figure 5.1-1. It also displays the demand per service values for each year since 1980. You can see that water use usually increases in the first years of a drought. Afterwards, conservation efforts are increased and the demand per service decreases accordingly. The statewide drought of 1987-1992 is a good example of these trends. The data shows that in the Hermosa-Redondo area the drought began as far back as 1984, with a corresponding increase in demand per service at the beginning and a consistent drop as the drought persisted. Water use has remained below pre-drought levels since this time and has recently declined further in response to the drought conditions from 2007-2009.

Figure 5.1-1: Comparison of Annual Rainfall to Historic Average



5.2 Drought Planning

The most recent driest year occurred in 2002 when the rainfall was 60 percent below average (5.39 inches). This is taken as the single dry year shown in the following table. The multiple dry years used in the following table are based on the most recent and consecutive lowest annual rainfall totals which occurred from 2006 to 2009. The normal year is taken as 2003, when the annual rainfall was approximately equal to the average rainfall totals. The base years are summarized in Table 5.2-1.

Table 5.2-1: Basis of Water Year Data (Table 27)

Water Year Type	Base Year (s)
Average Water Year	2003
Single-Dry Water Year	2002
Multiple-Dry Water Years	2006-2009

Cal Water is not a regional water wholesaler and does not store water seasonally in reservoirs or other storage facilities. Therefore total runoff figures can not be used to determine supply reliability. Perhaps a better indication of annual variability would be the variation in customer demand between normal and single dry or multiple dry years. This can be seen in the overall average demand per service values for the District, as shown in Table 5.2-2. The data suggests a typical pattern where demand increases at the beginning of the drought and is gradually reduced as dry conditions persist. This reduction generally happens as a result of increased conservation requests by water providers and a general awareness of the problem by customers.

Table 5.2-2 shows the water supplies used in the normal, single dry, and multiple dry years described above. As a result of dry conditions and decreased storage, in 2008 MWD entered into Stage 2 of its Water Supply Allocation Plan, resulting in approximately 10 percent reduction in imported water allocations. Cal Water customers responded by reducing demand to meet these allocation targets. For the reasons described above, demand totals have been substituted for supply amounts in this analysis. If customers were not able to meet the reduction target, demand would increase, and penalty rates could be applied to these additional Cal Water purchases.

Table 5.2-2: Supply Reliability – gal/service/yr (Table 28)

Average / Normal Water Year	Single Dry Water Year	Multiple Dry Water Years			
		Year 1	Year 2	Year 3	Year 4
189,704	195,643	181,103	183,055	174,575	164,341
% of Normal	103%	95%	96%	92%	87%

The supply reliability analysis reflects the assertion that the combination of the safe yield of groundwater in conjunction with MWD's available drought year supplies will be sufficient to provide the normal allotment of water to Cal Water's Dominguez District even in times of prolonged drought. For this analysis it is assumed that the current agreement for purchased water with WBMWD will be renewed and that normal amounts of recycled water will be available in all years.

Table 5.2-3 shows an estimate of the minimum water supply for the next three years. In this case 2010 was assumed to be a normal year and the supply for 2011-2013 will be reduced by the percentages listed in Table 5.2-2 for the multiple dry years. Groundwater and recycled water are drought proof supplies and will be available in their normal amounts in all years. The groundwater quantities shown in the table reflect Cal Water's expected pumping capacity in these years. Cal Water intends to increase well capacity until the full adjudicated right can be utilized on an annual basis. The recycled water quantities shown are the expected demands from this source. Imported water will be used to make up the remaining supply and will vary according to customer demand.

Table 5.2-3: Supply Reliability – Current Water Sources - AFY (Table 31)

Water Supply Source	Average / Normal Water Year Water Supply (2010)	Multiple Dry Water Year Water Supply		
		2011	2012	2013
Purchased	12,771	10,531	10,683	10,044
Recycled	134	153	153	154
Groundwater	1,424	3,000	3,000	3,000
Total	14,329	13,684	13,836	13,198
% of Normal Year	100%	82%	84%	79%

5.2.1 Normal-Year Comparison

Water supply and demand patterns change during normal, single dry, and multi dry years. To analyze these changes, Cal Water relies on historical usage to document expected changes in future usage in water demand; such as, assuming increasing demand due to increased irrigation needs or a decrease in demand due to awareness of drought conditions.

The groundwater supply is available in all hydrologic year types and is limited to Cal Water's adjudicated right. Cal Water intends to maximize this source by 2020 by increasing well capacity. The current practice of entering into short term lease agreements would need to be terminated so that the full adjudicated right could be realized. The recycled supply shown in Table 5.2-4 is the expected demand from this source and will be available in all hydrologic years.

The remaining supply will come from purchased water, which will vary depending on customer demand. The combined projected purchased water for all three of Cal Water's districts receiving water from WBMWD will be below the Tier I maximum of 70,000 AFY in normal hydrologic years.

According to MWD's 2010 Regional Urban Water Management Plan, sufficient supplies of imported water will be available in normal hydrologic years to meet all projected demands. For this analysis the normal demand is considered equal to the SBx7-7 target water demand projection plus recycled water use. Table 5.2-4 indicates that supplies will be reliable throughout the planning horizon of this UWMP and that no supply deficiencies are expected.

Table 5.2-4: Supply and Demand Comparison - Normal Year - AF (Table 32)

	2015	2020	2025	2030	2035	2040
Purchased water	10,850	10,291	10,680	11,080	11,489	11,910
Groundwater	3,500	4,070	4,070	4,070	4,070	4,070
Recycled water	155	159	162	166	169	173
Supply totals	14,506	14,519	14,912	15,315	15,728	16,152
Demand totals	14,506	14,519	14,912	15,315	15,728	16,152
Difference	0	0	0	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

5.2.2 Single Dry-Year Comparison

In general, and from operational records, the District's demand has shown to increase during a single-dry years as compared to normal years. The water demand increases due to maintenance of landscape and other high water uses that would normally be supplied by precipitation. The demand values shown in Table 5.2-5 were calculated by increasing the target demand projection in each year by the percentage listed for the single dry year in Table 5.2-2. Again, Cal Water assumes that the total supply available will equal the demand in all future years.

As noted in the previous section, groundwater and recycled water are expected to be available in normal amounts during all hydrologic years. And purchased water will provide the balance of supply to meet customer demands. The combined projected purchased water for all three of Cal Water's districts receiving water from WBMWD will be below the Tier I maximum of 70,000 AFY in single dry hydrologic years. According to MWD's 2010 Regional Urban Water Management Plan, sufficient supplies of imported water will be available in single dry years to meet all projected demands. MWD asserts that the policies provided in the 2010 IRP update will insure this reliability. Therefore, the supply is 100 percent reliable in single dry years.

Table 5.2-5: Supply and Demand Comparison - Single Dry Year - AF (Table 33) (Table 32)						
	2015	2020	2025	2030	2035	2040
Purchased water	11,304	10,745	11,147	11,559	11,981	12,415
Groundwater	3,500	4,070	4,070	4,070	4,070	4,070
Recycled water	155	159	162	166	169	173
Supply totals	14,960	14,974	15,379	15,795	16,221	16,658
Demand totals	14,960	14,974	15,379	15,795	16,221	16,658
Difference	0	0	0	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

5.2.3 Multiple Dry-Year Comparison

As noted earlier, water demand generally increases early in a multiple dry year period then gradually decreases as the drought persists and customers respond to conservation messaging. This pattern is evident in Table 5.2-6 where demands at the beginning of each five year period are higher than in the normal year scenario, and demands decrease each year thereafter. The supplies and demands shown here are calculated by multiplying the target demand projection for that year by the percentages listed in Table 5.2-2 for the multiple dry year period, including recycled water.

Groundwater and recycled water are expected to be available in normal amounts during all hydrologic years. Purchased water will provide the balance of supply to meet customer demands. The combined projected purchased water for all Cal Water's districts receiving water from WBMWD will be below the Tier I maximum of 70,000 AFY in multiple-dry hydrologic years. According to MWD's 2010 Regional Urban Water Management Plan, sufficient supplies of imported water will be available in single dry years to meet all projected demands. MWD asserts that the policies provided in the 2010 IRP update will insure this reliability. Therefore, Cal Water expects the supply to be 100 percent reliable in single dry years. Again, no supply deficiency is expected.

Using the recent drought from 2006-2009 as an example, Cal Water expects MWD to begin its Water Supply Allocation Plan during future dry year periods. Although not reflected in the table below, reductions in demand will likely be necessary as the drought persists. As was seen over the last three years, Cal Water's customers have been able to respond and meet these target demand allocations.

Table 5.2-6: Supply And Demand Comparison - Multiple Dry Year Events – AFY (Table 34)						
		2015	2020	2025	2030	2035
Multi-dry year first year supply	Purchased water	10,200	9,640	10,011	10,393	10,784
	Groundwater	3,500	4,070	4,070	4,070	4,070
	Recycled water	155	159	162	166	169
	Supply Totals	13,855	13,868	14,244	14,628	15,023
	Demand Totals	13,855	13,868	14,244	14,628	15,023
	Difference	0	0	0	0	0
	Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%
	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%
Multi-dry year second year supply	Purchased water	10,350	9,862	10,240	10,626	11,024
	Groundwater	3,500	4,070	4,070	4,070	4,070
	Recycled water	156	159	163	166	170
	Supply Totals	14,006	14,092	14,472	14,863	15,264
	Demand Totals	14,006	14,092	14,472	14,863	15,264
	Difference	0	0	0	0	0
	Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%
	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%
Multi-dry year third year supply	Purchased water	9,710	9,288	9,649	10,021	10,401
	Groundwater	3,500	4,070	4,070	4,070	4,070
	Recycled water	157	160	163	167	171
	Supply Totals	13,367	13,518	13,883	14,258	14,642
	Demand Totals	13,367	13,518	13,883	14,258	14,642
	Difference	0	0	0	0	0
	Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%
	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%

5.3 Factors Affecting Reliability of Supply

Although the historical record shows that the demand can be met by the supply, several factors that could negatively impact the reliability of each source are listed in Table 5.3-1.

Table 5.3-1: Factors Resulting In Inconsistency of Supply (Table 10)

Name of supply	Legal	Environmental	Water Quality	Climatic
West Basin Municipal Water District	✓	✓		✓
Groundwater			✓	

The viability of future supplies is contingent upon how these supplies influence or are affected by several critical conditions. These conditions include operational feasibility and reliability, supply reliability, economic incentive, economic effect on customers, and regional supply ramifications.

For an alternate water strategy to be acceptable, it must be feasible and add to the overall reliability of the distribution system. Treatment has been installed on all wells and the Hermosa-Redondo District has enough well capacity to produce all of its adjudicated rights for one year. However, accomplishing this is not practical since it requires that each of the three wells operate full time 365 days per year. Therefore, additional wells are needed in the district to fully utilize the available adjudicated right. The distribution system has the capacity to deliver the current and future demands of the District's customers. No additional major facilities are required to meet demand and maintain required pressures. However, developing additional production capacity can decrease the amount of money spent to purchase water and provide greater reliability during shortages. The cost of constructing facilities to provide additional production capacity increases as more facilities are constructed; at some point, the revenue requirements to finance this construction exceed the savings generated by the added capacity.

There are conditions that complicate the sightings of well facilities in the West Coast Basin. If these conditions are encountered, they can increase the costs of well development. If the well encounters saline water during development or during operation, desalination facilities would need to be installed to accommodate poor quality. Subsequently, additional property and equipment may be required, which would substantially drive up the total water cost. It is the Company's objective to provide facilities sufficient to maintain adequate production capacity in order to properly exercise the district's annual adjudicated rights and to take full advantage of economic incentives offered by MWDSC and WRDSC.

The reliability of MWDSC's imported water supplies has deteriorated in recent years. Because of this deterioration, Metropolitan has implemented programs that provide:

- Financial incentives for development of local supplies
- Seasonal use of imported supplies in a manner that maximizes importation into southern California
- Storage of surplus imported supplies for future use
- Restoration of the usability of contaminated local groundwater

As a regulated utility, the expense of purchasing or producing water is passed directly through to the customer; a utility can only earn money on the investment made in the utility plant—the equipment and facilities needed to produce and deliver water. Cal Water is committed to pursuing alternatives that provide the lowest achievable water cost without burdening customers and the Cal Water with unjustified and extravagant plant expenses.

Cal Water regularly reviews and comments on the proposed water rates of regional water supply and management agencies. Cal Water was instrumental in developing and promoting the In-lieu Replenishment concept in the 1960's and today is striving, through its work with regional water agencies, to improve these programs by maintaining the economic incentives and regional supply benefits.

For these programs to be successful, MWDSC and WRDSC must guarantee incentives for a given level of participation. It is anticipated that periodic dry spells will result in temporary suspension of the programs, resulting in delayed investment paybacks. If no assurance is provided that full-scale incentives will be maintained, projects that now appear feasible could burden ratepayers in the future.

Conversely, as water rates change, projects that appear not to be cost effective today may become economically feasible in the future.

Any program that modifies the operational strategy of the district or requires the installation of additional facilities to enhance supply reliability must, prior to being implemented, be evaluated to determine what impact that project will have on regional supply conditions. These ramifications are interrelated; impacting one will affect the others.

Supply conditions include the following:

- The West Coast Basin is an adjudicated groundwater basin.
- Seawater intrusion barriers exist within the basin.
- The West Basin Municipal Water District offers a reclamation program.
- Basin overdraft has caused declining groundwater levels.
- Shortages of available imported water supplies will become more frequent.

Although unlikely, any change to current agreements with WBMWD or WRDSC could negatively affect the future availability of supply. As discussed earlier the recent Wanger Decision limits the ability of the SWP and CVP to pump water from the Delta during critical supply times due to threatened fish species. At this time it is not known how long these restrictions will be in place or if other fish species will be protected under similar decisions. But environmental concerns such as these could result in a permanent reduction of available imported water supplies.

Before the Wanger Decision restrictions went into effect, short-term drought events were not thought to pose a serious threat to the reliability of supply in the Dominguez District. The buffer of excess imported supplies will not exist as long as Delta pumping is reduced. This decreases the reliability of supply for the Dominguez District. During drought events Cal Water may have to implement voluntary or mandatory rationing depending on the severity of the drought and availability of imported supplies. During extended droughts, as the primary source of supply shifts from WBMWD deliveries to groundwater withdrawals, and the reliability of supply would decrease as the drought event continued.

According to planning documents such as West Basin's 2005 Urban Water Management Plan and MWD's Updated Integrated Resource Plan (IRP), Cal Water can expect 100 percent reliability of supply even in multiple year droughts through 2030. Over time, water conservation and the use of recycled water will offset a portion of future demands. Also, during dry years as deliveries from the Colorado River Aqueduct and the SWP are reduced, MWD will draw water from other storage areas established through groundwater banking and transfer agreements made with other agencies. These agreements are further described in MWD's Water Surplus and Drought Management Plan (WSDM Plan).

5.4 Water Quality

The drinking water delivered in the Hermosa-Redondo District, whether its source is groundwater or imported water, meets or surpasses all federal and state regulations. All drinking water standards are set by the U.S. Environmental Protection Agency under the authorization of the Federal Safe Drinking Water Act of 1974. In California, the state's Department of Public Health can either adopt the USEPA standard or set state standards that are more stringent than those set by the federal government.

There are two types of drinking water standards: Primary and Secondary. Primary Standards are designed to protect public health by establishing Maximum Contamination Levels (MCL) for substances in water that may be harmful to humans or affect their health. MCLs are established conservatively for each contaminant, and are generally based on health effects that may occur if a person were to drink two liters of the water per day for 70 years. Secondary Standards are based on the aesthetic qualities of the water, such as taste, odor, color, and certain mineral content. These standards, established by

the State of California, specify limits for substances that may affect consumer acceptance of the water.

The Hermosa-Redondo water system is served by a combination of groundwater wells and treated surface water purchased from MWD. Three of MWD's treatment plants currently have ozone treatment. The remaining two treatment plants are currently under construction for ozone treatment. MWD has been fluoridating the water since October 2007. In MWD's 2010 Regional Urban Water Management Plan, their water quality concerns are salinity, perchlorate, TOC/bromide, nutrients (algae), arsenic, uranium, hexavalent chromium, NDMA, and PPCP (pharmaceuticals and personal care products).

The quality of the groundwater produced by the district's currently two active wells tends to have high manganese, total dissolved solids (TDS) and conductivity that exceeds the secondary MCLs. The reactivation of the remaining standby groundwater well that has similar issues is expected to be online in the future. There is currently wellhead treatment at all three groundwater wells for iron and manganese.

Cal Water is working on a plan to reduce the TDS and conductivity levels in the groundwater wells. All the groundwater wells are in close proximity and, according to Water Replenishment District's (WRD) modeling, are in the pathway of the seawater plume located behind the West Coast Basin barrier injection wells that is heading inland. Treatment will be necessary in the future for TDS and conductivity. The standby well also has hydrogen sulfide detected. All of the groundwater wells are disinfected with chlorine and ammonia to form chloramines. Since this water system is disinfected with chloramines, nitrification is a possibility that is constantly monitored in the distribution system and in storage tanks.

5.5 Water Shortage Contingency Plan

This section contains an updated version of Cal Water's Water Shortage Contingency Plan. The Water Shortage Contingency Plan was last revised in response to the drought that California experienced between 1987 and 1992. The first version of the Plan was included in each subsequent UWMP update.

California's most recent drought event that began in the spring of 2006, coupled with the Delta pumping restrictions, brought increased awareness to the importance of drought preparedness. By the spring of 2008 it became apparent that several of Cal Water's service districts had the potential for water supply shortages and potential wholesaler allocations in the following year. In response, a Conservation/Supply Team was formed to develop a plan for addressing these potential issues. Through this process Cal Water learned valuable lessons and is better prepared for extended droughts or other long term water shortages. The results of this planning process are summarized in this Water Shortage Contingency Plan.

5.5.1 Water Shortage Contingency Plan Scope

The Water Shortage Contingency Plan is a unique document designed to address specific conditions that may occur from time to time in Cal Water's service areas. It can be triggered by several types of events but is primarily used as a response to longer term drought conditions. The Water Shortage Contingency Plan provides a comprehensive company-wide strategy for approaching water supply shortages that may last from several months to several years in duration.

Other triggers may include a partial loss of supply due to a mechanical failure of either Cal Water or wholesale supplier facilities resulting from natural disasters, chemical contamination, or other water quality issues. These two types of triggers are unlikely in larger districts where operational changes can more easily be made in one part of the system to overcome supply shortages in other parts of the system. However, in smaller isolated systems that rely heavily on one source of supply, a partial loss of this supply could necessitate the implementation of the Water Shortage Contingency Plan. Generally, this type of water supply shortage would not last as long as those caused by drought.

There are some important distinctions that should be made between the Water Shortage Contingency Plan and other programs and plans that Cal Water has for each district. Cal Water also maintains an Emergency Response Plan (ERP) for each service area. The ERP is similar to the Water Shortage Contingency Plan in that it may include a loss of supply and inability to serve our customers with normal quantities of water. However, the ERP is designed to manage crises that occur more suddenly and are caused by events such as natural disasters, technological failures, chemical contamination, or national security emergencies.

The ERP provides a guide for district and general office personnel to follow in response to one of these emergencies. It includes the policies, responsibilities, and procedures to be used to protect public safety and includes the setup of an Emergency Operations Center and implementation of the Standardized Emergency Management System. The ERP also describes the necessary inter-jurisdictional coordination and provides the communications and notification plan to insure an efficient response to the emergency.

The ERP for each district was completed in 2004 in response to the Public Health and Safety and Bioterrorism and Response Preparedness Act (H.R. 3448) of 2002. They were then updated in May of 2008. Cal Water is planning to rewrite the ERPs in the next few years. These new Plans will include more detailed district-specific information and will be designed to be used as a manual for Cal Water personnel during emergency situations.

Cal Water is also in the process of developing Water Conservation Master Plans for each district. These Water Conservation Master Plans are different from the Water Shortage Contingency Plans in that they are designed to permanently reduce per capita water use by Cal Water's customers. The Water Conservation Master Plans are not associated with any short or long term loss of supply but will have the effect of making existing

supplies last further into the future. In the short term, this will also provide increased supply reliability.

The water use targets selected by Cal Water for each service area are consistent with current regulations. In general, this will mean a reduction in per capita demand. Specific reductions will vary by service area and are contained in the service-area specific Water Conservation Master Plans. The annual level of funding for these programs will be determined through each General Rate Case filed with the California Public Utilities Commission (CPUC). The Water Conservation Master Plan will be discussed in more detail in Section 5 of this UWMP.

5.5.2 Water Conservation/Water Supply Team

As mentioned earlier, Cal Water formed a Conservation/Supply Team in response to the water shortage conditions that were forecasted for 2009. This Team consisted of an interdepartmental group of personnel that guided the planning process for the company-wide response to the drought. Members of the Conservation/Supply Team include:

- Vice President of Regulatory and Corporate Communications
- Vice President of Customer Service, Human Resources, and Information Technology
- Director of Corporate Communications
- Director of Customer Service
- Conservation Manager
- Chief Engineer
- Water Resources Planning Supervisor
- Manager of Rates
- Manager of Operations
- Maintenance Manager
- Billing Manager
- Regulatory Accounting Manager
- Meter Operations Supervisor
- Support Staff

The Conservation/Supply Team held regular meetings to discuss strategies for all aspects of drought preparation such as water supply monitoring, public communications, wholesale and customer allocations, information technology improvements, and financial impacts. Additional staff participated as needed as the planning process progressed.

5.5.3 Water Supply Allocation Plan

During the most recent drought several of Cal Water's districts were faced with the possibility of reduced wholesale allocations of imported water. If implemented, Cal Water would need to reduce its use of this supply proportionally in order to meet regional conservation targets and avoid wholesaler imposed penalties for overuse. Cal Water would have to request customers to reduce water use, usually to the same level as required by the wholesaler.

These reductions could either be voluntary or mandatory depending on the severity of the cutback required. If mandatory rationing is deemed necessary, retail customer allocations would need to be implemented. To determine the methodology used for customer allocations a cross-functional Water Allocation Team was formed. The Water Allocation Team consisted of a subset of the Conservation/Supply Team and was tasked with developing the details of how the allocation process would be handled internally by Cal

Water. The Water Allocation Team reported back to the Conservation/Supply Team at the regular meetings.

The Water Allocation Team meetings resulted in a comprehensive strategy that is summarized in Cal Water's Water Supply Allocation Plan. The Water Supply Allocation Plan details the methodology used for determining customer allocations, conducting public communications, tracking water use, assessing penalties, and processing appeals.

The Water Supply Allocation Plan also outlines regulatory actions that must be taken in order to implement mandatory allocations. If it is determined that mandatory allocations are likely to be necessary in a particular district Cal Water will file a Tier 2 advice letter with the CPUC that describes the need for mandatory allocations as well as our methodology and plan for implementation. A public hearing is required during the 30 days following this filing and all customers in the affected district will be notified of the hearing. If, after the 30 day period, it is determined that mandatory allocations are necessary, Cal Water will file a Tier 1 advice letter with the CPUC, which would make mandatory allocations effective 5 days following the filing.

Cal Water has the legal authority to implement mandatory allocations only after requesting from the CPUC that Tariff Rule 14.1, Mandatory Conservation Plan, be added to existing tariffs. *Section A. Conservation – Nonessential or Unauthorized Water Use* of Tariff Rule 14.1 identifies specific water use prohibitions. Prior to implementing mandatory allocations Cal Water will communicate details of the Plan to all customers.

5.5.4 Allocation Methodology and Customer Information

The Water Allocation Team's methodology for determining customer allocations was decided through careful consideration of all available information. Throughout this process the Team tried to maintain fairness to all customers and develop a plan that was easy to understand and communicate. Secondary concerns included impacts to Cal Water such as the ease of implementation and revenue shortfalls.

Customer allocations will be calculated on a monthly basis for each "premise", or customer location. The required cutback will be a percent reduction from prior use compared to baseline time period. The percentage reduction and baseline that Cal Water uses will be consistent with those used by the regional wholesaler. This will be done to ensure regional coordination between agencies and to offer a clear message to the public. In districts that do not have an imported supply and therefore no wholesaler, Cal Water will choose the percent reduction depending on the severity of the water shortage.

In most cases the percent reduction will be kept constant on an annual basis. It will be reviewed and adjusted as necessary in the spring of each year after the water supply picture becomes clear for the following dry season. In most districts Cal Water does not have direct control over long term storage of imported water and will rely on the California Department of Water Resources, U.S. Bureau of Reclamation, and regional

water wholesalers to manage carryover storage between years. In some cases it may be necessary to adjust these percentages mid-year, if, for example, a district is not meeting its reduction target. The allocation period will end when Cal Water determines that the water shortage no longer exists and ample supplies are available on an ongoing basis.

A minimum allocation will be given to single-family residential customers whose monthly allocation would fall below a level that is considered necessary for health and safety. These minimum allocations will be calculated for each district and will include water for indoor consumption on a per capita basis and also a percentage of normal water for outdoor use such as landscape irrigation. Multi-family, commercial, industrial, government, and other service connection categories will not be subject to minimum allocations.

Cal Water will provide customers the opportunity to bank unused water that has been allocated in a billing period. A customer will bank their unused allocation in a given billing period which can then be used to offset a future month where the customer exceeds their allocation. There is no limit to the amount of water that can be banked by a customer. All banked water will expire once allocations are determined to no longer be needed.

As a deterrent to exceeding monthly allocations and to offset penalties that Cal Water may incur from wholesale agencies, a penalty rate will be applied to a customer's water use that is in excess of their allocation. This penalty rate will be charged in addition to the normal tiered rate for every unit (Ccf) above the allocation during a billing period.

If a customer feels that their allocation does not represent their current need, or to dispute penalties assessed to their account, customers can file an appeal with their local district. The appropriate personnel will review the appeal and issue a judgment in writing. The appeals will be reviewed according to rules outlined in the Water Supply Allocation Plan.

During a water shortage priority will be given to uses that promote public health and safety. These uses include residential indoor use and other sanitary purposes. On a case by case basis Cal Water will decide that certain services are seen as essential, such as hospitals, and may exempt the customer from allocations. The second priority will be given to commercial and industrial water use in an effort to minimize financial impacts to local businesses. And finally, outdoor irrigation has the lowest priority.

If Cal Water requests voluntary reductions, all customer categories will be asked to make the same percent reduction. If mandatory reductions are required, which in general means a reduction of greater than 15 percent, Cal Water may develop different demand reduction targets for each connection category. This will be done to enforce the priorities listed above and to ensure that the correct mix of targets are chosen so that the overall district demand reduction goal is reached.

5.5.5 Drought Stages

Cal Water has developed a four stage approach to drought response that corresponds to specific levels of water supply shortage. At each higher stage Cal Water will become more aggressive in requiring water use reductions from its customers. The decision to enter a new stage will be made by careful consideration of a variety of factors including wholesale supply, availability of alternative supplies, time of year, and regional coordinated activities. These stages are designed to guide Cal Water personnel in making informed decisions during water shortages. A certain amount of flexibility is built in to the stages to allow for the unique characteristics of each water shortage event and the unique characteristics within each of Cal Water's districts. In each progressive stage the actions taken in earlier stages will be carried through to the next stage either at the same or at an increased intensity level, thereby becoming more restrictive.

When the water conditions in a district appear to warrant the activation of the Shortage Contingency Plan's Demand Reduction Stages, whether that be via implementing Stage 1, the movement from one Stage to a higher stage, the movement from a higher stage back down to a lower stage, or deactivating the use of Demand Reduction Stages altogether; the Water Conservation /Water Supply Team will consider those conditions at hand and prepare a recommendation on the appropriate action to be taken by the Company. The Team's recommendation will be presented by the Chief Engineer to the Vice President of Engineering and Water Quality. If the Vice President of Engineering and Water Quality concurs with the WC/WS Team recommendation, then he or she will take that recommendation to the President and Chief Executive Officer. The President & CEO will make the final determination as to whether or not the recommended action is to be taken by the Company.

If it is determined that the Company will implement or change the active Demand Reduction Stage for a given District, then a press release will be made in a manner that advises the customers served by that district of this determination. This press release will explain the desired outcome of the action to implement the appropriate stage. Upon making that determination Cal Water will immediately begin implementing the specific actions identified for the determined stage as outlined in the reminder of this section of the Shortage Contingency plan.

Stage 1 covers water shortages of up to 10 percent and can be used to address annual variations in precipitation and mild drought events that may last only a year or two. All reductions in Stage 1 are voluntary and impacts to customers are minimal. The actions to be taken by Cal Water in Stage 1 are listed in Table 5.5-1.

Table 5.5-1: Demand Reduction Stage 1 (Table 36)

Stage	Water Supplier Actions
1. Minimal 5 to 10 percent Shortage Up to 10 percent Reduction Goal Voluntary Reductions	**Cal Water will:** Request voluntary customer conservation as described in CPUC Rule 14.1. Maintain an ongoing public information campaign. Maintain conservation kit distribution programs. Maintain school education programs. Maintain incentive programs for high efficiency devices. Coordinate drought response with wholesale suppliers and cities. Lobby cities for passage of drought ordinances. Discontinue system flushing except for water quality purposes. Request that restaurants serve water only on request.

Stage 2 includes water shortages of between 10 and 20 percent. Stage 2 will be entered during prolonged water shortages of moderate severity such as those caused by a multi-year drought. Reduction methods can either be voluntary or mandatory depending on the severity of the water shortage. Allocations would likely be implemented when the shortage exceeds 15 percent. Customers will begin to notice moderate impacts to normal water use and companies may begin to have financial impacts. In Stage 2 Cal Water will intensify its conservation efforts by implementing the actions listed in Table 5.5-2. All actions from Stage 1 will be carried through or intensified in Stage 2.

Table 5.5-2: Demand Reduction Stage 2 (Table 36)

Stage	Water Supplier Actions
2. Moderate 10 to 20 Percent Shortage Up to 20 Percent Reduction Goal Voluntary or Mandatory Reductions	**Cal Water will:** Increase or continue all actions from Stage 1. Implement communication plan with customers, cities, and wholesale suppliers. Request voluntary or mandatory customer reductions. File Schedule 14.1 with CPUC approval if necessary. Request memorandum account to track penalty rate proceeds and other drought related expenses. Lobby for implementation of drought ordinances. Monitor water use for compliance with reduction targets.

Stage 3 represents a severe water shortage emergency with a reduction in supply of between 20 and 35 percent. This stage can be triggered by the most severe multi-year droughts, major failures in water production and distribution facilities, or by water quality concerns, especially in smaller isolated systems. A shortage of this magnitude may begin to seriously impact public health and safety, and cause significant financial hardships on local businesses. All reductions will be mandatory and customer allocations would be necessary. During Stage 3 Cal Water will take the following actions listed in Table 5.5-3 which includes all the actions from Stage 2.

Table 5.5-3: Demand Reduction Stage 3 (Table 36)

Stage	Water Supplier Actions
3. Severe	**Cal Water will:**
20 to 35 Percent Shortage	Increase or continue all actions from previous stages.
	Implement mandatory conservation with CPUC approval.
Up to 35 Percent Reduction Goal	Install flow restrictors on repeat offenders.
	Require customers to have high efficiency devices before granting increased allocations.
Mandatory Reductions	Require participation in survey before granting an increased allocation.

Stage 4 is a critical water shortage emergency with a reduction of supply of at least 35 and potentially above 50 percent. This represents an exceptional crisis that could be caused only by the most severe multi-year drought, natural disaster, or catastrophic failure of major water supply infrastructure. Impacts to public health and safety would be significant. In Stage 4 Cal Water will take the additional actions listed in Table 5.5-4 while also continuing or increasing actions from Stage 3.

Table 5.5-4: Demand Reduction Stage 4 (Table 36)

Stage	Water Supplier Actions
4. Critical 35 to 50+ Percent Shortage Up to and above a 50 percent Reduction Goal Mandatory Reductions	**Cal Water will:** Increase or continue all actions from previous stages. Discontinue service for repeat offenders. Monitor water use weekly for compliance with reduction targets. Prohibit potable water use for landscape irrigation.

5.5.6 Water Supply Conditions and Trigger Levels

As described in Section 3, the water supply for the Hermosa Redondo District is a mix of groundwater, imported water, and recycled water. Cal Water's groundwater supply is limited to its APA of 4,070 AF. This value is based on the safe yield of the West Basin and is fixed in both wet and drought years. During water shortages the Hermosa Redondo District will have access to this full entitlement, less any amount that has been leased to other agencies, private companies or individuals. Once the full pumping capacity is restored, a portion of this groundwater supply could be used to offset any reductions in imported water deliveries. Another contingency option during dry years would be to make the decision not to renew these short term leases, which would make more groundwater available to Cal Water if it is faced with wholesale allocations.

The Central and West Basin Judgment, which defined water rights in the basin, also allows for increased groundwater pumping in times of Declared Water Emergencies. These may occur as a result of a temporary shortage of MWD imported supplies or an inability for MWD to deliver imported water. The maximum amount available in the West Basin for this purpose is 10,000 AF.

The recycled supply comes through WBMWD. The Hermosa Redondo District began serving recycled water to its customers in 1995 and now delivers approximately 100 AFY. Recycled water offers a drought proof supply that is available in all years and would not be subject to allocations from WBMWD. During a water shortage Cal Water can make an effort to maximize recycled water deliveries to replace potable water demand.

Cal Water's imported supply for the Hermosa Redondo District comes through the WBMWD, which is a member agency of the Metropolitan Water District of Southern California (MWD). Cal Water's Water Shortage Allocation Plan will ultimately be triggered by actions within these agencies. Cal Water will follow the lead of these agencies when deciding whether to implement the Water Shortage Allocation Plan. The percent shortage identified by MWD will determine which drought stage Cal Water enters into. These thresholds are shown in Table 5.5-5. The drought stages are discussed in more detail in the following section.

Table 5.5-5: Water Supply Triggering Levels (Table 35)

Stage	Percent Shortage
Stage 1	5 to 10% supply reduction
Stage 2	10 to 20% supply reduction
Stage 3	20 to 35% supply reduction
Stage 4	35 to 50% supply reduction

In April of each year, after the winter storm season, MWD will assess its available water supply and decide if it will request voluntary of mandatory reductions by its member agencies. MWD will judge the performance of WBMWD retailers as a whole and will only assess penalties to WBMWD if the retailers' collective use exceeds its allocation. These reduction targets will be passed along through WBMWD to Cal Water and from Cal Water to our customers. If necessary, the allocation period will begin on July 1st of the given year and will continue at least one year or until the availability of supplies warrants the lifting of water use restrictions.

Cal Water's timeline for implementing its Water Shortage Contingency Plan will generally follow MWD's schedule. However, Cal Water will monitor water supply conditions throughout the year and will independently assess the threat of water shortage conditions. This will allow Cal Water to make the necessary preparations prior to the high water use season when restrictions would likely go into effect. Preparations may include filing the appropriate advice letters with the CPUC, hiring additional staff, training existing staff, making billing system improvements, developing public communications material, making operational changes, and performing maintenance to the water system facilities. This advanced planning will minimize the potential lag time between when a water shortage is declared and when restrictions can take effect. The reduction in lag time is essential in order to maximize the water savings during the high use summer months.

5.5.7 Water Use Restriction Enforcement

Because of its investor owned status Cal Water has limited authority to enforce water use restrictions unless Rule 14.1 is enacted through CPUC approval. Restrictions on water use prior to enacting Rule 14.1 must be regulated by ordinances passed by the local governments in each community served. Cal Water has worked with municipalities to pass ordinances and will continue this effort on an ongoing basis. Rule 14.1 contains a detailed list of the water use restrictions common to many of these ordinances, and is included as Appendix E of this UWMP. The City of Hermosa Beach has also passed a water conservation ordinance. It is included in Appendix E.

Cal Water maintains extensive water use records on individual metered customer accounts. These records are reviewed in the districts to identify potential water loss problems. In order to protect itself against serious and unnecessary waste or misuse of water, Cal Water may meter any flat rate service and apply the regularly established meter rates where the customer continues to misuse or waste water beyond five days after Cal Water has given the customer written notice to remedy such practices.

During all stages of water shortages, production figures are reported to and monitored by the district manager. Consumption will be monitored through these daily production figures in the district for compliance with necessary reductions.

Cal Water, after one written warning, shall install a flow-restricting device on the service line of any customer observed by Cal Water personnel to be using water for any non-essential or unauthorized use defined in Section A. of Tariff Rule 14.1. Repeated violations of unauthorized water use will result in discontinuance of water service.

5.5.8 Analysis of Revenue and Expenditure Impacts

Cal Water is an investor-owned water utility and, as such, is regulated by the CPUC. On March 8, 1989, the Commission instituted an investigation to determine what actions should be taken to mitigate the effects of water shortages on the State's regulated utilities and their customers. In decision D. 90-07-067, effective July 18, 1990, the Commission authorized all utilities to establish memorandum accounts to track expenses and revenue shortfalls caused both by mandatory rationing and by voluntary conservation efforts. Subsequently, D. 90-08-55 required each class A utility (more than 10,000 connections) seeking to recover revenues from a drought memorandum account to submit; for Commission approval, a water management program that addresses long-term strategies for reducing water consumption. Utilities with approved water management programs were authorized to implement a surcharge to recover revenue shortfalls recorded in their drought memorandum accounts.

However, the Commission's Decision 94-02-043 dated February 16, 1994, states:

10. Now that the drought is over, there is no need to track losses in sales due to residual conservation.
11. The procedures governing voluntary conservation memorandum accounts (see D.92-09-084) developed in this Drought Investigation will no longer be available to water companies as of the date of this order.
12. Procedures and remedies developed in the Drought Investigation that are not specifically authorized for use in the event of future drought in these Ordering Paragraphs will no longer be available to water companies as of the date of this order except upon filing and approval of a formal application.
(CPUC Decision 94-02-043, Findings of Fact, paragraphs 10-12)

In 2008 the CPUC allowed for the creation of a Water Revenue Adjustment Mechanism (WRAM) and Modified Cost Balancing Accounts (MCBA). The goals of the WRAM and MCBA are to sever the relationship between sales and revenue to remove the disincentive to implement conservation rates and conservation programs especially in times of drought. WRAM and MCBA are designed to ensure that the utilities and ratepayers are proportionally affected when conservation rates are implemented, so that neither party is harmed nor benefits. Because of these regulatory developments Cal Water expects to increase the implementation of conservation rates and conservation programs on a permanent basis.

During water supply shortages Cal Water would expect to see a reduction in revenue. The amount of this reduction would depend on the total amount of water being conserved and the price (tier rate) at which the cutbacks were made for each customer. In other words, the reduction would be roughly equivalent to the quantity charge for the amount of water saved. Cal Water would still receive its monthly service charge fees.

Cal Water has adequate reserves to overcome this short term reduction. These reductions in revenue would also be recovered through the WRAM and MCBA. Through the WRAM and MCBA Cal Water will be able to track its revenue impacts and expenditures during water shortages and recover these losses through the CPUC rate case process in future years. Because of these new mechanisms Cal Water is assured that it will have adequate reserves available to operate normally under water shortage conditions.

Expenditures will not increase due to a mild water shortage condition. Any expenditure made during this time will come out of the normal conservation budget that has been approved by the CPUC. Actions that may be taken include public information campaigns that draw attention to the shortage and steer customers towards our other conservation programs (toilet rebates, washing machine rebates, home audits, etc) that are available. These programs will be paid for by money that is already budgeted. Therefore no additional expenditures will take place. If the water shortage warrants mandatory allocations, Cal Water would need to file an advice letter with the CPUC to seek approval to implement mandatory allocations. This process would include securing any additional funding necessary for the administration of this program. Again, these costs would be recovered through the MCBA and WRAM.

5.5.9 Catastrophic Water Supply Interruption

As mentioned earlier, Cal Water has an ERP in place that coordinates the overall company response to a disaster in any or all of its districts. In addition, the ERP requires each District to have a local disaster plan that coordinates emergency responses with other agencies in the area.

Cal Water also inspects its facilities annually for earthquake safety. To prevent loss of these facilities during an earthquake, auxiliary generators and improvements to the water storage facilities have been installed as part of Cal Water's annual budgeting and improvement process.

During an actual or threatened temporary shortage of imported water to the West Basin, the WRDSC is authorized by the West Coast Basin Judgment to enter into agreements with water purveyors in the basin that allow the over-extraction of groundwater. This authorized over-extraction can last for four months and may be used to produce a maximum of 10,000 acre-feet. Such agreements are not subject to the "make-up" provisions of the Judgment. If the shortage continues beyond four months, further over-extraction would require court approval. The Hermosa-Redondo District, because of the limited capacity to produce groundwater, currently is not in the position to participate in any authorized over-extraction program. As a result, the district's customers would be exposed to the full effect of a shortage.

There are 12 emergency connections in the Hermosa-Redondo District: three are with Cal Water's Palos Verdes District, six are with Cal Water's Dominguez system, one that is with the City of Torrance, one with the City of Manhattan Beach, and one with the City of El Segundo.

If the emergency were a complete loss of MWDSC's capability to deliver water to the region, then the Hermosa-Redondo District would have major disruption in service. The three Palos Verdes District connections are only capable of delivering imported water from MWDSC's distribution system. Only the emergency connection with Cal Water's Dominguez system, the City of Torrance and the one with the City of Manhattan Beach can deliver groundwater, and the ability to do so would depend on their having an excess in production capacity.

6 Demand Management Measures

6.1 Statewide Urban Water Demand Reduction Policies

As mentioned earlier, Cal Water is in the process of significantly expanding its conservation programs. Inter-related state-level policies and agreements aimed at reducing urban water use have provided much of the impetus for this change. The policies include: (1) recent decisions by the California Public Utilities Commission (CPUC) directing Class A and B water utilities to reduce per capita urban water demand; (2) state legislation mandating urban water suppliers to reduce per capita demand 20 percent by 2020; and (3) the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). This section discusses these requirements, their relationship to one another, and their relationship to Cal Water's overall conservation strategy.

The CPUC's Decision 07-05-062 directed Class A and B water utilities to submit a plan to achieve a 5 percent reduction in average customer water use over each three-year rate cycle. This policy was refined under Decision 08-02-036, which established a water use reduction goal of 3 to 6 percent in per customer or service connection consumption every three years once a full conservation program, with price and non-price components, is in place. These decisions anticipated enactment of policies by the State legislature to reduce urban water use in California 20 percent by 2020.

SBx7-7 requires the state to achieve a 20 percent reduction in urban per capita water use by December 31, 2020. The state is required to make incremental progress toward this goal by reducing per capita water use by at least 10 percent on or before December 31, 2015. SBx7-7 requires each urban retail water supplier to develop interim and 2020 urban water use targets. Urban retail water suppliers will not be eligible for state water grants or loans unless they comply with SBx7-7's requirements.

There are three ways in which a water supplier can comply with the MOU. The first way is to implement a set of water conservation best management practices (BMPs) according to the requirements and schedules set forth in Exhibit 1 of the MOU. The second way, called Flex Track compliance, is to implement conservation programs expected to save an equivalent or greater volume of water than the BMPs. The third way, similar to SBx7-7, is to reduce per capita water use. Each of these compliance options is briefly described below.

Originally, the MOU established a set of BMPs that signatories agreed to implement in good faith. For each BMP, the MOU established the actions required by the water supplier (e.g. site surveys, fixture and appliance rebates, water use budgets, volumetric pricing and conservation rate designs), the implementation schedule, and the required level of effort (in the MOU this is referred to as the coverage requirement). Additionally, the MOU established the terms by which a water supplier could opt out of implementing a BMP.

BMPs are grouped into five categories. Two categories, Utility Operations and Education, are "Foundational BMPs" because they are considered to be essential water conservation activities by any utility and are adopted for implementation by all signatories to the MOU as ongoing practices with no time limits. The remaining BMPs are "Programmatic BMPs" and are organized into Residential, Commercial, Industrial, and Institutional (CII), and Landscape categories. Table 6.1-1 shows the BMPs by category. The requirements and coverage levels of each BMP are set forth in Exhibit 1 of the MOU. As of the date of this UWMP, Cal Water is in process of completing and submitting BMP reports to the CUWCC for the period 2009-2010. Submission was delayed due to delays in the CUWCC reporting forms being made available.

Table 6.1-1: MOU Best Management Practices

BMP Group	BMP Name
1. Utility Operations Programs (F)	Conservation Coordinator
	Water Waste Prevention
	Wholesale Agency Assistance Programs
	Water Loss Control
	Metering & Volumetric Rates
	Retail Conservation Pricing
2. Education Programs (F)	Public Information Programs
	School Education Programs
3. Residential (P)	Residential Assistance Program
	Landscape Water Surveys
	High Efficiency Clothes Washer Program
	Watersense Toilet Program
	Watersense Specifications for Residential Development
4. Commercial, Industrial, Institutional (P)	Reduce baseline CII water use by 10% in 10 years
5. Landscape (P)	Large Landscape Water Budget Programs
	Large Landscape Water Surveys
F = Foundational BMP, P = Programmatic BMP	

Under Flex Track, a water supplier can estimate the expected water savings over the 10-year period 2009-2018 if it were to implement the programmatic BMPs in accordance with the MOU's schedule, coverage, and exemption requirements, and then achieve these water savings through any combination of programs it desires. Thus, through the Flex Track compliance option, a water supplier agrees to save a certain volume of water using whatever it determines to be the best combination of programs. Because the savings target depends on the programmatic BMP coverage requirements, which in turn are functions of service area size and composition of demand, the volume of water to be saved under this compliance option must be calculated separately for each supplier. The methodologies and tools for water suppliers to implement these calculations are still being developed by the CUWCC.

Under the gpcd option, a water supplier can comply with the MOU by reducing its baseline gpcd by 18 percent by 2018. The baseline is the ten-year period 1997-2006. The MOU also establishes interim gpcd targets and the highest acceptable levels of water use deemed to be in compliance with this option. The MOU's gpcd option is similar to using Method 1 to set the SBx7-7 target, except that it uses a fixed baseline period and only runs through 2018. This compliance option may be difficult to achieve for Cal Water districts that are part of a regional alliance for purposes of SBx7-7 compliance because savings as a percent of demand will vary considerably among the districts in the alliance. It may also conflict with district-specific SBx7-7 targets set using method 3 (hydrologic region-based target). Because of these potential conflicts, this is not considered a viable MOU compliance option for Cal Water districts.

Cal Water plans to use Flex Track to comply with the MOU. This compliance option affords the most flexibility in selecting conservation programs suited to each Cal Water district and allows for more streamlined reporting. Because CUWCC tools for calculating a district's Flex Track savings target are not yet available, Cal Water developed its own target estimates for planning purposes. Cal Water will update these estimates as necessary following the release of the CUWCC Flex Track target calculator.

6.2 Conservation Master Plans

In an effort to address the statewide policies for urban water use reduction Cal Water developed Conservation Master Plans for each of its service districts. These Conservation Master Plans are designed to provide a framework for meeting these statewide policies and to chart a course for Cal Water's conservation programs over the next five years. The major tasks of the Conservation Master Plans include:

1. A complete review of State policies and development of a compliance strategy
2. Calculating all appropriate per capita targets
3. Determining water savings required from new programs
4. Performing an analysis of conservation programs
5. Developing a portfolio of conservation programs
6. Creating a plan for monitoring and update of Conservation Master Plans

Cal Water's Conservation Master Plans have a five year planning horizon and are designed to be updated in coordination with the UWMP for each district. The Conservation Master Plan for the Hermosa-Redondo District is included in its entirety as Appendix G. A discussion of baseline and target water use can be found in Section 3 of this UWMP. A summary of the water savings requirements and program portfolio is summarized in the following section.

6.3 Water Savings Requirements

The gross water savings required under SBx7-7 can be determined with a simple calculation by subtracting the target water demand from the unadjusted baseline demand. According to this calculation the Hermosa-Redondo District has a gross savings requirement of -633 AF from 2011-2015, as shown in Table 6.3-1.

Table 6.3-1: SBx7-7 and MOU Gross Water Savings Requirements

Gross Water Savings Required by 2015	SBx7-7	MOU Flex Track
2015 Unadjusted Baseline Demand	14,191 AF	14,191 AF
2015 Target Demand	14,824 AF	13,662 AF
Gross Savings Requirement	**-633 AF**	**529 AF**

As discussed earlier, because CUWCC tools for calculating a district's Flex Track savings target are not yet available, Cal Water developed its own target estimates for planning purposes. The targets are based on the expected water savings from cost-effective programmatic BMPs over the ten-year period 2009-2018. The coverage requirements for the programmatic BMPs were used to calculate the Flex Track targets. Expected water savings and cost-effectiveness were based on the conservation program specifications and avoided water supply costs. The supporting data and calculations are provided in Appendix G.

The differences between the unadjusted baseline demand, district-specific SBx7-7 target, and MOU Flex Track target are shown in Table 6.3-1. This shows the maximum amount of water savings needed for SBx7-7 compliance, as well as the savings required for MOU compliance. Because Hermosa-Redondo District is part of a regional alliance, the amount of water savings needed for SBx7-7 compliance may turn out to be less than the amount shown in the table. Also, some of the reduction in baseline demand needed to achieve SBx7-7 and MOU compliance will come from efficiency codes, response to adjustments in rates, and savings from past program implementation. The remainder will need to come from new conservation program activity.

The unadjusted baseline demand described in Section 3 does not account for future changes in water demand due to the effects of plumbing fixture efficiency codes, changes in water rates, metering, and existing conservation programs. A portion of the gross savings requirements shown above are expected to come from these sources. The Conservation Master Plan includes an estimate of the volume of water saved as a result of these things. The results are used to adjust baseline demand so that the volume of water savings that will need to come from new conservation programs can be determined.

Two recent California laws are expected to accelerate the replacement of low efficiency plumbing fixtures – primarily toilets and showerheads – with higher efficiency alternatives.

- AB 715, passed in 2007, amended the California Building and Safety Code to require by January 1, 2014, that toilets sold or installed in California use no more than 1.28 gallons per flush. It also requires that urinals sold or installed use no more than 0.5 gallons per flush.

- SB 407, passed in 2009, amended the California Civil Code to require replacement of low efficiency plumbing fixtures with higher efficiency alternatives when a property undergoes alterations, improvements, or transfer. In the case of single-family residential properties, issuance of a certificate of final completion and occupancy or final permit approval by the local building department for building alterations or improvements will be conditional on the replacement of low efficiency plumbing fixtures beginning in 2014. Single-family property owners are required by law to replace any remaining non-compliant plumbing fixtures by no later than January 1, 2017. After this date, a seller or transferor of single-family residential real property must disclose in writing to the prospective purchaser or transferee whether the property includes any noncompliant plumbing fixtures. For multi-family and commercial properties non-compliant fixtures must be replaced by January 1, 2019. As with single-family properties, final permits or approvals for alterations or improvements are conditional on the replacement of low efficiency fixtures beginning in 2014.

The phase-in dates for AB 715 and SB 407 mean they will not greatly contribute to meeting the 2015 interim gpcd target under SBx7-7. But they will support meeting the 2020 target. Moreover, since the early 1990's, the sale and installation of toilets manufactured to flush more than 1.6 gallons, showerheads manufactured to have a flow capacity more than 2.5 gallons per minute, and interior faucets manufactured to emit more than 2.2 gallons per minute has been prohibited. These requirements will continue to improve the efficiency of plumbing fixtures in older residential and commercial buildings.

Water savings from expected rate adjustments in Hermosa-Redondo District were also calculated. The estimates are based on inflation-adjusted changes in rates for 2011, 2012, and 2013, as contained in CPUC's proposed GRC decision. Short-run price elasticity estimates used to calculate potential changes in demand were drawn from the CUWCC's conservation rate guidebook.

In addition to savings from codes and rates, expected on-going water savings from conservation activity occurring in 2009 and 2010 were also taken into account. The adjusted baseline demand and savings associated with code changes, rate changes, meter conversions, and existing conservation programs are shown in Table 6.3-2.

Table 6.3-2: Adjusted Baseline Demand Projection					
Adjusted Baseline (AF)	**2011**	**2012**	**2013**	**2014**	**2015**
Unadjusted Baseline	13,890	13,964	14,040	14,115	14,191
Less Savings from					
Codes	39	77	112	147	190
Schedule Rate Increases	-2	-12	-33	-52	-96
Existing Programs	13	13	13	9	5
Adjusted Baseline Demand	**13,839**	**13,887**	**13,948**	**14,012**	**14,091**
Per Capita (GPCD)	127	127	127	127	127

The amount of water savings required from new conservation programs is not the same for SBx7-7 and MOU Flex Track compliance. In the case of SBx7-7, the objective is to reduce 2015 per capita water use at least to the target of 134 gpcd, and any expected savings from codes, rates, and existing conservation programs can be credited toward meeting this goal. This is not the case for MOU Flex Track compliance, where the objective is to implement conservation programs that would save at least as much as the Flex Track target. Unlike SBx7-7, water savings from codes and rates cannot be credited against the Flex Track target. Only savings from existing conservation programs can be deducted.

Savings required from new conservation programs to meet SBx7-7 and MOU Flex Track compliance requirements are summarized in Table 6.3-3. In the case of SBx7-7, 2015 potable demand, after accounting for codes, scheduled changes in rates, and 2009-10 conservation program activity, is projected to be 732 AF less than required for SBx7-7 compliance. Hence no additional conservation is expected to be needed for SBx7-7 compliance in 2015.

In the case of MOU Flex Track Compliance, water savings from conservation programs implemented in 2009 and 2010 are expected to generate about 5 AF of savings in 2015. Thus conservation programs implemented over the period 2011-2015 will need to save an additional 524 AF by 2015 for Hermosa-Redondo District to be in compliance with the MOU.

Table 6.3-3: New Program Savings Required for SBx7-7 and MOU Compliance		
2015 Net Savings Requirement (AF)	**SBx7-7**	**MOU Flex Track**
Gross Savings Requirement	**-633**	**529**
Less		
Savings from codes	190	NA
Savings from rates	-96	NA
Savings from existing programs	5	5
Subtotal Expected Savings	*100*	*5*
Savings Required from New Programs[1]	**-732**	**524**
[1]*Negative net savings indicates that no new program savings required for compliance*		

6.4 Conservation Program Analysis

Cal Water engaged in a detailed, multi-step process to identify the best mix of programs to achieve the required savings. The process began with an inclusive range of potential program concepts. These concepts were qualitatively analyzed to eliminate those that were clearly inappropriate for each district and thereby narrow the analytical focus to those remaining programs that were potentially appropriate. Those programs were then subjected to detailed quantitative analysis. This Section describes the steps of the analytical process for Hermosa-Redondo District, and the programs that emerged as potential components of a portfolio of programs for the district.

As a result of an exhaustive search of the literature, consultation with experts in the field, knowledge of conservation programming by other water suppliers, and the experience of the project team, a total of more than 75 conservation program concepts were defined. At this point in the process, the goal was to be as inclusive as possible. The list was therefore intentionally large to ensure that all possible program concepts were considered. Cal Water did not want to risk inadvertently excluding a program from consideration.

Once the range of program concepts was defined, the next step was to subject each program concept to a careful district-specific qualitative screen, the objective of which was to eliminate those program concepts that were clearly inappropriate.

A preliminary quantitative analysis was conducted on the programs that passed the qualitative screen. To do that, estimates were made of key savings and cost parameters for each of the programs. Where applicable, these estimates were based on prior Cal Water experience with similar programs. In the absence of such experience, the experience of other water suppliers, the expertise of the project team, consultation with national experts, and published figures, where available, were relied upon. In particular, estimates developed by the California Urban Water Conservation Council and the Alliance for Water Efficiency were utilized where such estimates were available. While in most cases, the savings assumptions for a program do not vary across districts, for

several programs, they do due to district-specific characteristics of household size, climate, etc. Other than meter installation, program cost assumptions are uniform across districts, although in some cases, cost sharing with other water utilities reduce Cal Water's share.

Using the results of the qualitative screening and preliminary quantitative analysis, Cal Water identified five core programs that it would run in every district over the next five years. In addition to the core programs, an additional set of non-core programs was selected. Unlike core programs, Cal Water may not offer non-core programs in every district or in every year. Implementation of non-core programs will depend on whether additional water savings are required for SBx7-7 compliance, MOU compliance, or to help address local supply constraints. Table 6.4-1 lists all Cal Water core and non-core conservation programs.

Table 6.4-1: Cal Water Conservation Programs

Program Name	Description	Target Market
CORE PROGRAMS		
Rebate/Vouchers for toilets, urinals, and clothes washers	Provide customer rebates for high-efficiency toilets, urinals, and clothes washers	All customer segments
Residential Surveys	Provide residential surveys to low-income customers, high-bill customers, and upon customer request or as pre-screen for participation in direct install programs	All residential market segments
Residential Showerhead/Water Conservation Kit Distribution	Provide residential showerhead/water conservation kits to customers upon request, as part of residential surveys, and as part of school education curriculum	All residential market segments
Pop-Up Nozzle Irrigation System Distribution	Offer high-efficiency pop-up irrigation nozzles through customer vouchers or direct install.	All customer segments
Public Information/Education	Provide conservation messaging via radio, bill inserts, direct mail, and other appropriate methods. Provide schools with age appropriate educational materials and activities. Continue sponsorship of Disney Planet Challenge program.	All customer segments
NON-CORE PROGRAMS		
Toilet/Urinal Direct Install Program	Offer direct installation programs for replacement of non-HE toilets and urinals	All customer segments
Smart Irrigation Controller Contractor Incentives	Offer contractor incentives for installation of smart irrigation controllers	All customer segments
Large Landscape Water Use Reports	Expand existing Cal Water Large Landscape Water Use Report Program providing large landscape customers with monthly water use reports and budgets	Non residential customers with significant landscape water use and potential savings

Large Landscape Surveys & Irrigation System Incentives	Provide surveys and irrigation system upgrade financial incentives to large landscape customers participating in the Large Landscape Water Use Reports programs and other targeted customers	Non residential customers with significant landscape water use and potential savings
Food Industry Rebates/Vouchers	Offer customer/dealer/distributor rebates/vouchers for high-efficiency dishwashers, food steamers, ice machines, and pre-rinse spray valves	Food and drink establishments, institutional food service providers
Cooling Tower Retrofits	Offer customer/dealer/distributor rebates/vouchers of cooling tower retrofits	Non-residential market segments with significant HVAC water use
Industrial Process Audits and Retrofit Incentives	Offer engineering audits/surveys and financial incentives for process water efficiency improvement	Non-residential market segments with significant industrial process water uses

Core and non-core programs were then subjected to a detailed benefit cost analysis, the results of which were used to inform program portfolio development discussed in the next section. The first step in this process was to refine and finalize the savings and cost specifications of each program. The program savings and cost assumptions enable the calculation of program benefits and costs to the utility and its ratepayers, and comparisons of these costs in the form of benefit-cost ratios. The tool used to do this comparison was a simplified version of the Alliance for Water Efficiency Tracking Tool. Following are descriptions of how the model calculates and compares conservation program benefits and costs.

6.5 Conservation Program Portfolio

This section presents the recommended conservation program portfolio for the Hermosa-Redondo District. The program analysis results described in the previous section provided the starting point for portfolio development. The next step was to determine the annual levels of program activity needed to, at minimum, meet Hermosa-Redondo District's water savings targets and local demand management goals. Several considerations informed these decisions, including budgetary constraints included in the current GRC decision, Cal Water conservation program administrative capacity, program market and water savings potential, and the program benefit-cost results.

The water savings requirement analysis showed that, after accounting for water savings from existing water efficiency codes and ordinances, scheduled adjustments to water rates, and past investment in conservation programs, projected 2015 baseline demand (excluding recycled water use) in Hermosa-Redondo District is less than the 2015 per capita water use target. However, the analysis also showed that an additional 524 AF of water savings from new programs would be required to satisfy MOU compliance requirements in 2015. Moreover, 24 of the 32 programs evaluated had BCRs greater than or equal to one, indicating that implementation of these programs would be more cost-

effective for rate payers than purchasing imported water. For the Hermosa-Redondo District, the programs selected and the activity level of each are shown in Table 6.5-1.

Table 6.5-1: Recommended Program Levels

Program	Recommended Annual Activity Levels				
	2011	2012	2013	2014	2015
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	580	880	880	1,200	1,200
Clothes Washers	160	160	160	520	520
Urinals	0	0	0	0	0
Customer Surveys/Audits	60	60	60	60	60
Conservation Kit Distribution	690	690	690	690	690
Pop-Up Nozzle Distribution	6,000	6,000	6,000	6,000	6,000
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	870	1,030	1,030	2,600	2,600
Smart Irr. Controller Vendor Incentives	10	10	10	10	10
Large Landscape Water Use Reports	30	30	30	60	60
Large Landscape Surveys/Incentives	50	50	50	50	50
Commercial Kitchen Rebates/Vouchers	0	0	0	30	20
Cooling Tower/Process Water Retrofit Incentives	10	10	10	10	10

The program levels for 2011-2013 reflect the funding level approved in Cal Water's most recent General Rate Case (GRC) settlement with the CPUC. Program levels for 2014 and 2015 will be dependent on the outcome of Cal Water's 2014-2016 GRC filing.

Table 6.5-2 shows projected water savings associated with the programs listed above. The projected savings exceed the 2015 SBx7-7 and MOU Flex Track targets.

Table 6.5-2: Projected Water Savings by Program

Program	Annual Water Savings (AF)				
	2011	**2012**	**2013**	**2014**	**2015**
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	23.7	54.1	83.2	120.1	155.4
Clothes Washers	3.2	6.4	9.5	20.3	30.6
Urinals	0.0	0.0	0.0	0.0	0.0
Customer Surveys/Audits	2.3	4.3	6.1	7.8	9.2
Conservation Kit Distribution	10.8	20.3	28.6	35.9	42.4
Pop-Up Nozzle Distribution	24.0	48.0	72.0	96.0	120.0
Subtotal Core Programs	***63.9***	***133.0***	***199.4***	***280.0***	***357.6***
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	36.2	86.7	135.2	226.9	314.9
Smart Irr. Controller Vendor Incentives	0.1	0.2	0.2	0.3	0.4
Large Landscape Water Use Reports	2.3	2.3	2.3	4.5	4.5
Large Landscape Surveys/Incentives	6.6	13.3	19.9	26.3	32.7
Commercial Kitchen Rebates/Vouchers	0.0	0.0	0.0	2.9	5.5
Cooling Tower/Process Water Retrofit Incentives	10.3	20.5	30.8	32.9	35.0
Subtotal Non-Core Programs	***55.4***	***123.0***	***188.5***	***293.9***	***393.1***
Total Core and Non-Core Program Savings	**119.4**	**256.0**	**387.9**	**573.9**	**750.7**

Based on the above analysis the district is projected to achieve its district-specific 2015 and 2020 SBx7-7 compliance target in 2015 through a combination of passive and active savings. Appendix C, Worksheet 24, includes a comparison of conservation savings required to meet SBx7-7 compliance targets to the savings expected as a result of existing and planned programs, including passive savings due to code changes.

For the purpose of this analysis it is assumed that GPCD will remain flat from 2015 through 2020. However, it is likely that additional programs will be offered as part of Cal Water's ongoing conservation program. The activity level of each future program will depend on Cal Water's success in obtaining the necessary funding through the CPUC rate case process.

As part of the Conservation Master Plan development, one page program summaries, or fact sheets, were developed for each recommended program. These fact sheets provide a quick reference summarizing program design and marketing, expected level of customer

participation, projected water savings, and proposed program expenditure for the period 2011 – 2015. The fact sheets for the Hermosa-Redondo District are included in Appendix G.

7 Climate Change

7.1 Introduction

Investigating climate change brings the prospect of examining both model-predicted outcomes and unforeseen changes to the environment. These changes may physically affect the water districts that Cal Water serves. Climate change does not just mean a change in average temperature within any particular region, but a change in the climatic conditions that creates or results in an increase in extreme weather events. These potential changes include a more variable climate with risks of extreme climate events that are more severe than those in the recent hydrologic record, in addition to sea level rise, a hotter and drier climate, and the likelihood that more of the uplands precipitation will fall as rain and not as snow.

7.2 Strategy

Cal Water intends to prepare a Climate Assessment Report in 2013 that will examine the regional impacts on water supply for each of its 24 service areas. This report will review any supply changes that may occur due to climate change and will outline mitigation and adaption methods to meet the needs of the District's service area. The following section, adapted from DWR's *Guidebook to Assist Water Suppliers to Prepare a 2010 Urban Water Management Plan*, provides a range of topics to be examined in Cal Water's Climate Assessment Report.

Responding to climate change generally takes two forms: mitigation and adaptation. Mitigation is taking steps to reduce our contribution to the causes of climate change by reducing greenhouse gas (GHG) emissions. Adaptation is the process of responding to the effects of climate change by modifying our systems and behaviors to function in a warmer climate. Regardless if climate change is manmade or a result of natural climate cycles, investigating mitigation and adaptive methods to better manage possible uncertainties in climatic changes will have more immediate benefits such as: cutting carbon emissions, reducing energy usage, possible economic development at the local level, and financial savings for Cal Water and the ratepayers.

<u>Mitigation</u>

In the water sector, climate change mitigation is generally achieved by reducing energy use, becoming more efficient with energy use, and/or substituting fossil fuel based energy sources for renewable energy sources. Water requires energy to move, treat, use, and discharge, thus water conservation is energy conservation. One possible mitigation method is to calculate conserved energy and GHGs not-emitted as water conservation targets are being met.

<u>Adaptation</u>

Climate change means more than just hotter days. Continued warming of the climate system may have considerable impact on the operation of Cal Water Districts, even if indirectly. For example, snow in the Sierra Nevada provides 65 percent of California's

water supply. Predictions indicate that by 2050 the Sierra snowpack will be significantly reduced. Much of the lost snow will fall as rain, which flows quickly down the mountains during winter and cannot be stored in the current water system for use during the summer. This change in water runoff may severely impact groundwater recharge and other water supply networks. The climate is also expected to become more variable, bringing more droughts and floods. Cal Water districts will have to adapt to these new and more variable conditions.

7.3 Potential Climate Change Effects

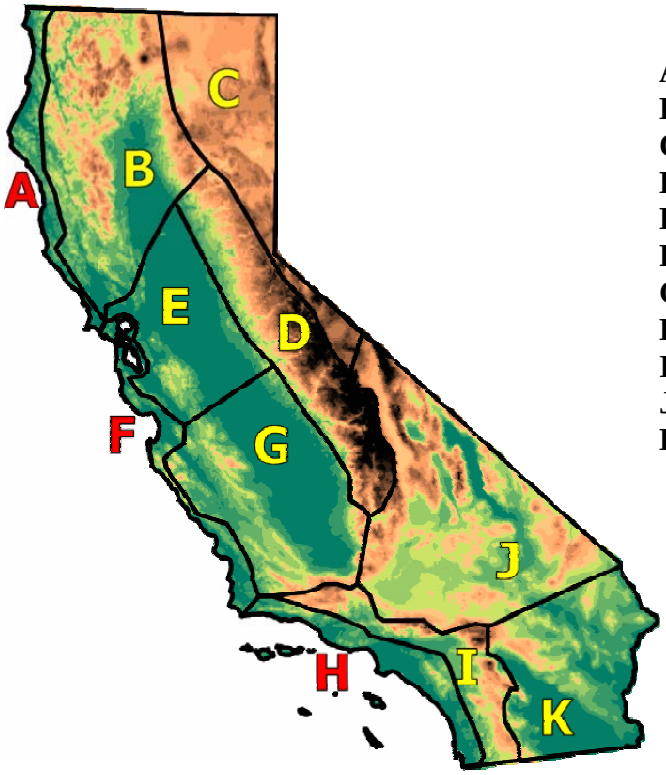
Even in the near term of the next 20 years, DWR has outlined potential climate change effects to water supplies, water demand, sea level, and the occurrence and severity of natural disasters. Some of these potential changes are presented below. Cal Water will investigate the following climate change and the effects on Cal Water's Districts:

- Water Demand — Hotter days and nights, as well as a longer irrigation season, will increase landscaping water needs, and power plants and industrial processes will have increased cooling water needs.
- Water Supply and Quality — Reduced snowpack, shifting spring runoff to earlier in the year, increased potential for algal bloom, and increased potential for seawater intrusion—each has the potential to impact water supply and water quality.
- Sea Level Rise — It is expected that sea level will continue to rise, resulting in near shore ocean changes such as stronger storm surges, more forceful wave energy, and more extreme tides. This will also affect levee stability in low-lying areas and increase flooding.
- Disaster — Disasters are expected to become more frequent as climate change brings increased climate variability, resulting in more extreme droughts and floods. This will challenge water supplier operations in several ways as wildfires are expected to become larger and hotter, droughts will become deeper and longer, and floods can become larger and more frequent.

7.4 Historical Climate Data Summary

The National Climatic Data Center (NCDC) has established 11 climate regions within California. Each region is defined be unique characteristics, and is shown in Figure 7.4-1.

Figure 7.4-1: The Climate Regions of California[5]



A. North Coast Region
B. North Central Region
C. Northeast Region
D. Sierra Region
E. Sacramento-Delta Region
F. Central Coast Region
G. San Joaquin Valley Region
H. South Coast Region
I. South Interior Region
J. Mohave Desert Region
K. Sonoran Desert Region

Cal Water has water service districts in 7 out of 11 of the climate regions. The Hermosa-Redondo District is located in the South Coast Region, as listed in Table 7.4-1.

Table 7.4-1: Cal Water Districts Sorted by Climate Region

Climate Region	Cal Water Districts in Each Climate Region
North Coast Region	None
North Central Region	Chico-Hamilton City, Redwood Valley
Northeast Region	None
Sierra Region	Kern River Valley
Sacramento-Delta Region	Dixon, Livermore, Marysville, Oroville, Stockton, Willows
Central Coast Region	Bear Gulch, Los Altos, Mid-Peninsula, Salinas, South San Francisco
San Joaquin Valley Region	Bakersfield, King City, Selma, Visalia
South Coast Region	Dominguez, East LA, **Hermosa-Redondo**, Palos Verdes, Westlake
South Interior Region	None
Mojave Desert Region	Antelope Valley
Sonoran Desert Region	None

[5] http://www.wrcc.dri.edu/monitor/cal-mon/frames_versionSTATIONS.html

The region has experience a general warming trend as indicated by the maximum, minimum, and mean temperature departure from average. Since 1895 these values have increased by 1.74°F, 3.19°F, and 2.47°F, respectively. More recently, since 1975, the maximum, minimum, and mean temperature departures have increased -0.76°F, 1.76°F, and 0.49°F, respectively. The historical data for these parameters are shown in Figures 7.4-2, 7.4-3, and 7.4-4.

Figure 7.4-2: Maximum Temperature Departure for South Coast Region

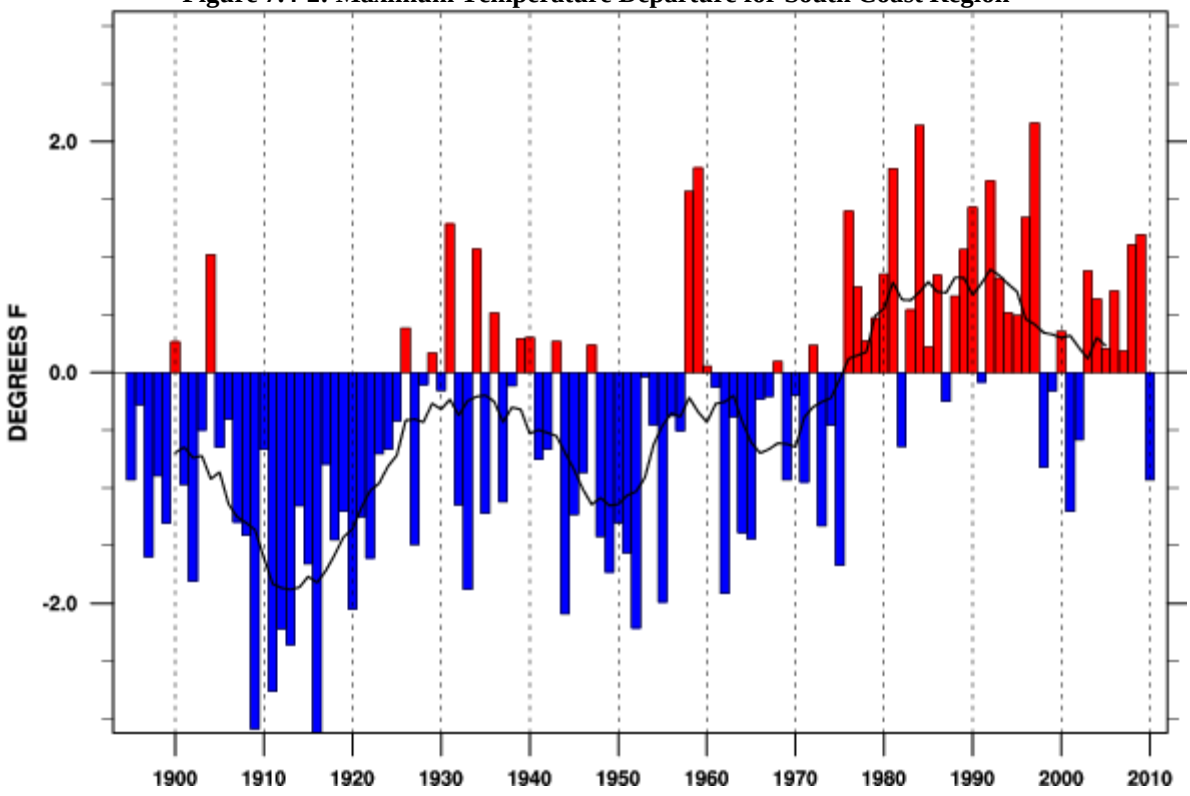


Figure 7.4-3: Mean Temperature Departure for South Coast Region

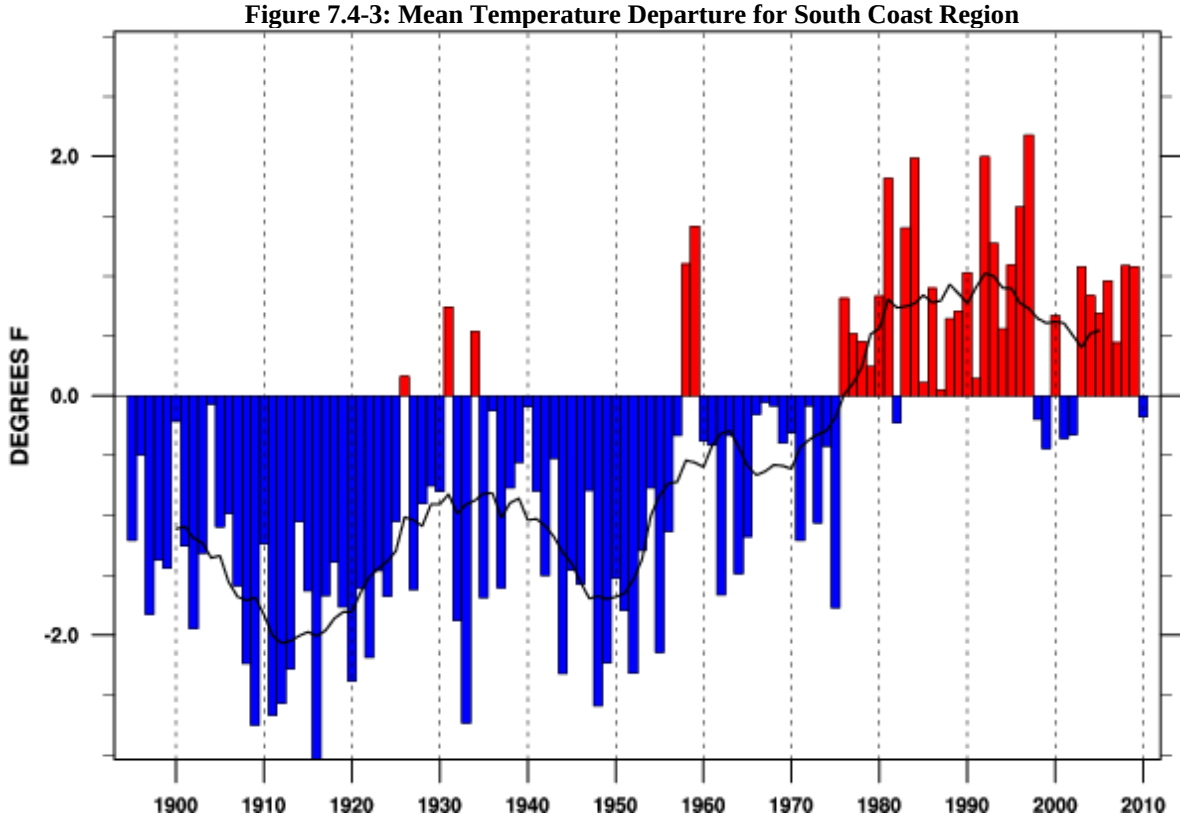
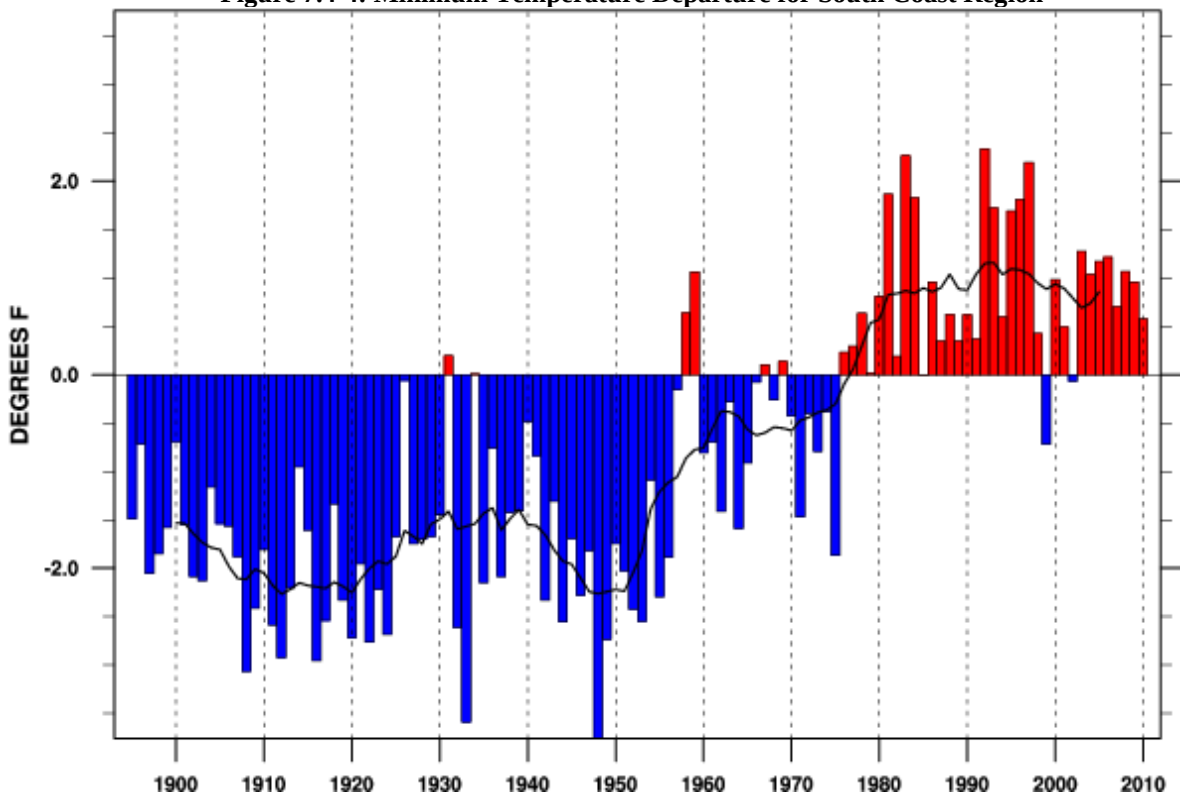
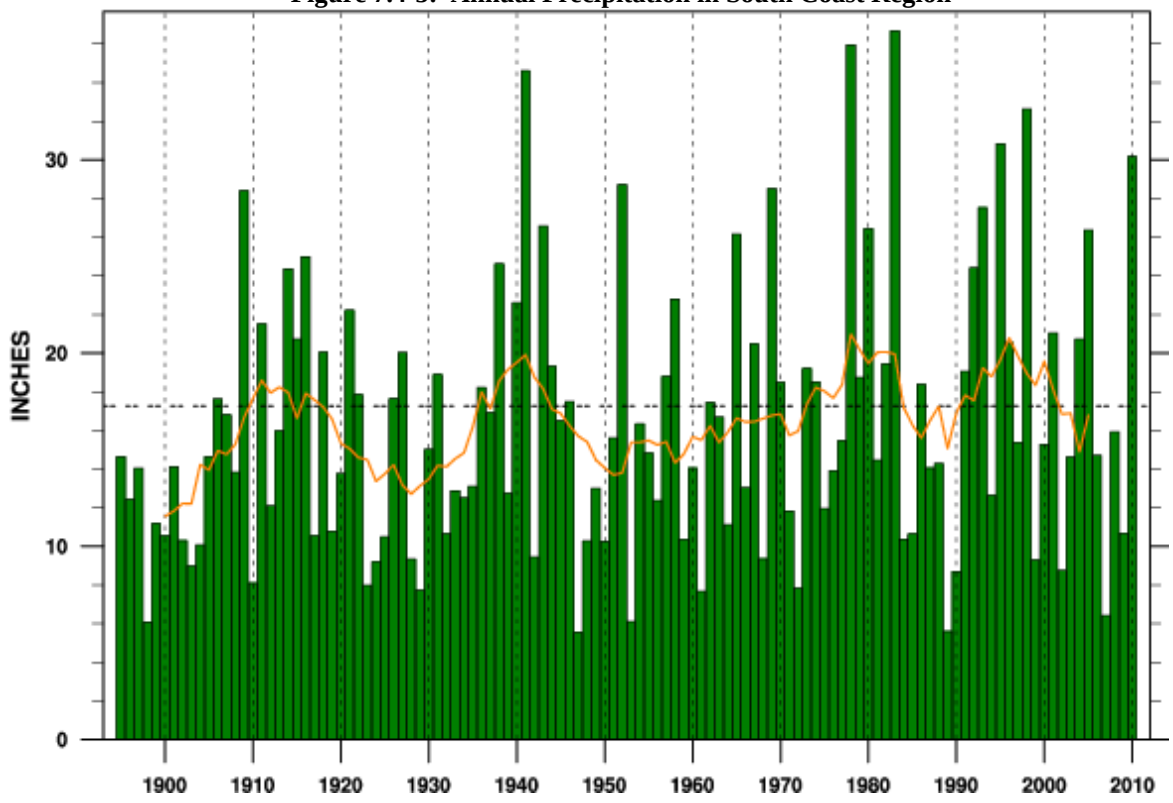


Figure 7.4-4: Minimum Temperature Departure for South Coast Region



Variation in annual rainfall totals has also shown an increasing trend since 1900 with more deviation from average occurring in recent decades as compared to earlier part of the century.

Figure 7.4-5: Annual Precipitation in South Coast Region



Historical data is showing a general correlation as to the general consensus for the different climate change scenarios. As stated above, a more comprehensive investigation will be prepared by Cal Water in 2013. The outcome of this report will outline mitigation and adaptation methods that will provide water supply reliability for Cal Water's service areas.

7.5 Climate Change Guidance

The California Department of Water Resources is currently in the process of compiling the potential actions and responses to climate change in the Integrated Regional Water Management (IRWM) climate change handbook. This handbook will provide guidance to water utilities for planning for the potential impacts of climate change and will offer a framework for responding to these impacts. Cal Water will review this handbook and other available literature when developing localized strategies for each of its water service districts.

8 Completed UWMP Checklist

8.1 Review Checklist

Table 8.1-1, adapted from DWR's *Guidebook to Assist Water Suppliers to Prepare a 2010 Urban Water Management Plan*, is included as a reference to assist DWR staff in review of this UWMP.

Table 8.1-1: Urban Water Management Plan Checklist (organized by legislation number)

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)	Water Conservation		3.3.1
2	Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions.	10608.36	Water Conservation		6.4
3	Report progress in meeting urban water use targets using the standardized form.	10608.4	Water Conservation		Appendix G
4	Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)	External Coordination and Outreach		1.2
5	An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.	10620(f)	Water Supply (Water Management)		1.4
6	Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.	10621(b)	External Coordination and Outreach		1.2
7	The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).	10621(c)	External Coordination and Outreach		1.2
8	Describe the service area of the supplier	10631(a)	Service Area		2.1
9	(Describe the service area) climate	10631(a)	Service Area		2.3
10	(Describe the service area) current and projected population. . . The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier . . .	10631(a)	Service Area	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	2.2

11	. . . (population projections) shall be in five-year increments to 20 years or as far as data is available.	10631(a)	Service Area	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	2.2
12	Describe . . . other demographic factors affecting the supplier's water management planning	10631(a)	Service Area		2.2
13	Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).	10631(b)	Water Supply	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	4.1
14	(Is) groundwater . . . identified as an existing or planned source of water available to the supplier . . .?	10631(b)	Water Supply	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	4.4
15	(Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management. Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)	Water Supply		4.4.2
16	(Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater.	10631(b)(2)	Water Supply		4.4.1

17	For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board	10631(b)(2)	Water Supply		Appendix I
18	(Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.	10631(b)(2)	Water Supply		Appendix I
19	For basins that have not been adjudicated, (provide) 10631(b)(2) Water Supply information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.	10631(b)(2)	Water Supply		4.4.1
20	(Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(3)	Water Supply		4.4
21	(Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(4)	Water Supply	Provide projections for 2015, 2020, 2025, and	4.4
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) An average water year, (B) A single dry water year, (C) Multiple dry water years.	10631(c)(1)	Reliability		5.3
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)	Reliability		5.1
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)	Water Supply (Transfers)		4.7
25	Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof;(I) Agricultural.	10631(e)(1)	Water Demands	Consider “past” to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	3.3

26	(Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following: (A) Water survey programs for single-family residential and multifamily residential customers; (B) Residential plumbing retrofit; (C) System water audits, leak detection, and repair; (D) Metering with commodity rates for all new connections and retrofit of existing connections; (E) Large landscape conservation programs and incentives; (F) High-efficiency washing machine rebate programs; (G) Public information programs; (H) School education programs; (I) Conservation programs for commercial, industrial, and institutional accounts; (J) Wholesale agency programs; (K) Conservation pricing; (L) Water conservation coordinator; (M) Water waste prohibition;(N) Residential ultra low-flush toilet replacement programs.	10631(f)(1)	DMMs	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	6.5
27	A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.	10631(f)(3)	DMMs		6.2
28	An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.	10631(f)(4)	DMMs		6.3
29	An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following: (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.	10631(g)	DMMs	See 10631(g) for additional wording.	6.4

30	(Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.	10631(h)	Water Supply		4.9
31	Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.	10631(i)	Water Supply		4.6
32	Include the annual reports submitted to meet the Section 6.2 requirement (of the MOU), if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	DMMs	Signers of the MOU that submit the biannual reports are deemed	6.5
33	Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).	10631(k)	Water Supply	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	N/A
34	The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)	Water Demands		3.3.2
35	Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.	10632(a)	Contingency		5.3.5
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)	Contingency		5.2

37	(Identify) actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)	Contingency		5.3.9
38	(Identify) additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)	Contingency		5.3.7
39	(Specify) consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)	Contingency		5.3.5
40	(Indicated) penalties or charges for excessive use, where applicable.	10632(f)	Contingency		5.3.7
41	An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)	Contingency		5.3.8
42	(Provide) a draft water shortage contingency resolution or ordinance.	10632(h)	Contingency		5.3
43	(Indicate) a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)	Contingency		5.3.7
44	Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area	10633	Recycled Water		4.5
45	(Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)	Recycled Water		4.5.1
46	(Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)	Recycled Water		4.5.2
47	(Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)	Recycled Water		4.5.3
48	(Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)	Recycled Water		4.5.3
49	(Describe) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.	10633(e)	Recycled Water		4.5.3

50	(Describe the) actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)	Recycled Water		4.5
51	(Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)	Recycled Water		4.5
52	The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.	10634	Water Supply (Water Quality)	For years 2010, 2015, 2020, 2025, and 2030	5.2.4
53	Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)	Reliability		5.2
54	The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.	10635(b)	External Coordination and Outreach		1.2
55	Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642	External Coordination and Outreach		1.2
56	Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area.	10642	External Coordination and Outreach		1.2
57	After the hearing, the plan shall be adopted as prepared or as modified after the hearing.	10642	External Coordination and Outreach		1.3
58	An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.	10643	External Coordination and Outreach		1.6

59	An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.	10644(a)	External Coordination and Outreach		1.3
60	Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.	10645	External Coordination and Outreach		1.3

[a] The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

[b] The Subject classification is provided for clarification only. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review for completeness.

APPENDIX A-1: RESOLUTION TO ADOPT UWMP

APPENDIX A-2: CORRESPONDENCES

APPENDIX A-3: PUBLIC MEETING NOTICE

APPENDIX B: SERVICE AREA MAP

APPENDIX C: WATER SUPPLY, DEMAND, AND PROJECTION WORKSHEETS

APPENDIX D: DWR'S GROUNDWATER BULLETIN 118

APPENDIX E: TARIFF RULE 14.1 WATER CONSERVATION AND RATIONING PLAN, AND LOCAL ORDINANCES

APPENDIX F: WATER EFFICIENT LANDSCAPE GUIDELINES

APPENDIX G: CONSERVATION MASTER PLAN

APPENDIX H: PURCHASE AGREEMENT WITH WBMWD

APPENDIX I: WEST BASIN ADJUDICATION ORDER

APPENDIX J: WRD STRATEGIC PLAN