California Water Service Company

2010 Urban Water Management Plan

Mid-Peninsula 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 over 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 Mid-Peninsula community since 1931.

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.

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 Mid-Peninsula District on April 1, 2011. The draft was sent to the agencies listed in Table 1.2-1 for review and comment. Copies of the draft plan were available at Cal Water's corporate office in San Jose and at the District office for public review and comment.

Table 1.2-1 summarizes Cal Water's attempt to include various agencies in the planning process of this UWMP.

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 San Carlos				✓	✓	✓	
City of San Mateo	✓	✓	✓	✓	✓	✓	
San Mateo County				✓	✓	✓	
San Francisco Public Utilities Commission	✓			✓	✓	✓	
Bay Area Water Supply and Conservation Agency	✓			✓	✓	✓	

Cal Water conducted a formal public meeting to present information on its Mid-Peninsula District UWMP on May 18, 2011, from 2:30-4:30 p.m. at the following location:

California Water Service Company
Bayshore District Customer Service Center
341 N. Delaware Street
San Mateo, CA 94401

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.

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 BAWSCA Membership

Cal Water is a member of The Bay Area Water Supply and Conservation Agency. BAWSCA was created on May 27, 2003 to represent the interests of the 26 agencies that include cities, water districts, a water company, and a university, in Alameda, Santa Clara and San Mateo counties that purchase water on a wholesale basis from the San Francisco Regional Water System (RWS). Collectively, the BAWSCA agencies are referred to as the Wholesale Customers.

BAWSCA is the only entity that has the authority to directly represent the needs of the wholesale customers that depend on the RWS. Through BAWSCA, the wholesale

customers can work with the San Francisco Public Utilities Commission (SFPUC) on an equal basis to ensure the RWS is rehabilitated and maintained and to collectively and efficiently meet local responsibilities.

BAWSCA has the authority to coordinate water conservation, supply and recycling activities for its agencies; acquire water and make it available to other agencies on a wholesale basis; finance projects, including improvements to the regional water system; and build facilities jointly with other local public agencies or on its own to carry out the agency's purposes.

Compliance with the Urban Water Management Planning Act lies with each agency that delivers water to its customers. In this instance, the responsibility for completing an UWMP lies with the individual BAWSCA member agencies. BAWSCA's role in the development of the 2010 UWMP updates is to work closely with its member agencies and the SFPUC to maintain consistency among the multiple documents being developed.

1.6 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 1.6-1: 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	Table 1.6-1: Plan Organization	Act Provision
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 with 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.	-
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 Water Conservation Ordinances This section contains the tariff rule 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	SFPUC Urban Water Management and AB 3030 Groundwater Management Plan for the Westside Basin This section contains the San Francisco Public Utilities Commission - Urban Water Management Plan for 2005 as reference.	§10631 (b)(1-4)
Appendix I	SFPUC Master Sales Contract	

1.7 Implementation of Previous UWMP

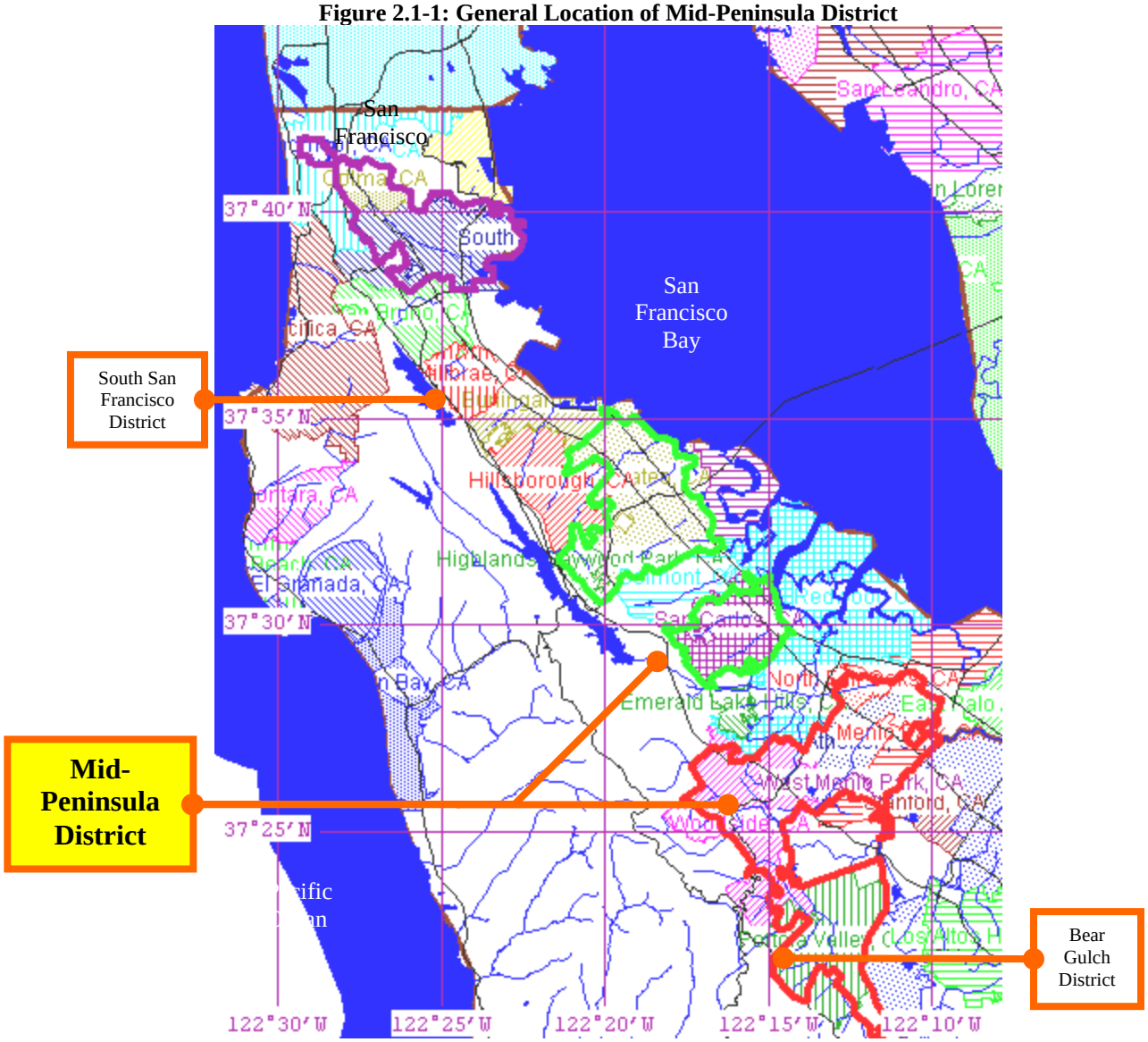
Cal Water will follow the California Water Code and file an UWMP at least once every five years on or before December 31, in years ending in five and zero. Since Cal Water operates 24 separate service districts the UWMP for each district has historically been submitted every third year to coincide with 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 Mid-Peninsula was last submitted as part of the 2007 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 Mid-Peninsula District is located in San Mateo County approximately 15 to 20 miles south-southeast of the City of San Francisco. A general location of Mid-Peninsula District is shown in Figure 2.1-1. The District serves the communities of San Carlos and San Mateo and adjacent unincorporated portions of San Mateo County including The Highlands and Palomar Park.

Figure 2.1-1: General Location of Mid-Peninsula District

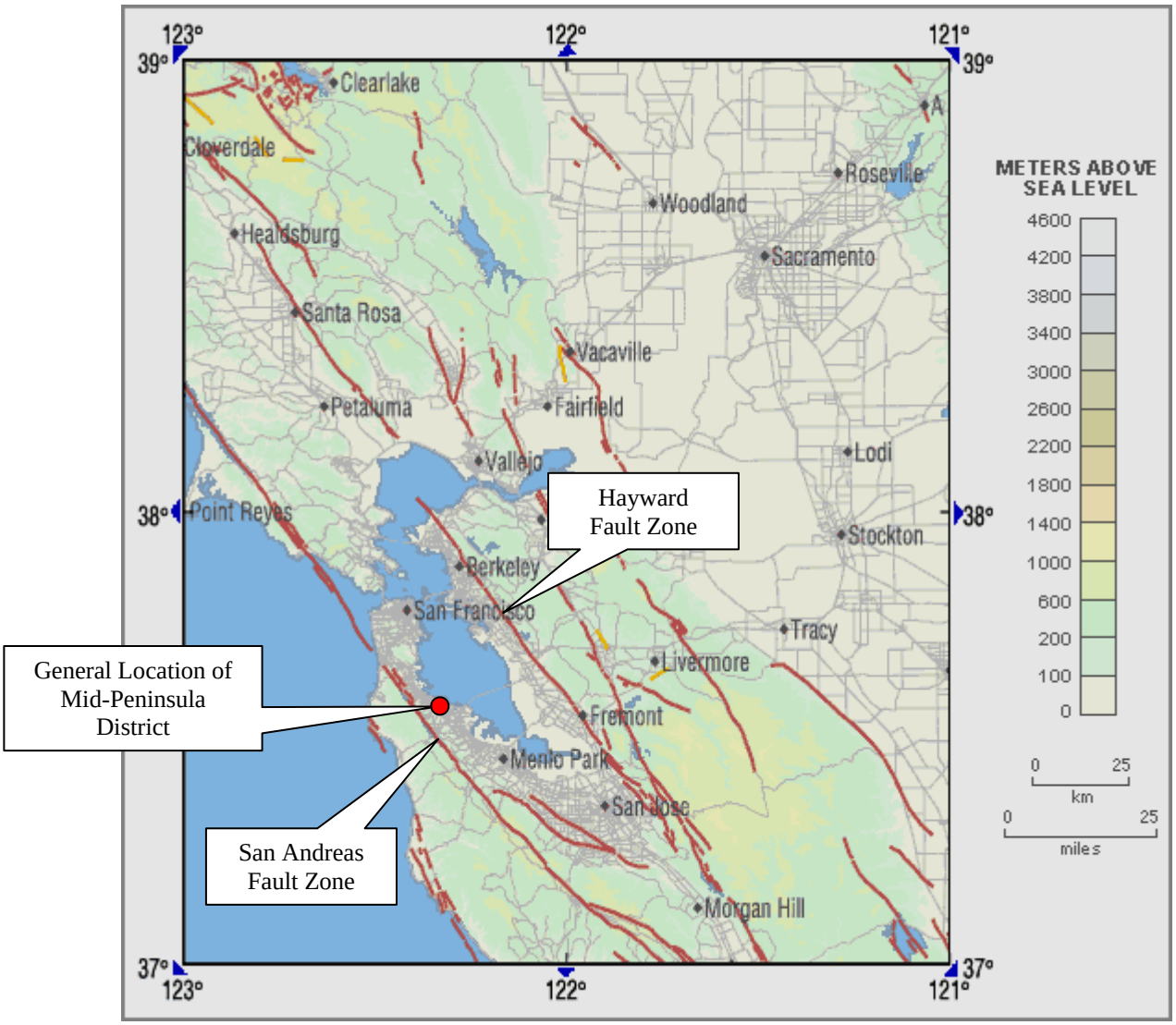


The system is bounded on the northwest by the City of Burlingame and the town of Hillsborough; on the northeast by the San Francisco Bay and Foster City; on the southeast by the City of Redwood City; and on the southwest by the San Francisco State Fish and Game Refuge. The City of Belmont separates the Cities of San Carlos and San Mateo and divides the District into two systems. These two systems are considered divisions of the District. The Service Area Map is included in Appendix B.

The major transportation links through the District are Interstate 280, U.S. Highway 101, El Camino Real, and the Arthur Younger Freeway (State Route 92). The San Mateo Bridge connects the area to the East Bay communities.

The San Andreas Fault rift zone forms the major geologic features of the area as it passes along the western boundary of the service area, see Figure 2.1-2[1]. The Hayward Fault is located on the east side of San Francisco Bay. Elevations in the service area range from just above sea level on the eastern boundary to over 600 feet above sea level on the western boundary. This marked variation in elevation requires 37 separate pressure zones for effective system operation. Twenty-three of these pressure zones are in San Carlos and fourteen are in San Mateo. Much of the terrain that bounds the service area on the west is too steep for any type of development.

Figure 2.1-2: Active Fault Lines

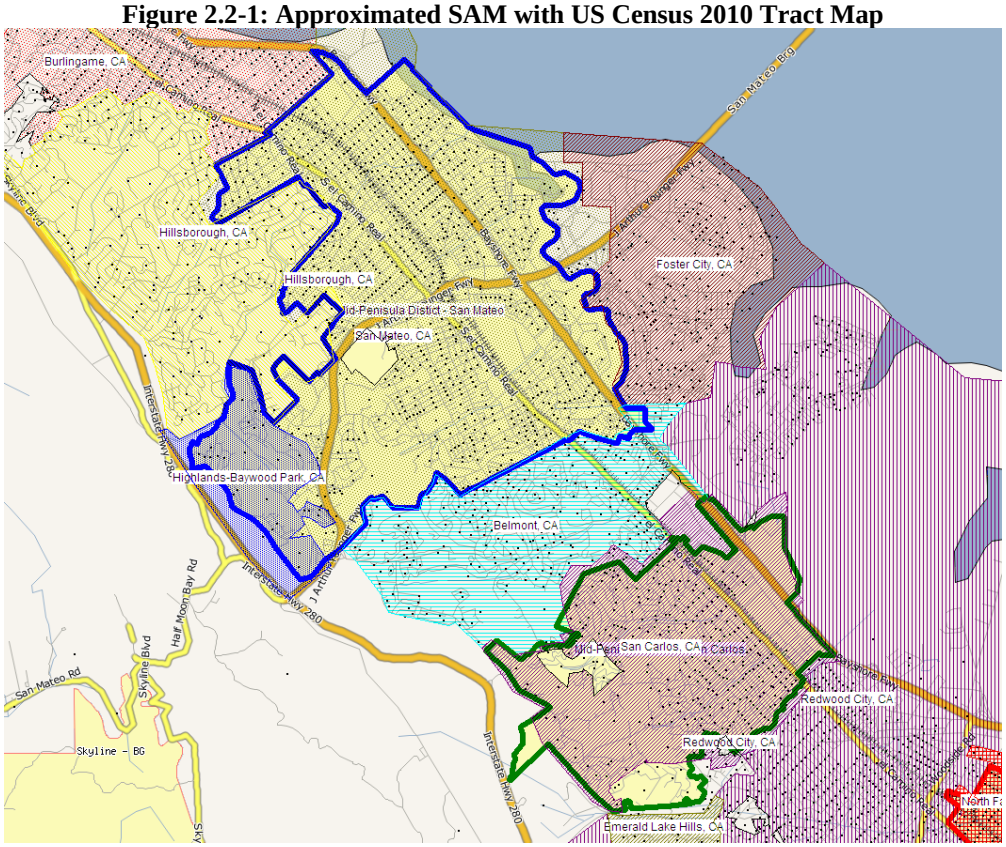


[1] U.S. Geological Survey, Earthquake Hazards Program, URL http://quake.wr.usgs.gov/info/ faultmaps/index.html

2.2 Service Area Population

Cal Water utilizes US census data as calibration points to estimate the population and housing units of its Districts. To tabulate the census data, MARPLOT[2] software is used to overlay the census data with the District service area boundary and the tally the US Census Blocks, as shown in Figure 2.2-1. The Census Block is the smallest geographic unit used by the United States Census Bureau for tabulation of 100-percent data (data collected from all houses, rather than a sample of houses). Several blocks make up Block Groups, which again make up Census Tracts.

Figure 2.2-1: Approximated SAM with US Census 2010 Tract Map



[2] LandView 5 and MARPLOT ® software, US Census Bureau/Environmental Protection Agency, downloaded from: http://www.census.gov/geo/landview/lv5/lv5.html, http://www.epa.gov/ceppo/cameo/marplot.htm

Table 2.2-1 summarizes the US Census Data for the District based on 2000 and 2010 service area boundary maps.

Table 2.2-1: Summary of the 2000 and 2010 US Census Data

Year	US Census Data						Census Blocks
	Population			Housing Units			
	San Mateo	San Carlos	Total	San Mateo	San Carlos	Total	
2000	93,187	27,445	120,632	37,837	11,629	49,466	1,130
2010	97,874	28,976	126,850	39,749	12,293	52,042	1,216
	105%	106%	105%	105%	106%	105%	108%

Table 2.2-2 summaries persons per housing unit and the multi family residential unit density based on the US Census data for years 2000 and 2010, respectively.

Table 2.2-2: Person and Unit Densities

Year	US Census		Persons per Housing Unit	Single Family Residential Services (DU)	Multi Family Residential		
	Population	Housing Units			Services	Residential Units (DU)	Unit Density
2000	120,632	49,466	2.44	30,931	582	18,535	31.85
2010	126,850	52,042	2.44	31,028	630	21,014	33.36
	105%	105%	100%	100%	108%	113%	105%

It is assumed that each Single Family Residential (SFR) service connection represents a single family dwelling unit, even though there may be some duplexes or multi family units connected to service meter that has been categorized as SFR.

For Multi Family Residential (MFR), only the service connections are recorded and reported within Cal Water's Revenue Management Solutions (RMS) database system; the number of dwelling units associated to each service connection is unknown. In addition, MFR units may be categorized as Commercial (COMM) accounts and not included in the above MFR service accounts. To account for these shortfalls, it is assumed that the difference of the US Census Housing Units and the SFR service connection (DU) is equal to the MFR dwelling units, which establishes the MFR unit density.

To establish a range of future service counts the 10-year, 20-year, and Master Plan projected growth rates for each service type were continued through 2040. The 10-year is the short-term growth rate calculated from 2000 to 2009, which has an overall annual average growth rate of 0.07 percent. The 20-year average is a long-term growth rate, calculated from 1990 to 2009, which exhibits an overall annual average growth rate of 0.12 percent. A comparison of service connection growth rates is shown in Figure 2.2-2.

Figure 2.2-2: Historical & Projected Services

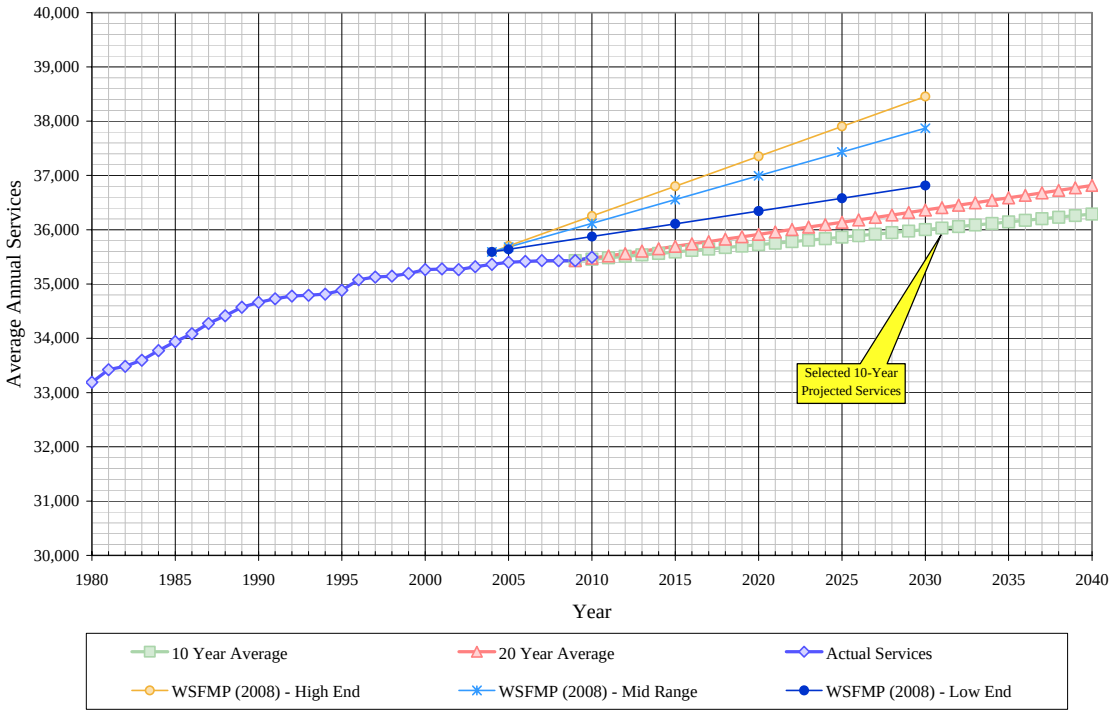


Figure 2.2-2 also shows the growth rate used in The Water Supply and Facilities Master Plan for the District. The rate chosen in the Master Plan used the highest historic growth rate for projecting services. It also incorporated the full development of the Bay Meadows Project, which inflated the growth rate. Given the downturn in the housing market, the slower than expected progress on the Bay Meadows Project, and the available space remaining in the District, Cal Water does not think that this is a realistic growth pattern. The District should see a slowing of the growth rate as it reaches buildout. Cal Water's ten-year average growth rate should account for any future growth in the service area.

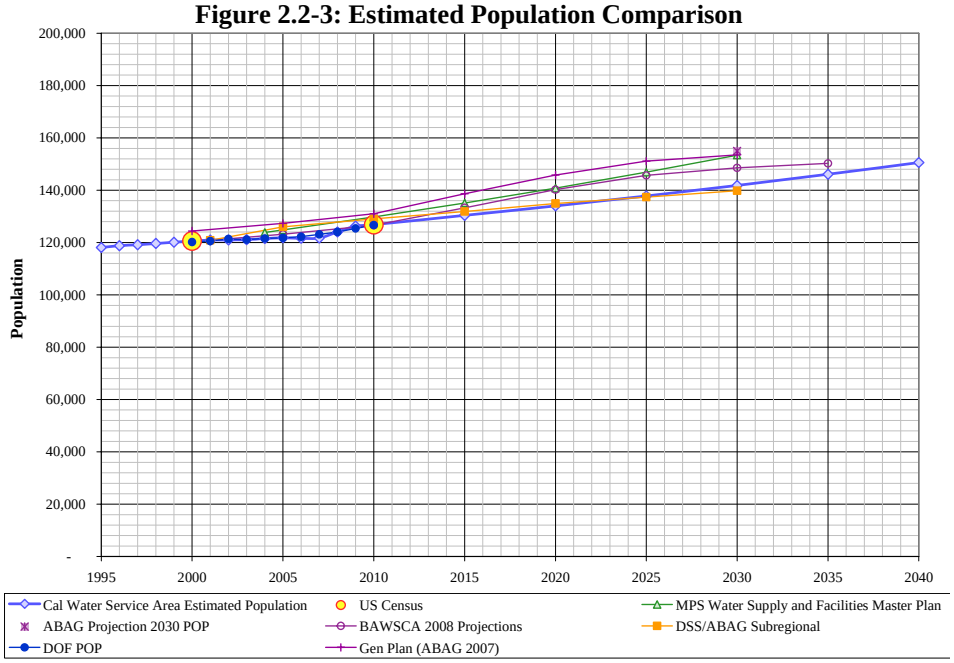
Cal Water estimates that the average population for 2010 in the Mid-Peninsula District is approximately 126,850. Cal Water bases this estimate on the average annual service connection count, persons per DU density, and the MFR DU density shown in Table 2.2-2. The persons per DU density remains nearly unchanged for the period from 2000 to 2010, and is assumed to remain the same until 2040. The MFR DU density shows an increase in the number of units per MFR services. A linear projection using the 2000 and 2010 data points is used to extrapolate the MFR unit density to 2040.

Cal Water estimates the service area's population could reach 150,580 by 2040. Table 2.2-3 lists the population growth in 5 year increments.

Table 2.2-3: Population - Current and Projected (Table 2)							
	2010	2015	2020	2025	2030	2035	2040
Service Area Population	126,850	130,382	134,004	137,824	141,853	146,101	150,580

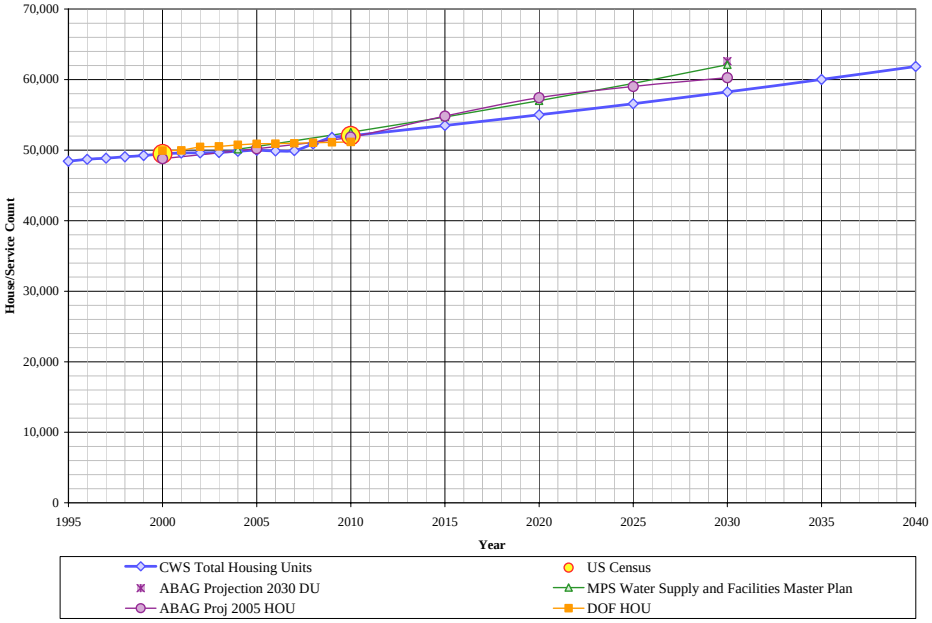
The population estimates for the District are compared to projections made by other governmental agencies, as shown in Figure 2.2-3. The two additional projections are from Cal Water's Water Supply and Facilities Master Plan (WSFMP), and BAWSCA's Decision Support System Model (DSS), which uses Association of Bay Area Government's (ABAG) data. The cities' General Plan population projections are consistent with those of ABAG. The growth rate is slightly higher for the WSFMP and ABAG compared to Cal Water's population projection. Cal Water believes that this variance stems from the fact that City boundaries and those used by ABAG are not contiguous with Cal Water's Mid-Peninsula District's boundaries.

Figure 2.2-3: Estimated Population Comparison



Similarly the housing count was estimated by comparing these data sources with the service counts for the Mid-Peninsula District, Figure 2.2-4. The US Census 2000 housing units estimate is based on summarizing the individual census blocks enclosed within the service area of the District. The BAWSCA/ABAG housing projection shows greater housing units since the city boundaries are outside of the service area of the District. In addition, the service counts that Cal Water records are the actual service meters and the not dwelling units. The values are lower than the US Census because the Census combines all of the housing units (single and multi-family residences), whereas the District service counts may have one meter that serves several housing units, such as duplexes or apartments. As with the population estimate discussed previously, the growth rate for the BAWSCA/ABAG projection is slightly higher then that for the Cal Water's projection. As with the population projections, this slight difference appears to be a result of the difference boundaries between Cal Water's District and the Cities.

Figure 2.2-4: Estimated Housing Comparison



2.3 Service Area Climate

The climate for the Mid-Peninsula District is a mild Mediterranean type climate which is regulated by the Pacific Ocean. The area is characterized by cool winters and warm summers. The greatest amounts of precipitation fall during late autumn, winter, and early spring. Table 2.3-1 lists the average annual conditions for the closest weather station to Mid-Peninsula District, which is in Redwood City.

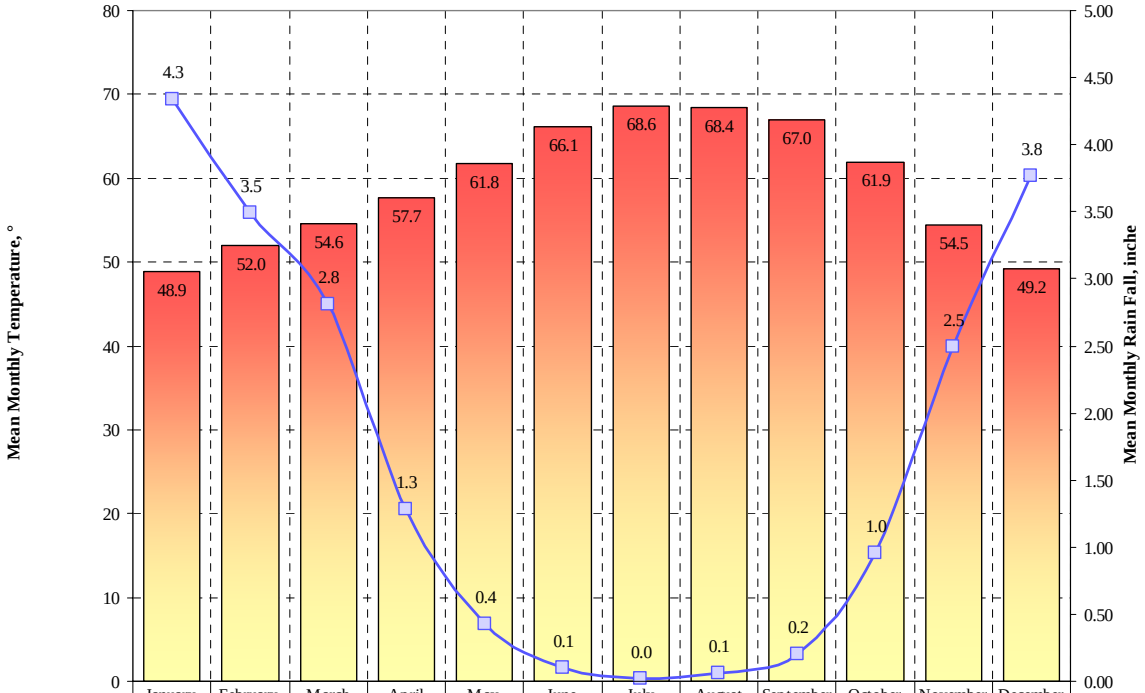
Table 2.3-1: Average Annual Climate (Table 3)

Average Temperature	Average Rainfall	Annual Total Evapotranspiration
59.1°F	19.2 inches	46.3 inches/month

Figure 2.3-1 displays the average monthly temperature and rainfall[3]. The graph illustrates the cool, modestly wet winters and warm dry summers.

[3] Western Regional Climate Center, San Francisco Richmond Weather Station, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?caredw+sfo

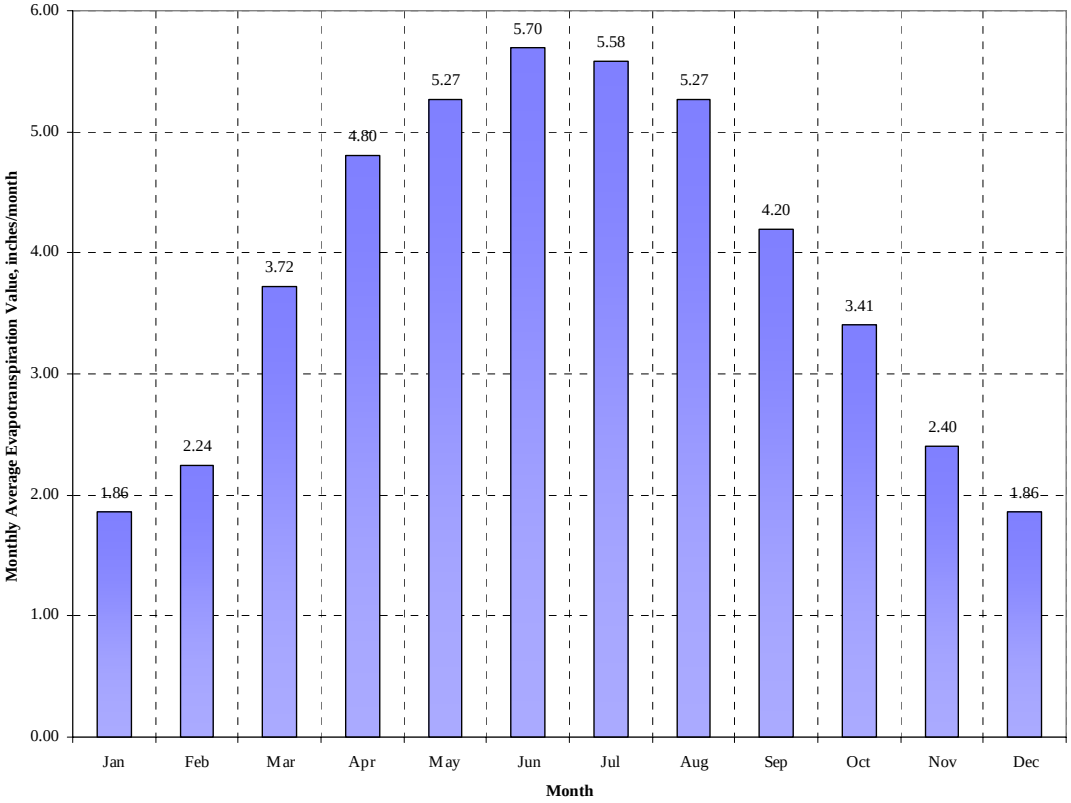
Figure 2.3-1: Average Monthly Temperature and Rainfall



	January	February	March	April	May	June	July	August	September	October	November	December
Temperature	48.9	52	54.6	57.7	61.8	66.1	68.6	68.4	67	61.9	54.5	49.2
Rainfall	4.34	3.49	2.81	1.28	0.43	0.1	0.02	0.06	0.2	0.96	2.5	3.77

Figure 2.3-2 displays the monthly average evapotranspiration values for the area of the District[3]. 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 Mid-Peninsula is 46.3 inches, which is more than twice the average rainfall. Additional climate data is provided in the Appendix C, worksheet 18.

Figure 2.3-2: Monthly Average Evapotranspiration Values



[3] California Irrigation Management Information System (CIMIS), EvapoTranspiration (Eto) Zones Map - Zone 15, http://wwwcimis.water.ca.gov/cimis/welcome.jsp

3 System Demands

3.1 Distribution of Services

Cal Water classifies the different customer connection categories as follows:

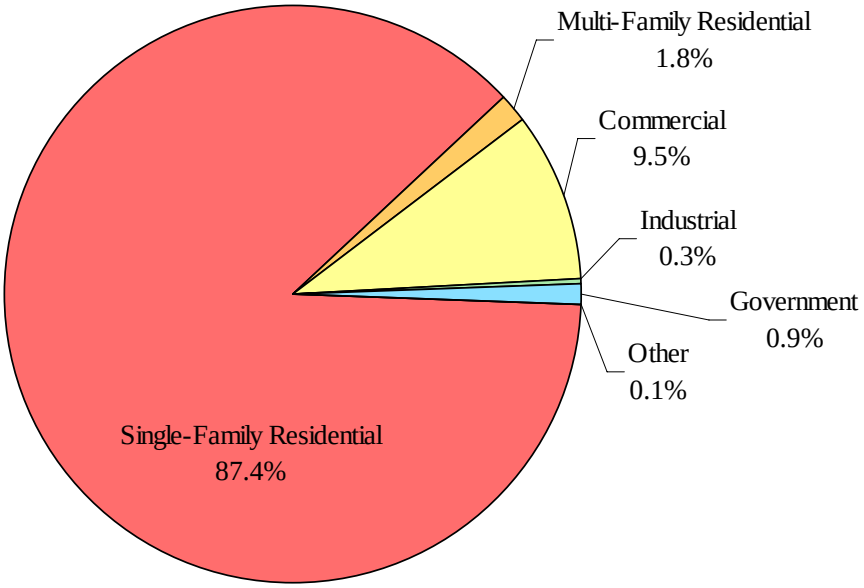
- Single Family Residential
- Multifamily Residential
- Commercial
- Industrial
- Government
- Other

The western portion of the District is composed of hilly, tree-covered terrain. The land use in this area is low-density single family housing and open space. The lower elevations are relatively flat and consist of high-density single family and multifamily residences intermixed with commercial development. Few changes have occurred in recent years that affect land use. Recent growth has occurred, however, through the redevelopment of lots containing single family homes or commercial businesses that are converted into multifamily residential facilities and or expanded commercial uses.

Several areas containing open space, which will never be developed, exist in or adjacent to the Mid-Peninsula District service area. This is primarily because of the steep terrain present in these areas and the established land use function for the areas. Among the largest of these areas are the San Francisco State Fish and Game Refuge (watershed lands that feed the Crystal Springs Reservoir), the Edgewood County Park, and Pulgas Ridge Open Space Preserve.

The average annual service count for calendar year 2010 was 35,494. Single family residential services represent 87.4 percent, commercial services 9.5 percent, with all other service connection types comprising 3.1 percent. The distribution of services for 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 are illustrated in Figure 3.2-2.

Figure 3.2-1: Historical Sales

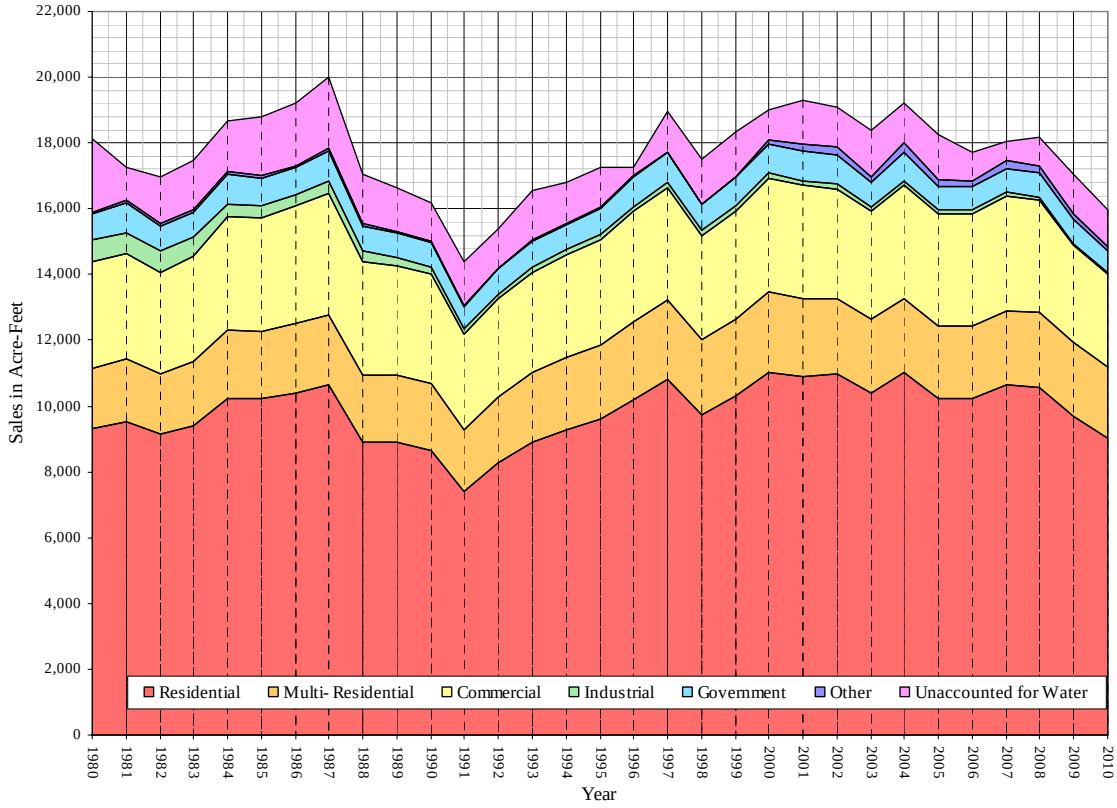
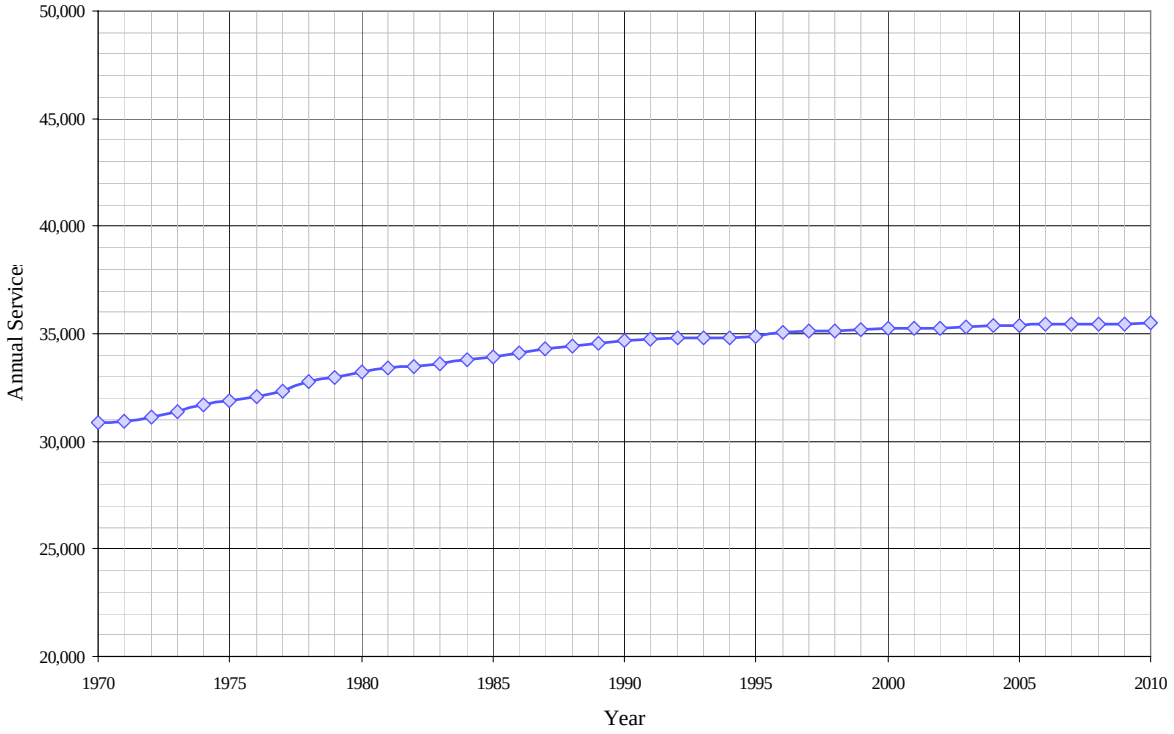
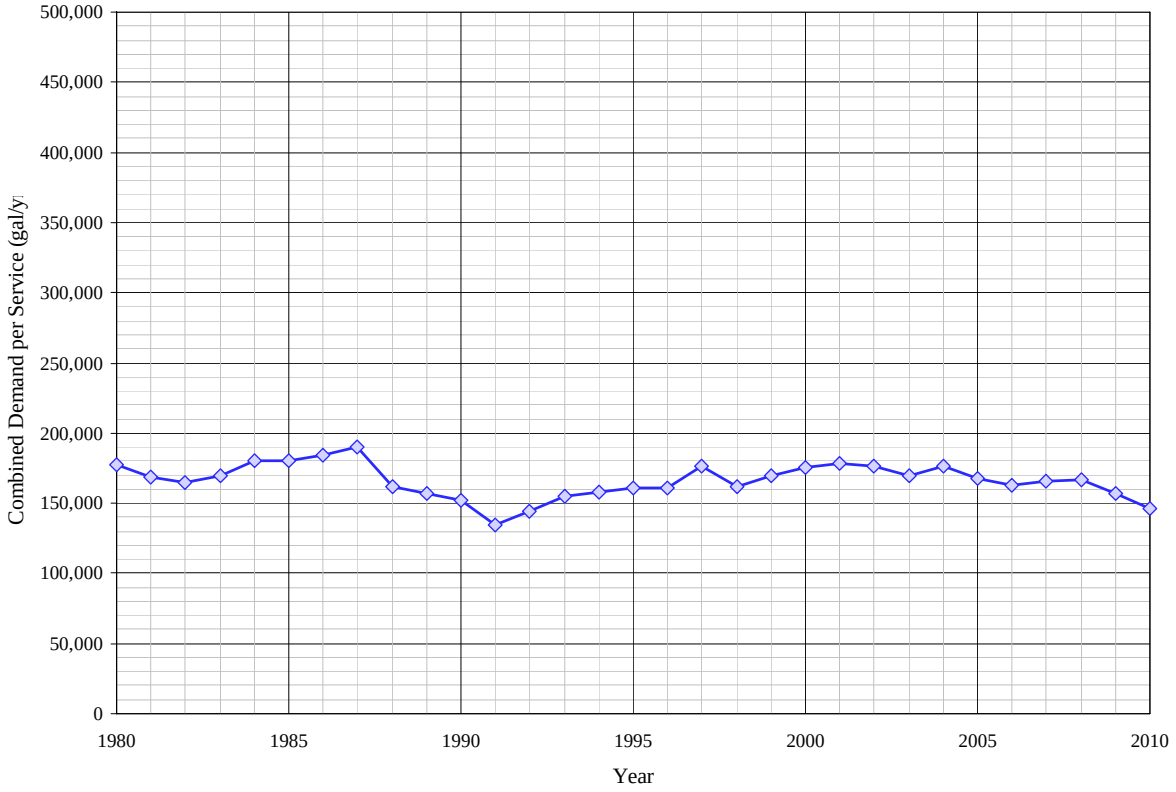


Figure 3.2-2: Historical Service Counts



Demand per service was established as a function of historical sales and service data. The demand per service has ranged from 146,000 to178,000 gal/yr for the past ten years, and tends to vary with changes in the climatic conditions and available supply, see Figure 3.2-3.

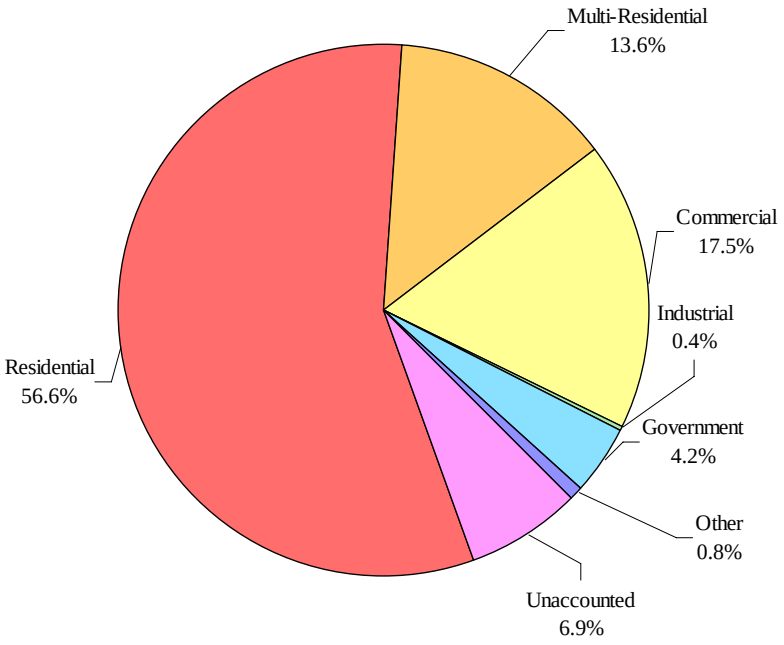
Figure 3.2-3: Historical Demand per Service



A marked decrease in customer demand coincided with the drought from 1987-1991. Even though drought conditions were present as early as 1984 and 1985, the response and curtailment of water demand did not begin in earnest until after the public was informed of the serious conditions that required the implementation of a 25 percent mandatory rationing program. With the conclusion of the long-term drought conditions, the demand increased gradually and moved toward pre-drought levels. However, as shown in Figure 3.2-3, the demand remains slightly below pre-drought levels as a result of implementing physical conservation mechanisms. Demand per service was again reduced steadily in response to the most recent drought from 2006-2009.

Commercial and residential water uses represent the two smallest demand per service segments in the District, yet due to the number of services involved, when combined they use 87.7 percent of the total demand, see Figure 3.2-4.

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 129 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

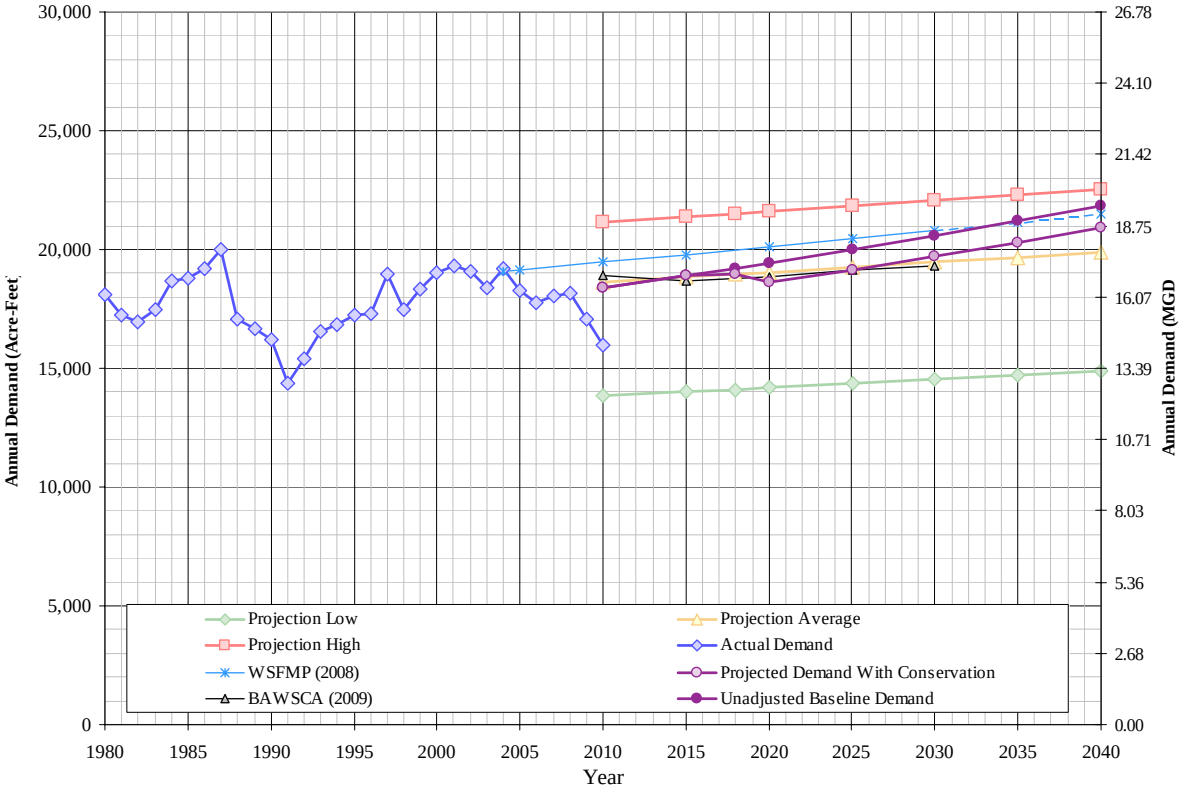


Figure 3.3-1 also shows the demand projection developed in Cal Water's Water Supply and Facilities Master Plan for the Mid-Peninsula District. In this case water demands were projected using a unit demand methodology based on land uses in the City's General Plan. It is included here to provide a comparison 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	31,107	10,217	-	-	10,217
Multi-family	579	2,230	-	-	2,230
Commercial	3,318	3,407	-	-	3,407
Industrial	98	126	-	-	126
Institutional/government	278	694	-	-	694
Landscape	-	-	-	-	-
Recycled	-	-	-	-	-
Other	22	202	-	-	202
Total	35,402	16,876	0	0	16,876

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	31,028	9,029	-	-	9,029
Multi-family	630	2,177	-	-	2,177
Commercial	3,382	2,795	-	-	2,795
Industrial	93	59	-	-	59
Institutional/government	333	666	-	-	666
Landscape	-	-	-	-	-
Recycled	-	-	-	-	-
Other	28	122	-	-	122
Total	35,494	14,848	0	0	14,848

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	31,044	10,241	-	-	10,241
Multi-family	658	2,548	-	-	2,548
Commercial	3,425	3,532	-	-	3,532
Industrial	96	123	-	-	123
Institutional/government	345	864	-	-	864
Landscape	-	-	-	-	-
Recycled	-	-	-	-	-
Other	23	212	-	-	212
Total	35,591	17,520	-	-	17,520

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	31,090	9,987	-	-	9,987
Multi-family	686	2,584	-	-	2,584
Commercial	3,476	3,490	-	-	3,490
Industrial	96	121	-	-	121
Institutional/government	355	865	-	-	865
Landscape	-	-	-	-	-
Recycled	-	-	-	-	-
Other	23	207	-	-	207
Total	35,726	17,253	-	-	17,253

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	31,137	10,174	31,184	10,371
Multi-family	715	2,738	744	2,903
Commercial	3,528	3,603	3,580	3,722
Industrial	96	123	97	126
Institutional/government	364	906	374	948
Landscape	-	-	-	-
Recycled	-	-	-	-
Other	23	211	23	216
Total	35,863	17,755	36,003	18,285

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	31,231	10,576	31,277	10,791
Multi-family	775	3,079	808	3,267
Commercial	3,634	3,846	3,688	3,977
Industrial	97	128	98	131
Institutional/government	384	993	395	1,041
Landscape	-	-	-	-
Recycled	-	-	-	-
Other	24	220	24	225
Total	36,144	18,843	36,289	19,432

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 Mid-Peninsula 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 Mid-Peninsula District lies within the San Francisco Bay hydrologic region, along with Bear Gulch, Livermore, Los Altos, and South San Francisco 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 San Francisco Bay hydrologic region are shown in Table 3.3-8. The 2015 and 2020 district-specific targets for Mid-Peninsula District are 131 and 124 gpcd, respectively. Over the last five years District demand has averaged about 129 gpcd. Thus, currently per capita demand already equals the 2015 target, but would need to decrease at least 5 percent more in order to achieve the 2020 target of 124 gpcd.

Table 3.3-8: Regional SBx7-7 Targets for Cal Water Districts in San Francisco Bay Hydrologic Region			
District	**Population**	**2015 Target**	**2020 Target**
Bear Gulch	56,013	214	190
Los Altos	55,290	217	193
Livermore	53,888	178	158
Mid-Peninsula	126,284	131	124
South San Francisco	58,297	138	124
Regional Targets[1]		**166**	**151**
[1] Regional targets are the population-weighted average of the district targets.			

The following analysis presents the individual SBx7-7 compliance targets for the Mid-Peninsula 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 Mid-Peninsula District, the 10-year base period 1997-2006 yielded the maximum target under this method. The 2015 target is 124 gpcd and a 2020 target is 110 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	17,297	AF
	2008 total volume of delivered recycled water	0	AF
	2008 recycled water use as a percent of total deliveries	0	%
	Number of years in base period	10	years
	Year beginning base period range	1997	
	Year ending base period range	2006	
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	1997	119,186	16.9	142
Year 2	1998	119,658	15.6	131
Year 3	1999	120,109	16.4	136
Year 4	2000	120,632	17.0	141
Year 5	2001	120,947	17.2	142
Year 6	2002	120,977	17.0	141
Year 7	2003	121,110	16.4	136
Year 8	2004	121,546	17.1	141
Year 9	2005	121,855	16.3	134
Year 10	2006	121,641	15.8	130
			Base Daily Per Capita Water Use	137

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 Mid-Peninsula District is located in the San Francisco Bay hydrologic region the Mid-Peninsula District's 2015 target is 131 gpcd and the 2020 target is 124 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 Mid-Peninsula District is 128 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	2004	122,560	17.1	140
Year 2	2005	123,570	16.3	132
Year 3	2006	123,690	15.8	128
Year 4	2007	121,690	16.1	133
Year 5	2008	120,740	15.3	127
			Base Daily Per Capita Water Use	127

Based on the results of this analysis as shown in Table 3.3-12, the Method 3 targets were chosen for the Mid-Peninsula District.

Table 3.3-12. Mid-Peninsula District SBx7-7 Targets

Maximum Allowable Target	
Base Period:	2003-2007
Per Capita Water Use:	135
Maximum Allowable 2020 Target:	128
Method 1: 80% of Baseline Per Capita Daily Water Use	
Base Period:	1997-2006
Per Capita Water Use:	137
2015 Target:	124
2020 Target:	110
Method 3: 95% of Hydrologic Region Target	
Hydrologic Region:	SF Bay
2015 Target:	131
2020 Target:	124
Selected District Target	
2015 Target:	131
2020 Target:	124

In their General Plan, the City of San Mateo has adopted a goal of reducing citywide gross per capita water use to 102 gallons/day and residential per capita water use to 70 gallons/day. The General Plan is a policy document and as such does not identify a specific plan or funding mechanism to achieve this goal. Cal Water and the City of San Mateo are committed to exploring funding sources for programs that will cost-effectively reduce water use.

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 projecting demand for low income households, Cal Water drew information from the Housing Element for each city served within the District. The Housing Element for San Mateo identified 9.8 percent of total households to be in the lowest income category.[4] In San Carlos, approximately 6 percent of households are in the lowest income category.[5] To estimate projected low income demands, an aggregate of these percentages, which works out to 7.9 percent, was applied to the total projected residential demand, as shown in Table 3.3-13.

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

Low Income Water Demands	2015	2020	2025	2030	2035	2040
Single-family residential	809	789	804	819	835	852
Multi-family residential	201	204	216	229	243	258
Total	1,010	993	1,020	1,049	1,079	1,111

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.

[4] "City of San Mateo, Housing Element of the General Plan, 2009", City of San Mateo, February 1, 2010, Page 5
[5] "San Carlos 2030 General Plan, Housing Element", City of San Carlos, October 12, 2009, Page 14

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	-	-	-	-	-	-	-
Unaccounted-for system losses	1,108	1,391	1,359	1,388	1,418	1,450	1,483
Total	1,108	1,391	1,359	1,388	1,418	1,450	1,483

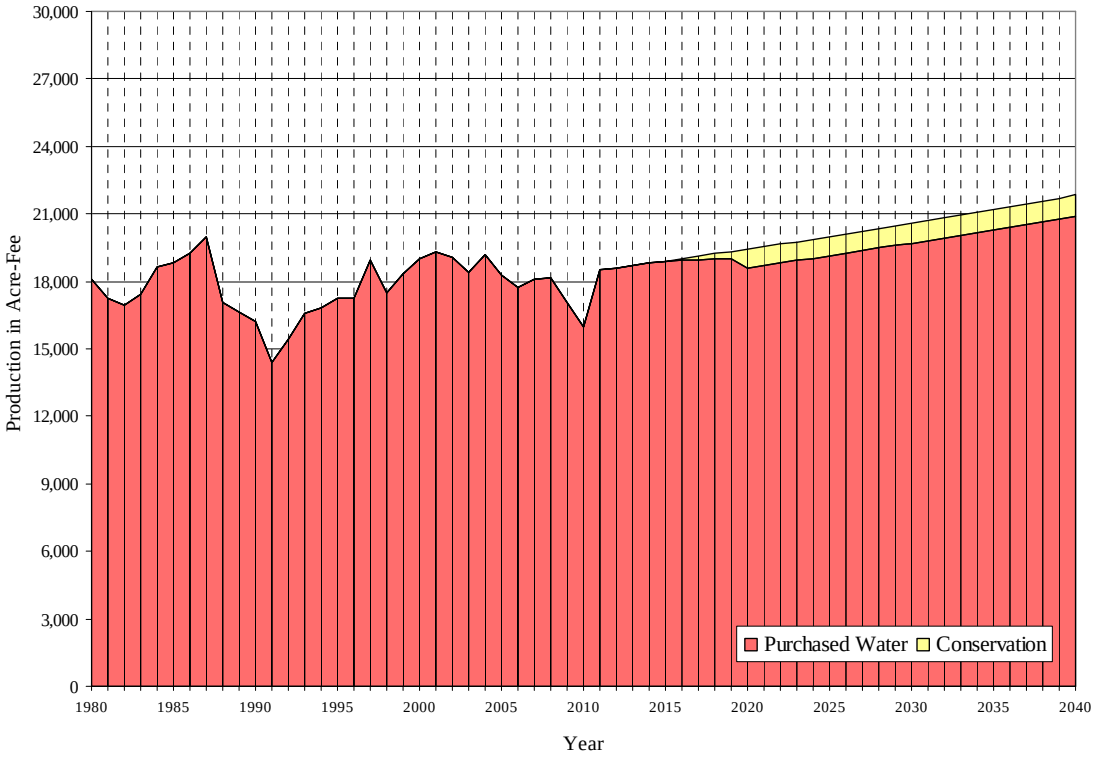
Actual and projected water use through 2040 is shown in Table 3.4-2. The values represent the total target demand projection based on SBx7-7 gpcd targets, including unaccounted for water.

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	18,253	15,956	18,911	18,613	19,143	19,703	20,293	20,915

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 SFPUC for the Mid-Peninsula District is shown in Table 3.4-3.

Table 3.4-3: Agency Demand Projections To Wholesale Suppliers (Table 17)
AFY

Wholesale Source	2015	2020	2025	2030	2035	2040
SFPUC	18,911	18,613	19,143	19,703	20,293	20,915

4 System Supplies

4.1 Water Sources

The water furnished to customers in the Mid-Peninsula District is entirely purchased water. Cal Water has an annual purchased water supply from SFPUC of 35.68 MGD (39,967) in normal hydrologic years, which is shared among the Bear Gulch, Mid-Peninsula, and South San Francisco Districts. The amount available to the Mid-Peninsula District in any given year varies, and depends on the availability of local supplies both in the other Cal Water districts. SFPUC sources are expected to provide 100 percent of supply in the Mid-Peninsula District.

Based on the contract described in the following section, Cal Water expects this quantity to be available for the length of the contract. Although increased levels of imported water may become available after completion of the SFPUC's Water System Improvement Program (WSIP), Cal Water does not anticipate a significant increase in its Supply Assurance over time. For planning purposes the imported supply has been limited to its present quantity.

The viability of installing groundwater wells has been investigated in the Water Supply and Facilities Master Plan for the District. Findings in the Master Plan suggest that wells constructed within the Mid-Peninsula District will likely have limited capacity based on the hydrogeology of the region. Recycled water and desalination were also analyzed as new supply sources in the Master Plan. At the time they were not found to be economically feasible. Cal Water again explored these potential sources in its Integrated Long Term Water Supply Plan for the Peninsula Districts. The results of this analysis are included in the following sections.

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

Water Supply Sources	2010 Actual	2015	2020	2025	2030	2035	2040
San Francisco Public Utilities Commission	15,956	18,911	18,613	19,143	19,703	20,293	20,915
Supplier produced groundwater	-	-	-	-	-	-	-
Supplier surface diversions	-	-	-	-	-	-	-
Transfers in or out	-	-	-	-	-	-	-
Exchanges In or out	-	-	-	-	-	-	-
Recycled Water (projected use)	-	-	-	-	-	-	-
Desalination	-	-	-	-	-	-	-
Total	15,956	18,911	18,613	19,143	19,703	20,293	20,915

4.2 Purchased Water

Cal Water receives water from the City and County of San Francisco's Regional Water System (RWS), operated by the San Francisco Public Utilities Commission (SFPUC). This regional supply is delivered through a network of pipelines, tunnels and treatment plants as illustrated in Figure 4.2.1. The water purchased is treated by SFPUC prior to delivery to Cal Water. The District takes delivery from SFPUC from eleven active and three standby metered turnouts from SFPUC transmission lines.

The amount of imported water available to the SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is very dependent on reservoir storage to firm-up its water supplies.

The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from the Hetch Hetchy Project in the Sierra Nevada Mountains. In practice, the local watershed facilities are operated to capture local runoff.

The Raker Act, which authorized the Hetch Hetchy project, prohibits the SFPUC from selling water from that project to a privately owned utility; however, local sources generated by the SFPUC are available for purchase by privately owned utilities. Section 6 of the Raker act states:

> *That the grantee [San Francisco] is prohibited from ever selling or letting to any corporation or individual, except a municipality or a municipal water district or irrigation district, the right to sell or sublet the water or the electric energy sold or given to it or him by the said grantee: Provided, that the rights hereby granted shall not be sold, assigned, or transferred to any private person, corporation, or association, and in case of any attempt to so sell, assign, transfer or convey, this grant shall revert to the Government of the United States.*

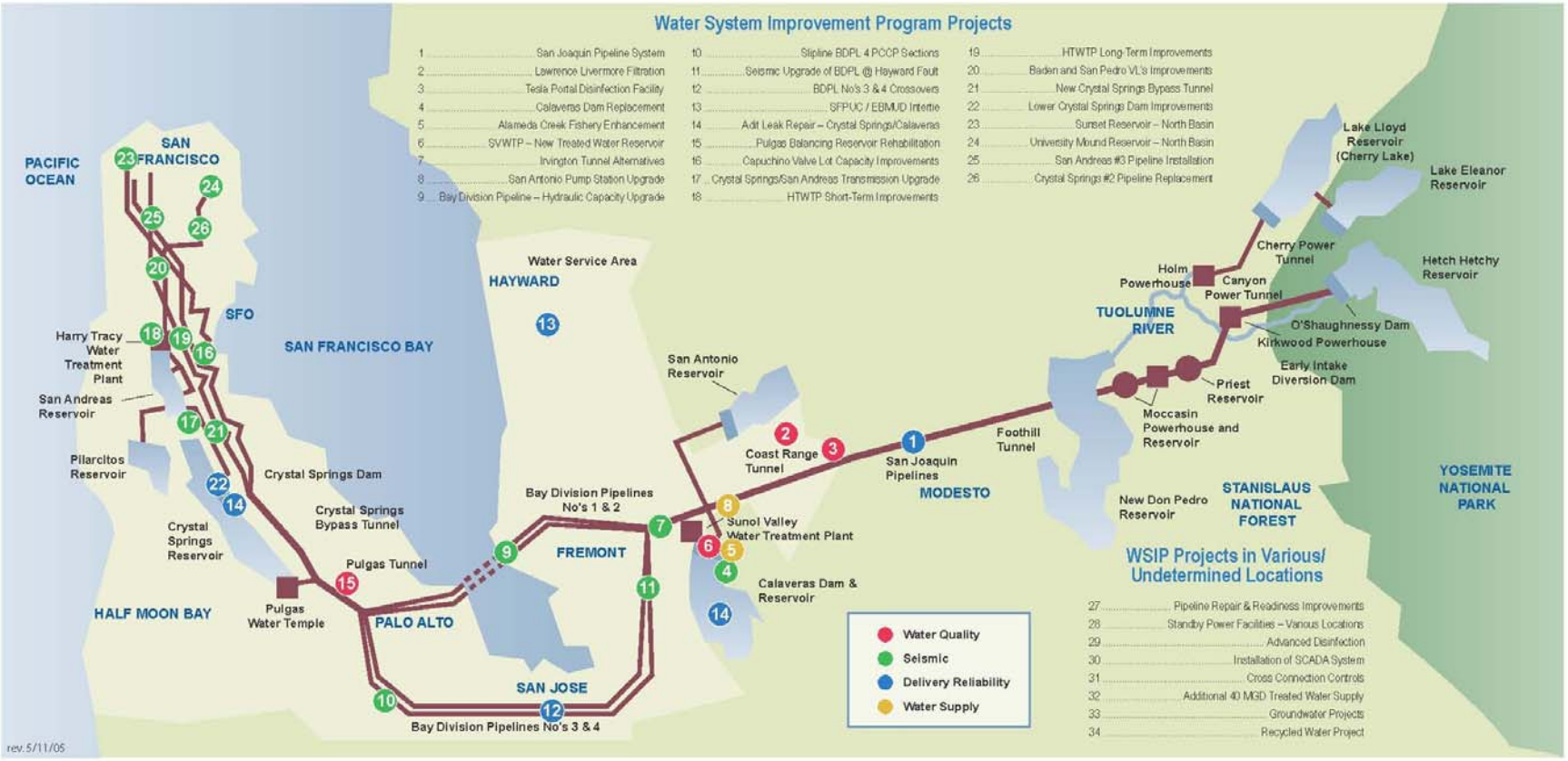
Cal Water's purchased water supply from the SFPUC is subject to the Water Supply Agreement (WSA) between the City and County of San Francisco and Wholesale Customers, which was adopted in July, 2009. The WSA is described in the following section (a copy of the WSA and associated Contract are included in Appendices I & J. As a means of addressing the aforementioned Raker Act exclusion the WSA contains Article 9.02 A. which identifies Cal Water as an investor owned utility company, and as such, has no claim to co-grantee status under the (Raker) Act. In addition Article 9.02 B. states that:

> The total quantity of water delivered by San Francisco to California Water Service Company shall not in any calendar exceed 47,400 acre-feet, which is the estimated average annual production of Local System Water. If San Francisco develops additional Local System Water after the Effective Date, it may (1) increase the maximum delivery amount stated herein; and (2) increase the Supply Assurance, but not necessarily both. San Francisco has no obligation to deliver water to California Water Service Company in excess of the maximum stated herein, except as such

maximum may be increased by San Francisco pursuant to this subsection. The maximum annual quantity of Local System Water set forth in this subsection is intended to be a limitation on the total quantity of water that may be allocated to California Water Service Company, and is not an Individual Supply Guarantee for purposes of Section 3.02. The maximum quantity of Local System Water set forth in this subsection is subject to reduction in response to (1) changes in long-term hydrology or (2) environmental water requirements that may be imposed by or negotiated with state and federal resource agencies in order to comply with state or federal law or to secure applicable permits for construction of Regional Water System facilities. San Francisco shall notify California Water Service Company of any anticipated reduction of the quantity of Local System Water set forth in this subsection, along with an explanation of the basis for the reduction.

Short term changes in hydrologic conditions such as drought and supply emergencies are governed by other provisions of the WSA including the two tiered allocation plan recently adopted by the BAWSCA membership as required in the WSA (see Section 5.2.2 & 5.2.3 & 5.3.6).

Figure 4.2-1: SFPUC Water System Improvement Program (WSIP) Projects



4.2.1 Supply Assurance

Cal Water serves two additional districts in the San Francisco peninsula (South San Francisco, and Bear Gulch), in addition to serving the Bear Gulch District. The three districts rely on the San Francisco Public Utility Commission (SFPUC) as the main water source. Prior to 1984 Cal Water had a contractual agreement with the SFPUC to purchase up to 47,400 AFY (42.32 mgd) of water per year for all three peninsula districts combined. This quantity is identified in the WSA as the estimated average annual production of Local System Water and serves as the maximum annual delivery amount to Cal Water from San Francisco.

In 1984, Cal Water, along with 29 other Bay Area water suppliers, signed a Settlement Agreement and Master Water Sales Contract (Master Contract) with San Francisco, supplemented by an individual Water Supply Contract. These contracts provided for a 184 mgd (annual average basis) Supply Assurance Allocation (SAA) to the SFPUC's wholesale customers collectively. This allocation was reached through negotiation in the early 1990s between the SFPUC and Bay Area Water Users Association (BAWUA), the predecessor organization BAWSCA. In 2009 the Master Contract was extended through 2018, keeping the SAA at 184 mgd, but changing its name to the Individual Supply Guarantee (ISG).

Cal Water's ISG for the three districts was 35.39 mgd (39,642 AFY). Additionally, the acquisition of the Los Trancos County Water District in July 2005 allowed the transfer of its 0.11 mgd ISG to Cal Water. In 2009 Cal water acquired the Skyline County Water District, which also transferred its 0.181 mgd ISG to Cal Water. This increased Cal Water's total ISG for the three districts to 35.68 MGD (39,967 AFY).

The WSA does not guarantee that San Francisco will meet peak daily or hourly customer demands when their annual usage exceeds the Supply Assurance. The SFPUC's wholesale customers have agreed to the allocation of the 184 mgd ISG among all agencies, with each entity's share of the SAA set forth on a schedule adopted in 1993.

The SFPUC can meet the demands of its retail and wholesale customers in years of average and above average precipitation. The WSA allows the SFPUC to reduce water deliveries during droughts, emergencies, and for scheduled maintenance activities. The SFPUC and all wholesale customers adopted an Interim Water Shortage Allocation Plan in 2000 to address the allocation of water between San Francisco, wholesale customers, and individual wholesale customers during water shortages of up to 20 percent of system-wide use. In 2010 the wholesale customers negotiated and have recently adopted a revised methodology for allocating supplies during shortages. This methodology is discussed in more detail in Sections 5.2.2, 5.2.3, and 5.3.6.

<u>Water Supply Improvement Program (WSIP)</u>

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply,

the SFPUC has undertaken the Water System Improvement Program (WSIP), approved October 31, 2008. The WSIP will deliver capital improvements aimed at enhancing the SFPUC's ability to meet its water service mission of providing high quality water to customers in a reliable, affordable and environmentally sustainable manner. Many of the water supply and reliability projects evaluated in the WSIP were originally put forth in the SFPUC's Water Supply Master Plan (2000).

A Program Environmental Impact Report (PEIR) was prepared in accordance with the California Environmental Quality Act for the WSIP. The PEIR, certified in 2008, analyzed the broad environmental effects of the projects in the WSIP at a program level and the water supply impacts of various alternative supplies at a project level. Individual WSIP projects are also undergoing individual project specific environmental review as required.

In approving the WSIP, the Commission adopted a Phased WSIP Variant for water supply that was analyzed in the PEIR. This Phased WSIP Variant established a mid-term water supply planning milestone in 2018 when the Commission would reevaluate water demands through 2030. At the same meeting, the Commission also imposed the Interim Supply Limitation which limits the volume of water that the member agencies and San Francisco can collectively purchase from RWS to 265 MGD until at least 2018. Although the Phased WSIP Variant included a mid-term water supply planning milestone, it did include full implementation of all proposed WSIP facility improvement projects to insure that the public health, seismic safety, and delivery reliability goals were achieved as soon as possible.

As of July 1, 2010, the WSIP was 27 percent complete overall with the planning and design work over 90 percent complete. The WSIP is scheduled to be completed in December 2015.

2009 Water Supply Agreement

The business relationship between San Francisco and its wholesale customers is largely defined by the "Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County" entered into in July 2009 (WSA). The new WSA replaced the Settlement Agreement and Master Water Sales Contract that expired June 2009. The WSA addresses the rate-making methodology used by the City in setting wholesale water rates for its wholesale customers in addition to addressing water supply and water shortages for the RWS. The WSA has a 25 year term.

In terms of water supply, the WSA provides for a 184 million gallon per day (MGD, expressed on an annual average basis) "Supply Assurance" to the SFPUC's wholesale customers, subject to reduction, to the extent and for the period made necessary by reason of water shortage, due to drought, emergencies, or by malfunctioning or rehabilitation of the regional water system. The WSA does not guarantee that San Francisco will meet

peak daily or hourly customer demands when their annual usage exceeds the Supply Assurance. The SFPUC's wholesale customers have agreed to the allocation of the 184 MGD Supply Assurance among themselves, with each entity's share of the Supply Assurance set forth on Attachment C to the WSA. The Supply Assurance survives termination or expiration of the WSA and this agency's Individual Water Sales Contract with San Francisco.

The Water Shortage Allocation Plan between the SFPUC and its wholesale customers, adopted as part of the WSA in July 2009, addresses shortages of up to 20% of system-wide use. The Tier 1 Shortage Plan allocates water from the RWS between San Francisco Retail and the wholesale customers during system-wide shortages of 20% or less. The WSA also anticipated a Tier 2 Shortage Plan adopted by the wholesale customers which would allocate the available water from the RWS among the wholesale customers.

Individual Supply Guarantee

In 2009, Cal Water, along with 25 other Bay Area water suppliers signed a Water Supply Agreement (WSA) with San Francisco, supplemented by an individual Water Supply Contract. These contracts, which expire in 25 years, provide for a 184 million gallon a day (MGD, expressed on an annual average basis) Supply Assurance to the SFPUC's wholesale customers collectively. Cal Water's Individual Supply Guarantee (ISG) is 35.68 MGD (or approximately 39,967 acre feet per year). Although the WSA and accompanying Water Supply Contract expire in 2034, the Supply Assurance (which quantifies San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely.

2018 Interim Supply Limitation

As part of its adoption of the WSIP in October 2008, the Commission adopted a water supply element, the Interim Supply Limitation (ISL), to limit sales from San Francisco Regional Water System (RWS) watersheds to an average annual of 265 million gallons per day (mgd) through 2018. The wholesale customers' collective allocation under the ISL is 184 mgd and San Francisco's is 81 mgd. Although the wholesale customers did not agree to the ISL, the WSA provides a framework for administering the ISL.

BAWSCA has developed a strategy to address each of its member agencies' unmet needs flowing from the ISL through its Water Conservation Implementation Plan and the Long-term Reliable Water Supply Strategy, separately addressed herein.

Interim Supply Allocations

The Interim Supply Allocations (ISAs) refers to each individual wholesale customer's share of the Interim Supply Limitation (ISL). On December 14, 2010, the Commission established each agency's ISA through 2018. In general, the Commission based the allocations on the lesser of the projected fiscal year 2017-18 purchase projections or

Individual Supply Guarantees. The ISAs are effective only until December 31, 2018 and do not affect the Supply Assurance or the Individual Supply Guarantees. San Francisco's Interim Supply Allocation is 81 million gallons per day (mgd).

Cal Water's ISA is 35.68 mgd, to be shared amongst its Bear Gulch, South San Francisco, and Mid-Peninsula Districts.

As stated in the Water Supply Agreement, the wholesale customers do not concede the legality of the Commission's establishment of the ISAs and Environmental Enhancement Surcharge, discussed below, and expressly retain the right to challenge either or both, if and when imposed, in a court of competent jurisdiction.

Environmental Enhancement Surcharge

The Commission plans to establish the Environmental Enhancement Surcharge concurrently with the budget-coordinated rate process. This surcharge will be unilaterally imposed by SFPUC on individual wholesale customers, and SFPUC retail customers, when each agency's use exceeds their Interim Supply Allocation and when sales of water to the wholesale customers and San Francisco retail customers, collectively, exceeds the Interim Supply Limitation of 265 mgd.

The SFPUC is in the process of developing the methodology and amount of this volume-based charge. The Environmental Enhancement Surcharge will become effective beginning fiscal year 2011-12.

BAWSCA Long Term Reliable Water Supply Strategy

BAWSCA's water management objective is to ensure that a reliable, high quality supply of water is available where and when people within the BAWSCA service area need it. A reliable supply of water is required to support the health, safety, employment, and economic opportunities of the existing and expected future residents in the BAWSCA service area and to supply water to the agencies, businesses, and organizations that serve those communities. BAWSCA is developing the Long-Term Reliable Water Supply Strategy (Strategy) to meet the projected water needs of its member agencies and their customers through 2035 and to increase their water supply reliability under normal and drought conditions.

The Strategy is proceeding in three phases. Phase I was completed in 2010 and defined the magnitude of the water supply issue and the scope of work for the Strategy. Phase II of the Strategy is currently under development and will result in a refined estimate of when, where, and how much additional supply reliability and new water supplies are needed throughout the BAWSCA service area through 2035, as well as a detailed analysis of the water supply management projects, and the development of the Strategy implementation plan. Phase II will be complete by 2013. Phase III will include the implementation of specific water supply management projects. Depending on cost-

effectiveness, as well as other considerations, the projects may be implemented by a single member agency, by a collection of the member agencies, or by BAWSCA in an appropriate timeframe to meet the identified needs. Project implementation may begin as early as 2013 and will continue throughout the Strategy planning horizon, in coordination with the timing and magnitude of the supply need.

The development and implementation of the Strategy will be coordinated with the BAWCSA member agencies and will be adaptively managed to ensure that the goals of the Strategy, i.e., increased normal and drought year reliability, are efficiently and cost-effectively being met.

4.3 Surface Water

Cal Water does not have the ability to divert local surface water to supply the Mid-Peninsula District. Surface water from local sources is ultimately the source for the District, but this supply is under jurisdiction of the SFPUC.

4.4 Groundwater

Cal Water does not have any groundwater wells to supply water for Mid-Peninsula District. Cal Water has investigated the possibility of adding a well in the District as a source of supply through the development of the Water Supply and Facilities Master Plan. The plan's conclusion was that, though a well could be drilled, the output of the well would be very low to make this project economically feasible.

4.4.1 Basin Boundaries and Hydrology

The San Mateo sub-basin occupies a structural trough, sub-parallel to the northwest trending Coast Ranges, at the southwest end of San Francisco Bay. San Francisco Bay constitutes its eastern boundary. The Santa Cruz Mountains form the western margin of the San Mateo basin. The Westside basin bounds it on the north and its southern limit is defined by San Francisquito Creek. The basin is composed of alluvial fan deposits formed by tributaries to San Francisco Bay that drain the basin[6, 7]. A detailed description of the basin is given in the California's Ground Water Bulletin 118, see Appendix D.

[6] Ground Water Atlas of the United States, California and Nevada. U.S. Geological Survey, HA 730-B, 1995

[7] California's Ground Water Bulletin 118, 2003: San Francisco Bay Hydrologic Region Santa Clara Valley Basin, San Mateo Sub-basin

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. Currently, no wastewater is recycled for direct reuse in the Mid-Peninsula District. The potential amount of recycled water that can be produced is proportional to the amount of wastewater that is generated by District, and is discussed in the following sections.

4.5.1 Wastewater Collection

Wastewater from Cal Water's Mid Peninsula service area community of San Mateo is treated at the San Mateo Wastewater Treatment Plant. Municipal wastewater is generated in the service area by residential, commercial, and industrial sources.

Wastewater from the Mid-Peninsula service area community of San Carlos is treated at the South Bayside System Authority (SBSA) Treatment Plant. The SBSA Treatment Plant treats wastewater flows generated from the San Carlos, Belmont, Redwood City, Atherton, Menlo Park, East Palo Alto, Woodside, and numerous unincorporated areas in San Mateo County. Municipal wastewater is generated in the SBSA service area by residential and commercial sources.

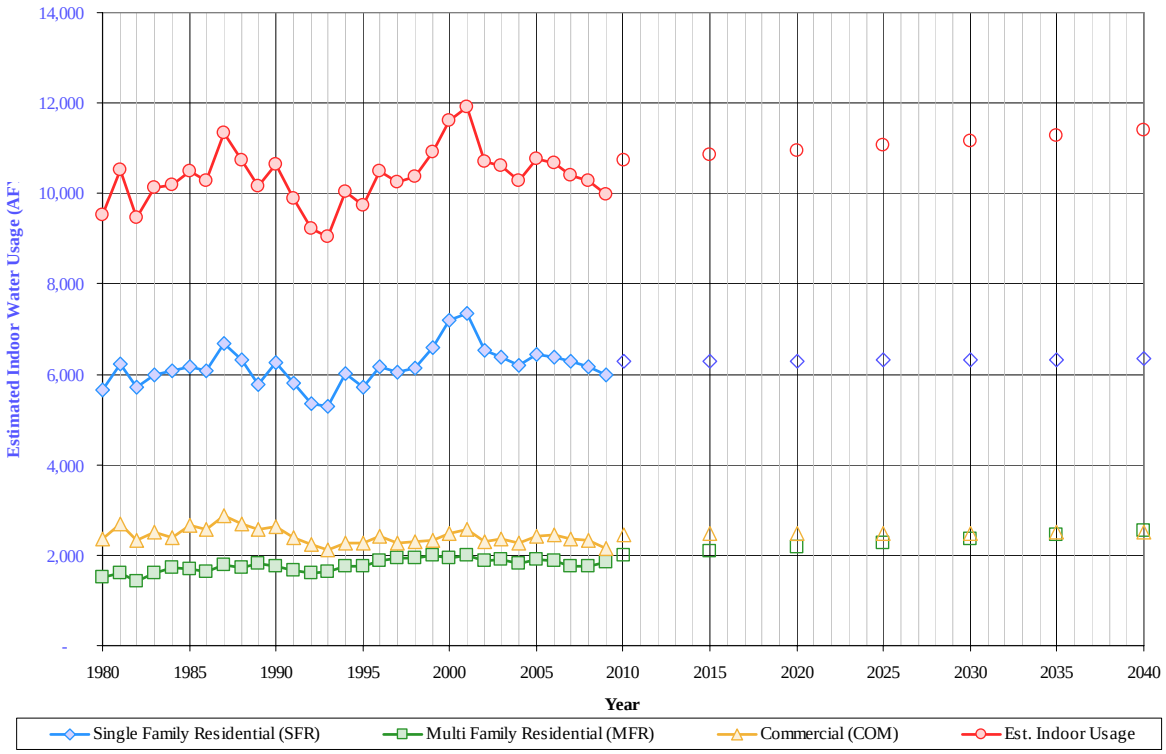
The City of San Mateo operates and maintains its sewer system consisting of gravity sewers and pumping stations. The collected wastewater is discharged to trunk sewers owned and operated by the City and conveyed to the San Mateo Wastewater Treatment Plant for treatment.

The City of San Carlos owns and operates its collection system and the wastewater is treated at the SBSA Treatment Plant. The wastewater from the collection systems from the neighboring areas is also pumped to the SBSA Treatment Plant in Redwood City. The SBSA owns and operates the regional sewer transmission lines and the associated pump stations. These force main diameters are 54 inches and smaller and convey flows generated from residential and commercial customers.

4.5.2 Estimated Wastewater Generated

The quantity of wastewater generated is proportional to the population and the water use in the service area. An estimate was obtained by a linear trend of 90 percent of the January water use from 1980 to the present for the residential and commercial services. A linear equation was then used to project to the year 2040, Figure 4.5-1.

Figure 4.5-1: Estimated District Annual Wastewater Generated



Estimates of the wastewater flows for the future conditions in Cal Water's Mid-Peninsula District service area are presented in Table 4.5-1.

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/Tertiary	10,750	10,879	11,012	11,150	11,292	11,438	11,590

Because no recycled water is used within Cal Water's service area, it is assumed that all the wastewater generated is disposed, as shown in Table 4.5-2.

Table 4.5-2: Disposal of Wastewater (non-recycled) AF Year (Table 22)

Method of disposal	Treatment Level	2010	2015	2020	2025	2030	2035	2040
Deep water outfall in the San Francisco Bay	San Mateo – Tertiary	10,750	10,879	11,012	11,150	11,292	11,438	11,590
	South Bayside – Secondary							
	Total	10,750	10,879	11,012	11,150	11,292	11,438	11,590

4.5.3 Wastewater Treatment and Recycling

The wastewater for the community of San Mateo currently undergoes primary, secondary, and tertiary treatment with chlorination and dechlorination prior to disposal into a deep-water outfall in the San Francisco Bay. The San Mateo Wastewater Treatment Plant consisted of two treatment trains from 1976 to 1993. One treatment train treated the high salinity influent of San Mateo's wastewater and the other treatment train treated wastewater with low salinity for recycling. The two treatment trains were combined in 1993 when the processes were deemed too expensive to run as separate entities without a higher demand for recycled water. The tertiary treatment method at the plant is pressure filtration. The San Mateo Wastewater Treatment Plant currently receives approximately 16 mgd from the San Mateo Wastewater Treatment Plant service area. Currently, none of the effluent from the San Mateo Wastewater Treatment Plant is recycled.

The wastewater at the SBSA Plant undergoes primary, secondary (activated sludge), dual media filtration, disinfection, and dechlorination treatment before being discharged to the deep-water outfall in the San Francisco Bay. The SBSA Plant has a capacity to treat 29.5 mgd, but currently receives 20 mgd from residential and commercial customers in the SBSA service area. SBSA is currently providing reclaimed water to sites located in and owned by the City of Redwood City. The reclaimed water is conveyed through piping that was installed in the mid-1980s in anticipation of the ultimate implementation of a water recycling program in the area. Currently, nine landscaped sites are irrigated with 26.5 acre-feet per year of reclaimed water. However, the recycled water is not distributed in the Cal Water service area.

4.5.4 Potential Water Recycling in District

Cal Water examined the potential for recycled water use in the Mid-Peninsula District in the Water Supply and Facilities Master Plan for the District. It was again explored in Cal Water's Integrated Long Term Water Supply Plan for the Three Peninsula Districts. These studies found a potential for 0.34 mgd of recycled water demand in the Mid-Peninsula District. Because of the low demand and high unit cost, this supply is not being immediately pursued. Cal Water will continue to evaluate the development of recycled water and will participate in a project if it becomes cost-effective. The potential recycled water use is shown in Table 4.5-3.

Table 4.5-3: Recycled Water - Potential Future Use-AFY (Table 23)

User Type	Description	Feasibility	2015	2020	2025	2030	2035	2040
Schools, Parks, Business Parks	Landscape irrigation	No	380	380	380	380	380	380
	Total		380	380	380	380	380	380

Two potential scenarios were evaluated in the Mid-Peninsula District Master Plan for Cal Water to provide recycled water to the San Carlos service area. These scenarios were

developed at a planning level of detail only and conceptual corridors are identified for general pipeline alignments. An additional scenario was developed in the Master Plan for service to the Bay Meadows development in San Mateo, but since the completion of the Master Plan, that development project proceeded without the use of recycled water.

In both scenarios, it is assumed that Cal Water would take recycled water from Redwood City's 16-inch diameter line at the corner of Oracle Parkway and Marine Parkway in Redwood Shores. This tie-in location was evaluated during the Master Plan development to provide the most flexibility for future planning. The scenarios include either service to all of the San Carlos System, or service only to the San Carlos Low Zone.

4.6 Desalinated Water

Cal Water explored the possibility of developing desalinated water as source of supply in its Water Supply and Facilities Master Plan for the District. It was examined in more detail in the Integrated Long Term Water Supply Plan for the three Peninsula Districts. There are a number of potential regional and local desalination projects which could be developed providing potable water to the Cal Water Peninsula districts.

Potential Regional Project

The Bay Area Regional Desalination Project (BARDP) will develop one or two desalination plants to produce reliable potable water. The participating agencies would either directly receive desalinated water or exchange other water between them. Participating agencies include Contra Costa Water District (CCWD), East Bay Municipal Utility District (EBMUD), SFPUC, Santa Clara Valley Water District (SCVWD), and Zone 7 Water Agency.

The BARDP evaluation process started in 2003 with the screening of 22 potential sites, narrowing those down to three sites. The 2007 feasibility study screened and ranked combinations of location, operation, and conveyance scenarios according to six issues: environmental, permitting, institutional/legal, cost, public perception, and reliability. The highest performing configuration was a 65 mgd facility in the City of Pittsburg, co-located with the existing Mirant Power Plant.

BARDP is currently conducting a pilot study at the East Contra Costa site to test different pretreatment and treatment technologies, brine discharge quality, and entrainment avoidance technologies, and to develop design criteria. After the pilot study is complete, a detailed site selection study is needed to identify a proposed site, preliminary layout, and conceptual engineering design for the facilities. Additionally, hazardous waste and geotechnical investigations would be required for the selected site or sites, and a blending study would be needed to evaluate the potential water sources and water quality of any transfer waters.

Potential Local Projects

In January 2011, Cal Water completed, with the assistance of Camp, Dresser, and McKee, a Long Term Water Supply Plan for the three Peninsula Districts (LTWSP). This LTWSP confirmed that a sizeable demand to supply gap exists or can be anticipated for these communities during drought conditions. More detailed information on the size of this gap, which could range up to 20 percent depending on the magnitude of the called drought, is presented in sections 5.2.1 and 5.2.3.

The LTWSP indicates that most viable alternatives to address this supply gap are through the development of either desalination and or water transfers. Cal Water intends to continue its investigation of these two alternatives.

The desalination options involve high pressure membrane technology to remove the salts fro the water. Two sources of water were considered: brackish groundwater and Bay water (either through an open intake or through slant wells). Based on the projected costs, brackish water desalination (with potential yields up to 5 mgd) is the most attractive option for meeting Cal Water needs. A Bay water option, while more expensive, is also attractive as it would provide greater capacity and provide opportunity for Cal Water to supply water to others both inside and outside of the service area.

Cal Water intends to conduct a more detailed feasibility investigation and, if results are positive, prepare a preliminary engineering analysis of the recommended desalination option. Implementing desalination will require 6 to 9 years. Several immediate steps are necessary over the next year for Cal Water to refine the costs including: verifying feasible brackish groundwater yield capacity, determining the best well location, confirming feasibility of brine discharge locations, siting treatment facilities based on land availability and costs, and determining the need for pilot testing. If a larger capacity facility is justified by interest in other parties, identify potential open water intake locations and determine costs.

The estimated cost of this detailed feasibility investigation and engineering analysis of the desalination option is $2.6 million, with a duration of 4-5 years. In order to proceed, Cal Water must first obtain approval to conduct the study from California Public Utilities Commission at its next General Rate Case, which starts in 2012, with a potential decision to proceed in 2013. This means that no supply from this source would likely be available until 2025. Therefore, desalination is a long term solution to the supply gap.

4.7 Transfer or Exchange Opportunities

The Integrated Long Term Water Supply Plan for the Three Peninsula Districts also examined several water transfer options as a means to augment existing supplies. These include Delta transfers, pre-1914 water rights transfers, “green option” transfers, and transfers of SFPUC water between BAWSCA agencies.

Delta Transfers

The majority of the Delta transfers are between SWP and CVP contractors, providing a shift in supply, but using the same infrastructure for transfer of these supplies. Non SWP

and CVP contractors have lower rights for accessing, availability, and capacity available for wheeling or groundwater storage. In drought years this provides a low level of certainty of being able to contract for, or obtain these types of transfer agreements.

Increasing reliability of long-term transfers requires addition of storage. In the case of the SWP, CVP, or transfer of supplies off of the central valley rivers this has most often been done as groundwater storage in Kern County. Addition of the groundwater storage increases costs, and there has been a significant demand by other SWP contractors to purchase the groundwater storage options.

Even with contracts for transfer in place storage may be required to off-set the seasonal availability of the Delta supplies. In addition, these supplies would still need to be transferred from the Delta to the Peninsula Districts. This would most likely occur either through the SBA or SCVWD transmission system from San Luis Reservoir. Wheeling agreements would be required with DWR for transfers through the SBA, and additional agreements with either ACWD or SCVWD. That water would then need to be conveyed through other agency systems to the District service areas, or ACWD would transfer part of its SFPUC supply to the Districts.

Not including conveyance/wheeling charges, the price for Delta transfer supply depends on the source, but currently is around $200/AF from the Sacramento Valley, and $400 to $900/AF for San Joaquin transfers. During dry years these costs tend to increase. These costs do not include wheeling from the Delta to the Bay Area or then to the Peninsula Districts.

Pre-1914 Water Right Transfers

Another potential group of water transfers are pre-1914 water right supplies. These supplies have higher priority than post-1914 and the majority of the SWP and CVP rights. As such, they are not subject to the same environmental and institutional cutbacks seen with the Delta supplies recently.

These pre-1914 rights are more reliable during droughts than other rights, and as such have a higher value and cost. One of the key issues is conveyance of that supply to the purchaser. This adds complexity to the transfer arrangements, and increases the costs for wheeling of the supply.

The two main issues associated with the pre-1914 rights are: the long-term availability, especially during droughts, and; the cost for purchase of the supply and the wheeling or infrastructure costs to transfer this supply to the Peninsula Districts.

Transfers of “Green Option” Supply

The conservation offset, or green option, is based on implementation of agricultural water use efficiencies in the lower Tuolumne River watershed (LTRW) (i.e. Modesto Irrigation District [MID] and Tuolumne Irrigation District [TID] service areas). The green option reduces irrigation water requirements through implementation of agricultural water efficiency measures, instead of fallowing land which can cause third-party impacts.

The Tuolumne river option has many advantages, including the high level of water quality. If the project is a direct offset for releases to MID and TID this would be equivalent to Hetch Hetchy supply. If this is water released from Don Pedro then additional treatment would be required. In either case, conveyance would be through the SFPUC system, and would not require other wheeling agreements outside of those with SFPUC.

Transfers between SFPUC wholesale customers

The water supply agreements with SFPUC allow the transfer of supply between wholesale customers without penalty, or additional charges. However, the agreements do not allow carry over from year to year of water if purchases were less than the interim supply agreement. This transfer mechanism can be used if other wholesale customers have excess supply, either due to their contract capacity, or if Cal Water were to fund other projects within these agencies that may free up SFPUC supply for transfer.

Since it is likely that some form of transfer can be implemented sooner than desalination, Cal Water is considering this to be a short term solution to the identified supply gap.

5 Water Supply Reliability and Water Shortage Contingency Planning

5.1 Water Supply Reliability

As previously identified, the water supply from the Mid-Peninsula District is 100 percent purchased water provided by the SFPUC. Thus the following discussion on supply reliability focuses primarily on the reliability of the purchased water. However, it should be noted that the reliability of the local supplies in other Cal Water Districts will influence supply reliability in the Mid-Peninsula District during a drought event. These impacts are considered in the Drought Planning section 5.2 that follows.

The SFPUC's Water System Improvement Program (WSIP) provides goals and objectives to improve the delivery reliability of the Regional Water System (RWS) including water supply reliability. The goals and objectives of the WSIP related to water supply are:

Table 5.1-1: WSIP Reliability Goals and Objectives

Program Goal	System Performance Objective
Water Supply – *meet customer water needs in non-drought and drought periods*	• Meet average annual water demand of 265 million gallons per day (mgd) from the SFPUC watersheds for retail and wholesale customers during non-drought years for system demands through 2018. • Meet dry-year delivery needs through 2018 while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts. • Diversify water supply options during non-drought and drought periods. • Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.

The adopted WSIP had several water supply elements to address the WSIP water supply goals and objectives. The following provides the water supply elements for all year types and the dry-year projects of the adopted WSIP to augment all year type water supplies during drought.

<u>Water Supply – All Year Types</u>
The SFPUC historically has met demand in its service area in all year types from its watersheds. They are the:

- Tuolumne River watershed
- Alameda Creek watershed
- San Mateo County watersheds

In general, 85 percent of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15 percent comes from the local watersheds through

the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. The adopted WSIP retains this mix of water supply for all year types.

Water Supply – Dry-Year Types

The adopted WSIP includes the following water supply projects to meet dry-year demands with no greater than 20 percent system-wide rationing in any one year:

- Restoration of Calaveras Reservoir capacity
- Restoration of Crystal Springs Reservoir capacity
- Westside Basin Groundwater Conjunctive Use
- Water Transfer with Modesto Irrigation District (MID) / Turlock Irrigation District (TID)

In order to achieve its target of meeting at least 80 percent of its customer demand during droughts, the SFPUC must successfully implement the dry-year water supply projects included in the WSIP.

Impact of Recent SFPUC Actions on Dry Year Reliability of SFPUC Supplies

In adopting the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements Project, the SFPUC committed to providing fishery flows below Calaveras Dam and Lower Crystal Springs Dam as well as bypass flows below Alameda Creek Diversion Dam. The fishery flow schedules for Alameda Creek and San Mateo Creek represent a potential decrease in available water supply of an average annual 3.9 mgd and 3.5 mgd, respectively with a total of 7.4 mgd average annually. These fishery flows could potentially create a shortfall in meeting the SFPUC demands of 265 mgd and slightly increase the SFPUC's dry-year water supply needs. If a shortfall occurs, it is anticipated at the completion of construction of both the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements project in approximately 2015 and 2013, respectively when the SFPUC will be required to provide the fishery flows. This reduction in local supply could seriously impact Cal Water's dry year supply from SFPUC.

The adopted WSIP water supply objectives include (1) meeting a target delivery of 265 mgd through 2018 and (2) rationing at no greater than 20 percent system-wide in any one year of a drought. As a result of the fishery flows, the SFPUC may not be able to meet these objectives between 2013 and 2018 without (1) a reduction in demand, (2) an increase in rationing, or (3) a supplemental supply. The following describes these actions.

Reduction in Demand

The current projections for purchase requests through 2018 remain at 265 mgd. However, in the last few years, SFPUC deliveries have been below this level. If this trend continues, the SFPUC may not need 265 mgd from its watersheds to meet purchase requests through 2018. As a result, the need for supplemental supplies of 3.5 mgd

starting in 2013 and increasing to 7.4 mgd in 2015 to offset the water supply loss associated with fish releases may be less than anticipated.

Increase in Rationing

The adopted WSIP provides for a dry year water supply program that, when implemented, would result in system-wide rationing of no more than 20 percent. The PEIR identified the following drought shortages during the design drought; 3.5 out of 8.5 years at 10 percent rationing and 3 out of 8.5 years at 20 percent. If the SFPUC did not develop a supplemental water supply in dry years to offset the effects of the fishery flows on water supply, rationing would increase during dry years. If the SFPUC experiences a drought between 2013 and 2018 in which rationing would need to be imposed, rationing would increase by approximately 1 percent in shortage years. Rationing during the design drought would increase by approximately 1 percent in rationing years.

Supplemental Supply

The SFPUC may be able to manage the water supply loss associated with the fishery flows through the following actions and considerations:

- Development of additional conservation and recycling
- Development of additional groundwater supply
- Water transfer from MID and/or TID
- Increase in Tuolumne River supply
- Revising the Upper Alameda Creek Filter Gallery Project capacity[8]
- Development of a desalination project

The SFPUC is committed to meeting its contractual obligation to its wholesale customers of 184 mgd and its delivery reliability goal of 265 mgd with no greater than 20 percent rationing in any one year of a drought. The SFPUC will be considering a report at the end of March 2011 that describes how the SFPUC intends to continue meeting its delivery reliability goals. Pursuant to Commission Resolution 10-0175 adopting the Lower Crystal Springs Dam Improvements Project, the Commission specifically directed staff to (1) continue monitoring water supply and demand to determine whether the Commission should consider additional water supply strategies to meet demand up to 2018, (2) provide to this Commission for its consideration the Interim Supply Allocation in December 2010 in accordance with its existing contractual obligations, and (3) provide

[8] The adopted WSIP included the Alameda Creek Fishery Enhancement project, since renamed the Upper Alameda Creek Filter Gallery (UACFG) project, which had the stated purpose of recapturing downstream flows released under a 1997 California Department of Fish and Game MOU. Implementation of the UACFG project was intended to provide for no net loss of water supply as a result of the fishery flows bypassed from ACDD and/or released from Calaveras Dam. At the time the PEIR was prepared, the UACFG was described in the context of recapturing up to 6300 AF per year. The UACFG will undergo a separate CEQA process in which all impacts associated with the project will be analyzed fully.

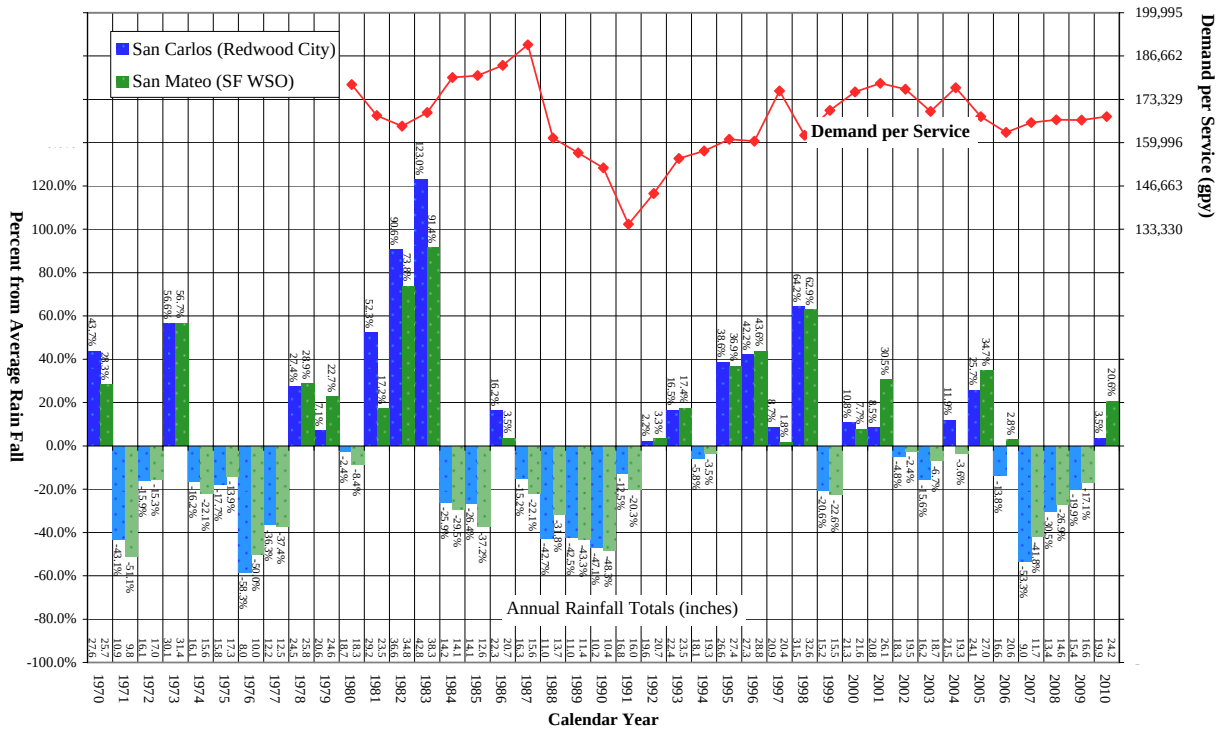
information to the Commission and the public by March 31, 2011 on how the SFPUC has the capability to attain its water supply levels of service and contractual obligations.

5.2 Drought Planning

The water supply for the Mid-Peninsula District is ultimately reliant on annual precipitation in Tuolumne River watershed, and local watersheds that supply the Regional Water System. Although Cal Water only has access to SFPUC's local supplies, a shortage in imported supplies would reduce the total amount available in the RWS. According to SFPUC, approximately 15 percent of their supplies are generated locally. So while local precipitation only contributes a small portion to the supply, it has a large impact on customer demands. In dry years demand tends to increase as natural precipitation is replaced by potable supply for uses such as outdoor landscape irrigation. As dry conditions persist, demands tend to decrease over time as customers respond to drought conditions and conservation messaging. Figure 5.2-1 shows the annual rainfall compared to historical average. The average annual rainfall for the District is 19.2 inches (at Redwood City).

Figure 5.2-1: Comparison of Annual Rainfall to Historical Average

Average Annual Rainfall San Carlos (Redwood City) = 19.57 inches
Average Annual Rainfall San Mateo (SF WSO) = 20.17 inches



For the purposes of this analysis 1997 was chosen as the most recent normal hydrologic year when rainfall was 9 percent (20.9 in) above average at Redwood City. 2007 was chosen as the single dry year because it had a rainfall of 53 percent (9.0 in) below average. The multiple dry year range used in this analysis was from 1988-1991, which coincides with the extended drought California experienced during this time.

Table 5.2-1: Basis of Water Year Data (Table 27)	
Water Year Type	**Base Year**
Average Water Year	1997
Single-Dry Water Year	2007
Multiple-Dry Water Years	1988-1991

The Mid-Peninsula District's supply needs are solely by purchases of imported water from SFPUC. Local supplies from either the Cal Water's South San Francisco or Bear Gulch Districts are not available in Mid-Peninsula. However, the availability of these local sources impacts how much water is ultimately available to the Mid-Peninsula District. Because there is no access to local surface water within the District, total runoff figures were not used in this analysis. 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 is 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: 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**
175,930	166,164	161,450	156,828	152,250	134,886
Percent of Average/Normal Year:	94%	92%	89%	87%	77%

Because of customer demand reductions, an adequate SFPUC supply has often been available during multiple-dry year events. During future dry periods customer water use patterns are expected to be similar to past events. Table 5.2-3 shows the supplies that would be available in a multiple dry year event from 2011-2013, beginning with a normal year in 2010. The SFPUC supply amounts were calculated by applying the percentages from years 1-3 in Table 5.2-2 to the target demand projection for those years; and assuming there is no called for reduction or implementation of the Water Shortage Allocation Plan.

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

Water Supply Source	Average / Normal Water Year Water Supply	Multiple Dry Water Year Water Supply		
		2011	2012	2013
SFPUC	18,399	16,987	16,589	16,191
% of Normal Year	100%	92%	90%	88%

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 landscaping needs or a decrease in demand due to awareness of drought conditions.

Cal Water's ISG from SFPUC is shared among all three of its districts on the San Francisco Peninsula. This provides the operational flexibility to distribute the supply as needed in each system depending on the availability of local supplies and conditions within each district. Therefore, for the purposes of the normal, single-dry, and multiple-dry year supply and demand comparison analysis, the three districts have been considered together.

In normal years the full ISG of 35.68 MGD (39,967 AF) is available, as shown in Table 5.2-4. The long term average of local surface supply in the Bear Gulch District is 1,260 AFY. This amount is considered to be the normal year supply.

Cal Water, in conjunction with the City San Bruno, City of Daly City, and SFPUC, is participating in an evaluation of the Westside Groundwater Basin to estimate the safe yield of the basin and determine the feasibility of entering a conjunctive use program. Preliminary results indicate that under this scenario Cal Water's South San Francisco District program pumping level will be 1,535 AFY in a normal non-put or take year. If implemented this in-lieu conjunctive use program will not alter the total available supply. Depending on the type of year, this program will only impact the source of the supply, not the total quantity. Therefore for the purposes of this analysis it is not considered.

Based on the availability of normal year supplies, there will be a deficiency of approximately 2,100 AF by 2040. Cal Water will only purchase enough SFPUC water to meet customer demand in any given year. The projected demand shown in Table 5.2-4 is based on the SBx7-7 target demand, which assumes that each district reaches its individual demand goals.

Table 5.2-4: Supply and Demand Comparison - Normal Year - AF (Table 32)						
	2015	2020	2025	2030	2035	2040
SFPUC Total	39,967	39,967	39,967	39,967	39,967	39,967
BG - Surface	1,260	1,260	1,260	1,260	1,260	1,260
SSF - Wells	1,535	1,535	1,535	1,535	1,535	1,535
Supply totals (from Table 16)	42,762	42,762	42,762	42,762	42,762	42,762
BG	13,839	12,622	12,975	13,348	13,743	14,160
MPS	18,911	18,613	19,143	19,703	20,293	20,915
SSF	9,297	8,665	8,928	9,204	9,494	9,799
Demand totals (From Table 11)	42,047	39,900	41,046	42,255	43,530	44,875
Difference	715	2,862	1,716	507	(768)	(2,113)
Difference as % of Supply	1.7%	6.7%	4.0%	1.2%	-1.8%	-4.9%
Difference as % of Demand	1.7%	7.2%	4.2%	1.2%	-1.8%	-4.7%

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. However, based on the years chosen for this analysis, when combined, Cal Water's three San Francisco Peninsula districts used slightly less water in single dry years.

Based on historical records, the local surface supply from the Bear Gulch Reservoir provides approximately 351 AFY in single dry years. The South San Francisco District's normal groundwater supply of 1,535 AFY is expected to be fully available in single dry years. According to the SFPUC reliability analysis provided to BAWSCA for this UWMP, there could be a 10 percent system-wide cutback during single dry years. Under the Tier 2 allocation plan, Cal Water could see a reduction in SFPUC supply of up to 17 percent.

The single dry year supply and demand values for all three Peninsula Districts are shown in Table 5.2-5. The demand values were calculated by increasing the target demand projection in each year by the historic percentage listed for the single dry year in Table 5.2-2. A 10 percent system-wide cutback in SFPUC supplies results in a supply shortfall of approximately 6,700 AF in 2015 and 9,400 AF in 2040.

Table 5.2-5: Supply and Demand Comparison – Single Dry Year - AF (Table 33)						
	2015	2020	2025	2030	2035	2040
SFPUC Total	33,173	33,173	33,173	33,173	33,173	33,173
BG - Surface	351	351	351	351	351	351
SSF - Wells	1,535	1,535	1,535	1,535	1,535	1,535
Supply totals	35,059	35,059	35,059	35,059	35,059	35,059
BG	15,065	13,740	14,125	14,531	14,960	15,415
MPS	17,861	17,580	18,081	18,609	19,167	19,754
SSF	8,819	8,220	8,469	8,731	9,006	9,296
Demand totals	41,746	39,540	40,675	41,871	43,134	44,465
Difference	(6,687)	(4,481)	(5,616)	(6,813)	(8,075)	(9,406)
Difference as % of Supply	-19.1%	-12.8%	-16.0%	-19.4%	-23.0%	-26.8%
Difference as % of Demand	-16.0%	-11.3%	-13.8%	-16.3%	-18.7%	-21.2%

Historically, SFPUC supplies have not been reduced this dramatically in the first year of a drought. Under normal circumstances SFPUC has adequate carryover storage in the RWS to provide an increased level of service in single dry years. If the hydrologic conditions were severe enough, Cal Water would expect SFPUC to request a voluntary reduction in purchases. Cal Water would respond accordingly by requesting additional conservation by its customers through implementation of the Water Shortage Contingency Plan.

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. However, based on the years chosen for this analysis, Cal Water's three Peninsula Districts had lower demands during the multiple dry year period than in either the single dry or normal hydrologic years. The historic data from 1988-1990 shows that customer demand in multiple dry years was between 12 and 18 percent less than in normal years. This was the result of customer response to the severe drought conditions at the time. Although past droughts are a good indication of what can be expected in future multiple dry year periods, each drought has its own characteristics and poses unique challenges.

Based on historical records, the local surface supply from the Bear Gulch Reservoir provides an average of approximately 609 AFY in multiple dry years. The South San Francisco District's normal groundwater supply of 1,535 AFY is expected to be fully available in multiple dry years. As in the single dry year the in-lieu conjunctive use program will not impact the quantity of supply, only the source of supply to Cal Water.

According to the SFPUC reliability analysis provided to BAWSCA for this UWMP, there could be a 10 percent system-wide cutback during the first year of a multiple dry year period, and a 20 percent cutback in years two and three. As mentioned earlier, a 10 percent system-wide cutback results in a 17 percent reduction in SFPUC supplies to Cal Water, while a 20 percent cutback results in a 34 percent reduction in SFPUC supplies.

As shown in Table 5.2-6, there is a supply shortfall of 526 AF as early as 2015 if a 10 percent system-wide reduction is required. If the cutback reaches 20 percent Cal Water could see a shortfall of 7,900 AF beginning in 2016, and over 9,700 AF in 2040. These shortfalls would need to be met through a combination of customer demand reductions resulting from the implementation of the Water Shortage Contingency Plan, and the development of alternative supplies.

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	SFPUC Total	33,173	33,173	33,173	33,173	33,173
	BG - Surface supply	609	609	609	609	609
	SSF - Well supply	1,535	1,535	1,535	1,535	1,535
	Supply totals	**35,316**	**35,316**	**35,316**	**35,316**	**35,316**
	BG	11,329	10,332	10,622	10,927	11,250
	MPS	17,355	17,081	17,568	18,081	18,623
	SSF	8,528	7,948	8,190	8,443	8,709
	Demand totals	**37,212**	**35,362**	**36,379**	**37,451**	**38,582**
	Difference	(1,895)	(45)	(1,063)	(2,135)	(3,266)
	Difference as % of Supply	-5.4%	-0.1%	-3.0%	-6.0%	-9.2%
	Difference as % of Demand	-5.1%	-0.1%	-2.9%	-5.7%	-8.5%
Multi-dry year second year supply	SFPUC Total	26,378	26,378	26,378	26,378	26,378
	BG - Surface supply	609	609	609	609	609
	SSF - Well supply	1,535	1,535	1,535	1,535	1,535
	Supply totals	**28,522**	**28,522**	**28,522**	**28,522**	**28,522**
	BG	11,329	10,571	10,869	11,183	11,516
	MPS	16,878	16,685	17,163	17,667	18,198
	SSF	8,232	7,821	8,060	8,310	8,573
	Demand totals	**36,439**	**35,077**	**36,091**	**37,160**	**38,287**
	Difference	(7,917)	(6,555)	(7,569)	(8,638)	(9,765)
	Difference as % of Supply	-27.8%	-23.0%	-26.5%	-30.3%	-34.2%
	Difference as % of Demand	-21.7%	-18.7%	-21.0%	-23.2%	-25.5%
Multi-dry year third year supply	SFPUC Total	26,378	26,378	26,378	26,378	26,378
	BG - Surface supply	609	609	609	609	609
	SSF - Well supply	1,535	1,535	1,535	1,535	1,535
	Supply totals	**28,522**	**28,522**	**28,522**	**28,522**	**28,522**
	BG	10,880	10,392	10,686	10,996	11,325
	MPS	16,404	16,288	16,757	17,252	17,774
	SSF	8,120	7,868	8,109	8,361	8,627
	Demand totals	**35,404**	**34,548**	**35,552**	**36,610**	**37,726**
	Difference	(6,882)	(6,026)	(7,030)	(8,088)	(9,204)
	Difference as % of Supply	-24.1%	-21.1%	-24.6%	-28.4%	-32.3%
	Difference as % of Demand	-19.4%	-17.4%	-19.8%	-22.1%	-24.4%

5.3 Factors Affecting Reliability of Supply

Several factors that could influence supply reliability 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
San Francisco Public Utilities Commission	✓	✓		✓

Cal Water does not expect any legal issues to negatively influence supply reliability in the near future. The current purchased water agreement will not be renegotiated until 2018, and the quantity available is not expected to decrease below this level. The WSIP is subject to CEQA documentation and public review. Any of the projects in the WSIP could be challenged legally, which could impact the reliability of future supplies. The SFPUC's Regional Water System is largely isolated from the issues surrounding the Sacramento-San Joaquin River Delta and should not be impacted by the legal and environmental problems associated with it. Although unlikely, it is possible that similar issues could arise along the Tuolumne River or in the local watersheds on the San Francisco Peninsula.

The water supplied by the SFPUC is of very high quality. No water quality concerns are thought to threaten supply reliability.

The reliability of the purchased water supply is dependent on the frequency, timing, and magnitude of winter storms in the central Sierra Nevada Mountains. Short and long-term drought events will reduce the availability of supply because of decreased springtime snowpack and reservoir carryover storage.

5.4 Water Quality

The drinking water delivered in the Mid-Peninsula District meets 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 Health Services 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 that are referred to as Primary and Secondary Standards. 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 very conservatively for each contaminant, and are generally based on health effects, which may occur if a person was 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.

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.

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 Mid-Peninsula District is completely reliant on imported water. Cal Water's imported supply comes through the SFPUC's Regional Water System. Because this source of supply provides the all of total supply for the District, Cal Water's Water Shortage Allocation Plan will be triggered by actions within this agency. Cal Water will follow the lead of the SFPUC when deciding whether to implement the Water Shortage Allocation Plan. The percent shortage identified by SFPUC will determine which drought stage the District 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 July 2009, in connection with the WSA, the wholesale customers and San Francisco adopted a Water Shortage Allocation Plan (WSAP) to allocate water from the regional water system to retail and wholesale customers during system-wide shortages of 20 percent or less (the "Tier One Plan"). The Tier One Plan replaced the prior Interim Water Shortage Allocation Plan, adopted in 2000, which also allocated water for shortages up to 20 percent. The Tier One Plan also allows for voluntary transfers of shortage allocations between the SFPUC and any wholesale customer and between wholesale customers themselves. In addition, water "banked" by a wholesale customer, through reductions in usage greater than required, may also be transferred.

The Tier One Plan, which allocates water between San Francisco and the wholesale customers collectively, distributes water based on the level of shortage:

Table 5.5-6: Annual Allocations Between SFPUC and Wholesale Customers

System Wide Reduction Required	Share of Available Water	
	SFPUC Share	Wholesale Customers Share
5% or less	35.5%	64.5%
6-10%	36.0%	64.0%
11-15%	37.0%	63.0%
16-20%	37.5%	62.5%

The Tier One Plan will expire at the end of the term of the Water Supply Agreement, unless extended by San Francisco and the wholesale customers.

The wholesale customers have negotiated and adopted the "Tier Two Plan," the second component of the WSAP which allocates the collective wholesale customer share among each of the 26 wholesale customers. This Tier Two allocation is based on a formula that takes multiple factors for each wholesale customer into account, including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the wholesale customers collectively will be allocated among them in proportion to each wholesale customer's Allocation Basis, expressed in millions of gallons per day (mgd), which in turn is the weighted average of two components. The first component is the wholesale customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the wholesale customers for all available water supplies. The second component is accorded twice the weight of the first, fixed component in calculating the Allocation Basis. Minor adjustments to the

Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain wholesale customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all wholesale customers' Allocation Bases to determine each wholesale customer's Allocation Factor. The final shortage allocation for each wholesale customer is determined by multiplying the amount of water available to the wholesale customers' collectively under the Tier One Plan, by the wholesale customer's Allocation Factor.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the wholesale customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each wholesale customer will also change. However, for long-term planning purposes, each wholesale customer shall use as its Allocation Factor, the value identified in the Tier Two Plan when adopted.

The Tier Two Plan will expire in 2018 unless extended by the wholesale customers.

Cal Water's timeline for implementing its Water Shortage Contingency Plan will generally follow SFPUC'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.

In the Mid-Peninsula District the City of San Carlos has passed a water efficient landscape 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.

There are currently fourteen emergency connections with neighboring water systems. These connections will help to prevent the complete interruption of service in the event of a failure of water supply facilities by allowing water to be delivered to either system.

Mains, tanks, and pump stations are designed to deliver fire flows for normal residential, commercial, and industrial fires. Most storage tanks are designed to provide fire flows for a minimum of two hours. Facilities are not designed to handle wild fires such as the Oakland Hills fire, nor extended power outages such as could be possible after a major forest fire, earthquake, or other disaster.

6 Demand Management Measures

6.1 BAWSCA Water Conservation Implementation Plan

In September 2009, BAWSCA completed the Water Conservation Implementation Plan (WCIP). The goal of the WCIP is to develop an implementation plan for BAWSCA and its member agencies to attain the water efficiency goals that the agencies committed to in 2004 as part of the Program Environmental Impact Report (PEIR) for the Water System Improvement Program (WSIP). The WCIP's goal was expanded to include identification of how BAWSCA member agencies could use water conservation as a way to continue to provide reliable water supplies to their customers through 2018 given the SFPUC's 265 million gallons per day (MGD) Interim Supply Limitation. The SFPUC imposed the Interim Supply Limitation on October 31, 2008, to limit the volume of water that the BAWSCA member agencies and San Francisco can collectively purchase from the RWS to 265 MGD until at least 2018.

Based on the WCIP development and analysis process, BAWSCA and its member agencies identified five new water conservation measures, which, if implemented fully throughout the BAWSCA service area, could potentially save an additional 8.4 MGD by 2018 and 12.5 MGD by 2030. The demand projections for the BAWSCA member agencies, as transmitted to the SFPUC on June 30, 2010, indicate that collective purchases from the SFPUC will stay below 184 MGD through 2018 as a result of revised water demand projections, the identified water conservation savings, and other actions.

Several member agencies have elected to participate in the BAWSCA regional water conservation programs and BAWSCA continues to work with individual member agencies to incorporate the savings identified in the WCIP into their future water supply portfolios with the goal of maintaining collective SFPUC purchases below 184 MGD through 2018.

BAWSCA and its member agencies look for opportunities to work with other water agencies, including the SFPUC and the Santa Clara Valley Water District (SCVWD), and leverage available resources to implement water use efficiency projects. For example, in 2005, BAWSCA and the SFPUC entered into a Memorandum of Understanding (MOU) regarding the administration of a Spray Valve Installation Program. Through this MOU, BAWSCA and the SFPUC worked cooperatively to offer and coordinate the installation of water conserving spray valves to food service providers throughout the BAWSCA service area. In addition, BAWSCA participates in the Bay Area Efficient Clothes Washer Rebate Program, which is a residential rebate program offered by all of the major Bay Area water utilities. Through participation in this program, BAWSCA and its participating member agencies were the recipients of $187,500 in Proposition 50 grant funds, which became available in Fiscal Year 2006/2007.

More recently, as part of the Bay Area Integrated Regional Water Management Plan, BAWSCA and the other major Bay Area water utilities submitted a Proposition 84 Implementation Grant Proposal in January 2011 to support regional water conservation

efforts that offer drought relief and long-term water savings. The proposed project includes a package of water conservation programs to improve water use efficiency throughout the San Francisco Bay Area. The project provides direct funding, financial incentives (rebates), and/or subsidies for the implementation of programs that achieve reduced water demand, by all classes of water users: residential, and commercial, industrial and institutional. Four specific programs were selected for the project because they were determined to provide the most quantifiable and sustainable water savings, including: 1.) Water-Efficient Landscape Rebates, Training and Irrigation Calculator, 2.) High-Efficiency Toilet/Urinal Direct Install and/or Rebates, 3.) High-Efficiency Clothes Washer Rebates, and 4.) Efficient Irrigation Equipment Rebates.

BAWSCA and its member agencies will continue to look to partner with each other and the other Bay Area water utilities, as appropriate, to develop regional water conservation efforts that extend beyond local interests to examine costs, benefits and other related issues on a system-wide level. The goal is to maximize the efficient use of water regionally by capitalizing on variations in local conditions and economies of scale.

6.2 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 6.2-1: 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.

6.3 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 Mid-Peninsula 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.

6.4 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 Mid-Peninsula District has a gross savings requirement of -197 AF from 2011-2015, as shown in Table 6.4-1.

Table 6.4-1: SBx7-7 and MOU Gross Water Savings Requirements

Gross Water Savings Required by 2015	SBx7-7	MOU Flex Track
2015 Unadjusted Baseline Demand	18,920 AF	18,920 AF
2015 Target Demand	19,117 AF	18,285 AF
Gross Savings Requirement	**-197 AF**	**635 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 6.4-1. This shows the maximum amount of water savings needed for SBx7-7 compliance, as well as the savings required for MOU compliance. Because Mid-Peninsula 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 Mid-Peninsula 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 6.4-2.

Table 6.4-2: Adjusted Baseline Demand Projection

Adjusted Baseline (AF)	2011	2012	2013	2014	2015
Unadjusted Baseline	18,519	18,618	18,718	18,818	18,920
Less Savings from					
Codes	42	82	120	156	205
Schedule Rate Increases	13	24	31	24	3
Existing Programs	72	70	69	61	54
Adjusted Baseline Demand	**18,393**	**18,442**	**18,498**	**18,576**	**18,657**
Per Capita (GPCD)	129	128	128	128	128

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 131 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 6.4-3. In the case of SBx7-7, 2015 demand, after accounting for codes, scheduled changes in rates, and 2009-10 conservation program activity, is projected to be 460 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 54 AF of savings in 2015. Thus conservation programs implemented over the period 2011-2015 will need to save an additional 580 AF by 2015 for Mid-Peninsula District to be in compliance with the MOU.

Table 6.4-3: New Program Savings Required for SBx7-7 and MOU Compliance		
2015 Net Savings Requirement (AF)	**SBx7-7**	**MOU Flex Track**
Gross Savings Requirement	18,920	18,920
Less		
Savings from codes	205	NA
Savings from rates	3	NA
Savings from existing programs	54	54
Subtotal Expected Savings	*263*	*54*
Savings Required from New Programs[1]	**-460**	**580**
[1]*Negative net savings indicates that no new program savings required for compliance*		

6.5 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 Mid-Peninsula 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 6.5-1 lists all Cal Water core and non-core conservation programs.

Table 6.5-1: 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.

6.6 Conservation Program Portfolio

This section presents the recommended conservation program portfolio for the Mid-Peninsula 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 Mid-Peninsula 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 in Mid-Peninsula District would equal its 2015 per capita water use target. However, the analysis also showed that an additional 580 AF of water savings from new programs would be required to achieve MOU compliance in 2015 and SBx7-7 compliance in 2020. The program recommendations presented in this section are designed to both achieve its 2015 Flex Track target and position it to achieve its 2020 per capita target. For the Mid-Peninsula District, the programs selected and the activity level of each are shown in Table 6.6-1.

Table 6.6-1: Recommended Program Levels					
Program	**Recommended Annual Activity Levels**				
	2011	**2012**	**2013**	**2014**	**2015**
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	880	880	880	1,810	1,810
Clothes Washers	1,380	1,380	1,380	2,160	2,160
Urinals	0	0	0	0	0
Customer Surveys/Audits	110	110	110	150	150
Conservation Kit Distribution	1,080	1,080	1,080	1,120	1,120
Pop-Up Nozzle Distribution	12,750	12,750	12,750	13,290	13,290
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	330	330	350	3,530	3,530
Smart Irr. Controller Vendor Incentives	10	10	10	600	600
Large Landscape Water Use Reports	70	70	70	120	120
Large Landscape Surveys/Incentives	90	90	80	90	90
Commercial Kitchen Rebates/Vouchers	0	0	0	30	30
Cooling Tower/Process Water Retrofit Incentives	0	0	0	0	0

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 6.6-2 shows projected water savings associated with the programs listed above. The projected savings exceed the 2015 and 2020 SBx7-7 and MOU Flex Track targets. The proposed level of demand reduction is economically justified based on the cost of conservation water savings relative to purchased water costs.

Table 6.6-2: Projected Water Savings by Program

Program	Annual Water Savings (AF)				
	2011	2012	2013	2014	2015
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	31.7	62.2	91.5	149.9	205.9
Clothes Washers	24.6	48.2	70.9	104.7	137.2
Urinals	0.0	0.0	0.0	0.0	0.0
Customer Surveys/Audits	4.5	8.5	12.1	19.8	26.7
Conservation Kit Distribution	16.8	31.5	44.5	56.7	67.3
Pop-Up Nozzle Distribution	51.0	102.0	153.0	206.1	259.2
Subtotal Core Programs	***128.6***	***252.4***	***372.0***	***537.1***	***696.3***
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	16.5	32.2	48.3	166.1	279.3
Smart Irr. Controller Vendor Incentives	0.1	0.2	0.2	16.4	32.5
Large Landscape Water Use Reports	5.5	5.5	5.5	10.4	10.4
Large Landscape Surveys/Incentives	12.9	25.9	37.9	51.4	64.9
Commercial Kitchen Rebates/Vouchers	0.0	0.0	0.0	3.8	7.4
Cooling Tower/Process Water Retrofit Incentives	0.0	0.0	0.0	0.0	0.0
Subtotal Non-Core Programs	***34.9***	***63.7***	***91.9***	***248.1***	***394.5***
Total Core and Non-Core Program Savings	**163.5**	**316.1**	**463.9**	**785.2**	**1,090.8**

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 Mid-Peninsula 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 SFPUC Strategy

The issue of climate change has become an important factor in water resources planning in the State, and is frequently being considered in urban water management planning purposes, though the extent and precise effects of climate change remain uncertain. As described by the SFPUC in its Final Water Supply Availability Study for the City and County of San Francisco, dated October 2009, there is evidence that increasing concentrations of greenhouse gasses have caused and will continue to cause a rise in temperatures around the world, which will result in a wide range of changes in climate patterns. Moreover, there is evidence that a warming trend occurred during the latter part of the 20th century and will likely continue through the 21st century. These changes will have a direct effect on water resources in California, and numerous studies have been conducted to determine the potential impacts to water resources. Based on these studies, climate change could result in the following types of water resource impacts, including impacts on the watersheds in the Bay Area:

- Reductions in the average annual snowpack due to a rise in the snowline and a shallower snowpack in the low and medium elevation zones, such as in the Tuolumne River basin, and a shift in snowmelt runoff to earlier in the year;
- Changes in the timing, intensity and variability of precipitation, and an increased amount of precipitation falling as rain instead of as snow;
- Long-term changes in watershed vegetation and increased incidence of wildfires that could affect water quality;
- Sea level rise and an increase in saltwater intrusion;
- Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality;
- Increases in evaporation and concomitant increased irrigation need; and
- Changes in urban and agricultural water demand.

According to the SFPUC (2009), other than the general trends listed above, there is no clear scientific consensus on exactly how climate change will quantitatively affect the state's water supplies, and current models of water systems in California generally do not reflect the potential effects of climate change.

Initial climate change modeling completed by the SFPUC indicates that about seven percent of runoff currently draining into Hetch Hetchy Reservoir will shift from the spring and summer seasons to the fall and winter seasons in the Hetch Hetchy basin by 2025. This percentage is within the current interannual variation in runoff and is within the range accounted for during normal runoff forecasting and existing reservoir management practices. The predicted shift in runoff timing is similar to the results found by other researchers modeling water resource impacts in the Sierra Nevada due to warming trends associated with climate change.

The SFPUC has stated that based on this preliminary analysis, the potential impacts of climate change are not expected to affect the water supply available from the San Francisco Regional Water System (RWS) or the or the overall operation of the RWS through 2030.

The SFPUC views assessment of the effects of climate change as an ongoing project requiring regular updating to reflect improvements in climate science, atmospheric/ocean modeling, and human response to the threat of greenhouse gas emissions. To refine its climate change analysis and expand the range of climate parameters being evaluated, as well as expand the timeframes being considered, the SFPUC is currently undertaking two additional studies. The first utilizes a newly calibrated hydrologic model of the Hetch Hetchy watershed to explore sensitivities of inflow to different climate change scenarios involving changes in air temperature and precipitation. The second study will seek to utilize state-of-the-art climate modeling techniques in conjunction with water system modeling tools to more fully explore potential effects of climate change on the SFPUC water system as a whole. Both analyses will consider potential effects through the year 2100.

7.3 Cal Water 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.

Mitigation

In the water sector, climate change mitigation is generally achieved by reducing energy use, becoming more efficient with energy use, and/or substituting fossil fuel based energy sources for renewable energy sources. 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.

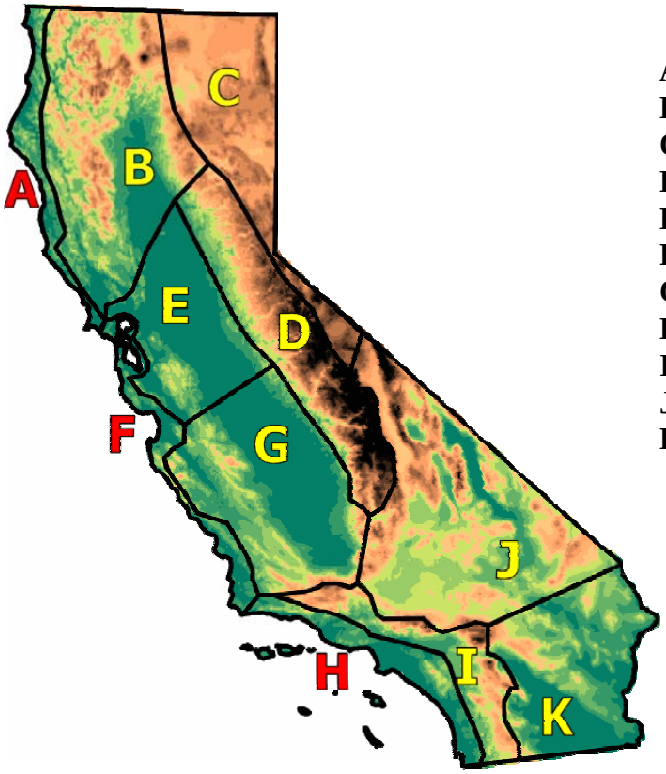
Adaptation

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.

7.3.1 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 7.2-1.

Figure 7.3-1: The Climate Regions of California[9]



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

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

Cal Water has water service districts in 7 out of 11 of the climate regions. The Mid-Peninsula District is located in the Central Coast Region, as listed in Table 7.2-1.

Table 7.3-1: 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

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 1.00°F, 2.10°F, and 1.55°F, respectively. More recently, since 1975, the maximum, minimum, and mean temperature departures have increased 1.24°F, 3.29°F, and 1.02°F, respectively. The historical data for these parameters are shown in Figures 7.2-2, 7.2-3, and 7.2-4.

Figure 7.3-2: Maximum Temperature Departure for Central Coast Region

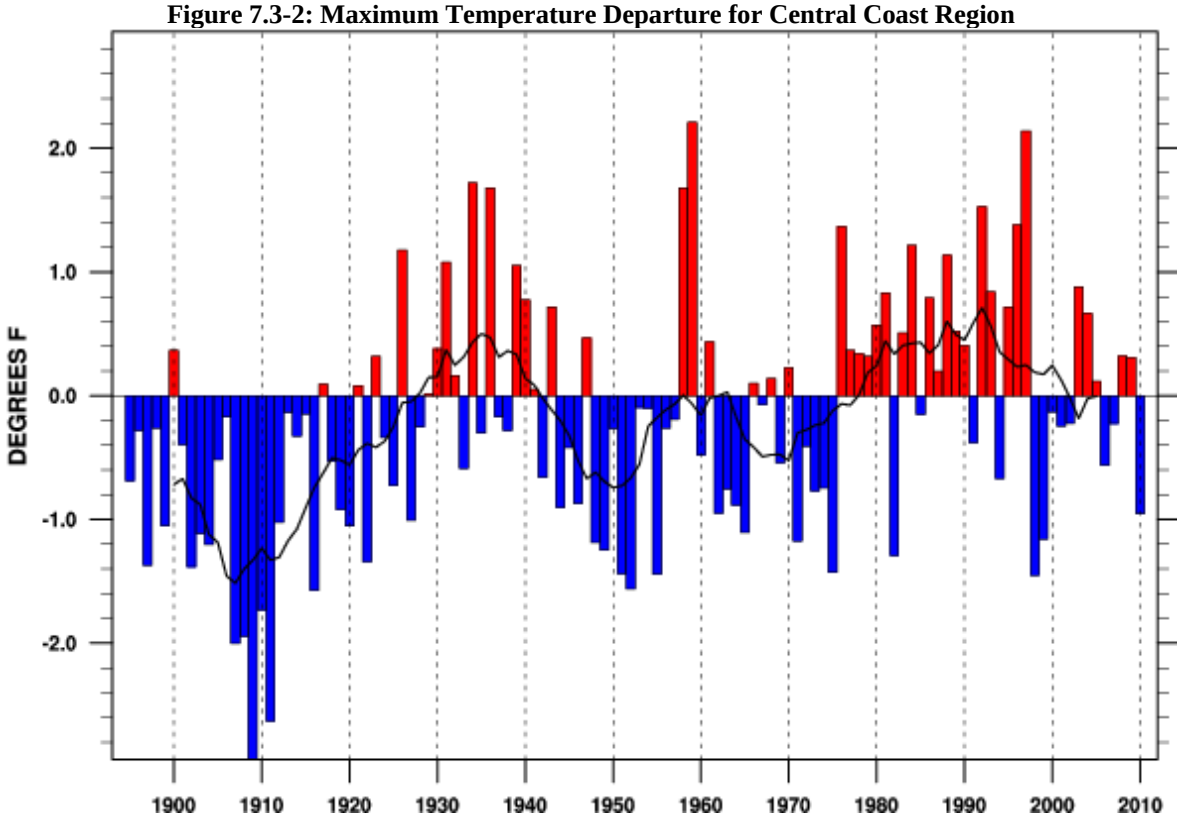


Figure 7.3-3: Mean Temperature Departure for Central Coast Region

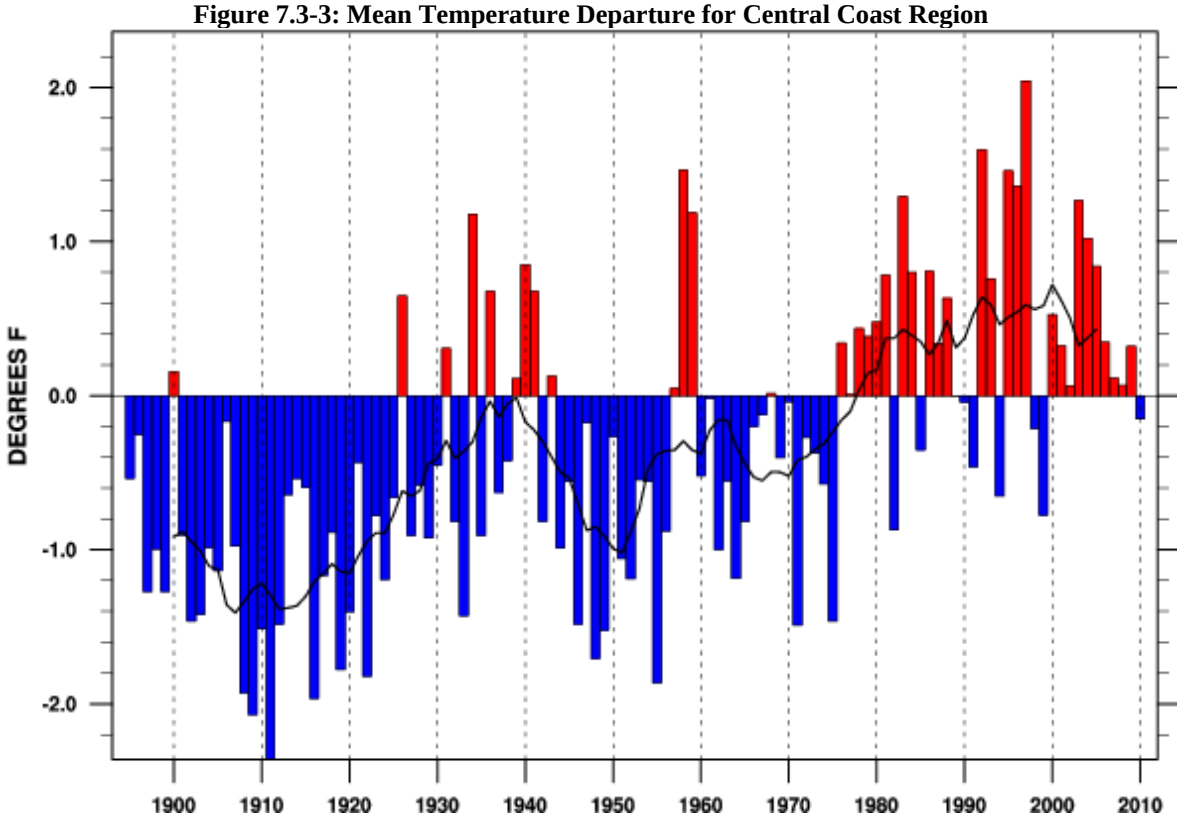
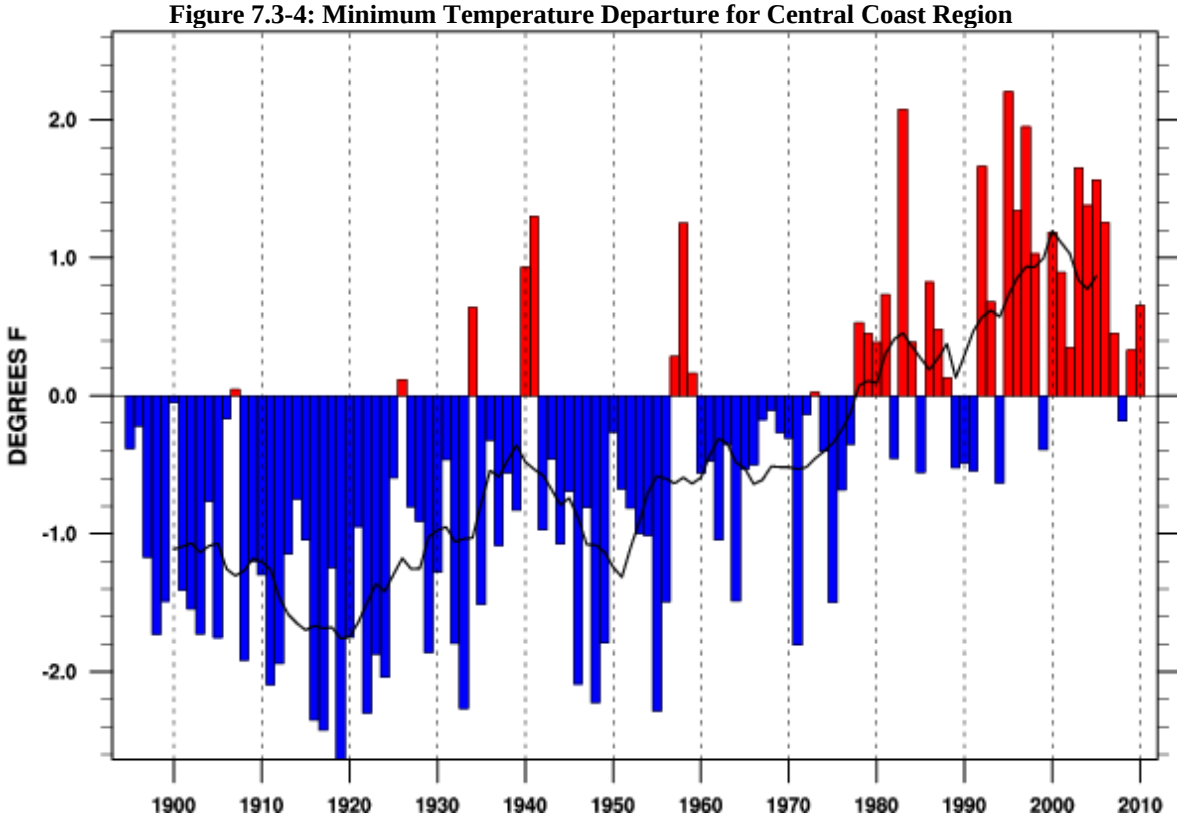
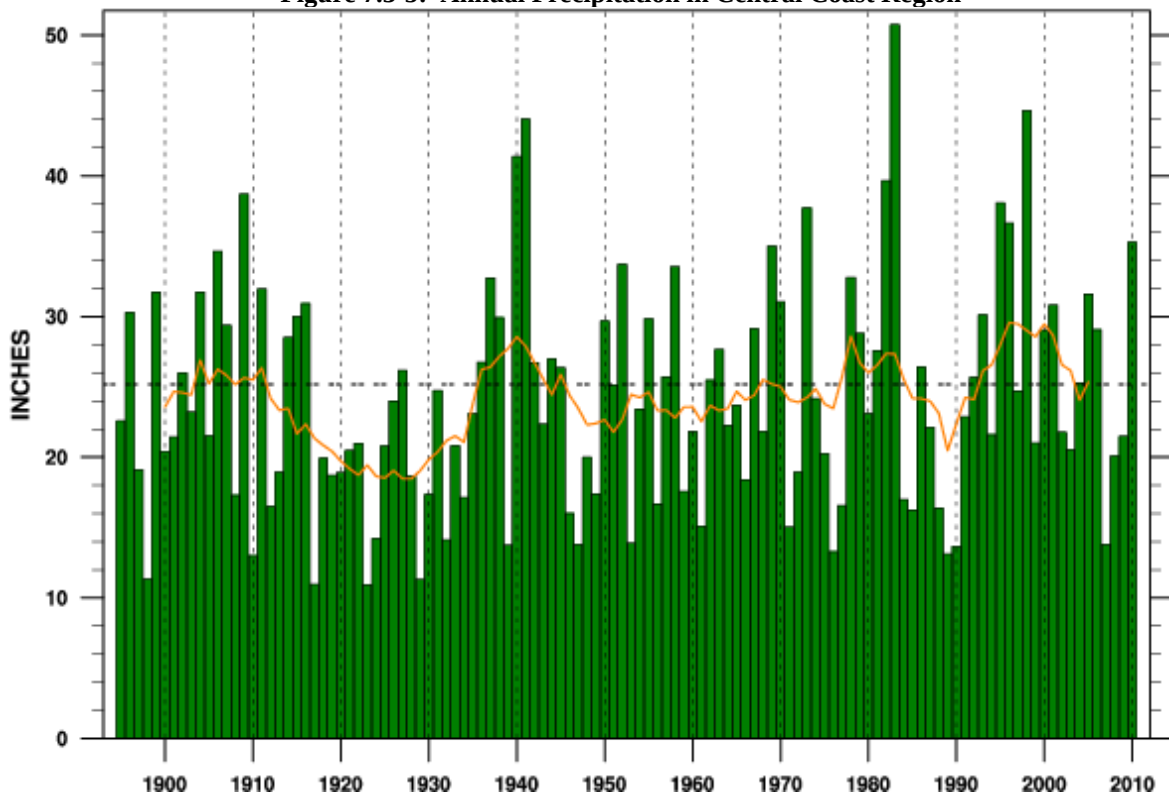


Figure 7.3-4: Minimum Temperature Departure for Central Coast Region



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 7.3-5: Annual Precipitation in Central 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.

7.4 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		N/A

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		N/A
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

APPENDIX F: WATER EFFICIENT LANDSCAPE GUIDELINES

APPENDIX G: CONSERVATION MASTER PLAN

APPENDIX H: SFPUC WATER SALES CONTRACT

APPENDIX I: SFPUC WATER SUPPLY AGREEMENT