California Water Service Company

2010 Urban Water Management Plan

Visalia District

ADOPTED

June 2011

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1 Plan Preparation

California Water Service Company (Cal Water) is an investor-owned public utility supplying water service to 1.7 million Californians through 435,000 connections. Its 25 separate service districts serve 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 incorporated in 1926 and has provided water service to the Visalia community since 1927.

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. All urban water suppliers as defined in Section 10617, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet annually are required to prepare an UWMP.

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

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

1.2 Coordination

In May of 2009 Cal Water began a series of meetings with the City of Visalia and Kaweah Delta Water Conservation District (KDWCD) to coordinate preparation of the 2010 Visalia District UWMP. The City and KDWCD actively participated in the planning and review process and attended these regular meetings. Cal Water completed a draft of the UWMP for the 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 are available at the Cal Water's corporate office in San Jose, and at the District office for public review and comment.

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 Visalia	✓	✓	✓	✓	✓	✓	
County of Tulare				✓	✓	✓	
KDWCD	✓	✓		✓	✓	✓	

Cal Water conducted a formal public meeting to present the UWMP within the Visalia service area. This serves as a public review of the UWMP. The public meeting was held on May 24, 2011, from 5:00-7:00 p.m. at the following location:

California Water Service Company
Visalia District Customer Service Center Conference Room
216 North Valley Oaks Drive
Visalia, CA 93292

Proof of the public meeting and the meeting minutes are presented in Appendix A.

1.3 Plan Adoption

The deadline for final comments was June 15, 2011. The final plan was adopted by the Vice President of Engineering & Water Quality on June 24, 2011 and was submitted to California Department of Water Resources within 30 days of approval. Appendix A presents a copy of the signed Resolution of Plan Adoption. A copy of the final version of this report will be sent to the agencies listed above and to the California State Library.

In addition to the resolution, Appendix A also contains the following:

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

1.4 Water Management Tools

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

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

1.5 Plan Organization

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

Section	Table 1.5-1: Plan Organization	Act Provision
Contact Sheet	List of Contact Persons	-
Section 1	Plan Preparation This section describes the requirement and the purpose of the Urban Water Management Planning Act, coordination, plan adoption, schedule, and management tools.	§10620 (d)(2) §10621(a -b) §10635(b) §10642 §10643 §10644 (a) §10645
Section 2	System Description This section describes the District service area and includes area information, population estimate, and climate description.	§10631 (a)
Section 3	System Demands This section describes the water supply projection methodology used to estimate water demands and supply requirements to 2040. It also includes a discussion of SBx7-7 baselines and targets.	§10631 §10608.20(e)
Section 4	System Supplies This section includes a detailed discussion of the water supply sources.	§10631 §10633 §10634
Section 5	Water Supply Reliability and Water Shortage Contingency Planning This section includes a discussion of the water supply reliability and describes the District's planning for water shortages during drought and emergency situations.	§10620 §10631 (d) §10632 §10634 §10635 (a)
Section 6	Demand Management Measures This section describes Cal Water's conservation programs.	§10631
Section 7	Climate Change This section contains a discussion of climate change.	
Section 8	DWR Checklist This section includes the completed DWR UWMP Checklist.	
Appendix A	Resolution To Adopt The Urban Water Management Plan This section includes the following: 1) Resolution 2) Letters to and comments from various agencies 3) Minutes from the public hearing 4) Correspondence between Cal Water and participating agencies	§10621 (b) §10642 §10644 (a)
Appendix B	Service Area Map This appendix includes the service area map of the District as filed with the Public Utilities Commission.	-
Appendix C	Water Supply, Demand, And Projection Worksheets This section includes the spreadsheets used to estimate the water demand for the District.	-
Appendix D	DWR Groundwater Bulletin 118	§10631 (b)(1-4)

Section	Table 1.5-1: Plan Organization	Act Provision
	Sections from the Department of Water Resources Bulletin 118 are included as reference and provide details of the basin for the District.	
Appendix E	Tariff Rule 14.1 Water Conservation And Rationing Plan and Local Conservation Ordinances This section contains the tariff rule and ordinance 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	Kaweah Delta Groundwater Management Plan This section contains the Management Plan.	§10631 (b)(1-4)

1.6 Implementation of Previous UWMP

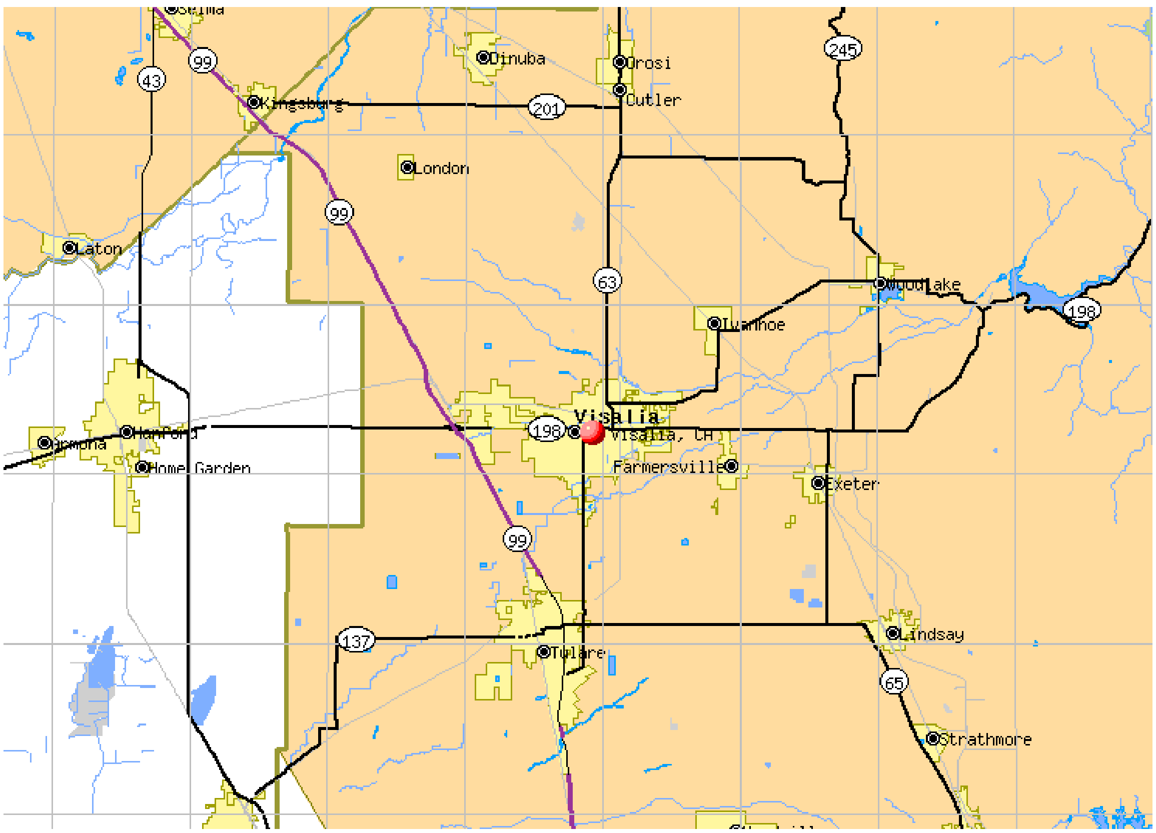
Cal Water will follow the California Water Code and file an UWMP at least once every five years on or before December 31, in years ending in five and zero. Since Cal Water operates 24 separate service districts the UWMP for each district has historically been submitted every third year to coincide with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

2 System Description

2.1 Service Area Description

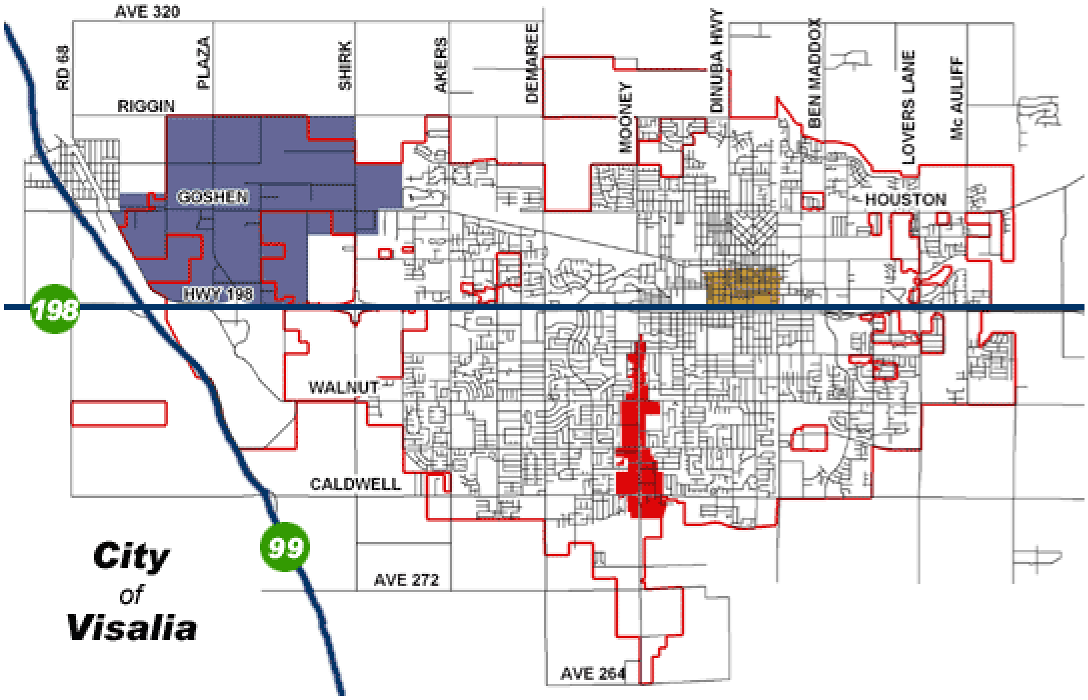
The Visalia District is located in Tulare County, serving the City of Visalia and segments of unincorporated Tulare County including the community of Goshen. It is situated in the Tulare Lake hydrologic region, within the King-Kaweah-Tule Rivers sub-area. The service area is built upon the alluvium of the Kaweah River. The District lies approximately 42 miles southeast of the City of Fresno and 75 miles north of the City of Bakersfield. Figure 2.1-1 shows a general location map[1] of the District and Figure 2.1-2 shows the general service area. A more detailed service area map as filed with the California Public Utilities Commission is included in Appendix B.

Figure 2.1-1: General Location of Visalia District



[1] http://www.city-data.com/city/Visalia-California.html

Figure 2.1-2: General Service Area

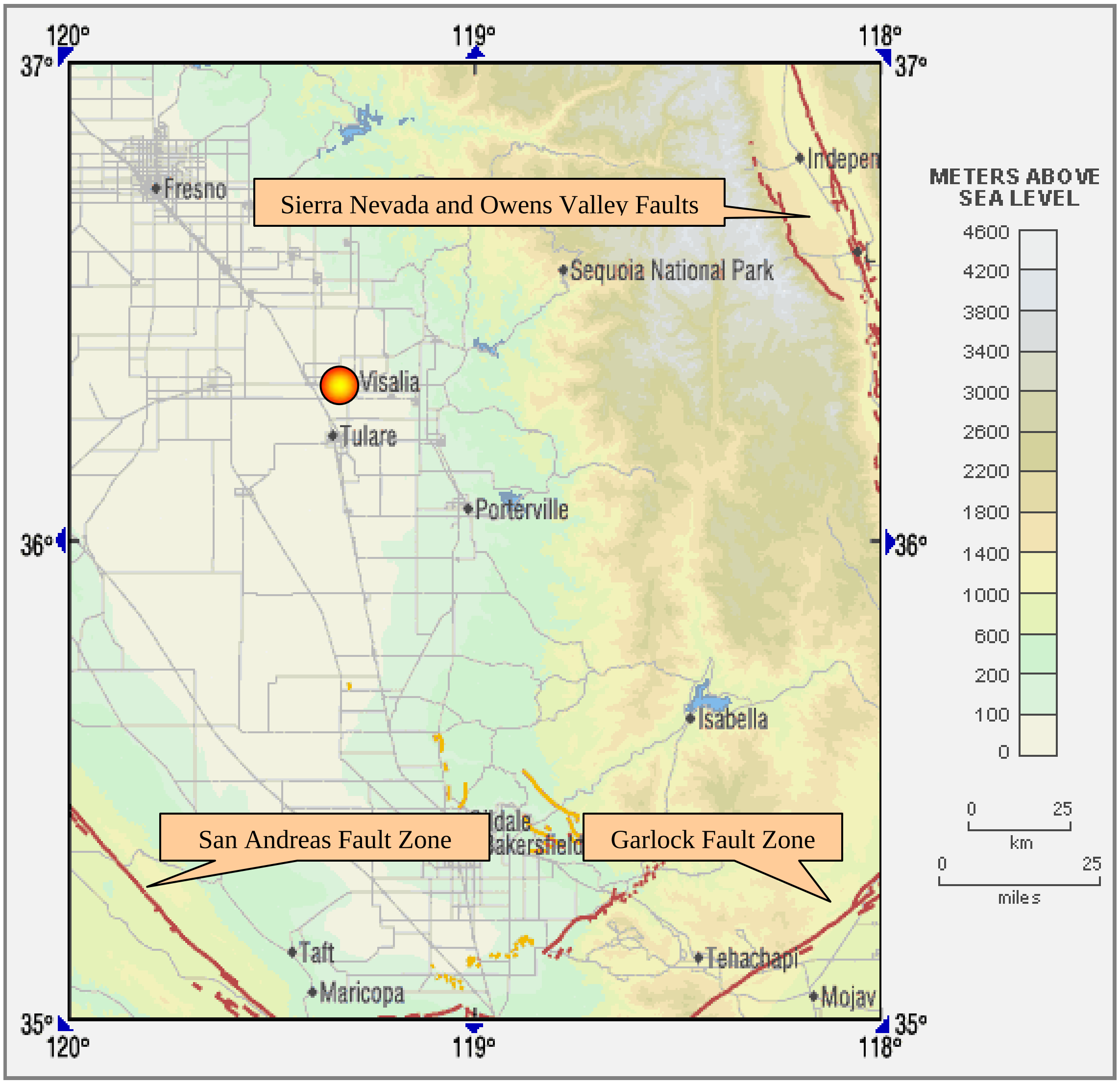


Major transportation links in the District include the Golden State Highway (State Route 99), State Route 63 and State Route 198. The Southern Pacific and the Atchison, Topeka and Santa Fe Railroads provide rail service to the region.

No major geologic features are located in the Visalia region. However, the San Andreas Fault Zone lies approximately 75 miles to the west-southwest; the Garlock Fault Zone lies 125 miles to the south-southeast. In combination, these faults are responsible for the uplift of base rock that forms the Transverse Mountain Range that separates the Tulare Lake basin from the Los Angeles basin. The District's location with respect to major faults is shown in Figure 2.1-3.[2]

[2] http://earthquake.usgs.gov/earthquakes/recenteqscanv/FaultMaps/119-36.html

Figure 2.1-3: Major Fault Lines near Visalia District



The Kaweah River provides drainage for the southern Sierra Nevada Mountains. This river splits east of Visalia forming the St. Johns River that flows just north of Visalia while the Kaweah River continues south. Lake Kaweah is located on the Kaweah River about twenty miles up stream from the city. This 183,000 AF reservoir is operated by the U.S. Army Corps of Engineers and provides both flood control and irrigation water storage. The Kaweah River flows intermittently into the Tulare Lake Bed.

2.2 Service Area Population

The Visalia District is a rapidly growing district that is increasing service connections through redevelopment of existing service areas and by delivering new service to undeveloped portions of Visalia and adjacent unincorporated areas of Tulare County. The Visalia system is surrounded by and includes large parcels of land used for agricultural functions. As the City has grown the land use within the Urban Development Boundary (UDB) has shifted from agricultural to urban uses, drawing more people to the City. Due to the large amount of land available, this trend is likely to continue. Cal Water expects the Visalia District to grow at a similar rate to what has historically been seen in the area.

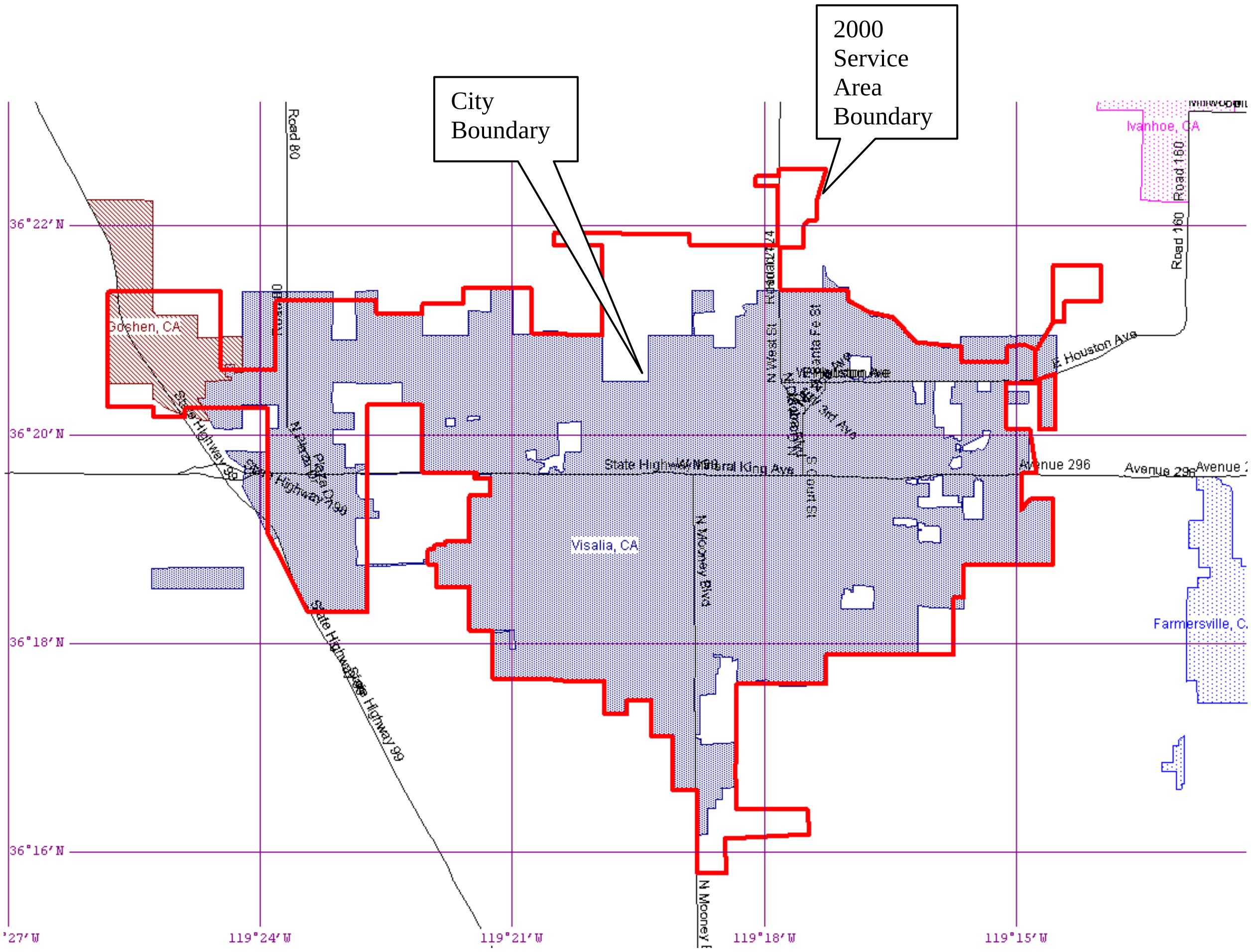
Cal Water's service area also encompasses several unincorporated portions of Tulare County, most notably the community of Goshen. There are also several small sections of the City that are served by independent water districts or mutual water companies. However, the City of Visalia makes up the vast majority of the population served by Cal Water. Because of this the City's projected rate of population growth can be used as a baseline for estimating the total population within the Visalia District.

In 2009 the City estimates its population to be 123,670. For future projections a growth rate of 2.5 percent was used for the years 2010-2020, 2.25 percent for 2021-2030, and 2.0 percent for 2031-2040. This decreasing rate of growth reflects the overall long term trend in Visalia and also mimics patterns seen in other highly urbanized areas. Applying these growth rates provides an estimate of 247,094 total persons in 2040 for the City of Visalia.

The unincorporated areas of Tulare County within Cal Water's service area are expected to grow at a similar rate to that of the City of Visalia. According to the County of Tulare, Goshen is not expecting significant growth beyond levels seen historically. During the recent housing boom Goshen was considering expanding its urban growth boundary by 1,300 acres to accommodate 2,500 new homes and associated support services. Due to the downturn in the housing market this is no longer expected to happen and growth in Goshen will be consistent with other unincorporated areas of the county. For projecting growth in these areas the County uses California Department of Finance data, which for Tulare County falls between the 2.0-2.5 percent range that the City projects. Because of this similar rate, and because these areas make up a small portion of the total service area, Cal Water applied the City's projected population growth rate to its service connection growth rate for the entire District.

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

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



A summary of the census data for the year 2000 is shown in Table 2.2-1. LandView 5 and MARPLOT ® software were used to generate the data[3].

Table 2.2-1: Summary of Census 2000 Data			
	Census Blocks	**Population**	**Housing Units**
Visalia Service Area	1,221	98,325	34,832

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

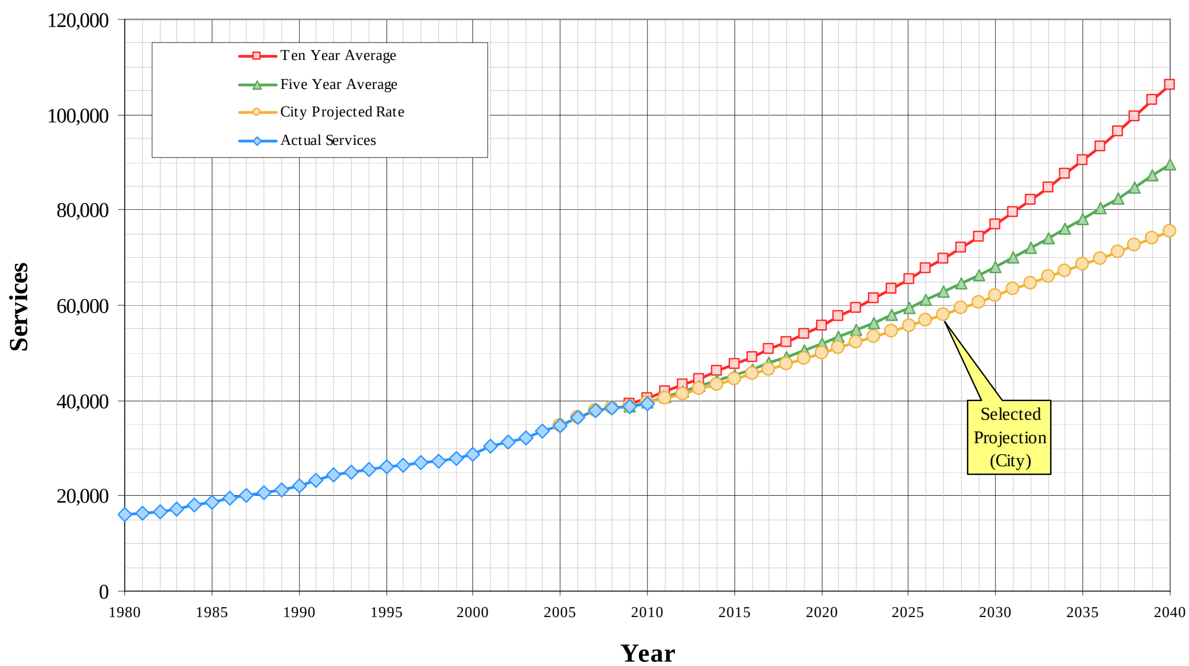
[3] LandView 5 and MARPLOT ® software, US Census Bureau/Environmental Protection Agency, downloaded from: http://www.census.gov/geo/landview/lv5/lv5.html, http://www.epa.gov/ceppo/cameo/marplot.htm

density value. This density was then multiplied by the number of Cal Water residential dwelling units in each future year.

To establish a range of future service counts the five-year, ten year, and City of Visalia projected growth rates for each service type were continued through 2040. The 5-year is the short-term growth rate calculated from 2005 to 2009, which has an overall annual average growth rate of 2.88 percent. The 10-year average is a long-term growth rate, calculated from 2000 to 2009, which exhibits an overall annual average growth rate of 3.33 percent.

The growth rate ultimately chosen to project future water demand is the City of Visalia's projected rate of population growth so that there would be consistency with the General Plan Update. For future service projections a growth rate of 2.5 percent was used for the years 2010-2020, 2.25 percent for 2021-2030, and 2.0 percent for 2031-2040. A comparison of service connection growth rates is shown in Figure 2.2-2.

Figure 2.2-2: Historical & Projected Services



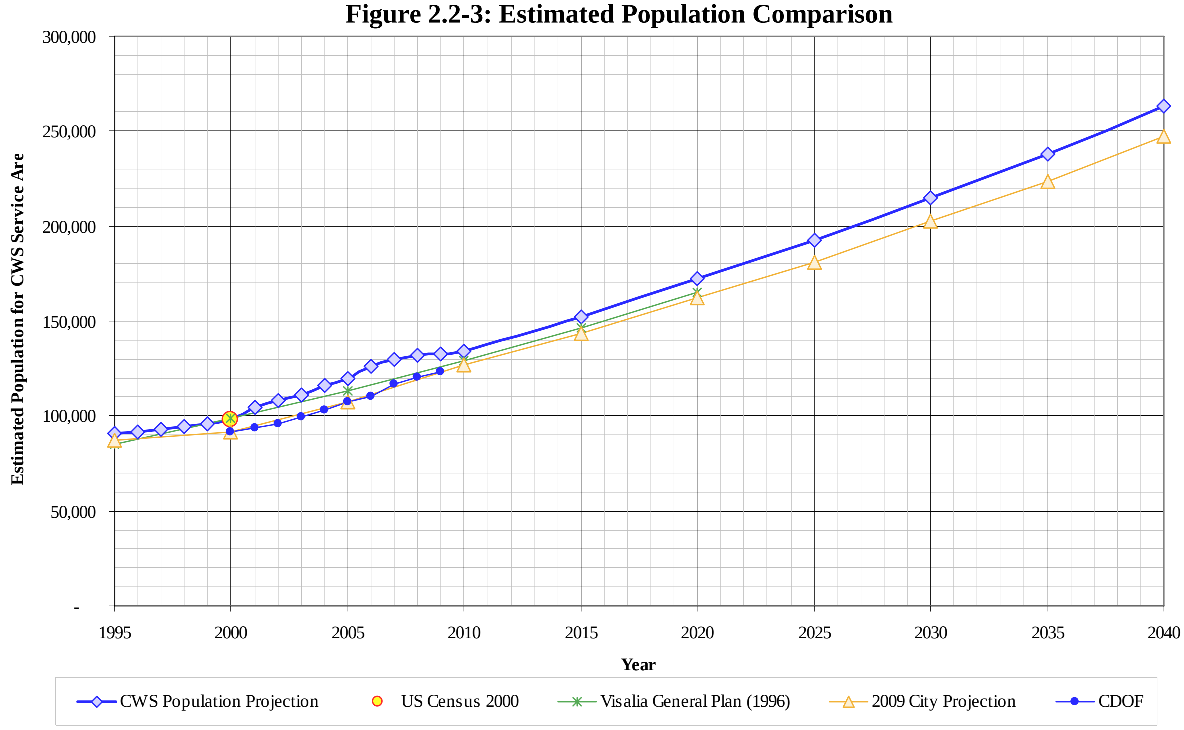
Based on these service projections Cal Water estimates that the service area's population could reach 263,110 by 2040. Table 2.2-2 lists the population growth in five-year increments.

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

	2005	2010	2015	2020	2025	2030	2035	2040
Service Area Population	119,710	134,410	152,080	172,060	192,300	214,930	238,310	263,110

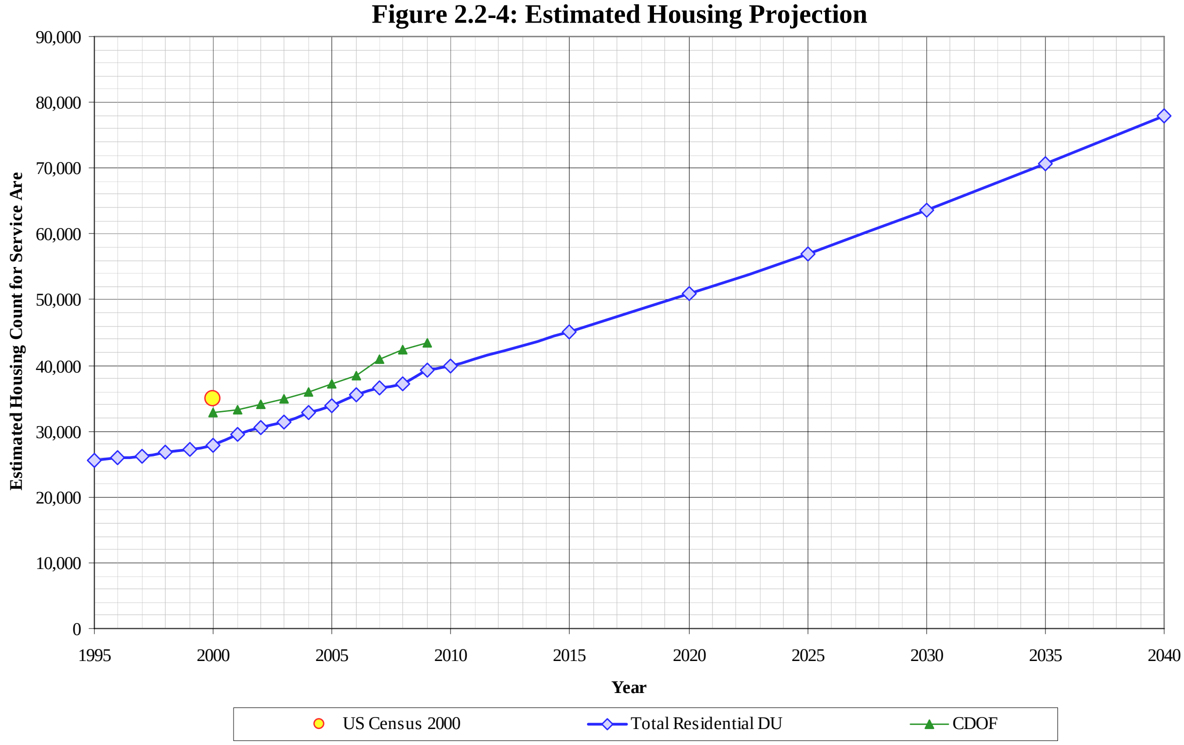
The population estimates for the District are compared to projections made by the City of Visalia and the California Department of Finance, as shown in Figure 2.2-3. Cal Water's projected rate of population growth is similar to the rates projected both in the 1996 General Plan Update and in 2009's estimate. However, the total population of the Visalia District is greater due to its inclusion of Goshen and other unincorporated areas of Tulare County. The graph also indicates that these rates are also consistent with those seen in historical data.

Figure 2.2-3: Estimated Population Comparison



Similarly, the housing count was estimated by comparing the US Census 2000 data to the service counts for the Visalia District, Figure 2.2-4. The service count for the year 2000 is lower then US Census 2000 housing units estimate. This is a result of District service connections including one meter that serves several housing units, such as duplexes or apartments, whereas the US Census totals all of the housing units (single and multifamily residences). The US Census 2000 housing unit value was established by summarizing the individual census blocks enclosed within the service area of the District. As with the population estimate discussed previously, the growth rates for the City of Visalia projection are the same as the Cal Water's projection. But the total housing units are greater because the service area extends beyond City boundaries.

Figure 2.2-4: Estimated Housing Projection



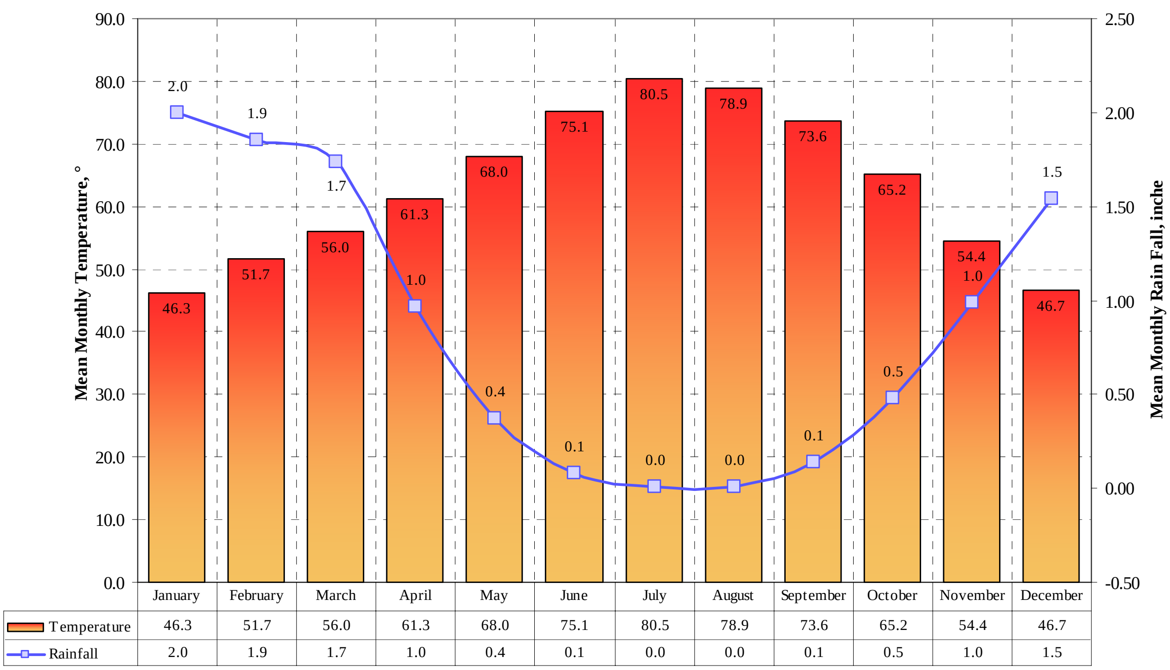
2.3 Service Area Climate

The climate for the Visalia District is moderate with hot dry summers and cool winters. The majority of precipitation falls during late autumn, winter, and early spring. Table 2.3-1 lists the average annual conditions for the Visalia weather station.

Table 2.3-1: Average Annual Climate (Table 3)		
Average Temperature	**Average Rainfall**	**Annual Total Evapotranspiration**
63.1°F	10.2 inches	50.7 inches

Figure 2.3-1 displays the average monthly temperature and rainfall[4]. Additional climate data is provided in the Appendix C, worksheet 18.

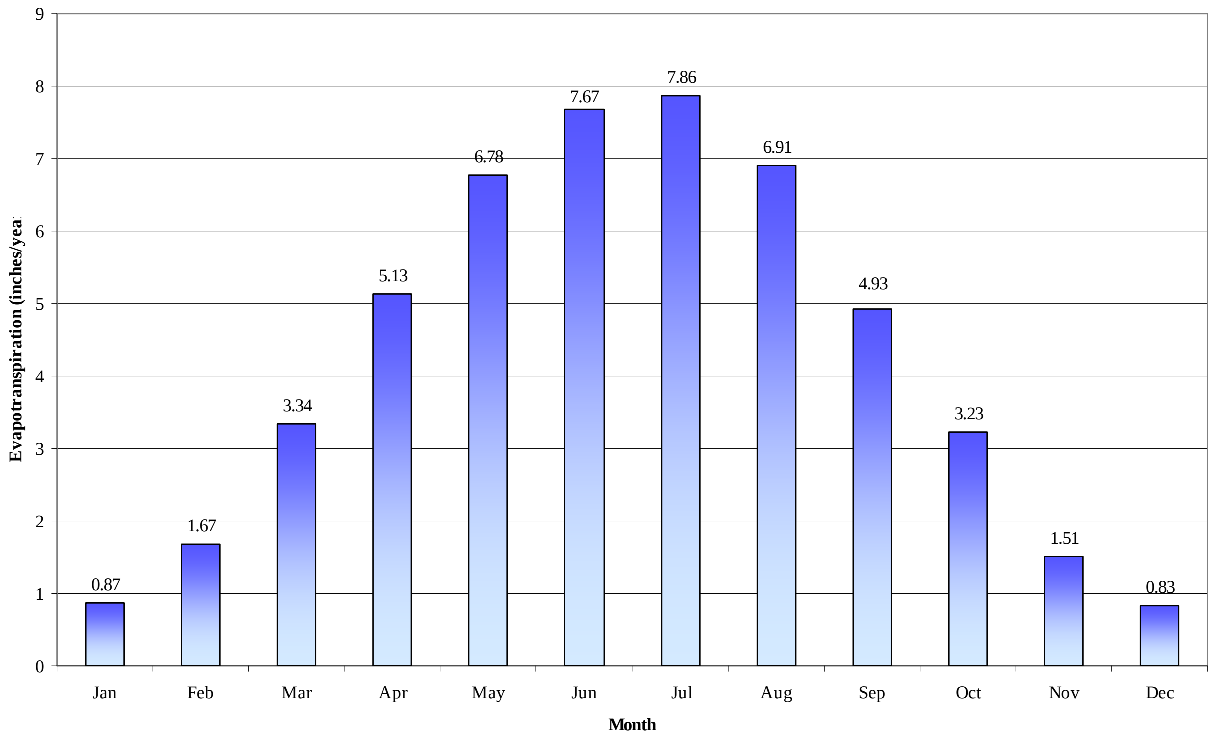
Figure 2.3-1: Average Monthly Temperature and Rainfall



[4] Western Regional Climate Center, Bakersfield WSO Airport Weather Station, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?cabake+sca

Figure 2.3-2 displays the monthly average evapotranspiration values for the area of the District[5]. 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 Visalia is 50.7 inches. The average annual rainfall of 10.2 inches is only 20 percent of the annual total evapotranspiration value.

Figure 2.3-2: Monthly Average ETo Values



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

3 System Demands

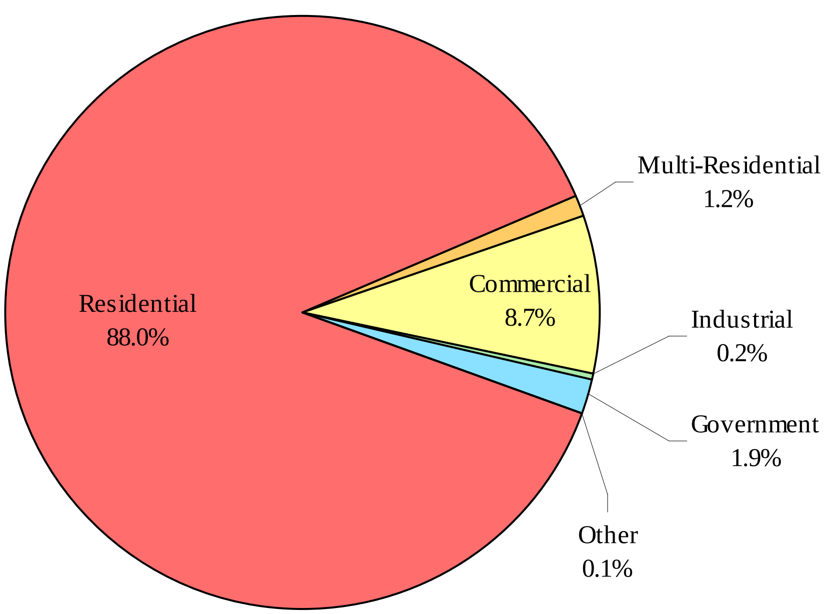
3.1 Distribution of Services

Cal Water classifies customer service connections in the following categories:

- Residential
- Multifamily
- Commercial
- Industrial
- Government
- Other

Land use in the Visalia District is dominated by residential and commercial activities, as seen in the distribution of services for the District, Figure 3.1-1. Single-family residential services account for 88.0 percent of all services; multifamily residential services represent 1.2 percent, and commercial services 8.7 percent. Thus, 97.9 percent of all services are for residential and commercial facilities. The remaining 2.1 percent includes industrial, governmental uses, and other functions such as temporary construction meters.

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

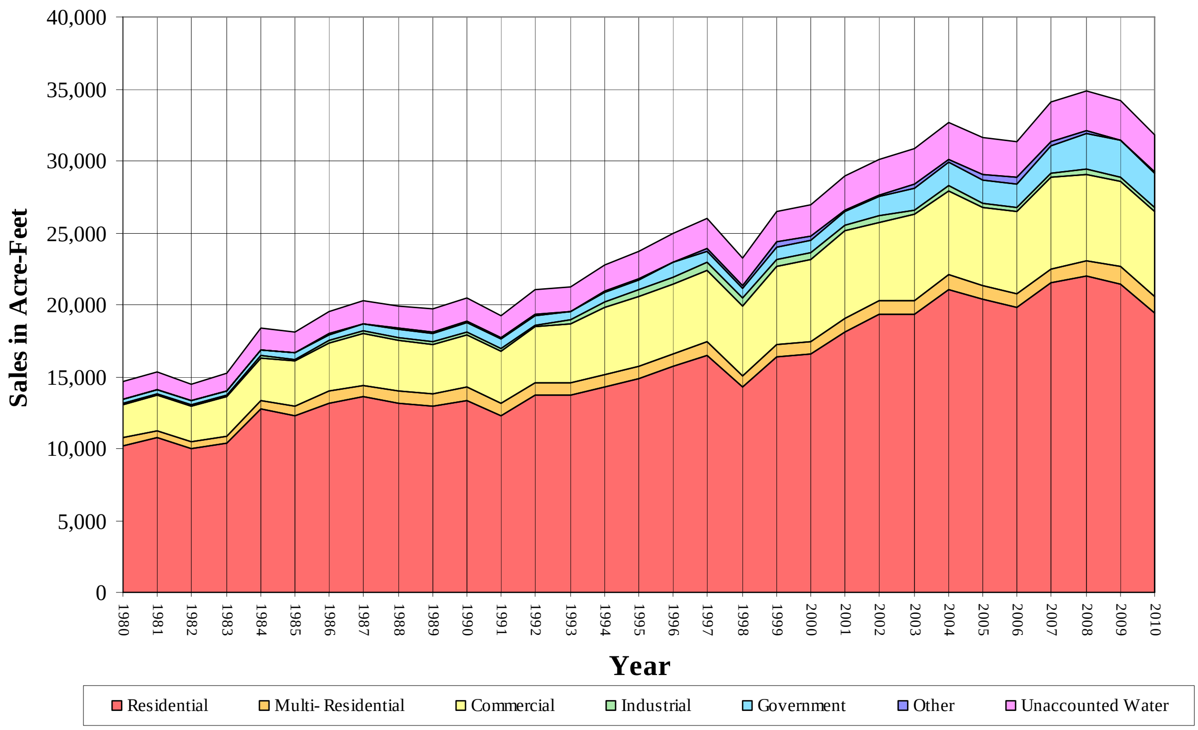
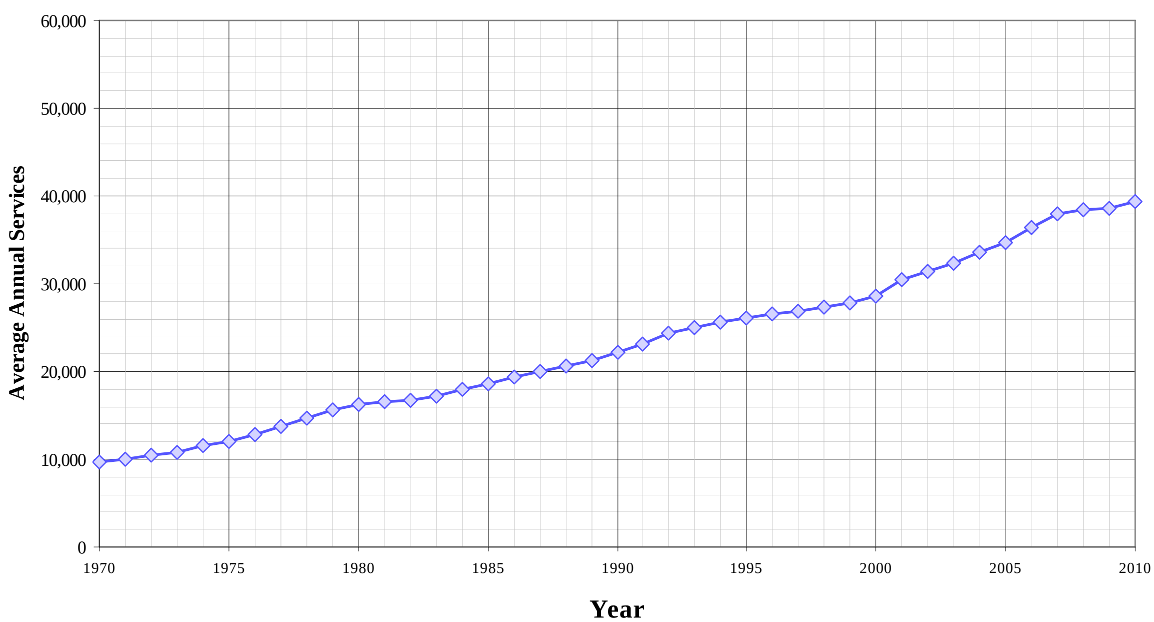
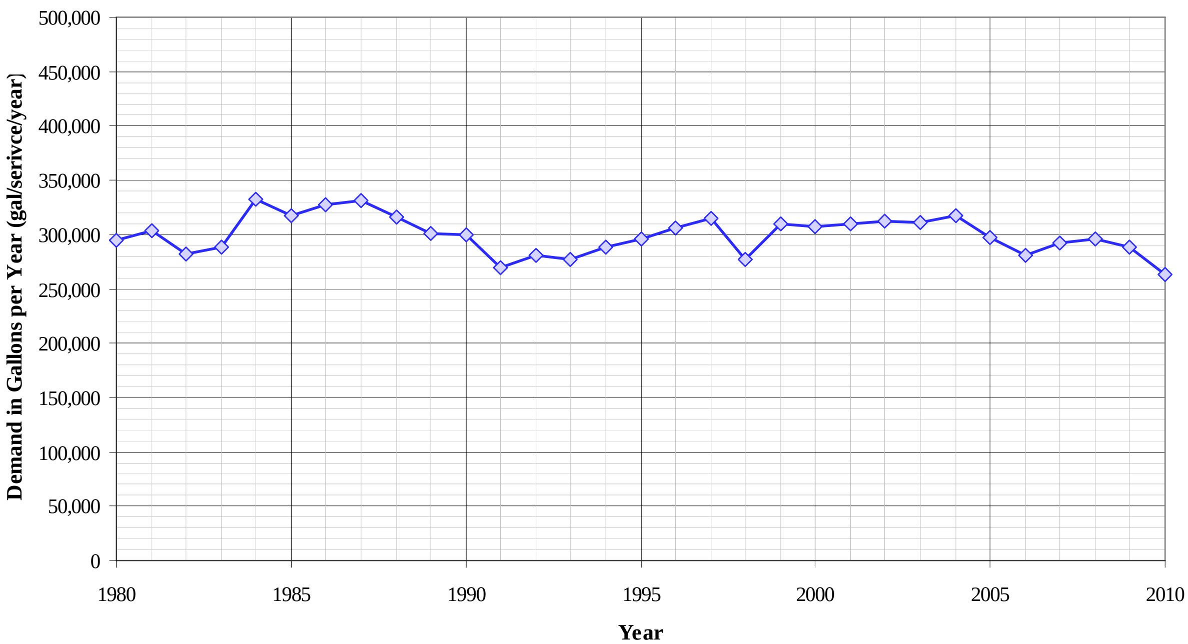


Figure 3.2-2: Historical Service Counts



Demand per service was established as a function of historical sales and service data. The combined demand per service for all services fluctuates between 270,000 and 330,000 gallons per service per year, as shown in Figure 3.2-3.

Figure 3.2-3: Historical Demand per Service



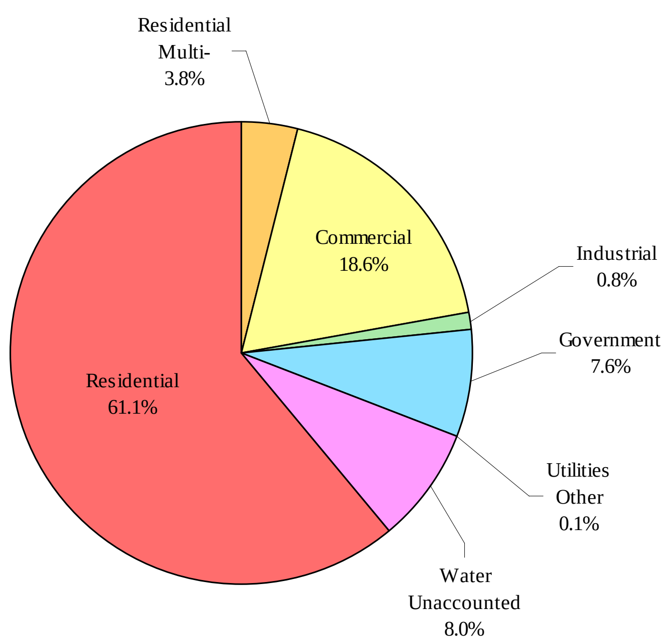
A response to the statewide drought conditions resulted in a reduction in the demand per service values from 1988 to 1991. This response, however, was short-lived with demand per service rebounding to previous levels throughout the 1990's. More recently the combined demand per service has remained below 300,000 gallons per service per year. Curbing these demands will require the implementation of conservation activities. Cal Water has set a goal of a 20 percent reduction in per capita demand. The methods used to achieve this goal are discussed in the following sections.

Single family residential water use represents the smallest demand per service segment in the District at approximately 210,000 gallons per service per year, yet this category uses 60 percent of the total demand. The multifamily residential use was three percent of the total demand with a demand per service that is greater than 1,300,000 gallons per service per year. The combined residential sector component of demand is equal to 64 percent of total demand.

Assembly Bill No. 2572, adopted in September, 2004 requires conversion of all flat rate meters to metered service by January 1, 2025. Cal Water, upon approval by the CPUC is conducting an aggressive replacement program in Visalia. In 2007 there were 17,700 flat rate services in Visalia. As of January 10, 2011 Cal Water had converted 14,386 services, leaving some 3,300 services to convert.

Because the Visalia District still has some unmetered services it is difficult to estimate unaccounted for water. For the purposes of this UWMP unaccounted for water was fixed at 8 percent of total demand, which is below industry standard practices but above similar Cal Water districts. Once all the unmetered services have been retrofitted with meters over the next few years it will be possible to determine a better estimate of this value. The distribution of demand from each service category is shown in Figure 3.2-4.

Figure 3.2-4: Distribution of Demand by type of use (2010)



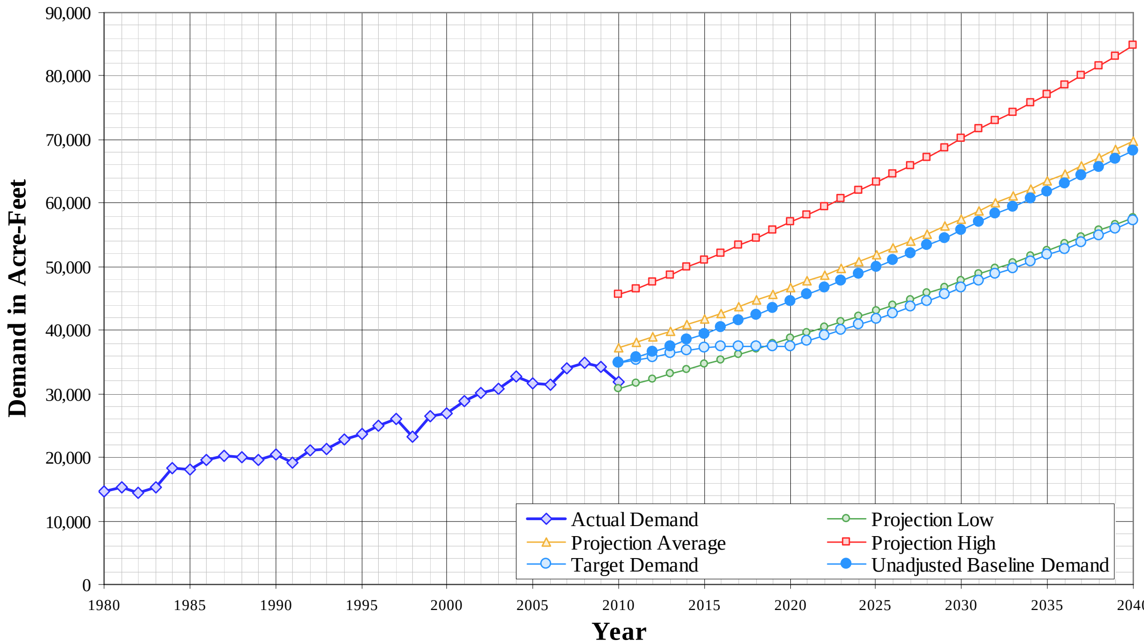
3.3 Water Demand Projections

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 232 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



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	12,718	8,365	17,773	11,996	20,361
Multi-family	196	926	-	-	926
Commercial	3,360	5,431	-	-	5,431
Industrial	64	288	-	-	288
Institutional/government	507	1,636	-	-	1,636
Landscape	-	-	-	-	-
Recycled	-	-	-	-	-
Other	70	408	-	-	408
Total	16,915	17,054	17,773	11,996	29,050

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	34,634	13,276	10,935	6,131	19,407
Multi-family	474	1,205	-	-	1,205
Commercial	3,420	5,898	-	-	5,898
Industrial	63	269	-	-	269
Institutional/government	747	2,404	-	-	2,404
Landscape	-	-	-	-	-
Recycled	-	-	-	-	-
Other	39	39	-	-	39
Total	39,377	23,090	10,935	6,131	29,221

Table 3.3-3: Actual 2015 Water Deliveries – AF (Table 3)					
	2015				
	Metered		Not Metered		Total
Water Use Sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	39,311	24,432	-	-	24,432
Multi-family	496	2,366	-	-	2,366
Commercial	3,695	4,687	-	-	4,687
Industrial	69	488	-	-	488
Institutional/government	842	2,262	-	-	2,262
Landscape	-	-	-	-	-
Recycled	-	-	-	-	-
Other	52	144	-	-	144
Total	44,465	34,378	-	-	34,378

Table 3.3-4: Actual 2020 Water Deliveries – AF (Table 4)					
	2020				
	Metered		Not Metered		Total
Water Use Sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family	44,477	24,725	-	-	24,725
Multi-family	562	2,394	-	-	2,394
Commercial	3,901	4,426	-	-	4,426
Industrial	73	463	-	-	463
Institutional/government	953	2,289	-	-	2,289
Landscape	-	-	-	-	-
Recycled	-	-	-	-	-
Other	59	145	-	-	145
Total	50,024	34,443	-	-	34,443

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	49,711	27,843	55,561	31,344
Multi-family	628	2,696	702	3,035
Commercial	4,118	4,708	4,348	5,007
Industrial	77	496	82	530
Institutional/government	1,065	2,578	1,190	2,902
Landscape	-	-	-	-
Recycled	-	-	-	-
Other	66	164	74	184
Total	55,665	38,484	61,956	43,002

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	61,644	34,985	68,061	38,826
Multi-family	775	3,371	855	3,741
Commercial	4,590	5,318	4,846	5,643
Industrial	87	566	93	603
Institutional/government	1,314	3,223	1,451	3,577
Landscape	-	-	-	-
Recycled	-	-	-	-
Other	81	204	90	227
Total	68,492	47,667	75,395	52,618

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 Visalia 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 Visalia District lies within the Tulare Lake hydrologic region, along with Bakersfield, Kern River Valley, and Selma 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 Tulare Lake hydrologic region are shown in Table 3.3-8. The 2015 and 2020 district-specific targets for Visalia District are 219 and 194 gpcd, respectively. Over the last five years District demand has averaged about 232 gpcd. Thus, per capita demand needs to fall by about 6 percent by 2015 and by about 16 percent by 2020 in order for Visalia District to meet its district-specific targets. Alternatively, demand for the four Cal Water districts within the Tulare Lake hydrologic region can average no more than 250 gpcd in 2015 and 222 gpcd in 2020.

Table 3.3-8: Regional SBx7-7 Targets for Cal Water Districts in Tulare Lake Hydrologic Region			
District	**Population**	**2015 Target**	**2020 Target**
Bakersfield	252,010	268	239
Kern River Valley	6,359	190	179
Selma	24,260	242	215
Visalia	132,930	219	194
Regional Targets[1]		**250**	**222**
[1] Regional targets are the population-weighted average of the district targets.			

The following analysis presents the individual SBx7-7 compliance targets for the Visalia 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 Visalia District, the 10-year base period 1996-2005 yielded the maximum target under this method. The 2015 target is 219 gpcd and a 2020 target is 194 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	32,060	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	1996	
	Year ending base period range	2005	
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	1996	91,920	22.3	243
Year 2	1997	93,020	23.2	250
Year 3	1998	94,600	20.7	219
Year 4	1999	96,230	23.7	246
Year 5	2000	98,330	24.0	244
Year 6	2001	104,720	25.8	247
Year 7	2002	108,030	26.8	249
Year 8	2003	111,300	27.5	247
Year 9	2004	116,060	29.2	252
Year 10	2005	119,710	28.2	236
			Base Daily Per Capita Water Use	243

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 Visalia District is located in the Tulare Lake hydrologic region the Visalia District's 2015 target is 225 gpcd and the 2020 target is 179 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 Visalia District is 226 gpcd, as shown in Table 3.3-11. In this case, neither target calculation method results in a target exceeding the maximum allowable target, so no adjustment is necessary.

Table 3.3-11: Daily Base Per Capita Water Use-5-Year Range (Table 15)				
Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	111,300	27.5	247
Year 2	2004	116,060	29.2	252
Year 3	2005	119,710	28.2	235
Year 4	2006	125,970	28.0	222
Year 5	2007	129,800	30.4	235
			Base Daily Per Capita Water Use	238

Based on the results of this analysis as shown in Table 3.3-12, the Method 1 targets were chosen for the Visalia District.

Table 3.3-12. Visalia District SBx7-7 Targets	
Maximum Allowable Target	
Base Period:	2003-2007
Per Capita Water Use:	238
Maximum Allowable 2020 Target:	226
Method 1: 80% of Baseline Per Capita Daily Water Use	
Base Period:	1996-2005
Per Capita Water Use:	243
2015 Target:	219
2020 Target:	194
Method 3: 95% of Hydrologic Region Target	
Hydrologic Region:	Tulare Lake
2015 Target:	225
2020 Target:	179
Selected District Target	
2015 Target:	219
2020 Target:	194

3.3.2 Low Income Housing Projected Demands

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

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

For the purposes of estimating projected demands from low income housing, Cal Water used information from the City of Visalia's Housing Element. According to the Housing Element, 4.2 percent of homeowners and 10.7 percent of renters are in the lowest income group.[6] These percentages were applied to Cal Water's projected demands for single family and multi-family residential customers, respectively. Table 3.3-13 shows the projected demands for low income households.

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

Low Income Water Demands	2015	2020	2025	2030	2035	2040
Single-family residential	1,026	1,038	1,169	1,316	1,469	1,631
Multi-family residential	253	256	288	325	361	400
Total	1,279	1,295	1,458	1,641	1,830	2,031

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.

[6] "City Of Visalia, Housing Element", Mintier Harnish, March 15, 2010, Page 53

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. These losses are likely inflated due to the assumption of 8 percent unaccounted for water. As the remaining unmetered services are converted, a more accurate estimate of system losses will be available.

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	2,541	2,929	2,947	3,304	3,704	4,119	4,558
Total	2,541	2,929	2,947	3,304	3,704	4,119	4,558

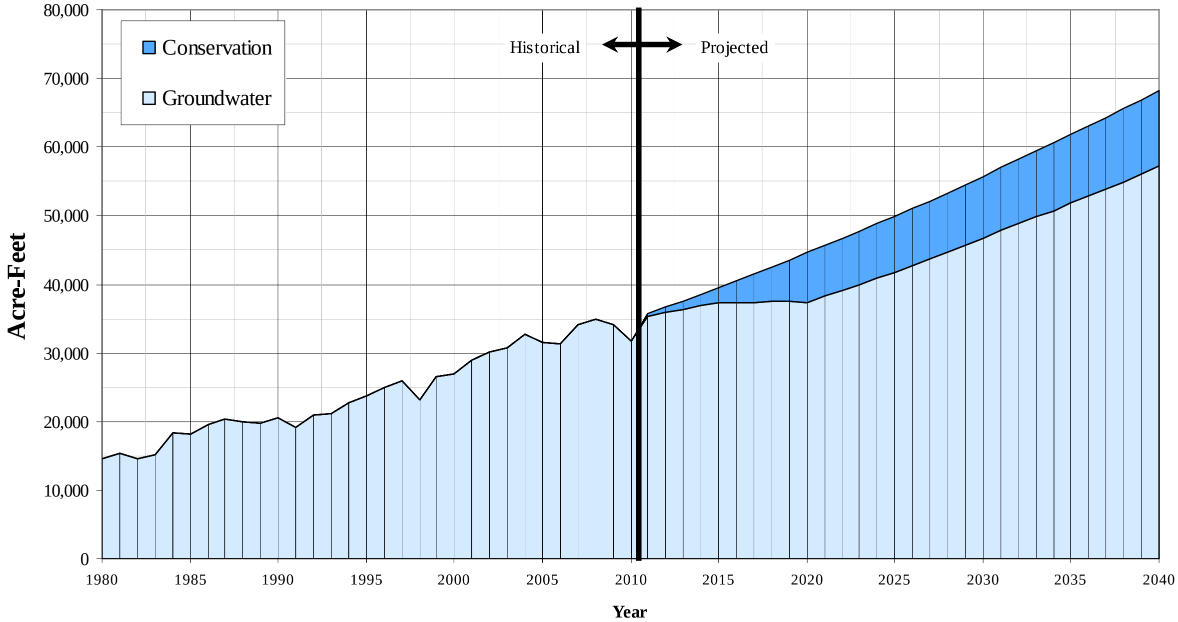
Actual and projected water use through 2040 is shown in Table 3.4-2. The values represent the total target demand projection based on SBx7-7 gpcd targets, including unaccounted for water.

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	31,576	31,762	37,307	37,390	41,788	46,706	51,787	57,176

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



4 System Supplies

4.1 Water Sources

The sole source of water supply for the customers of the Visalia District has historically been groundwater. It will likely continue to provide the majority of supply throughout the planning horizon of this UWMP. However, because of overdraft conditions in the Kaweah basin additional supplies will need to be pursued. An analysis of alternative supplies is being performed concurrently with development of this UWMP in Cal Water's Water Supply and Facilities Master Plan for the Visalia District (Master Plan). Potential future supplies include but are not limited to increased artificial recharge, surface water diversions, water transfers, and recycled water.

Kaweah Delta Water Conservation District (KDWCD) and other irrigation districts and companies have historically managed groundwater through the conjunctive use of surface water. KDWCD regularly provides programs that benefit local agricultural by making available additional surface water supplies for irrigation. These programs effectively reduce the withdrawals of groundwater and as such in-lieu recharge occurs to the aquifer. Groundwater is normally used by agricultural as an alternate source when surface supplies are not available, and is the sole source in areas within KDWCD jurisdiction that don't have access to surface water.

KDWCD also operates about 40 dedicated water management basins with a total area of approximately 2,100 acres for the multiple purposes of flood control and groundwater replenishment. The basins have the capacity to recharge approximately 983 acre-feet per day under optimal conditions. Normal operation of these facilities provides both the direct and indirect groundwater recharge of the basin in the form of conveyance losses and from agricultural applications of surface water that percolate into the aquifer.

In areas of the Lower Kaweah River such as Packwood and Cameron Creeks surface water deliveries are managed by Tulare Irrigation District and other irrigation districts and companies. The City of Visalia maintains a groundwater recharge program that provides localized benefit to the Visalia District. Under this program the City works cooperatively with KDWCD and these irrigation districts and companies to manage groundwater resources. These efforts are described further in section 4.4 of this Plan.

The Urban Water Management Planning Act requires water suppliers to quantify planned water supplies for a minimum of 20 years into the future. Because groundwater is the only source of supply, determining the actual supply available to Cal Water in any given year is more difficult than in areas supplied by surface water. Since there has not been a legal adjudication of groundwater rights for the basin other methods must be used to estimate this value.

One method of calculating available supply could be considered the amount that Cal Water has the ability to pump. The design capacity of all the active wells is currently 100,829 AFY. However, this value greatly exceeds the projected water demands throughout the planning horizon of this UWMP, and it may be unrealistic to characterize this quantity as the available supply.

In an attempt to resolve the question of available groundwater supply an analysis of several groundwater modeling efforts was conducted. The result is an estimate of what could reasonably be considered Cal Water's share of the sustainable pumping in the basin. This analysis pulled data from several groundwater modeling efforts that have been performed for KDWCD, the City of Visalia, and Cal Water. The results are described later in the supply reliability discussion in Section 5.

Cal Water recognizes the need for responsible management of groundwater resources and will remain committed to implementing conservation programs to minimize its pumping in the basin, and will remain supportive of the management efforts of KDWCD and the City of Visalia. Cal Water will only pump enough water to meet the needs of its existing customers and future development as approved by the City. So for the purposes of this UWMP the available supply in future years is considered to be equal to the projected demand. Based on the reliability analysis, Cal Water assumes that groundwater supplies are adequate to meet all projected demands over the planning horizon. The projected water supply source and volumes based on the SBx7-7 target demand are summarized in Table 4.1-1.

Additional surface water transfers or exchanges will likely be necessary to alleviate the overdraft condition in and around Visalia. At this time it is unknown whether this surface supply would be used to enhance groundwater recharge or be treated and delivered directly to Cal Water customers. Because of the uncertainty in future supply, for the purposes of this UWMP it was assumed that groundwater would continue to provide 100 percent of supply to the Visalia District.

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

Water Supply Sources	2010 Actual	2015	2020	2025	2030	2035	2040
Purchased Water	-	-	-	-	-	-	-
Supplier produced groundwater	31,762	37,307	37,390	41,788	46,706	51,787	57,176
Transfers in or out	-	-	-	-	-	-	-
Exchanges In or out	-	-	-	-	-	-	-
Recycled Water (projected use)	-	-	-	-	-	-	-
Desalination	-	-	-	-	-	-	-
Total	31,762	37,307	37,390	41,788	46,706	51,787	57,176

4.2 Purchased Water

KDWCD does not provide wholesale imported surface water directly for urban use. Therefore, it is unlikely that sources of purchased water will become available from them in the near future. However, KDWCD does have a contract with the Bureau of Reclamation to receive Central Valley Project (CVP) water from the Friant-Kern Canal. KDWCD could transfer a portion of this water to urban use, or could act as an intermediary in a water transfer between another CVP contractor and Cal Water.

4.3 Surface Water

Cal Water does not currently have any surface water rights in the Visalia area and does not use surface water as a direct supply source for its Visalia customers. The alternatives analysis to be included in the 2011 WSFMP assesses the feasibility of acquiring surface water rights which would be used directly or indirectly by Cal Water customers. This analysis also examined the possibility and economic feasibility of acquiring permanent surface water rights or temporary transfers to be used either for groundwater recharge or for treatment and direct potable use.

Terminus Dam and Reservoir was built by the U.S. Army Corps of Engineers in 1962 mainly to provide flood protection on the Kaweah River, but also to conserve water as an irrigation supply for the Kaweah Basin. The dam is located approximately 18 miles east of the City of Visalia and the Reservoir has a capacity of 183,000 acre-feet.

The fifty year average of Kaweah River runoff is approximately 454,000 AFY. However, annual runoff varies greatly and is greatly dependent on winter snowfall in the upper Kaweah River watershed. KDWCD holds the primary contract for storage of water within Lake Kaweah and the District has agreements in place that allocates the storage to the water rights holders that are members to the Kaweah & St. Johns Rivers Association. The Kaweah & St. Johns Rivers Association functions collectively toward the monitoring and delivery of water to its members, whom consist of various irrigation districts, ditch companies, and private landholders. All those entitled to surface water are members of the Kaweah and St. John's Rivers Association, which functions as the Watermaster. The Association contracts with KDWCD to perform operations and management activities within its service boundary.

Runoff from the Kaweah River makes up about 80 percent of all the surface water that enters the KDWCD boundary. Smaller sources include several smaller streams and imports from the Kings River and the Friant-Kern Canal.

In 2010 KDWCD became a member of the Friant Water Authority and gained access to surface water from the Central Valley Project's (CVP) Friant Kern Canal. The assignment calls for 1,200 AFY of Class 1 water and up to 7,400 AFY of Class 2 water, in addition to intermittently available unstorable flood flows (Section 215 water). The quantity of Class 2 water and unstorable flood flows available is dependent on annual hydrologic conditions. CVP contractors can expect to receive an average of approximately 20 percent of their Class 2 contract amount each year. This new source of surface water will provide KDWCD the opportunity to bring additional supplies into the basin to be used in various programs to the benefit of the basin's groundwater.

Releases from Terminus Dam are used both for agricultural irrigation and groundwater recharge. The conjunctive use of surface and groundwater increases reliability for the Visalia District's water supply. A great deal of artificial groundwater recharge occurs throughout the extensive ditch and canal system, in addition to the dedicated basins. These unlined conveyance structures allow for deep percolation of surface water, which provides a benefit to the Visalia District.

4.4 Groundwater

Historically, groundwater has satisfied 100 percent of the Visalia District's water demand. The groundwater is extracted from the unconfined aquifer system of the Kaweah Delta that underlie the District. Groundwater extraction is accomplished using 94 wells; 75 of which are currently operational. The historical volume of the groundwater pumped is shown in Table 4.4-1.

Table 4.4-1: Amount of Groundwater Pumped – AFY (Table 18)

Basin Name	2006	2007	2008	2009	2010
Kaweah Sub-basin	31,352	34,101	34,848	34,171	31,762
% of Total Water Supply	100%	100%	100%	100%	100%

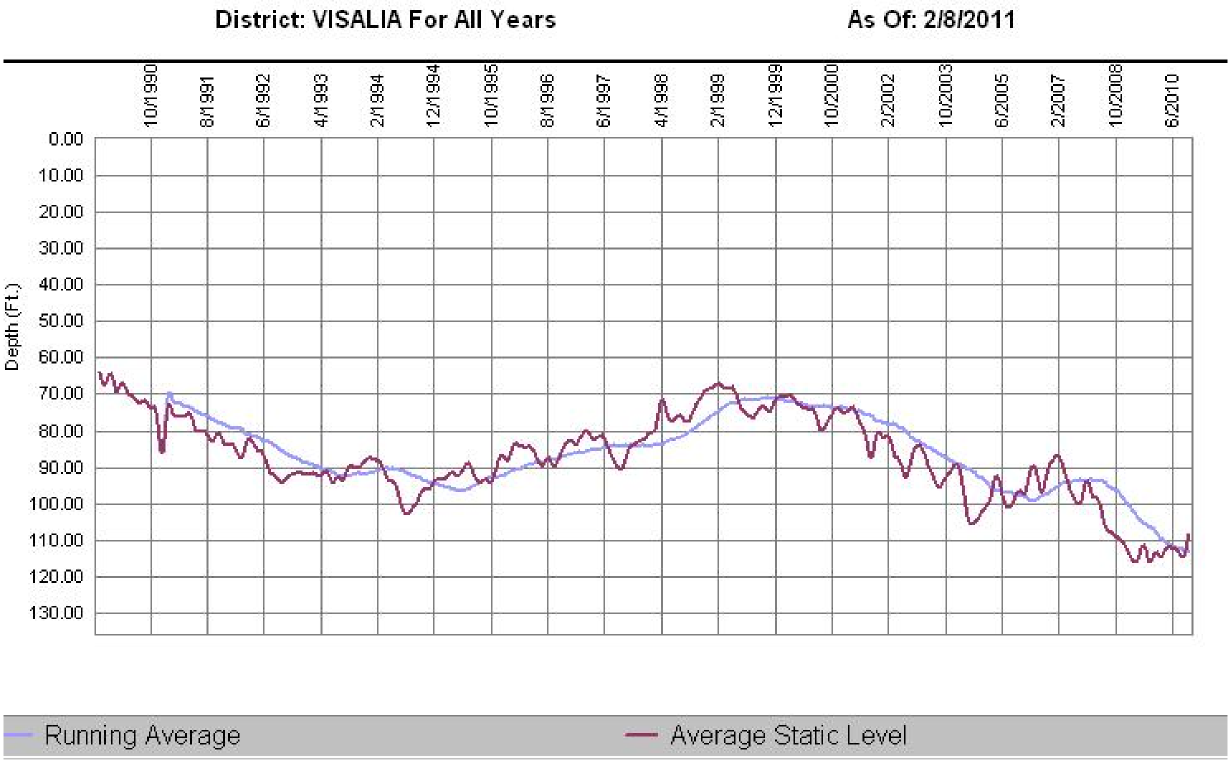
The amount of groundwater projected to be pumped for the Visalia District is shown on Table 4.4-2. The values shown are based on the SBx7-7 target demand.

Table 4.4-2: Amount of Groundwater projected to be pumped – AFY (Table 19)

Basin Name	2015	2020	2025	2030	2035	2040
Kaweah Sub-basin	37,307	37,390	41,788	46,706	51,787	57,176
% of Total Water Supply	100 %	100 %	100 %	100%	100 %	100 %

Figure 4.4-1 shows that average static groundwater elevations in the district have declined up to 50 feet over the past twenty years. Short periods of water level recovery have ranged from 20 to 30 feet over five to ten-year periods of bountiful precipitation. The recent below average rainfall period from 2000 to 2009 shows about a 40-foot decline in static groundwater level. The declining groundwater level is the result of both reduced surface water for recharge and increased pumping due to urban growth and agricultural demand.

Figure 4.4-1: Average Water Level of All District Wells



The long-term trend of groundwater is a slow decline in water levels. If not addressed the continuation of this decline has the potential to decrease available groundwater supplies at some unknown point in the future, which could be considerably outside of the planning horizon of this document. This condition could result in additional costs in terms of both well construction, and operation and maintenance costs generated by the needed effort to seek groundwater at greater and greater depths. Potential solutions to this condition are being addressed through a number of means including:

- The implementation of Kaweah Delta Water Conservation District's established groundwater management plan to which both Cal Water and the City of Visalia are signatory.
- The collection of fees and charges by the City of Visalia to fund the purchase of additional surface water rights and groundwater recharge facilities to slow or eliminate the declining groundwater levels.
- The importation of additional surface water for recharge purposes by the Kaweah Delta Water Conservation District as facilitated by their becoming a long-term Friant Division Central Valley Project contractor.
- The implementation of aggressive demand management strategies through Cal Water's Conservation Program.
- The securing of alternative supplies as discussed elsewhere in this document.
- The City of Visalia Effluent Reuse Project and water exchanges with irrigation users.

As the average static groundwater levels are a function of regional and local conditions, future updates to this UWMP will detail actions to be taken regionally and locally to achieve a long-term balanced groundwater condition for the Visalia District.

4.4.1 Basin Boundaries and Hydrology

The Kaweah Subbasin lies between the Kings Groundwater Subbasin on the north, the Tule Groundwater Subbasin on the south, crystalline bedrock of the Sierra Nevada foothills on the east, and the Tulare Lake subbasin on the west. Major rivers and streams in the subbasin include the Kaweah and St. Johns Rivers.

The Kaweah Subbasin is recognized as being in overdraft by the Department of Water Resources (DWR). Additional details of the basin are given in the DWR's Groundwater Bulletin 118, see Appendix D.[7]

4.4.2 Groundwater Management Plan

The groundwater basin that the Visalia District pumps from is an un-adjudicated sub-basin almost entirely within the KDWCD boundaries. As noted previously, Cal Water participates with the KDWCD, the City of Visalia and others in the Groundwater Management Plan (GMP) established under the provisions of Assembly Bill 3030. The Kaweah Delta Water Conservation District is the lead agency in this effort. KDWCD has historically focused on the conservation of flows of the Kaweah River for groundwater recharge.

In 2006 KDWCD updated the GMP in response to SB 1938 to include all the required elements. Cal Water participated as a stakeholder in the development of the Plan and is a signatory of the Memorandum of Understanding for the GMP. The current version of the GMP is attached as Appendix H.

The groundwater management plan acknowledges a continuing decline in groundwater levels of the aquifer system below the Visalia District. In an effort to assist in mitigating this groundwater decline, The City of Visalia has established fees which are expected to fund groundwater recharge and other water resource projects within the City. The Groundwater Recharge revenues are derived from three fees: the Groundwater Recharge Fee, Groundwater Extraction Fee, and the Groundwater Mitigation Fee:

- ***The Groundwater Recharge Fee*** was created on December 17, 2001 through an adopted Resolution 2001-09 which adds a fee for groundwater recharge as part of a cooperative agreement with KDWCD to increase groundwater recharge efforts. The fee is collected from the monthly City utility bill and is based on the size of

[7] California's Ground Water Bulletin 118, 2003; Tulare Lake Hydrologic Region; San Joaquin Valley Subbasin; Groundwater Basin Number: 5-22.11

the water service line. First priority of recharge fees is for the acquisition of water and other activities to improve groundwater levels. This fee currently generates approximately $125,000 per year. The portion of the fee that is not sent to KDWCD is available for use by the City to fund groundwater recharge efforts. 5,358 AF were purchased and recharged under this program during the 2010 calendar year, which was a wetter than average year, making Class 2 water available for purchase.

- ***The Groundwater Impact Fee*** became effective January 2006 and is charged to Cal Water or anyone who pumps groundwater within the City, which include all residential, commercial and industrial water suppliers. This fee is $14 per acre foot of water pumped.

- ***The Groundwater Mitigation Fee*** became effective August 2005 and is charged to any person seeking to annex property. This fee is $950 per acre of land to be developed or its equivalent value in surface water rights.

All fees in this fund are to be used for acquisition of surface water rights and surface water supplies, groundwater recharge facilities, and other activities to improve groundwater levels and increase supply of water to the City. The City purchased and recharged 2,482 AF and the Visalia Water Management Committee purchased and recharged 5,358 AF in 2010. Since 2005 the City and the Visalia Water Management Committee have purchased and recharged 15,940 AF for an annual average of 3,188 AF.

4.4.3 Conservation Ordinance

In 1989 the City of Visalia passed a water conservation ordinance in effort to reduce urban water demand. The ordinance is designed to minimize unnecessary or excessive water use. It contains a four stage plan that lists guidelines that limit specific water uses under given water shortage conditions. Each stage describes increasingly restrictive measures to be implemented as directed by the City Manager. Violations of the water conservation ordinance are considered a public nuisance and citations can be issued by various City employees. The City of Visalia’s Water Conservation Ordinance is included in Appendix E.

4.4.4 Storm Water Management

The City of Visalia maintains a network of storm drains that convey storm water flows to detention and retention basins throughout the City. A Storm Water Master Plan was initially developed in 1989 and was updated in 1994. The Storm Water Master Plan identified storm water systems and established drainage tributary areas for each. Waterways used for storm water conveyance include the St. Johns River, Modoc Ditch, Goshen Drain, Mill Creek, Evans Ditch, Packwood Creek, Cameron Creek, and Persian/Watson Ditches.

The creeks and ditches listed above are primarily used to deliver irrigation water to surrounding farms. However, the City has entered into several agreements that allow these channels to double as storm water conveyance facilities. The agreements determine the timing and magnitude of flows in each creek or ditch.

The artificial recharge of storm water is an important component of the overall water management strategy for the Visalia area. The City and KDWCD share two facilities upstream of the City for the purposes of improving recharge in and around the urban area. The use of City storm water basins for surface water layoff provides a mutually beneficial augmentation of groundwater supplies.

New construction is required to follow the City's current Storm Water Master Plan. An updated Storm Water Master Plan will be completed with the City's General Plan Update. The new Plan will include low-impact design measures and on-site retention to increase storm-water recharge.

4.4.5 Visalia Water Management Committee

The City of Visalia and the Kaweah Delta Water Conservation District (KDWCD) have an agreement to improve groundwater recharge in the Visalia area. The agreement was created in 2001 as part of negotiations with the Tulare Irrigation District (TID) for an alternative to a canal-lining project they proposed. The primary purpose of the agreement is to maintain existing water rights and acquire additional water supplies for the primary benefit of the residents of the City. Pursuant to the agreement, the City makes deposits to a fund held by KDWCD, as discussed above. The VWMC is comprised of two members, a Visalia City Council Member and a KDWCD Board Member. The efforts of this group contribute to the reliability of local water resources.

4.4.6 Integrated Regional Water Management Planning

Since 2002 there have been several voter approved propositions that created bond funding for the purpose of encouraging Integrated Regional Water Management Planning (IRWM). First, in 2002, Proposition 50 was passed by California voters, appropriating $500 million for integrated regional water management projects. Then in 2006 Proposition 84 provided funding for an additional $1 billion in IRWM funding. Also passed in 2006 was Proposition 1E, which authorized the State to sell $4.09 billion in bonds to finance the reconstruction of California's ageing flood control structures and protect vulnerable levees.

In order to be eligible for these funds local agencies must come together to form a Regional Water Management Group (RWMG) and develop an IRWM Plan. Each region is responsible for developing priorities for water resource needs within its region. KDWCD and the City of Visalia are members of the Kaweah River Basin RWMG. Together, along with the other RWMG members, they will navigate the IRWM process and submit projects for grant funding. To be eligible for grant funds through the IRWM

Grant Program, a project must be contained within an adopted IRWM Plan (IRWMP) developed in accordance with guidelines provided by the State.

Cal Water is considered a stakeholder in the Kaweah River Basin IRWM Region process. In this capacity it will look for opportunities to partner with KDWCD, the City of Visalia, or any other local agency or party on water management strategies that are mutually beneficial.

4.5 Recycled Water

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

4.5.1 Wastewater Collection

The City of Visalia owns and operates the primary sewer system within the Visalia District. A small portion of the wastewater produced in the District is disposed of in on-site septic systems, principally in current and former county islands. The City's system consists of gravity sewers, pumping stations, and force mains to collect wastewater from residential, commercial, and industrial customers. The collected wastewater is discharged to trunk sewers and interceptors and conveyed to the Visalia Water Conservation Plant (WCP).

The wastewater undergoes secondary treatment with trickling filters, activated sludge, and chlorination. The City is now undergoing an upgrade to its wastewater treatment facilities that will tertiary treat all of the effluent. As part of the City's proposed Effluent Reuse Project, the WCP would be upgraded to produce 100 percent tertiary effluent. The Effluent Reuse Project will be discussed in more detail in Section 4.5.3. Currently, the treated effluent is discharged into Mill Creek for use in agricultural irrigation of cotton and silage crops.

The WCP has a capacity to treat 22 MGD but under Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements Order No. R5-2006-0091, is limited to its permit capacity of 20 MGD. In early 2010 it was receiving an average of 13 MGD from residential, commercial, and industrial customers in the City of Visalia and from other parts of unincorporated Tulare County.

Another factor influencing the improvements to the WCP is the effluent ammonia concentration limit of 0.025 mg/l, which is required by March 25, 2011. The upgrade will include a denitrification process to insure compliance with this waste discharge requirement. As an interim measure the City will divert discharged effluent to a percolation basin for recharge. Water used for artificial recharge does not currently have the same ammonia restrictions, but likely will in the future.

Table 4.5-1: Wastewater Flow Rates in Visalia				
Plant	Capacity		Current Flow Rate	
	MGD	AFY	MGD	AFY
Visalia Treatment Plant	22	24,640	13	14,560

4.5.2 Estimated Wastewater Generated

Estimates for the District's wastewater production quantity since 1980 are shown in Figure 4.5-1 and were calculated by annualizing 90 percent of January water use in the Cal Water's service area. The future quantity of waste generation is based on a linear projection of the historical estimates. These estimates include wastewater generated outside of the City limits in areas served by the wastewater collection system, such as Goshen.

Figure 4.5-1: Estimated Annual Wastewater Generated

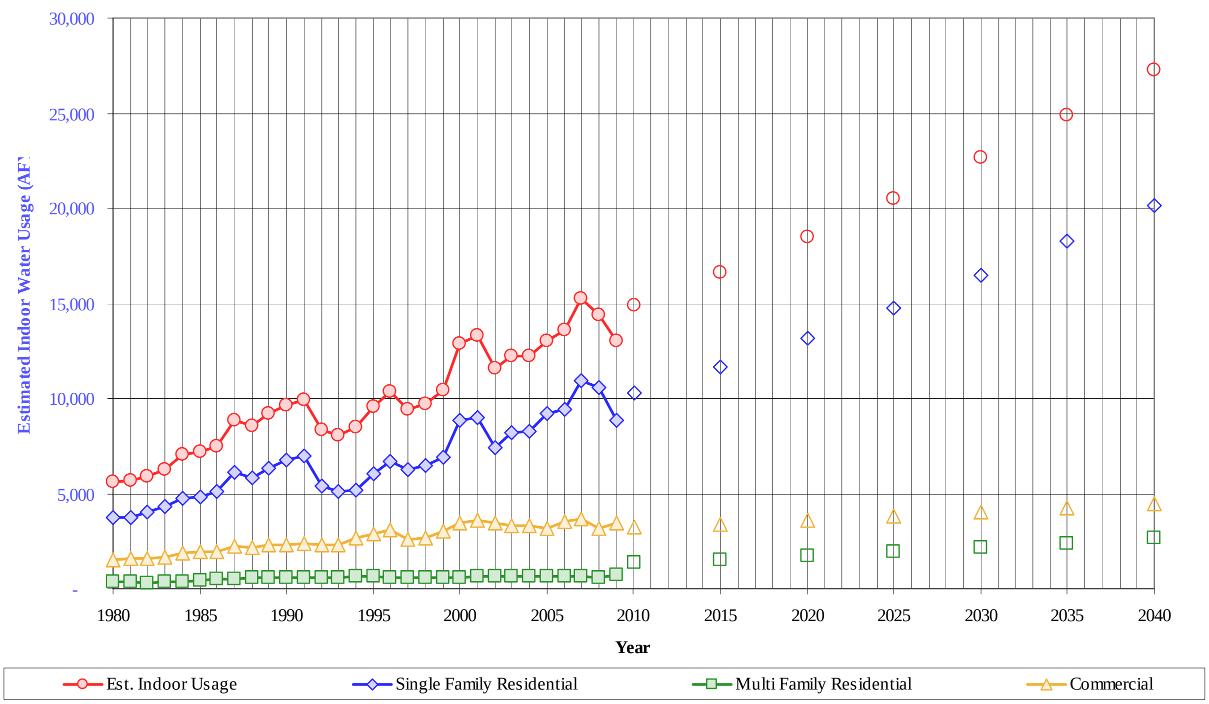


Table 4.5-2: Recycled Water-Wastewater Collected and Treated-AFY (Table 21)								
Type of Wastewater	**Treatment Level**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Total Collected and Treated	Secondary/Tertiary	14,884	16,595	18,517	20,473	22,647	24,899	27,285
Volume Meeting Recycled Water Standard	Tertiary	0	16,595	18,517	20,473	22,647	24,899	27,285

Upgrades to the WCP are planned to be complete by 2015. At this time the City expects 100 percent of the treated effluent to be reused through transfer and exchange agreements with local irrigation districts. The estimated volume of wastewater disposed of for the District presented in Table 4.5-3 reflects this assumption. By 2040 the volume of water reused under these programs could reach over 27,000 AFY.

Table 4.5-3: Disposal of wastewater (non-recycled) AFY (Table 22)								
Method of Disposal	**Treatment Level**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
• Percolation Ponds • Stream Discharge • Irrigation	Secondary/Tertiary	14,884	0	0	0	0	0	0

4.5.3 Potential Water Recycling

A portion of the treated effluent from the WCP is now being used for several purposes including placement in percolation basins with incidental groundwater recharge and agricultural irrigation. Recharge occurs by diverting treated effluent to City owned recharge Basin 4 located at the WCP, and by the deep percolation of discharges into Mill Creek. An estimated 2,250 AFY is currently used for recharge in Basin 4. In addition, approximately 6,905 AFY of the treated effluent discharged in Mill Creek is also used directly for agricultural irrigation by nearby farmers. Another 767 AFY is used for agricultural irrigation on City owned farmland near the WCP.

The Effluent Reuse Project proposed by the City of Visalia would provide tertiary treatment and recycling of approximately 14,000 AFY of wastewater from the WCP. The Project calls for the construction of an upgraded treatment facility and a distribution system for the delivery of recycled water to locations near the WCP. A backup delivery system would also be built to Recharge Basin No. 4 to eliminate the possibility to discharges to Mill Creek. The recycled water would be used for several purposes including agricultural irrigation on City owned properties surrounding both the Visalia Airport and the WCP, and for landscape irrigation at Plaza Park and the Valley Oaks Golf Course. These areas presently use pumped groundwater to provide their irrigation water supply needs and are not served by Cal Water other than for potable water.

The City of Visalia is also intending to enter into exchange agreements with one or more irrigation districts and companies in which the City would deliver recycled water to the irrigation districts in exchange for water delivered east of the City for groundwater recharge. This would increase recharge in the Visalia area thus improving the local water balance. The quantity of water involved in the exchange is uncertain at this time, but the local benefit to the basin will be proportional to this amount. An estimate of the potential amount of recycled water use is listed in Table 4.5-4.

Table 4.5-4: Recycled Water - Potential Future Use-AFY (Table 23)								
User Type	**Description**	**Feasibility**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Agricultural irrigation	Agricultural exchanges	Yes	8,674	12,950	17,227	21,373	23,625	26,011
Landscape irrigation	Not replacing potable supply	N/A	1,274	1,274	1,274	1,274	1,274	1,274
Groundwater recharge	City basins	Yes	6,647	4,293	1,972	0	0	0
Indirect potable reuse	Pump to City basins	N/A	0	0	0	0	0	0
	Total		16,595	18,517	20,473	22,647	24,899	27,285

Cal Water will continue to consider providing recycled water to replace potable demands if it becomes economically beneficial to our customers. Due to the proposed City of Visalia exchanges, excess supply from this source is thought to be limited, at least in the near term. As the City grows the potential development of this source of supply will increase. Cal Water supports the proposed exchanges as a positive step forward in improving the water balance in Visalia.

There are currently several barriers to using recycled water in the Visalia District. The first is the cost of treatment and distribution as compared to groundwater pumping. Potential customers in the City of Visalia are approximately four miles east of the treatment plant. In addition, many of these potential customers use groundwater not supplied by Cal Water to meet their needs. Another barrier is the low potential demand from Cal Water customers which leads to a high unit cost for recycled water. Because of these things Cal Water does not anticipate serving recycled water in the near term, but will evaluate its use as conditions change that may impact its feasibility.

4.6 Desalinated Water

There are no opportunities for the development of desalinated water in the District. Visalia is located in the eastern Central Valley at a great distance from any potential source of saline water.

4.7 Transfer or Exchange Opportunities

The participants in the previously mentioned groundwater management plan see the importation of additional surface water into the sub-basin as an important element to achieving a balanced groundwater condition. As has already been mentioned KDWCD is already the beneficiary of contracts for water supplies to be developed and delivered by the federal Central Valley Project.

Besides the additional water to be delivered into the area as a contract entitlement, the status as a long-term contractor also affords improved access to surplus federal water supplies that may be available from other federal contractors or which may be surplus to the federal project's overall immediate demands. Monies are being set aside by both Kaweah Delta Water Conservation District as well as the City of Visalia which would enable the purchase of such water supplies when they come available.

If a surface supply could be obtained it would come from two possible sources. The first is from Section 215 of the Reclamation Reform Act (RRA) of 1982 which allows for water designated as unstorable irrigation water to be released due to flood control criteria or unmanaged flood flows. KDWCD has access to this water and continues to work towards maximizing use of these excess flows.

The second source would be to work directly with agricultural users to obtain a water transfer or exchange. These agricultural transfers can be permanent or interruptible. Permanent agricultural transfers involve the permanent acquisition of agricultural water rights and the transfer or change of a water right to municipal and industrial uses either in the form of the cessation of irrigation on formerly irrigated lands or through transfer of flood flows for indirect potable reuse. Interruptible agricultural transfers consist of temporary agreements where agricultural water rights can be used for other purposes. The agreement with agricultural users allows for the temporary cessation of irrigation so that the water can be used to meet Visalia's municipal needs.

Although these sources are available it is unlikely that Cal Water will purchase imported water directly from KDWCD for delivery to municipal and industrial customers in Visalia. Any increased acquisition of surface flows by KDWCD would most likely be used for aquifer recharge, and would be available to Cal Water through groundwater pumping.

One transfer opportunity was recently presented by Cal Water. Cal Water has brought the opportunity to purchase water from an "outside-the-basin" water source. There is 10,000 acre-feet of water banked in the City of Bakersfield's groundwater bank, which is owned by Cal Water, can be made available over 5 to 7 years for extraction and ultimate delivery to the Visalia area via the Kaweah River and its distributaries for groundwater recharge.

In order to make the cost acceptable as recharge water, the water will be first delivered to citrus growers in Hills Valley Irrigation District (that can use and are willing to pay for the firm nature of this water) and they in turn will provide the City of Visalia and the Visalia District water in a future year at a cost of somewhere between $25 and $55 per acre-foot at a time when the City of Visalia otherwise does not have access to water at equivalent costs. Thus, the City of Visalia will be able to access 10,000 acre-feet of water it otherwise would not be able to purchase elsewhere at a net cost of somewhere between $25 and $55 per acre-foot. In 2010 1,623 AF were recharged under this agreement, 1,300 of which were purchased by the City at a price of $55/AF and 324 of which were prepaid by Hills Valley at no cost to the City.

4.8 Water Supply Alternatives

As stated earlier, Cal Water is in the process of completing a Water Supply and Facilities Master Plan (WSFMP) for the Visalia District. The WSFMP will include a detailed feasibility analysis of water supply alternatives. This information will be used to develop a water supply strategy for the Visalia District. Because the WSFMP will not be complete until late in 2011, the results will not be ready for inclusion in this UWMP. However, the preliminary results are summarized below.

To meet future demands, the WSFMP has identified a need for additional surface water supply. The difference between projected demand and existing supplies is about 19,000 AFY. This estimate does not take into account current groundwater recharge activities, which are assumed to be embedded in the historical analysis of sustainable pumping rates.

Depending upon the water supply strategy, this quantity considered to be a lower bookend. If future demands are to be met from treated surface water, one acre-foot of imported supply is assumed to yield one acre-foot of delivered water. If future demands continue to be met from groundwater, with imported water being recharged, additional recharge may be needed to avoid continued water declines, particularly if agricultural pumping within the basin remains unchanged.

The WSFMP is evaluating the following two principal supply scenarios:

- Groundwater with Surface Water Recharge Scenario: Continue to rely on groundwater supply, with acquisition of supplemental surface water for recharge to the groundwater basin.

- Groundwater and Treated Surface Water Supply Scenario: Meet some future demand from treated surface water, and the remainder of demand from groundwater. This scenario assumes that approximately 10,000 AFY would be served from a new surface water treatment plant by 2020, with the plant expanded to treat an additional 10,000 AFY by 2030.

Scenarios may also include expansion of the City water recycling project beyond its proposed initial phase, and will identify Cal Water's planned water conservation programs identified in Cal Water's Water Conservation Master Plan.

The WSFMP has identified several potential sources of surface water for acquisition. The two that appear to be the most promising are:

- Friant Project Contract Water. The Friant project is part of the federal Central Valley Project, and located in the upper reaches of the San Joaquin River watershed. Water is impounded at the Millerton Lake and delivered to the Friant-Kern canal. Friant contractors are principally agricultural agencies in the southern San Joaquin Valley. Two types of water are available to Friant project contractors: Class 1 water, which has associated rights to storage in Millerton Lake, and is available in all years, with some reductions during drought years; and, Class 2 water, which is water that cannot be stored in Millerton Lake and is available only in wetter hydrologic years. Potential opportunities include outright purchase of Class 1 Friant water or funding purchase of Class 2 water for exchange with Class 1 water. The Friant-Kern canal runs through Tulare County east of the City of Visalia. Water would be delivered to the Visalia District via a pipeline constructed to deliver water from the Friant-Kern Canal.

- Long-term Surface Water Transfer with the San Joaquin Exchange Contractors. The Exchange Contractors entered into agreement with the Bureau of Reclamation to exchange their pre-1914 water rights on the San Joaquin River for Central Valley Project water delivered at Mendota Pool. This agreement enabled construction of the Friant Project. Water transferred from the Exchange Contractors would need to be wheeled through the Friant system for delivery to the Visalia District.

5 Water Supply Reliability and Water Shortage Contingency Planning

5.1 Water Supply Reliability

Determining the water supply reliability for areas such as the Visalia District which rely on groundwater can be more difficult than in other cities that use surface water. Surface supplies generally are either collected from a dedicated watershed and stored in reservoirs for future use, or are dictated by contracts with wholesale agencies. In these cases water planners can rely on many years of hydrologic data to estimate future supply.

But because the Visalia District relies only on groundwater in a basin that is in overdraft condition and has no limits on pumping, the reliability analysis is more complex. Theoretically Cal Water could continue to construct wells and pump groundwater to meet all future demands and thereby claim 100 percent reliability through 2040. However, this approach is unsustainable and irresponsible, especially in this region of the San Joaquin Valley.

It is understood that ultimately the reliability of the water supply to the Visalia District is function of the long term balance between aquifer replenishment and groundwater extraction. To better plan for ways to achieve this balance the City of Visalia and KDWCD participated in the development of a numerical groundwater model that encompasses the Visalia Urban Development Boundary. The model will be utilized for several applications including, but not limited to, assisting in the land use decision-making process, analysis of various recharge opportunities to determine the most effective strategies, and the determination of a practical rate of withdrawal in the future. The model results indicate that with current programs, overdraft of the basin will continue.

The following section provides an analysis of the previously mentioned modeling efforts. The primary goals were to establish Cal Water as an appropriator, determine how much additional supply will be required, and the urgency at which these projects will need to be pursued.

Regional Groundwater Basin Setting

The Kaweah Subbasin of the San Joaquin Valley Groundwater Basin as defined by DWR comprises 446,000 acres in Tulare and Kings Counties. The Kaweah Subbasin encompasses the area of the Kaweah Delta Water Conservation District (about 340,000 acres) and some additional surrounding lands. Previous studies (Fugro 2003, 2005) indicate that the KDWCD has an overall safe yield on the order of 600,000 AFY based on data for the 1981 to 1999 time period, and estimated overdraft during this time period was 17,000 to 30,000 AFY.

Ongoing analysis of more recent data through 2008 has indicated that average annual groundwater storage declines could range from 50,000 to 80,000 AFY depending on the beginning and ending dates used in the calculation. It is not known at this time how much of the recent increase in groundwater storage declines is due to relatively dry climatic conditions since 2000 versus increased groundwater extractions. Additional studies are currently being conducted by KDWCD to further evaluate water balance conditions between 1981 and 2008.

Evaluation of Historic Data for the Visalia Urban Area

A groundwater modeling study of the Visalia area was initiated in 2006 and was nearing completion in Fall 2010. This study involved a detailed hydrogeologic characterization of the subsurface sediments and water balance (various components of recharge and discharge) in addition to construction, calibration, and application of a numerical groundwater model. The Visalia model encompassed approximately 62,000 acres in and around the Visalia urban area (and within KDWCD boundaries). The urban area portion of the model domain consists of about 17,800 acres surrounded by agricultural lands.

Within the 62,000 acre Visalia model domain (VMD) the water balance indicates that average annual recharge from 1981 through 2005 was 157,866 AFY and average annual discharge was 167,485 AFY (Fugro Draft Final Report, Sept. 2010, Tables 1 and 3). Thus, there has been a net average annual deficit of about 9,600 AFY over this 25-year time period.

Cal Water pumping over the 1981-2005 timeframe averaged about 16 percent of total pumping, and more recently over the 2001 to 2005 time frame has averaged about 21.5 percent of total pumping within the VMD. On the basis of the proportion of gross Cal Water pumping to total pumping compared to the average annual net deficit, the portion of the water balance net deficit that might be attributed to Cal Water pumping over this historic time period could be considered to be 1,535 to 2,064 AFY. In terms of net pumping averaged over the 1981-2005 study period Cal Water accounts for about 27 percent (2,573 AFY) of the 9,600 AFY average annual deficit, and as of 2005 it accounted for 34 percent (3,526 AFY).

Provost and Pritchard (January 7, 2009) cited data from the Cal Water UWMP that showed the average Visalia District water level declined 30 feet between 1989 and 2006, while customer water demands increased from 19,700 to 31,400 AFY over the same time frame. Provost & Pritchard calculated that the 30-foot decline combined with a specific yield of 9 percent over an area of 14,000 acres yields a total groundwater storage decline of 37,800 AF or an average decline of 2,225 AFY.

The two estimates described above of the amount of historic groundwater storage decline that may be attributable to Cal Water groundwater pumping (1,500 to 3,500 AFY from the model water balance and 2,225 AFY based on Provost & Pritchard calculations) in the Visalia District are in good agreement. The results generally indicate that about 2,000 to 3,000 AFY of groundwater storage decline on an average annual basis likely occurred due to Cal Water groundwater pumping over the time period from 1981 to 2005.

Preliminary Sustainable Pumping Estimate

The above analysis of historic data provides an estimate of the historic average annual deficit in the water balance that might be related to Cal Water pumping. However, it is also necessary to derive some estimate of sustainable pumping for City of Visalia/Cal Water pumping to guide future groundwater management. One method of providing a preliminary estimate of sustainable pumping is to use total groundwater pumping plus or minus the change in groundwater storage over a given time period. If sustainable pumping is equal total pumping +/- change in storage we have:

- Cal Water Pumping from 1989 to 2006 = 25,935 AFY average or 440,895 AF total
- Small Public Water Systems and Urban Landscape Pumping from 1989 to 2006 = 7,090 AFY average x 2/3 = 4,750 AFY average
- Combined Pumping (Cal Water plus Small Public plus Urban Landscape) from 1989 to 2006 = 30,685 AFY average
- Change in Groundwater Storage (from Provost and Pritchard) = -2,225 AFY average or -37,800 AF total
- Sustainable Pumping (based upon 1989 to 2006 data) = 28,460 AFY (Table 5.1-1)

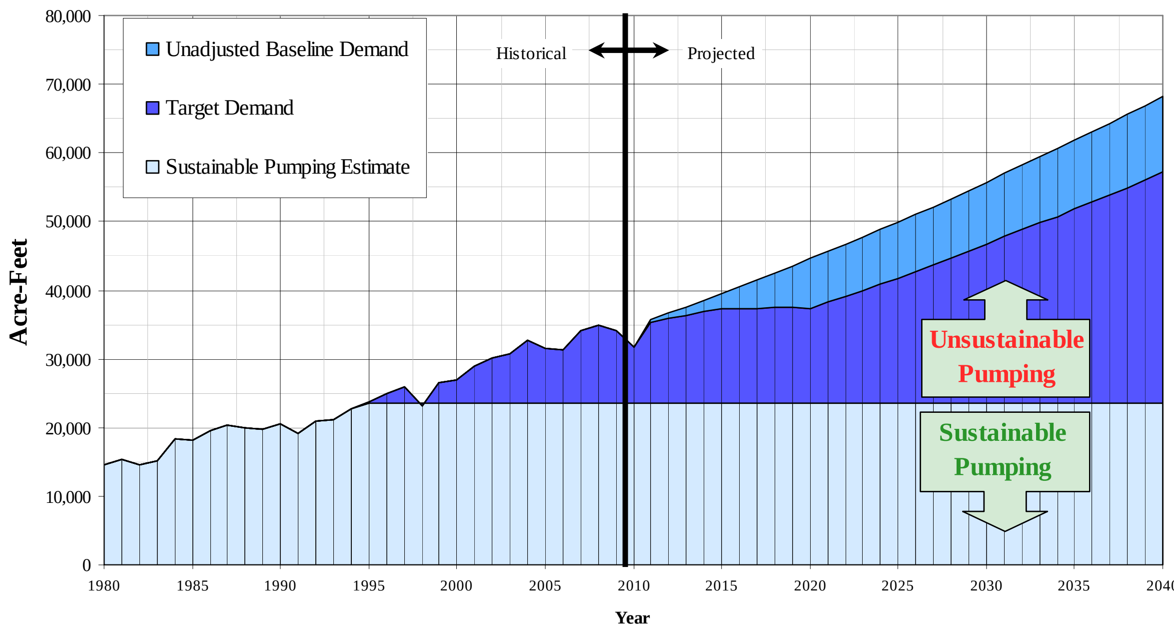
Table 5.1-1: Preliminary Sustainable Pumping Estimates

Sustainable Pumping Estimate (AFY)	Area (Acres)	Description of Area	Comments on Differences
23,500	17,764	Allocation of Sustainable Pumping Estimate to Cal Water in Visalia urban area.	Based on 1989-2006 average Cal Water pumping vs. total urban pumping
28,460	17,764	Total Sustainable Pumping Estimate in Visalia urban area	Based on 1989-2006 average urban pumping and storage change
608,700	340,000	Safe Yield for KDWCD Model Domain (using net of subsurface inflows and outflows) for 1981-1999	

The combined pumping (as calculated above) has exceeded the sustainable pumping estimate every year since 1999, and total pumping has exceeded the sustainable pumping estimate by more than 5,000 AFY since 2001. Given recent year (2005) small public water system plus urban landscape pumping of about 7,500 AFY and assuming 2/3 of that amount or 5,000 AFY is pumped from an area defined as "City of Visalia", the implication is that Cal Water could pump a maximum of about 23,500 AFY to remain within the "Sustainable Pumping Estimate" of about 28,500 AFY for the City of Visalia area. Cal Water's share of the sustainable pumping estimate is expected to increase slowly over time as the City grows and accounts for a larger portion of the VMD. However, for this analysis the sustainable pumping estimate was kept constant at 23,500 AFY.

This is approximately the annual pumping amount for Cal Water in 1998. Cal Water pumping was 32,700 AFY in 2004, and then leveled off at about 31,600 AFY in 2005 and 2006 as shown in Figure 5.1-1. Cal Water pumping subsequently increased to 34,100 AF in 2007 and 34,850 AF in 2008.

Figure 5.1-1: Comparison of Projected Demands and Sustainable Pumping Estimate



This analysis would suggest that a reduction of about 11,000 AFY from 2007/2008 Cal Water pumping (or a reduction of about 30%) is needed to bring the area back into balance. This balance could also be achieved by a combination of management activities including increased conservation, augmented artificial recharge, recycled water use, exchanges and transfers, and surface water acquisition. These activities and Cal Water's strategy for achieving a sustainable portfolio of water supply sources for the Visalia District was discussed in the Section 4.9 of this UWMP.

Ongoing studies for KDWCD can provide some context for the more local-scale Visalia urban area groundwater storage declines. Preliminary results of groundwater storage decline calculations during the 1981 to 2008 time period over the entire 340,000 acre District area typically amount to between 50,000 and 80,000 AFY depending on the start and end dates used in the calculation. For the time period from 1989 to 2006 used in the Visalia urban area analysis, the annual average storage decline amounted to 80,000 AFY on a District-wide basis. It should be noted that time periods such as 1989 to 2006 or 1981 to 2008 do not necessarily represent balanced periods in terms of wet and dry-year cycles and therefore, groundwater storage declines over these periods are not equivalent to overdraft related to safe yield.

Evaluation of the Visalia urban area indicates that current levels of City of Visalia/Cal Water pumping appear to result in an annual average deficit on the order of 11,000 AFY for the time period analyzed (i.e., 1989 to 2006). Using the same time period on a basin-wide basis, current levels of Cal Water pumping to meet City of Visalia urban water demands account for 11,000 AFY, or about 14 percent of the total deficit of 80,000 AFY within KDWCD.

Total Groundwater Storage and Average Annual Groundwater Storage Change Calculations

In order to provide some context for the evaluation of historic data and preliminary sustainable pumping estimates provided above, it is useful to compare those results to the total amount of groundwater in storage and historic average annual changes in groundwater storage. The City of Visalia groundwater flow model domain provides a reasonable area (62,000 acres) over which to make the total groundwater storage calculation. It is estimated that the upper 100 feet of saturated sediments holds about 725,000 acre-feet of groundwater in storage over the 62,000 acre area. Similarly, the total saturated aquifer thickness of about 600 feet contains about 4 million acre-feet of groundwater.

To provide further context, we can divide the total groundwater storage by the average annual net deficit in the water balance from 1981 to 2005 (9,600 AFY) to calculate that storage would theoretically be depleted in about 400 years (not accounting for changes in groundwater inflow from boundaries) for all four model layers and 75 years for model layer 1. Using more recent year data from 2000 to 2005 the average annual deficit is calculated to be about 22,000 AFY, which can be divided into the total groundwater storage of 4+ million AF to yield a supply still lasting 180 years for storage in all model layers.

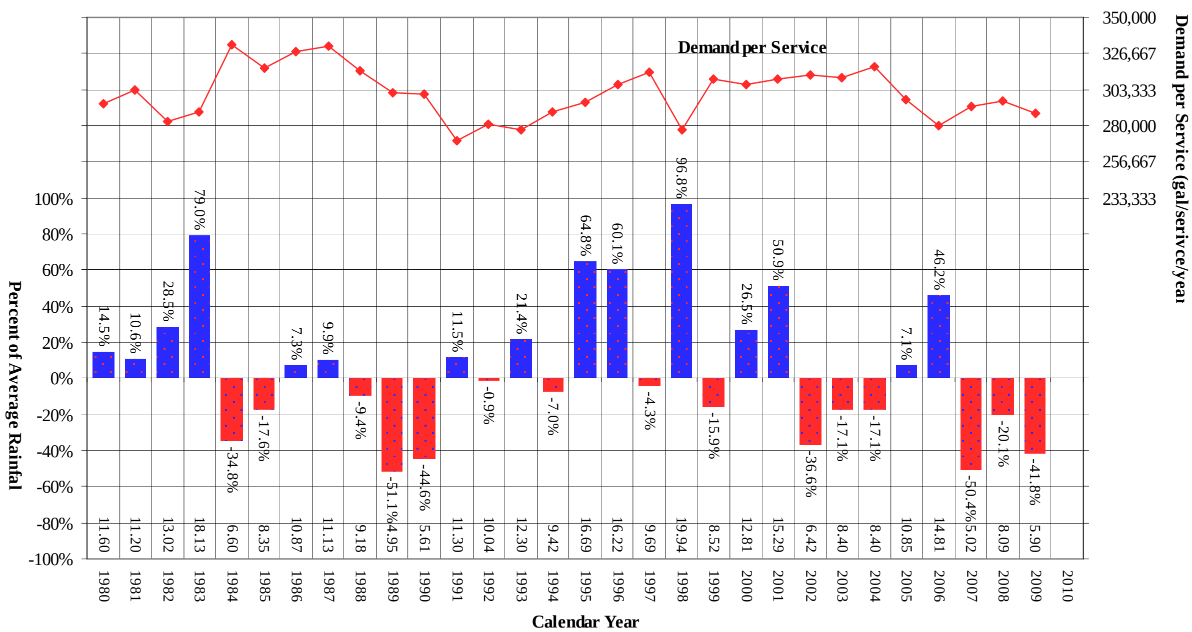
Annual Rainfall Variability

As stated earlier, Cal Water does not have access to surface water from the Kaweah River for direct municipal use. However, the annual rainfall and snowmelt in the Kaweah River watershed has a large impact on groundwater storage in the basin. In wet years abundant surface water is used for agricultural irrigation while farmers cut back on groundwater pumping. The surplus of surface supply in wet years allows for increased groundwater storage both through artificial recharge and by conveyance loss in unlined canals and ditches. Conversely, in dry years surface water is less available, which leads to increased pumping and a reduction in storage throughout the basin.

Annual precipitation, especially as snowfall in the higher elevations of the Kaweah River watershed, will be the best indicator of river runoff. However, there is generally a strong relationship between the rainfall in Visalia and runoff amounts in local rivers. Kaweah River runoff data shows a similar high degree of annual variability compared to rainfall in Visalia. Although the average rainfall was calculated for the purposes of this analysis you can see that average conditions rarely exist.

The annual percentage of normal rainfall and the average demand per service is shown in Figure 5.1-2. In general, water demand tends to increase in dry years primarily due to increased water use for activities such as landscape irrigation.

Figure 5.1-2: Comparison of Annual Rainfall to Historical Average



5.2 Drought Planning

For the purposes of this analysis 2005 was chosen as the most recent normal hydrologic year when rainfall was 7.1 percent (10.9 in) above average. 1999 was chosen as the single dry year because preceded and followed by wet years, and had a rainfall of 15.9 percent (8.5 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 (s)**
Average Water Year	2005
Single-Dry Water Year	1999
Multiple-Dry Water Years	1988-1991

The normal method of comparing dry year supply to average conditions doesn't work as well in an area supplied only by groundwater as it would in areas with a surface supply. Because groundwater is the sole source the Visalia District's dry year supply is buffered by the relatively large amounts of storage present in the basin. If the assumption that the total available supply will equal the total demand in any year is made, comparing the supplies in past years doesn't usually provide meaningful results. The primary reason for this is that growth within the service area leads to increased demands over time, regardless of hydrologic conditions. And because the Visalia District is growing at a rapid rate, demand has increased dramatically over short time periods.

Perhaps a better indication of annual variability would be the variation in customer demand between normal and single dry or multiple dry years. This can be seen in the overall average demand per service values for the District, as shown in Table 5.2-2. The data suggests a typical pattern where demand increases at the beginning of the drought and is gradually reduced as dry conditions persist. This reduction generally happens as a result of increased conservation requests by water providers and a general awareness of the problem by customers.

Table 5.2-2: 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**
296,614	309,833	315,660	301,307	300,180	270,007
% of Normal	104%	106%	102%	101%	91%

For the reasons described above, groundwater supplies are not limited during dry hydrologic years. An adequate supply to meet customer demands is expected to be 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, with a normal supply for 2010. The supply amounts were calculated by applying the percentages from years 1-3 in Table 5.2-2 to the SBx7-7 target demand projection for those years.

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**
Groundwater	34,869	37,622	36,406	36,763
% of Normal Year	100%	108%	104%	105%

5.2.1 Normal-Year Comparison

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

For this analysis the normal supply is considered equal to the target water demand projection. Conservation savings is already incorporated into this projection, therefore groundwater is the only supply source. Table 5.2-4 indicates that groundwater will be reliable throughout the planning horizon of this UWMP and that no supply deficiencies are expected.

Table 5.2-4: Supply and Demand Comparison - Normal Year - AF (Table 32)						
	2015	2020	2025	2030	2035	2040
Supply totals	37,307	37,390	41,788	46,706	51,787	57,176
Demand totals	37,307	37,390	41,788	46,706	51,787	57,176
Difference	0	0	0	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

5.2.2 Single Dry-Year Comparison

In general, and from operational records, the District's demand has shown to increase during a single-dry years as compared to normal years. The water demand increases due to maintenance of landscape and other high water uses that would normally be supplied by precipitation. The supply and demand values shown in Table 5.2-5 were calculated by increasing the target demand projection in each year by the percentage listed for the single dry year in Table 5.2-2. Again, Cal Water assumes that the total supply will equal the demand in all future years. Therefore, the supply is 100 percent reliable in single dry years.

Table 5.2-5: Supply and Demand Comparison – Single Dry Year - AF (Table 33)

	2015	2020	2025	2030	2035	2040
Supply totals	38,970	39,056	43,651	48,788	54,095	59,724
Demand totals	38,970	39,056	43,651	48,788	54,095	59,724
Difference	0	0	0	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

5.2.3 Multiple Dry-Year Comparison

As noted earlier, water demand generally increases early in a multiple dry year period then gradually decreases as the drought persists and customers respond to conservation messaging. This pattern is evident in Table 5.2-6 where demands at the beginning of each five year period are higher than in the normal year scenario, and demands decrease each year thereafter. The supplies and demands shown here are calculated by multiplying the target demand projection for that year by the percentages listed in Table 5.2-2 for the multiple dry year period. Again, no supply deficiency is expected.

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	Supply Totals	39,702	39,791	44,472	49,705	55,112
	Demand Totals	39,702	39,791	44,472	49,705	55,112
	Difference	0	0	0	0	0
	Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%
	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%
Multi-dry year second year supply	Supply Totals	37,957	38,836	43,405	48,599	53,657
	Demand Totals	37,957	38,836	43,405	48,599	53,657
	Difference	0	0	0	0	0
	Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%
	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%
Multi-dry year third year supply	Supply Totals	37,853	39,561	44,215	49,388	54,525
	Demand Totals	37,853	39,561	44,215	49,388	54,525
	Difference	0	0	0	0	0
	Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%
	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%

5.3 Factors Affecting Reliability of Supply

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

Table 5.3-1: Factors Resulting In Inconsistency of Supply (Table 29)				
Name of supply	**Legal**	**Environmental**	**Water Quality**	**Climatic**
Groundwater	✓		✓	✓

Since aquifer levels tend to be quite reactive with respect to rainfall amounts and basin-wide pumping, climatic variation could impact the consistency of supply. An extended drought period may significantly reduce the available supply of groundwater, depending on the depth of wells throughout the District.

Water quality concerns have not shown to be a major contributor to consistency of supply in the Visalia District. However, emerging contaminants or reduced Maximum Contamination Levels for contaminants known to be present may affect the local availability of groundwater resources.

Potential legal issues resulting from conflicts with agricultural water users or future adjudication efforts could also have unforeseen consequences for urban water suppliers in the area.

5.4 Water Quality

The drinking water delivered to customers in the Visalia District meets or surpasses all federal and state regulations. The U.S. Environmental Protection Agency as authorized by the Federal Safe Drinking Water Act of 1974 sets drinking water standards. A state can either adopt the USEPA standard or set state standards that are more stringent than those set by the federal government.

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

The quality of groundwater produced by the District's active wells can vary depending on location. Several wells have been tested to produce water that exceeds the Secondary Standard for manganese; however, these wells have either been taken out of service or treated to reduce the contaminant level in the water delivered. Other issues of concern in the district are arsenic, nitrate and salt. The presence of these contaminants puts into question the potential availability of these facilities if the concentrations were to increase above the existing treatment capacity. Also of concern is the potential loss of other wells due to contaminate migration.

Additionally, some wells have been found to contain concentrations of volatile organic compounds (VOCs), particularly trichloroethylene (TCE), tetrachloroethylene (PCE) and carbon tetrachloride (CTC), which have, on occasion, exceeded the MCL for these substances. A number of wells contain detectable concentrations of the inorganic compound nitrate. Cal Water is increasing its monitoring of pesticides (DBCP), nitrate, arsenic, and pentachlorophenol. In all cases if the concentration of these compounds exceeds the MCL, the wells are taken out of service or appropriate treatment technologies are applied to remove the contaminant.

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 reduced 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).

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 wholesale allocations of imported water. If implemented, Cal Water would need to reduce its use of this supply proportionally in order to meet regional conservation targets and avoid wholesaler imposed penalties for overuse. Cal Water would have to request customers to reduce water use, usually to the same level as required by the wholesaler.

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

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

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

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

5.5.4 Allocation Methodology and Customer Information

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

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

In most cases the percent reduction will be kept constant on an annual basis. It will be reviewed and adjusted as necessary in the spring of each year after the water supply picture becomes clear for the following dry season. In most districts Cal Water does not have direct control over long term storage of imported water and will rely on the California Department of Water Resources, U.S. Bureau of Reclamation, and regional water wholesalers to manage carryover storage between years. In some cases it may be necessary to adjust these percentages mid-year, if, for example, a district is not meeting its reduction target. The allocation period will end when Cal Water determines that the water shortage no longer exists and ample supplies are available on an ongoing basis.

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

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

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

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

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

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

5.5.5 Drought Stages

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

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

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

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

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

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

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

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

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

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

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

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

In many of Cal Water's service districts at least a portion of the supply is provided by purchased water imported through a wholesale water agency. In these cases the wholesaler generally sets reduction targets based on their supply portfolio for the year, and Cal Water's Water Shortage Allocation Plan will be triggered by these agencies. The Visalia District does not receive any purchased water from wholesale agencies and instead must rely on groundwater as the sole source of supply. As a result setting meaningful triggering mechanisms is more difficult.

Because of the large storage capacity of the aquifers surrounding the Visalia District acute water shortages during droughts are unlikely. However, Cal Water recognizes that prudent management of groundwater resources is essential to the sustainability of long term supplies and will still ask for reductions in water use by its customers. The duration and degree of cutback required will be similar to those in other areas of the state that rely on imported water. The shortage thresholds are shown in Table 5.5-5.

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

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.

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.

Because of Visalia's relative geographical isolation, Cal Water does not currently have the ability to form inter-connections with neighboring water utilities for emergency purposes. Several small mutual water companies exist in the area but none have sufficient supply capacities to meet the demand requirements of Cal Water's customers.

6 Demand Management Measures

6.1 Statewide Urban Water Demand Reduction Policies

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

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

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

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

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

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

Table 6.1-1: MOU Best Management Practices

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

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

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

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

6.2 Conservation Master Plans

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

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

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

6.3 Water Savings Requirements

The gross water savings required under SBx7-7 can be determined with a simple calculation by subtracting the target water demand from the unadjusted baseline demand. According to this calculation the Visalia District has a gross savings requirement of 2,195 AF from 2011-2015, as shown in Table 6.3-1.

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

Gross Water Savings Required by 2015	SBx7-7	MOU Flex Track
2015 Unadjusted Baseline Demand	39,452 AF	39,452 AF
2015 Target Demand	37,257 AF	39,448 AF
Gross Savings Requirement	**2,195 AF**	**4 AF**

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

The differences between the unadjusted baseline demand, district-specific SBx7-7 target, and MOU Flex Track target are shown in Table 6.3-1. This shows the maximum amount of water savings needed for SBx7-7 compliance, as well as the savings required for MOU compliance. Because Visalia 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 Visalia 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 conversion of flat rate customers to metered billing plus conservation activity occurring in 2009 and 2010 were also taken into account. The adjusted baseline demand and savings associated with code changes, rate changes, meter conversions, and existing conservation programs are shown in Table 6.3-2.

Table 6.3-2: Adjusted Baseline Demand Projection					
Adjusted Baseline (AF)	**2011**	**2012**	**2013**	**2014**	**2015**
Unadjusted Baseline	35,742	36,634	37,550	38,489	39,452
Less Savings from					
Codes	44	86	128	168	228
Schedule Rate Increases	103	215	332	346	362
Existing Programs & Meter Conversion	1,786	2,228	2,228	2,221	2,213
Adjusted Baseline Demand	**33,810**	**34,105**	**34,863**	**35,755**	**36,648**
Per Capita (GPCD)	219	216	215	215	215

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 219 gpcd, and any expected savings from codes, rates, and existing conservation programs can be credited toward meeting this goal. This is not the case for MOU Flex Track compliance, where the objective is to implement conservation programs that would save at least as much as the Flex Track target. Unlike SBx7-7, water savings from codes and rates cannot be credited against the Flex Track target. Only savings from existing conservation programs can be deducted.

Savings required from new conservation programs to meet SBx7-7 and MOU Flex Track compliance requirements are summarized in Table 6.3-3. In the case of SBx7-7, expected savings from codes, rates, and existing programs, including meter conversion, exceed the gross savings requirement by about 600 AF and new program savings are not required to achieve district-specific SBx7-7 compliance in 2015. Similarly, expected water savings from 2009-10 conservation program activity are expected to be sufficient to satisfy the 2015 MOU Flex Track target.

Table 6.3-3: New Program Savings Required for SBx7-7 and MOU Compliance		
2015 Net Savings Requirement (AF)	**SBx7-7**	**MOU Flex Track**
Gross Savings Requirement	**2,195**	**4**
Less		
Savings from codes	-228	NA
Savings from rates	-362	NA
Savings from existing programs	-2,213	-14
Subtotal Expected Savings	*-2,804*	*-14*
Savings Required from New Programs[1]	**-609**	**-10**

[1]*Negative net savings indicates that no new program savings required for compliance*

While the forgoing analysis indicates that Visalia District does not require additional water savings for SBx7-7 or MOU compliance in 2015, this depends to a large extent on the realization of estimated water savings from converting flat rate customers to metered billing plus the scheduled changes in rates. If these savings turn out to be less than estimated, the district will require additional conservation program savings for compliance. Moreover, additional conservation is needed to help with groundwater overdraft. The next section describes the analyses undertaken to identify the best mix of new conservation programs to meet these district demand management objectives.

6.4 Conservation Program Analysis

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

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

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

A preliminary quantitative analysis was conducted on the programs that passed the qualitative screen. To do that, estimates were made of key savings and cost parameters for each of the programs. Where applicable, these estimates were based on prior Cal Water experience with similar programs. In the absence of such experience, the experience of other water suppliers, the expertise of the project team, consultation with national experts, and published figures, where available, were relied upon. In particular, estimates developed by the California Urban Water Conservation Council and the Alliance for Water Efficiency were utilized where such estimates were available. While in most cases, the savings assumptions for a program do not vary across districts, for several programs, they do due to district-specific characteristics of household size, climate, etc. Other than meter installation, program cost assumptions are uniform across districts, although in some cases, cost sharing with other water utilities reduce Cal Water’s share.

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

Table 6.4-1: Cal Water Conservation Programs

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

Cooling Tower Retrofits	Offer customer/dealer/distributor rebates/vouchers of cooling tower retrofits	Non-residential market segments with significant HVAC water use
Industrial Process Audits and Retrofit Incentives	Offer engineering audits/surveys and financial incentives for process water efficiency improvement	Non-residential market segments with significant industrial process water uses

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

6.5 Conservation Program Portfolio

This section presents the recommended conservation program portfolio for the Visalia 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 Visalia 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, conversion of flat rate customers to metered billing, and past investment in conservation programs, Visalia District's adjusted baseline demand in 2015 is expected to be less than its 2015 SBx7-7 per capita water use target and about on par with its MOU Flex Track target. However, the district will need to reduce adjusted baseline demand in 2020 by approximately 4,000 AF in order to meet its 2020 SBx7-7 target. The programs the district will implement starting in 2011 will provide the foundation for meeting this longer-range target. For the Visalia District, the programs selected and the activity level of each are shown in Table 6.5-1.

Table 6.5-1: Recommended Program Levels					
Program	**Recommended Annual Activity Levels**				
	2011	**2012**	**2013**	**2014**	**2015**
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	250	250	250	1,000	1,000
Clothes Washers	140	140	140	740	740
Urinals	0	0	0	0	0
Customer Surveys/Audits	190	190	190	910	910
Conservation Kit Distribution	330	330	330	480	480
Pop-Up Nozzle Distribution	6,900	6,900	6,900	10,430	10,430
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	230	230	230	1,380	1,380
Smart Irr. Controller Vendor Incentives	10	10	10	410	410
Large Landscape Water Use Reports	60	60	60	150	150
Large Landscape Surveys/Incentives	30	30	30	60	60
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 6.5-2 shows projected water savings associated with the programs listed above. The projected savings exceed the 2015 SBx7-7 and MOU Flex Track targets but are needed for the district to meet its 2020 SBx7-7 target and to help address the district's long-term groundwater overdraft problem.

Table 6.5-2: Projected Water Savings by Program

Program	Annual Water Savings (AF)				
	2011	**2012**	**2013**	**2014**	**2015**
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	8.4	16.4	24.1	59.6	93.7
Clothes Washers	2.5	4.9	7.2	20.4	33.1
Urinals	0.0	0.0	0.0	0.0	0.0
Customer Surveys/Audits	15.1	28.8	41.0	83.2	121.3
Conservation Kit Distribution	5.1	9.5	13.5	19.2	24.3
Pop-Up Nozzle Distribution	27.6	55.2	82.8	124.5	166.2
Subtotal Core Programs	***58.7***	***114.8***	***168.6***	***307.0***	***438.5***
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	8.7	16.9	24.9	74.8	122.6
Smart Irr. Controller Vendor Incentives	0.1	0.1	0.2	12.7	25.1
Large Landscape Water Use Reports	6.4	6.4	6.4	16.0	16.0
Large Landscape Surveys/Incentives	4.8	9.5	14.3	25.3	36.4
Commercial Kitchen Rebates/Vouchers	0.0	0.0	0.0	8.8	17.6
Cooling Tower/Process Water Retrofit Incentives	0.0	0.0	0.0	0.0	0.0
Subtotal Non-Core Programs	***19.9***	***33.0***	***45.8***	***137.5***	***217.6***
Total Core and Non-Core Program Savings	**78.6**	**147.8**	**214.5**	**444.5**	**656.1**

Based on the above analysis the district is projected to achieve its district-specific 2015 SBx7-7 compliance target 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 there will be a linear reduction in GPCD from 2015-2020 to achieve the district-specific 2020 SBx7-7 compliance target. Programs required to achieve 2020 SBx7-7 compliance will be outlined in the next Conservation Master Plan for the district, which will be included in the 2015 UWMP. 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 Visalia District are included in Appendix G.

7 Climate Change

7.1 Introduction

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

7.2 Strategy

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

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

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

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

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

7.3 Potential Climate Change Effects

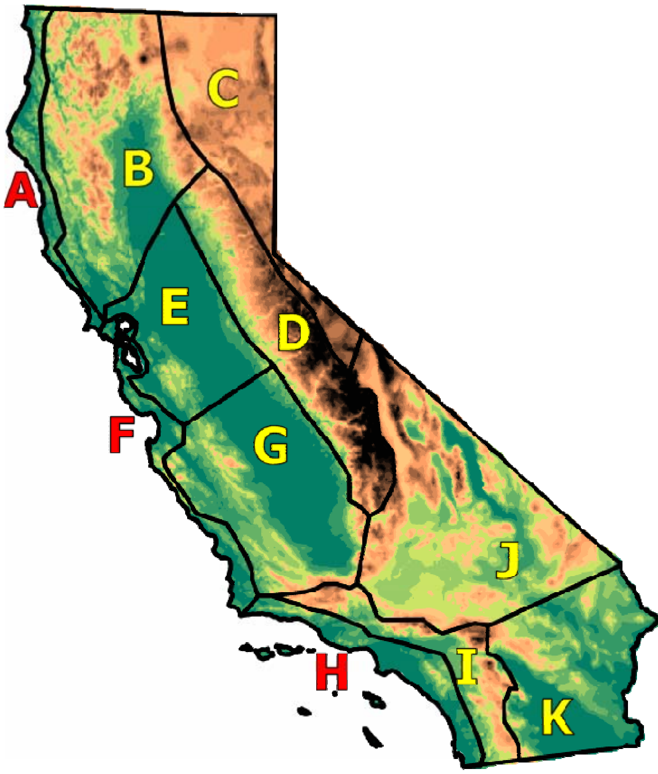
Even in the near term of the next 20 years, DWR has outlined potential climate change effects to water supplies, water demand, sea level, and the occurrence and severity of natural disasters. Some of these potential changes are presented below. Cal Water will investigate the following climate change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

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

7.4 Historical Climate Data Summary

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

Figure 7.4-1: The Climate Regions of California[8]



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

Cal Water has water service districts in 7 out of 11 of the climate regions. The Visalia District is located in the San Joaquin Valley Region, as listed in Table 7.4-1.

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

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

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

The region has experience a general warming trend as indicated by the maximum, minimum, and mean temperature departure from average. Since 1895 these values have increased by 0.33°F, 2.42°F, and 1.37°F, respectively. More recently, since 1975, the maximum, minimum, and mean temperature departures have increased 2.70°F, 5.36°F, and 4.03°F, respectively. The historical data for these parameters are shown in Figures 7.4-2, 7.4-3, and 7.4-4.

Figure 7.4-2: Maximum Temperature Departure for San Joaquin Valley

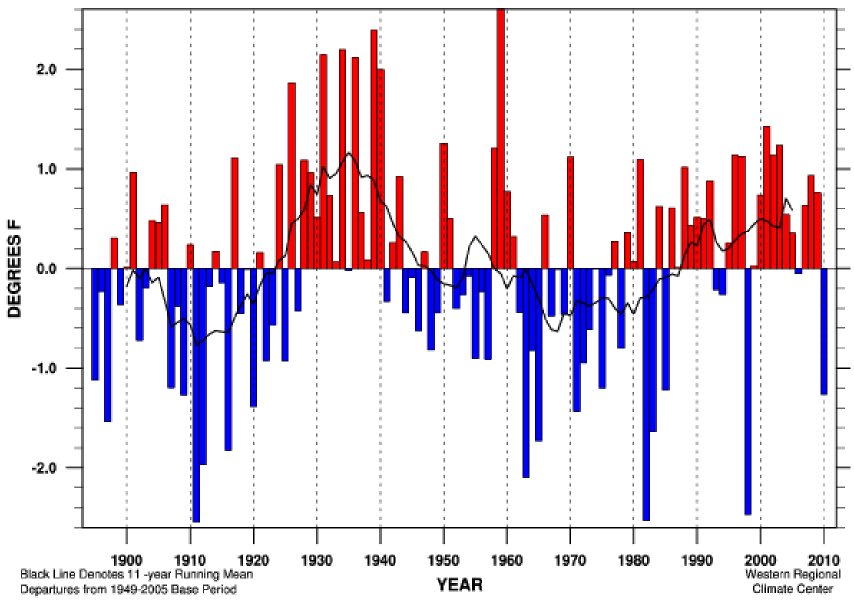


Figure 7.4-3: Mean Temperature Departure for San Joaquin Valley

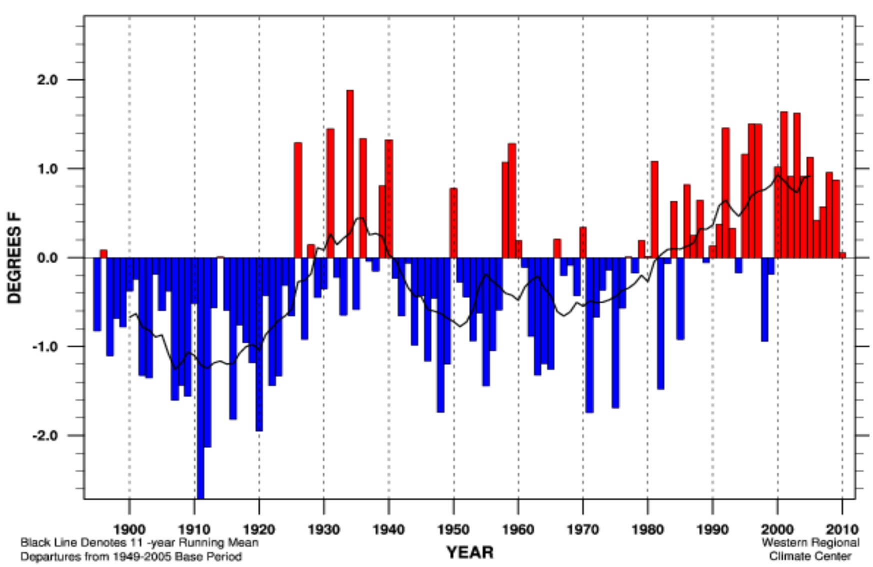
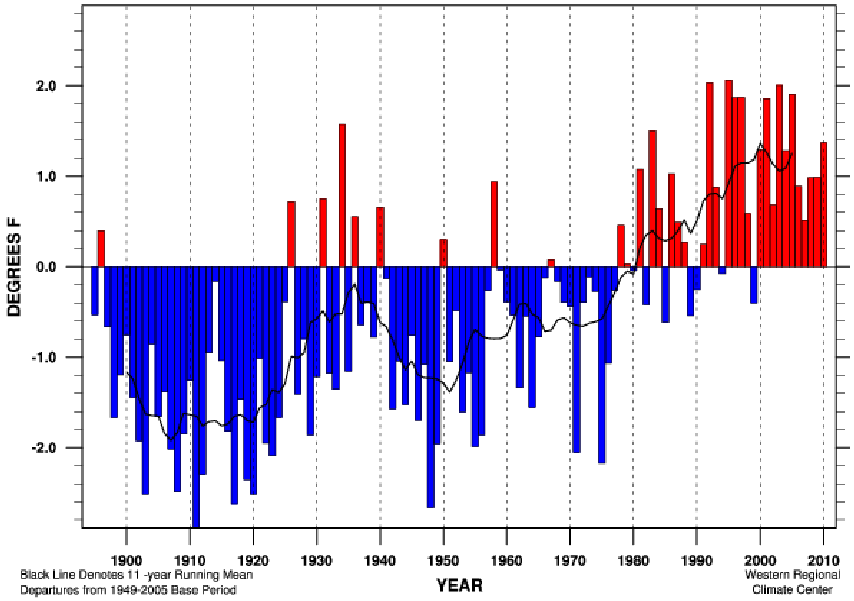
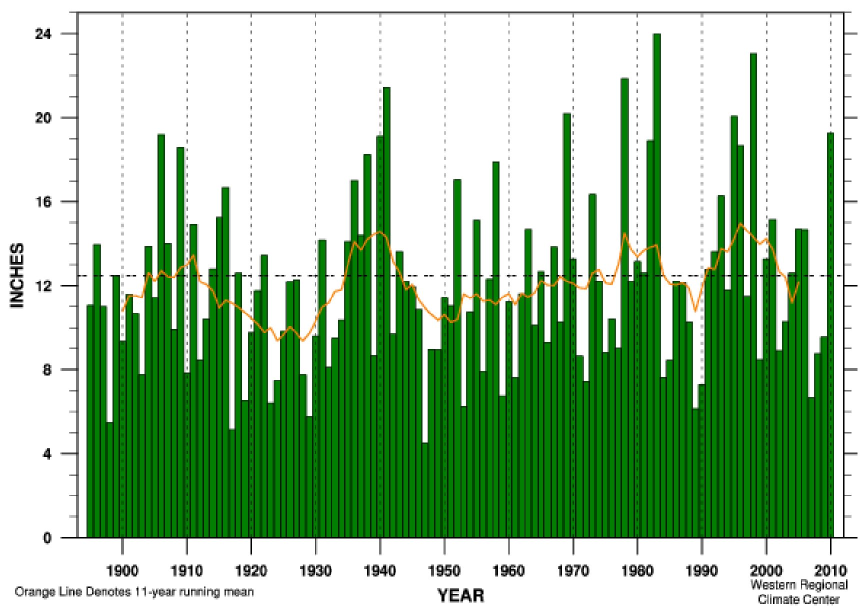


Figure 7.4-4: Minimum Temperature Departure for San Joaquin Valley



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

Figure 7.4-5: Annual Precipitation in San Joaquin Valley



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

7.5 Climate Change Guidance

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

8 Completed UWMP Checklist

8.1 Review Checklist

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

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

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

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

17	For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board	10631(b)(2)	Water Supply		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, AND LOCAL ORDINANCES

APPENDIX F: WATER EFFICIENT LANDSCAPE GUIDELINES

APPENDIX G: CONSERVATION MASTER PLAN

APPENDIX H: KDWCD GROUNDWATER MANAGEMENT PLAN