CAMBRIA COMMUNITY SERVICES DISTRICT

2010 URBAN WATER MANAGEMENT PLAN

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Section 1 – Plan Preparation

1.1 Background

The 2010 Urban Water Management Plan (UWMP) update for the Cambria Community Services District was prepared in compliance with the Urban Water Management Planning Act, California *Water Code* (CWC) §10610 through §10657, as amended. Since the CCSD last adopted its 2005 UWMP on December 15, 2005, significant CWC amendments resulted from the State adoption of the Water Conservation Act of 2009 (SB X7-7), which requires the establishment and adoption of water conservation goals. The California Department of Water Resources (DWR) subsequently produced the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" (Final, March 2011), which was used to guide the development of the CCSD's 2010 UWMP update. When compared to the CCSD's earlier 2005 UWMP, the 2010 UWMP update has been rearranged to better correlate with the outline and content needs suggested within the March 2011 DWR Guidebook. Many of the tables presented herein are also intended to match the formatting suggested within the DWR Guidebook with the intention of facilitating a future DWR review.

1.2 Coordination

Coordination of the CCSD's 2010 UWMP update occurred via discussions with the San Luis Obispo County Department of Planning and Building, Local Agency Formation Commission, and through the attendance of a March 2011 workshop conducted by California DWR. The CCSD also had separate Board meeting discussion items on August 25, 2011, to describe the water conservation goal setting requirement of SB X7-7; and, on September 22, 2011, when the CCSD Board agreed by motion to consider the 2015 and 2020 conservation goals that are presented within Section 3. On October 27, 2011, a separate Board meeting discussion item outlined water conservation industry trends to further solicit public input and suggestions for consideration on future water conservation measures. Table 1-1 summarizes the agencies contacted during the preparation of this UWMP.

Table 1-1 – Agency Coordination Summary

Coordinating Agencies	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
San Luis Obispo Co. Planning and Building				X		X	
San Luis Obispo Co. Local Agency Formation Commission				X			
General Public			X	X			

Note:
Format based on March 2011 DWR Guidebook Table 1.

1.3 Notifications

In accordance with the requirements of CWC §10621, a formal 60-day advanced notice was provided to San Luis Obispo County via a letter to County planning staff dated October 17, 2011. Published notices also occurred in The San Luis Obispo *Tribune* newspaper on November 30, 2011 and December 7, 2011. Adoption of the plan was continued from the CCSD December 17, 2011 meeting to February 23, 2012, which resulted in further noticing of the County as well as advertising on February 1, 2012, and February 8, 2012. Noticing for the CCSD public hearing occurred as part of the CCSD's established Board meeting noticing protocol, which complies with §6066 of the *Government Code*. Appendix A includes the 60-day noticing letter to the County as well as the published newspaper notices.

1.4 Plan Adoption, Submittal, and Implementation

In accordance with the requirements of CWC §10644, within 30 days after its adoption, the UWMP will be submitted to the DWR and the County of San Luis Obispo, and plan copies will be provided to the California State Library System and the San Luis Obispo County Library. The updated plan will also be posted on the CCSD web site (www.cambriacsd.org) and made available for public review at the CCSD District office. The CCSD Board resolution adopting the plan will be enclosed as Appendix A.

1.5 UWMP Preparation

The 2010 UWMP update was prepared by the CCSD District Engineer[1] with support from CCSD staff, CCSD legal counsel, as well as earlier studies and reports commissioned by the

[1] Robert C. Gresens, P.E. C 34018 (6/30/2013). The 2010 UWMP was prepared as a planning-level document and is not for construction.

CCSD. Outside expert review was provided by Consulting Hydrologist, Mr. Eugene Yates; and, Bill and Lisa Maddaus, of Maddaus Water Management. Word processing and final report production were completed with the assistance from Ms. Sharon Creason and Ms. Karen Herb.

References used to support development of the UWMP are provided in Section 7. Questions concerning the UWMP should be directed to the CCSD District Office at P.O. Box 65, Cambria, CA 93465, or by calling the District Office at 805-927-6223. Requests for copies of the UWMP or supporting CCSD references should be submitted to the CCSD District Clerk. The 2010 update will also be posted on the CCSD web site at www.cambriacsd.org.

Section 2 – System Description

This section provides an overview of the CCSD water system, service area, and population.

2.1 CCSD Water System Background and Overview

The Cambria Community Services District provides water service to the unincorporated town of Cambria within San Luis Obispo County. Cambria is located along Highway 1 on the North Coast of San Luis Obispo County approximately 35 miles north of the City of San Luis Obispo. The community is relatively isolated to access north and south from Highway 1 due to the Pacific Ocean being immediately to the west, and the Santa Lucia Mountain Range lying to the east. Highway 46 connects into Highway 1 approximately four miles south of Cambria, and provides the main inland connector route to Highway 101, which is approximately 22 miles inland. To travel inland towards Paso Robles, the route along Highway 46 passes over a summit at 1,720 feet above sea level. Figure 2-1 shows the location of Cambria.

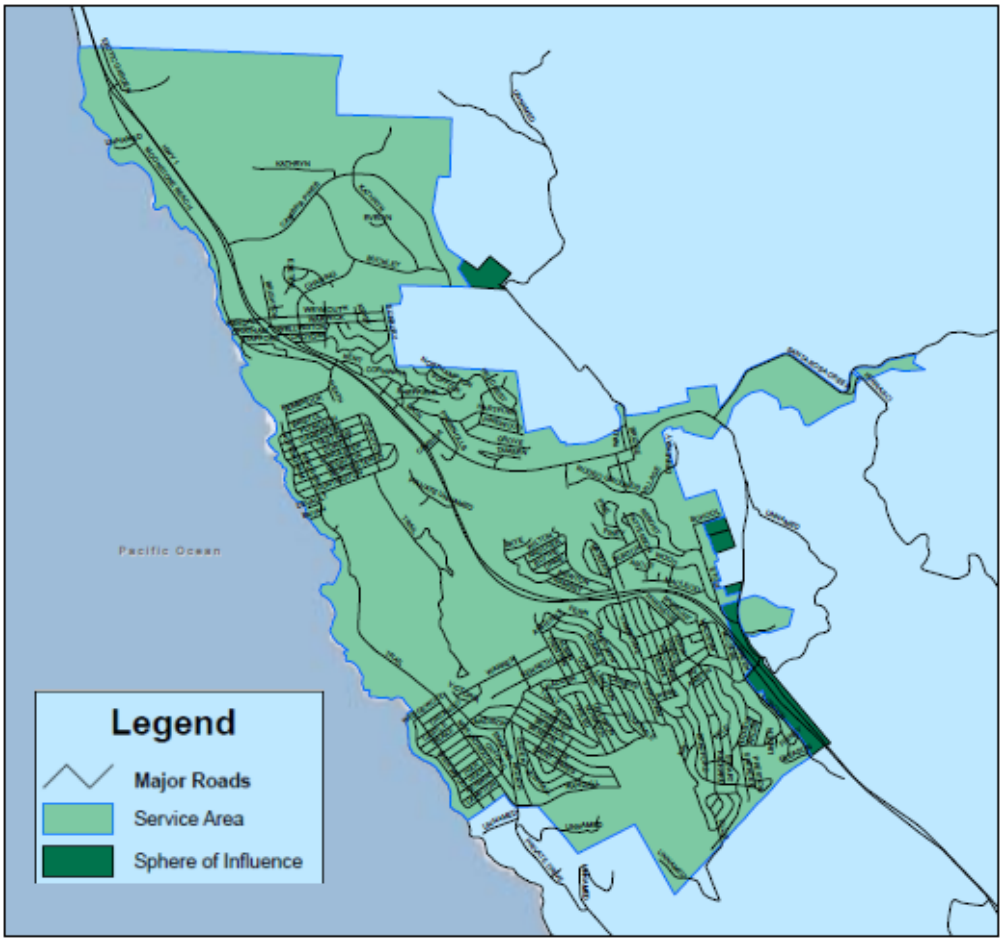
Figure 2-1 – Location Map

The Cambria Community Services District provides water supply, wastewater collection and treatment, fire protection, garbage collection, and a limited amount of street lighting and recreation. When it was formed in 1977, the Cambria Community Services District became a successor to an earlier Cambria County Water District, which was formed in 1959. The CCSD has a five-member elected Board of Directors. Land use authority for the service area is under the auspices of San Luis Obispo County, which also provides the area services for police, flood control, and roadways. The District's service area is also within the Coastal Zone and subject to the Local Coastal Program that was first developed by the County and certified by

the California Coastal Commission in 1988. Land use is guided through conformance with the San Luis Obispo County North Coast Area Plan, Coastal Zone Land Use Ordinance, and Framework for Planning Coastal Zone, General Plan Land Use, and Circulation Elements.

Prior to 1959, the community water supply was provided by the Cambria Development Company, and earlier by the J.D. Campbell Water Company. The District currently serves a year-round population of about 6,032[2] as well as a large number of visitors to the Central Coast. Figure 2-2 shows CCSD service area and sphere of influence areas, which was last adopted by the San Luis Obispo County LAFCO in 2007. The CCSD service area covers approximately four (4) square miles

Figure 2-2 – CCSD Service Area and Sphere of Influence Areas[3]



The District's potable water is supplied solely from groundwater wells in the San Simeon and Santa Rosa Creek aquifers (underflow of these streams). The California Department of Water Resources Bulletin No. 118 identifies these two sources as the San Simeon and Santa Rosa

2 2010 US Census for Cambria CDP
3 From San Luis Obispo County Local Agency Formation Commission

groundwater basins, numbers 3-35 and 3-36, respectively. Appendix C contains the Bulletin 118 summary description of each of the two aquifers, neither of which is listed as being in overdraft status by the State. The San Simeon and Santa Rosa aquifers are relatively shallow and porous, with the groundwater levels typically recharged every year during the rainy season. With CCSD pumping, groundwater levels generally exhibit a characteristic pattern of consistent high levels during the wet season, steady decline during the dry season, and rapid rise when the wet season resumes. Appropriations permits issued by the SWRCB to the CCSD allow a maximum of 1230 acre-feet annually from the San Simeon aquifer, while limiting dry season pumping to 370 acre-feet maximum from the time that the creek ceases flow at the Palmer Flats gauging station, until October 31. The Santa Rosa Creek SWRCB appropriations permit limits the Santa Rosa aquifer pumping to 518 acre-feet annually, with a dry season pumping limit of 260 acre-feet from May 1 to October 31. The maximum pumping rates allowed are 2.5 cubic feet per second (cfs, or 1120 gpm) for the San Simeon aquifer; and, 2.67 cfs (1197 gpm) for the Santa Rosa aquifer.

To minimize potable groundwater losses at the aquifer and ocean interface, the CCSD percolates treated wastewater effluent into the San Simeon Creek aquifer downstream from its production wells. This practice also helps to prevent saltwater intrusion into the freshwater water aquifer. If the groundwater level drops too far, treated effluent and seawater could migrate toward the water supply wells, deteriorating the quality of the water and potentially rendering the freshwater non-potable. Conditions required by the Regional Water Quality Control Board (RWQCB) Waste Discharge Order for the CCSD wastewater treatment plant include maintaining a positive differential between the up-gradient groundwater levels at its production wells and the down-gradient percolation ponds. During parts of the summer dry season, and depending upon the prior year's precipitation, the CCSD may periodically pump groundwater from its percolation fields in order to maintain this differential.

The Santa Rosa well field is Cambria's oldest supply source and was relegated to a back-up and augmentation role following start-up of the San Simeon well field in 1979. The San Simeon groundwater has better quality than the Santa Rosa groundwater due to lower hardness, total dissolved solids (TDS), iron, and manganese concentrations. In 1999 the Santa Rosa well field was shut down after the discovery of an MtBE plume. An emergency well SR-4 and associated treatment plant were subsequently installed further upstream from the existing Santa Rosa well field and placed into operation during August of 2001.

In November 2001, the District's Board of Directors declared a Water Code 350 emergency and ceased issuing additional connection permits until an adequate long-term supply project was completed. Current planning calls for a seawater desalination facility to provide drought protection, improve supply reliability, and to augment existing groundwater supplies. To date, no new connections are being issued and the District remains under a Water Code 350 declaration.

Due to the steep and varying topography of the service area, there are eight pressure zones within the District's water distribution system. The area is served via a system of four

groundwater wells, three-distribution system pumping stations, pressure reducing stations, and four tank sites.

2.2 Service Area Physical Description

Cambria is known for its outstanding natural environment, which includes native forests of Monterey Pine, creek-side areas, and a scenic coastline. The beauty of the area combined with a mild climate tempered by sea breezes has led to Cambria's popularity and attraction to retirees and tourists. Rainfall averages approximately 20 inches per year and is generally limited to the winter months.

Cambria is within an original Rancho Santa Rosa Mexican land grant area. The town was established in the late 1860s to accommodate shipping of mining and agricultural products in the central coast region. Its importance as a commercial center dissipated around 1900 as mines were depleted and shipping moved further inland by railroad. Today, visitor serving commercial establishments consist of hotels, motels, restaurants, and retail shops. The California States Park operated Hearst Castle is approximately five miles north of Cambria, which also serves to draw tourism to the area.

Much of the water service area is hilly terrain, with lower lying areas existing along the coastline, the Santa Rosa Creek channel, Main Street, and the Highway 1 corridor. The water service area elevations range from near sea level to approximately 550 feet above sea level. There are two commercial retail areas along Main Street, consisting of East Village and West Village. Much of the hilly areas outside of the lower lying commercial areas were subdivided into 25-foot-wide residential lots during the late 1920s by the Cambria Land Development Company.

The dominant geologic feature of San Luis Obispo County and the Cambria area is the Santa Lucia Mountain Range. The San Simeon Creek and Santa Rosa Creek basins lie on the westerly slope of the Santa Lucia Range where drainage is to the Pacific Ocean. The maximum elevation of the Santa Rosa basin is 2,933 feet on Cypress Mountain, and the highest point in the San Simeon basin is 3,432 feet on Rocky Butte.

The Santa Lucia Mountains are made up largely from the Franciscan formation, which in the San Simeon and Santa Rosa basins, is composed of a mélange of greywacke, metavolcanic rocks, and graywacke. The Franciscan formation is partially overlain with uplifted marine sediments of the late Jurassic, Cretaceous, Tertiary, and Quaternary periods. The most recent formations are Holocene alluvial deposits of gravel, sand, silt, and clay, which make up the streambeds of the creeks. These deposits are the only apparent water-bearing formations within the Santa Rosa and San Simeon drainage basins.

2.3 Service Area Climate

Table 2-1 summarizes the evapotranspiration rates (ET_o), precipitation, and temperatures for Cambria. The area benefits from a relatively low evapotranspiration rate when compared to inland areas due to its location being along the coast. The area also has a Mediterranean rainfall pattern with rains typically occurring during the November through March period. The peak summertime irrigation period combined with seasonal tourism results in the maximum daily water demands occurring during the summer. The July 4th holiday weekend often includes the maximum water demand day of the year, which has averaged approximately 1.58 times the average annual demand over the past ten years[4].

Table 2-1 – Monthly Average Climate Data for Cambria

Month	Estimated Monthly Average ET_o (1) (inches)	Average Total Rainfall(2) (inches)	Average Temperature(3) (degrees Fahrenheit)	
			Max	Min
January	1.86	3.53	65	45
February	2.22	3.70	66	46
March	2.93	4.37	66	47
April	3.54	1.19	67	48
May	4.15	0.20	66	50
June	4.49	0.10	67	53
July	4.76	0.02	68	55
August	4.27	0.12	69	56
September	3.54	0.63	71	55
October	3.05	0.94	71	52
November	2.03	1.88	69	49
December	1.64	2.98	65	45
Total	38.48	19.66		

(1) Table 5, 1998 USGS Report 98-4061, Yates & Van Konyenberg
(2) Rainfall data from Cambria CSD wastewater treatment plant gauge, 1974-1992
(3) Temperature Data from Weather.com website for Cambria, California

2.4 Demographics

Although population data was available from the 2010 US Census during development of the 2010 UWMP update, demographic information from 2010 was not available. Unless otherwise noted, the demographic information that follows is based on data from the earlier 2000 US Census. For 2000, Cambria had a total full time population of 6,232, with a median age of 50.7 years. The 2000 vacancy rate of 24.4 percent indicates a high percentage of the homes may be second or vacation homes. In contrast, the US average for vacancy during the same period was 9 percent. The vacancy rate from the 2010 Census data showed an increase to 32 percent, as there were a total of 4,062 housing units, with 1300 that were vacant. For 2010,

[4] CCSD water department data, calendar years 2000 through 2010.

the average household size was 2.18 persons per occupied home. When including the vacant homes, the average 2010 household drops to 1.48 persons per home. From earlier 2000 and 1990 census data, the overall occupancy rate was approximately 1.66 persons per household, which was derived from dividing the population by the total number of housing units (I.e., both occupied and non-occupied housing units).

From the earlier 2000 census data, the median household income for Cambria (in 1999 dollars) was $45,243. For the same period, the California median household income was $47,493 (in 1999 dollars). This equates to Cambria's median household income being about five percent lower than the statewide average. Approximately 21.3 percent of the households in Cambria made less than a low income level of $24,995. There were 72 families and 542 individuals living in Cambria below the poverty level.

2.5 Service Area Population

As a result of the declaration of a Water Code 350 water shortage emergency due to concerns over long-term reliability of its water supply and fire suppression needs, the CCSD has had a water connection moratorium in place since November of 2001. The CCSD had also completed a series of water master planning studies, which were incorporated by reference into a program-level water master plan EIR (PEIR) that was certified by the CCSD Board on August 21, 2008. The prior studies recommended a multifaceted approach that included improvements to the potable distribution system to enhance firefighting, water conservation, recycled water for non-potable irrigation, and further augmenting and drought-proofing the local potable supply using seawater desalination.

The water master plan PEIR addressed growth inducement concerns through the adoption of a build-out reduction program mitigation measure. The build-out reduction program was based on detailed geographical information system mapping and analysis coupled with financial modeling. This work was further reviewed by a local citizens committee, which met for over a year during its development. The result was a recommended build-out goal of 4,650 existing and future residences. This essentially allowed for an existing water connection wait list of 666 lot owners to proceed at a pace estimated to spread out over 22 years into the future, once the moratorium is lifted.

San Luis Obispo County also completed work on the Cambria and San Simeon Acres Community Plans of the North Coast Area plan. The County Board of Supervisors certified their EIR on the community plans, which adopted an alternative for 4,650 existing and future housing units, that was subsequently incorporated into the San Luis Obispo County North Coast Area Plan. The County also has a growth management ordinance in place that sets maximum growth rates following review of a periodic Resource Management System report to the County Board of Supervisors (periodic reviews are annually, and may possibly become semi-annual in the future). Layered on top of the County's growth management ordinance, are conditions imposed by the California Coastal Commission from earlier Coastal Development

Permits that may also affect the CCSD's growth rate. These include a maximum rate of 125 new residences in any one year.

The timing of future growth is subject to the permitting and approval of future projects by other agencies, economic conditions, and other factors that may not be under the direct control of the CCSD. Therefore, any projections on population growth should be viewed with caution. For purposes of developing population estimates, it was assumed that adequate progress would be made on a supplemental source of water to allow the moratorium to be lifted in four years. Several variations on this assumption are also presented, including one scenario that assumes there would be enough pent up demand to build new homes following the lifting of the moratorium, such that a maximum of 125 housing units could being released in year one. Several growth rates are also presented based on the past history of the County in allowing a 2.3 percent maximum county-wide growth rate when there were no other public service concerns; and, a lower 1 percent per year growth rate when there were some less critical areas of concern. A further scenario was made that assumed an aggressive water conservation program could be built upon measures within the 2010 California Green Building Code, which could conceivably allow release of approximately 20 units per year prior to the development of a supplemental water source. This later scenario is highly speculative and would need to be acceptable to both the County and Coastal Commission. Additional discussions are still needed at these levels to further assess the feasibility of such an approach.

Beyond the build-out scenarios, there is also an unknown associated with the population in Cambria decreasing by three percent from 2000 to 2010. Some have speculated the drop in population occurred due to the economic recession forcing people to move away and find employment elsewhere. For purposes of forecasting, the lost three percent of population (approximately 200) was assumed to come back into the area as the economy improves. Therefore, the forecasting assumed the earlier 2000 census total would be re-established by 2015 in each scenario. The future projections also used the 1990 and 2000 census averages of approximately 1.66 persons per housing unit. Table 2-2 summarizes the projected population under each of the aforementioned scenarios.

Table 2-2 – Current and Projected Population[5]

	Build-out Scenario	Population					
		2010	2015	2020	2025	2030	2035
1	2.3%/yr starting in 4 yrs.	6032(1)	6375	7143	7720(2)	7720	7720
2	1.0%/yr starting in 4 yrs	6032	6294	6615	6953	7308	7680
3	125 units during initial year 1 starting in 4 yrs, then 2.3%/yr	6032	6588	7381	7720(2)	7720	7720
4	20 units/yr from revamped retrofit program during initial yrs 2-3, then 2.3% yr starting in year 4.	6032	6443	7220	7720	7720	7720

(1) 6,032 population for 2010 is from the US Census for Cambria CDP
(2) 7,720 population at build-out estimated by using 2000 Census 1.66 persons per household times 4,650 existing and future housing units. 4,650 existing and future housing units is based on the San Luis Obispo County "Cambria and San Simeon Acres Community Plans of the North Coast," as certified by the County Board of Supervisors, 2006; and, CCSD "Water Master Plan Program Environmental Impact Report," Mitigation Measure PHG-1, (Buildout Reduction Program), as certified by the CCSD Board on August 21, 2008.

Notes
Format based on March 2011 DWR Guidebook Table 2.

[5] Table corrected and revised February 23, 2012.

Section 3 – System Demands

3.1 Water Use Baseline and Targets

The following describes the approach used by the CCSD in developing its water conservation targets and associated data baselines. The methodology and criteria used followed the approach described within Part II, Section M; of the March 2011 DWR Guidebook. Table 3-1 summarizes the baseline periods that were used in the analysis. Because the CCSD did not deliver recycled water in excess of 10 percent of its 2008 potable water deliveries, a 10-year base period was applied in determining its initial per capita baseline.

Table 3-1 – Summary of Baseline Periods of the CCSD

Base Period Ranges			
Base	Parameter	Value	Units
10-15 year Base Period	2008 Total Water Deliveries	708	acre-feet
	2008 Total Volume of Delivered Recycled Water	0	
	Number of years in base period	10	years
	Year beginning base period range	1997(1)	
	Year ending base period range	2006	
5-year Base Period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range	2007	

(1) All years stated on Table 3-1 are in calendar years

Notes:
Format based on March 2011 DWR Guidebook Table 13

3.2 Water Use Targets

The DWR Handbook outlines four methods for water agencies to consider in developing its per capita water use targets. The CCSD selected DWR Method 3, which is based on 95 percent of the hydrologic regional goal for the central coast area (117 gpcd). A final check of this goal is also performed to ensure the target meets the legislation's minimum reduction requirement of a five percent reduction when compared to a 5-year baseline average. The first step in this procedure is to develop a 10-year base average, which is shown in Table 3-2. For the CCSD, a 10-year base average of 112.4 gallons per capita per day (gpcd) results for the 10 year period of 1997 through 2006, inclusive. This baseline level of use is already less than the central coast area 95 percent target of 117 gpcd, which must then be compared to a 5-year base period average.

Table 3-2 – CCSD Base Daily Per Capita Water Use (10-year range)

Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	1997	5977	0.70	117.4
Year 2	1998	6062	0.63	104.2
Year 3	1999	6147	0.69	112.5
Year 4	2000	6232	0.71	114.4
Year 5	2001	6212	0.71	114.7
Year 6	2002	6192	0.72	116.7
Year 7	2003	6172	0.71	114.7
Year 8	2004	6152	0.69	112.1
Year 9	2005	6132	0.66	107.9
Year 10	2006	6112	0.67	109.0
Base daily per capita water use				112.4

Notes:
Format based on March 2011 DWR Guidebook Table 14

Table 3-3 shows the 5-year base gpcd for the CCSD as 110.7 gpcd, which is also less than the central coast target of 117 gpcd.

Table 3-3 – CCSD Base Daily Per Capita Water Use (5-year range)

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	6172	0.71	114.7
Year 2	2004	6152	0.69	112.1
Year 3	2005	6132	0.66	107.9
Year 4	2006	6112	0.67	109.0
Year 5	2007	6092	0.67	109.6
Base daily per capita water use				110.7

Notes:
Format based on March 2011 DWR Guidebook Table 15

Because the 5-year baseline average is greater than 100 gpcd, the 2009 Water Conservation Act (a.k.a.; 20 × 2020 legislation) require that a 5-percent reduction be applied to the 5-year base average. This final check provision was apparently made part of the 20 × 2020 legislation to ensure that most agencies would be required to conserve, or at least those with greater than 100 gpcd water use. Therefore, even though the CCSD customers already meet the central coast hydrologic reduction target, the UWMP Act still require an additional 5-percent reduction. Table 3-4 summarizes the data that was used as the basis in developing reduction targets, as well as the CCSD's 2020 goal of 105 gpcd, and an interim 2015 goal of 109 gpcd.

Table 3-4 – CCSD Base Water Use and Conservation Targets

20 × 2020 Data	Gallons per Capita per Day (gpcd)
Base per capita water use	
10-year Average	112.4
5-year Average	110.7
2020 Target Using DWR Method 3	
95 percent of Central Coast Hydrologic Target (123 gpcd)	117
95 percent of CCSD 5-year average base (110.7 gpcd)	105(1)
Actual 2020 Target	105
2015 Interim Target	109

(1) Although meeting the Central Coast Hydrologic 95% target of 117 gpcd, the UWMP Act and March 2011 DWR Guidebook methodology require using the lower 105 gpcd target value

3.3 Historical and Projected Water Use

Table 3-5 and Table 3-6 show the historic CCSD water use by customer type for 2005 and 2010. This data is based on metered customer demands, and does not include any water distribution system losses or unaccounted for water that may be attributable with overall water production. When compared to actual production totals, the 2005 delivered total was approximately 6 percent less, which shows the unaccounted water from leaks and other non-metered uses is fairly low when compared to industry standards. For 2010, the difference between pumped and billed water was 8 percent. Tables 3-7 through 3-9 show projected water use by customer type (I.e., water use sectors) in five-year increments from 2015 through 2035. To maintain consistency with the tables suggested in the DWR guidebook, the “not metered” columns have remained, even though all of the CCSD water use sectors are metered.

Table 3-5 – 2005 CCSD Water Deliveries

Water use sectors	2005				Total Volume (af/yr)
	Metered		Not metered		
	# of Accounts	Volume (af/yr)	# of Accounts	Volume (af/yr)	
Single family	3,611	543.8	0	0	543.8
Multi-family	131	22.7	0	0	22.7
Commercial	204	129.3	0	0	129.3
Industrial			0	0	
Institutional/governmental	5	4.0	0	0	4.0
Landscape			0	0	
Agriculture			0	0	
Other			0	0	
Total	3,951	699.8	0	0	699.8

Notes:
a. Total well production for 2005 was 741.24 acre-feet, which results in an unaccounted for water loss of 5.6% for 2005.
b. Format based on March 2011 DWR Guidebook Table 3

Between 2005 and 2010, the CCSD started tracking registered vacation rental homes, which are used as for profit commercial enterprises to serve outside visitors. In 2010, there were 247 vacation rental homes, which were included within the single-family use sector of Table 3-6.

Table 3-6 – 2010 CCSD Water Deliveries

Water use sectors	2010				Total Volume (af/yr)
	Metered		Not metered		
	# of Accounts	Volume (af/yr)	# of Accounts	Volume (af/yr)	
Single family	3644(1)	443.8	0	0	443.8
Multi-family	131	21.5	0	0	21.5
Commercial	224(2)	139.5	0	0	139.5
Industrial			0	0	
Institutional/governmental	5	4.8	0	0	4.8
Landscape			0	0	
Agriculture			0	0	
Other (Internal use)	20	9.3	0	0	9.3
Total	4,024	618.9	0	0	618.9(3)

(1) Includes 246 registered vacation rental houses, which had an annual use of 31.5 acre-feet
(2) The 224 commercial account total does not include schools and Cal Fire Department services, which are listed under institutional/ governmental use category
(3) The total production for 2010 was 672.41 acre-feet, which results in an unaccounted loss of approximately 8-percent

Notes:
Format based on March 2011 DWR Guidebook Table 4

Table 3-7 shows projected deliveries for 2015, which has its total demand based on the interim conservation target goal of 109 gpcd, less an estimated 8-percent unaccounted-for water (from 2010 data, Table 3-6) and build-out scenario 3 (previously described in Section 2, Table 2-2 – Current and Projected Population).

Table 3-7 – Projected 2015 CCSD Water Deliveries

Water use sectors	2015				Total Volume (af/yr)
	Metered		Not metered		
	# of Accounts	Volume (af/yr)	# of Accounts	Volume (af/yr)	
Single-family	3892	530.6	0	0	530.6
Multi-family	140	25.7	0	0	25.7
Commercial	239	166.8	0	0	166.8
Industrial			0	0	
Institutional/governmental	5	5.7	0	0	5.7
Landscape			0	0	
Agriculture			0	0	
Other (internal use)	21	11.1	0	0	11.1
Total	4,298	740	0	0	740

Notes:
Format based on March 2011 Guidebook Table 5

Table 3-8 shows projected deliveries for 2020, which has its total demand based on the 2020 conservation target goal of 105 gpcd, less an estimated 8-percent unaccounted-for water (from 2010 data, Table 3-6), and build-out scenario 3 (previously described in Section 2, Table 2-2).

Table 3-8 – Projected 2020 CCSD Water Deliveries

Water use sectors	2020				Total Volume (af/yr)
	Metered		Not metered		
	# of Accounts	Volume (af/yr)	# of Accounts	Volume (af/yr)	
Single-family	4361	572.7	0	0	572.7
Multi-family	157	27.7	0	0	27.7
Commercial	268	180	0	0	180
Industrial			0	0	
Institutional/governmental	6	6.2	0	0	6.2
Landscape			0	0	
Agriculture			0	0	
Other (internal use)	24	12.	0	26	12.
Total	4816	798.7	0	0	798.7

Notes:
Format based on March 2011 DWR Guidebook Table 6

Table 3-9 provides projected demands for 2025, 2030, and 2035. The projected totals do not change after 2025; due to the assumption that build-out would be achieved at that time per Table 2-2 – Current and Projected Population (page 2-8). These future year projections continue to use the previously derived 2020 conservation goal of 105 gpcd, less an estimated 8 percent unaccounted-for water (from 2010 data, Table 3-6 (page 3-4).

Table 3-9 – Projected 2025, 2030, and 2035 CCSD Water Deliveries

Water use sectors	2025		2030		2035	
	Metered		Metered		Metered	
	# of Accounts	Volume (af/yr)	# of Accounts	Volume (af/yr)	# of Accounts	Volume (af/yr)
Single-family	4481	599	4481	599	4481	599
Multi-family	161	29	161	29	161	29
Commercial	356	188	356	188	356	188
Industrial						
Institutional/governmental	6	7	6	7	6	7
Landscape						
Agriculture						
Other	25	13	25	13	25	13
Total		836		836		836

Notes:
Format based on March 2011 DWR Guidebook Table 7

3.4 Low Income Projected Water Demands

The 2000 census data indicated approximately 21.3 percent of all households in Cambria were within a low income group (i.e., annual income earned less than $24,999). To project low income water demands it was assumed that the 21.3 percent were evenly distributed between the single-family and multi-family water use sectors shown in Tables 3-7, 3-8, and 3-9. The projected low income demands using this approach are shown in Table 3-10.

Table 3-10 – CCSD Low-Income Projected Water Demands

Low-income water demands(1)	2015	2020	2025	2030	2035
Single-family residential	113	122	128	128	128
Multi-family residential	6	6	6	6	6
Total	119	128	134	134	134

(1) Values shown are in acre-feet per year.

Notes:

Format based on March 2011 DWR Guidebook Table 8

3.5 Sales to Other Agencies

To facilitate subsequent DWR review for conformance with the DWR's March 2011 UWMP Guidebook recommendations, it is noted that the CCSD does not sell water to other water agencies.

3.6 Additional Water Uses and Losses

The CCSD replaced all of its residential water meters during 2005 and 2006 with remote read meters, which has helped lower the amount of unaccounted water that may otherwise pass through older meters without being registered. The new meters also have an electronic flag, which provide a warning that the customer's household plumbing system and appliances may be leaking. The CCSD billing staff keeps track of such flagged services and coordinates with the CCSD water department and customer to arrange for follow up inspections. In addition, the CCSD provides remote meter readouts with warning lights, which are magnetic to allow easy placement onto a customer's refrigerator. The remote readouts allow customers to have their own independent noticing of potential household leaks. The electronic flags on the newer water meters check that a zero-flow period occurs over at least one continuous hour during a 24-hour period. If no such condition occurs, the meter flags the potential for a leak.

Table 3-11 summarizes additional water uses and losses, which are not included within Tables 3-5 through 3-10. The CCSD has lowered unaccounted-for water loss from past 1995 and 2000 values of 12.1 and 12.6 percent respectively, to 5.6 percent in 2005, and 8 percent in 2010. For purposes of making future projections, an average of 8-percent was assumed in future years.

The CCSD also completed a recycled water master plan in 2004[6], which considered both “no-net increase in diversion from the aquifer” demands as well as future project recycled water demands that could conceivably increase diversions from the aquifer if a supplemental potable water source does not offset such uses. Approximately 50 acre-feet of no-net increase recycled water demands were identified, which essentially replace existing potable groundwater users with non-potable recycled water. An additional 50 acre-feet of recycled water use was further identified from future demand projects, such as a planned community park. These demands may be subject to available funding for a future recycled water distribution and treatment system, as well as potential timing of a future potable water source. A key concern in developing such an approach in recycled water planning was to avoid any increases in diversion that could be construed as potentially impacting downstream environmental uses. The CCSD currently percolates all of its treated wastewater effluent into the lower San Simeon groundwater basin, approximately one-third of a mile downstream from the San Simeon potable well field. The percolated effluent serves as a seawater intrusion barrier while also slowing the seaward outflow of freshwater from the up-gradient well field. The percolation basins are also upstream from the San Simeon lagoon, which is designated as critical habitat for the endangered tidewater goby and threatened steelhead trout.. The recycled water demands shown in Table 3-11 assumed the no-net increase recycled water uses could occur in 2020, with future demand increases following during years 2020 through 2035. The saline barrier flow shown is from the use of percolated wastewater treatment plant effluent, less any use of recycled water for non-potable irrigation. The values shown for treated effluent were approximated at 80-percent of total potable water production based on a 1998 USGS report, which calculated the percentage of indoor water use.

[6] Task 3: Recycled Water Distribution System Master Plan, Cambria Community Services District, July, 2004, Kennedy/Jenks Consultants

Table 3-11 – Additional Water Uses and Losses

Water Use Type	Water Uses and Losses						
	2005	2010	2015	2020	2025	2030	2035
Saline barriers(1)	560	495	643	644(2)	677(2)	677(2)	677(2)
Groundwater recharge							
Conjunctive use							
Raw water							
Recycled water				50	100	100	100
System losses(3)	41	54	64	69	73	73	73
Total(4)	41	54	64	69	73	73	73

(1) Saline barrier is entirely from the CCSD WWTP treated wastewater effluent, which was estimated at 80-percent of the total potable production. The 80-percent value is from the 1998 USGS report, 98-4061, p. 66.
(2) Total water production is derived from adding deliveries (See Tables 3-5 through 3-9) and estimated systems losses. 80-percent of this total was then used to estimate the annual treated wastewater volume percolated into the lower San Simeon groundwater basin for use as a saline intrusion barrier. The saline barrier volume was reduced by the amount estimated for non-potable recycled-water irrigation beginning in year 2020.
(3) System losses for years 2015 and beyond were estimated at 8-percent of total production based on 2010 data.
(4) To differentiate between potable water use types and losses and non-potable recycled water uses, only potable water system uses and losses were included in the totals shown for each year. The total potable water uses and losses are subsequently used in Table 3-12 per DWR Guidebook methodology.

Notes:
a. Years shown are calendar years
b. Values shown are in acre-feet per year.
c. Format is based on the March 2011 DWR Guidebook, Table 10

3.7 Total Water Use

Table 3-12 shows total water uses and losses, which is based on the DWR guidebook's recommended tabulating procedure. The 2004 recycled water master plan had estimated 50 acre-feet per year of recycled water use was "no-net increase in diversion" water, which simply replacing existing potable demands with recycled water demands. Therefore, only the additional future demands of 50 acre-feet of recycled associated with future projects are included within the additional water uses line in Table 3-12 for years 2020 through 2035.

Table 3-12 – Total Water Uses and Losses

Water Use	Total Water Use						
	2005	2010	2015	2020	2025	2030	2035
Total water deliveries (from Tables 3-5 to 3-9)	699.8	618.9	740	798.7	836	836	836
Sales to other agencies							
Additional water uses and losses (from Table 3-11)	41	54	64	69	73	73	73
Total	741	673	804	868(1)	909	909	909

(1) See Table 3-11 for non-potable recycled water use estimates for a saline barrier, and non-potable irrigation, which are not included within the total potable water use and losses shown.

Notes:
a. Years shown are calendar years
b. Values shown are in acre-feet per year.
c. Format is based on the March 2011 DWR Guidebook, Table 11

3.8 Water Use Reduction Plan

The CCSD's current 10-year baseline consumption of 112 gpcd is already below the year 2020, 95-percent target for the central coast hydrologic area of 117 gpcd. To a certain extent, this is attributable to microclimate variability, which has much lower evapotranspiration (ET) rates along coastal areas when compared to the inland areas included within the overall central coast hydrologic region. In addition, Cambria's forested setting tends to have less turf grass areas, such as those more commonly found in suburban subdivisions, community parks, and golf courses that may be more prevalent in certain inland areas. Regardless of the land use and ET differences that may exist within the hydrologic area, the CCSD has also had a long history of offering conservation rebate incentives, as well as requiring the retrofit of existing homes on resale, during remodels, and on new construction. Additionally, the CCSD has a steeply tiered water rate structure in place that further serves as a direct financial incentive to conserve. In recent years, and since the 2005 UWMP was adopted, the CCSD invested heavily in replacing all of its residential water meters with newer automatic remote read meters, which allow for the sensing and flagging of household plumbing leaks that occur downstream from the meter. The new meters now allow CCSD staff to contact customers that are electronically flagged as possibly wasting water through leaks in household plumbing, fixtures, and appliances.

To meet its future challenge for achieving an interim 2015 target of 109 gpcd and 2020 target of 105 gpcd, the CCSD will continue to invest in cost-effective water conservation measures, while also looking at ways to update and expand upon the use of newer technologies. A key area of opportunity lies in the mandatory and voluntary conservation measures called for in the 2010 California Green Building Code Standards (a.k.a. 2010 CalGreen Building Code), which became effective during 2011. CCSD staffs are currently updating its retrofit inspection forms and internal tracking methods to ensure the latest 2010 Cal Green code requirements are being implemented as part of its existing conservation program. An example requirement includes newer 1.28 gallon per flush (gpf) toilets that have become the 2010 CalGreen standard effective on July 1, 2011, which will ultimately replace the prior 1.6 gpf toilets. The CCSD is further investigating the potential for lowering the standard even further by considering rebates to encourage newer 1.0 and 0.8 gpf toilets. In essence, the CCSD reduction plan will continue to proactively expand and improve upon its existing water conservation efforts as new technology becomes available; through enforcement of water conservation requirements mandated by the CCSD municipal code; and, execution of the demand management measures that are described in Section 6.

Section 4 – System Supplies

This section describes the existing and potential future water supply sources for the CCSD. It provides a description of each water source, source limitations, water quality, potential water exchange opportunities, proposed potable water augmentation projects, and the use of recycled water for certain non-potable irrigation uses.

4.1 Water Sources

Table 4-1 summarizes the CCSD potable water supplies from 2010 through 2035, which includes existing groundwater supplies; planned potable water augmentation projects to improve potable supply reliability during dry periods and droughts; and, the planned future use of recycled water for non-potable irrigation. The totals shown here are not intended to reflect the proposed demand, as the supplies may exceed demand to meet reliability needs. In addition, groundwater supplies shown are based on past experiences and a water budget developed as part of a 1998 USGS Report (described within Section 4.3, Groundwater, page 4-2 and Table 4-2, page 4-3.). Increasing dry season demands within each watershed could further reduce the values presented. Further discussion on supply and demand is provided in Section 5.

Table 4-1 – Current and Projected Water Supplies for the CCSD

Source Water Purchased From	Wholesaler supplied volume (yes/no)	2010	2015	2020	2025	2030	2035
Wholesale purchase	No	0	0	0	0	0	0
Groundwater(1)		810	810	810	810	810	810
Transfers In		0	0	0	0	0	0
Exchange In		0	0	0	0	0	0
Recycled Water		0	0	50	100	100	100
Potable water augmentation(2)		0	600	600	600	600	600
Other		0	0	0	0	0	0
Total		810	1410	1460	1510	1510	1510

(1) See related discussion in paragraph 4.3 and Table 4-2. The 810 acre-feet per year is based on an update to a water budget developed within 1998 USGS Report 98-4061 and past operating experiences. However, 1230 acre-feet per year is the maximum annual diversion allowed from both the Santa Rosa and San Simeon aquifers by SWRCB-issued appropriations permits, as well as a maximum annual limit conditioned by an earlier Coastal Commission-approved, Coastal Development Permit (Condition 4 of Coastal Permit No. 428-10). Beyond the annual supply limit shown, there are dry-season limitations that are described further in Section 5.

(2) Potable water supply alternatives identified in a 2004 Assessment of Long-Term Water Supply Alternatives report[7] included seawater desalination, an exchange of buying Nacimiento reservoir water for the use of water stored in the Whale Rock Reservoir, direct transmission of Nacimiento reservoir water to Cambria, and various in-stream and off-stream storage reservoirs. The 600 acre-feet shown assumes seawater desalination would become available in 2015. However, the Army Corps of Engineers is currently completing a NEPA-compliant Environmental Impact Statement (EIS), which will include further environmental assessment and analysis of a wide range of water supply alternatives for Cambria. This work is currently being completed through a Federal Water Resource Development Act, Project Cooperation Agreement between the CCSD and the Army Corps of Engineers.

Notes:

a. Units shown are in acre-feet per year.

b. Format based on March 2011 DWR Guidebook Table 16

[7] Final Report, Assessment of Long-Term Water Supply Alternatives, Cambria Community Services District, June, 2004, Kennedy/Jenks Consultants.

4.2 Wholesale Supplies

The CCSD does not receive any wholesale water supplies.

4.3 Groundwater

The District's potable water is supplied solely from groundwater wells in the San Simeon and Santa Rosa Creek aquifers (underflow of these streams). The California Department of Water Resources Bulletin No. 118 identifies these two sources as the San Simeon and Santa Rosa groundwater basins, numbers 3-35 and 3-36, respectively. Appendix C contains the Bulletin 118 summary description of each of these aquifers, neither of which is listed as being in overdraft status by the State. The basins are recharged primarily by San Simeon and Santa Rosa Creeks, respectively.

The Santa Rosa and San Simeon creeks sustain high quality habitat for a variety of aquatic and terrestrial species. Both creeks terminate into lagoons that may provide seasonal habitat to both the endangered Tidewater Goby as well as the threatened South-Central Coast Steelhead. In addition, the inland riparian corridors provide habitat for the threatened Red-Legged Frog as well as the Southwestern Pond Turtle. Of the two streams, Santa Rosa Creek has a much longer reach of perennial flow areas that contribute to the survival of juvenile and smolt-sized steelhead during the summer. Approximately 12 miles of such habitat exists along the Santa Rosa Creek. In contrast, San Simeon Creek is blocked by a natural rock fall, and has about one-mile of perennial habitat area in its upper reaches.[8] Additionally, the CCSD recharges the lower reach of San Simeon Creek underflow with treated wastewater effluent down-gradient from its potable well field. To maintain a high quality water supply, and to avoid impacting fish habitat, groundwater from Santa Rosa Basin is used sparingly by the CCSD to supplement groundwater from the San Simeon Basin.

The SWRCB has issued and administered the CCSD's diversion permits for both groundwater basins. In addition, the California Coastal Commission has issued coastal development permits that provide further limits to CCSD water withdrawals.

The United States Geological Survey (USGS) conducted a detailed study of the hydrogeology of the two groundwater basins that was later summarized in a 1998 report[9]. Although the report is dated 1998, the water budget table was based on an April 1988 through March 1989 time frame. Table 4-2 presents an update to the simulated annual water budget developed within the USGS report. In developing this table, all inflows and outflows were assumed to remain the same as in the 1998 report except for a 1991 change in operation by the CCSD to its treated wastewater effluent spray field system. In 1991, the CCSD converted a treated

[8] D.W Alley & Associates

[9] U.S. Geological Survey. 1998. Report 98-4061; Hydrogeology, Water Quality, Water Budgets, and Simulated Responses to Hydrologic Changes in Santa Rosa and San Simeon Creek Ground-Water Basins, San Luis Obispo County, California

wastewater effluent spray field operation into a percolation pond operation. This change decreased losses due to evaporation, and increased inflows into the San Simeon Basin by approximately 60 acre-feet.

Based on Cal Poly rainfalls records, approximately 18.4 inches of rainfall occurred from the April 1988 through March 1989 time frame that Table 4-2 (page 4-3) was based upon. This amount is only slightly less than the historic annual mean of 19.77 inches for the Cal Poly station. Therefore, it is assumed that the Table 4-2 would represent a reasonable baseline for average rainfall conditions, which would include fully recharged aquifers (For further discussion on the latter, please also see Section 5.1, Water Supply Reliability and Drought Planning, page 5-1.) From review of Table 4-2 municipal pumping from the Santa Rosa and San Simeon aquifers was 250 and 550 acre-feet per year, respectively. The total net flows from Table 4-2 show the Santa Rosa aquifer was estimated to be approximately negative 50 acre-feet, while the San Simeon aquifer was estimated to be positive 60 acre feet. To balance these two values to zero, it was estimated that municipal pumping would be approximately 200 acre feet from the Santa Rosa aquifer and 610 acre-feet from the San Simeon aquifer. These values are subsequently used as baseline estimates for normal precipitation year supply volumes.

Table 4-2 – Annual Water Budget Summary for San Simeon and Santa Rosa Basins

Budget Item	Santa Rosa Basin			San Simeon Basin		
	Inflow	Outflow	Net Flow	Inflow	Outflow	Net Flow
Rainfall Recharge	140	0	140	50	0	50
Creek Seepage	1,120	650	470	950	410	540
Subsurface Inflow and Outflow						
Onshore Boundaries	370	0	370	150	0	150
Ocean Boundary	0	60	-60	0	320	-320
Agricultural Water Use						
Pumpage	0	890	-570	0	450	-280
Irrigation-Return Flow	320	0		170	0	
Nonagricultural Water Use						
Municipal Pumpage	0	250		0	550	
Rural Pumpage	0	10		0	<10	
Wastewater Recharge			-240			-50
Percolation Ponds	0	0		500	0	
Septic Tanks	10	0		<10	0	
Irrigation-Return Flow	10	0		0	0	
Phreatophyte Transpiration	0	160	-160	0	30	-30
Total Net Flow			-50			+60

Notes:
a. All values rounded to the nearest 10 AFY. Positive net flow indicates flow into basin; negative net flow indicates flow out of basin.
b. From 1998 USGS report 98-4061, p.46, modified to show subsequent change from wastewater effluent spray field operation to percolation ponds.

Figure 4-1 shows the annual CCSD pumping from each aquifer for the period of 1967 through 2010. The Santa Rosa well field is Cambria's oldest supply source and was relegated to a back-up and augmentation role following start-up of the San Simeon well field in 1979. In 1999 the Santa Rosa well field was shut down after the discovery of an MtBE plume from a nearby gas station. An emergency well SR-4 and associated treatment plant were subsequently installed further upstream from the existing Santa Rosa well field and placed into operation during August of 2001. Figure 4-1 shows how production ceased from the Santa Rosa aquifer during 1999 to 2001, and has, within the past few years, started to reach a similar level of use that last occurred during an earlier 1988 to 1993 period. Total water production from both aquifers in recent years has also dropped by approximately 100 acre-feet since the early 2000 to 2003 period, or roughly 12 percent. Conservation efforts coupled with the economic recession may have both influenced this reduction in overall demand.

Figure 4-1 – 1967-2010 San Simeon and Santa Rosa Production

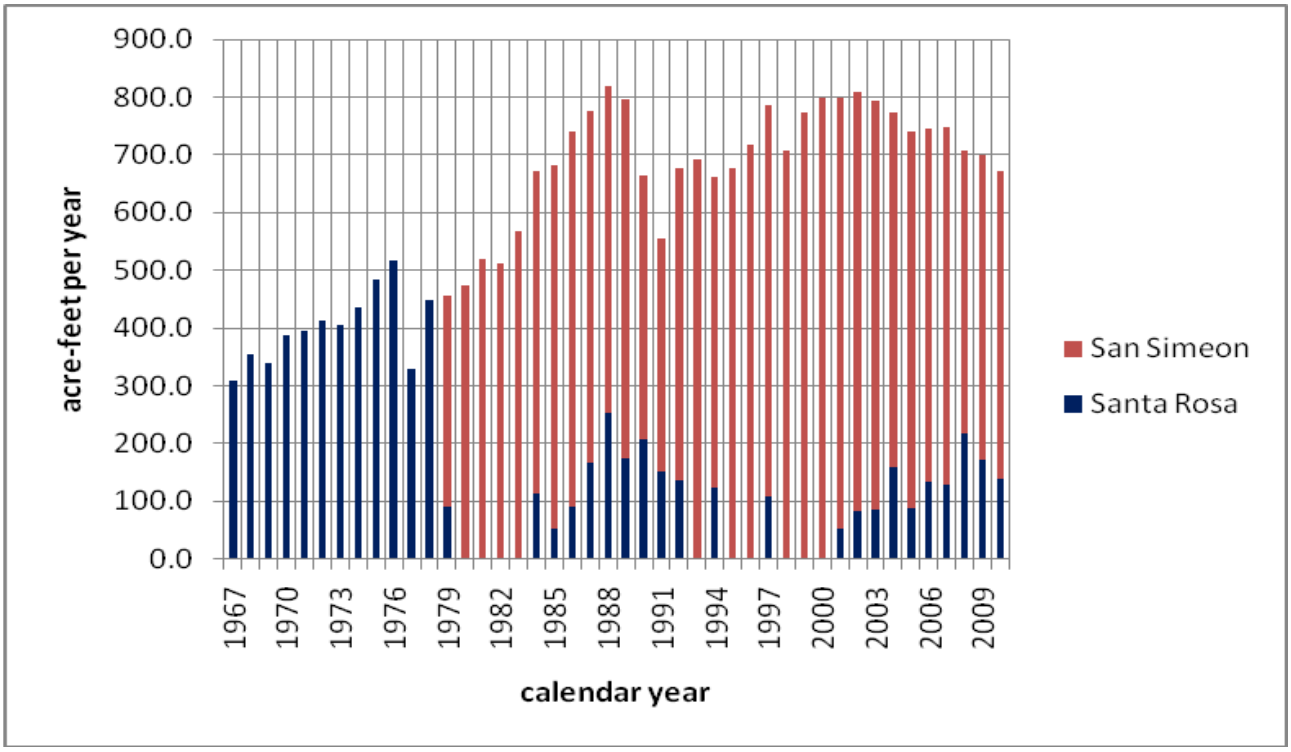


Table 4-3 provides a further breakdown on the volumes pumped by each source for the years 2006 through 2010.

Table 4-3 – CCSD Groundwater Pumping History (2006-2010)

Basin Name	Metered or Unmetered	2006	2007	2008	2009	2010
San Simeon	Volumetric meter	613	619	490	527	534
Santa Rosa	Volumetric meter	133	130	218	173	139
Total groundwater pumped		746	749	708	700	672
Groundwater as a percent of total water supply		100	100	100	100	100

Notes:
a. Units shown are in acre-feet per year
b. Format based on March 2011 DWR Guidebook Table 18

Table 4-4 provides projected groundwater pumping in five year increments from 2015 through 2035. To error on the conservative side, build-out scenario 3 from Table 2-2 (page 2-8) was used as the basis for population forecasting. It was further assumed that approximately 20 to 25 percent of the groundwater pumping demand could be met by the Santa Rosa aquifer based on Table 4-2, and operational experiences from 2006 through 2010. Beginning in year 2015, it is assumed the CCSD will meet its interim water reduction target of 109 gpcd, while beginning in 2020, the target goal of 105 gpcd will be achieved. By 2020, it was further assumed that approximately 50 acre-feet of irrigation demands could be met by the use of recycled water. Therefore, a calculated total of 868 acre-feet of demand for 2020 was reduced to 818 acre-feet as the result of future recycled water use. Similarly, an additional 50 acre-feet of irrigation demand was assumed to be provided by recycled water during 2025, which reduced a calculated demand total of 909 acre-feet by 100 acre-feet of recycled water use. By 2025, the CCSD's adopted build-out reduction program limit would be reached, resulting in no further demands being placed on the supply system.

Table 4-4 – CCSD Projected Groundwater Pumping (2015-2035)

Basin Name	2015	2020	2025	2030	2035
San Simeon	610	610	610	610	610
Santa Rosa	194	208	199	199	199
Total groundwater pumped	804	818	809	809	809
Groundwater as percent of total water supply	100	94	89	89	89

Notes:
a. Beginning in 2020, it is assumed that approximately 50 acre-feet per year of recycled water for non-potable irrigation would become available per 2004 recycled water master planning. These uses would result in no-net increase in diversion from the aquifer system, as the recycled water demands would be from existing CCSD potable water customers (I.e., groundwater pumping). Therefore, the total groundwater pumped value for 2020 was reduced by 50 acre-feet per year when compared to Table 3-12.
b. Beginning in 2025 and subsequent years, it is assumed that approximately 100 acre-feet per year of recycled water for non-potable irrigation would become available per 2004 recycled water master planning. Of this amount, approximately 50 acre-feet per year would serve future demands. Therefore, the total groundwater pumped value was reduced by 100 acre-feet per year in year 2025 and subsequent years when compared to Table 3-12.
c. Units shown are in acre-feet per year.
d. Format based on March 2011 DWR Guidebook Table 19

4.4 Transfers and Exchanges

The CCSD does not have any existing water transfer agreements in place with other agencies. A major factor is the remote location of Cambria in comparison to the State Water Project aquifer and Nacimiento reservoir pipeline, which are along routes located further inland and east of the Santa Lucia mountain range from Cambria. However, earlier water master planning had investigated the potential for a water transfer agreement with certain member agencies of the Whale Rock Commission, which use the Whale Rock Reservoir located approximately 13 miles south of Cambria near Cayucos. The Whale Rock Reservoir exchange alternative would involve the CCSD reaching an agreement with certain Whale Rock Commission member agencies that have entitlements to Nacimiento Reservoir water in exchange for the use of an equivalent allocation from the Whale Rock reservoir[10].

The Whale Rock Commission members use a 17.6-mile-long, 30-inch diameter transmission main that extends south from the Whale Rock Reservoir to Cal Poly (Which is contiguous with the City of San Luis Obispo and among the City's water customers). The inland Nacimiento Reservoir pipeline connects into the City of San Luis Obispo, which has a contractual entitlement to 3,340 acre-feet of Nacimiento Reservoir water. Under such an exchange approach, an agreement would need to be negotiated to offset the cost of additional Nacimiento entitlement in exchange for using a portion of the City's Whale Rock reservoir water. Table 4-5 summarizes potential transfer and exchange opportunities involving the use of the Whale Rock Reservoir.

Table 4-5 – Transfer and Exchange Opportunities

Transfer Agency	Transfer or exchanges	Short-term or long-term	Proposed volume
City of San Luis Obispo(1)	Exchange	Long-term	TBD, ranging from approximately 300 to 600 acre-feet
County Service Area 10A(2)	Exchange	Long-term	TBD, ranging up to approximately 25 acre-feet

(1) The City of San Luis Obispo has an entitlement to 3,380 acre-feet per year of Nacimiento Reservoir water.
(2) County Service Area 10A (CSA 10A) has an entitlement to 25 acre feet per year capacity of Nacimiento Reservoir water.

Notes:
a. TBD (To Be Determined). Actual value would be subject to future planning details and negotiations.
b. Format based on March 2011 DWR Guidebook Table 20

During earlier CCSD water master planning, seawater desalination was favored over the Whale Rock exchange alternative due to desalination being viewed as a more reliable supply during major droughts because: its use allowed for more local control on when to augment the existing supply; the substantial buy-in cost for a comparably reliable supply of Nacimiento

[10] The Whale Rock Commission member agencies consist of the City of San Luis Obispo, California Men's Colony, and California Polytechnic State University.

exchange water[11]; and, the favored economics of desalination from having power costs offset by a renewable solar power supply. Regardless, there may also be other approaches to consider, which may combine seawater desalination with the use of Whale Rock Reservoir storage. Such approaches are briefly described within paragraph 4.5.

Beyond exchanges with other water agencies, the potential may also exist for the formation of voluntary exchange agreements with local agricultural interests. Such agreements may include fallowing certain irrigated areas during drought periods in exchange for compensation resulting from the loss of income-producing crops.

4.5 Desalinated Water Opportunities

The CCSD has a project cooperation agreement in place with the Army Corps of Engineers to complete a water supply project, which was authorized under Section 219 of the Federal Water Resources Development Act (WRDA). During the completion of this UWMP update, the Corps was in the process of gathering data to support the definition of water supply alternatives, which would be further analyzed and assessed within a subsequent EIR/EIS environmental clearance process.

The Corps environmental clearance effort is subject to the National Environmental Policy Act (NEPA), which requires defining and analyzing a broad range of water supply alternatives within the pending water supply project EIR/EIS (currently under contract between the Army Corps and The Chambers Group). Such project alternatives will be briefly described within a pending EIS/EIR scoping session, which will be presented by the Corps project team during early 2012. An earlier mid-1990s designed desalination project alternative involving a screened ocean-floor mounted intake and ocean-floor mounted outfall is currently planned to be included within the desalination alternatives that will be further defined and assessed within the subsequent water supply project EIR/EIS. This earlier 1990s era project made use of a CCSD-owned, ocean-front flag lot located north of the San Simeon Creek area. The flag lot allowed intake and outfall pipes to be staged offshore without passing under the California State Parks beach area at the outlet of San Simeon Creek. Opposition from State Parks over having pipes cross under the San Simeon Creek beach area during development of the 1990s-era desalination project led to the CCSD's acquisition of the flag lot. However, since development of the 1990s-era desalination project design, the area offshore from Cambria has been re-designated from being a State Marine Conservation Area to a State Marine Park[12]. Although this re-designation was directed primarily at restoring fisheries by not allowing

[11] The buy-in cost for Nacimiento water was estimated at approximately $25,000 per acre-foot of capacity, not including the cost for treatment and transmission of the water to Cambria from the Whale Rock Reservoir. The approximately 600 acre-ft dry season capacity from a proposed desalination project would have a comparable Nacimiento buy-in cost of $15 million. To achieve the same 1200 acre-ft of year-round desalination capacity, the comparable buy-in cost would be $30 million.

[12] August 17, 2010 California State Parks and Recreation Commission meeting minutes

commercial fishing in the offshore Marine Park area, it raises further questions on whether the earlier 1990s era desalination project design could still be permitted within the State Marine Park area. If not, other desalination alternatives may include directionally drilling subterranean intake and outfall pipelines to allow future placement of any ocean-floor mounted intake and outfall to be outside of the State Marine Park boundary. Alternatives may also consider having a desalination facility south of Cambria and outside of the southern Cambria State Marine Park boundary. A southern location would likely require a transmission main from the Cayucos area to Cambria. Developing such a southern alternative may also facilitate integrating the use of the Whale Rock Reservoir, as well as some limited regional use by agencies affiliated with, or otherwise within close proximity to the Whale Rock transmission main[13]. Depending upon the analyses and recommendations of the pending water supply project EIR/EIS, the agreement between the Army Corps and CCSD for 30% level design of a desalination project, could also require a future amendment.

4.6 Recycled Water Opportunities

The CCSD owns and operates a one-million gallon per day capacity wastewater treatment plant (WWTP), which is located southwesterly from the intersection of Santa Rosa Creek and Windsor Boulevard in Cambria. The WWTP provides secondary level treatment using an extended aeration, activated sludge process. Treated effluent from the WWTP is pumped approximately 2.5 miles north to percolation ponds near the base of the San Simeon Creek aquifer. The CCSD's treated wastewater effluent percolation ponds are approximately one-third of a mile downstream from the main San Simeon potable well field. The percolated wastewater effluent serves as a barrier to slow the seaward migration of subterranean freshwater, while also preventing saltwater intrusion towards the up-gradient San Simeon aquifer wells. Treated WWTP effluent is subject to meeting conditions required by the Regional Water Quality Control Board (RWQCB) waste discharge requirements order 01-100.

CCSD Water Master planning[14] included the future completion of a recycled water distribution system, which recommended further analysis of the existing aquifer and lagoon interface to determine the amount of recycled water that could be made available for future non-potable irrigation demands. The recycled water plan further described a "no-net increase" in aquifer diversion approach, which would maintain the existing aquifer balance by converting a limited number of existing potable water customers over to recycled water. The no-net increase approach was developed in response to potential environmental concerns to the San Simeon Creek lagoon, which is downstream from the percolation ponds. This area is currently listed as critical habitat for the endangered tidewater goby. Therefore, it was assumed that any

[13] For example, the Cuesta Community College may not be a member of the Whale Rock Commission, but could be in relatively close proximity to the Whale rock transmission main.

[14] Final Report Task 3: Recycled Water Distribution System Master Plan, July 2004, Kennedy/Jenks Consultants

additional diversion from the aquifer beyond the current baseline could be subject to additional biological and geohydrological studies before such diversionary demands would be permitted.

The no-net-increase in aquifer diversion recycled water demands were estimated to total approximately 50 acre-feet per year. Future non-potable irrigation demands were also estimated to add an additional 50 acre-feet beyond the no-net increase balance, which could conceivably divert 50 acre-feet away from the percolation ponds. This additional 50 acre-feet of recycled water diversion could ultimately be offset should seawater desalination or another aquifer-independent-supply source, be made available to meet future customer demands. This future demand balancing concern would be met by providing that portion of future non-potable irrigation water demands (e.g., interior water use, which would typically be treated at the wastewater treatment plant and be pumped to the percolation ponds). A full copy of the CCSD recycled water master plan is included as Appendix H.

In conformance with recommendations made within the March 2011 DWR Guidebook, Table 4-6 has been provided as a summary of the CCSD wastewater collected and treated by the CCSD. Future years include estimates for recycled water that would be treated to meet Title 22 requirements for non-potable irrigation. Similarly, Table 4-7 has been provided to further detail the methods of disposal for treated wastewater effluent.

Table 4-6 – Recycled Water – Wastewater Collection and Treatment

Type of Wastewater	2005	2010	2015	2020	2025	2030	2035
Wastewater collected and treated in service area(1)	593	538	643	694	727	727	727
Volume that meets recycled water standard(2)	0	0	0	50	100	100	100

(1) Estimated from 1998 USGS Report 98-4061, (which had developed an interior potable water use for Cambria at approximately 80% of total water production) and total water use shown on Table 3-12.
(2) Beginning in year 2020, approximately 50 acre-feet per year of no-net-increase in diversion from aquifer recycled water use is anticipated by converting existing CCSD customers from potable, groundwater-source-based use to non-potable outdoor irrigation using recycled water. For 2025, 2030, and 2035, and additional 50 acre-feet of outdoor irrigation with recycled water is estimated for future project demands.

Notes:
Values shown are in acre-feet per year.
Format based on March 2011 DWR Guidebook Table 21

Table 4-7 – Recycled Water – non-recycled wastewater disposal

Method of disposal	Treatment Level	2010	2015	2020	2025	2030	2035
Percolated seawater intrusion barrier	Secondary	538	643	694	677	677	677
Conversion of existing potable water irrigation customers to non-potable recycled water	Tertiary			50	50	50	50
Future non-potable irrigation demands	Tertiary				50	50	50
Total		538	643	744	777	777	777

Notes:
a. Values shown are in acre-feet per year
b. Format based on March 2011 DWR Table 22

Table 4-8 provides a summary of potential recycled water use by user categories suggested within the March 2011 DWR Guidebook. Essentially, the CCSD's earlier 2004 recycled water master planning developed a backbone distribution system, which was laid out to be reasonably close to the most significant outdoor irrigation customers. These included a planned community park on the east Fiscalini Ranch property, an existing commercial nursery, as well as the middle and elementary schools.

Table 4-8 - Recycled Water – Potential Future Use

Use Type	Description	Feasibility	2015	2020	2025	2030	2035
Agricultural irrigation	None planned						
Landscape irrigation	Per 2004 recycled water master plan	See note (1)		50	100	100	100
Commercial irrigation	Included under landscape irrigation						
Golf course irrigation	Included under landscape irrigation						
Wildlife habitat	unknown						
Wetlands	unknown						
Industrial reuse	None planned						
Groundwater recharge	Included with seawater barrier						
Seawater barrier	Continuation of existing percolation pond operation		643	694	677	677	677
Geothermal/Energy	None planned						
Indirect potable reuse	None planned						
Total			643	744	777	777	777

(1) Feasibility will be driven by available funding and potential downstream habitat concerns. Because of potential downstream habitat concerns, the 2004 recycled water master plan bifurcated recycled water demands between the conversion of existing groundwater-based customer uses (50 acre feet estimated starting in 2020); and, potential future project demands (an additional 50 acre feet in recycled water use during 2025,2030, and 2035.)

Notes:

a. Values shown are in acre-feet per year. Unless otherwise noted, blanks indicate a zero estimate.

b. Format based on March 2011 DWR Table 23

In accordance with methodology recommended within the March 2011 DWR Guidebook, Table 4-9 compares recycled water use from the 2005 UWMP estimate with actual 2010 use. This shows that the treated wastewater percolated into the groundwater basin at the lower reach of the San Simeon Creek aquifer continues to be the most significant use.

Table 4-9 – Recycled Water – 2005 UWMP use projection compared to 2010 actual

Use Type	2010 actual use	2005 projected for 2010
Agricultural irrigation	0	0
Landscape irrigation	0	0
Commercial irrigation	0	0
Golf course irrigation	0	0
Wildlife habitat	0	0
Wetlands	0	0
Industrial reuse	0	0
Groundwater recharge	Included with seawater barrier	Included with seawater barrier
Seawater barrier	538	671[1]
Geothermal/Energy	0	0
Indirect potable reuse	0	0
Total	538	671

Notes:

a. From Table 4-1 of the 2005 CCSD UWMP, production for 2010 was estimated to be 839 acre-feet per year. Based on the USGS Report 98-4061 estimate of indoor water use being approximately 80 percent of total water use, 671 acre feet was estimated as being treated at the wastewater plant and being pumped to the percolation basins.
b. Values shown are in acre-feet per year.
c. Format based on March 2011 DWR Table 24

Table 4-10 summarizes potential methods to encourage future recycled water use. The actions listing provides a summary of potential measures to consider as a means encourage future end use of recycled water[1]. To date, none of these actions have been adopted as policy. Regardless, they are memorialized here for future reference and discussion.

(1) February 23, 2012 CCSD Board of Directors deliberations adopting the 2010 UWMP directed staff to include consideration of the potential for potable reuse of recycled water. Such use would be subject to meeting existing and future regulatory requirements of the California Department of Public Health and California Regional Water Quality Board. Therefore, future use of recycled water may consider the non-potable irrigation uses identified within the 2004 Recycled Water Distribution System Master Plan, (See 2010 UWMP Appendix H .), as well as potable reuse opportunities.

Table 4-10 – Methods to encourage recycled water use

Actions	Projected Results[(a)]					
	2010	2015	2020	2025	2030	2035
Rate discount for end user						
Low interest loan program for on-site conversions						
Mandatory use ordinance/project conditions of approval			50	100	100	100
Outside grant funding						
Water conservation retrofit program						
Point of use recycled water systems						
CCSD capital improvement program funded projects						
Off-stream seasonal storage of recycled water to avoid dry-season percolation pond diversions from future non-potable irrigation demands						
Total	0	0	50	100	100	100

(a) To date, there have not been any supporting studies completed to further quantify the projected results in acre-feet per year from the various actions shown. Therefore, the blanks shown in this table may also be construed as being "unknown," or "to be determined (TBD)."

Notes:
Format from March 2011 DWR Table 25

4.7 Future Water Supply Projects

Past CCSD water master planning recommended a three-pronged approach towards achieving a long-term reliable water supply, which consists of water conservation, recycled water for non-potable irrigation, and seawater desalination. This supply approach, along with distribution system improvements for improving fire flow and fire storage, were incorporated into a Water Master Plan Program Environmental Impact Report (WMP PEIR), which was certified by the CCSD on August 21, 2008. The California Environmental Protection Act (CEQA) allows tiering from such program EIRs to further address project-specific environmental concerns. Therefore, subsequent supply projects may incorporate the earlier the WMP PEIR while addressing project-specific environmental concerns within project-specific environmental clearances.

Currently, the CCSD has a project cooperation agreement in place with the U.S. Army Corps of Engineers, which includes contracts for completing a project-specific environmental clearance and developing a thirty percent level of design. Because the Army Corps is a lead Federal agency, the environmental clearance process must also meet the requirements of the Federal, National Environmental Policy Act (NEPA). NEPA requirements require the Army Corps to consider a broad range of water supply alternatives while completing its environmental clearance process, which is planned to include completion of an Environmental Impact Statement/Environmental Impact report (EIS/EIR). Because the EIS/EIR is currently under development, this UWMP update assumes that a seawater desalination project will remain to be the recommended supply alternative, which is why it is shown on Table 4-11. However, much remains to be completed on the EIS/EIR, which could conceivably recommend a different water supply alternative.

Table 4-11 – Future Water Supply Projects

Project name	Project Start / Completion	Potential Project Constraints	Normal-year supply	Single dry-year supply	Multiple-dry year		
					Year 1 supply	Year 2 supply	Year 3 supply
Recycled water	2020 / 2025	Capital costs and funding Potential habitat concerns over diversions Permitting Cost escalation to remove emerging contaminants of concern	50 to 100	50 to 100	50 to 100	50 to 100	50 to 100
Seawater desalination	2013 / 2015	Capital costs and funding Permitting Cost escalation due to permitting appeals Unknowns from pending environmental clearance process Non-governmental organizations (NGOs) opposition to desalination	0 to 200	300 to 600	300 to 600	300 to 600	300 to 600

Notes:
a. Values shown are in acre-feet per year
b. Format based on March 2011 DWR Guidebook Table 26.

Section 5 – Water Supply Reliability and Water Shortage Contingency Plan

The water supply for Cambria is vulnerable to drought because of the limited amount of groundwater storage capacity in the Santa Rosa and San Simeon basins. Storage is small relative to average annual groundwater pumping, and storage is consequently incapable of sustaining current pumping rates through one or more years of substantially decreased recharge. Because local groundwater aquifers are the only supply of water, the CCSD was investigating means to further augment and diversify its existing potable supplies using seawater desalination or other supply alternatives that were independent of the local aquifers. Since November 2001, the CCSD has been under a water moratorium following the CCSD's declaration of a Water Code Section 350 emergency water shortage. With this background in mind, the following sections describe the CCSD's water supply reliability and drought planning, groundwater supply reliability, and related drought analyses and actions.

5.1 Water Supply Reliability and Drought Planning

Recharge into the CCSD's local groundwater aquifers is dominated by net stream percolation. In most years, the availability of stream flow far exceeds the amount required to replenish the aquifer storage depleted during the previous dry season (both streams are intermittent and cease flowing for a number of months in summer and fall). Wet years provide no added storage reserve because once the basins are full; any additional stream recharge is rejected. As a result, the amount of groundwater in storage at the beginning of the dry season is essentially the same over a broad range of hydrologic year types ranging from slightly dry to wet.

Droughts in the two stream-aquifer systems are very threshold dependent. For progressively smaller amounts of annual rainfall and stream flow, the annual amount of available groundwater remains about the same until the point at which winter stream flow is inadequate to fully replenish the basins. Statistical analysis of San Luis Obispo rainfall and local stream discharge was combined with groundwater modeling to determine that incomplete recharge occurs when annual rainfall is less than 10.31-10.95 inches, as shown in Table 5.1, and the average recurrence interval of rainfall less than amount is approximately 18-25 years (Yates and Van Konynenburg, 1998). For even smaller amounts of annual rainfall, water supply conditions worsen up to the point at which there is no stream flow (and no recharge) at all. Beyond that point, further decreases in rainfall do not make water supply conditions any worse. Zero stream flow occurs with 9.78-9.85 inches of annual rainfall (slightly different for the two basins), corresponding to an average recurrence interval of 31-32 years.

Table 5-1 – Recurrence Intervals of Low Annual Rainfall and Discharges from 1998 USGS Report

Item	Recurrence Interval (years)	Annual rainfall at San Luis Obispo (inches)	Annual discharge at upstream gauging station (acre-feet)	
			Santa Rosa Creek	San Simeon Creek
Minimum amount likely to occur once in				
100 years	100	8.20	0	0
50 years	50	9.15	0	0
20 years	20	10.80	580	1,040
10 years	10	12.41	1,490	2,810
Zero discharge in				
Santa Rosa Creek	32	9.78	0	0
San Simeon Creek	31	9.85	40	0
Minimum discharge for complete basin recharge in				
Santa Rosa basin	18	10.95	660	1,200
San Simeon basin	25	10.31	300	500
Minimum recorded stream discharge				
Santa Rosa (1977)	26	10.21	240	na
San Simeon (1976)	25	10.29	na	480

The most extensive rainfall history for the area is from the Cal Poly weather station, which has records dating from the 1872-1873 water year to the present. This weather station is also within proximity of the rainfall isohyetal precipitation contour line that crosses Cambria, which indicates a reasonable correlation would be expected between the two locations. Figure 5-1 provides a plot of the Cal Poly annual rainfall totals, while Figure 5-2 provides a map showing the isohyetal precipitation contours for San Luis Obispo County. From Figure 5-2, the amount of rainfall increases substantially within the San Simeon and Santa Rosa watersheds with increasing elevation. This is due to the Santa Lucia mountain range being east of Cambria, and the predominantly inland, west to east direction of storm paths off the Pacific. (Because storm clouds hold less moisture as they increase in elevation, precipitation totals will typically increase with rising elevations along the area's western facing mountain slopes.) To further check the correlation of rainfall totals for the two areas, Figure 5-3 was developed using the more limited historical record from the Cambria CDF weather station and overlaying that data with the Cal Poly station data. This showed there actually were some significant differences for the four-year multiple dry period of July 1, 2005 through June 30, 2009, which occurred at the Cal Poly station, versus the more local CDF fire station, which had a minimum four-year low occurring from July 1, 1989 to June 30, 1993. Because it was more local to Cambria, and also within the more recent historical record for both locations; the Cambria CDF data was used for the multiple dry-year basis.

Figure 5-1 – Rainfall Totals from Cal Poly Station

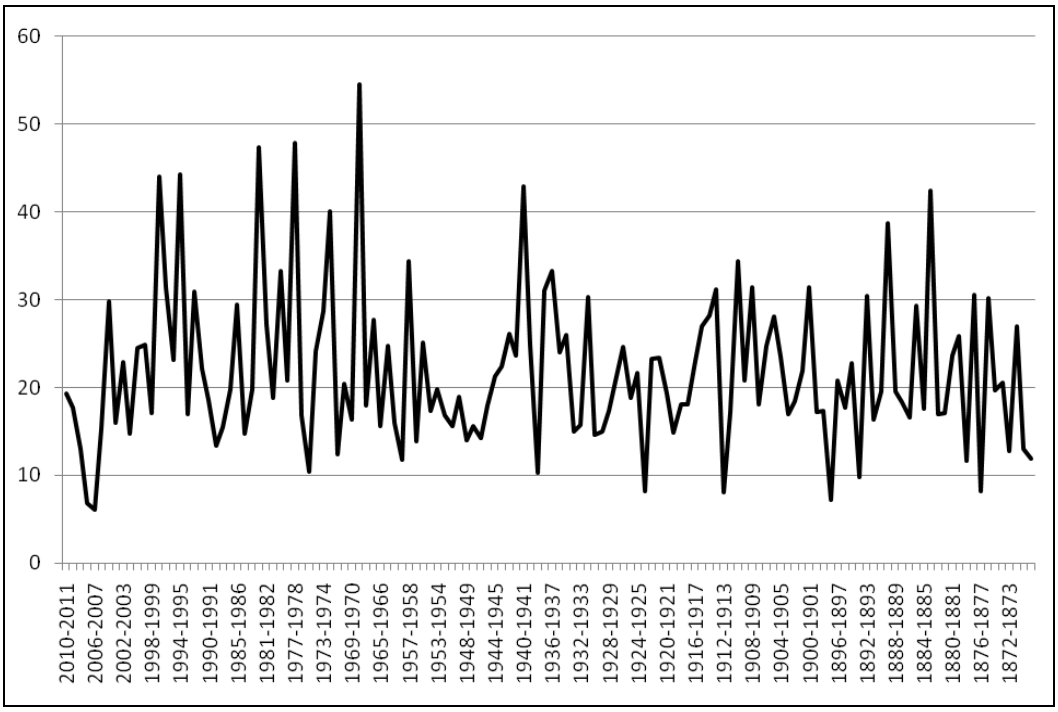
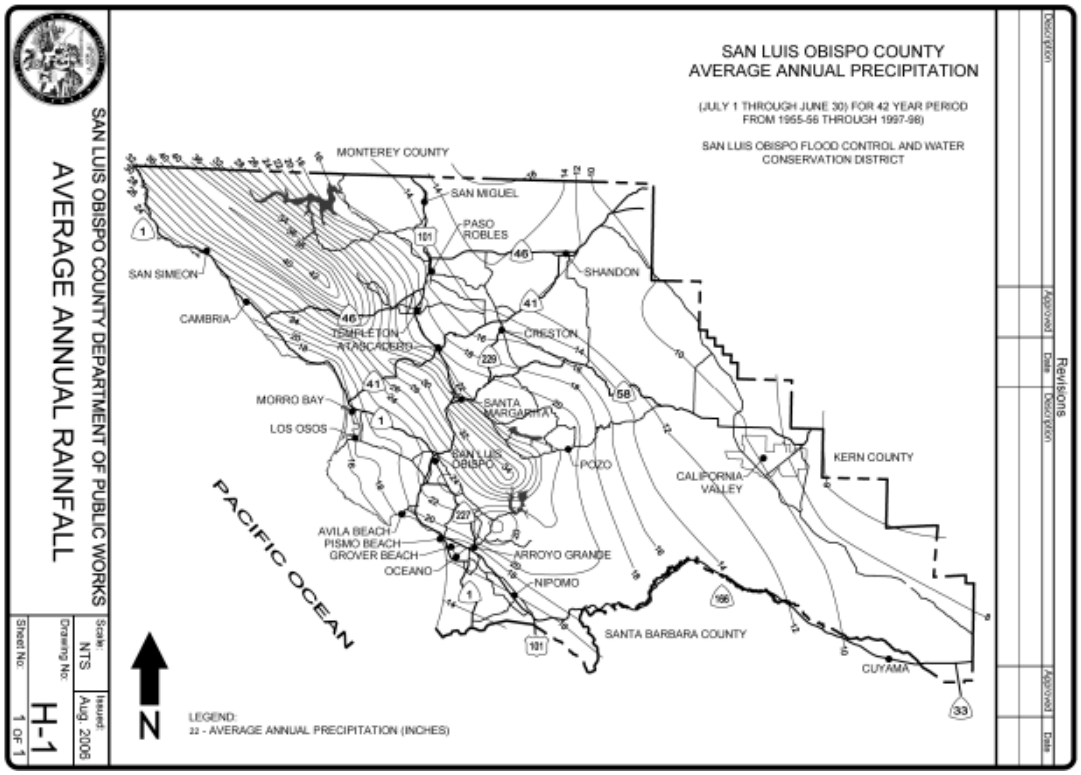


Figure 5-2 – San Luis Obispo County Average Annual Precipitation



From review of the Cal Poly rainfall data, the 1953-1954 water-year was chosen as being a normal water year. The 19.77 inch total for 1953-1954 was closest to the Cal Poly historic median of 19.73 inches. The single dry year chosen was from 1897-1898, which totaled 7.2 inches, and was not associated with adjacent dry years either before or after this year. The multiple dry year period varied between the local Cambria CDF precipitation records and the Cal Poly weather station data during a relatively recent period when records were available from each location.

Figure 5-3 shows the variation in data records between the more local Cambria CDF weather station and the Cal Poly station data. Because of the data being more local to Cambria, the Cambria CDF data was used to determine the multiple three and four year dry periods as being between July 1, 1989 through June 30, 1993, which is used in subsequent analyses.

Figure 5-3 – Rainfall Totals for Cambria CDF and Cal Poly Weather Stations, 1979-2010

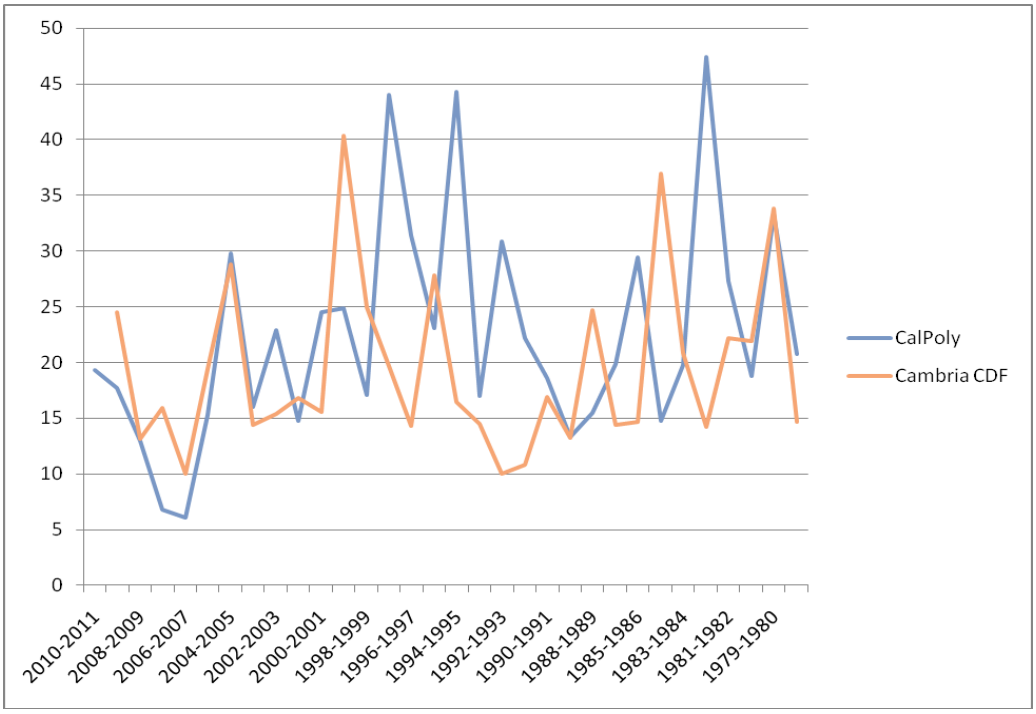


Table 5-2 summarizes the water year basis, while also integrating in the associated rainfall and creek discharges that would be estimated using the rainfall-discharge relationships developed as part of the earlier 1998 USGS study.

Table 5-2 – Basis of Water Year Data

Water Year Type	Base Years and corresponding rainfall total and creek discharge							
Normal Water Year(1)	1953-1954							
	Annual precipitation: 19.77 inches							
	Estimated annual creek discharge, acre-feet							
	San Simeon (SS) 10,916				Santa Rosa (SR) 5,674			
Single Dry Water Year(1)	1897-1898							
	Annual precipitation: 7.2 inches							
	Estimated annual creek discharge, acre-feet							
	San Simeon 0				Santa Rosa 0			
Multiple-Dry Water Years(2)	1989-1990		1990-1991		1991-1992		1992-1993	
Annual Precipitation:	13.21”		16.91”		10.78”		9.98”	
	Estimated annual creek discharge, acre-feet							
	SS 3,694	SR 1,948	SS 7,768	SR 4,050	SS 1,018	SR 568	SS 140	SR 114

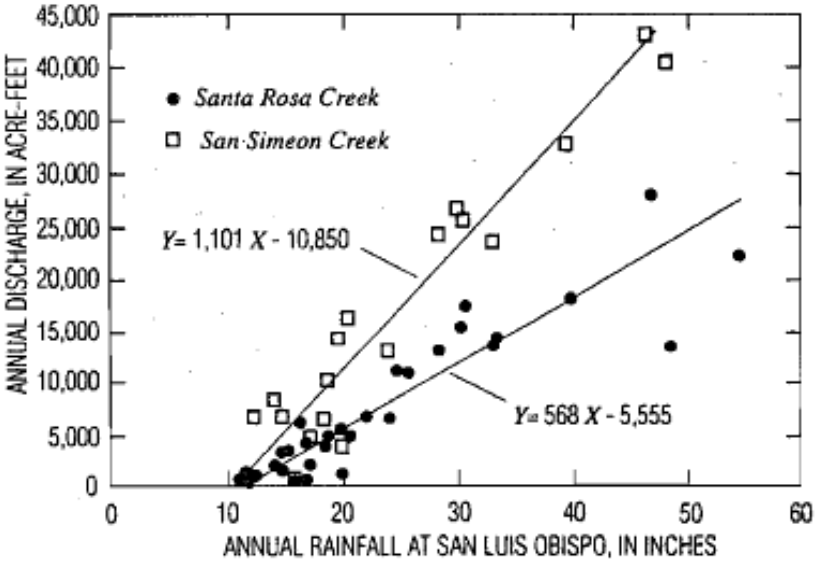
(1) From Cal Poly weather station data
(2) From Cambria CDF weather station data

Notes:
a. Estimated annual creek discharges are from formulas shown on Figure 5-5.
b. Format based on March 2011 DWR Guidebook Table 27 with additional information added on estimated rainfall totals and associated annual creek discharges.

The severity of drought to be used for the “single dry year” analysis in Urban Water Management Plans is specified by the California Department of Water Resources (2011) as the year of least recorded stream flow since 1903. This corresponds to a drought event with an average recurrence interval of approximately 100 years. For San Simeon and Santa Rosa Creeks, that would clearly be a year of zero stream recharge. Based on the correlations with San Luis Obispo rainfall, two such years have occurred since 1903: one in 1913 and one in 1924. An additional two occurred in 1877 and 1898.

To confirm whether creek flows were occurring relative to the annual rainfall amounts, the following Figure 5-4 was used from the 1998 USGS study, which had developed the mathematical relationships shown between annual rainfall and annual discharge in each creek. This confirmed that the amounts of rainfall in 1913, 1914, or 1898 would have resulted in no creek discharge from either the San Simeon or Santa Rosa Creeks, and would not have recharged the aquifers. Under such a scenario, and short of any other alternative supply source, water stored within the aquifers from the prior rain year would likely be relied upon in meeting demands. In analyzing the multiple dry year period, the aquifers would likely recharge each year, with the fourth dry year having close to zero discharge from each creek.

Figure 5-4 – Annual Discharge and Precipitation Plots for San Simeon Creek and Santa Rosa Creek from 1998 USGS Report



The hydrologic consequences of a year with zero stream recharge were simulated by the U.S. Geological Survey (USGS) using groundwater flow models of the two creek basins (Yates and Van Konynenburg, 1998). Groundwater levels did not recover at all during the winter without stream flow, because rainfall recharge was also zero under those circumstances. Municipal and agricultural pumping were assumed to continue as usual during the second dry season, and groundwater levels continued to decline. In both basins, declines in water levels and storage during the second dry season were greatest near the upper ends of the valleys because groundwater is continually draining down-valley, with or without municipal pumping. During the second dry season, groundwater levels declined an additional 20 feet near the upstream end of the valley, an additional 15 feet near the municipal well field (to 13 feet below sea level) and an additional 6 feet near the State Park campground (to 3 feet below sea level).

The two groundwater basins differ with respect to the three major impacts of excessive water-level declines: seawater intrusion, subsidence and depletion of base flow and the coastal lagoons. Simulation results indicated that there would be seawater intrusion in the San Simeon basin, but not the Santa Rosa basin. During the year prior to the winter without recharge, there was 320 AFY of groundwater outflow to the ocean. During the subsequent year, this reversed to become 48 AFY of seawater intrusion. Although seawater intrusion during the second dry season amounted to only 9% of municipal pumping in the San Simeon basin, pumping would have to be decreased by more than 9% to eliminate intrusion. This is because other head-dependent terms in the water balance—specifically, storage and phreatophyte ET—also respond to changes in pumping.

Additional simulations were not completed to estimate the pumping reduction needed to eliminate seawater intrusion. However, assuming the shift from groundwater outflow during the first year to seawater intrusion the second year was proportional to pumping, then pumping would need to be reduced by approximately 13% to eliminate intrusion.

Subsidence would probably occur in the Santa Rosa basin during the dry season following a winter without recharge, but the risk is probably smaller in the San Simeon basin. Subsidence occurred in the Santa Rosa basin during the 1976-1977 drought, when groundwater levels in Cambria dropped to 14-20 feet below sea level (Cleveland, 1980). If a basin contains compressible sediments, subsidence typically occurs when groundwater levels fall substantially below their historical minimum levels, and simulated groundwater levels in Cambria were 25 feet below sea level by the end of the second dry season. Dry-season water-level declines are approximately proportional to the total amount of dry-season pumping. This suggests that minimum water levels in Cambria during the second dry season would have remained higher than 14 feet below sea level if pumping had been reduced from 238 to 170 AF. This latter amount of pumping represents a 15% decrease from average-year CCSD production in the Santa Rosa basin (Table 4-4).

Table 5-3 summarizes the CCSD's diversion permit capacities that have been issued by the State Water Resource Control Board (SWRCB). During normal years the CCSD has ample groundwater capacity during the wet season, as both groundwater basins are typically fully recharged during such times. Except for the September and October 2002 operating experiences, the newer Santa Rosa well, SR-4, in combination with the San Simeon well field, are typically able to meet dry season demands.

Table 5-3 – CCSD Diversion Permit Summary for San Simeon and Santa Rosa Aquifers

Period	San Simeon (AFY)(1)	Santa Rosa (AFY) (2)	Total (AFY)
Annual	1,230	518	1,230(3)
Dry Season(2)	370	260	630

(1) SWRCB permitted diversion from the San Simeon Creek underflow includes a maximum dry season diversion 370 acre feet from when flow ceases at Palmer Flats until October 31. The annual maximum diversion is limited to 1,230 acre-feet.
(2) Santa Rosa Creek underflow maximum dry season and annual diversion in acre-feet, as defined by SWRCB diversion permit 20387. The dry season defined within the Santa Rosa SWRCB permit as being May 1 to October 31.
(3) California Coastal Commission Coastal Development Permit 428-10 limits the annual diversion from both underflows to 1,230 acre per year.

Table 5-4 provides an annual summary for years 2025 and beyond (i.e., when build-out may be reached) of estimated reliability during each water year type scenario. It was assumed that the CCSD would issue a Stage 2 water conservation emergency (call for a a 15 % demand reduction goal) during the single-dry year condition when there would be inadequate creek flows to recharge the aquifers. Similarly, a Stage 2 water conservation emergency was assumed to be issued during driest years 3 and 4 of the multiple-dry-year scenario due to the estimated creek discharge approaching zero during these periods. A corresponding 15-percent reduction was therefore applied to the groundwater being supplied during these periods. No reductions in groundwater sources were shown for years 1 and 2 of the multiple-dry period due

to aquifer recharge occurring during the intervening winter rainy season. A water conservation program was also added to Table 5-4 as a place holder to account for any future conservation efforts that may exceed the planned five-percent reduction in demand by 2020. A future conservation program would need to be further defined and quantified, but may include certain voluntary measures identified within the recent 2010 California Green Building Standards Code (e.g., eliminating the use of any potable water for landscape irrigation, interior use of recycled water,…) as an extension to the CCSD's existing retrofit program.

Table 5-4 – CCSD Supply Reliability for 2025

Source	Normal Water Year	Single-Dry Water Year	Multiple-Dry Water Years			
			Year 1	Year 2	Year 3	Year 4
San Simeon Groundwater	610(1)	519(2)	610	610	519	519
Santa Rosa Groundwater	200(1)	170(2)	200	200	170	170
Recycled Water	100	100	100	100	100	100
Water Conservation	TBD(3)	TBD	TBD	TBD	TBD	TBD
Desalination	600	600	600	600	600	600
Total	1510(4)	1389(4)	1510(4)	1510(4)	1389(4)	1389(4)
Percent of Normal/Average		92	100	100	92	92

(1) See Section 4, paragraph 4.3 discussion and Table 4-4
(2) It was estimated that groundwater production was reduced by 15% during a single-dry year period and years 3 and 4 of the multiple dry-year period.
(3) To be determined (TBD).
(4) Without a future desalination project, the total value shown would be reduced from 1510 to 910; or, from 1389 to 789.

Notes:
a. Values shown are in acre-feet per year
b. Format based on March 2011 DWR Guidebook Table 28.

Table 5-5 shows current sources over a three-year dry period starting in 2011 and extending to 2013. This includes a multiple dry three year period starting in 2011, which includes a reduction in supply of approximately 15 percent may occur during 2012 and 2013. This indicates a Stage 2 level water emergency declaration could be required during those years for existing customers. Tables 5-6 through 5-8 project the quantities of water supplied versus demands in five year increments from 2015 through 2035 under normal year, single dry year, and multiple dry year conditions.

Water supply conditions during a sequence of dry years is not worse than for a single dry year, because incomplete recharge is a rare, isolated event. Analysis of historical rainfall at San Luis Obispo revealed that for every 2-year period since records began in 1870, at least one year received enough rainfall (and associated stream flow) to completely refill the San Simeon and Santa Rosa Creek groundwater basins. Statistical analysis showed that two successive years of incomplete recharge would occur on average once every 360-730 years, and the recurrence interval for two successive years of zero recharge is over 1,200 years (Yates and Van Konynenburg, 1998). Therefore, a drought response plan for a single dry year would be adequate for multiple dry years.

Table 5-5 – Supply Reliability – Current Water Sources

Water Supply Sources	Average/Normal Water Year Supply(1)	Multiple Dry Water Supply Year		
		Year 2011	Year 2012	Year 2013
San Simeon groundwater	610	610	519	519
Santa Rosa groundwater	200	200	170	170
Total	810	810	689	689
Percent of normal year	100	100	85	85

(1) See related capacity discussion in Section 4, paragraph 4.3
Notes:
a. Maximum permitted diversion for both aquifers is 1,230 acre-feet per year.
b. Format based on March 2011 DWR Guidebook Table 31.

Table 5-6 – Supply and Demand Comparison – Normal Year

	2015	2020	2025	2030	2035
Supply Totals (Table 4-1)(1)(2)	1410	1460	1510	1510	1510
Demand Totals (Table 4-4)	804	868	909	909	909
Difference	606	592	601	601	601
Difference as % of Supply	43	41	40	40	40
Difference as % of Demand	75	68	66	66	66

(1) See Table 4-1 for further details.
(2) Values shown would be reduced by 600 acre-feet without the desalination facility on line by 2015.
Notes:
Values shown are in acre-feet per year
Format based on March 2011 DWR Guidebook Table 32

Table 5-7 – Supply and Demand Comparison – Single Dry Year

	2015	2020	2025	2030	2035
Supply Totals (Table 4-1) (1)(2)	1289	1339	1389	1389	1389
Demand Totals (Table 3-12)	804	818	809	809	809
Difference	485(3)	521	580	580	580
Difference as % of Supply	38	39	42	42	42
Difference as % of Demand	60	64	72	72	72

(1) Table 4-1 totals less 15% of groundwater capacity for drought year reduction.
(2) Values shown are in acre-feet per year
(3) Without a supplemental supply to augment groundwater, such as a 600 acre-foot capacity desalination facility listed in Table 4-1, the difference would be a negative 115 acre-feet.

Notes
a. Format based on March 2011 DWR Guidebook Table 33

Table 5-8 – Supply and Demand Comparison - Multiple Dry Year

		2015	2020	2025	2030	2035
Multiple-dry year first year supply	Supply Totals	1410	1460	1510	1510	1510
	Demand Totals	804	868	909	909	909
	Difference	606	592	601	601	601
	Difference as % of Supply	43	41	40	40	40
	Difference as % of Demand	75	68	66	66	66
Multiple-dry year second year supply	Supply Totals	1289	1339	1389	1389	1389
	Demand Totals	804	818	809	809	809
	Difference	485(1)	521	580	580	580
	Difference as % of Supply	38	39	42	42	42
	Difference as % of Demand	60	64	72	72	72
Multiple-dry year third year supply	Supply Totals	1289	1339	1389	1389	1389
	Demand Totals	804	818	809	809	809
	Difference	485(1)	521	580	580	580
	Difference as % of Supply	38	39	42	42	42
	Difference as % of Demand	60	64	72	72	72

(1) Without a supplemental supply to augment groundwater, such as a 600 acre-foot capacity desalination facility listed in Table 4-1, the difference would be a negative 115 acre-feet for 2015; negative 79 acre feet for 2020; and negative 20 acre feet for 2025, 2030, and 2035.

Notes

a. Values shown are in acre-feet per year

b. Format based on March 2011 DWR Guidebook Table 34

5.2 Factors Resulting in Inconsistency of Supplies

Factors that may impact the availability of existing and future water supplies are summarized in Table 5-9. Of the two groundwater supplies, factors that could result in inconsistent supply include drought, as well as increased future diversions towards agricultural irrigation and environmental habitat protection. Any future recycled water project would be subject to environmental clearance and permitting. The 100 acre-feet per year estimated for recycled water includes the potential diversion of 50 acre-feet per year of future project demands, which would need to be supported by future geohydrological analyses and discussion within an environmental clearance process. A future water supply project to augment the local groundwater supplies is currently undergoing an environmental clearance process. Any future supply project relying upon seawater desalination will require further permitting before it could be relied upon as a future drought-proof water supply.

Table 5-9 – Factors Resulting in Inconsistency of Supplies

Water supply sources	Source name	Limitation quantification	Legal	Environmental	Water Quality	Climate	Additional information
San Simeon groundwater	same	SWRCB diversion permit	none	Endangered species act compliance	none	drought	Non-adjudicated watershed
Santa Rosa groundwater	same	SWRCB diversion permit	none	Endangered species act compliance	MtBE remediation	drought	Non-adjudicated watershed
Recycled water	same	Permitting of 50 acre-feet/year of future demands (50 of 100 acre feet shown in Table 5-4)	none	Potential habitat concerns over future diversions from percolation ponds	none	none	Capital costs and funding
Conservation Program	same						Voluntary versus non-voluntary measures
Desalination	same	Permitting	none	Currently subject to completion of an environmental clearance process.	Permitting required for concentrate return	drought-proof	Capital costs and funding

Note:
Format based on March 2011 DWR Guidebook Table 29

5.3 Water Quality issues

The main water quality concern associated with supply reliability has been the shutdown of the CCSD's lower Santa Rosa aquifer wells SR-1 and SR-3. This occurred during 1999 following the discovery of an MtBE plume from a nearby gas station. Following this discovery, the CCSD constructed a new emergency well SR-4 and treatment facility further upstream from the plume area, which went into service during late summer of 2001. Dry season production achieved by well SR-4 from 2002 through 2011 has been approximately 100 to 185 acre-feet less than the SWRCB permitted dry season maximum of 260 acre-feet. This is partly due to the preference to use San Simeon aquifer water due to its better quality[15]. However, there was also a period during September and October 2002 when Well SR-4 was shut down due to concerns over its potential impact to the adjacent creek habitat. CCSD operations has since refined its conjunctive operation of Well SR-3 with the San Simeon well field, which has not necessitated a similar shut down need since the 2002 events.

Other water quality concerns are associated with the potential for saltwater intrusion into the aquifers, particularly towards the end of each dry season. The aquifers are generally "U"

[15] The San Simeon groundwater is lower in hardness as well as iron and manganese when compared to the Santa Rosa aquifer. Well head treatment is provided on Santa Rosa aquifer water to reduce iron and manganese concentrations.

shaped in cross section, which results in an accelerated drop in well levels as the storage volume decreases with depth.

Table 5- 10 summarizes the current and projected water supply impacts associated with water quality concerns. In addition, Appendix J contains the latest plot of the MtBE plume near the lower Santa Rosa aquifer wells. This plume is being treated through the use of a vapor-phase extraction treatment process; from the pumping and treatment of groundwater out of localized, on-site wells; and, periodic purging with aerated water to encourage in-situ biological degradation.

Table 5-10 – Water Quality – Current and Projected Water Supply Impacts

Water sources	Description of condition	2010	2015	2020	2025	2030
San Simeon groundwater	none	none	none	none	none	none
Santa Rosa groundwater	MtBE plume migration concerns resulted in shut down of lower aquifer wells SR-1 and SR-3	100 to – 185(1)	100 to - 185[1]	100 to - 185[1]	100 to - 185[1]	100 to - 185[1]
Recycled water	none	none	none	none	none	none
Desalination	none	none	.none	none	none	none

(1) Approximately 100 to 185 acre-feet per year production difference exists when comparing the maximum dry season diversion allowed by the SWRCB diversion permit for wells SR-1 and SR-3 (i.e., 260 acre-feet); and, actual 2001 to 2011 dry season production achieved from emergency well SR-4.

Notes:
a. Format based on March 2011 DWR Guidebook Table 30

5.4 Water Shortage Contingency Planning

The CCSD has adopted several ordinances that established its water shortage contingency planning, which have since been incorporated into the District's Municipal Code. These include the following criteria:

- Water shortage stages with associated actions to be taken, consumption limitations, and overall conservation goals for each stage.
- Mandatory prohibitions against particular water use practices during water shortages.
- Penalties for excessive water use during declared water shortages

Table 5-11 summarizes the CCSD's three-stages of water conservation as defined within its Municipal Code[16]. A Stage 1 drought declaration sets a "drought watch" condition and allocates three units (three hundred cubic feet) per person per month as a maximum for its residential customers. The purpose of the Stage 1 condition is to reduce demand by about 7

[16] Recommendations made by a citizens committee (Water Emergency Alternatives Citizens' Committee, January 20, 2011 CCSD Board presentation) included increasing the number of drought stages by at least one to allow for a more gradual increase between the levels of conservation required at each stage. Future updates to the CCSD Municipal Code will be required to implement the citizen committee's recommendations. The current CCSD Municipal code is based on the three stages described herein.

percent. A Stage 2 declaration sets a “water shortage condition” and places financial surcharges into effect for those exceeding their base use and also allows for shutting of service in some circumstances. The purpose of the stage 2 conditions is to reduce overall demand by 15-percent. Stage 3 establishes a “drought emergency” condition and lowers the maximum allowable use to two-units (two hundred cubic feet) per resident per month. Stage 3 also prohibits outdoor irrigation watering and includes surcharges and fines for overuse. The trigger points for each stage is determined from a hydrologic model developed as part of the December 8, 2000 Baseline Water Supply Analysis by Kennedy Jenks Engineers. The model predicts available supply based on an October Southern Oscillation Index (SOI) value, estimated dry season duration, existing plus estimated demands for the coming dry season, and aquifer well level.

Table 5-11 – Water Shortage Contingency – Rationing Stages to Address Water Supply Shortages

Stage No.	Water Supply Conditions	% Shortage
1	Drought Watch - voluntary Residential Use ≤ 3 units/person/month Comm. Use ≤ 5 units/EDU/month	7 % reduction goal
2	Water Shortage - mandatory Residential Use ≤3 units/person/month Comm. Use ≤ 5 units/EDU/month Surcharges applied for exceeding limits	15 % reduction goal
3	Emergency Condition - Mandatory Residential Use ≤ 2 units/person/month Comm. Use ≤ 3 units/EDU/month Surcharges applied for exceeding limits	50 % reduction goal

Notes:
Format based on March 2011 DWR Guidebook Table 35

Table 5-12 summarizes the mandatory prohibitions associated each drought rationing stage.

Table 5-12 – Water Shortage Contingency – mandatory prohibitions

Prohibition	Applicable Drought Stage
Watering of landscaping, which allows excess water runoff	At all times, including drought stages 1, 2, and 3
Washing of sidewalks, driveways, and other hard-surfaced areas by direct hosing.	At all times, including drought stages 1, 2, and 3
Serving of water to customers by any eating establishment except when specifically requested.	At all times, including drought stages 1, 2, and 3.
Washing vehicles by use of an unrestrained hose.	At all times, including drought stages 1, 2, and 3
Use of potable water from the district's water supply system for compacting or dust control purposes.	At all times, including drought stages 1, 2, and 3
Use of potable water for fire drills	Stage 3
Irrigation of gardens and landscaping with potable water	Stage 3

Notes:
Format based on March 2011 DWR Guidebook Table 36

Table 5-13 further summarizes the CCSD's water shortage contingency reduction methods as suggested within the March 2011 DWR guidebook.

Table 5-13 – Water Shortage Contingency – consumption reduction methods

Consumption Reduction Method	Stage when method takes effect	Project savings goal
Voluntary drought watch conservation efforts	1	7 %
Mandatory Reductions in Use	2 and 3	15 and 50 %, respectively
Penalties	2 and 3	unknown

Notes
Format based on March 2011 DWR Guidebook Table 37

Besides prohibitions and reduction goals, the CCSD has a steeply tiered water rate structure, which is further accelerated by drought surcharges. Table 5-14 summarizes the CCSD drought surcharges.

Table 5-14 – Water Shortage Contingency – penalties and charges

Penalties or Charges	Stage when penalty takes place
500 % surcharge applies to all use beyond the customer's maximum based on the following: Residential Use ≤3 units/person/month Comm. Use ≤ 5 units/EDU/month Any subsequent use excesses subject to a 1,000 % surcharge.	Stage 2
500 % surcharge applies to all use beyond the customer's maximum based on the following: Residential Use ≤ 2 units/person/month Comm. Use ≤ 3 units/EDU/month Any subsequent use excesses subject to a 1,000 % surcharge.	Stage 3

Notes
Format based on March 2011 DWR Guidebook Table 38

5.5 Catastrophic Supply Interruption Planning

The CCSD service area has overhead power and communications lines, which co-exist with a heavily forested area of Monterey Pines. This has resulted in a history of power and communication outages during storm events, which often results from trees falling onto overhead lines. Therefore, the CCSD relies upon emergency generators to operate its water system during such major power outages. In addition, the CCSD is in the process of completing a Supervisory Control and Data Acquisition (SCADA) upgrade, which will allow for the use of radio communications as opposed to overhead phone lines.

Other catastrophic events, such as earthquakes, can coincide with structural damage, pipeline failures, fires, as well as power and communications interruptions. An emergency response command and control center has been established at the CCSD fire station, which is structurally designed to withstand earthquake events, has an emergency power supply, and includes a SCADA control center for water system operations. Emergency response planning

by the CCSD includes action plans for various emergency scenarios. The overall emergency response framework is based on the State of California's Standardized Emergency Management System (SEMS).

Besides weather and earthquake associated events, substantial catastrophic water supply interruptions can also occur from groundwater contamination and seawater intrusion into the aquifers. Tsunamis from the result of distant seismic events are also known to have resulted in seawater flooding of freshwater aquifers in other parts of the world.

To address drought emergencies, the CCSD has planned for the use of seawater desalination to further augment its local aquifers. It is envisioned that the same facility would also provide an emergency supply in response to more immediate catastrophic supply interruptions.

Review of the overall supply system also needs to consider the seasonal variation of demands, which typically peaks during the summer season. California Waterworks Standards call for having adequate capacity to meet the maximum day water demand with the largest supply source out of service. The maximum day demand is based on an average of 10 years of operating data. For Cambria, the maximum day demand has averaged approximately 1.6 times the average day demand for the entire year. Table 5-15 provides an estimate of the maximum day demand for 2015 through 2035.

Table 5-15 – Maximum Day Demand Estimates

	2015	2020	2025	2030	2035
Annual demand total, acre-feet/yr (Table 5-6)	804	868	909	909	909
Annual average day demand, gpm	498	538	564	564	564
Maximum day demand, gpm	797	861	902	902	902

Table 5-16 provides an estimate of maximum groundwater pumping capacities for comparison against the projected maximum day demands. There are several scenario totals included on this table to account for periods when well SS-1 cannot operate due to the creek flow being within 150 feet of this particular well. The largest supply well is SR-4. Therefore, to further assess reliability of the existing groundwater wells without any additional future water source totals with Wells SS-1 and SR-4 being off line are shown. From review of these totals, it appears that the existing well system would normally be adequate to meet maximum day demands. However a shortfall of approximately 127 gallons per minute during maximum day demands could occur at build-out should well SS-1 being off line due to creek surface flow being within 150 feet at the same time the largest supply well, SR-4, is off line. This shortfall would likely be covered by any new supply source.

Table 5-16 – Estimate of Maximum Well Field Pumping Capacities

Well Field	Well ID	Capacity(1) (gpm)
San Simeon	SS-1	325
San Simeon	SS-2	385
San Simeon	SS-3	390
Estimated San Simeon well field subtotal with all pumps operational(2)		1,100
San Simeon well field subtotal with SS-1 off line due to surface water flow within 150 feet		775
Santa Rosa	SR-4	590
Santa Rosa well field subtotal		590
Estimated capacity with all wells on line, gpm		1,690
Outage Scenarios		
Estimated capacity when Well SS-1 is off line due to surface water flow being within 150 feet		1365
Estimate capacity with all wells operational, except largest (SR-4)		1,100
Estimated capacity with all wells operational except SS-1 due to surface water within 150 feet, and largest (SR-4), being out of service		775

(1) Individual pump capacities are from 10/4/2011 testing by Wayne Cooper Ag Services.
(2) Capacity when all three pumps are operating will likely be less than 1100 gpm due to their sharing a common discharge pipeline. Further hydraulic analysis is required to more accurately estimate this value

5.6 Revenue Impacts

Revenue reductions from water conservation pose a significant challenge to the CCSD. The CCSD has a significant population of elderly residents on fixed incomes, which are generally opposed to rate increases. Past history of the CCSD also includes a Proposition 218, majority protest of an early rate increase, which resulted in it not being implemented. To offset future lost revenues from future droughts, the CCSD should continue to establish a reserve water fund.

Section 6 – Demand Management Measures

The Demand Management Measure (DMM) discussion that follows is intended to correlate with the completeness review format used by the DWR. Each DMM is summarized by describing the existing District program and practices, plans to expand existing practices to more rigorously promote a specific measure, as well as any projected water savings that may occur with each measure.

6.1 DMM A - Survey Programs for Single-Family and Multi-family Residential Customers

Since starting DMM A in 1988, the District has completed water surveys on all of its multi-family customers and over 50-percent of its residential connections. With the exception of two apartment buildings where it was not reasonable to modify existing plumbing, existing multi-family complexes were converted from one single master meter to individual meters for each housing unit. The surveys continue to be offered free of charge upon customer request. The voluntary surveys typically include leak checking and noting whether water efficient fixtures and appliances have been installed. In addition to encouraging the installation of water efficient fixtures and appliances, the District also offers circulating hot water pumps to its residential customers.

Planned Measures – Future documenting of the number of surveys completed and associated estimate of water savings will conform to reporting criteria developed by the CUWCC. Further staff training through the attendance of CUWCC sponsored seminars will also be pursued with more emphasis being placed on potential savings related to landscaping practices. Future surveys will also track whether newer evapotranspiration (ET) based irrigation controllers are in place, and whether they have soil moisture detection in accordance with the latest 2010 California Green Building Standards Code. The District will also expand upon the existing survey practice by targeting and promoting audits to high water use customers. The planned surveys will be used as opportunities to identify and market other programs, such as rebates to replace old toilets or inefficient washing machines.

Estimated Cost, Potential Water Savings, and Effectiveness Monitoring – The following table reflects the District's continued water survey program for single and multiple family residential customers. Future Urban Water Management Plan updates will incorporate the CUWCC reporting practices to improve consistency of reporting and verification of water conservation effectiveness.

Estimate of Single Family and Multi-Family Surveys					
Planned	2011	2012	2013	2014	2015
# of single family surveys	180	180	180	180	180
# of multifamily surveys	5	5	5	5	5
projected expenditures - $	$18,000	$18,000	$18,000	$18,000	$18,000
projected water savings - AFY	4.35	4.35	4.35	4.35	4.35

The above savings assumed a potential of 15-percent reduction in water use on surveyed customers based on literature distributed by the CUWCC. The effectiveness can be monitored in the future using customers before and after billing records for the same bi-monthly billing period.

6.2 DMM B – Residential Plumbing Retrofit

Existing Program – Since 1989, approximately 88-percent of the single-family residential connections within Cambria have had plumbing retrofits completed. Retrofitting of an existing house is a requirement upon resale or remodeling. The District uses a point system to develop equivalencies for any new home construction as well as remodels. Once the total points are determined, new construction and remodels are required to either retrofit a set number of retrofit points within the service area, or pay into a retrofit in-lieu fee. Collected fees from this program are used to support water conservation programs throughout the District. The District's retrofit program was designed to achieve a 2:1 water savings goal, with retrofitted homes providing twice the water savings as the projected demand from new construction.

Planned Measures – The District proposes to continue with its existing retrofit program. There are an estimated 430 residential homes remaining within the District that may not have been part of a past retrofit. Additional opportunities have also occurred on previously retrofitted homes with the onset of more efficient fixtures as the result of the 2020 California Green Building Standards Code. Future data collected from the retrofit program will also be maintained in a format that meets the CUWCC reporting criteria.

Estimated Cost, Potential Water Savings, and Effectiveness Monitoring – The following table projects the District's continuation of its residential plumbing retrofit program for single and multiple family residential customers, estimated cost for implementing the program, and approximate annual water savings. In developing this estimate, it was assumed that approximately 30 residential units per year would trigger retrofitting due to resale and remodeling. Because the CUWCC DMM reporting system is based on water conservation devices as opposed to the District's point system, or number of residential units, it was estimated that six water conservation devices would be installed per retrofitted home. Devices could include low-flow showerheads, low-flow aerators, new toilet flappers, and toilet displacement kits. To avoid duplication with DMMs dealing with installation of low-flow toilets and water efficient washing machines elsewhere in this report (see DMMs F & N), installation of new toilets and washing machines is not included in the following estimate.

Estimate of Residential Plumbing Retrofitting					
Planned	2011	2012	2013	2014	2015
# of single family "devices"	180	180	180	180	180
# of multi-family devices	0	0	0	0	0
projected expenditures - $	$3000	$3000	$3000	$3000	$3000
projected water savings - AFY	.72	.72	.72	.72	.72

The effectiveness of installing the above can be monitored in the future using customers' before and after billing records for the same bi-monthly billing period.

6.3 DMM C – System Audits, Leak Detection, and Repair

Existing Program – Since approximately 1988, the District routinely compares its well production to billed totals every two months. The two-month interval is used because it also matches the District's two-month billing cycle. The District makes minor adjustments to account for non-metered use due to process equipment, such as flow through turbidity meters, and other non-metered District water use. System repairs are completed whenever water operations spot a leak or receive reports from citizens or other public services such as police and fire. Since the 2005 UWMP, the District replaced its entire inventory of water meters with remote-read units featuring electronic flags to alert the CCSD of potential leaks on the customer's side of the meter. The CCSD also offers household magnetic monitors with a leak warning light that can be readily attached to a refrigerator door.

Planned Measures – To further reduce the difference between production and billed totals, the District will be replacing its entire inventory of approximately 200 commercial water meters with remote-read units featuring leak detection within the next three to five years.

Estimated Cost, Potential Water Savings, and Effectiveness Monitoring – The following table was developed in accordance with criteria used by the DWR. The costs for 2011 through 2015 assumes approximately 40 commercial meters would be replaced during each of those years at an average replacement cost of $500 each. It is not known whether any projected water savings will occur at this time due to the possibility that more water use will be metered and billed as a result of new, more accurate meters. Therefore, although the amount of water billed may go up and lower the percent of unaccounted water, it is not known whether this will lower the amount of water being produced. For this reason, projected water savings from this measure are shown as being unknown.

System Water Audits, Leak Detection, and Repair					
Planned	2011	2012	2013	2014	2015
% of unaccounted water	8	8	6	6	6
miles of mains surveyed	N/A	N/A	N/A	N/A	N/A
miles of lines repaired	N/A	N/A	N/A	N/A	N/A
Projected expenditures - $	20,000	20,000	20,000	20,000	20,000
Projected water savings – AFY	unknown	unknown	unknown	unknown	unknown

A comprehensive annual water audit complying with AWWA audit worksheets will be completed following installation of the new commercial meters to further document and attempt to identify potential savings. The audit should also be preceded by checking calibration on the existing production meters, estimating water used for fire training and fighting, as well as estimating losses that may occur throughout the year from accidental leaks such as a main breaks and a fire hydrant being hit by a car. The District should also adopt a long-term performance goal for maintaining the percentage of water loss, which may be equal to or less than the current 8-percent.

6.4 DMM D – Metering with Commodity Rates

Existing Program – All of the District's customers are metered. Bi-monthly meter billings are also based on an inclining block rate to encourage conservation.

Planned Measures – The District has no plans to separate mixed-use meters that may be serving both domestic and irrigation uses, into separate meters to solely meter each use. However, the District would separate such uses as part of its long-term plan for the use of recycled water at certain larger scale landscape irrigation sites. Such future efforts would also comply with California Department of Public Health requirements for isolation of systems and cross connection testing.

Estimated Cost, Potential Water Savings, and Effectiveness Monitoring – No information to report since this measure has already been implemented.

6.5 DMM E – Large Landscape Conservation Programs and Incentives

Existing Program – Using funds obtained from its retrofit and in-lieu fee program, the District previously funded retrofitting of all the existing school sites within Cambria as well as the State Parks campground. The use of District funding for these programs provides a direct incentive for improving water use efficiency while also lowering future water bills. Outdoor irrigation improvements typically involve the use of drip irrigation as opposed to conventional spray irrigation methods. On certain larger commercial establishments, cisterns have been installed for purposes of collecting rainfall for irrigation. To continue use of the cisterns during the dry season, an independent contractor or private individuals may truck non-potable water to specific cistern locations.

Planned Measures – Further staff training through the attendance of CUWCC sponsored seminars will be pursued with more emphasis being placed on potential water savings related to landscaping practices. Future surveys will also track whether newer evapotranspiration (ET) based irrigation controllers are in place, as well as soil moisture sensors. Staff training will also develop an understanding on how to develop an irrigation water budget for larger irrigation customers. The District's "MOMs" billing software will also be investigated to determine whether an irrigation budget can be tracked and flagged as part of existing operations.

Estimated Cost, Potential Water Savings, and Effectiveness Monitoring – Further research is needed to assess the potential savings from ET-based controllers and soil moisture sensors. A recent study by the Irvine Ranch Water District has shown some promise in further water savings from these newer controllers. However, Cambria is unique due to its steeply tiered water rates, and hardening of demand that has already occurred from past water conservation efforts. It is estimated that further staff training will be needed in 2012 and 2013 and that some nominal costs may be incurred to test certain ET controllers before offering incentives. The remaining years may follow with additional controller replacements and staff time spent in developing irrigation audits and budgets. The 2010 California Green Building Standards Code currently requires all new construction to use weather-based ET controllers, or to have soil moisture sensors to shut off automated irrigation controllers.

Estimate for Large Landscape Conservation Programs and Incentives					
Planned	2011	2012	2013	2014	2015
# of budgets developed	0	0	10	10	10
# of surveys completed	0	0	10	10	10
# of follow-up visits	0	0	0	5	5
Projected expenditures - $	0	0	2500	2500	2500
Projected water savings - AFY	Unknown	Unknown	Unknown	Unknown	Unknown

6.6 DMM F – High Efficiency Washing Machine Rebate Programs

Existing Program – The District previously offered a $150 rebate on every energy-star washing machine installed. However, this program was suspended due to a budget shortfall during FY2009/2010. Regardless of this interim setback, the CCSD remains committed to moving forward with DMM F as funding becomes available. Each energy-star washing machine saves on average approximately 4.8 units (3,580 gallons) of water per year. Since this program began in 2002, the District has funded the installation of __ energy-star rated washing machines. In developing the actual program costs, approximately $25 was added to the rebate for staff processing time.

Planned Measures – The District plans to continue the existing rebate program. In addition, staff will further assess whether modifications are needed to the rebate program to account varying level of water savings among different styles and brands of energy-star machines that have evolved since beginning the rebate program. Future rebates may be based on Tier 3 machines that are listed by the Consortium for Energy Efficiency (CEE) and updated quarterly.

Estimated Cost, Potential Water Savings, and Effectiveness Monitoring – The following table summarizes future estimated costs and savings associated with the high-efficiency washing machine rebate program.

Projected High-Efficiency Washing Machine Rebates and Savings					
Planned	2011	2012	2013	2014	2015
$ per rebate (estimated median rebate value)	$150	$150	$150	$150	$150
# of rebates paid	0	50	50	50	50
Projected expenditures - $	0	8,750	8,750	8,750	8,750
Projected water savings - AFY	0	.55	.55	.55	.55

6.7 DMM G – Public Information Programs

Existing Program – The District routinely provides public information on water conservation via its web site, billing inserts, and community billboards. Tent cards on water conservation are also provided to restaurants and motels. The existing billing system also provides customer water usage between current and prior years on each water bill.

The District previously placed an added emphasis on testing pressure-regulating valves on services in response to a distribution pipeline project coupled with a high failure rate discovered from residential home surveys. To facilitate testing, pressure gages are loaned to customers free of charge for testing incoming household pressures downstream from their pressure-regulating valve. The District's web site also contains information explaining pressure-regulating valve testing.

Planned Measures – The District will expand upon its public information program using resources made available as the result of its membership in the CUWCC and the Alliance for Water Efficiency (AWE). This will include promoting the use of the CUWCC's interactive "H2OUSE" on the District's web site as well as links to the AWE Home Water Use calculator site. Opportunities to further promote water conservation will also be made during future televised Board meetings.

Estimated Cost, Potential Water Savings, and Effectiveness Monitoring – The following table projects the number of planned public information activities and estimated cost for each of the years shown.

Public Information Program					
Planned	2011	2012	2013	2014	2015
a. Paid advertising (#)	0	0	0	0	0
b. Public Service Announcements (#)	0	6	6	6	6
c. Bill Inserts / Newsletters / Brochures (#)	0	4	4	4	4
d. Bill showing water usage in comparison to previous year's usage (#)	6	6	6	6	6
e. Demonstration Gardens (#)	0	0	0	0	0
f. Special Events, Media Events (#)	0	0	0	0	0
g. Speaker's Bureau (#)	0	1	1	1	1
h. Program to coordinate with other government agencies, industry and public interest groups and media (#)	1	1	1	1	1
Projected expenditures - $	750	750	750	750	750

6.8 DMM H – School Education Programs

Existing Program – School education programs on water conservation began after the District developed a water conservation officer position in 1989. The Water Conservation Officer conducted education programs free of charge to the schools. In more recent years, the schools have elected to conduct their own water conservation classes using their science teachers. The CCSD also shares past water conservation officer duties among the Water Superintendent, District Engineer, and Administrative staff.

Planned Measures – The District plans to research available training materials available through the CUWCC as well as other professional water utility organizations, and make them available to the schools for their use. Training of the area's children on water conservation will continue to be encouraged.

Estimated Cost, Potential Water Savings, and Effectiveness Monitoring – To estimate the cost for this program, it was assumed that an average cost for handout materials would be $1 per student, with an average class size of 30 students, the cost of handouts will be approximately $330 per year.

School Education Program		No. of class presentations				
Actual	# of classes	2011	2012	2013	2014	2015
Grades K-3rd	3	3	3	3	3	3
Grades 4th-6th	2	2	2	2	2	2
Grades 7th-8th	2	2	2	2	2	2
High School	4	4	4	4	4	4
projected expenditures - $	330	330	330	330	330	330

6.9 DMM I – Conservation Programs for Commerciall, Industrial, and Institutional (CII)

Existing Program – The District evaluates and funds conservation programs for its commercial, industrial, and institutional accounts on a case-by-case basis. For example, in 2004, the District provided funding to replace 15 commercial regenerative water softeners with non-regenerative softeners. In 2003, the District installed 30 water efficient pre-rinse valves for all of the restaurants and commercial kitchens within its service area.

Planned Measures – The primary commercial water users in the District's service area are restaurants and the hotel industry. Future research should include assessing water use efficiencies related to those industries such as dishwashers, icemakers, vegetable steamers, and similar water using equipment. The PG&E Food Science Technology Center in San Ramon, California conducts such equipment testing and may be able to make further recommendations on the selection and use of more water efficient replacements. In addition, the replacement of regenerative water softening systems with non-regenerative systems should continue to be encouraged. Further staff training from the CUWCC on these subjects

will also be pursued. In addition, the potential exists for the replacement of ultra-low flow hotel toilets with newer high-efficiency 1.0 and 0.8 gpf units.

Schools are the primary institutional water users in the District's service area. The use of recycled water has been planned by the District for use at the middle school, as well as a backup supply to the innovative Evaporative Control System (ECS) system that was commissioned at the new elementary school. Recycled water is also planned for a future community park, a commercial nursery, and a hotel complex. Beyond recycled water, the potential exists for converting existing flush urinals to the waterless urinals.

Estimated Cost, Potential Water Savings, and Effectiveness Monitoring – Water savings under this demand management measure will require surveys to assess the specialized equipment in use and the possibilities for further water savings. The District's water conservation officer will need additional training in this area. In addition, the use of an outside expert may need to be used in some cases. The following tables provide estimates on future water conservation surveys as well as future potential ultra-low flow toilet replacements under this measure.

Commercial and Institutional Water Conservation Surveys					
Planned	2011	2012	2013	2014	2015
Estimated # of surveys	0	5	5	5	5
Would incentives be provided?	Unknown	Unknown	Unknown	Unknown	Unknown
Estimated # of follow-up visits	0	5	5	5	5
Projected expenditures - $	0	$1000	$1000	$1000	$1000
Projected water savings – AFY	none	Unknown	Unknown	Unknown	Unknown

In estimating potential savings for commercial replacements of ultra-low flow toilets, it was assumed only single occupancy would occur per room, and an average of 50% occupancy during the course of a year. However, these values will need to be revisited on a case-by-case basis, after reviewing specific operating records and water consumption records.

Commercial and Institutional Ultra-low Flow Toilet Installations					
Planned	2011	2012	2013	2014	2015
# of commercial replacements	0	20	20	20	20
# of industrial replacements	0	0	0	0	0
# of institutional replacements	0	0	0	0	0
projected expenditures - $	0	2,000	2,000	2,000	2,000
projected water savings - AFY	0	0.10	0.10	0.10	0.10

6.10 DMM J – Wholesale Agency Program

The District is the sole provider of water to the community and there is also no imported water from other agencies. Therefore, this demand management measure does not apply.

6.11 DMM K – Conservation Pricing

The District uses an inclining block rate structure that provides a direct financial incentive to conserve water. In addition, the District applies a drought surcharge to further curb demand during Stage 2 and 3 drought periods, which are defined within the CCSD Municipal Code and briefly discussed within Section 5, paragraph. 5.4. In 2003 and 2004, a drought surcharge was applied during the summer season due to rainfall being 25-percent less than normal.

6.12 DMM L – Water Conservation Coordinator

Existing Program – The District has staffed a full time water conservation coordinator position beginning in 1989. During 2003 this position was modified to one half-time person and support from other District staff. Due to budgetary constraints, during 2010, the duties of this position were split among the Water Department Supervisor, District Engineer, and Administrative staff. The water operators also provide field-level inspections on suspected water leaks and in support of the conservation retrofit program.

Planned Measures – Subsequent cost-effectiveness analyses will be conducted to further assess the ability to support a specialized position to serve as a Water Conservation Coordinator. In the meantime, further training of the staff sharing these duties will be sought out from the CUWCC and other sources. This training will include water conservation associated with landscaping audits and budgeting, as well as commercial water conservation. The goal would be to implement as much of the program in-house using the conservation coordinator's time. The updating and collection of water conservation data will also be made to comply with the CUWCC database and reporting system.

Estimated Cost, Potential Water Savings, and Effectiveness Monitoring – Estimated costs for the Water Conservation Coordinator are shown on the following table.

Water Conservation Officer					
Planned	2011	2012	2013	2014	2015
# of full-time positions	0	0	0	0	0
# of full/part-time staff	.5	.5	.5	.5	.5
Projected expenditures - $	0	$52,050(1)	$52,075(1)	$53,000(1)	$53,025(1)

(1) Future cost-effective analyses may consider incorporating some of the costs shown into other DMMs

6.13 DMM M – Water Waste Prohibition

The District's first water waste prohibition ordinance was approved in 1989. This was later modified in 1990, and again in 2000. The District subsequently codified the ordinances covering water waste prohibition in 2004, which are now part of the CCSD Municipal Code (Chapter 4.08). Section 5, paragraph 5.4 also provides additional discussion on the CCSD's water waste prohibition

6.14 DMM N – Residential Ultra-Low-Flush Toilet Replacement Programs

Existing Program – Since beginning a rebate program for replacement of toilets in 1989, approximately 2,615 single-family residences have been retrofitted with ultra-low-flow toilets (1.6 gpf). This is the result of direct customer rebates as well as the existing CCSD plumbing retrofit program. It is estimated that a total of approximately 5,200 ultra-low-flow toilets (1.6 gpf) have been installed to date. Since these retrofits occurred, the State and County have adopted the 2010 California Green Building Standards Code, which went into effect on July 1, 2011. These new standards have revised the toilet standard to 1.28 gpf, which provides future opportunities for additional conservation. Subject available funding each year, the CCSD offers rebates of $75 when replacing an older 3 gpf toiler with a newer 1.28 gpf toilet. A $50 rebate is offered when replacing a 1.6 gpf toilet with a newer 1.28 gpf toilet.

Planned Measures – The District will be continuing its existing toilet replacement program into the future. It is also investigating the potential application of newer "Stealth" toilets, which are as low as 1.0 to 0.8 gpf. If the newer Stealth toilets prove reliable, the CCSD may further modify its rebate program to encourage their installation. The following table estimates future ultra-low flow toilet installations from 2011 through 2012. It is also estimated that all of the future installations will come from single-family residences due to the only a handful of older multi-family units being in the service area.

Residential Ultra-Low Flow Toilet Installations	Single-Family and Multi-Family				
Planned	2011	2012	2013	2014	2015
# of ULF rebates	0	20	20	20	20
# of ULF direct installs	20	40	40	40	40
# of ULF CBO installs	0	0	0	0	0
projected expenditures - $	2,000	6,000	6,000	6,000	6,000
projected water savings - AFY	0.96	0.96	0.96	0.96	0.96

Estimated Cost, Potential Water Savings, and Effectiveness Monitoring – It is not known whether newer 0.8 to 1.0 gpf toilets will begin to replace the 1.28 gpf ultra-low flow units into the future. The District will continue testing and monitoring these more efficient toilets and will revise its projections accordingly in future updates.

6.15 Cost Benefit Analysis

Subsequent to the completion of this UWMP Update, the CCSD may perform cost-effectiveness evaluations on select DMMs to further assess their potential savings versus cost to implement. If certain DMMs prove not to be cost-effective; the CCSD will provide detailed analyses to the CUWCC for the emphasis of the CCSD's commitment to the conservation measures, which would be shifted to more cost-effective measures called for within the CUWCC's Memorandum of Understanding.

Section 7 – References

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