2015 Urban Water MANAGEMENT PLAN UPDATE

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RMC water and environment

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List of Acronyms

AB	Assembly Bill
AF	Acre-feet
AFY	Acre-feet per year
AMR	Automatic meter reading
AWWA	American Water Works Association
CCWD	Calaveras County Water District
CII	Commercial, Industrial, Institutional
CIMIS	California Irrigation Management Information System
CIP	Capital Improvement Plan
CPUD	Calaveras Public Utility District
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Water Project
CWC	California Water Code
District	Calaveras County Water District
DMM	Demand Management Measure
DOF	Department of Finance
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utilities District
EPA	Environmental Protection Agency
ETo	Evapotranspiration
FERC	Federal Energy Regulatory Commission
GBA	San Joaquin Groundwater Banking Authority
GPCD	Gallons per capita per day
GWMP	Groundwater Management Plan
IRWM	Integrated Regional Water Management
IRWMP	Integrated Regional Water Management Plan
LGA	Local Groundwater Assistance
MAC	Mokelumne-Amador-Calaveras
mgd	Million gallons per day
MHI	Median household income
MCG	MokeWISE Collaborative Group
MokeWISE	Mokelumne Watershed Interregional Sustainability Evaluation
MOU	Memorandum of Understanding
MSL	Mean Sea Level
NCPA	Northern California Power Agency
PG&E	Pacific Gas & Electric Company

RC&D	Central Sierra Resource Conservation and Development Council
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition
SEWD	Stockton East Water District
SGMA	Sustainable Groundwater Management Act
STE	Stewardship Through Education
SWRCB	State Water Resources Control Board
T-Stan	Tuolumne-Stanislaus
UMRWA	Upper Mokelumne River Watershed Authority
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
UV	Ultraviolet
UWMP	Urban Water Management Plan
WSCP	Water Shortage Contingency Plan
WWTP	Wastewater treatment plant

1 Introduction and Executive Summary

Water planning is an essential function of water suppliers, but is particularly critical as California faces ongoing drought and expected long-term changes in climate. Prior to the adoption of the Urban Water Management Planning Act in 1983, there were no specific requirements for water agencies to conduct long-term planning. While many agencies had conducted planning efforts prior to the Act, there were a number who did not and were thus left vulnerable to supply disruptions resulting from drought or catastrophic events.

The Calaveras County Water District (CCWD/District) understands that water is a limited resource and that a long-term reliable supply of water is essential to protect the local and state economy. The District is committed to reducing the per capita demand of its water customers. It also recognizes that, while conservation and efficient use of water is a statewide concern, planning for this use is best done at a local level. As described in this Urban Water Management Plan (UWMP), the District has developed multiple water supplies and implemented successful water conservation programs. By preparing this UWMP Update, the District is primarily meeting all necessary regulatory requirements pursuant to the Urban Water Management Planning Act, but the subsidiary benefits are immeasurable. This professional strategic planning document further shows the commitment of the District to ensure the availability of adequate future supplies by efficiently using its current supplies to protect both its customers and the water and natural resources of this County, in any planning scenario.

1.1 Plan Preparation

The Urban Water Management Planning Act requires that urban water suppliers providing water for municipal purposes to more than 3,000 customers, or supplying more than 3,000 acre-feet (AF) of water annually, prepare and adopt a UWMP. UWMPs must report, describe, and evaluate water deliveries and uses, water supply sources, efficient water uses, and demand management measures. The District, as an urban water supplier, is required to update its Plan in accordance with the California Water Code (CWC). All units presented in the District's Plan are in acre-feet per year (AFY), and all annual data is based on a calendar years.

As part of preparing the UWMP, the District notified the cities within its service area that it would be updating the Plan. Additionally, the District noticed and held a public hearing to present the Plan and provide a forum for collecting comments. To further provide opportunity for comment, the District formally held a three-week public comment period and posted a draft of the Plan on the District's website. More information on plan preparation can be found in **Chapter** 2.

1.2 District Overview

The District serves roughly 17,000 water and wastewater connections (a permanent resident population of about 20,700) throughout six different water service areas within Calaveras County: Jenny Lind, Copper Cove/Copperopolis, Wallace, Ebbetts Pass, Sheep Ranch and West Point. The service area has a relatively low growth rate of less than one percent per year; 2040 projected permanent population is projected to be just over 25,000 people. Many residents of Calaveras County currently live in fragmented rural areas outside of the District's service areas, and rely mainly on small private domestic systems and wells drilled in fractured bedrock.

The District is home to two distinct climate zones, one in the lower elevation service areas of Jenny Lind, Copper Cove/Copperopolis and Wallace, and one in the high elevation service areas of Ebbetts Pass, Sheep Ranch and West Point. The lower elevation service areas can be characterized by warm, dry summers and cool, wet winters. Average annual precipitation is around 31 inches. Average temperature ranges from a low of 38 degrees in the winter to a high of 97 degrees in the summer. The higher elevation service areas are similarly warm and dry in the summer and cool and wet in the winters; however, temperatures are lower (a low of 28 degrees in the winter and a high of 83 degrees in the summer) and average precipitation is greater (around 54 inches). More information on the District is included in **Chapter 3.**

1.3 District Supplies and Water Use

The District provides water to its customers from four sources: the Calaveras River, the Stanislaus River, the upper Mokelumne River (or its tributaries), or groundwater from the portions of the Eastern San Joaquin Groundwater Subbasin underlying the western portion of the county. Because these sources and their associated water systems are largely independent of one another with no interties, many sections of this UWMP include discussion of specific conditions within each distinct sub-region, including individual tables for each sub-region; District-wide tables, as required by the California Department of Water Resources (DWR), are included in **Appendix A**.

1.3.1 Sub-Region A: Calaveras River

The District serves the Jenny Lind and Sheep Ranch service areas with water from the Calaveras River. These systems together delivered nearly 3,200 AF in 2015. Jenny Lind is the District's second largest system (approximately 3,800 connections) whereas Sheep Ranch is the smallest service area in the District (51 connections). Water for these areas is provided from New Hogan Reservoir releases. Water in this sub-region is almost entirely dedicated to residential and agricultural uses.

1.3.2 Sub-Region B: Stanislaus River

The District serves the Ebbetts Pass and Copper Cove/Copperopolis areas with water from the Stanislaus River, and storage in Spicer Reservoir. The storage supplies serving this sub-region were developed as part of the North Fork Hydroelectric Project and New Spicer Reservoir, owned by the District and operated in partnership with Northern California Power Agency. The Ebbetts Pass service area receives water from the North Fork of the Stanislaus River via a diversion in the North Fork Hydroelectric Project's Collierville Tunnel, and Copper Cove/Copperopolis receives water by means of the diversion and re-diversion of upstream storage at Tulloch Reservoir. The Ebbetts Pass system is the District's largest service area, serving about 6,000 connections, while Copper Cove/Copperopolis serves almost 2,600. These service areas together delivered nearly 2,500 AF in 2015, mostly for residential and landscaping use.

1.3.3 Sub-Region C: Mokelumne River

CCWD provides water to nearly 600 customers in West Point. The water supply for the area originates from Bear Creek, a tributary to the Middle Fork of the Mokelumne River. The District also receives water by contract from the Middle Fork of the Mokelumne River. In 2015, 111 AF was delivered primarily for residential use in this sub-region.

1.3.4 Sub-Region D: Groundwater

The Wallace service area receives its water supply from groundwater wells drawing on the Eastern San Joaquin Groundwater Subbasin. In 2015, water deliveries totaled 37 AF (35 AF of which was for residential use).

More detailed information on the district's water use and supply can be found in **Chapter 4** and **Chapter 6**, respectively.

1.4 SB X7-7 Reporting

As part of the 2015 UWMP process, the District re-evaluated its service area population for baseline demand calculations using finalized 2010 and 2000 Census numbers. The District then updated its baseline water usage using annual water usage divided by the updated population numbers. The corrected 10 year baseline usage was determined to be 240 gallons per capita per day (GPCD) from 2000 to 2009. The District's 2020 goal was set to a 20 percent reduction of this baseline value (192 GPCD) and its 2015 target set to an interim level of 216 GPCD. The District's actual 2015 GPCD was calculated as 179 GPCD, thus demonstrating that the District had met and exceeded the interim 2015 target GPCD of 216. Furthermore, the District is on track to meet its 2020 target of 192 GPCD, as it has already reduced per capita water use well below that level. A more detailed discussion of Senate Bill (SB) X7-7 baselines and targets is provided in **Chapter 5.**

1.5 Demand Management Measures

The District is a signatory to the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding (MOU) and views conservation as an integral part of its water resources stewardship responsibility. The District has implemented many demand management measures (DMMs), such as leak detection and repair, 100-percent metered service, metered rates, public information programs, and water waste prohibitions. The District has worked to expand its water conservation program to achieve the largest water savings and appropriately manage a tiered rate structure to promote water conservation while ensuring water use equity. However, due to the rural nature of the county; the diversity in climate, soils, elevation, and geography; and the small, rural population containing a large percentage of low income housing; the affordability of DMM implementation is diminished. Nevertheless, the District is exploring cost-effective options to meet DMM requirements, and has been successful with the current efforts in maintaining interim compliance with the state's 20x2020 requirements. The District's water conservation efforts are discussed in more detail in **Chapter 9**.

1.6 Supply Reliability and Contingency Planning

A number of factors could negatively impact the reliability of the District's supply, including naturally-occurring limits on the amount of supply available, water quality issues, changing climatic conditions, or a combination of these. To adequately plan for a potential future reduction in supply, the District compared historical supply to projected future demands to identify potential shortages. This analysis helps determine the potential shortage that could occur should a severe drought year repeat. As the District relies primarily on surface water, its water supplies are extremely susceptible to hydrologic changes and State-mandated water use curtailments. Detailed information on supply reliability is included in **Chapter 7.**

To address potential shortages, the District developed a Water Shortage Contingency Plan. Five stages of action have been established based upon potential reduction in total District supply. The first stage is in place for supply reductions up to 10 percent and includes a number of voluntary actions to reduce demand. The following four stages (set at supply reductions of 11 percent, 16 percent, 26 percent and 50 percent, respectively) include varying levels of mandatory rationing. More information on the District's current water contingency planning can be found in **Chapter 8**.

1.7 Plan Adoption, Submittal, and Implementation

The District adopted its 2015 UWMP on June 22, 2016 and will submit its Plan to the DWR by July 1, 2016 via the approved online submittal tool. The District will submit a CD copy of the Plan to the California State Library and the cities to which it provides water no later than 30 days after June 22nd, 2016, the date of Plan adoption. A copy of the Plan will also be available on the District's website, at the District offices, and at local libraries. The Plan will be implemented to meet the District's 2020 urban water use target of 192 GPCD by continued implementation of the district's water conservation program and focused DMMs. More detailed information can be found in **Chapter 10.**

1.8 Plan Organization

The District's 2015 UWMP is organized into the chapters as listed below.

Chapter 2: Plan Preparation

Chapter 3: System Description

Chapter 4: System Water Use

Chapter 5: SB X7-7 Baselines and Targets

Chapter 6: System Supplies

Chapter 7: Water Supply Reliability Assessment

Chapter 8: Water Shortage Contingency Planning

Chapter 9: Demand Management Measures

Chapter 10: Plan Adoption, Submittal, and Implementation

2 Plan Preparation

2.1 Basis for Preparing a Plan

The Urban Water Management Planning Act was created by Assembly Bill (AB) 797, which was signed into law in September 1983. Since that time, the Act has been amended by AB 2661 (July 1990), AB 1869 (October 1991), and AB 11X (October 1991). Since the 2010 UWMPs were submitted, AB 2067, Senate Bill (SB) 1420, and SB 1036 were passed, which further amended reporting requirements associated with the Urban Water Management Planning Act.

The Urban Water Management Planning Act requires that urban water suppliers (i.e., municipal water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 AF of water annually) prepare and adopt UWMPs that report, describe, and evaluate water deliveries and uses, water supply sources, efficient water uses, and demand management measures (DMMs). These plans are required to be prepared every five years and are due following years ending in 0 and 5. The Urban Water Management Planning Act also directs water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies are available to meet existing and future demands. Urban water suppliers are required to assess current demands and supplies over a 20-year planning horizon and consider various drought scenarios. Water shortage contingency planning and drought response actions are also to be included in a UWMP.

In November 2009, the Water Conservation Bill of 2009 (SB X7-7) was passed. This bill includes elements of the 20x2020 Water Conservation Plan which was designed to reduce the statewide per capita urban water use by 20 percent over an established baseline by the year 2020. The Water Conservation Bill of 2009 requires urban water suppliers to report in their UWMPs base daily per capita water use (baseline), an urban water use target, an interim urban water use target, and compliance daily per capita water use. This will enable water agencies and DWR to track progress towards decreasing daily per capita urban water use throughout the state. Beginning in 2016, retail water suppliers are required to comply with the conservation requirements in SB X7-7 in order to be eligible for State water grants and loans.

Calaveras County Water District (CCWD/District) is an urban retail water supplier that owns and operates a public water system, as defined in the California Water Code. Table 2-1 below provides information on the District's public water system.

Table 2-1: Public Water Systems (DWR Table 2-1)

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015 (AF)
CA0510004	C.C.W.D Sheep Ranch	51	7
CA0510006	C.C.W.D Jenny Lind	3,756	3,071
CA0510005	C.C.W.D. West Point	582	141
CA0510017	CCWD Copper Cove	2,556	1,656
CA0510016	CCWD Ebbetts Pass Improvement District	6,027	1,177
CA0510019	Wallace Community Services District	103	45
	TOTAL	**13,075**	**6,096**

The District has prepared this UWMP to comply with the requirements associated with the Urban Water Management Planning Act and 2015 UWMP Guidebook, and to meet the following planning objectives:

- Ensure the efficient use of available water supplies;
- Determine existing baseline water consumption;
- Establish water use targets;
- Describe and evaluate the existing water system and historical and projected water use;
- Evaluate current and projected water supply reliability;
- Describe and evaluate DMMs; and
- Provide a Water Shortage Contingency Plan.

In an effort to verify that the District has met all the requirements for urban water management planning as outlined in the California Water Code, a checklist is provided in **Appendix B**. This checklist indicates the page number that corresponds to each Water Code requirement related to urban water management planning.

2.2 Regional Planning

CCWD participates in many regional planning efforts to improve the integrated management of its shared watersheds. One of the many key regional planning efforts the District partakes in is California's Integrated Regional Water Management (IRWM) planning program. The State promotes development of IRWM Plans (IRWMPs) as a method to improve water management by better coordinating agencies and stakeholders within regions.

In 2006, the District participated in completing the first IRWMP for the Mokelumne and Calaveras Watersheds, known as the Mokelumne-Amador-Calaveras IRWMP (MAC IRWMP or MAC Plan). The District has continued to participate in plan development and implementation, including multiple Plan updates. The District's Board of Directors adopted the most recent MAC IRWMP update in March 2013. The MAC IRWMP is now under the governance of the Upper Mokelumne River Watershed Authority (UMRWA, www.umrwa.org) and has been successful in securing grant funding for the region under the State's Proposition (Prop) 50 and Prop 84 planning and implementation funding programs. This funding has been used to update the MAC IRWMP and to implement important water management programs in the MAC region for agencies including the District. Through the IRWM program, CCWD was successful in securing nearly $1.5 million in grant funds for the West Point Water Main and Tank Replacement Project.

An ongoing IRWMP effort immediately to the south of the MAC IRWMP is the Tuolumne-Stanislaus (T-Stan) IRWMP, formed in 2008 through adoption of a Memorandum of Understanding. The T-Stan IRWMP covers the Tuolumne and Stanislaus Watersheds, including the Highway 4 corridor in Calaveras County and the area served by CCWD in the Lake Tulloch / Copperopolis area, tributary to the Delta. Like the MAC IRWMP, the T-Stan IRWMP was successful in the State's IRWMP Regional Acceptance Program as an accepted geographic region and has been able to secure funding through a Prop 84 planning grant.

Coordination of information between IRWMPs is one of the State's IRWM planning requirements. With CCWD serving as a core member of both the MAC and T-Stan IRWM planning efforts, the flow and coordination of information between regions provides a unique opportunity to improve both IRWMP processes. Membership in multiple IRWMP regions, however, comes at a cost. The staff commitment and financial requirements associated with multiple IRWMP memberships means that CCWD must look strategically at governance, cost sharing, and its potential return on investment to improve management and infrastructure to its ratepayers. Funding of these IRWM programs is an ongoing issue, especially during difficult economic times.

In 2005, CCWD joined other agencies and stakeholders in signing the Memorandum of Understanding forming the Mokelumne River Forum (www.mokelumneforum.org). The Mokelumne River Forum (Forum) was developed to coordinate its member's endeavors to increase in the availability and reliability of water resources from the Mokelumne River watershed. Forum members include a broad range of interest groups, ranging from environmental non-governmental organizations to local water agencies. The Forum, now inactive, served to increase coordination and collaboration between the upper Mokelumne system represented through UMRWA and the downstream Mokelumne entities represented by the San Joaquin Groundwater Banking Authority (GBA).

This improved coordination is evidenced by an MOU between the two IRWM regions to move forward with preparing and submitting a successful Prop 84 planning grant application for the

Mokelumne Watershed Interregional Sustainability Evaluation (MokeWISE) Program. The first ever inter-regional grant awarded, the MokeWISE Program a 22-month process initiated in 2013 and guided by the MokeWISE Collaborative Group (MCG). The District was a member of the MCG, along with non-governmental organizations, other water agencies, private entities, resource agencies, and local and state agencies. The MokeWISE Program, now complete, yielded a comprehensive understanding of regional opportunities and alternatives for enhanced integrated water resource management, which will ultimately strengthen both IRWMPs.

Thanks to collaborative planning efforts such as the IRWMPs, agencies are now working together on projects that will offer regional improvements and "holistic" water management opportunities. As the District's multi-IRWM planning area straddles three major surface water supplies - the Mokelumne, Calaveras, and Stanislaus Rivers - many projects and studies have been identified to investigate and/or implement methods to manage and operate the regional resources as a whole to improve regional and State-wide benefits.

CCWD's emphasis on regional planning and collaboration is essential. The District must actively seek additional regional planning opportunities and potential partners as it addresses the many issues confronting the District, the County, and its watersheds.

2.3 Individual or Regional Planning and Compliance

CCWD has opted to develop this UWMP as an individual agency, as shown in **Table 2-2**. As such, the Plan covers CCWD's service area and addresses all the relevant requirements of the California Water Code.

Table 2-2: Plan Identification (DWR Table 2-2)

Select Only One	Type of Plan
☑	Individual UWMP
☐	Regional UWMP

2.4 Fiscal or Calendar Year and Units of Measure

As indicated in **Table 2-3**, all data reported in this UWMP is on a calendar year basis and all water volume units are presented in AF. Because the UWMP is structured in calendar year, water use and planning data for the entire calendar year of 2015 is used.

It should also be noted that, because the District has several water systems that are largely independent of one another, many sections of this UWMP include multiple versions of a required DWR table – one for each sub-region. District-wide tables are included in **Appendix A**.

Table 2-3: Agency Identification (DWR Table 2-3)

Type of Agency	
☐	Agency is a wholesaler
☑	Agency is a retailer
Fiscal or Calendar Year	
☑	UWMP Tables are in Calendar Years
☐	UWMP Tables are in Fiscal Years
Units of Measure Used in UWMP	
Unit	Acre Feet (AF)

2.5 Coordination and Outreach

The District did not notify any wholesale supplier (**Table 2-4**) as it serves as its own water supplier. The District proactively seeks to engage the IRWMP partners, various watershed groups and forums, and other stakeholders as it continues to improve its respective stewardship of the County's water resources.

CCWD continues to coordinate the preparation of this plan and other planning efforts with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practical. The District sent letters to a number of local entities notifying them of the District's intent to update the UWMP. CCWD also noticed and held a Public Hearing on the UWMP and provided a three-week public comment period. Additional information regarding outreach and public participation is included in **Chapter 10**.

Table 2-4: Water Supplier Information Exchange (DWR Table 2-4)

The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name
N/A

3 System Description

The District provides water and wastewater services to six geographically distinct service areas throughout Calaveras County. These service areas are served by one of four different water sources: the Calaveras River, the Stanislaus River, the Upper Mokelumne River (or its tributaries), or groundwater from the portions of the Eastern San Joaquin Groundwater Subbasin underlying the county boundary in the west. This chapter describes each system based on its supply source, including descriptions of the improvement district service areas, demographics, land use, climate and the water supply infrastructure. Although the District's service area encompasses all of Calaveras County, smaller water or wastewater providers exist within the County to serve specific areas, and many properties are served by private wells and/or septic systems.

For the 2015 UWMP, the District has opted to describe and characterize its six service areas based on their supply source, thus grouping them into four distinct sub-regions. Because these sub-regions have separate delivery infrastructure and no interties, available supply in one sub-region cannot necessarily be used to meet demand into another sub-region. Consequently, in addition to considering supplies and demands on a district-wide scale, the District must also consider more localized planning based on these four sub-regions. The following sections in this chapter are grouped by the four sub-regions: Sub-Region A: Calaveras River, Sub-Region B: Stanislaus River, Sub-Region C: Mokelumne River, and Sub-Region D: Groundwater.

3.1 District History and Background

CCWD was organized in November 1946 under the laws of the State of California as a public agency for the purpose of developing and administering water resources and wastewater services in Calaveras County. The District owns two hydropower projects: the North Fork Stanislaus Hydroelectric Development Project (FERC 2409), completed in 1990, and the New Hogan Power Project (FERC 2903) on the Calaveras River, completed in 1986.

CCWD is a non-profit governmental agency also known as a "special district", conducting business in the performance of public services for Calaveras County, and is governed by an elected five-member Board of Directors. The District's service area includes all of Calaveras County, but it is administratively and fiscally independent from the Calaveras County government. CCWD is the largest public water purveyor in the county in terms of service area, number of customers served, and amount of water delivered. As a special district, CCWD's authority includes providing public water service, water supply development and planning, wastewater treatment and disposal, and recycling. CCWD maintains broad general powers over the use of water within its boundaries, including: authority to acquire, control, distribute, store, spread, treat, purify, reclaim, process, and salvage water for beneficial use; providing wastewater service; selling treated or untreated water; acquiring or constructing hydroelectric facilities and selling the power and energy produced to public agencies or public utilities engaged in distributing power; contracting with the United States or other political subdivisions, public subdivisions, public utilities, or other persons; and, subject to Article XIIIA of the Constitution of the State of California, levying taxes and improvements. CCWD also maintains certain administrative authorities through the adoption and maintenance of its groundwater management plan and monitoring program for the Camanche/Valley Springs area, which is a portion of the DWR Bulletin 118 recognized Eastern San Joaquin Groundwater Subbasin within the boundary of Calaveras County.

3.2 General System Description

While the District "sphere of influence" shares the same boundaries as Calaveras County, the District does not provide water and/or wastewater services to all communities in the county. Large sections of the more rural areas of the county are served by private wells or other small community water systems, and several other smaller public or private agencies exist within the county to serve select towns and developed areas. In 2015, the District provided water service to more than 13,000 municipal, residential, and commercial customers through six independent water systems throughout the county:

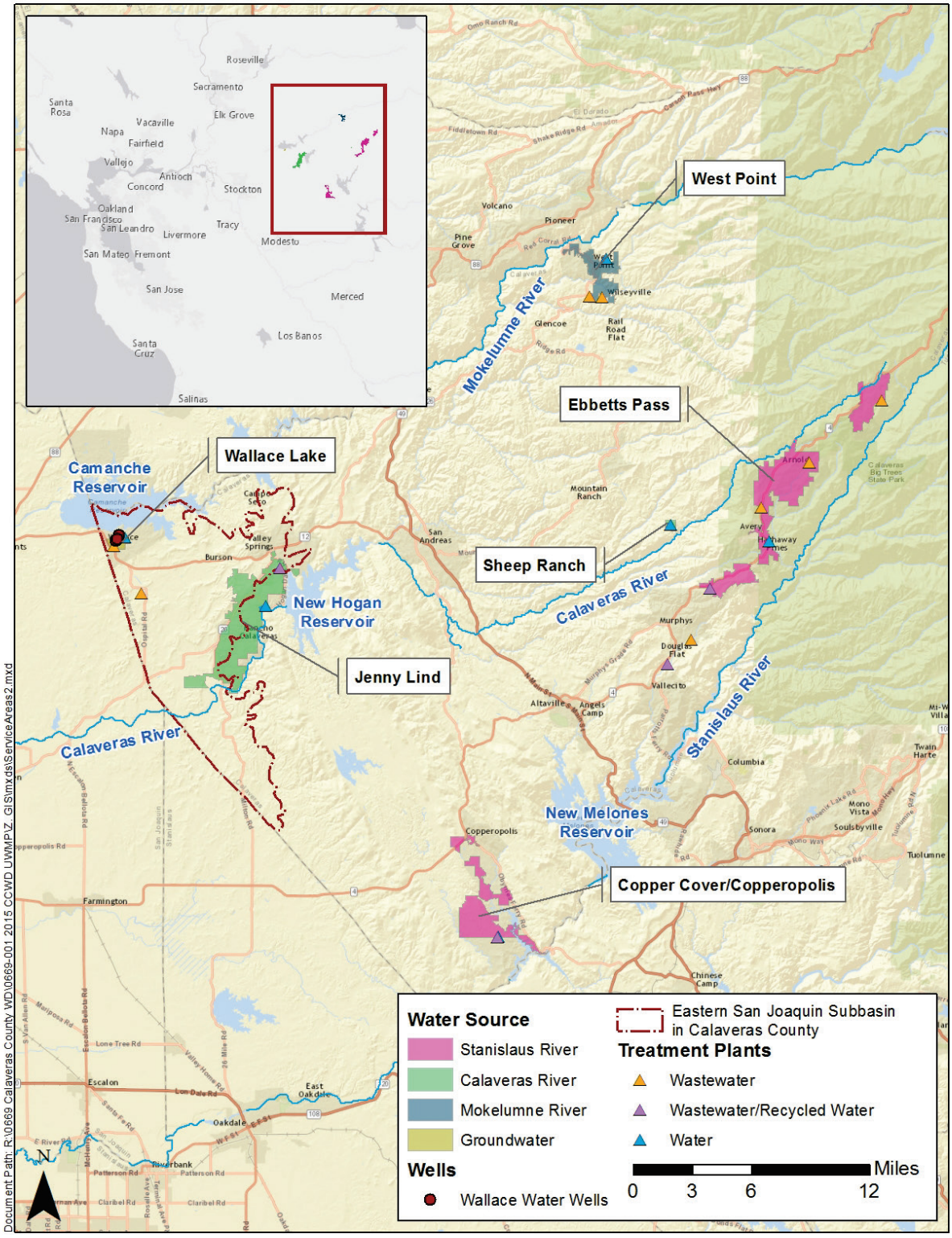
- Jenny Lind (served by the Calaveras River)
- Sheep Ranch (served by San Antonio Creek, tributary of the Calaveras River)
- Ebbetts Pass (served by the Stanislaus River)
- Copper Cove/Copperopolis (served by the Stanislaus River)
- West Point (served by the Mokelumne River and Bear Creek, a Mokelumne River tributary)
- Wallace (served by the Eastern San Joaquin Groundwater Subbasin)

Figure 3-1 shows the location of CCWD's six service areas, color-coded by supply source. These supply sub-regions are not associated with any specific service area or agency, but instead represent resource-based planning sub-regions to assist CCWD in better managing resources through the District's two existing Integrated Regional Water Management planning efforts discussed in **Chapter 2**. In addition to providing treated water to its customers, CCWD also provides wastewater service to more than 5,000 customers in 14 independent wastewater collection service areas, with a portion of these areas falling into five of CCWD's six water system service areas. The system supporting each of the four supply sources is summarized in the following sections and shown in **Table 3-1**.

Table 3-1: Water System Summary

Name	Water Source	Number of (2015) Connections
Jenny Lind	Calaveras River	3,756
Sheep Ranch	Calaveras River	51
Ebbetts Pass	Stanislaus River	6,027
Copper Cove/Copperopolis	Stanislaus River	2,556
West Point	Mokelumne River	582
Wallace	Groundwater	103

Figure 3-1: CCWD Service Areas by Sub-Region



3.2.1 Sub-Region A: Calaveras River

The Calaveras River sub-region includes the Jenny Lind and Sheep Ranch systems, described below.

Jenny Lind

The Jenny Lind system, CCWD's second largest potable water service area, serves roughly 7,600 acres in the northwestern part of the county. This system provides treated potable water and recycled water to retail customers, along with supplies of raw water to agricultural customers and a golf course along the lower Calaveras River riparian corridor below New Hogan Dam. In 2015, the Jenny Lind system served more than 3,500 water connections. This area is unique in that it represents the transition from the Central Valley floor to the foothills, is located in proximity to significant surface water reservoirs (including New Hogan, Camanche, and Pardee Reservoirs) and overlies a significant portion of the critically-overdrafted Eastern San Joaquin Groundwater Subbasin. The area also benefits from enhanced local accessibility and transportation linkages to the Highway 99 corridor via State Routes 12 and 26. This area will likely see measureable growth in the near-term planning horizon, potentially outpacing the rest of the County.

The Jenny Lind system is near New Hogan Reservoir and Dam, as shown in **Figure 3-2**, and was formed on September 6, 1967 to provide water and wastewater services to the area. The service area predominately consists of housing developments with accompanying recreational land uses such as golf courses and open space. Lot sizes in the area vary greatly, with smaller lots near Valley Springs supplied with both treated water and wastewater services by CCWD. Many of the existing residential lots served by CCWD's potable water supply system in the Rancho Calaveras area are more than 1 acre in size and are on septic systems. As densities increase, or updated State septic tank regulations are promulgated, water management must address wastewater disposal, recycled water opportunities, and the infrastructure necessary to maintain supply and water quality to preserve the potential for sustainable growth.

The Jenny Lind system receives surface water from New Hogan Reservoir through a non-Central Valley Water Project (CVP) contract with the United States Bureau of Reclamation (USBR). The diversion point is an infiltration gallery in the lower Calaveras River, approximately one mile downstream of the New Hogan Dam. The Jenny Lind Water Treatment Plant serves the area with an existing capacity of 6 million gallons per day (mgd). The distribution system is divided into five tank service zones and contains two clearwells, six storage tanks, eight booster pumping stations, and 16 pressure-reducing valves. The system hydraulic grade line varies from 485 to 918 feet.

Sheep Ranch

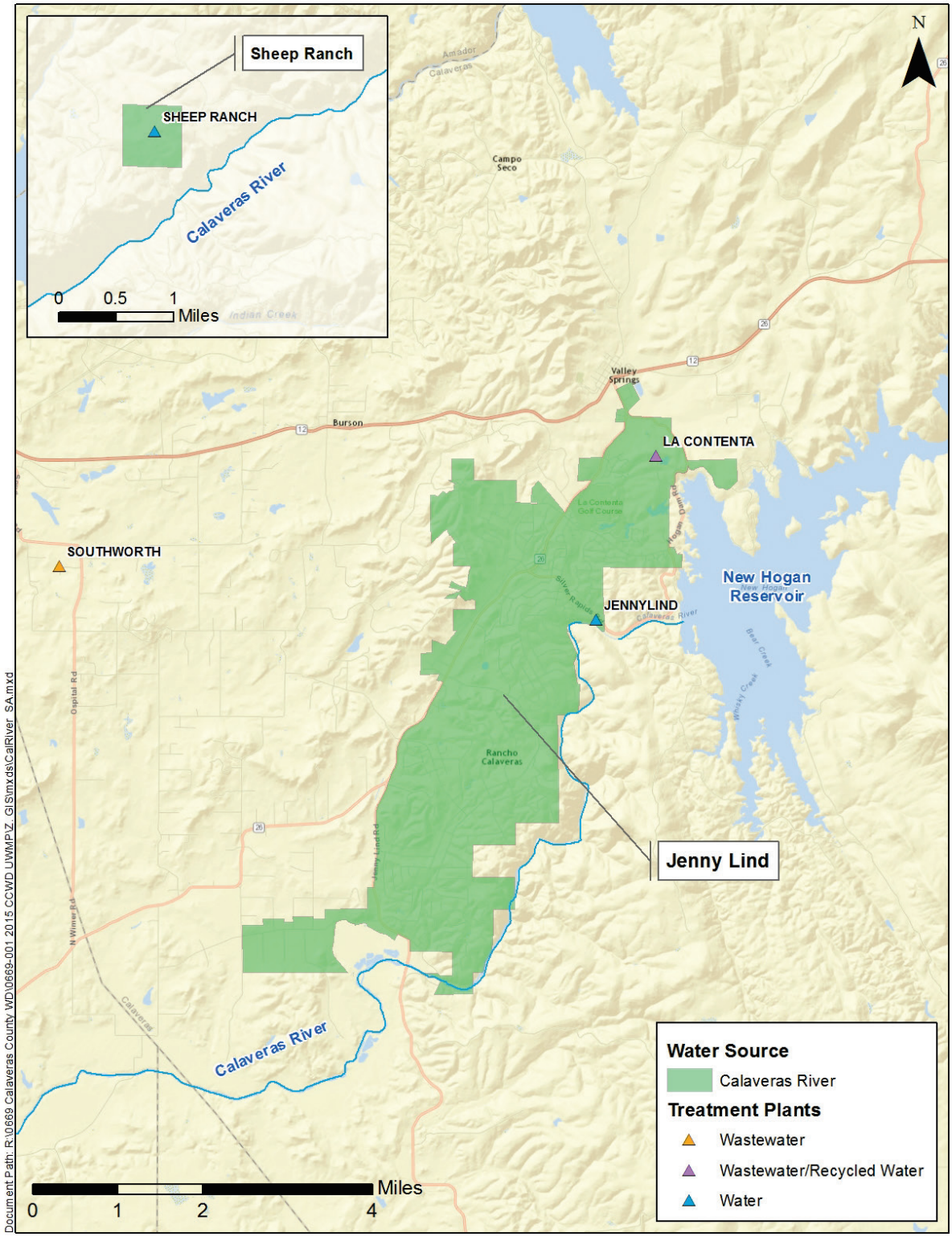
Another CCWD service area served by an upper tributary in the headwaters of the Calaveras River is Sheep Ranch. The Sheep Ranch Improvement District was formed on March 2, 1960. The service area is approximately 175 acres in size and serves approximately 51 connections in the rural community of Sheep Ranch, as shown in **Figure 3-3**. Due to a State-imposed moratorium on new connections directly related to severe limitations on local supply reliability, there is no significant growth planned for this area. The Sheep Ranch community does support General Plan policies that place limitations on smaller parcels; larger parcels could benefit from raw water supplies to support hobby orchards or vineyards.

Given the small customer base in this isolated area, the District faces management and funding challenges. Facilities are aging and in need of replacement, but the customer base is not large enough to fund new facilities or capital improvements without significant financial impacts to the District in

the absence of considerable grant funding. Sheep Ranch receives its water supply from water the District releases from White Pines Lake into San Antonio Creek (a tributary to the Calaveras River). After flowing in San Antonio Creek for about eight miles, the water is diverted and pumped to the Sheep Ranch Water Treatment Plant, which has a capacity of 20,000 gallons per day. Water is stored in one 90,000 gallon storage tank prior to distribution. The service area elevation is approximately 2,300 feet.

This service area and the surrounding land is one that has been identified as a potential area where a burgeoning cannabis cultivation industry may currently exist, or exist in the future. The Calaveras County Board of Supervisors adopted a temporary urgency ordinance on May 10th, 2016 establishing a moratorium on new farms/gardens and preliminary regulations the industry. As a note, the District must position itself to ensure the protection of customer's water supplies and infrastructure investments first. However, with the potential regulation of this agricultural product, the District should engage leaders in the community about whether a collaborative relationship is necessary to develop water supplies to support this industry. Until the time that more is known about the direction of County regulations and ordinance, any analysis of water supply needs for cannabis cultivation would be speculative, and therefore no evaluation has been included in this UWMP.

Figure 3-2: Sub-Region A: Calaveras River Infrastructure



3.2.2 Sub-Region B: Stanislaus River

The Stanislaus River sub-region includes the Ebbetts Pass and Copper Cove / Copperopolis systems, described below.

Ebbetts Pass

The Ebbetts Pass/Highway 4 service area, the largest of the District's service areas, covers nearly 8,500 acres in the northeastern part of the County along the Highway 4 Corridor. This area occupies the North Fork Stanislaus River drainage, which is tributary to the Stanislaus River and New Melones Reservoir. The Ebbetts Pass service area covers the State Highway 4 Corridor from Avery to Arnold, as shown in **Figure 3-4**. The Ebbetts Pass Improvement District was formed on January 28, 1964 to provide water and wastewater services and includes the Forest Meadows subdivision. The system includes six wholesale connections in addition to retail connections. As of 2015, there are about 6,000 retail connections. The Ebbetts Pass area has historically been a second home destination for many property owners.

The area is served treated surface water, as groundwater found in fractured rock along the western slope of the Sierra Nevada Mountains is typically unreliable. The Ebbetts Pass system receives water supplies from North Fork of the Stanislaus River through the so-called Mill Creek "Tap". This Tap is a direct diversion out of the Collierville Tunnel, a rock drilled tunnel that feeds into the North Fork Hydroelectric Project's largest generation facility, the Collierville Powerhouse. Additionally, the Mill Creek Tap diverts a portion of the water to serve the Utica Water and Power Authority's power project, which also conveys water supplies for Murphys and Angels Camp. CCWD retains the water rights to serve up to 9,000 AFY to this area, which resides outside of the District's service areas.

The existing Hunters Water Treatment Plant, that serves the Ebbetts Pass area, has a capacity of 4 mgd. The distribution system contains 17 storage tanks, 10 pumping stations, and 65 pressure zones. The upper system hydraulic grade line varies from fewer than 3,000 feet in elevation to more than 5,355 feet.

Copper Cove/Copperopolis

The Copper Cove/Copperopolis service area covers the southwest area of the County, an area that transitions from the Central Valley floor to the foothills of the Sierra Nevada Mountains. This service area is bordered by significant river and reservoir systems, including the Calaveras River and New Hogan Reservoir to the north, and the Stanislaus River and the New Melones/Tulloch Reservoirs to the south. A number of smaller tributaries also flow through this area before ultimately draining to the Delta. Similar to the Jenny Lind service area, this service area overlies a portion of the Eastern San Joaquin Groundwater Subbasin. However, groundwater is an unreliable source of supply in this service area due to quality and quantity issues.

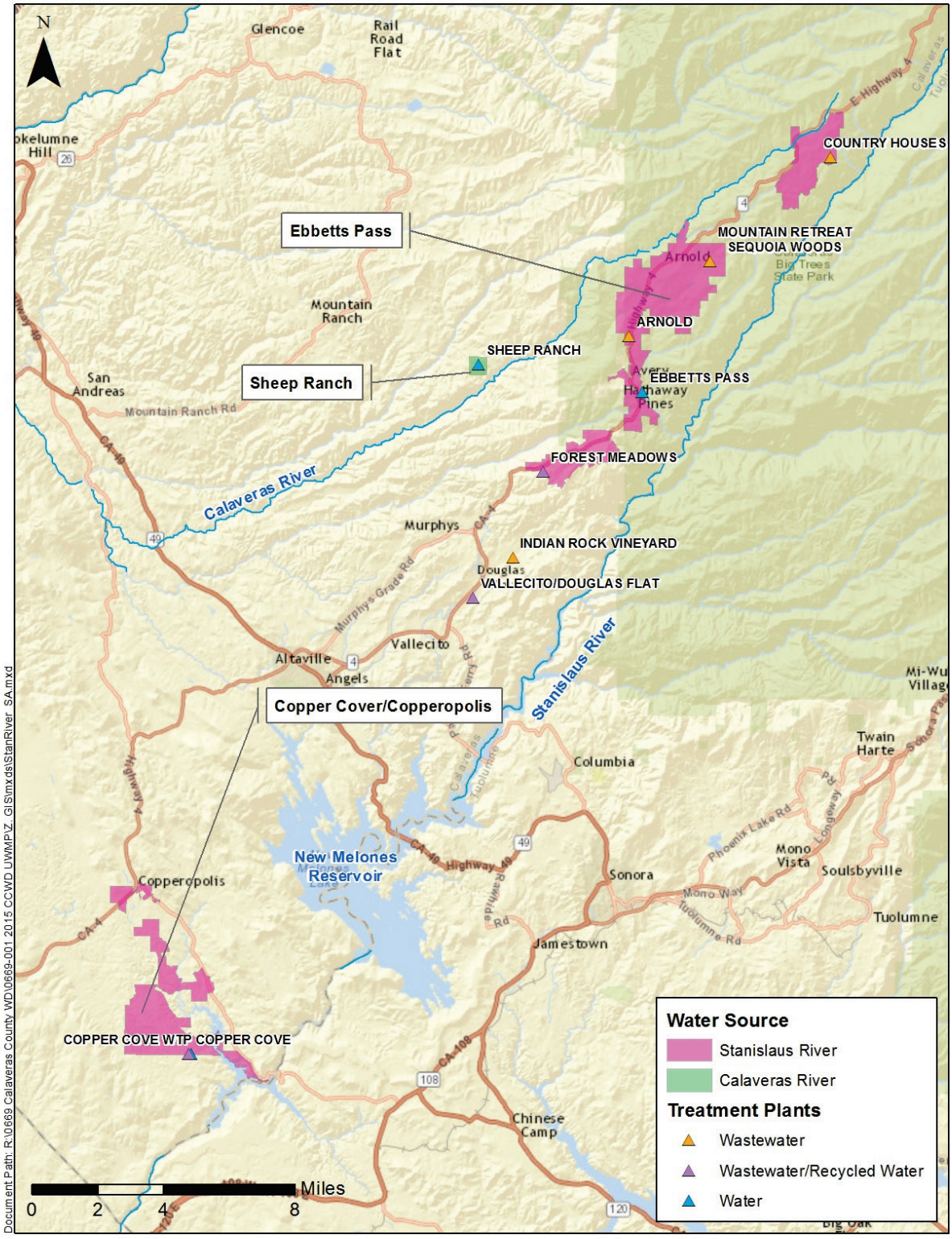
The Copperopolis Improvement District, formed on April 4, 1952, and the Copper Cove Improvement District, formed on July 2, 1969, have been physically connected and now function as a single system. The service area is approximately 4,000 acres in size and serves the communities of Copperopolis and Copper Cove, Conner Estates, Copper Meadows, Saddle Creek and Lake Tulloch communities, as shown in **Figure 3-4**. The service area is predominately new housing developments with accompanying recreational land uses such as golf courses and open space. Prior to the recent housing market collapse, this area was one of the fastest growing areas in the region. Based upon the historic growth patterns and 2003 projections, the population of the County's Copperopolis Community Plan area was expected to increase 5 to 10 percent annually over 20 year period, reaching approximately

11,000 dwelling units by 2023. Beyond 2023, measurable growth around Lake Tulloch was expected due to the rich recreational opportunities, including a yet to be developed 3,500 acre Spanish land grant parcel, "the Rancheria Del Rio Estanislao," on the southeastern edge of Lake Tulloch.

However, growth slowed due to the recession and while many planned housing developments remain on file with the County in this area, meaningful progress in construction has yet to materialize post-recession. As anticipated connections increase, District capital improvement planning will need to focus on addressing wastewater disposal, recycled water opportunities, and the infrastructure necessary to maintain supply and water quality to preserve a sustainable growth potential.

This service area receives water from the North Fork of the Stanislaus River through Tulloch Reservoir. One 4.0 mgd water treatment plant currently serves the area. The distribution system is divided into 10 pressure zones using one clearwell, four storage tanks, two booster pumping stations, and pressure reducing valves. The system hydraulic grade line varies from 775 feet to 1,267 feet.

Figure 3-3: Sub-Region B: Stanislaus River Infrastructure



3.2.3 Sub-Region C: Mokelumne River

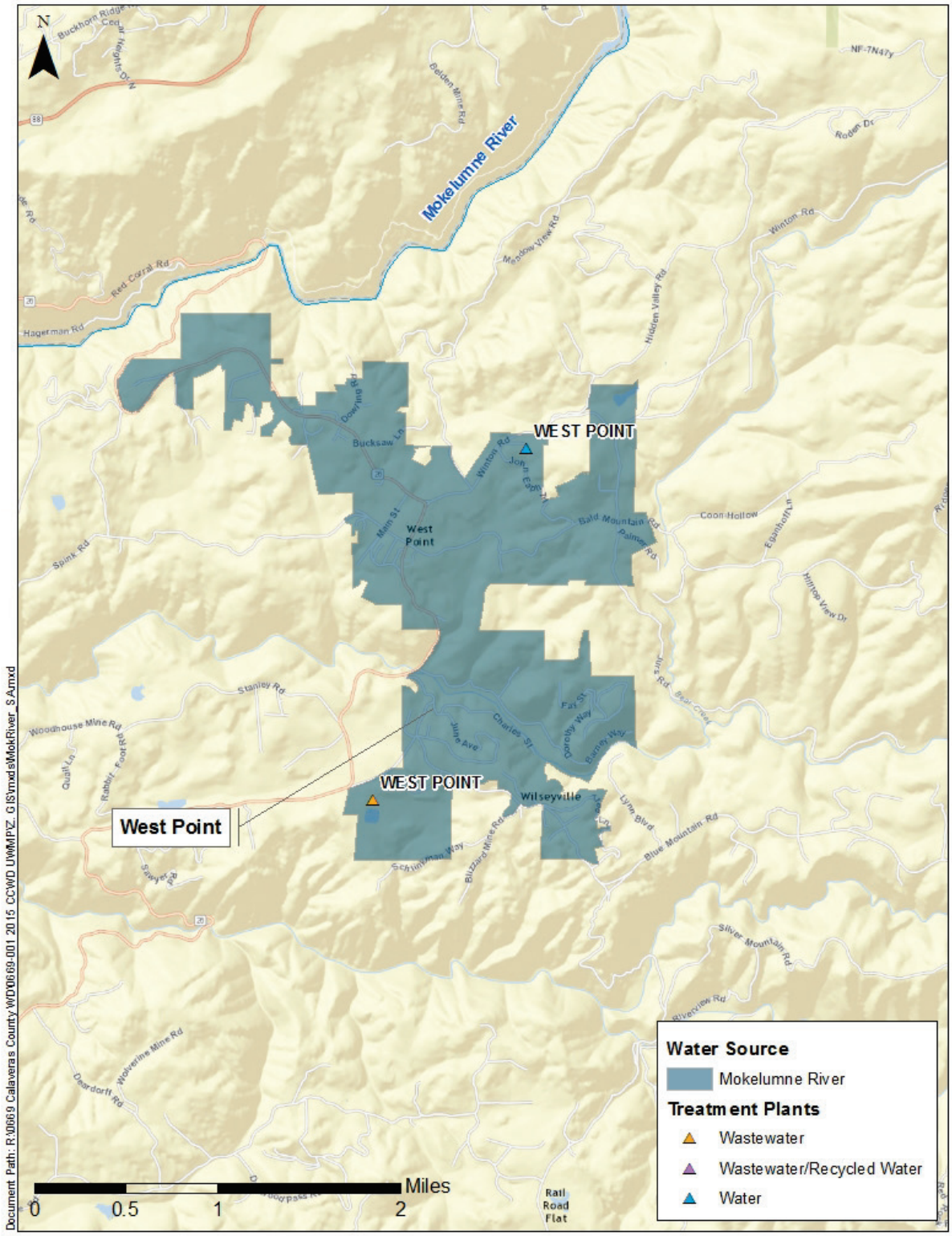
The Mokleumne River sub-region includes one system: the West Point system. The West Point service area covers approximately 2,000 acres in the northeastern part of the County serving the communities of West Point, Wilseyville, and Bummerville. It is a remote, rural area on the western slope of the Sierra Nevada Mountains in the middle and southern tributary watersheds of the Upper Mokelumne River Watershed. Customers within this service area receive treated water from the upper Mokelumne River and its tributaries. All wastewater customers and are connected to CCWD through Septic Tank Effluent Pumping systems, where effluent from a property owner's independent septic system is pumped and diverted to a force main and treated at one or more wastewater treatment plants. As with other areas within the County, some residents rely on fractured bedrock wells for their domestic supply, though the quality and quantity of these sources are unreliable.

CCWD's West Point system serves the communities of West Point, Wilseyville, and Bummerville, as shown in **Figure 3-5**. The West Point Improvement District was formed on May 25, 1954, and the Wilseyville Improvement District was formed on May 16, 1974. As of 2015, there are approximately 590 retail connections. Communities in the Mokelumne River Sub-Region are supportive of General Plan policies that place limitations on smaller parcels; larger parcels could benefit from raw water supplies to support hobby orchards or vineyards. Currently, there are roughly 350 acres of walnut orchards operating in the vicinity utilizing "dry-farming" methods. Like the Sheep Ranch area, infrastructure in the West Point service area is aging and is in need of replacement; however, financial investments are difficult to initiate due to the small customer base.

The water supply for the West Point area is diverted from Bear Creek and the Middle Fork of the Mokelumne River. The existing West Point water treatment plant capacity is one mgd. The distribution system is divided into two tank service zones and contains two clearwells, one storage tank, and two booster pumping stations. The system hydraulic grade line varies from 2,910 feet to 3,230 feet.

This service area and the surrounding land is one that has been identified as a potential area where a burgeoning cannabis cultivation industry may currently exist, or exist in the future. The Calaveras County Board of Supervisors adopted a temporary urgency ordinance on May 10th, 2016 establishing a moratorium on new farms/gardens and preliminary regulations for the industry. As a note, the District must position itself to ensure the protection of customer's water supplies and infrastructure investments first. However, with the potential regulation of this agricultural product, the District should engage leaders in the community about whether a collaborative relationship is necessary to develop water supplies to support this industry. Until the time that more is known about the direction of County regulations and ordinance, any analysis of water supply needs for cannabis cultivation would be speculative, and therefore no evaluation has been included in this UWMP.

Figure 3-4: Sub-Region C: Mokelumne River Infrastructure

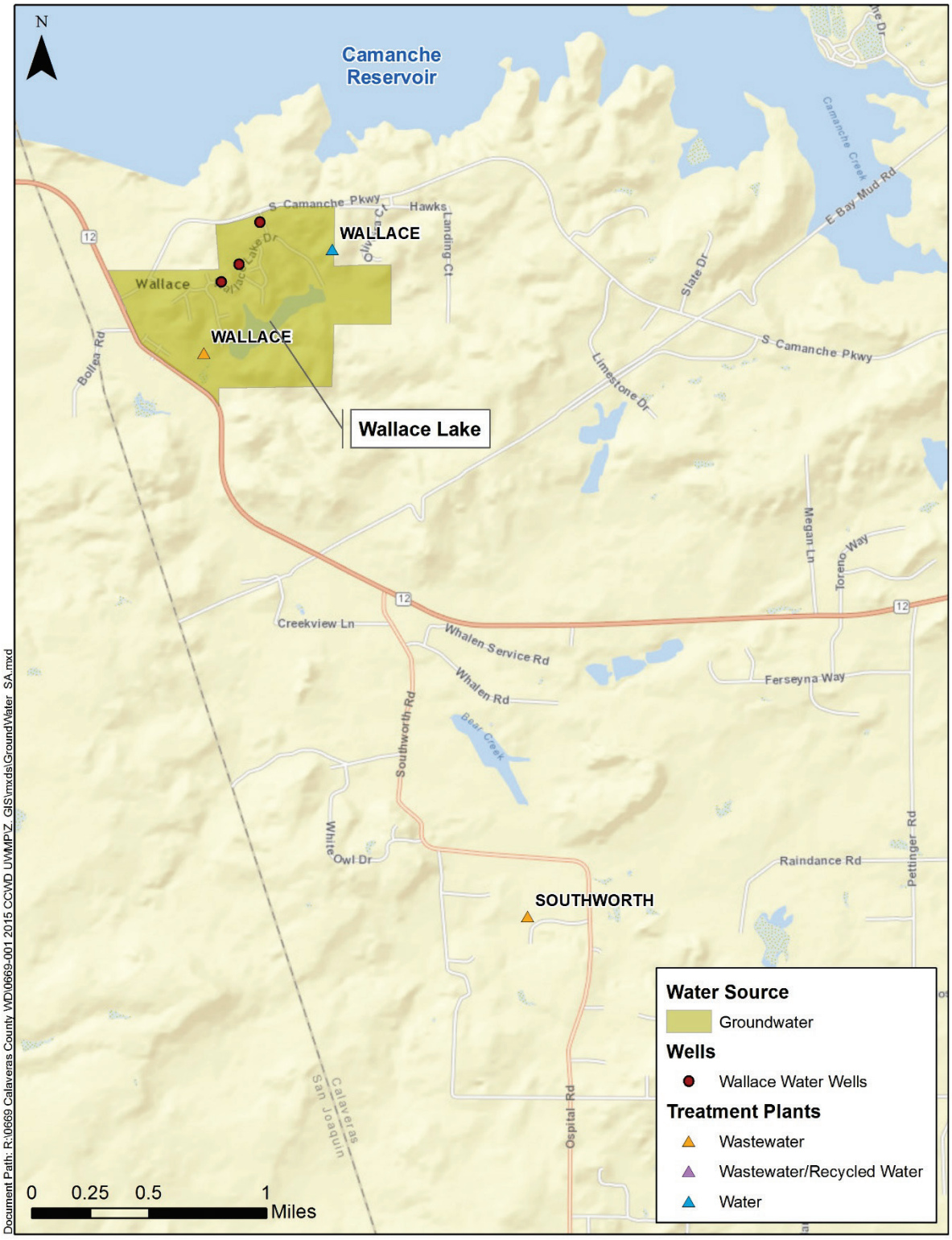


3.2.4 Sub-Region D: Groundwater

The Groundwater sub-region includes the Wallace service area. The Wallace service area was served by the District for many years under an operating contract with the Wallace Community Service District to provide water and wastewater treatment services. However, the District was not responsible for providing water supplies to Wallace, as they owned a system of groundwater wells that remains in operation. In late 2013, the Wallace Lake Estates Community was annexed by the District and is now referred to as CCWD's Wallace service area. Located in the far northwestern area of the County along State Route 12, Wallace receives its water supply from two 200 gallons per minute wells that serve groundwater from the Eastern San Joaquin Groundwater Subbasin, which has been listed as "critically overdrafted" for more than 35 years by DWR.

The groundwater from these wells is high in iron and manganese, which causes treatment challenges. The water treatment plant for this service area has a capacity of 273,000 gpd. Treated water is stored a 224,000 gallon clearwell and then pumped to a 60,000 gallon elevated storage tank using three booster pumps. The only service area within the District to be served by groundwater, Wallace has roughly 100 connections and covers around 380 acres (see **Figure 3-6**), and has some large subdivisions that remain undeveloped. The system hydraulic grade line varies from 250 feet to 438 feet and elevation varies from 328 feet to 338 feet. The long-term reliability of this area's groundwater supply is problematic given that planned development of large subdivisions will almost certainly occur at some point in time, and it overlies the critically-overdrafted Eastern San Joaquin Groundwater Subbasin. The District has completed high-level conceptual planning in conjunction with East Bay Municipal Utility District (EBMUD) related to utilizing "area of origin" water rights on the Mokelumne River to provide water to serve these planned developments via their existing delivery system in the vicinity of the Wallace and Burson areas. While some existing infrastructure could be utilized, this project would require constructing a pipeline to the Wallace/Burson area to supply this surface water. However, growth would need to actualize in order to provide the financial resources needed to implement the infrastructure required for this project to be viable. Communities in the Wallace area are supportive of General Plan policies that place limitations on smaller parcels; larger parcels could benefit from raw water supplies to support hobby orchards or vineyards.

Figure 3-5: Sub-Region D: Groundwater



3.3 Climate

Calaveras County is situated in a transitional zone between the San Joaquin Valley and the Sierra Nevada and has elevations ranging from 200 feet above mean sea level (MSL) near the valley floor to approximately 10,000 feet near the crest of the Sierra Nevada. Due to its specific location within California and the associated topography, the County has a remarkably varied climate. Hot, dry summers and temperate winters prevail in the western foothills, with temperatures ranging from the mid-30's to the high 90's in degrees Fahrenheit (°F), occasionally exceeding 100°F during the summer. Mild summers and cold winters characterize the mountainous eastern portion of the County, with temperatures ranging from the low 20's to the mid-80's °F.

Annual precipitation generally increases with altitude and occurs in the form of rain at lower elevations and snow in the higher elevations. The combination of hot and dry weather results in higher water demands during the summer in the western service areas. For the purposes of reporting climate data, the District's service areas are grouped based on elevation. The Jenny Lind, Copper Cove/Copperopolis, and Wallace service areas are at lower elevations with similar climates, while the other three systems are higher in elevation. Climate data for the lower elevation service areas are presented in **Table 3-2**, and data for the higher elevation service areas are presented in **Table 3-3**. For each area, the nearest weather station with the longest period of record data was selected. There are no evapotranspiration (ETo) data stations near any of the service areas. Instead, ETo values are provided per the zone summaries presented on the California Irrigation Management Information System (CIMIS) Reference Evapotranspiration map.

Table 3-2: Climate Data for Lower Elevation Service Areas (Jenny Lind, Copper Cove/Copperopolis and Wallace)

Month	Average precipitation (in.)	Average monthly ETo	Average maximum temperature (°F)	Average minimum temperature (°F)
January	6.8	1.24	57	38
February	5.2	1.96	59	40
March	4.3	3.41	65	43
April	2.6	5.10	69	45
May	1.7	6.82	79	52
June	0.5	7.80	88	58
July	0.0	8.06	97	65
August	0.1	7.13	96	64
September	0.2	5.40	91	60
October	1.6	3.72	79	52
November	2.8	1.80	65	44
December	5.5	0.93	57	38
Annual	31.2	53.4	75	50

NOTES: Data obtained from the Western Region Climate Center, New Melones Dam HQ (046174), 1992 to 2015. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6174; ETo based on Zone 12 as shown on CIMIS Reference Evapotranspiration map provide at http://www.cimis.water.ca.gov/Content/pdf/CimisRefEvapZones.pdf; (2) ETo = evapotranspiration

Table 3-3: Climate Data for Higher Elevation Service Areas (Ebbetts Pass, Sheep Ranch, and West Point)

Month	Average precipitation (in.)	Average monthly ETo	Average maximum temperature (°F)	Average minimum temperature (°F)
January	10.4	1.55	45	28
February	9.4	2.24	47	29
March	8.1	3.10	50	30
April	4.6	4.50	56	34
May	2.2	5.89	65	40
June	0.7	7.20	75	46
July	0.1	8.06	83	52
August	0.2	7.44	82	51
September	0.7	5.70	76	47
October	2.9	3.72	65	40
November	5.8	2.10	54	33
December	9.4	1.55	47	29
Annual	54.4	53.1	62	38

NOTES: Data obtained from the Western Region Climate Center, Calaveras Big Trees (041277), 1929 to 2014. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca1277; ETo based on Zone 11 as shown on CIMIS Reference Evapotranspiration map provide at http://wwwcimis.water.ca.gov/Content/pdf/CimisRefEvapZones.pdf; (2) ETo = evapotranspiration

3.3.1 Climate Change

Climate change will affect water management throughout California and could have significant impacts on the District. There is mounting scientific evidence that global climate conditions are changing and will continue to change as a result of the continued build-up of greenhouse gases (GHGs) in the Earth's atmosphere. Studies specific to the Calaveras and Mokelumne River watersheds indicate that changes in climate in these areas can modify the timing, amount, and form of precipitation, as well as water demands and the quality of surface runoff (Upper Mokelumne River Watershed Authority 2012). Evidence of warming trends is apparent in winter temperatures in the Sierra Nevada; an increase of almost 2°C (4°F) was observed during the second half of the 20th century. Unless there is a significant decrease in greenhouse gases, an additional 2°C (4°F) increase is expected over the next half century.

Changes in climate, including precipitation, temperature, and evaporation, could impact the District by changing the levels of water demand, impacting reservoir water quality and storage capacity, and stressing conveyance systems and treatment plants. Planning for and adapting to the anticipated changes in climate will be essential to ensuring water supply reliability for all users and to protecting sensitive infrastructure against more frequent and extreme precipitation and wildfire events.

3.4 Service Area Population and Demographics

The current permanent resident population served by the District was estimated using U.S. Census data and the number of residential connections (i.e., single family and multi-family connections) for each service area. **Table 3-4** shows the 2015 service area permanent population, as well as the estimated population in five-year increments from 2020 through 2040. The 2015 population was estimated by multiplying the number of residential connections (i.e., single family and multi-family connections) by the average number of persons per household for all Census block groups that intersect the service area. The 2010 U.S. Census was used to determine the average number of persons per household for each block group. This methodology is further described in **Appendix C**.

To project population, the District used the California Department of Finance (DOF) Report P-1, which projects the total population of Calaveras County in five-year increments through 2060. Because the District does not serve the entire County, the County-wide percent increases were determined and assumed to apply to the District's service area. Note that **Table 3-4** reflects permanent residents only.

Table 3-4: Population – Current and Projected (DWR Table 3-1)

Service Area	2015	2020	2025	2030	2035	2040
Jenny Lind	*9,592*	*10,226*	*10,739*	*11,136*	*11,469*	*11,671*
Sheep Ranch[1]	*93*	*99*	*104*	*108*	*111*	*113*
SUB-REGION A	9,685	10,325	10,843	11,244	11,580	11,784
Ebbetts Pass	*5,368*	*5,723*	*6,010*	*6,232*	*6,418*	*6,531*
Copper Cove	*4,416*	*4,708*	*4,944*	*5,127*	*5,280*	*5,373*
SUB-REGION B	9,784	10,431	10,954	11,359	11,698	11,904
West Point (SUB-REGION C)	988	1,053	1,106	1,147	1,181	1,202
Wallace (SUB-REGION D)	241	257	270	280	288	293
TOTAL[2]	**20,698**	**22,066**	**23,173**	**24,030**	**24,747**	**25,183**

NOTES: (1) There is a growth moratorium currently in effect in Sheep Ranch; as such, population growth will likely be less than what is shown, until the moratorium is lifted. (2) These projections are from Department of Finance data and are not reflective of projections that are included in the General Plan.

4 Water Use

The District's current and projected water demands are presented in this chapter. Current water demands are provided by water use sector; demands are projected to 2040 in five-year increments by water use sector.

4.1 Current Water Uses by Sector

This section quantifies current water uses by sector. **Table 4-1** below shows current District-wide water use by use type.

Table 4-1: District-Wide Demand for Potable and Raw Water – Actual (DWR Table 4-1)

Use Type	2015 Actual		
	Additional Description (if needed)	Level of Treatment When Delivered	Volume (AF)
Single Family	--	Drinking water	2,316
Multi-Family	--	Drinking water	19
Commercial	--	Drinking water	126
Institutional/Governmental	--	Drinking water	50
Landscape	--	Drinking water	153
Landscape	--	Raw water	494
Agricultural irrigation	--	Raw water	1,469
Sales/Transfers/Exchanges to other agencies	--	Drinking water	14
Other[1]	--	Drinking water	8
Losses	--	Drinking water	1,447
		TOTAL	**6,096**
NOTES: (1) Includes fire flow for emergency services and Lancha Plana metered fill stations. The Lancha Plana program provides drinking water for non-CCWD customers.			

As described in Chapter 3, the District's water connections can be separated into four distinct sub-regions designated by water supply source (see **Figure 3-1**). The following sections discuss current demand by sub-region.

4.1.1 Sub-Region A: Calaveras River

Calaveras River water is supplied to the areas referred to as Jenny Lind and Sheep Ranch. **Table 4-2** shows the current water use for Sub-Region A; **Appendix D** includes the information for the Jenny Lind and Sheep Ranch service areas separately.

Jenny Lind Service Area

Customers in the Jenny Lind Water System include residential (single family and multi-family), commercial, institutional/governmental, landscape, agricultural irrigation, and emergency water use customers. Total demand in the Copper Cove Service Area was 3,071 AF in 2015. Of the potable water supplied (to all customer types except agricultural), 94.4 percent was used to meet single family residential demand, 2.5 percent met commercial water demand, 1.8 percent met institutional demand, and 0.8 percent met potable landscape demand. The remaining 0.5 percent met multi-family and other demands. "Other" demands include the Lancha Plana program metered fill stations and fire flow for emergency services. There is currently only one multi-family residential connection, so multi-family water demand is minimal compared to the other customer types.

Raw water from the Calaveras River is currently supplied to one golf course and nine agricultural customers. The golf course, La Contenta, diverts raw water directly from the New Hogan Reservoir to supplement its recycled water irrigation supply. Recycled water use is discussed in further detail in Chapter 6. In 2015, the golf course used 92 AF of raw water.

The District serves nine agricultural customers in the Camanche/Valley Springs area along the lower Calaveras River between New Hogan Reservoir and the Calaveras/San Joaquin County line. The existing agricultural customers use raw water diverted from the lower Calaveras River under a combination of riparian rights and by purchase from the District's New Hogan Reservoir storage contract. The usage for these parcels tends to fluctuate on an annual basis depending upon users' needs and the water supply outlook (i.e. planned crop type, end of water year storage levels), but has remained relatively static for the preceding five years. The District currently estimates annual usage based on acreage, planned or established crop type (mostly orchard), and land use factors. In 2015, these customers were estimated to use a little over 1,450 AF of raw water for irrigation.

Sheep Ranch Service Area

The Sheep Ranch water system currently has 51 single family residential connections. In 2015, this water demand was 5 AF.

The District's current demand in Sub-Region A is included in **Table 4-2**.

Table 4-2: Sub-Region A Demand for Potable and Raw Water – Actual (DWR Table 4-1)

Use Type	2015 Actual		
	Additional Description (if needed)	Level of Treatment When Delivered	Volume (AF)
Single Family	--	Drinking water	1,065
Multi-Family	--	Drinking water	3
Commercial	--	Drinking water	28
Institutional/Governmental	--	Drinking water	20
Landscape	--	Drinking water	9
Landscape	--	Raw water	92
Agricultural irrigation	--	Raw water	1,469
Other[1]	--	Drinking water	3
Losses	--	Drinking water	389
TOTAL	**3,807**		**3,078**
NOTES: (1) Includes fire flow for emergency services and Lancha Plana metered fill stations. The Lancha Plana program provides drinking water for non-CCWD customers.			

4.1.2 Sub-Region B: Stanislaus River

Stanislaus River water is supplied to the Ebbetts Pass and Copper Cove service areas. **Table 4-3** below shows the current water use for Sub-Region B; **Appendix D** includes the information for the Ebbetts Pass and Copper Cove service areas separately.

Ebbetts Pass Service Area

The Ebbetts Pass water system includes residential (single family and multi-family), commercial, institutional/governmental, landscape, emergency, and wholesale potable water connections. Total demand in the Ebbetts Pass Service area in 2015 was 1,177 AF. Of the retail demand (not including losses) in 2015, single family residential users accounted for 77.4 percent of total demand. Commercial users accounted for 8.3 percent, landscape demand accounted for 8.8 percent, multi-family use accounted for 2.3 percent, and institutional demand accounted for 3.1 percent. The remaining 0.1 percent was for water associated with the Lancha Plana program (metered fill stations) and fire flow for emergency services, shown as "Other" in **Table 4-3**. In addition to its retail customers, the District also wholesales treated water to two private water systems: Snowshoe Springs Mutual Water Company and Blue Lake Springs Mutual Water Company.

Copper Cove Service Area

The customer classes within the Copper Cove service area include single family residential, commercial, institutional/governmental, emergency, and landscape. Total demand in the Copper Cove Service Area was 1,656 AF in 2015. Of the total potable demand, 82.6 percent is for single family residential use, 11.4 percent is for landscape use, and 4.8 percent is for commercial use. Institutional

and other potable water demand accounts for the remaining 1.2 percent. "Other" demand includes the Lancha Plana program metered fill stations and fire flow for emergency services.

In addition to potable water, the water system also supplies Saddle Creek Golf Course which receives a mixture of raw and recycled water. The golf course uses raw water from Lake Tulloch to supplement the recycled water used for irrigation and water feature ponds. In 2015, Saddle Creek received 402 AF of raw water.

Table 4-3 below shows the current water use for Sub-Region B.

Table 4-3: Sub-Region B Demand for Potable and Raw Water – Actual (DWR Table 4-1)

Use Type	2015 Actual		
	Number of Connections	Level of Treatment When Delivered	Volume (AF)
Single Family	8,180	Drinking water	1,132
Multi-Family	10	Drinking water	16
Commercial	302	Drinking water	91
Institutional/Governmental	8	Drinking water	27
Landscape	80	Drinking water	144
Landscape	1	Raw water	402
Sales/Transfers/Exchanges to other agencies	2	Drinking water	14
Other[1]	--	Drinking water	4
Losses	--	Drinking water	1,002
TOTAL	**8,583**		**2,832**
NOTES: (1) Includes fire flow for emergency services and Lancha Plana metered fill stations. The Lancha Plana program provides drinking water for non-CCWD customers.			

4.1.4 Sub-Region C: Mokelumne River

The area served by Mokelumne River supply includes single family residential, commercial, institutional/governmental, and landscape connections that are all metered and all receive treated surface water. Single family residential water demand accounts for 90 percent of the total water use, commercial users account for 5 percent, and institutional connections for almost 4 percent. "Other" demand is use associated with the Lancha Plana program metered fill stations and fire flow for emergency services; together, these uses account for just over 1 percent of total use. Total demand was 141 AF in 2015. The current number of connections and water use by customer type are shown in **Table 4-4**.

Table 4-4: Sub-Region C Demand for Potable and Raw Water – Actual (DWR Table 4-1)

Use Type	2015 Actual		
	Number of Connections	Level of Treatment When Delivered	Volume (AF)
Single Family	527	Drinking water	82
Commercial	42	Drinking water	5
Institutional/Governmental	10	Drinking water	3
Landscape	3	Drinking water	0
Agricultural irrigation	0	N/A	0
Other[1]	--	Drinking water	1
Losses[2]	--	Drinking water	50
TOTAL	**582**		**141**

NOTES: (1) Includes fire flow for emergency services and Lancha Plana metered fill stations. The Lancha Plana program provides drinking water for non-CCWD customers. (2) Losses include water provided for fire response and emergency supply during the 2015 Butte Fire. This is captured in "Losses," contributing to the high loss number.

4.1.6 Sub-Region D: Groundwater

The District has provided groundwater to Wallace since its annexation in 2013. In 2015, the District served 97 single family residential and 6 commercial connections. All water use is metered; in 2015, as shown in **Table 4-5**, single family residential demand accounted for about 95 percent (37 AF) of total demand and commercial connections used the remaining 5 percent (2 AF).

Table 4-5: Sub-Region D Demand for Potable and Raw Water – Actual (DWR Table 4-1)

Use Type	2015 Actual		
	Number of Connections	Level of Treatment When Delivered	Volume (AF)
Single Family	97	Drinking water	37
Commercial	6	Drinking water	2
Losses	--	Drinking water	6
TOTAL	**103**		**45**

4.2 Water Use Projections

Many water agencies and districts use adopted General Plans and other planning documents as the basis for projecting future water demands consistent with planned growth. It should be noted that the County's General Plan 1996 was challenged, and the County is in the process of completing a Plan update. As such, the District implemented three separate approaches to projecting future water demands. These approaches projected demands based on: 1- historical connection growth, 2- future land use, and 3- projected population growth. Each of these approaches is discussed in further detail in the sections below.

The approaches below only apply to projecting non-agricultural demand under the assumption that agricultural demand grows differently and that historical connection growth, future land use, or population growth is not a good indicator of future agricultural demand. Therefore, agricultural demand for all three approaches is determined using values derived from a Provost & Pritchard 2011 report on potential agricultural development in the County. The agricultural demand at build-out, assumed to be the year 2100, was linearly interpolated between 2015 and 2100, using 2008-2013 average agricultural demand as the baseline. Agricultural lands outside of the current service area that may fall into Sub-Regions A and B were also included in the projections. The Provost & Pritchard study found approximately 29,220 acres of land within Sub-Regions A and B, though not necessarily within current District service areas, to be suitable for irrigated agricultural development at build-out. During analysis of the study, approximately 1,150 acres were found to already be included within CCWD's current service area, within the remaining approximately 28,000 acres outside of the current service area that could potentially be served by CCWD in Sub-Regions A and B in the future. Most of the agricultural demands that are discussed in the study are outside of the District's current boundaries, but still within its "sphere of influence," so projected agricultural supplies are broken out into anticipated needs within CCWD's current service area and those outside of the service area. It's also important to note that for these demands to be met, an assessment or irrigation district would likely need to be formed to develop the supplies and conveyance further to serve these parcels prior to the District annexing these areas into water service areas. CCWD has plans to conduct further studies, evaluation, and outreach to the agricultural community to determine needs in the future.

This is becoming increasingly important given that evaluation of constraints on groundwater supplies in the adjacent counties is important for Sustainable Groundwater Management Act (SGMA) compliance. Furthermore, efforts to decrease the overdraft of the Eastern San Joaquin Subbasin are expected to occur, all of which may pressure valley growers to seek a surface water source in addition to any groundwater supplies, potentially making foothill grazing land conversion more enticing.

The use category "Other" in the tables is the potable water provided to between thirty and sixty non-CCWD customers at metered fill stations and fire flow for emergency services. This demand is not expected to change significantly in the future.

4.2.1 Approach 1: Historical Connection Growth Projections

The first method of projecting District demand assumed that future demands would increase at the same rate as historical growth in the number of new residential connections. For this approach, a historical connection growth rate was developed based on the actual growth in residential connections observed during the five-year period from 2011-2015. This growth rate was then applied to the current baseline demand, defined as the average demand from 2009-2013. The baseline demand was used because it reflects representative demands following the recession but prior to economic recovery, and excludes depressed demands observed during the recent drought with implementation of mandatory water use restrictions implemented in response to State mandates. The average growth rate for each service area was applied, beginning at the baseline, to each five-year period through 2040. District-wide demands for 2040 using this approach are projected to be 43,496 AFY. Tabulated results for each service area are included in **Appendix E**.

4.2.2 Approach 2: Land Use Based Projections

A land use based approach is the second method used to project District demands. Land use based demands were calculated based on Calaveras County's expected build out according to the County's General Plan 1996 as well as approved Community Plans and Special Plans.

For each residential land use type, the allowable dwelling unit density per acre was multiplied by average number of residents per household and the 2015 residential gallons per capita per day (R-GPCD). For non-residential land use types, an area-based water demand factor was developed using CCWD consumption data from 2009-2013. Each non-residential account was matched by Assessor's Parcel Number (APN) to a GIS shapefile of Calaveras County parcels in order to calculate the area served by each billed water account. Using account-specific water consumption and geographic area, a sector-specific area-based water demand factor was calculated and applied towards future non-residential land use projections (for example: Commercial, Public Service, Landscape, Commercial Office, etc.). Agricultural demands were calculated as described above. District-wide demands for 2040 using this approach are projected to be 47,964 AFY. This approach is further described in **Appendix F**.

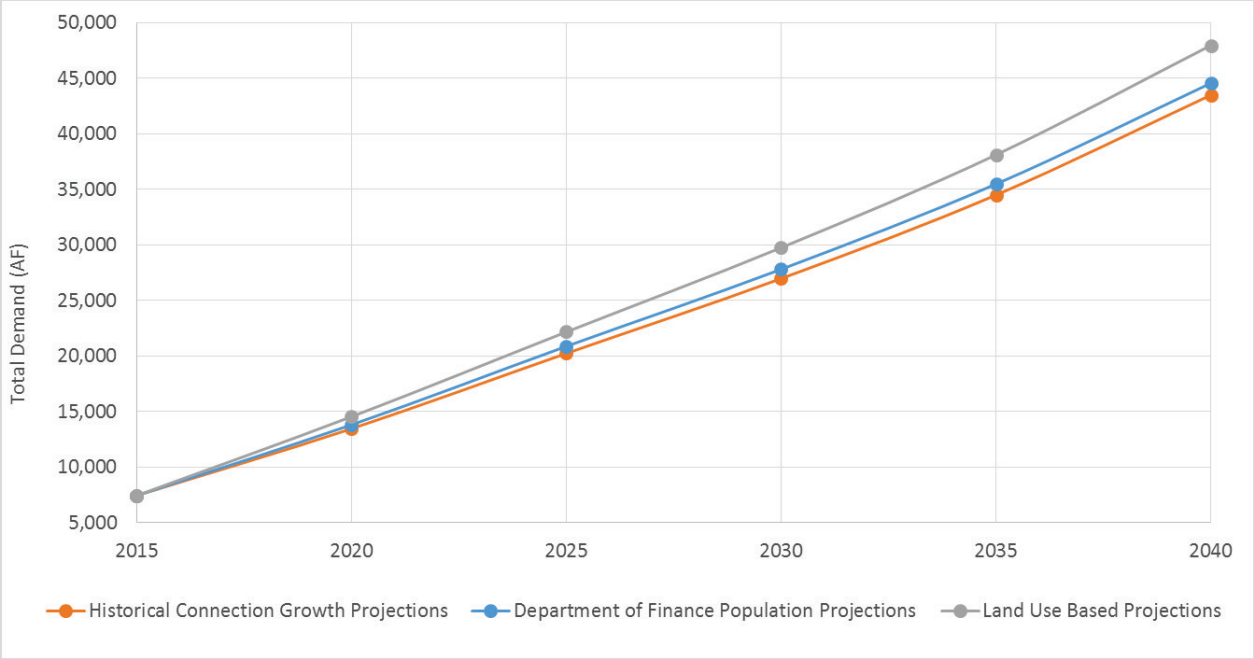
4.2.3 Approach 3: Department of Finance Population Projections

The third method used to project water demand is based on the DOF population projection data. To project demands, the DOF population percent growth for Calaveras County (also used in Section 3.4 to project permanent population) was applied to the baseline demand from 2009-2013 in each service area for all customer classes apart from agriculture. As described under approach 1, the baseline demand was used because it reflects representative demands following the recession but prior to economic recovery, and excludes depressed demands observed during the recent drought with implementation of mandatory water use restrictions implemented in response to State

mandates. Baseline demand was used to develop a more conservative projection by capturing water consumption under the more normal conditions prior to the drought and the Governor's conservation mandates. Agricultural demands were projected as described above and are discussed in more detail for each sub-region below.

The projections developed using this third, population-based approach, fall between the projections developed with the other two approaches, and are anticipated to be the most representative of future growth in the District. For the purposes of the UWMP tables and all further analysis related to the UWMP, the District has used the projections developed using this approach (represented in **Figure 4-1** below by the blue line).

Figure 4-1: District-Wide Total Demand Projections (Three Approaches)



CCWD pumps water for municipal use from the Eastern San Joaquin Groundwater Subbasin, which has been categorized by DWR as a critically overdrafted basin. An approximately 70 square-mile area of the Eastern San Joaquin Groundwater Subbasin overlies the western edge of Calaveras County. The District serves many administrative functions over that portion of the basin through the establishment of the Assembly Bill No. 3030 approved Groundwater Management Plan and its role as the recognized California Statewide Groundwater Elevation Monitoring entity for the region. As such, CCWD is actively participating in regional efforts to establish one or more Groundwater Sustainability Agency(ies) (GSA) and a Groundwater Sustainability Plan (GSP) for the Eastern San Joaquin Groundwater basin to meet SGMA requirements. The District acknowledges this key role with regard to stewardship of the County's surface water supplies, which must be holistically evaluated to support the regional planning efforts mandated in the SGMA legislation. The District will likely be an important partner in ultimately achieving the sustainability goals required by SGMA by using its permitted rights to address overdraft in the basin. It is anticipated that, through these efforts, CCWD will be required to participate in some form of groundwater recharge program to

achieve long-term sustainability of the basin, which would increase future demands. However, SGMA is being implemented in a parallel planning process and the District's future demands associated with groundwater recharge are currently unknown. Therefore, groundwater recharge is included as a line item in each of the projected demand tables, but does not have an associated future demand due to the current uncertainty of future CCWD obligations. The District reserves the right to modify the status of these efforts as they progress for the purposes of water supply planning.

Table 4-6: District-Wide Demands for Potable and Raw Water - Projected (AFY) (DWR Table 4-2)

Use Type	Additional Description (if needed)	Projected Water Use (AF)				
		2020	2025	2030	2035	2040
Single Family	--	3,521	4,148	4,709	5,698	7,518
Multi-Family	--	25	26	27	28	28
Commercial	--	153	161	167	173	176
Institutional/ Governmental	--	94	99	102	105	108
Landscape	--	254	267	278	285	291
Landscape	--	419	440	456	470	478
Groundwater recharge[1]	--	*	*	*	*	*
Agricultural irrigation[2]	--	7,017	12,970	18,923	24,876	30,830
Sales/Transfers/ Exchanges to other agencies	--	137	138	139	140	141
Other	--	9	9	9	9	9
Losses[3]	--	2,196	2,624	3,011	3,702	4,985
	TOTAL	**13,825**	**20,882**	**27,821**	**35,486**	**44,564**

NOTES: (1) As an active user of the Eastern San Joaquin Groundwater basin, it is anticipated that CCWD will be required to participate in some form of groundwater recharge program as part of the Sustainable Groundwater Management Act; however, future demands associated with groundwater recharge are currently unknown; (2) This is a conservative estimate of agricultural demand that the District could serve in the future. CCWD will continue to evaluate the agricultural potential and the impact on demand; (3) Losses were calculated by determining the percent of losses as a total of the demand for calendar year 2015 and applying that percentage to the projected demand. Losses represent real and apparent losses; (4) Department of Finance data indicates that, between 2010 and 2015, Calaveras County has experienced a 0.6% decrease in population.

Table 4-7: District-Wide Total Water Demands (AFY) (DWR Table 4-3)

	2015	2020	2025	2030	2035	2040
Potable and Raw Water *From DWR Tables 4-1 and 4-2*	6,096	13,825	20,882	27,821	35,486	44,564
Recycled Water Demand *From DWR Table 6-4*	344	537	669	801	933	1,068
TOTAL WATER DEMAND	**6,440**	**14,362**	**21,551**	**28,622**	**36,419**	**45,632**

The following sections discuss projected demand by sub-region.

4.2.4 Sub-Region A: Calaveras River

Projected demand for Sub-Region A is shown in **Table 4-8** and includes demand for potable and raw water. Assumptions for the Jenny Lind and Sheep Ranch service areas are discussed below; individual demands associated with Jenny Lind and Sheep Ranch are included in **Appendix G**.

There are areas not currently served by the District within this Sub-Region, including the unincorporated communities of Paloma and Toyon, that use groundwater. Given the uncertainty of the supply and quality of groundwater, the District may need to backstop failing wells and serve these communities and others like them in the future. Coordination between the District and Calaveras County Environmental Health Department and Planning Department, can help identify more areas and parcels with at risk wells. These demands, while a potential District demand in the future, are not included in the projections; thus, demands may be higher than what is shown in **Table 4-8**.

There is a potential for increased agricultural production of nut crops in this Sub-Region, particularly along the Highway 26 corridor. As nut crop production moves into Calaveras County, water use associated with this production will likely increase. Future agricultural demands associated with nut crop production, including walnuts and almonds, are included in **Table 4-8** and discussed further in the sections below.

Jenny Lind Service Area

According to a recent study completed by CCWD, there is potential for agricultural development in the Valley Springs area (Provost & Pritchard, 2011). Approximately 3,400 acres were evaluated to assess potential for agricultural irrigation with surface water in the future. Though the 2010 UWMP anticipated over 5,500 acres of agricultural development beginning in 2015, projections using the Provost & Pritchard report suggest more modest growth of just over 2,500 acres of agricultural demand in 2040, as reflected by projections in **Table 4-8**. These projections include the nine current agricultural customers along with new land that may be supplied by the District. According to the American Society of Farm Managers and Rural Appraisers, *Trends in Agricultural Land and Lease Values 2015*, almond and walnut orchard development continues to put upward pressure on price levels for land that is "plantable" within the foothill regions, including Calaveras County. Further, "vineyard development has occurred over the past several years in the primary growing areas" of this region. As these permanent plantings increase in the region and within the District, the District anticipates having to meet continual increases in agricultural water demand within its service areas and these have been accounted for in **Table 4-8.**

Sheep Ranch Service Area

An October 2014 compliance order from the SWRCB's Division of Drinking Water prevents the District from adding customers or providing "will serve" letters in the Sheep Ranch area until a reliable alternate source of water is identified. As such, projected growth in demands in this area is limited to demands from existing homes. The District currently has a small number of customers in Sheep Ranch that are waiting to be served, and there are known failing wells in the community that will need to be replaced with suitable supplies in the future. As such, the District anticipates a total of five new customers through the planning horizon, which would be served through planned infrastructure improvements. Serving these existing customers would increase the number of connections to 53 by 2020 and 56 by 2025. To project the increase in demand, a baseline per person demand factor was calculated using baseline demand and estimated population in Sheep Ranch. This demand factor was multiplied by population estimates in 2020 and 2025 (resulting from the assumed increase in population associated with the additional customers CCWD anticipates serving) to project water use in Sheep Ranch. After 2025, no further change in demand is assumed due to the growth moratorium. This additional demand is reflected in **Table 4-8**.

Table 4-8: Sub-Region A Demands for Potable and Raw Water - Projected (AFY) (DWR Table 4-2)

Use Type	Level of Treatment When Delivered	Projected Water Use (AF)				
		2020	2025	2030	2035	2040
Single Family	Drinking water	1,623	1,704	1,767	1,819	1,851
Multi-Family	Drinking water	3	3	3	3	3
Commercial	Drinking water	35	36	38	39	40
Institutional/ Governmental	Drinking water	41	43	45	46	47
Landscape	Drinking water	17	18	19	19	19
Landscape	Raw water	109	114	118	122	124
Groundwater recharge[1]	--	*	*	*	*	*
Agricultural irrigation[2]	Raw water	1,704	2,345	2,985	3,626	4,267
Other	Drinking water	6	6	6	6	6
Losses[3]	--	595	625	648	667	678
TOTAL[4]		**4,133**	**4,894**	**5,629**	**6,347**	**7,035**

NOTES: (1) As an active user of the Eastern San Joaquin Groundwater basin, it is anticipated that CCWD will be required to participate in some form of groundwater recharge program as part of the Sustainable Groundwater Management Act; however, future demands associated with groundwater recharge are currently unknown; (2) This is a conservative estimate of agricultural demand that the District could serve in the future. CCWD will continue to evaluate the agricultural potential and the impact on demand; (3) Losses were calculated by determining the percent of losses as a total of the demand for calendar year 2015 and applying that percentage to the projected demand. Losses represent real and apparent losses; (4) Demands associated with communities that are not currently served by the District are not included in the above projections.

Table 4-9 below shows total water demands for Sub-Region A; this includes potable, raw, and recycled water demand.

Table 4-9: Sub-Region A Total Water Demands (AFY) (DWR Table 4-3)

	2015	2020	2025	2030	2035	2040
Potable and Raw Water *From DWR Tables 4-1 and 4-2*	3,078	4,133	4,894	5,629	6,347	7,035
Recycled Water Demand *From DWR Table 6-4*	139	199	233	267	301	336
TOTAL WATER DEMAND	**3,217**	**4,332**	**5,127**	**5,896**	**6,648**	**7,371**

4.2.5 Sub-Region B: Stanislaus River

Projected demand for Sub-Region B is shown in **Table 4-10** and includes demand for potable and raw water. Assumptions for the Ebbetts Pass and Copper Cove service areas are discussed below; individual demands associated with Ebbetts Pass and Copper Cove are included in **Appendix G**.

There are areas not currently served by the District within this Sub-Region, including the Diamond XX Ranch Estates and Circle XX Ranch, that use groundwater. Given the uncertainty of the supply and quality of groundwater, the District may need to backstop failing wells and serve these communities and others like them in the future. Coordination between the District and Calaveras County Environmental Health Department and Planning Department, can help identify more areas and parcels with at risk wells. These demands, while a potential District demand in the future, are not included in the projections; thus, demands may be higher than what is shown in **Table 4-10**.

Ebbetts Pass Service Area

Wholesale water use in Ebbetts Pass, shown in the tables below as sales/transfers/exchanges, was developed as discussed in approach 3 above. However, because Fly-in Acres was incorporated in 2014 and the District began serving Blue Lake Springs in late 2015, the baseline water use period of 2009-2013 is not representative of current water use. As such, the baseline water demand used for this service area is the sum of the 2009-2013 average for Snowshoe Springs (similar to the baseline methodology implemented for other service areas) and the estimated annual water demand for Blue Lake Springs based on the agreement in **Appendix H**.

According to *Trends in Agricultural Land and Lease Values 2015*, Calaveras County has opportunity for almond and walnut orchard development in the foothill regions, as well as continued vineyard development in current growing areas, including wineries around the Murphys area. As these permanent plantings increase in the region and within the District, the District anticipates having to meet continual increases in agricultural water demand within its service areas**.** The 2010 UWMP anticipated 1,000 acres of raw water agricultural land irrigation in the Murphys area in the short-term with additional growth in the future, associated with the purchase of the Cataract Mine Cement Slurry Line. CCWD is in the final process of purchasing that conveyance (slurry line). Under SWRCB Order WR No. 97-05, up to 1,000 AFY may be diverted through the cement slurry line and used for raw water/agricultural demand in the Murphys vicinity along the Highway 4 corridor to Calaveritas, located south of San Andreas in Central Calaveras County. This is included in the Provost & Pritchard agricultural demand projections shown in **Table 4-10**, which is estimated to reach about 26,563 AFY

in 2040 for the entire Sub-Region if all potential agricultural land outside of the District (about 25,800 acres at build-out) is supplied by CCWD surface water.

As per its 1997 water rights filings, CCWD reserves the right to serve water supplies to communities along the Highway 4 Corridor, outside of its current service area. The District plans to begin providing that water to single family residential and agricultural customers, beginning with 1,000 AFY by 2025 and increasing to 7,000 AFY in 2040. These supplies and their verified demand would need to be developed in coordination with the water purveyors in the areas outside of CCWD's service area, including the Utica Water and Power Authority, Union Public Utilities District, and the City of Angels. These projections are included in all demand projections and in **Table 4-10**.

Copper Cove Service Area

The 2010 UWMP estimated that five new golf courses would receive both recycled water and raw water. Planning on these golf courses has stalled and it is currently expected that, if any golf courses are constructed, they will be served with primarily recycled water. Therefore, large raw water landscape growth is not reflected in the demand projections. A recent study (Provost & Pritchard 2011) found nearly 26,000 acres of land in the Copper Cove Service Area to be suitable for irrigated agricultural development, including the production of almonds, vineyard, pistachios and stone fruits in the Salt Springs and Copperopolis areas that make up portions of the Copper Cove service area. Much of the demands that are discussed in the study are outside of the District's current boundaries, but still within the "sphere of influence" and so may be developed in the future. CCWD plans to further study the potential for increased agricultural needs in the future. These projections are included in the demand projections in **Table 4-10**.

Table 4-10: Sub-Region B Demands for Potable and Raw Water - Projected (AFY) (DWR Table 4-2)

Use Type	Level of Treatment When Delivered	Projected Water Use (AF)				
		2020	2025	2030	2035	2040
Single Family	Drinking water	1,725	2,262	2,754	3,685	5,469
Multi-Family	Drinking water	22	23	24	25	25
Commercial	Drinking water	111	117	121	125	127
Institutional/ Governmental	Drinking water	45	48	49	51	52
Landscape	Drinking water	237	249	259	266	272
Landscape	Raw water	310	326	338	348	354
Groundwater recharge[1]	--	*	*	*	*	*
Agricultural irrigation[2]	Raw water	5,313	10,625	15,938	21,250	26,563
Sales/Transfers/ Exchanges to other agencies	Drinking water	137	138	139	140	141
Other	Drinking water	3	3	3	3	3
Losses[3]	--	1,520	1,914	2,274	2,944	4,214
TOTAL[4]		**9,423**	**15,705**	**21,899**	**28,837**	**37,220**

NOTES: (1) As an active user of the Eastern San Joaquin Groundwater basin, it is anticipated that CCWD will be required to participate in some form of groundwater recharge program as part of the Sustainable Groundwater Management Act; however, future demands associated with groundwater recharge are currently unknown; (2) This is a conservative estimate of agricultural demand that the District could serve in the future. CCWD will continue to evaluate the agricultural potential and the impact on demand; (3) Losses were calculated by determining the percent of losses as a total of the demand for calendar year 2015 and applying that percentage to the projected demand. Losses represent real and apparent losses; (4) Demands associated with communities that are not currently served by the District are not included in the above projections.

Table 4-11 shows total water demands for Sub-Region B; this includes potable, raw, and recycled water demand.

Table 4-11: Sub-Region B Total Water Demands (AFY) (DWR Table 4-3)

	2015	2020	2025	2030	2035	2040
Potable and Raw Water *From DWR Tables 4-1 and 4-2*	2,832	9,423	15,705	21,899	28,837	37,220
Recycled Water Demand *From DWR Table 6-4*	205	338	436	534	632	732
TOTAL WATER DEMAND	**3,037**	**9,761**	**16,141**	**22,433**	**29,469**	**37,952**

4.2.6 Sub-Region C: Mokelumne River

As this area is more remote, there is less growth expected than in the western side of the County. The CCWD study on agricultural development did not include the West Point service area, as the study focused on the western portion of Calaveras County due to its suitable soils, terrain, and elevation (Provost & Pritchard 2011). That is not to say that there are not potential areas of agricultural demand in this Sub-Region. However, given the limited access to existing infrastructure and topography within the District's current delivery system and the smaller parcel size of the currently designated agricultural use categories, it is hard to establish or determine verifiable agricultural demands for this Sub-Region until the County General Plan Update is finalized or further technical evaluation by the District is completed. Therefore, agricultural demands are not included in **Table 4-12** or **Table 4-13**. However, the District intends to further study the agricultural irrigation potential within the Mokelumne River Sub-Region to better understand and plan for future demands associated with agriculture.

Table 4-12 shows demands for potable and raw water within Sub-Region C.

Table 4-12: Sub-Region C Demands for Potable and Raw Water - Projected (AFY) (DWR Table 4-2)

Use Type	Level of Treatment When Delivered	Projected Water Use (AF)				
		2020	2025	2030	2035	2040
Single Family	Drinking water	120	126	130	134	137
Commercial	Drinking water	6	6	6	7	7
Institutional/Governmental	Drinking water	8	8	8	8	9
Groundwater recharge[1]	--	*	*	*	*	*
Agricultural irrigation[2]	--	*	*	*	*	*
Losses[3]	--	73	77	80	82	84
TOTAL[3]		**207**	**217**	**224**	**231**	**237**

NOTES: (1) As an active user of the Eastern San Joaquin Groundwater basin, it is anticipated that CCWD will be required to participate in some form of groundwater recharge program as part of the Sustainable Groundwater Management Act; however, future demands associated with groundwater recharge are currently unknown; (2) The CCWD study on agricultural development did not include the West Point service area, however there may be some areas that will see increased agricultural irrigation associated with nut production and cannabis. CCWD will continue to evaluate the agricultural potential and the impact on demand; (3) Losses were calculated by determining the percent of losses as a total of the demand for calendar year 2015 and applying that percentage to the projected demand. Losses represent real and apparent losses; (3) Additional capacity may be needed to meet these future projected demands.

Table 4-13 below shows total water demands for Sub-Region B; this includes potable, raw, and recycled water demand.

Table 4-13: Sub-Region C Total Water Demands (AFY) (DWR Table 4-3)

	2015	2020	2025	2030	2035	2040
Potable and Raw Water *From DWR Tables 4-1 and 4-2*	141	207	217	224	231	237
Recycled Water Demand *From DWR Table 6-4*	0	0	0	0	0	0
TOTAL WATER DEMAND	**141**	**207**	**217**	**224**	**231**	**237**

4.2.7 Sub-Region D: Groundwater

Table 4-14 below shows the projected demand for raw and potable water in Sub-Region D; this includes potable, raw, and recycled water demand.

Table 4-14: Sub-Region D Demands for Potable and Raw Water - Projected (AFY) (DWR Table 4-2)

Use Type	Level of Treatment When Delivered	Projected Water Use (AF)				
		2020	2025	2030	2035	2040
Single Family	Drinking water	53	56	58	60	61
Commercial	Drinking water	1	2	2	2	2
Losses[1]	--	8	8	9	9	9
TOTAL[2]		**62**	**66**	**69**	**71**	**72**
NOTES: (1) Losses were calculated by determining the percent of losses as a total of the demand for calendar year 2015 and applying that percentage to the projected demand. Losses represent real and apparent losses; (2) Additional capacity may be needed to meet these demands, particularly if a portion of th these demands will be met with surface water.						

Table 4-15 shows total water demands for Sub-Region B; this includes potable, raw, and recycled water demand.

Table 4-15: Sub-Region D Total Water Demands (AFY) (DWR Table 4-3)

	2015	2020	2025	2030	2035	2040
Potable and Raw Water *From DWR Tables 4-1 and 4-2*	45	62	66	69	71	72
Recycled Water Demand *From DWR Table 6-4*	0	0	0	0	0	0
TOTAL WATER DEMAND	**45**	**62**	**66**	**69**	**71**	**72**

4.3 Distribution System Water Losses

This section quantifies distribution system water losses for each of the District's four sub-regions. Distribution system water losses include water physically lost from the water distribution system and the supplier's storage facilities, up to the point of customer consumption. Water loss between the treatment plant and customer usually occurs as a result of system leaks. However, other uses also can cause unmetered water usage such as fire flows, system flushing activities, construction activities, illegal connections, theft, under-registering water meters, and others.

Losses were calculated using the American Water Works Association's (AWWA) Water Loss Audit worksheet. District-wide losses in calendar year 2015 were roughly 1,450 AFY, as shown in **Table 4-16** below; this represents almost 24% of total District demand. Distribution water loss for each sub-region is included in the water demand tables presented in this chapter. The full water loss reporting analysis is included in **Appendix I**.

Table 4-16: All Sub-Regions 12 Month Water Loss Audit Reporting (DWR Table 4-4)

Sub-Region	Reporting Period Start Date	Volume of Water Loss* (AF)
A (Calaveras)	01/2015	389
B (Stanislaus)		1,002
C (Mokelumne)		50
D (Groundwater)		6
TOTAL		**1,447**
NOTES: The volume of water lost represents both real and apparent losses in calendar year 2015 and was calculated using the AWWA worksheet.		

4.4 Estimating Future Water Savings

As shown in **Table 4-18**, future water savings were not explicitly included in projections. However, because demand projections are based on an increase to existing demands, which include passive savings, passive savings are implicitly included in the demand projections presented throughout the UWMP.

4.5 Water Use for Lower Income Households

State legislation (SB 1087 and Government Code §65589.7) effective January 1, 2006 requires local water agencies and wastewater collection and treatment districts to grant priority to service connections for projects that help meet the community's fair housing need. For the purposes of assessing fair housing needs, a lower-income household is defined as a household with an income that is less than 80 percent of the statewide median household income (MHI), adjusted for family size. In December 2015, the statewide unemployment rate was 5.7 percent; Calaveras County had a 6.3 percent unemployment rate, with many rural communities experiencing a much higher unemployment rate, some as high as 10 percent. The boom and bust cycle of mining, timber harvesting, and tourism has left many rural communities in the County perennially disadvantaged with MHI well below the state threshold. CCWD serves many of these communities, including West Point and portions of Ebbetts Pass. The 2010-2014 American Community Survey estimates that the MHI for West Point is $28,262 and that the MHI for Avery, an area in Ebbetts Pass, is $31,719, which is 46% and 52% respectively of the statewide median household income of $61,489.

Calaveras County adopted an updated Housing Element in May 2015 that estimates low-income housing needs through 2019. The total required new housing units in unincorporated areas of the County are estimated at 1,079, of which 416 are designated as low-income. Based the population summary presented in Section 3.4, CCWD serves approximately 65 percent of the total population in

the County. It is assumed this percent can also be applied to estimate the low-income housing needs; therefore, it is assumed that CCWD will be serving 270 low-income households. Average District-wide water use per single family residential account is a little over 0.25 AF/connection/year, though this value varies across service areas. The total demand for these low-income households is estimated to be 71 AFY in 2020, or 2 percent of total single family demand. Assuming this stays constant in the future, low-income household water demand will grow to 153 AFY in 2040, as shown in **Table 4-17**.

Table 4-17: Low-Income Household Water Demand (AFY)

	2020	2025	2030	2035	2040
Low-Income Housing Water Demand (AFY)	71	84	96	116	153

As indicated in **Table 4-18**, low-income household demand is included in the demand projections presented in this chapter.

Table 4-18: Inclusion in Water Use Projections (DWR Table 4-5)

Component	Included?
Are Future Water Savings Included in Projections?	No
If "Yes" to above, state the section or page number where citations of the codes, ordinances, etc. utilized in the demand projections are found	N/A
Are Lower Income Residential Demands Included In Projections?	Yes

4.6 Climate Change

In general, water demand varies based on precipitation and temperature. Changes in precipitation and temperature due to climate change will likely result in increased evaporation leading to drier soils, increased plant ETo, and a longer growing season. All of these factors generally increase water demand. Because the District's service area includes large portions of forested and agricultural areas, including grazing and wine grapes, climate change could have significant impacts on future projected agricultural demands. These impacts would likely include higher water use in the summer months and, as a result of potentially longer growing seasons, higher demands in months that are currently considered to be months with low irrigation demand. These effects, when combined, would result in higher annual agricultural demands.

Additionally, residential and commercial water use could increase as a result of changes in climate. The District has been successful reducing demands with conservation measures, including implementation of various stages of the water shortage contingency plan. However, as demand hardens in the future, and because the District is heavily dependent on precipitation-driven supplies, the region may become more vulnerable to shortages.

5 Baselines and Targets

The Water Conservation Act of 2009, also known as SB X7-7, requires the state to reduce its urban water demands 20 percent by 2020 (referred to as 20x2020). The California Department of Water Resources (DWR) developed methodologies and procedures for demonstrating compliance with 20x2020 (included in the DWR 2010 and 2015 UWMP Guidelines). This section presents the baseline population analysis, baseline demand, and target development to meet 20x2020 compliance. All suppliers are required to submit the SB X7-7 Verification Form, which is included as **Appendix J**.

5.1 Updating Calculations from the 2010 UWMP

CCWD's 2010 UWMP described the methodology and calculation of the District's baseline demand and 2020 and 2015 per capita water use reduction targets. The 2010 UMWP calculated a baseline demand of 215 GPCD for 2000 through 2009 and determined a 2015 goal of 195 GPCD and a 2020 goal of 172 GPCD. After examining sample of data from DOF, DWR determined that significant discrepancies exist between DOF-projected populations for 2010 (based on 2000 Census data) and actual population for 2010, as compiled by the U.S. Census. Therefore, DWR has required water suppliers that did not use 2010 Census data for their baseline population calculations in the 2010 UWMP to recalculate their baseline population in the 2015 UWMP. This update, along with the SBX7-7 baseline and target calculation methodologies, is described in this chapter.

5.2 Service Area Population

The 2015 UWMP Guidelines require that populations be determined using 2000 and 2010 data from the U.S. Census. The Guidelines recommend several methodologies for calculating service area population, including use of DOF data for cities and census designated places or DWR's Population Tool. These methods are not appropriate for the District, as its service area does not match up closely with a city or census-designated place(s), and the DWR Population Tool does not adequately capture the rural population within the District's service area. As a result, the District has elected to use an alternate method to calculate population that is similar to the Persons-per-Connection method described in the Guidelines and is based on 2000 and 2010 U.S. Census data. Baseline population estimates are summarized below in **Table 5-1**. A more detailed discussion on the methodology for determining historical population is included in **Appendix K**. It should be noted that, per DWR instructions, seasonal population is not accounted for in this analysis; only permanent population is included.

5.3 Gross Water Use

Gross water use is defined in the Guidelines as the amount of water that enters the District's distribution system over a 12 month period (a calendar year in this UWMP). There are certain allowable exclusions from this measure of water, including recycled water, water placed into long term storage, wholesale deliveries, water delivered for agricultural use, and process water. Thus, water delivered for these uses has been excluded from this analysis.

5.4 Baseline Daily per Capita Water Use

The population served, water supplied, and resulting GPCD values are summarized in **Table 5-1**. Each year's GPCD is calculated by dividing the gross water use in that year by the service area population calculated for that year. The 10-year average GPCD has been calculated and is included in

the table. The UWMP Guidelines list the methodologies to be followed for 20x2020 compliance, including the baseline demand analysis. The baseline demand is the average annual per capita demand during a 10-year period ending no earlier than 2004. A 15-year average is allowed if recycled water use in 2008 was greater than 10 percent of total water use. The District's 2008 recycled water use was less than 10 percent of total water use; therefore, a 10-year average is used for the baseline calculations. CCWD has selected the 10-year period from 2000-2009 as its baseline period, with an average water use of 240 GPCD. This baseline is slightly greater than that calculated in the 2010 UWMP because the population derived from 2010 U.S. Census data used in this calculation was slightly less than the population used for the 2010 UWMP.

Per the UWMP Guidelines, the 2020 goal must be no more than 95 percent of a five-year GPCD average ending no earlier than 2007. The 2008 five-year average of 242 GPCD was selected for use in this analysis. The actual 2015 GPCD of 179 is also shown in **Table 5-1**.

Table 5-1: Gallons Per Capita per Day (GPCD) (SB X7-7 Table 5)

Baseline Year		Service Area Population	Annual Gross Water Use	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	2000	15,989	4,207	235
Year 2	2001	16,475	4,652	252
Year 3	2002	17,190	4,651	242
Year 4	2003	18,004	4,548	226
Year 5	2004	19,041	5,293	248
Year 6	2005	20,021	5,145	229
Year 7	2006	20,983	5,485	233
Year 8	2007	20,436	5,833	255
Year 9	2008	20,821	5,728	246
Year 10	2009	20,726	5,370	231
10-15 Year Average Baseline GPCD				**240**
5 Year Baseline GPCD				
Year 1	2004	19,041	5,293	248
Year 2	2005	20,021	5,145	229
Year 3	2006	20,983	5,485	233
Year 4	2007	20,436	5,833	255
Year 5	2008	20,821	5,728	246
5 Year Average Baseline GPCD				**242**
2015 Compliance Year GPCD				
2015		20,698	4,141	**179**

5.5 Water Use Targets

There are four target methodologies as allowed by the DWR in the 2010 UWMP Guidelines for calculating the 2015 and 2020 year GPCD targets:

1. 20 percent reduction of baseline demand;
2. Adherence to indoor residential, landscape, and commercial, industrial, and institutional (CII) use performance standards;
3. 95 percent of 2020 Task Force hydrologic region goal of 165 GPCD; and
4. Calculated potential savings by water sector.

CCWD has selected Method 1 (20 percent of baseline demand) to set its 2020 target. With a baseline demand of 240 GPCD, the 2020 goal is 192 GPCD, and the 2015 goal, which is halfway between the baseline and 2020 target, is 216 GPCD. The selected base year information and selected targets are summarized in **Table 5-2** and **Table 5-3**, respectively.

Table 5-2: Baseline Period Ranges (SB X7-7 Table 1)

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	4,390	Acre Feet
	2008 total volume of delivered recycled water	217	Acre Feet
	2008 recycled water as a percent of total deliveries	4.94%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	2000	
	Year ending baseline period range	2009	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2004	
	Year ending baseline period range[4]	2008	

NOTES: (1) If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period; (2) The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data; (3) The ending year must be between December 31, 2004 and December 31, 2010; (3) The ending year must be between December 31, 2004 and December 31, 2010; (4) The ending year must be between December 31, 2007 and December 31, 2010.

Table 5-3: Baselines and Targets Summary (DWR Table 5-1)

Baseline Period	Start Year	End Year	Average Baseline GPCD[1]	2015 Interim Target[1]	Confirmed 2020 Target[1]
10-15 year	2000	2010	240	216	192
5 Year	2004	2008	242		
NOTES: (1) All values are in Gallons per Capita per Day (GPCD)					

5.6 2015 Compliance

The District's actual 2015 GPCD was calculated using the same method as described above to calculate GPCD during the baseline period (that is, dividing 2015 water demands by the District's 2015 population). A GPCD of 179 was calculated for 2015, thus demonstrating that the District met and exceeded both the 2015 target GPCD of 216 and the 2020 target of 192 GPCD. Compliance with the 2015 target is demonstrated in **Table 5-4**. No GPCD adjustments are needed.

Table 5-4: 2015 Compliance (DWR Table 5-2; SB X7-7 Table 9)

Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments to 2015 GPCD					2015 GPCD *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		Extraordinary Events	Economic Adjustment	Weather Normalization	TOTAL Adjustments	Adjusted 2015 GPCD		
179	216	0	0	0	0	179	179	Yes
NOTES: All values are in Gallons per Capita per Day (GPCD)								

6 System Supplies

Reliable water supplies are vital to Calaveras County. According to the 2010 U.S. Census, Calaveras County was among the fastest growing areas in California between 2000 and 2010, in terms of annual percent increases.

Groundwater, while important to local domestic water users in Calaveras County, is limited and typically characterized by both quantity and quality issues with an expanding list of domestic well users experiencing well failures and the resulting health and safety issues surrounding finding an alternative water supply. Unlike alluvial groundwater basins in the Central Valley that provide a primary water supply source or a water supply 'safety net' in times of drought, Calaveras County water users must rely upon the annual and seasonal uncertainties of precipitation cycles, surface water storage, and the efficient use of available surface water supplies.

Recycled water is also in integral part of the County's integrated water resources supply portfolio. CCWD, as the County's retail and wholesale water purveyor, understands the importance of treating and using recycled water to reduce potable water demands.

When considering the uncertainty of groundwater in Calaveras County, surface water availability is essential to maintaining adequate supply for the County's residents. CCWD was founded on the premise of securing and developing an adequate surface water supply source for the build-out of the County's needs. To this end, the District proactively seeks to develop and secure its water rights to fulfill its obligations to meet water demands within Calaveras County. This chapter describes the District's water supplies, including source, quantities, constraints, and water quality. Current and projected water supplies are also presented.

The following sections describe the District's water supply sources. Each source, and associated tables, is discussed by Sub-Region; District-wide tables are presented in **Appendix A**.

6.1 Purchased Water

CCWD purchases a secondary water supply under contract from the Calaveras Public Utility District (CPUD) to serve customers in the West Point service area (Sub-Region C). The district accesses storage in CPUD's Schaads Reservoir via a direct diversion on the Middle Fork of the Mokelumne River. The contract allows for the purchase of up to 200 AFY. CCWD has historically accessed this water during periods of curtailment or when CCWD's Bear Creek water quality is impacted by dry conditions. As discussed in Chapter 7, projected demands are expected to exceed the water available through CPUD's Bear Creek right.

6.2 Groundwater

6.2.1 Sub-Region A – Calaveras River

Sub-Region A has no groundwater supplies.

6.2.2 Sub-Region B – Stanislaus River

Sub-Region B has no groundwater supplies.

6.2.3 Sub-Region C - Mokelumne River

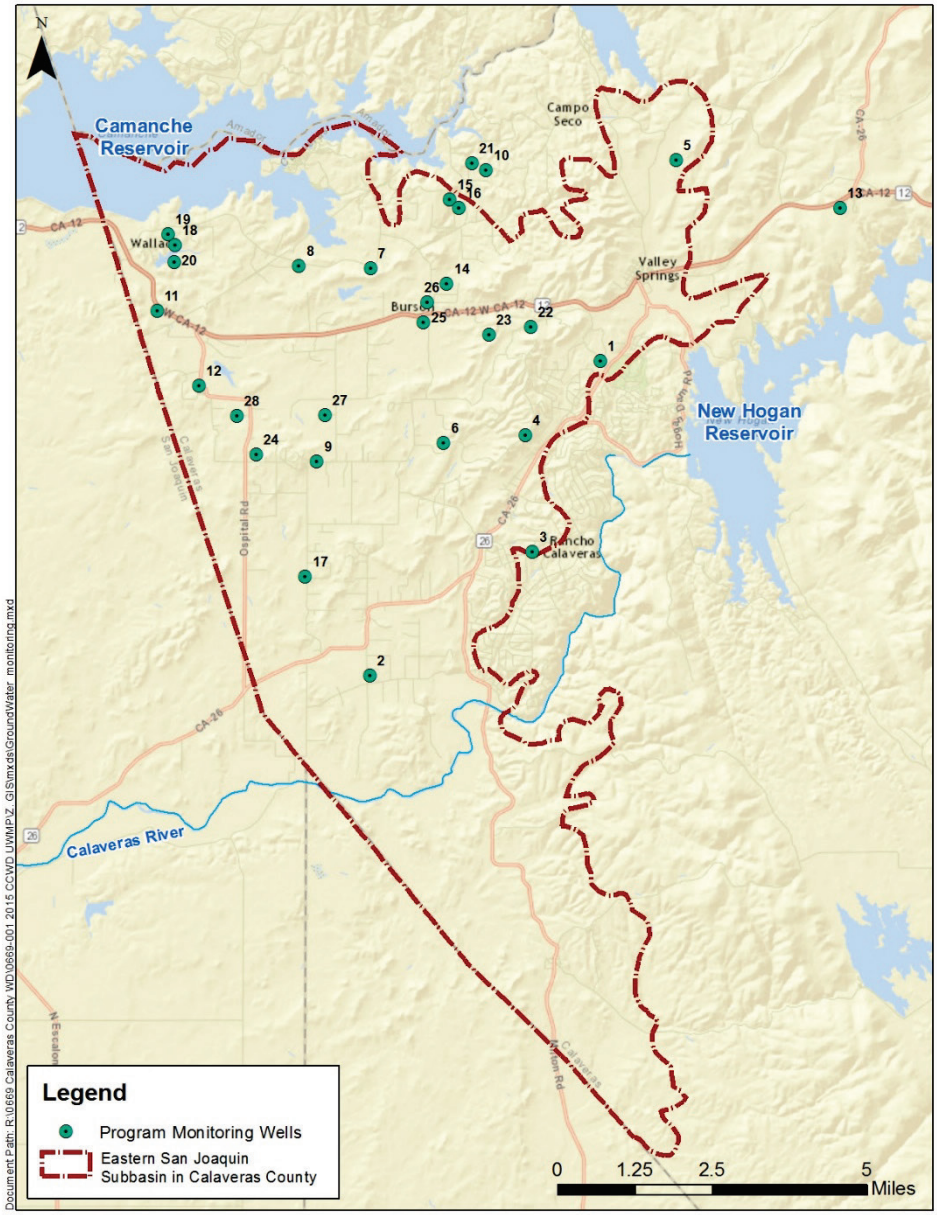
Sub-Region C has no groundwater supplies.

6.2.4 Sub-Region D – Groundwater

Basin Description

Historically, groundwater has not been a long-term reliable source of water supply for large areas of the District. Available groundwater comes from fractured rock systems which characteristically produce small and unpredictable yields. However, the Camanche/Valley Springs Area, illustrated in **Figure 6-1**, is part of the Eastern San Joaquin Groundwater Subbasin (DWR Bulletin 118, *California's Groundwater*), which is identified by Bulletin 118 as being in a state of critical overdraft.

Figure 6-1: Eastern San Joaquin Groundwater Subbasin Map



Groundwater Management

In response to the undesirable impacts to groundwater levels and groundwater quality in the Camanche/Valley Springs area, CCWD utilized Assembly Bill No. 3030 (AB 3030, 1992) and the resultant state regulations to adopt a Groundwater Management Plan (GWMP) for the Camanche/Valley Springs Area in 2001 which was subsequently updated in 2007.[1] An AB 303 Local

[1] A copy of the Groundwater Management Plan Update can be found at: http://ccwd.org/pdf/pub/watermanagement/CCWD%20GWMP%202007%20Update_011608.pdf

Groundwater Assistance (LGA) grant funded a groundwater investigation that was completed in 2003-2004 which identified opportunities to improve management of groundwater resources in western Calaveras County (Water Resources & Information Management Engineering, Inc. 2003). A *Phase II Groundwater Management Study*, completed in June 2005, was developed to update the District's Groundwater Management Plan to make it consistent with SB 1938, Basin Management Objectives. CCWD was successful in receiving a second AB 303 LGA grant to cooperatively work with DWR and the U.S. Geological Survey (USGS) to install multi-completion monitoring wells in the west county area to complement the existing groundwater level monitoring program.[2] In 2013, the District undertook a study to identify specific recharge opportunities within its portions of the subbasin; this Technical Memorandum was titled *Groundwater Characteristics And Recharge Implications Near Lake Camanche And Valley Springs, California* (Dunn Environmental 2013). Based on these efforts, the District is currently evaluating the most effective methods to conjunctively manage its water resources within the County, including the use of its permitted surface water rights for groundwater recharge. The District continues to study the groundwater basin in the Camanche/Valley Springs area to determine potential management methods to improve the basin and/or its potential for conjunctive use to meet future water supply needs within the region. Currently, the District does not include groundwater in its projected supplies due to the general availability of surface water to meet current service area needs.

Overdraft Conditions

Use of groundwater from the Eastern San Joaquin Groundwater Subbasin for irrigation, domestic, and municipal purposes has resulted in a continuous decline of available groundwater over the past 40 years. DWR designated the Eastern San Joaquin Groundwater Subbasin as "critically overdrafted" in Bulletin 118 and in its recent designation under SGMA. The Subbasin is currently being managed under an AB 3030 Groundwater Management Plan. The Camanche/Valley Springs area is managed under a separate GWMP, adopted by CCWD in 2001, for investigation of opportunities to improve management of groundwater resources in western Calaveras County (UMRWA 2013).

The Eastern San Joaquin Groundwater Subbasin is currently overdrafted at a rate of approximately 70,000 to 80,000 AFY (GBA 2014). Between 140,000 and 160,000 AFY of water is anticipated to be needed by 2030 to reverse overdraft conditions and stabilize the groundwater basin at target levels, assuming an estimated 2030 level of development as specified in either adopted or draft general planning documents (GBA 2007). Long-term groundwater overdraft has had dramatic effects on groundwater levels. Portions of the Subbasin have exhibited groundwater levels declining by as much as 2 feet per year, up to 90 feet below sea level (GBA 2007). Even with conservation and recycled water programs in place, reversing groundwater overdraft will require a substantial amount of supplemental water (GBA 2007).

In addition, the SGMA legislation requires that GSAs with high and medium priority basins prepare a GSP that includes (among other things):*"A description of surface water supply used or available for use for groundwater recharge or in-lieu use (WC 10727.2§(d)(5))."*

To reduce long-term overdraft the District is currently considering moving its groundwater customers to surface water. The District is also collaborating with other basin users to identify a GSA and develop a GSP as part of complying with SGMA requirements. Through these efforts, the District

[2] Note: multi-completion simply means a nest of monitoring wells within a large-diameter borehole, sealed and screened at different vertical depths within the geologic profile.

and other basin users will work to eliminate long-term overdraft conditions in the Eastern San Joaquin Groundwater Subbasin.

Historical Groundwater Pumping

Table 6-1 below shows historical groundwater pumping from the Eastern San Joaquin Groundwater Subbasin by CCWD. Groundwater used by the District has historically been unreliable in both quality and supply. As mentioned above, the District is currently considering supplementing groundwater use with surface water, thereby increasing reliability for its current groundwater customers.

Table 6-1: Groundwater Volume Pumped (AFY) (DWR Table 6-1)

Groundwater Type	Location or Basin Name	2011	2012	2013	2014	2015
Alluvial Basin	Eastern San Joaquin Groundwater Subbasin	48	18	65	54	45
	TOTAL	**48**	**18**	**65**	**54**	**45**

6.3 Surface Water

The District obtains its water supply from three main watersheds that drain the western slope of the Sierra Nevada Mountains and foothills before it enters the northern San Joaquin Valley. The snow-fed North Fork of the Stanislaus River forms the District's southern boundary and serves communities from the Ebbetts Pass area in the east to the Copper Cove/Copperopolis area in the west. The lower elevation Calaveras River watershed is wholly enclosed in the District's boundaries and serves the middle and northwestern portion of the District. The snow-fed Mokelumne River serves as the District's northern boundary, and provides water supply to the West Point/Wilseyville community. Plans to extend treated and raw surface water from the Mokelumne River to the Valley Springs/Wallace area are presently being conducted.

The three primary sources of surface water currently serving the geographically-independent service areas are summarized in **Table 6-2** and shown in **Figure 3-1**.

Table 6-2: CCWD Service Area Surface Water Source

Service Area	Sub-Region	Supply River Watershed
Jenny Lind/Valley Springs	A	Calaveras River
Sheep Ranch	A	Calaveras River
Copper Cove/Copperopolis	B	North Fork Stanislaus River
Ebbetts Pass	B	North Fork Stanislaus River
West Point	C	Mokelumne River

Each supply source is discussed in the subsections below. Many factors, such as water rights, permits, contracts, hydrologic factors, and infrastructure restrictions limit actual supply availability and reliability. The District is actively collaborating with stakeholders, both in the county and downstream outside of Calaveras County, to evaluate the potential for regional projects to improve water supply reliability, identify opportunities for environmental benefits and groundwater recharge, and provide drought protection within its service areas.

6.3.1 Sub-Region A - Calaveras River

The Calaveras River watershed is located entirely within the District's boundary. The headwaters are located in mid-level elevations, just north of Highway 4 near Arnold. The Calaveras River is a unique river for the foothill area because the watershed is at lower elevations and contains little snowpack; therefore, the river flow is mostly rain-dependent, which gives it an annual runoff pattern much different than other snowpack-based rivers. The watershed above New Hogan Reservoir is approximately a 400-square mile watershed, which ranges from elevations of approximately 5,000 feet above mean sea level (MSL) at the top of the Summit Level Ridge, down to near sea level at its confluence with the lower San Joaquin River. The elevation is 550 feet at New Hogan Reservoir. Annual precipitation in the watershed from 1948 to 2007 at the upper elevations ranged from 22 inches in 1977 to 109 inches in 1983. Annual precipitation from 1956 to 2004 at the lower elevation in San Andreas ranged from 10 inches in 1977 to 52 inches in 1998. San Andreas data for 1983 were not available to compare the maximum annual precipitation in the upper basin.

The Calaveras River flows from central Calaveras County into New Hogan Reservoir, owned by USBR. Water released from the reservoir flows westerly in the lower Calaveras River, out of Calaveras County and into the San Joaquin Valley. The New Hogan Reservoir is operated by the U.S. Army Corps of Engineers (USACE) for flood control and by the Stockton East Water District (SEWD) (on behalf of itself and CCWD) for water conservation.

The District serves two of its service areas using the Calaveras River and tributaries. The following describes the Calaveras River supply for the Jenny Lind/Valley Springs and Sheep Ranch service areas.

Calaveras River Rights and Permits

The District holds water right permits for storage and diversion on the Calaveras River. White Pines is a 250 AF reservoir owned by CCWD, located in the upper watershed on San Antonio Creek, a tributary to the Calaveras River. The District holds a license for 25 AFY of storage, plus pre-1914 water rights. This supply serves the Sheep Ranch system.

The District obtains water from the Calaveras River system at New Hogan Reservoir pursuant to agreements with the USBR and SEWD. The agreements allocate 43.5 percent of the New Hogan Project "conservation storage" yield to CCWD, typically estimated at 30,928 AFY based on average long-term estimated yield, plus 350 AFY in downstream riparian demands from New Hogan, for a total of 31,278 AFY. Under the agreement with USBR, USBR holds the water right permit for New Hogan Reservoir on behalf of CCWD and SEWD. This agreement is not a CVP contract and CCWD is not a CVP contractor. CCWD owns a 3.15 MW hydroelectric generation facility at the base of the dam, operated by Modesto Irrigation District. The District diverts its consumptive allocation downstream of the New Hogan powerhouse through an infiltration gallery located in the streambed. Private agricultural users divert water pursuant to settlement rights, and pay the District for use. La Contenta Golf Course diverts from New Hogan Reservoir under CCWD's water use contract and pays CCWD for its use. La Contenta's primary supply source is CCWD's Title 22 recycled water, with New Hogan raw water as its secondary supply to meet its agronomic needs.

6.3.2 Sub-Region B - North Fork of the Stanislaus River

The North Fork of the Stanislaus River watershed is located on the District's southern boundary, with its headwaters in Alpine, Tuolumne, and Calaveras Counties. The North Fork of the Stanislaus River forms the Calaveras-Tuolumne County boundary. The 1,075 square-mile watershed ranges in elevation from 10,000 feet MSL in the Sierra Nevada to approximately 25 feet MSL elevation at its confluence with the lower San Joaquin River. The elevation at the western Calaveras County line is about 200 feet MSL. Annual precipitation from 1948 to 2007 at the mid-level elevations ranged from 22 inches in 1977 to 109 inches in 1983.

Water is stored in the upper reaches of the watershed in four main reservoirs as part of the District's North Fork Stanislaus River Project. New Spicer Meadow, Union, Utica, and Lake Alpine Reservoirs are operated for hydropower and consumptive uses by CCWD and the Northern California Power Agency (NCPA). The District's North Fork Stanislaus River Project was designed in the 1940s to provide water storage facilities, with hydropower facilities added as a component of the project to provide revenue to fund water development. Construction began in 1985 and facilities were placed on-line in 1990. Build-out of the North Fork Stanislaus River project combines water usage and electric power generation in an environmentally-sound manner, while also providing recreation and water supply. CCWD holds the 50-year FERC Project 2409 license and associated water rights. The NCPA operates the North Fork Project facilities as the project manager.

Flows in the lower Stanislaus River are regulated by the 2,420,000 AF multi-purpose storage facility New Melones Reservoir. New Melones was built and completed in 1978 by the U.S. Army Corps of Engineers with USACE operating the reservoir for flood control and the USBR operating as the water purveyor during non-flood control season. Tulloch Reservoir, owned and operated by the Tri-Dam Project for hydropower, consumptive use, and recreation purposes, is immediately downstream of the larger New Melones Reservoir. CCWD maintains water supply intake facilities at Tulloch Reservoir to meet water supply demands in the Copper Cove/Copperopolis area. Water released from Tulloch then flows west, out of Calaveras County and into the San Joaquin Valley.

The District serves the water supply needs of Ebbetts Pass and Copper Cove/Copperopolis using the diversion and re-diversion of surface water supplied from the North Fork of the Stanislaus River, via the North Fork Hydroelectric Project.

CCWD North Fork Stanislaus River Rights and Permits

The District holds pre-1914 and post-1914 rights for hydropower and consumptive use on the Stanislaus River system and is the county-of-origin supplier for purposes of State filings. The District entered into an agreement with the NCPA when developing the North Fork Stanislaus River Hydroelectric Development Project. The agreement provides that all water developed by the project will be available for production of power on schedules determined by NCPA, except for consumptive uses by CCWD, flow downstream of the Collierville Powerhouse, and mandatory releases required by state or federal agencies.

The District maintains numerous filings and rights on the North Fork Stanislaus River for diversions and storage, with some acquired prior to 1914. Pursuant to the terms and conditions of its post-1914 water right permits, and agreements with NCPA, the District can divert up to 8,000 AFY to supply the Ebbetts Pass system, and up to 6,000 AFY from Lake Tulloch to supply the Copper Cove/Copperopolis system. Some or all of these amounts can be increased if CCWD files a change petition with the SWRCB and demonstrates the need for increased supplies within its service area. Pursuant to contractual arrangements with NCPA and the Utica Power Authority, the District can also access pre-1914 water supplies from the North Fork Stanislaus system after it is used for power purposes.

6.3.3 Sub-Region C - Mokelumne River

The Mokelumne River watershed is located on the District's northern boundary with the headwaters in parts of Calaveras, Alpine, and Amador Counties. The majority of flow in this river is derived from snowmelt. The watershed ranges from peak elevations of approximately 10,000 feet MSL at the Pacific Crest, down to 580 feet MSL at Pardee Reservoir. The Mokelumne watershed, upstream from Pardee Reservoir, is approximately 227,000 acres. Annual precipitation from 1903 to 1997 at the lower elevation of 720 feet MSL ranged from 11 inches in 1976 to 62 inches in 1983. Annual precipitation from 1929 to 1997 at the mid-level elevation of 3,700 feet MSL ranged from 19 inches in 1976 to 92 inches in 1983.

The watershed above Pardee Reservoir is mostly undeveloped, with a large portion located in the Mokelumne Wilderness. Many tributaries flow into the Mokelumne River before it reaches Pardee Reservoir. Reservoirs in the higher portions of the watershed include Lower Bear and Salt Springs, both owned by Pacific Gas & Electric Company (PG&E). Upstream hydropower facilities owned and operated by PG&E include diversion tunnels and regulating reservoirs, with most of diverted flow released back into the river system. Pardee Reservoir, and its downstream companion, Camanche Reservoir, are owned and operated by EBMUD; Pardee is operated for water supply and Camanche is operated for water supply, flood control, and instream requirements. Both reservoirs provide incidental hydropower. Water not diverted from Pardee Reservoir into the EBMUD Mokelumne Aqueduct flows into Camanche Reservoir, and then down the Mokelumne River into the San Joaquin Valley.

The District serves the West Point area from the Mokelumne River and its tributaries.

Mokelumne River Rights and Permits

The District holds water right permits for storage and diversion on Bear Creek, a tributary to the Mokelumne River. The storage right is for 150 AFY, and the diversion right is a year-round diversion of 4 cfs with a maximum annual diversion of 1,830 AF. However, Bear Creek cannot support a 4 cfs diversion during seasonal dry periods, due to availability and undesirable water quality treatability

concerns. To supplement supply, the District maintains a contract with CPUD to provide 200 AF annually from the Middle Fork of the Mokelumne River through the pre-1914 Schaads Reservoir.

CCWD also possesses the opportunity to secure an additional surface water right through an assignment under 1927 State Filings. These State filings pre-committed a major portion of the Mokelumne River's flow for the future use of Calaveras County. The District is updating and refining supply projections and pursuing analysis of drought supply reliability and projects that will improve flexibility and reliability, including conjunctive use and potential regionalization.

6.3.4 Sub-Region D – Groundwater

There are no surface water supplies used in Sub-Region D.

6.4 Stormwater

Stormwater runoff is comprised of precipitation, including rain, sleet, and melting snow, that runs off pervious and impervious surfaces. There is significant rainfall within Calaveras County, but it is highly variable and seasonal, with most precipitation occurring between November and May and very little occurring from late spring to fall.

As an example of the potential for stormwater runoff capture and reuse, the MokeWISE Water Availability Analysis calculated the potential stormwater supply that could be captured from residential areas in the upper Mokelumne River Watershed if customers were to participate in a rain barrel program. The study considered restrictions on storage capacity as well as timing of precipitation, and concluded that approximately 90 AFY of stormwater runoff could be captured throughout the watershed. This included customers in the Mokelumne River Watershed located in both Amador and Calaveras Counties.

6.5 Wastewater and Recycled Water

Recycled water is in integral part of the District's integrated water resources supply portfolio. The District utilizes recycled water to reduce potable water demands and provide for treated effluent disposal. This section provides information on recycled wastewater and its potential for use as a water resource in the District. The District maintains thirteen geographically-separate wastewater treatment facilities service areas throughout the County. All of the systems are geographically independent from each other, and as such, are presented in this chapter as separate systems categorized under the four supply sub-regions.

The District operates ten independent wastewater treatment facilities and three smaller, independent systems serving approximately 4,767 total wastewater connections. Collection and transport systems consist of over 125 miles of 6- to 10-inch diameter lines, 44 pump stations, and facilities for emergency power and odor control. The effluent produced by the treatment facilities is disposed of by two principal means – subsurface infiltration galleries (leach field) and spray disposal. Four of the plants contain facilities to recycle wastewater for golf course irrigation and other potential beneficial uses. The following sections describe recycled water planning agency coordination and wastewater/recycled water efforts for each treatment area.

6.5.1 Recycled Water Plant Coordination

The District engages all appropriate planning agencies in the development of its recycled water planning efforts, as indicated in **Table 6-3**. In particular, the District coordinates closely with the

County regarding development plans, land use designations, and water needs as new developments are proposed.

Table 6-3: Organization Participation in Recycled Water Planning

Participating organizations	Role
Calaveras County	Coordinate land use planning with water and recycled water needs.
Calaveras County Farm Bureau Federation	Assist District in identifying potential recycled water demands and with public information efforts.
UC Cooperative Extension	Assist District in identifying potential recycled water demands and with public information efforts.
Calaveras Grown	Coordinate potential demands and public outreach with District.

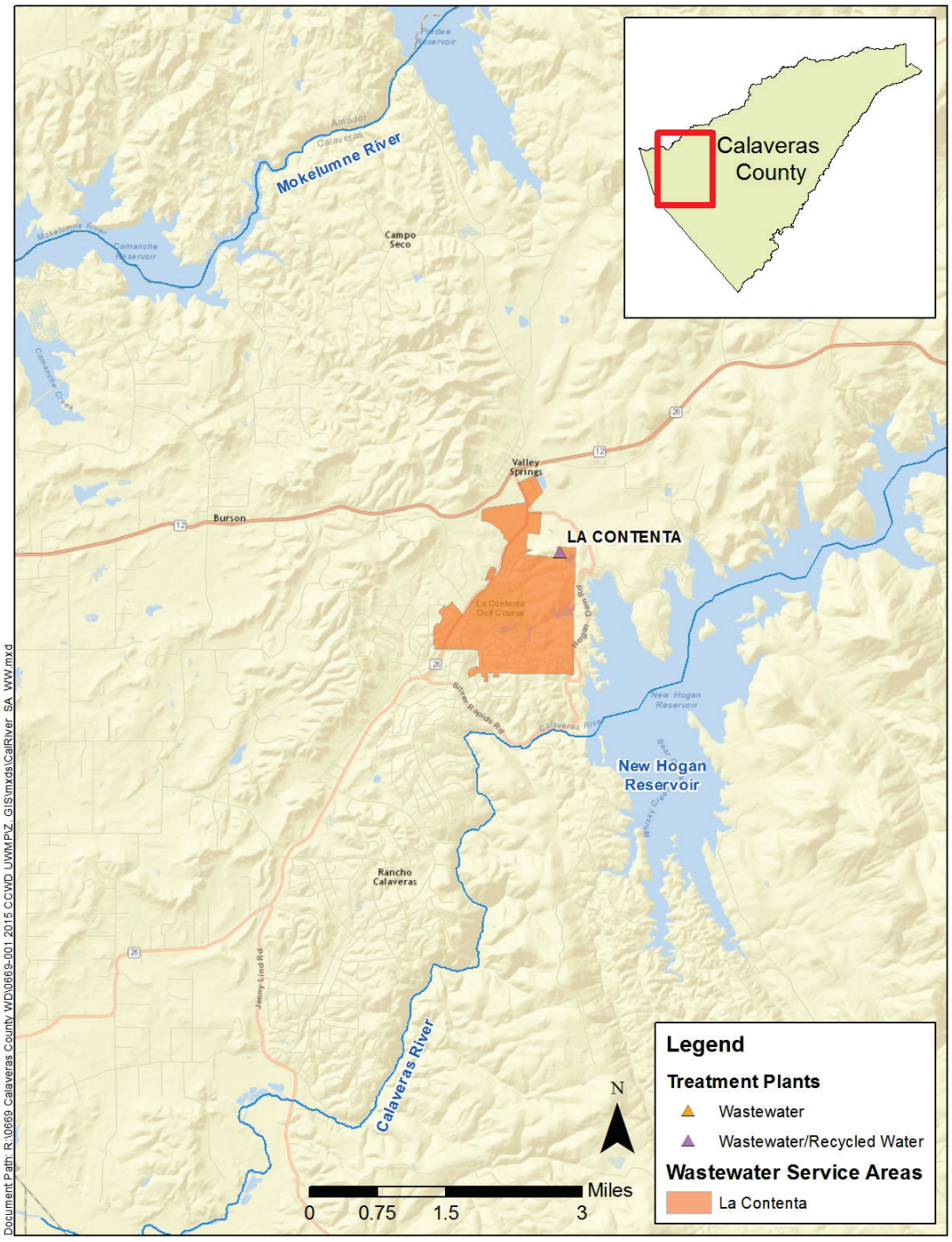
6.5.2 Wastewater Collection, Treatment, and Disposal

Sub-Region A – Calaveras River

The one wastewater treatment plant (WWTP) located in Sub-Region A is La Contenta WWTP.

Figure 6-2 shows the boundaries of the wastewater service area and the location of the plant. In 2015, La Contenta WWTP treated 147 AF of wastewater and provided 139 AF of recycled water. **Table 6-4** shows a summary of the wastewater collected and treated in Sub-Region A as well as the responsible agencies. Wastewater treatment and disposal volumes for the service area are shown in **Table 6-5.**

Figure 6-2: Sub-Region A – Wastewater Service Area and Facilities



The La Contenta development is located in the northern portion of the Jenny Lind Water System service area. Assessment District 604 (AD604) was formed in 1991 and generally includes the areas directly adjacent to the east and north sides of the La Contenta development. The La Contenta wastewater system provides collection and treatment services for all development within AD604, plus the existing service provided to La Contenta. The remaining portion of the Jenny Lind Water Service area is served by private septic systems.

The treatment plant consists of extended aeration activated sludge, clarification, sand filtration, and disinfection to Title 22 tertiary standards. In 2008, CCWD added an ultraviolet (UV) system to replace chlorine for disinfection purposes. The treated effluent is stored and used for golf course irrigation. The system currently serves 990 connections and contains approximately 30 miles of pipeline.

The La Contenta plant discharge is currently permitted for land disposal only. The District relies on wastewater recycling by meeting irrigation demands at the La Contenta Golf Course.

Table 6-4: Sub-Region A Wastewater Collected Within Service Area in 2015 (DWR Table 6-2)

	Percentage of 2015 service area covered by wastewater collection system *(optional)*					
	Percentage of 2015 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	**Wastewater Volume Metered or Estimated?**	**Volume of Wastewater Collected from UWMP Service Area 2015 (AFY)**	**Name of Wastewater Treatment Agency Receiving Collected Wastewater**	**Treatment Plant Name**	**Is WWTP Located Within UWMP Area?**	**Is WWTP Operation Contracted to a Third Party?**
CCWD	Metered	147	CCWD	La Contenta Wastewater Treatment Plant	Yes	No
Total Wastewater Collected from Service Area in 2015:		**147**				

Table 6-5: Sub-Region A Wastewater Treatment and Discharge Within Service Area in 2015 (AFY) (DWR Table 6-3)

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2015 Volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
La Contenta Wastewater Treatment Plant	Storage pond	Discharged to a dual storage pond system where is can be utilized for application to the La Contenta Golf Course in Valley Springs.	5B05NC00021	Land disposal	No	Tertiary	147	8	139	0
						TOTAL	**147**	**8**	**139**	**0**

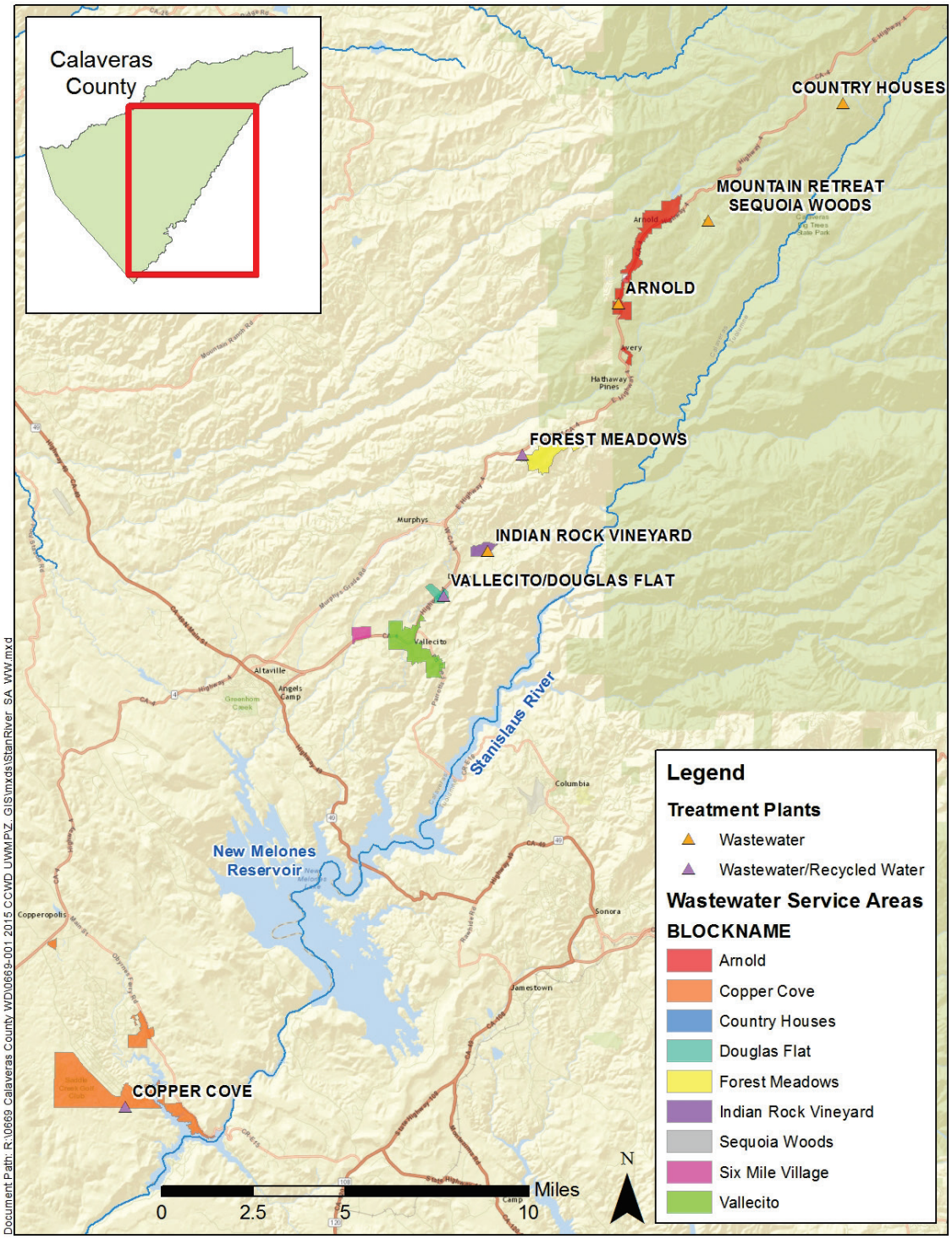
Sub-Region B – Stanislaus River

In Sub-Region B, there are five WWTPs, including:

- Copper Cove Wastewater Treatment and Reclamation Plant (2 plants)
- Forest Meadows Wastewater Treatment Plant
- Arnold Wastewater Treatment Plant
- Douglas Flat/Vallecito Wastewater Treatment Facility

Combined, the facilities treated 349 AF of wastewater in 2015 and provided 205 AF of recycled water. Each of these treatment plants is discussed in more detail in the sections below. The sub-region also includes three smaller collection and leach field treatment systems: Mountain Retreat/Sequoia Woods, Indian Rock, and Country Houses. **Figure 6-3** shows the boundaries of the wastewater service areas and their respective treatment facilities. **Table 6-6** shows a summary of the wastewater collected and treated in Sub-Region B, as well as the responsible agencies. Wastewater treatment and disposal volumes within each service area are shown in **Table 6-7**.

Figure 6-3: Sub-Region B – Wastewater Service Areas and Facilities



Copper Cove Wastewater Treatment and Reclamation Plant

The Copper Cove facility consists of two separate treatment plants, co-located on the same site. The first plant includes primary aeration ponds and disinfection. This disinfected secondary effluent is land applied through spray disposal on site. The system serves 1,780 connections and contains approximately 25 miles of pipeline.

In 2000, CCWD constructed the tertiary treatment reclamation plant adjacent to the existing WWTP. The reclamation plant takes secondary treated wastewater from the existing, older plant and provides tertiary treatment that complies with Title 22 disinfected tertiary requirements suitable for golf course irrigation. In 2006, CCWD added a UV system to replace chlorine for disinfection purposes.

Forest Meadows Wastewater Treatment Plant

The Forest Meadows Wastewater Treatment Plant is part of the Ebbetts Pass Improvement District and serves the Forest Meadows Community. The Forest Meadows plant consists of a complete mix secondary aeration pond, a sludge settling pond, deep-bed sand filtration, and UV disinfection. The service area contains approximately 11.3 miles of pipeline. The system serves 604 connections in the Forest Meadows Community. In 1999, CCWD upgraded the wastewater treatment plant to tertiary treatment to provide recycled water for irrigation of the Forest Meadows Golf Course. Golf course irrigation is the current method of effluent disposal. As development continues and wastewater flows increase, the District plans to include seasonal surface water discharge in addition to the recycled water golf course irrigation.

Arnold Wastewater Treatment Plant

The Arnold Wastewater Treatment Plant is part of the Ebbetts Pass Improvement District and services the communities of Arnold, Avery, and Mill Woods. The Arnold plant provides chlorine disinfected secondary treatment and consists of an extended oxidation ditch (racetrack), clarification, chlorination, and sand filtration. Effluent disposal is via on-site leach field and spray irrigation on pasture. Approximately 16 miles of pipeline serve 656 connections.

The separate Mill Woods primary treatment system (leach fields) which collected and treated wastewater from 195 connections in Mill Woods was closed in 2014-15 and all wastewater flows were routed to the Arnold Wastewater Treatment Plant.

Douglas Flat/Vallecito Wastewater Treatment Facility

The Douglas Flat/Vallecito Wastewater Treatment Facility is part of the Ebbetts Pass Improvement District and serves the communities of Douglas Flat and Vallecito. CCWD received a $4.42 million grant to upgrade the facility from secondary to tertiary treatment in 2011-2012, including the installation of membrane biological reactors, a UV disinfection system, and a belt press for sludge dewatering. The existing storage ponds were reconfigured and the pasture irrigation system remained the same. The average dry weather flow limit also increased from 65,000 gallons per day (gpd) to 75,000 gpd. The system currently serves 254 connections with approximately 10.6 miles of pipeline.

The District has secured a Prop 84 Round 2 grant to install a pump station to utilize recycled water for landscape application. The project has begun and is anticipated to be completed in two years. It is anticipated that the neighboring agricultural/landscape user will be able to make full use of the recycled water that is produced.

Other Systems

The District also operates a smaller collection system downstream of the Douglas Flat/Vallecito area called Six Mile Village. Wastewater is currently pumped to Angels and treated at the City of Angels' wastewater treatment plant. The District intends to continue this operation, although future regionalization studies may recommend a change to this policy.

The District also maintains smaller treatment systems in Sub-Region B which are collection and leach field systems, including:

- Mountain Retreat/Sequoia Woods (23 connections) – onsite leachfield disposal
- Indian Rock Vineyard (20 connections) – secondary treatment via recirculating bed sand filtration and disposal at onsite leachfields
- Country Houses (25 condos) – primary treatment and disposal at onsite leachfields

Table 6-6: Sub-Region B Wastewater Collected Within Service Area in 2015 (DWR Table 6-2)

	Percentage of 2015 service area covered by wastewater collection system *(optional)*
	Percentage of 2015 service area population covered by wastewater collection system *(optional)*

Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	**Wastewater Volume Metered or Estimated?**	**Volume of Wastewater Collected from UWMP Service Area 2015**	**Name of Wastewater Treatment Agency Receiving Collected Wastewater**	**Treatment Plant Name**	**Is WWTP Located Within UWMP Area?**	**Is WWTP Operation Contracted to a Third Party? *(optional)***
CCWD	Metered	177	CCWD	Copper Cove Wastewater Treatment and Reclamation Plant	Yes	No
CCWD	Metered	8	City of Angels[1]	City of Angels Wastewater Treatment Plant	No	Yes
CCWD	Metered	50	CCWD	Forest Meadows Wastewater Treatment Plant	Yes	No
CCWD	Metered	45	CCWD	Douglas Flat/Vallecito Wastewater Treatment Facility	Yes	No
CCWD	Metered	76	CCWD	Arnold Wastewater Treatment Plant	Yes	No
Total Wastewater Collected from Service Area in 2015:		**357**				

NOTES: (1) City of Angels collects wastewater from Six Mile Village

Table 6-7: Sub-Region B Wastewater Treatment and Discharge Within Service Area in 2015 (AFY) (DWR Table 6-3)

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2015 Volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Copper Cove Wastewater Treatment Plant[1]	Sprayfields	Several Holding Ponds and sprayfields located adjacent to the WWTP.	5B05NP00001	Land disposal	No	Secondary, Disinfected	177	136	0	0
Copper Cove Wastewater Reclamation Plant[2]	Saddle Creek Golf Course	Saddle Creek Golf Course and adjacent water features	5B05NP00001	Land disposal	No	Tertiary	136	0	164	0
Forest Meadows Wastewater Treatment Plant	Forest Meadows Golf Course, and Leach Fields	Forest Meadows HOA large holding pond and water feature, where it is stored and applied to the Forest Meadows Golf Course and leach fields. Additionally, permitted for seasonal surface water discharge to the North Fork Hydroelectric Project Collierville Powerhouse Tunnel Surge Shaft.	5B05NP00014	Land disposal, surface water discharge (backup)	No	Tertiary	50	10	41	0
Douglas Flat/ Vallecito Wastewater Treatment Facility	Sprayfields	Holding ponds and sprayfields adjacent to the WWTP.	5B050107005	Land disposal	No	Tertiary	45	45	0	0
Arnold Wastewater Treatment Plant	Percolation Beds and Sprayfields	11 percolation beds (3.3 acres) and 22 acres of sprayfields adjacent to the facility	5B051003001	Land disposal	No	Secondary Disinfected	76	76	0	0
						TOTAL	**485**	**267**	**205**	**0**

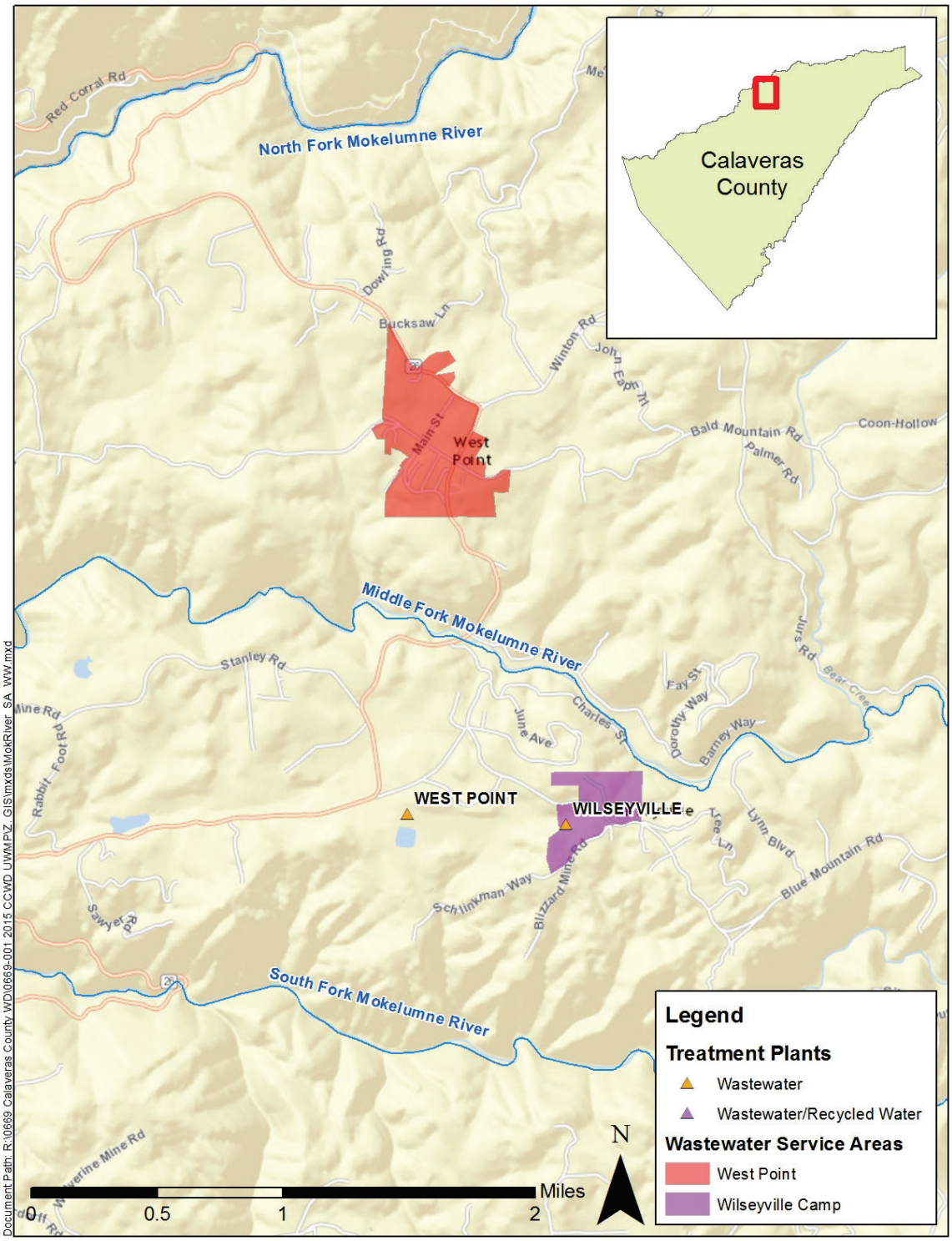
NOTES: (1) Copper Cove Wastewater Treatment Plant discharges to "Pond 6", which acts as a forebay and source for the Copper Cover Wastewater Reclamation Plant's recycled water production; (2) More water is recycled within service area (164 AFY) than is treated (136 AFY) due to carryover storage from the previous year in Pond 6.

Sub-Region C – Mokelumne River

In Sub-Region C, there are two treatment plants - the West Point WWTP and the Wilseyville Camp WWTP. Combined, these plants treated 16 AFY of wastewater in 2015 and provided 0 AF of recycled water. Each of these treatment plants is discussed in more detail in the sections below.

Figure 6-4 shows the boundaries of the wastewater service areas and their respective treatment facilities. **Table 6-8** shows a summary of the wastewater collected and treated in Sub-Region C, as well as the responsible agencies. Wastewater treatment and disposal volumes within each service area are shown in **Table 6-9**.

Figure 6-4: Sub-Region C – Wastewater Service Areas and Facilities



West Point Wastewater Treatment Plant

The West Point Wastewater Treatment Plant provides secondary treatment through a recirculation sand bed filter system, chlorine disinfection, storage in two ponds, and onsite disposal through 45 acres of spray irrigation fields. The system currently serves 165 connections in the West Point community, and contains approximately 13 miles of pipeline in the collection system.

Wilseyville Camp Wastewater Treatment Plant

The District operates a smaller wastewater treatment system, Wilseyville, near the West Point system. The Wilseyville system provides secondary treatment via an aerated pond and 10-acre spray field disposal system. The system serves 28 connections and is considered at buildout.

The District is seeking grant money from the SWRCB to combine the Wilseyville and West Point WWTPs, which are geographically situated near each other. At its earliest, the project would be completed in 2018.

Table 6-8: Sub-Region C Wastewater Collected Within Service Area in 2015 (DWR Table 6-2)

	Percentage of 2015 service area covered by wastewater collection system (*optional*)					
	Percentage of 2015 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	**Wastewater Volume Metered or Estimated?**	**Volume of Wastewater Collected from UWMP Service Area 2015 (AFY)**	**Name of Wastewater Treatment Agency Receiving Collected Wastewater**	**Treatment Plant Name**	**Is WWTP Located Within UWMP Area?**	**Is WWTP Operation Contracted to a Third Party? *(optional)***
CCWD	Metered	15	CCWD	West Point Wastewater Treatment Plant	Yes	No
CCWD	Estimated	1[1]	CCWD	Wilseyville Camp Wastewater Treatment Plant	Yes	No
Total Wastewater Collected from Service Area in 2015:		**16**				
NOTES: (1) Wilseyville WWTP collected volume calculated based on average daily inflow of 900 GPD.						

Table 6-9: Sub-Region C Wastewater Treatment and Discharge Within Service Area in 2015 (AFY) (DWR Table 6-3)

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2015 Volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
West Point Wastewater Treatment Plant	Storage Pond and Sprayfields	The discharge is to a recirculating gravel bed filter with storage ponds and sprayfields adjacent to the WWTP	5B052009002	Land Disposal	No	Secondary, Disinfected	15	15	0	0
Wilseyville Camp Wastewater Treatment Plant[1]	Pond	Discharge is to a singular pond with an aerator (percolation)	5B052000001	Percolation Pond	No	Secondary, Undisinfected	1	1	0	0
						TOTAL	**16**	**16**	**0**	**0**
NOTES: (1) Wilseyville WWTP treatment volume calculated based on average daily inflow of 900 GPD.										

Sub-Region D – Groundwater

In Sub-Region D, there are two wastewater treatment plants - the Wallace WWTP and the Southworth WWTP. Combined, these plants treated 22 AF of wastewater in 2015 and provided 0 AF of recycled water. Each of these treatment plants is discussed in more detail in the sections below. **Figure 6-5** shows the boundary of the wastewater service area and location of the treatment plant. **Table 6-10** shows a summary of the wastewater collected and treated in Sub-Region D, as well as the responsible agencies. Wastewater treatment and disposal volumes within the service area are shown in **Table 6-11**.

Wallace Lake Estates Wastewater Treatment Plant

Wallace Wastewater Treatment Plan provides wastewater treatment to 101 connections in the gated community of Wallace Lake Estates. Each lot has a private sealed septic tank for solid treatment and effluent collection. Liquid effluent gravity flows or is pumped to the Wallace Wastewater Treatment Plant which provides secondary and tertiary treatment through aerobic trickling filters, sedimentation, sand filtering, and disinfection. Treated effluent is stored in a pond. There is also a 12-acre spray field where treated effluent can be used for irrigation purposes if needed.

Southworth Wastewater Treatment Plant

Southworth Wastewater Treatment Plant provides wastewater treatment for 56 connections on septic tanks within the Southworth Ranch Estates subdivision located southeast of Wallace. This small system provides secondary treatment via recirculating sand filters, a storage pond, and disposal to an onsite spray field.

Figure 6-5: Sub-Region D – Wastewater Service Area and Facilities

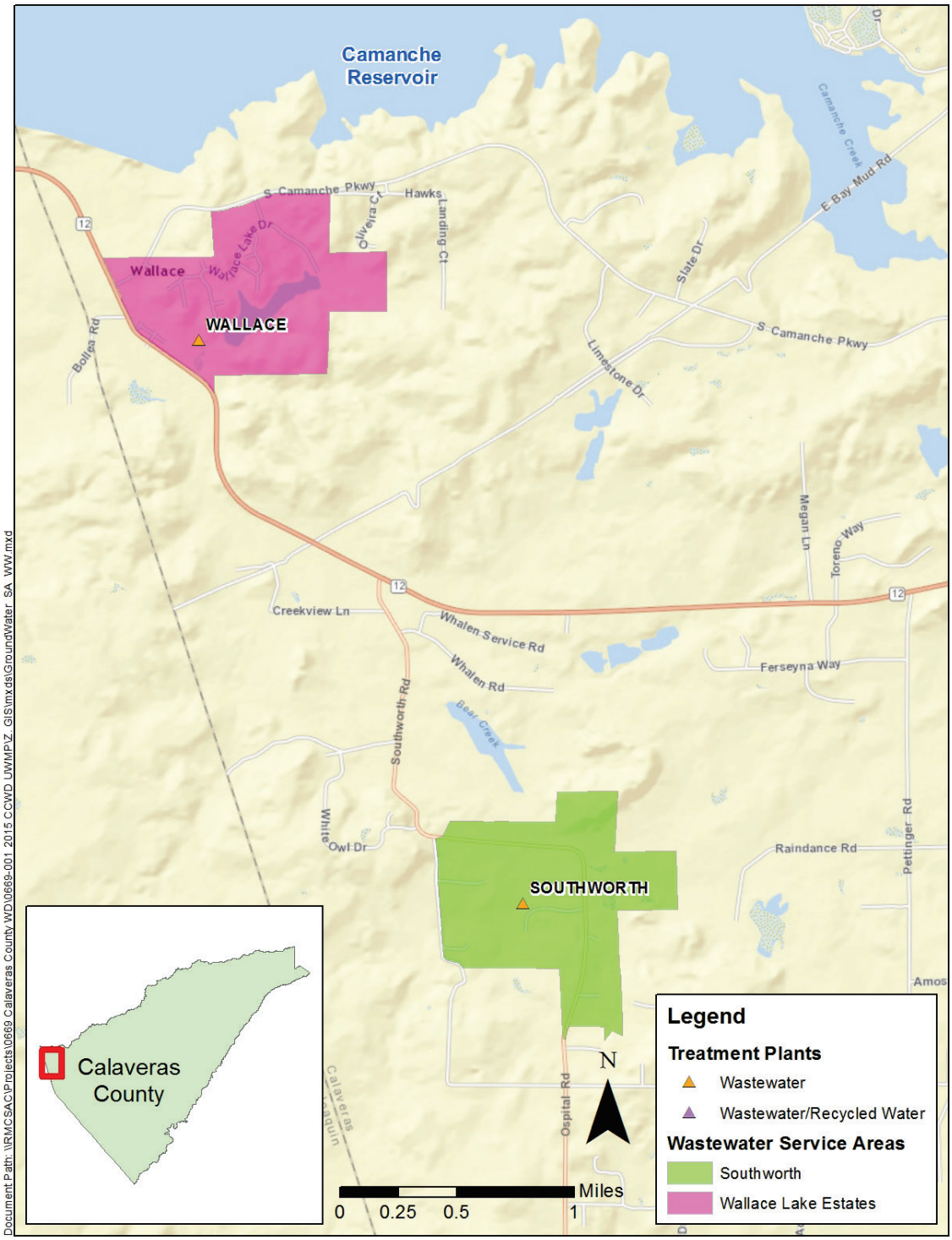


Table 6-10: Sub-Region D Wastewater Collected Within Service Area in 2015 (DWR Table 6-2)

	Percentage of 2015 service area covered by wastewater collection system (*optional*)					
	Percentage of 2015 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	**Wastewater Volume Metered or Estimated?**	**Volume of Wastewater Collected from UWMP Service Area 2015 (AFY)**	**Name of Wastewater Treatment Agency Receiving Collected Wastewater**	**Treatment Plant Name**	**Is WWTP Located Within UWMP Area?**	**Is WWTP Operation Contracted to a Third Party? *(optional)***
CCWD	Metered	12	CCWD	Wallace Wastewater Treatment Plant	Yes	No
CCWD	Metered	10	CCWD	Southworth Wastewater Treatment Plant	No	Yes
Total Wastewater Collected from Service Area in 2015:		**22**				

Table 6-11: Sub-Region D Wastewater Treatment and Discharge Within Service Area in 2015 (AFY) (DWR Table 6-3)

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2015 Volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Wallace Wastewater Treatment Plant	Storage Ponds and Sprayfields	Storage ponds and adjacent sprayfields	5B050107007	Land disposal	No	Tertiary	12	12	0	0
Southworth Wastewater Treatment Plant	Storage Ponds and Sprayfields	Storage Ponds and adjacent sprayfields	5B051003004	Land disposal	No	Secondary, disinfected	10	10	0	0
						TOTAL	**22**	**22**	**0**	**0**

6.5.3 Recycled Water System

Sub-Region A – Calaveras River

The La Contenta WWTP consists of extended aeration activated sludge, clarification, sand filtration, and disinfection to Title 22 tertiary standards. In 2008, CCWD added a UV system to replace chlorine for disinfection purposes. Wastewater is collected, treated, and distributed by CCWD.

The La Contenta golf course uses the treated plant effluent as its primary irrigation supply source, and uses raw water from New Hogan to meet its supplemental water supply needs. As growth continues and effluent volumes exceed the irrigation demands of the existing golf course, the District intends to incorporate additional wastewater recycling programs in other areas, such as parks, landscape, and highway medians. Without these preferable alternatives, the District will dispose of additional effluent through dedicated land application.

Sub-Region B – Stanislaus River

Copper Cove Wastewater Treatment and Reclamation Plant

The Copper Cove facility consists of two separate treatment plants, co-located on the same site. The first plant includes primary aeration ponds and disinfection. In 2000, CCWD constructed the tertiary treatment reclamation plant adjacent to the existing wastewater treatment plant. The reclamation plant takes secondary treated wastewater from the existing, older plant and provides tertiary treatment. In 2006, CCWD added a UV system to replace chlorine for disinfection purposes. Wastewater is collected, treated, and distributed by CCWD.

Recycled water is delivered from Copper Cove Wastewater Reclamation Plant to the adjacent Saddle Creek Golf Course for irrigation. Under a current agreement with CCWD, Saddle Creek Golf Course takes all of the Title 22 treated wastewater for recycling to meet its water supply needs. It is anticipated that as this area grows as projected, the additional Title 22 wastewater generated will be delivered to the existing golf course or other landscape uses. CCWD maintains Waste Discharge Requirements to land-apply treated effluent through spray irrigation if ever needed as a backup.

As development continues, the District plans to upgrade and expand the existing facilities to provide full Title 22 tertiary treatment for all flows. The District will also evaluate other potential future recycled water demands within and near the service area.

Forest Meadows Wastewater Treatment Plant

The Forest Meadows Wastewater Treatment Plant consists of a complete-mix secondary aeration pond, a sludge settling pond, deep-bed sand filtration, and UV disinfection. In 1999, CCWD upgraded the wastewater treatment plant to tertiary treatment to provide recycled water for irrigation of the Forest Meadows Golf Course. The golf course is in the process of closing down operations, but CCWD expects to continue utilizing recycled water onsite for some form of landscape application. As development continues and wastewater flows increase, the District plans to include seasonal surface water discharge in addition to the recycled water landscape irrigation. Wastewater is collected, treated, and distributed by CCWD.

Douglas Flat/Vallecito Treatment Facility

The Douglas Flat/Vallecito Treatment Facility consists of a grit removal unit, a flow equalization tank, two fine screens, two membrane biological reactors, a sludge holding tank, a sludge belt press, a dry sludge storage area, and a UV disinfection system. Wastewater is collected, treated, and distributed

by CCWD. The original secondary treatment facility was recently upgraded in 2011-2012 to provide tertiary treatment as part of a $4.42 million grant from the State Water Resources Control Board.

The District has secured a Prop 84 Round 2 grant to install a pump station to utilize recycled water for landscape application. The project has begun and is anticipated to be completed in two years. It is anticipated that the project will be able to make full use of the recycled water that is produced from the Douglas Flat/Vallecito Treatment Facility.

Sub-Region C – Mokelumne River

Sub-Region C does not have any recycled water treatment facilities.

Sub-Region D – Groundwater

Sub-Region D does not have any recycled water treatment facilities.

6.5.4 Recycled Water Beneficial Uses

Current and Planned Uses of Recycled Water

The only current use of recycled water in the District's service areas is golf course irrigation. Planned future uses include irrigation in parks, landscapes, and highway medians as well as some limited agricultural irrigation. All projected values are based on the 2005 Wastewater Master Plan. CCWD expects to update this Master Plan in 2016. The District continually revises and updates its water and wastewater master plan as necessary based on the County's Community Plan. The District is also investigating regionalization of its water and wastewater treatment systems. If a feasible regionalization project is identified, it would most likely impact the current recycled water projections.

Sub-Region A – Calaveras River

La Contenta has the greatest growth potential within CCWD's service area. The District expects to at least double the number of customer connections on the wastewater system, with about 750 AFY of wastewater expected at full buildout. Additionally, CCWD may take on some wastewater effluent from Valley Springs Public Utility District within the next decade.

The only current recycled water consumer is the La Contenta Golf Course which is estimated to use 242 AFY of recycled water (Condor Earth Technologies 2012).

Table 6-12 shows the current and projected recycled water direct beneficial uses within Sub-Region A, served by the La Contenta WWTP.

Table 6-12: Sub-Region A - Current and Projected Recycled Water Direct Beneficial Uses Within Service Area (AFY) (DWR Table 6-4)

Name of Agency Producing (Treating) the Recycled Water:	CCWD
Name of Agency Operating the Recycled Water Distribution System:	CCWD
Supplemental Water Added in 2015	0
Source of 2015 Supplemental Water	N/A

Beneficial Use Type	General Description of 2015 Uses	Level of Treatment	2015	2020	2025	2030	2035	2040
Agricultural irrigation	N/A	Tertiary	0	10	12	13	15	17
Landscape irrigation (excludes golf courses)	N/A	Tertiary	0	50	58	67	75	84
Golf course irrigation	Golf course irrigation	Tertiary	139	139	163	187	211	235
Commercial use			0	0	0	0	0	0
Industrial use			0	0	0	0	0	0
Geothermal and other energy production			0	0	0	0	0	0
Seawater intrusion barrier			0	0	0	0	0	0
Recreational impoundment			0	0	0	0	0	0
Wetlands or wildlife habitat			0	0	0	0	0	0
Potable reuse (indirect/direct)			0	0	0	0	0	0
		TOTAL	**139**	**199**	**233**	**267**	**301**	**336**

NOTES: These projections (for La Contenta WWTP) assume linear growth to 750 AF of wastewater produced at full 2100 buildout (linearly interpolated back to 2040). Projections also assume the following split for recycled water use: 70% for golf course irrigation, 25% for future expected landscape irrigation, and 5% agriculture. Since the golf course is expected to use up to 242 AFY of recycled water, landscape disposal was not assumed to be necessary given the current projections.

Table 6-13 shows a comparison of the projected 2015 recycled water use made in 2010 for Sub-Region A against the actual recycled water use in 2015.

Table 6-13: Sub-Region A - 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual (AFY) (DWR Table 6-5)

Use Type	2010 Projection for 2015	2015 Actual Use
Agricultural irrigation	0	0
Landscape irrigation (excludes golf courses)	0	0
Golf course irrigation	245	139
Commercial use	0	0
Industrial use	0	0
Geothermal and other energy production	0	0
Seawater intrusion barrier	0	0
Recreational impoundment	0	0
Wetlands or wildlife habitat	0	0
Potable reuse (indirect/direct)	0	0
TOTAL	**245**	**139**

Sub-Region B – Stanislaus River

Table 6-14 below shows the current and projected recycled water direct beneficial uses within Sub-Region B, served by the Forest Meadows WWTP, Copper Cove Wastewater Treatment and Reclamation Plant, and Douglas Flat/Vallecito Treatment Facility.

Forest Meadows

The Forest Meadows Golf Course (which currently uses recycled water from Forest Meadows WWTP) is in the process of closing down their operations. CCWD expects to continue utilizing recycled water onsite for some form of landscape application but decisions about specific land use are still underway.

Douglas Flat/Vallecito

The District has secured a Prop 84 Round 2 grant to install a pump station to utilize recycled water from the Douglas Flat/Vallecito Wastewater Treatment Facility for non-golf course landscape application and agriculture on an adjacent property (vineyard). The project has begun and is anticipated to be completed in two years. It is anticipated that the recycled water user will be able to make full use of the recycled water that is produced.

Copper Cove

At the current rate, CCWD expects that no more than one additional golf course will be constructed in the Copper Cove/Copperopolis area at full buildout. There is significant potential for the possibility that housing developments in the service area will start replacing potable water with recycled water for landscape irrigation in community spaces.

Table 6-14: Sub-Region B - Current and Projected Recycled Water Direct Beneficial Uses Within Service Area (AFY) (DWR Table 6-4)

Name of Agency Producing (Treating) the Recycled Water:		CCWD						
Name of Agency Operating the Recycled Water Distribution System:		CCWD						
Supplemental Water Added in 2015		0						
Source of 2015 Supplemental Water		N/A						
Beneficial Use Type	**General Description of 2015 Uses**	**Level of Treatment**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Agricultural irrigation	N/A	Tertiary	0	81	98	116	133	151
Landscape irrigation (excludes golf courses)	N/A	Tertiary	0	152	190	227	265	303
Golf course irrigation	Golf course irrigation	Tertiary	205	105	148	191	234	278
Commercial use			0	0	0	0	0	0
Industrial use			0	0	0	0	0	0
Geothermal and other energy production			0	0	0	0	0	0
Seawater intrusion barrier			0	0	0	0	0	0
Recreational impoundment			0	0	0	0	0	0
Wetlands or wildlife habitat			0	0	0	0	0	0
Potable reuse (indirect/direct)			0	0	0	0	0	0
		TOTAL	**205**	**338**	**436**	**543**	**632**	**732**

NOTES: Forest Meadows: (1) Assumes growth of 60 AFY total (2010-2015 average) to 120 AFY in 2040, with 75% landscape irrigation and 25% agriculture, with spray field optional. (No golf course irrigation starting 2020); Copper Cove: (2) 2050 recycled water projection from 2010 UWMP divided in two (1942 AF/2 = 971 AF) and then grown linearly from 2015 production. Assumes 37.5% for golf course irrigation, 25% landscape irrigation, 12.5% agriculture, and 25% non-beneficial land application spray field disposal; Douglas Flat/Vallecito: (4) Assumes constant 55 AFY recycled water production with 50% agriculture and 50% landscape irrigation.

Table 6-15 shows a comparison of the projected 2015 recycled water use made in 2010 for Sub-Region B against the actual recycled water use in 2015.

Table 6-15: Sub-Region B - 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual (AFY) (DWR Table 6-5)

Use Type	2010 Projection for 2015	2015 Actual Use
Agricultural irrigation	154	0
Landscape irrigation (excludes golf courses)	0	0
Golf course irrigation	779	205
Commercial use	0	0
Industrial use	0	0
Geothermal and other energy production	0	0
Seawater intrusion barrier	0	0
Recreational impoundment	0	0
Wetlands or wildlife habitat	0	0
Potable reuse (indirect/direct)	0	0
TOTAL	**933**	**205**
NOTES: CCWD had some permitting issues with the discharge to the Golf Course from Copper Cove Reclaimed Wastewater Treatment Plant, and was subject to a specific "Time Schedule Order" issued by the Regional Water Quality Control Board. As such, the District was not able to put as much reclaimed water to beneficial use in 2015 as it has in the past. Therefore, it is not reflective of actual historical trends.		

Sub-Region C – Mokelumne River

Sub-Region C does not have any recycled water treatment facilities.

Sub-Region D – Groundwater

Sub-Region D does not beneficially reuse recycled water. As mentioned in **Section 6.1.1** above, this Sub-Region does use a percolation pond to discharge tertiary treated water.

6.5.5 Actions to Encourage and Optimize Future Recycled Water Use

The main use of recycled water in the District's service areas is golf course irrigation. The District requires all golf courses to be irrigated with recycled water, supplemented with raw water when necessary. The District does not offer financial incentives directly, although the District will not approve water service to new developments until a method for disposing of wastewater is developed and accepted. This policy indirectly creates the demand and projected use of recycled water. Many

of the District's wastewater treatment facilities are too small to reasonably and economically develop recycled water systems. The District only uses landscape irrigation with recycled water at its largest facilities. However, the District is committed to marketing recycled water throughout its service area to increase beneficial reuse and expand into other areas of service. This will help the District move away from sprayfields and towards beneficial reuse over the long-term planning horizon. The District will continue to evaluate recycled water use potential in its various master plan updates and facilities plans. All of the District's major treatment plants currently, or are planned to, treat wastewater to a minimum quality of Title 22 secondary disinfected standards, except the Arnold WWTP which is located in a heavily forested area with spaced out developments and would not be a cost-effective location to produce recycled water.

The County's Parks and Recreation Department evaluates new park and recreational needs as part of its general planning process. These efforts may result in new and/or expanded parks and recreational areas. The District will coordinate with the County to discuss potential irrigation and recycled water needs and develop recycled water plans, as appropriate.

Table 6-16 shows a summary of the future actions which will expand future recycled water use.

Table 6-16: Methods to Expand Future Recycled Water Use (DWR Table 6-6)

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Installation of pump station	Will enable use of recycled water for non-golf course landscape application in property adjacent to Douglas Flat/Vallecito Wastewater Treatment Facility	2018	55
Encourage RW landscape use in Jenny Lind and Copper Cove	Development is expected in La Contenta and Copper Cove which will potentially be able to use recycled water for landscape irrigation.	2020 - 2040	269
Encourage RW agricultural use in Jenny Lind and Copper Cove	CCWD is working with potential agricultural customers to utilize recycled water.	2020 - 2040	139
Require RW golf course irrigation in Copper Cove	One additional golf course may be built in Copper Cove region and will be required to irrigate with recycled water	2020 - 2040	278
		TOTAL	**741**

6.6 Desalinated Water Opportunities

There are no opportunities for the development of desalinated water within the District's service area as a future supply source.

6.7 Exchanges and Transfers

The District currently relies exclusively on its surface water supplies to meet customer demands, with the exception of some groundwater customers in the Wallace area. To improve reliability, CCWD is evaluating water supplies through integrated regional water management planning efforts and multi-party collaborations, such as the Mokelumne River Forum. In some locations, CCWD utilizes short-term water transfer and similar arrangements to address various water supply shortage contingencies. However, there are limited options for large volume transfer opportunities due to lack of storage within the County under CCWD control.

6.8 Future Water Projects

Many regionalization and agency-specific projects are under evaluation by CCWD and its partners to increase supply reliability in the future. As discussed previously, CCWD is a partner in two IRWM planning efforts, for the MAC and T-Stan regions. These efforts provide an excellent opportunity to improve regional water resource management. Many of the projects identified in the IRWMPs provide inter-regional benefits, in addition to directly benefiting CCWD water supply reliability and volume. The District is also evaluating intra-regional projects within the County to identify potential connections between its three river sources to improve supply reliability and to provide service in areas where groundwater is failing. **Table 6-17** lists the current and planned water supply projects from the IRWMP that CCWD is considering. For projects that are still in the planning stages, projected supply volumes are listed as unknown.

In addition to the projects identified in the MAC and T-Stan IRWMPs, the Mokelumne Watershed Interregional Sustainability Evaluation (MokeWISE) Program also identified several projects that would potentially increase water supply and water supply reliability for the District. These include the Amador and Calaveras Counties Hydrologic Assessment, the Groundwater Banking Evaluation within the Eastern San Joaquin Groundwater Subasin, and the Raise Lower Bear Feasibility Study. Each of these projects are still in the study phase and while not included in **Table 6-17**, are discussed in the following sections. There are also a number of projects included in the District's Capital Improvement Plan (CIP) that are not compatible with **Table 6-17**. These are also described below.

Amador and Calaveras Counties Hydrologic Assessment

Very little quantitative information is available on the carrying capacities of the local groundwater systems within Sierra Nevada foothill areas. Those groundwater systems occur mostly in poorly permeable fractured rock, within which groundwater storage is limited to the small volume represented by the fracture openings. Natural recharge occurs seasonally from the deep percolation of precipitation during the winter. However, the recharge is the small percentage of precipitation remaining after the loss of precipitation to runoff or the consumptive use of vegetation. This characteristic makes the foothill groundwater systems very sensitive to seasonal, year-to-year, and long-term changes in precipitation. This study seeks to answer questions regarding groundwater recharge in Amador and Calaveras Counties so that sustainable groundwater evaluations can be determined to guide land use decisions and provide direction to water agencies to meet planned water needs.

Groundwater Banking Evaluation within the Eastern San Joaquin Groundwater Subbasin

This study will establish the basis for and feasibility of groundwater banking within the Eastern San Joaquin Groundwater Subbasin with the objective of improving reliable water supplies for not only Eastern San Joaquin County, but also EBMUD and the Upper Mokelumne River Watershed region. The desired outcomes of a potential project are improved groundwater levels in the vicinity of the groundwater banking location, the development of a reliable alternative water supply for agencies who rely on Mokelumne River water, and also increased flexibility to provide environmental benefits to the Mokelumne watershed. The study will also consider impacts and benefits to the environment, conduct an analysis of the feasibility of alternative supplies to the Mokelumne River including stormwater capture, locally-generated recycled water, and conserved water, and identify climate change adaptation. This document summarizes the approach for analyzing and developing the proposed project concept in the form of a feasibility study.

Raise Lower Bear Feasibility Study

The study will evaluate the feasibility of enlarging Lower Bear Reservoir by raising the existing dam (embankment) by up to 32 feet to increase surface water storage capacity within the upper Mokelumne River watershed and operating the enlarged reservoir to protect the Mokelumne River and its resources consistent with the existing licenses, permits, legal agreements, legal decisions, and operating regimes that currently protect the river's water quality, cultural and historical resources, recreational uses, scenic values. In addition to modifications to the dam itself, the study will evaluate construction of an updated intake structure and spillway, and relocation of adjacent roads and existing recreation facilities. This feasibility study will be a continuation of previous studies and serve to address previously unanswered questions and unresolved issues.

Calaveras Public Utilities District Middle Fork Ditch Pipeline and Hydroelectric Power Project

This project is still in the study/planning phase and, if implemented, could develop mutually beneficial water supply and conveyance benefits for CCWD and CPUD. This project is currently envisioned to provide necessary improvements to existing infrastructure that would enhance supply deliveries to CPUD's Jeff Davis Treatment Plant. The project could also provide better system reliability and delivery enhancements for CPUD that could benefit the regional Mokelumne supplies and provide ancillary benefits to CCWD.

Regional Sludge Drying/Containment Facility

This project is still in the study/planning phase and if implemented would be a joint project between CCWD, City of Angels, San Andreas Sanitary District, and Murphys Sanitary District. Valley Springs Public Utility District and Mokelumne Hill Sanitary District have also shown interest. This project, as currently envisioned, would establish a planning pathway to develop a permitted Regional Sludge Handling Facility at a CCWD's La Contenta Wastewater Plant. Currently, treated sludge must be trucked out of the region to a facility outside of the County. Many other local wastewater facilities would make use of this future facility, at significant cost and environmental savings from trucking solids long distances.

West Point Water Treatment Plant Drinking Water Compliance Project

The West Point Drinking Water Compliance Project is a project to address a current violation with the Department of Public Health regarding a backup filter system for an economically disadvantaged community. Currently, the treatment process is an Absorption Clarifier followed by Sodium Hypochlorite disinfection. However, the West Point Water Treatment Plan does not include

a backup filtration system. The DPH issued permit requires a backup system to produce potable water for a minimum period of 2-weeks. This backup treatment system does not exist.

Sheep Ranch Drinking Water Compliance Project

The Sheep Ranch Drinking Water Compliance Project involves upgrading the current small water treatment plant currently out of compliance. The Sheep Ranch water treatment plant currently produces 30 gallons per minute via an out of date, non-compliant pressure filter according to the California Department of Public Health. CCWD was first notified in 1993 that the current system is out of compliance and not an approved technology. The Department of Public Health recommends current technology to include a membrane filter system with sodium hypochlorite disinfection. In addition, the current WTP technology cannot treat water to drinking water standards during storm events when turbidity levels increase. At these times, the plant must shut down.

Table 6-17: Expected Future Water Supply Projects or Programs (DWR Table 6-7)

☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.
☑	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in narrative format.
6-44/45/46	Provide page location of narrative in the UWMP.

Name of Future Projects or Programs	Joint Project with other agencies?	Description (if needed)	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Agency
Vallecto/Douglas WWTP Title 22 Recycled Water Project	No	Develops necessary conveyance and permitting requirements to serve recycled water to customers in vicinity of the Vallecito/Douglas Flat WWTP	2018	All Year Types	30 AF
White Pines and Blagen Mill Pond Restoration Project	No	Restores capacity loss due to sedimentation in White Pines Lake and the adjacent Blagen Mill Pond.	2020	All Year Types	Approximately 25 AF
Wilson Dam	No	Planning, permitting and implementation efforts to address preferred alternative for Wilson Lake and Dam	2020	All Year Types	Unknown
Ebbetts Pass Distribution Pipeline Replacements -Reach 3A -Reach 1 -Techite Line	No	Three projects in the Ebbetts Pass Service Area that replaces approximately 47,000 linear feet of pressurized water mains that have reached the end of their usable life or have been identified as being problematic due to leaks.	2019	All Year Types	Unknown, though losses in the system are significant

6.9 Summary of Existing and Planned Sources of Water

The following sections summarize existing and planned sources of water for each of the District's sub-regions.

6.9.1 Sub-Region A – Calaveras River

Table 6-18 shows a summary of all actual water supplies in 2015 in Sub-Region A, served by the Calaveras River, while **Table 6-19** provides projections of supply through 2040.

Table 6-18: Sub-Region A Water Supplies – Actual (AFY) (DWR Table 6-8)

Water Supply	Additional Detail on Water Supply	2015		
		Actual Volume	Water Quality	Total Right or Safe Yield
Surface Water[1]		8,437	Raw water	8,437
Recycled Water[2]		139	Recycled water	139
	TOTAL	**8,576**		**8,576**
NOTES: (1) Actual available surface water in 2015 is based on 7,700 AF minimum from New Hogan + 350 AF of riparian rights + 25 AF from Mill Pond + 362 AF from Big Pines Creek. (2) Recycled water is based on 2015 recycled water production.				

Table 6-19: Sub-Region A Water Supplies – Projected (AFY) (DWR Table 6-9)

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2020		2025		2030		2035		2040	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Surface water[1]		31,665	8,437	31,665	8,437	31,665	8,437	31,665	8,437	31,665	8,437
Recycled water[2]		199	199	233	233	267	267	301	301	336	336
TOTAL		**31,864**	**8,636**	**31,898**	**8,670**	**31,932**	**8,704**	**31,966**	**8,738**	**32,001**	**8,773**
NOTES: (1) Surface water based on supply rights from New Hogan Reservoir and Mill pond. (2) Recycled water is based on projections of beneficial recycled water use from DWR Table 6-4.											

6.9.2 Sub-Region B – Stanislaus River

Table 6-20 shows a summary of all actual water supplies in 2015 in Sub-Region B, served by the Stanislaus River, while **Table 6-21** provides projections of supply through 2040.

Table 6-20: Sub-Region B Water Supplies – Actual (AFY) (DWR Table 6-8)

Water Supply	Additional Detail on Water Supply	2015		
		Actual Volume	Water Quality	Total Right or Safe Yield
Surface Water[1]		56,864	Raw water	69,230
Recycled Water[2]		205	Recycled water	205
	TOTAL	**57,069**		**69,435**
NOTES: (1) Surface water in 2015 is based on the total volume available in New Spicer Meadow Reservoir on 1/1/15. (2) Recycled water is based on 2015 recycled water production.				

Table 6-21: Sub-Region B Water Supplies – Projected (AFY) (DWR Table 6-9)

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2020		2025		2030		2035		2040	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Surface water[1]		76,300	70,530	76,300	70,530	76,300	70,530	76,300	70,530	76,300	70,530
Recycled water[2]		338	338	436	436	534	534	632	632	732	732
TOTAL		**76,638**	**70,868**	**76,736**	**70,966**	**76,834**	**71,064**	**76,932**	**71,162**	**77,032**	**71,262**
NOTES: (1) Surface water is based on CCWD's storage right in New Spicer Meadow Reservoir. (2) Recycled water is based on projections of beneficial recycled water use from DWR Table 6-4.											

6.9.3 Sub-Region C - Mokelumne River

Table 6-22 shows a summary of all actual water supplies in 2015 in Sub-Region C, served by the Mokelumne River, while **Table 6-23** provides projections of supply through 2040.

Table 6-22: Sub-Region C Water Supplies – Actual (AFY) (DWR Table 6-8)

Water Supply	Additional Detail on Water Supply	2015		
		Actual Volume	Water Quality	Total Right or Safe Yield
Surface Water[1]		200	Raw water	200
TOTAL		**200**		**200**
NOTES: (1) CCWD's Bear Creek surface water right was curtailed by action of the SWRCB due to the unavailability of supplies in the San Joaquin River Basin in 2015. Available supply came from the 200 AF of water purchased from CPUD which has a pre-1914 right and was not subject to curtailment.				

Table 6-23: Sub-Region C Water Supplies – Projected (AFY) (DWR Table 6-9)

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2020		2025		2030		2035		2040	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Surface water[1]		2,030	200	2,030	200	2,030	200	2,030	200	2,030	200
TOTAL		**2,030**	**200**	**2,030**	**200**	**2,030**	**200**	**2,030**	**200**	**2,030**	**200**

NOTES: (1) Surface water is based on CCWD's Bear Creek water right as well as purchase from Calaveras Public Utility District.

6.9.4 Sub-Region D – Groundwater

Table 6-24 shows a summary of all actual water supplies in 2015 in Sub-Region D, served by local groundwater, while **Table 6-25** provides projections of supply through 2040.

Table 6-24: Sub-Region D Water Supplies – Actual (AFY) (DWR Table 6-8)

Water Supply	Additional Detail on Water Supply	2015		
		Actual Volume	Water Quality	Total Right or Safe Yield
Groundwater		45	Raw water	45
	TOTAL	**45**		**45**
NOTES: (1) 45 AF was pumped in 2015 and is also the least amount of supply available based on an analysis of historical groundwater use.				

Table 6-25: Sub-Region D Water Supplies – Projected (AFY) (DWR Table 6-9)

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2020		2025		2030		2035		2040	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Groundwater		65	45	65	45	65	45	65	45	65	45
TOTAL		**65**	**45**	**65**	**45**	**65**	**45**	**65**	**45**	**65**	**45**

NOTES: (1) 65 AF is assumed to be reasonably available based on an analysis of historical groundwater use. 45 AF is the least amount of supply available based on an analysis of historical groundwater use.

6.10 Climate Change Impacts to Supply

Recent climate change studies have shown potential impacts to the District's water supplies as a result of a changing climate. As previously mentioned, the North Fork of the Stanislaus River and the Mokelumne River are snow-fed river systems sensitive to temperature changes. While the headwaters of the Calaveras River may accumulate snow, the volume of snowmelt runoff is less significant in comparison to higher elevation watersheds. Snowpack accumulation, and the associated timing of the spring melt, is an important component to the State's surface water delivery and reliability. California's annual snowpack accumulates, on average, during the months from November through the end of March, with a corresponding melt period from April through July. This snowmelt provides significant quantities of water to streams, reservoirs, and groundwater basins for several months after the annual storm season has ended.

The length and timing of each year's period of snowpack accumulation and melting may fluctuate as temperature and precipitation conditions vary. Climatic change, including global warming, can impact snowpack accumulation and melt by increasing the frequency of rain at higher elevations and shortening the length of the melt recession curve as a result of higher temperatures and less snowpack accumulation. Earlier and increased frequency of runoff events may result in greater reservoir spills, which leads to less reservoir carryover storage and reduced soil moisture storage base flow, thereby decreasing overall water supply reliability within the system. These are the primary factors that are anticipated to impact the District's water supplies and ability to deliver water in a reliable manner.

CCWD will examine practical management measures as more information becomes available regarding climate changes. In the interim, the District maintains a comprehensive water shortage contingency plan to address water shortages. The contingency plan is discussed in **Chapter** 8.

Anticipated climate change impacts to water supply and demand in the Stanislaus, Calaveras and Mokelumne River Watersheds include:

- Increased water demand to fight increase in wildfires;
- Increased demand for process cooling water for food processing industries with increased surface water temperatures;
- Increased domestic demands with increased evapotranspiration;
- Increased agricultural demands due to longer growing season, increased temperatures and evapotranspiration, and more frequent/severe drought;
- Increased variability and flooding resulting from larger precipitation events; and
- Decreased water supply due to decreased snowpack in the Sierra Nevada Mountains and a shift in timing of seasonal runoff.

As a result of these climate change impacts, supply reliability is likely to be affected. A study completed by the El Dorado Irrigation District suggested that supply reliability would be reduced

by around 10% as a result of climate change (EID 2008). While El Dorado County is located roughly 80 miles north of Calaveras County, they are both a heavily snow and rain-fed system. Thus, climate change impacts in El Dorado County would likely be similar in Calaveras County.

7 Supply Reliability Assessment

7.1 Constraints on Water Sources

Many factors could result in constraints on the District's water supply, including limits on the amount of supply available, potential water quality impacts, changing climatic conditions, or a combination of these. **Table 7-1** lists the District's sources of water supply and the potential factors that could, generally, impact the District's supply.

Table 7-1: Factors Resulting in Inconsistency of Supply

Factors	Surface Water	Groundwater	Recycled Water
Limited Quantity	Hydrologic variation could result in limited storage carryover.	Overdraft and subsequent lowering of groundwater levels could cause wells to go dry for periods of time.	None
Legal	Inconsistent supply increases due to delays in construction, approval of water rights applications, or environmental documentation. Mandatory curtailment of water rights could create inconsistency of supply.	Potential ramifications resulting from the implementation of SGMA.	None
Environmental	Future increases in instream flow requirements could decrease supply.	None	None
Water Quality	Could be impacted by higher naturally-occurring levels of manganese, creating long-term nuisance issues for treatment. Increased nitrates, nutrients, or other constituents associated with agricultural production are of ongoing concern.	Could be impacted by high levels of iron and manganese, nitrates, nutrients and other constituents associated with agricultural production; known to impact the region and often tied with limited quantity.	None
Climatic	Drought could reduce available surface water supply.	The availability of surface water could affect the rate of groundwater pumping in San Joaquin County.	None

More detailed discussions on the specific constraints on CCWD's water supplies, by sub-region, are included below.

7.1.1 Sub-Region A – Calaveras River

The District's Calaveras River supply can be impacted by water quality and climatic factors. The following discusses the potential impacts of each element to the District's supply.

Water quality on the Calaveras River is relatively good with routinely anticipated seasonal fluctuations; historical water quality issues and treatability have not impacted the District's supply. A watershed sanitary survey is conducted every five years to identify current water quality and potential impacts to future water quality. In addition, a baseline water quality program study was completed in 2005 under a CALFED Bay-Delta Program grant. The study found that potential impacts to the Calaveras River are mostly naturally-occurring with water quality including increased sediments from runoff, manganese from runoff and low reservoir levels, nutrient loading, and coliform bacteria. However, these impacts do not affect supply reliability as they can be mitigated through watershed programs, suitable treatment technology, and supply management. Water quality in this region could also be impacted by high levels of iron, manganese, nitrates, nutrients, and other constituents associated with agricultural production. Illegal cannabis production can also create polluted runoff, habitat destruction, and reduced streamflow due to illegal diverting (PPIC 2015). In a recent report on regulating marijuana in California, the Public Policy Institute of California recommended that a tightly regulated marijuana market would include strict environmental and water use requirements (PPIC 2016).

The impacts to the Calaveras River Watershed from the 2015 Butte Fire were significant, with over 40% of the total watershed being burned. However, the corollary negative effects on water quality downstream have yet to be determined and will likely be experienced for multiple years after the fire. The District is in the process of implementing a pre-treatment project with cooperation and funding assistance from the Federal Emergency Management Agency and California Office of Emergency Services. This project will be fully implemented by the end of calendar year 2016, ensuring that the District will continue to meet all drinking water quality standards into the future, while also ensuring more operational flexibility.

As discussed in more detail in **Chapter** 6, climatic changes may impact availability of the District's supplies. As a result of the change in amount or timing of precipitation, the operational strategy of New Hogan Reservoir, specifically related to flood control and water storage operations, may be forced to change. To mitigate any potential shortages associated with climatic changes, such as drought, the District has developed a comprehensive Water Shortage Contingency Plan, which is discussed in more detail in **Chapter** 8.

7.1.2 Sub-Region B – Stanislaus River

The reliability of the North Fork Stanislaus River water supply is a function of natural hydrologic conditions and its interaction with the legal and institutional landscape.

SWRCB WR Order No. 97-05 provides that the District may deliver no more than 8,000 AFY for use within the Ebbetts Pass service area under certain permitted rights held by the District. Separately, the District's agreement with NCPA limits diversions for consumptive use in the Ebbetts Pass service area, including water taken from the Collierville tunnel tap, to 8,000 AFY. These provisions may be modified only in coordination with NCPA. Further under SWRCB WR Order No. 97-05, an additional

1,000 AFY may be diverted through an existing cement slurry line to meet agricultural needs in the Highway 4/Murphys area. SWRCB WR Order No. 97-05 also authorizes the diversion of 6,000 AFY from Lake Tulloch to meet the water supply needs of the Copper Cove/Copperopolis area. The District will petition for a change of its permitted rights as necessary to provide sufficient supply to its service areas. The District's agreement with the NCPA expires in 2032; at that time, CCWD will need to renegotiate the terms of the agreement.

Water quality on the North Fork of the Stanislaus River is relatively good; historically, the District has not experienced reliability impacts as a result of poor water quality. A watershed sanitary survey is conducted every five years to identify current water quality and potential impacts to future water quality. Potential impacts to water quality include increased loading of sediment, nutrients, and coliform bacteria in runoff. These impacts, however, are not expected to affect supply reliability as they can be mitigated through watershed programs, treatment technology, and supply management. Water quality in this region could also be impacted by high levels of iron, manganese, nitrates, nutrients, and other constituents associated with agricultural production. Illegal cannabis production can also create polluted runoff, habitat destruction, and reduced streamflow due to illegal diverting (PPIC 2015). In a recent report on regulating marijuana in California, the Public Policy Institute of California recommended that a tightly regulated marijuana market would include strict environmental and water use requirements (PPIC 2016).

7.1.3 Sub-Region C - Mokelumne River

The District's Mokelumne River supply can be impacted by legal, water quality, and climatic changes. The District is a County of Origin entitled to obtain assignments of State Filed water right applications on the Mokelumne River. The District's right to 27,000 AFY of these State Filings is recognized pursuant to a State Water Resources Control Board decision, release of priority by DWR, and contracts with EBMUD. The District already obtained an assignment of a small portion of the State Filing, which is used to provide water within the West Point service area. While the water available under this County of Origin State Filing is senior to other water rights on the River, its future availability could be inconsistent due to delays in construction or environmental review.

Water quality on the Mokelumne River is relatively good; historically, CCWD has not experienced any impacts on supply reliability due to poor water quality. However, there are legacy contaminants as a result of significant gold, silver, and other mining activities along the river dating back to the mid-1800s. As a result, many of the tributaries and the Mokelumne River itself are potentially vulnerable to contamination with mercury, copper, zinc, and other contaminants. While other potential impacts to the water quality include increased sediments and nutrients from runoff, these impacts are not expected to affect reliability as they can be mitigated through watershed programs, treatment technology, and supply management. While there is limited agriculture in the area currently, water quality could be impacted in the future by high levels of iron, manganese, nitrates, nutrients, and other constituents associated with agricultural production. Illegal cannabis production can also create polluted runoff, habitat destruction, and reduced streamflow due to illegal diverting (PPIC 2015). In a recent report on regulating marijuana in California, the Public Policy Institute of California recommended that a tightly regulated marijuana market would include strict environmental and water use requirements (PPIC 2016).

As discussed in more detail in **Chapter** 6, climatic changes may impact the reliability of the District's Mokelumne River water supply. Should climatic changes affect the timing and volume of flow in the

Mokelumne River, the District will implement its Water Shortage Contingency Plan, included in **Chapter** 8, to address potential water shortages.

7.1.4 Sub-Region D – Groundwater

DWR designated the Eastern San Joaquin Groundwater Subbasin as critically overdrafted in Bulletin 118 and in its recent designation under SGMA. Long-term groundwater overdraft has had dramatic effects on groundwater levels and select portions of the Subbasin in San Joaquin County have exhibited groundwater levels declining by as much as two feet per year, up to 90 feet below sea level (GBA 2007). As a result, groundwater has not been viewed as a long-term reliable source of water supply for large areas of the District and continued overdraft poses reliability impacts to the District's supply. See **Section 6.2** for a more thorough discussion of conditions in the Eastern San Joaquin Groundwater Subbasin.

7.2 Reliability by Year Type

CCWD's drought planning considers water supplies from each source during single dry and multiple dry years as defined below:

- **Average Year:** Typically, average year is defined as the year that most closely represents the average supply available. For much of its supply, the District has not experienced shortages, either through curtailments or low flows. As a result, the average year for some supplies is defined as the upper limit of the permit or contract rights for the particular water supply. This will be noted as appropriate in the following sections.

- **Single Dry Year:** Defined as the year that represents the lowest water supply available to CCWD.

- **Multiple Dry Year:** Defined as the period that represents the lowest water supply available to CCWD for a consecutive 3-year period.

The supply assumed for each year type by Sub-Region is discussed in further detail in the following sections. District-wide tables are included in **Appendix A**.

7.2.1 Sub-Region A – Calaveras River

Table 7-2 shows the total Calaveras River water supply available in each year type to the District. The average year supply volume is assumed to be the upper limit of the District's Calaveras River water right, or 31,665 AFY. CCWD's Calaveras River water rights are subject to reductions; however, 7,700 AFY of this right can't suffer a deficit, and must be made available in every year type. Along with the District's 350 AFY in riparian rights that predate the storage development in New Hogan Reservoir, the storage rights in Mill Pond, and direct diversion rights from Big Trees Creek, the District's available supply in any dry year is assumed to be 8,437 AFY.

Table 7-2: Sub-Region A – Basis of Water Year Data (DWR Table 7-1)

Year Type	Base Year	Available Supplies if Year Type Repeats	
		☐ —	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.
		☑ —	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year[1]	--	31,665	100%
Single-Dry Year[2]	--	8,437	27%
Multiple-Dry Years 1st Year[2]	--	8,437	27%
Multiple-Dry Years 2nd Year[2]	--	8,437	27%
Multiple-Dry Years 3rd Year[2]	--	8,437	27%
NOTES: (1) Average year supply is assumed to be the upper limit of the water right and includes supply from New Hogan Reservoir and Mill Pond. (2) Available supplies in dry years reflects the amount of supply that CCWD is able to get under its Calaveras River rights in every year type.			

7.2.2 Sub-Region B – Stanislaus River

Table 7-3 shows the total water supply in each year type for the District's Stanislaus River supply. The average year supply volumes are based on the District's storage right in Spicer Reservoir. This supply was assumed to be available in the first year of a multi-year drought. In subsequent, consecutive dry years, it was assumed that a segment of the District's Stanislaus River water rights would be curtailed (as they were in 2014 and 2015) and only the water that the District had stored in Spicer Reservoir prior to the curtailment would be available. Supply available in the second and third consecutive dry years was reduced by the 2015 demand to represent the District's use of the stored water in times of curtailment.

Table 7-3: Sub-Region B – Basis of Water Year Data (DWR Table 7-1)

Year Type	Base Year	Available Supplies if Year Type Repeats	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year[1]	--	76,300	100%
Single-Dry Year[2]	--	70,530	92%
Multiple-Dry Years 1st Year[2]	--	76,300	100%
Multiple-Dry Years 2nd Year[2]	--	73,415	96%
Multiple-Dry Years 3rd Year[2]	--	70,530	92%
NOTES: (1) Average year is based on the District's storage right in Spicer Reservoir. (2) The District's ability to directly divert from the Stanislaus River was assumed to be curtailed in the second and third years of a multi-dry year period; available supplies was assumed to be the water available in Spicer Reservoir less the demands from the prior year (assumed to be 2015 demand).			

7.2.3 Sub-Region C - Mokelumne River

Table 7-4 shows the total water supply in each year type for the Mokelumne River. The average year supply volume is assumed to be the upper limit of the District's Mokelumne River water rights. In 2014, the District received a notice from the State Water Resources Control Board curtailing CCWD's water right from Bear Creek. During the period of curtailment (2014 and 2015), CCWD relied solely on its 15-year contract with CPUD and access to its supplies from the Middle Fork Mokelumne River storage at Schaads Reservoir. Supplies available to CCWD were capped at 200 AFY, per the terms of the agreement. However, it should be noted that the District could potentially request additional water above the 200 AFY through a "reopener" contract clause that allows for mutually approved changes to the contracted amount. Furthermore, the District could receive additional water supply reliability and conveyance by partnering with CPUD on the Middle Fork Ditch Pipeline and Hydroelectric Power Project. The analysis below does not consider this possibility for additional

water; however, the District is interested in working with CPUD to develop additional projects that could help the District develop Mokelumne River supplies in the County. While the District has not yet experienced three consecutive years of curtailment, the State Water Resources Control Board may still issue curtailment notices in 2016. To be conservative in its supply planning, the District has assumed that the supply available in the third year of a multiple-dry year scenario would also be reduced as a result of curtailments.

In the first year of a multiple-dry year scenario, the available supply was assumed to be 250 AF, with 200 AF supplied through the contract with CPUD and 50 AF supplied by storage in the regulating reservoir, which is offstream storage owned by CCWD to serve the West Point Service Area. In the second year of a drought, the 50 AF in storage would be unavailable, having gone to meet demand in the first year. Thus, supply available in the second and third years of a multiple-dry year period would be 200 AF.

Table 7-4: Sub-Region C – Basis of Water Year Data (DWR Table 7-1)

Year Type	Base Year	Available Supplies if Year Type Repeats	
		☐ —	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.
		☑ —	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year[1]	-	2,030	100%
Single-Dry Year	2014	200	10%
Multiple-Dry Years 1st Year[2]	2013	250	12%
Multiple-Dry Years 2nd Year	2014	200	10%
Multiple-Dry Years 3rd Year	2015	200	10%
NOTES: (1) Up to 200 AFY is available for purchase from the CPUD and CCWD's Bear Creek water right allows 1,830 AFY of diversion for a total average year Mokelumne River supply of 2,030 AFY. (2) Includes 50 AFY from the District's regulating reservoir and 200 AFY from CPUD.			

7.2.4 Sub-Region D – Groundwater

Average year supply for the District's groundwater was assumed to be the amount of water that has historically been supplied to the area. The supplies available in dry years represent the amount of groundwater supplied from the years 2013 through 2015. While it is expected that historical supplies of groundwater will be available in the future, the Eastern San Joaquin Groundwater Subbasin is listed as a critically overdrafted basin. CCWD is exploring options to supplement groundwater supplies with surface water to meet Wallace Lake Estates demands and improve water reliability for the area. **Table 7-5** shows the total water supply in each year type for Sub-Region D.

Table 7-5: Sub-Region D – Basis of Water Year Data (DWR Table 7-1)

Year Type	Base Year	Available Supplies if Year Type Repeats	
		☐ _	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.
		_ ☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year	--	65	100%
Single-Dry Year	2015	45	69%
Multiple-Dry Years 1st Year	2013	65	100%
Multiple-Dry Years 2nd Year	2014	54	83%
Multiple-Dry Years 3rd Year	2015	45	69%

7.3 Supply and Demand Assessment

This section compares projected water supplies in various hydrologic year types to projected demands for each sub-region. The demands used for this analysis are presented in **Section 4.2**. The supply and demand assessment for each sub-region is presented in the following sections; District-wide tables are included in **Appendix A**. The tables provided below show that Sub-Regions A and B have sufficient supply to meet demand in every year type through the UWMP planning horizon, while Sub-Regions C and D do not have adequate supply to meet demand in a single-dry year and in the second and third years of a multiple drought.

It should be noted that actual CCWD demands could be higher than what is shown herein, potentially resulting in a supply deficit in some or all of the District's sub-regions. For instance, while the specific requirements resulting from SGMA are unknown at this time, CCWD overlies and actively utilizes the Eastern San Joaquin Groundwater Subbasin, which has been categorized by DWR as critically overdrafted. As such, CCWD is actively participating in regional efforts to establish one or more Groundwater Sustainability Agency(ies) and a Groundwater Sustainability Plan for the Eastern San Joaquin Groundwater Subbasin to meet SGMA requirements. It is anticipated that, through these efforts, CCWD will be required to participate in some form of groundwater recharge program to achieve long-term sustainability of the basin, which would increase future demands. However, SGMA is being implemented in a parallel planning process, and the District's future demands associated with groundwater recharge are currently unknown. Furthermore, the demands represented in the following tables do not reflect projected build-out demands, as build-out is not expected to occur within the planning horizon of this UWMP. Build-out demands are expected to be higher than those presented herein, potentially resulting in future supply deficits.

An additional factor that could impact the supply and demand assessment provided in this section is climate change. While climate change may increase outdoor irrigation and agricultural demands due to increased temperatures and ETo rates, the more significant expected impact will likely be a decrease in the amount of surface water supply available to the District in all years. This section assumes reduced availability of surface water supplies based on historic observed hydrology. Should climate change significantly impact supply availability in the future, the District may experience a supply shortfall in some sub-regions, particularly when coupled with groundwater recharge demand and build-out demands. The effect of climate change on supplies and demands is further discussed in **Section 6.10** and **Section 4.6**, respectively.

7.3.1 Sub-Region A – Calaveras River

Table 7-6, **Table 7-7**, and **Table 7-8** present the supply and demand assessment for the District's Calaveras River supply. As described above, the demands included in the following tables do not reflect potential groundwater recharge demands or build-out demand. As a result, the District's actual future demands on its Calaveras River supply could be higher than what is presented here.

Table 7-6: Sub-Region A – Normal Year Supply and Demand Comparison (DWR Table 7-2)

	2020	2025	2030	2035	2040
Supply Totals	31,864	31,898	31,932	31,966	32,001
Demand totals	4,332	5,127	5,896	6,648	7,371
Difference	27,532	26,771	26,036	25,318	24,630
NOTES: Recycled water is included in both supply and demand total.					

Table 7-7: Sub-Region A – Single-Dry Year Supply and Demand Comparison (DWR Table 7-3)

	2020	2025	2030	2035	2040
Supply Totals	8,636	8,670	8,704	8,738	8,773
Demand totals	4,332	5,127	5,896	6,648	7,371
Difference	4,304	3,543	2,808	2,090	1,402
NOTES: Recycled water is included in both supply and demand total.					

Table 7-8: Sub-Region A - Multiple Dry Year Supply and Demand Comparison (DWR Table 7-4)

		2020	2025	2030	2035	2040
First Year	Supply totals	8,636	8,670	8,704	8,738	8,773
	Demand totals	4,332	5,127	5,896	6,648	7,371
	Difference	4,304	3,543	2,808	2,090	1,402
Second Year	Supply totals	8,636	8,670	8,704	8,738	8,773
	Demand totals	4,332	5,127	5,896	6,648	7,371
	Difference	4,304	3,543	2,808	2,090	1,402
Third Year	Supply totals	8,636	8,670	8,704	8,738	8,773
	Demand totals	4,332	5,127	5,896	6,648	7,371
	Difference	4,304	3,543	2,808	2,090	1,402
NOTES: Recycled water is included in both supply and demand total.						

7.3.3 Sub-Region B – Stanislaus River

Table 7-9, **Table 7-10**, and **Table 7-11** present the supply and demand assessment for the District's Stanislaus River supply. As described above, the demands included in the following tables do not reflect potential groundwater recharge demands or build-out demand. As a result, the District's actual future demands on its Stanislaus River supply could be higher than what is presented here.

Table 7-9: Sub-Region B – Normal Year Supply and Demand Comparison (DWR Table 7-2)

	2020	2025	2030	2035	2040
Supply totals	76,638	76,736	76,834	76,932	77,032
Demand totals	9,761	16,141	22,433	29,469	37,952
Difference	66,877	60,595	54,401	47,463	39,080
NOTES: Recycled water is included in both supply and demand total.					

Table 7-10: Sub-Region B – Single-Dry Year Supply and Demand Comparison (DWR Table 7-3)

	2020	2025	2030	2035	2040
Supply totals	70,868	70,966	71,064	71,162	71,262
Demand totals	9,761	16,141	22,433	29,469	37,952
Difference	61,107	54,825	48,631	41,693	33,310
NOTES: Recycled water is included in both supply and demand total.					

Table 7-11: Sub-Region B - Multiple Dry Year Supply and Demand Comparison (DWR Table 7-4)

		2020	2025	2030	2035	2040
First Year	Supply totals	76,638	76,736	76,834	76,932	77,032
	Demand totals	9,761	16,141	22,433	29,469	37,952
	Difference	66,877	60,595	54,401	47,463	39,080
Second Year	Supply totals	73,753	73,851	73,949	74,147	74,147
	Demand totals	9,761	16,141	22,433	29,469	37,952
	Difference	63,992	57,710	51,516	44,678	36,195
Third Year	Supply totals	70,868	70,966	71,064	71,162	71,262
	Demand totals	9,761	16,141	22,433	29,469	37,952
	Difference	61,107	54,825	48,631	41,693	33,310
NOTES: Recycled water is included in both supply and demand total.						

7.3.4 Sub-Region C – Mokelumne River

Table 7-12, **Table 7-13**, and **Table 7-14** present the supply and demand assessment for the District's Mokelumne River supply. As described above, the demands included in the following tables do not reflect potential groundwater recharge demands or build-out demand. As a result, the District's actual future demands on its Mokelumne River supply could be higher than what is presented here.

Table 7-12: Sub-Region C - Normal Year Supply and Demand Comparison (DWR Table 7-2)

	2020	2025	2030	2035	2040
Supply totals[1]	2,030	2,030	2,030	2,030	2,030
Demand totals	207	217	224	231	237
Difference	1,823	1,813	1,806	1,799	1,793
NOTES: (1) Includes 200 AFY of water from CPUD, per contract.					

Table 7-13: Sub-Region C – Single-Dry Year Supply and Demand Comparison (DWR Table 7-3)

	2020	2025	2030	2035	2040
Supply totals	200	200	200	200	200
Demand totals	207	217	224	231	237
Difference[1]	-7	-17	-24	-31	-37
NOTES: (1) The District intends that the difference noted here will be met with increased conservation associated with implementation of its Water Shortage Contingency Plan, detailed in **Chapter 8**. Additionally, the District could request additional supply above the 200 AFY through a "reopener" contract clause that allows for mutually approved changes to the contracted amount or partner with CPUD on the Middle Fork Ditch Pipeline and Hydroelectric Power Project.					

Table 7-14: Sub-Region C - Multiple Dry Year Supply and Demand Comparison (DWR Table 7-4)

		2020	2025	2030	2035	2040
First Year	Supply totals	250	250	250	250	250
	Demand totals	207	217	224	231	237
	Difference	43	33	26	19	13
Second Year	Supply totals	200	200	200	200	200
	Demand totals	207	217	224	231	237
	Difference(1)	-7	-17	-24	-31	-37
Third Year	Supply totals	200	200	200	200	200
	Demand totals	207	217	224	231	237
	Difference(1)	-7	-17	-24	-31	-37
NOTES: (1) The District intends that the difference noted here will be met with increased conservation associated with implementation of its Water Shortage Contingency Plan detailed in **Chapter 8**. Additionally, the District could request additional supply above the 200 AFY through a "reopener" contract clause that allows for mutually approved changes to the contracted amount or partner with CPUD on the Middle Fork Ditch Pipeline and Hydroelectric Power Project.						

7.3.5 Sub-Region D – Groundwater

Table 7-15, **Table 7-16**, and **Table 7-17** present the supply and demand assessment for groundwater. As described above, the demands included in the following tables do not reflect build-out demand. As a result, the District's actual future demands in the Wallace sub-region could be higher than what is presented here. Currently, groundwater is the only source for sub-region D; however, the District is exploring options to increase supply reliability in the region by meeting a portion of demands with surface water.

Table 7-15: Sub-Region D – Normal Year Supply and Demand Comparison (DWR Table 7-2)

	2020	2025	2030	2035	2040
Supply totals	65	65	65	65	65
Demand totals	62	66	69	71	72
Difference[1]	3	-1	-4	-6	-7
NOTES: (1) CCWD is exploring options to supplement groundwater supplies with surface water to meet Wallace Lake Estates demands and improve reliability. The District intends that the difference noted here will be met with surface water and increased conservation associated with implementation of its Water Shortage Contingency Plan detailed in **Chapter 8.**					

Table 7-16: Sub-Region D – Single-Dry Year Supply and Demand Comparison (DWR Table 7-3)

	2020	2025	2030	2035	2040
Supply totals	45	45	45	45	45
Demand totals	62	66	69	71	72
Difference[1]	-17	-21	-24	-26	-27
NOTES: (1) CCWD is exploring options to supplement groundwater supplies with surface water to meet Wallace Lake Estates demands and improve reliability. The District intends that the difference noted here will be met with surface water and increased conservation associated with implementation of its Water Shortage Contingency Plan detailed in **Chapter 8.**					

Table 7-17: Sub-Region D - Multiple Dry Year Supply and Demand Comparison (DWR Table 7-4)

		2020	2025	2030	2035	2040
First Year	Supply totals	65	65	65	65	65
	Demand totals	62	66	69	71	72
	Difference	3	-1	-4	-6	-7
Second Year	Supply totals	54	54	54	54	54
	Demand totals	62	66	69	71	72
	Difference[1]	-8	-12	-15	-17	-18
Third Year	Supply totals	45	45	45	45	45
	Demand totals	62	66	69	71	72
	Difference[1]	-17	-21	-24	-26	-27

NOTES: (1) CCWD is exploring options to supplement groundwater supplies with surface water to meet Wallace Lake Estates demands and improve reliability. The District intends that the difference noted here will be met with surface water and increased conservation as a result of implementing the Water Shortage Contingency Plan discussed in **Chapter** 8.

7.4 Regional Supply Reliability

CCWD is evaluating groundwater recharge and conjunctive use opportunities, regional and inter-regional partnerships for improving water supply reliability during dry years, improving water conservation opportunities, rationing measures, and the strategic use of groundwater supply wells to meet peaking and dry year water supply needs. As part of its water management efforts, CCWD maintains a detailed Water Shortage Contingency Plan as discussed in Chapter 8 and is continually preparing to manage supplies and demands during droughts and water shortages to ensure a high quality, reliable water supply to its customers.

As described in the previous section, CCWD overlies and actively utilizes the Eastern San Joaquin Groundwater Subbasin, which has been categorized by DWR as a critically overdrafted basin. Agencies throughout the basin, including CCWD, are actively coordinating to establish one or more Groundwater Sustainability Agency(ies) and a Groundwater Sustainability Plan for the Eastern San Joaquin Groundwater basin to meet SGMA requirements. Because SGMA is being implemented in a parallel planning process, specific requirements are currently unknown; however, CCWD will continue to participate in regional planning efforts to increase regional supply reliability and sustainability of the groundwater basin.

8 Water Shortage Contingency Planning

The Urban Water Management Planning Act requires that each water supplier provide a Water Shortage Contingency Plan that outlines how the supplier will prepare for and respond to water shortages. This chapter addresses this requirement by describing the staged actions that the District would implement in response a water shortage that occurs over a period of time, such as a drought or interruption in supply due to a catastrophic event, as required by California Water Code.

The District is comprised of six independent water systems located throughout Calaveras County; however, the overwhelming majority of the District's supply is surface water, which is particularly vulnerable to drought. Despite having distinct supply systems, each system would be similarly impacted by a supply shortage resulting from a drought or emergency disturbance. Water shortage contingency planning will help the District plan for and mitigate supply shortages for all District customers, regardless of their water delivery system.

8.1 Stages of Action

The Water Shortage Contingency Plan provides five stages of response based on water supply conditions within the District's service area. The initial Advisory Stage, set at a 10 percent reduction, is a voluntary stage to preserve water in the early stages of a potential shortage. The four mandatory rationing levels are designed to respond to increasingly severe supply shortages. **Table 8-1** below highlights each stage, the respective percent supply reduction, and the water supply condition.

Table 8-1: Stages of Action (DWR Table 8-1)

Stage	Percent Supply Reduction	Water Supply Condition
1: Advisory Stage (Voluntary Rationing)	≤10%	Up to a 10% reduction in total District supply
2: Alert Stage (Mandatory Rationing)	11-15%	11-15% reduction in total District supply
3: Moderate Stage (Mandatory Rationing)	16-25%	16-25% reduction in total District supply
4: Critical Stage (Mandatory Rationing)	26-49%	26-49% reduction in total District supply
5: Emergency Stage (Mandatory Rationing)	≥50%	50% or more reduction in total District supply

8.1.1 Addressing Reductions Determined Outside of District Control

On January 14, 2014, the Governor of California declared a drought state of emergency and called on Californians to reduce water use by 20 percent. On April 1, 2015, the Governor set a precedent in California by issuing Executive Order B-29-15 which mandated water use reductions to achieve a 25 percent statewide reduction. To achieve this statewide goal, the State Water Resources Control

Board adopted regulations specific to each agency; as a result, CCWD was mandated to reduce water use by 16 percent on a monthly basis in 2015, as compared to corresponding monthly use in 2013.

Recognizing that outside factors beyond supply conditions could generate a need for demand reduction, the District has opted to include an additional trigger in its updated Water Shortage Contingency Plan that is not directly related to current water supply conditions. This offers the District added flexibility to address future potential state mandates or any other needed demand reductions that are not directly triggered by the District's local water supply outlook. The stage resulting from the trigger would be dependent on the reduction required, as indicated below in **Table 8-2**.

Table 8-2: Additional Trigger for Responding to External Factors

Trigger	Stage
Reduction required due to external factors	To be selected from one of the 5 stages of action based on level of reduction needed (see **Table 8-1**).

8.2 Prohibitions on End Uses

The District implements ongoing water waste prohibitions, as well as additional prohibitions specific to the various stages of action. **Table 8-3** highlights these prohibitions and the stage under which each is implemented. The following sections describe each of the 5 stages, as well as the on-going prohibitions.

Table 8-3: Restrictions and Prohibitions on End Users (DWR Table 8-2)

Stage	Restrictions and Prohibitions to End Users	Additional Explanation or Reference (optional)	Penalty, Charge, or Other Enforcement? Y/N
Landscape Irrigation			
Ongoing	Other landscape restriction or prohibition	Irrigating outdoors during, and within 48 hours after, measureable rainfall is prohibited	Y
Ongoing	Other landscape restriction or prohibition	Inspect all irrigation systems, repair leaks and adjust spray heads to provide optimum coverage and eliminate avoidable overspray	Y
1, 2	Other landscape restriction or prohibition	Customers should take responsive actions to establish appropriate run-times for landscape irrigation to eliminate excessive water runoff	N

Stage	Restrictions and Prohibitions to End Users	Additional Explanation or Reference (optional)	Penalty, Charge, or Other Enforcement? Y/N
		extending beyond the customer property	
1, 2	Other landscape restriction or prohibition	Request that landscape watering is avoided during the hottest portion of the day	N
2, 3, 4, 5	Other landscape restriction or prohibition	Customers must repair controllable water leaks, correct overspray, or repair excessive landscape watering	Y
3, 4, 5	Restrict or prohibit runoff from landscape irrigation	Customers must take actions to establish appropriate run-times for landscape irrigation to eliminate excessive water runoff extending beyond the customer property	Y
3, 4, 5	Limit landscape irrigation to specific times	Irrigation is prohibited between the hours of 10 a.m. and 6 p.m.	Y
3, 4, 5	Limit landscape irrigation to specific days		Y
4, 5	Prohibit certain types of landscape irrigation	Golf course irrigation will be restricted to greens and trees if raw water is sole source	Y
5	Prohibit all landscape irrigation		Y
5	Prohibit certain types of landscape irrigation	Golf courses are limited to the use of treated effluent or private well water sources for irrigation	Y
Commercial Industrial Institutional (CII)			
2, 3, 4, 5	Lodging establishment		Y

Stage	Restrictions and Prohibitions to End Users	Additional Explanation or Reference (optional)	Penalty, Charge, or Other Enforcement? Y/N
	must offer opt out of linen service		
2, 3, 4, 5	Restaurants may only serve water upon request		Y
Water Features and Swimming Pools			
Ongoing	Require covers for any new pools and spas		Y
Ongoing	Other water feature or swimming pool restriction	All pools, spas, must use recirculating pumps and be maintained leak free. Dump and fill maintenance practice for pools is prohibited	Y
Ongoing	Restrict water use for decorative water features, such as fountains	Prohibit non-recirculating water displays or features such as decorative water fountains	Y
4, 5	Restrict water use for decorative water features, such as fountains	Prohibit operation of water displays or features such as decorative water fountains and recreational ponds	Y
4, 5	Other water feature or swimming pool restriction	Prohibit filling new or existing pools	Y
Other			
Ongoing	Require automatic shut-off hoses		Y
Ongoing	Other	All new water connections are prohibited from having single-pass cooling systems	Y
Ongoing	Other	All new conveyor car wash and commercial laundry systems are	Y

Stage	Restrictions and Prohibitions to End Users	Additional Explanation or Reference (optional)	Penalty, Charge, or Other Enforcement? Y/N
		prohibited from having non-recirculating washing systems	
Ongoing	Other	Any use of potable water that results in excessive runoff from the property and/or gutter flooding is prohibited	Y
Ongoing	Other	Limit use of potable water for cleaning driveways, sidewalks, parking lots, and streets except when necessary to alleviate health and safety hazards	Y
1, 2	Prohibit use of potable water for washing hard surfaces	Use of water for cleaning driveways, walkways, parking lots and streets is discouraged, except to alleviate immediate safety or sanitation hazards.	N
2, 3, 4, 5	Customers must repair leaks, breaks, and malfunctions in a timely manner	All leaks, breaks, or other malfunctions shall be repaired within 72 hours of being notified by the District	Y
3, 4, 5	Prohibit use of potable water for washing hard surfaces	Use of water for cleaning driveways, walkways, parking lots and streets is prohibited, except to alleviate immediate safety or sanitation hazards.	Y
3, 4, 5	Other	Request that local fire departments limit training exercises that use potable water and cease hydrant testing.	N
4, 5	Prohibit use of potable water for washing hard surfaces		Y

Stage	Restrictions and Prohibitions to End Users	Additional Explanation or Reference (optional)	Penalty, Charge, or Other Enforcement? Y/N
4, 5	Limit use of potable water for construction and dust control	Potable water shall not be used for construction or dust control if recycled or raw water is reasonably available	Y
5	Other	New water service applications will be granted upon the condition that water shall be used only for interior purposes and landscaping shall be delayed until the District determines that Stage 5 rationing levels are no longer needed	Y

8.2.1 Stage 0: Ongoing Prohibitions

Stage 0 contains prohibitions which are always in place, regardless of the District's water supply conditions. These restrictions, highlighted below, are part of the District's Water Waste Ordinance No. 2010-02, which is included in **Appendix L**. The water waste prohibitions are designed to decrease baseline water use and encourage responsible use of local supplies. During Stage 0, the District implements a public information campaign and discourages wasteful water practices. The campaign includes targeted messaging, and online informational postings to inform customers about conserving water. In addition to public outreach, the following list identifies on-going prohibitions:

- Any use of water that results in excessive water runoff from the property and/or gutter flooding is prohibited.
- Irrigating outdoors during, and within 48 hours after, measurable rainfall is prohibited.
- All irrigation systems must be inspected, leaks repaired, and spray heads adjusted to provide optimum coverage and eliminate avoidable overspray.
- All hoses must be equipped with an automatic shutoff device.
- All new water connections are prohibited from having single pass cooling systems.
- All new conveyor car wash and commercial laundry systems are prohibited from having non-recirculating washing systems.
- Pool covers are required for all new outdoor swimming pools.
- Once notified by the District, leaks should be repaired within a timely manner.
- All pools, spas, fountains, and other water displays must use a recirculation pump and be maintained leak free. Dump and fill maintenance practice for pools is prohibited.
- Recirculating water is required for water fountain and decorative water features.

8.2.2 Stage 1: Advisory Stage (Voluntary Actions)

During Stage 1, the water supply shortage is triggered by a reduction in District supply of less than 10 percent. This Stage includes voluntary measures that the District may suggest to customers.

Stage 1 includes the following voluntary measures:

- Landscape watering should be avoided during the hottest portion of the day, when ETo rates are high.
- Customers should take responsive action to establish appropriate run-times for landscape irrigation to eliminate water runoff extending beyond their properties.
- Use of water for cleaning driveways, walkways, parking lots and streets is discouraged, except to alleviate immediate safety or sanitation hazards.

8.2.3 Stage 2: Alert Stage (Mandatory Prohibitions)

Stage 2 is designed to respond to a supply reduction of between 11 percent and 15 percent. During Stage 2 of a water supply shortage, demand must be reduced by at least 11 percent for the District to meet the immediate needs of its customers.

All preceding voluntary requirements remain in effect, and Stage 2 includes the following mandatory prohibitions:

- Customers must repair controllable water leaks, correct overspray, and cease excessive landscape watering.
- Lodging establishments must provide patrons the option of not having towels and linens laundered daily by displaying notices prominently in each guestroom.
- Dining establishments may only serve water upon request.

8.2.4 Stage 3: Moderate Stage (Mandatory Prohibitions)

During Stage 3, the water supply shortage is moderate and triggered by a reduction in District supply of between 16 percent and 25 percent. As a result, District demand must be reduced by at least 16 percent in order for the District to meet the immediate needs of its customers.

All preceding Stage 2 mandatory prohibitions remain in effect; in addition, voluntary actions under Stage 1 become mandatory. Stage 3 prohibitions include all the following mandatory prohibitions:

- Landscape irrigation is prohibited between the hours of 10 a.m. and 6 p.m.
- Landscape irrigation shall be limited to three days per week.
- Customers must take responsive action to establish appropriate run-times for landscape irrigation to eliminate water runoff extending beyond their properties.
- All leaks, breaks, or other malfunctions shall be repaired within 72 hours of being notified by the District.
- Local fire departments will be asked to limit training exercises that use potable water and cease hydrant testing.

8.2.5 Stage 4: Critical Stage (Mandatory Prohibitions)

Stage 4 is structured to respond to a critical shortage and is triggered by a reduction in District supply of between 26 percent and 49 percent. During Stage 4 of a water supply shortage, demand must be reduced by at least 26 percent for the District to meet the immediate needs of its customers.

All Stage 3 prohibitions remain in effect and the following mandatory prohibitions are added:

- Landscape irrigation restrictions are implemented to limit the allowable frequency of irrigation to a maximum of two days per week and based on the following schedule:
    - Premises having odd-numbered street addresses irrigate only on Wednesdays and Sundays.
    - Premises having even-numbered street addresses irrigate only on Tuesdays and Saturdays.
- No watering will be allowed by any addresses on Mondays, Thursdays, and Fridays.
- Filling of new or existing pools is prohibited.
- Operation of water displays or features such as decorative water fountains and recreational ponds is prohibited.
- Use of potable water for cleaning hardscapes, except to alleviate immediate safety or sanitation hazards is prohibited.
- Use of potable water for construction or dust control is prohibited, except if recycled or raw water is reasonably available.
- Golf course irrigation will be restricted to greens and trees if raw water is the sole source.

8.2.6 Stage 5: Emergency Stage (Mandatory Prohibitions)

During Stage 5 of a water supply shortage, a 50 percent or greater reduction in water use is required for the District to meet the immediate needs of its customers.

All Stage 4 prohibitions remain in effect and the following mandatory prohibitions are added:

- Outdoor watering by hose or irrigation system will be prohibited.
- Golf courses will be limited to the use of treated effluent or well water sources for irrigation.
- New water service applications will be granted only on the condition that water shall be used exclusively for interior purposes and landscaping shall be delayed until the District determines that Stage 5 rationing levels are no longer needed.

8.3 Enforcement of Prohibitions

Any customer violating the regulations and restrictions on water use set forth above in **Table 8-3** shall receive a written warning for the first such violation. Upon a subsequent second and third violation, the District may institute fines and install a flow restrictor. If a flow restrictor is placed, the cost of installation and removal shall be paid by the violator. Any willful violation occurring subsequently shall constitute a misdemeanor and may be referred to the Calaveras County District Attorney's office for prosecution.

Penalties for failure to comply with any of the restrictions outlined in **Table 8-3** are as follows:

- First violation: Upon a determination by CCWD staff that a violation has occurred, CCWD will issue an initial Notice of Violation, which shall include written warning that further violations will result in possible restriction of water service. The Notice of Violation shall provide 72 hours for the person responsible for the violation to correct or cure the violation, except in the case of emergency, as determined by CCWD staff.
- Second violation: If a customer fails to correct or cure the violation following the issuance of a Notice of Violation, the customer's water service may be restricted by a flow-restricting device for a period of at least 30 days, and the customer may be subject to administrative fines not to exceed $100 per violation, or both. If a flow-restricting device is installed, it shall remain in place until the Board of Directors repeals the state of emergency or threat of emergency or shortage and upon payment of all fines accrued to date and a $72 fee for administrative, installation, and removal costs.
- Third violation: For a third violation, the customer's water service may be restricted by a flow-restricting device installed by the District and the customer may also be subject to a fine not to exceed $200 for the third violation within the preceding 12 months, or both. If a flow-restricting device is installed, it shall remain in place until the Board of Directors repeals the state of emergency or threat of emergency or shortage and upon payment of all fines accrued to date and a $72 fee for administrative, installation and removal costs.
- Fourth and subsequent violations: In the event of continuing violations, the Customer may be subject to fines not to exceed $500 per violation for each additional violation within the preceding 12 months. If a flow-restricting device is installed, it shall remain in place until the Board of Directors repeals the state of emergency or threat of emergency or shortage and upon payment of all fines accrued to date and a $72 fee for administrative, installation and removal costs.
- The violation of a District ordinance is a misdemeanor. CCWD retains the ability to pursue any and all other remedies available to it under the law, including the referral of alleged violations to local law enforcement, civil and criminal prosecution, and termination of water service. In particular, the District may pursue a violation of conservation restriction under Water Code Section 31029 which states in part, "… it is a misdemeanor for any person to use or apply water received from the district contrary to or in violation of the restriction or prohibition, until the ordinance has been repealed or threatened emergency case ceased, and upon conviction thereof, that person shall be punished by imprisonment in the county jail for not more than 30 days or by fine of not more than six hundred dollars ($600) or by both the fine and imprisonment."

Administrative fines shall be added directly to the customer's water bill, and each additional fine shall be accompanied by a Notice of Violation. A customer may appeal an administrative fine to the Board of Directors within 30 days of the Notice of Violation. Fines that have not been appealed within the 30-day time period are presumed by the Board to be uncontested and correctly levied. Any legal challenge to the imposition of administrative fines under this section must be brought within 20 days of the expiration of the time for appeal before the Board, or within 20 days of the Board's ultimate determination on appeal, whichever is later pursuant to Government Code § 53069.4.

8.4 Consumption Reduction Methods

Consumption reduction methods are actions that are taken by the District to reduce water consumption. Prohibitions on end uses, addressed in Section 4, are actions that restrict end uses that are the responsibility of the end users. In addition to the actions described in Section 4, the District also engages in consumption reduction actions to support the varying rationing stages. These actions include aggressive public information campaigns, water saving retrofit incentives, and technical support such as leak detection surveys. These actions are highlighted in **Table 8-4** below.

Table 8-4: Stages of Water Shortage Contingency Plan - Consumption Reduction Methods (DWR Table 8-3)

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference (optional)
Stage 0 (Ongoing)	Extend public information campaign	
Stage 0 (Ongoing)	Provide customers with a wide variety of free conservation supplies	
Stage 0 (Ongoing)	Provide rebates on plumbing fixtures and devices, offer other incentives and conservation tools.	
Stage 0 (Ongoing)	Identify and repair transmission and distribution system leaks to reduce water losses.	
Stage 3, 4, 5	Discontinue non-essential flushing of mains and hydrants.	
Stage 3, 4, 5	Identify emergency water delivery rate structure	See section below
Stage 5	Discontinue line flushing	
All Stages	Encourage conservation through public outreach (local media, billing statements, direct mailings, signage)	

8.4.1 Emergency Drought Rate Structure

During the existing drought, the District has not implemented drought pricing. However, the District will be evaluating a drought rate structure as an option to be implemented in the future. This approach would both encourage conservation and help meet reduction goals. The District will be initiating a cost of service study, anticipated to begin at the end of 2016, which will help to identify an appropriate drought rate structure. At the time the study is finalized, the District may include the recommended drought rate structure as a measure in Stages 3, 4, and 5.

8.5 Determining Water Shortage Reductions

All CCWD services are metered and individual account records are stored electronically. These records will allow the District to quickly determine whether demand has been reduced to the level identified in the prevailing stage, as well as allowing CCWD to make usage comparisons on a billing period basis. This type of comparison will not only verify reductions are being made, but also provide information needed to pursue enforcement actions.

The District can also track its water use reduction through the state's Drinking Water Information Clearinghouse portal, operated by the State Water Resources Control Board, which logs the monthly reporting by urban water suppliers made mandatory by drought emergency regulations. The website tracks water use reduction by comparing each supplier's monthly total potable water production with the same month's total production in 2013. In July 2015, the District's customers reduced water use by 39 percent compared with the same month in 2013; this was the third consecutive month that the District reduced residential water use by nearly 40 percent.

8.6 Revenue and Expenditure Impacts

Since the District is the sole provider of its water supplies and conveyance, the District will not experience any increase in expenditures on water often associated with decreases in supply. However, the District's revenues are tied to water use, so as the stages in the Water Shortage Contingency Plan are implemented, the District will experience revenue impacts. For instance, as a result of reduced demands due to the recent drought, the District experienced significant financial impacts in fiscal year 2014-2015 (see **Table 8-5**).

Table 8-5: Water Revenues (Consumption) for the Previous Four Fiscal Years

Fiscal Year	Water Revenues (Consumption)	% Change from Prior Year
2011-2012	$1,234,693	--
2012-2013	$1,469,339	19%
2013-2014	$1,358,779	-8%
2014-2015	$909,763	-33%

There are many methods available to offset the projected reduced revenue impacts resulting from decreased customer demand. The District will consider utilizing operating reserves to meet the remaining revenue shortfalls during water shortages. Additionally, the District will begin a cost of services analysis in late 2016. At the time that study is concluded, the District will consider implementing a drought rate structure for all treated water accounts to encourage conservation and meet reduction goals.

8.7 Resolution or Ordinances

The District adopted an ordinance that formally adopts the Water Shortage Contingency contained in this chapter; this ordinance is included as **Appendix M**. This ordinance allows the District to

quickly adapt to changing supply conditions by working within the various stages described in this chapter.

8.8 Catastrophic Supply Interruption

California Water Code Section 10632(a)(3) requires actions to be undertaken by the water supplier to prepare for, and implement during a catastrophic interruption of water supplies. A catastrophic event that constitutes a proclamation of a water shortage would be any event, either natural or manmade, that causes a severe shortage of water. Catastrophic supply interruptions differ from the staged responses addressed earlier in this chapter in that catastrophic interruptions occur suddenly and can immediately jeopardize all or a large portion of an agency's water supply. These interruptions may result from variations in weather, natural disasters, or unanticipated situations (e.g. systems failures, acts of terror).

In the event of any catastrophic supply interruption, the District would increase media attention to the water supply situation during a shortage, coordinate with the proper emergency response agencies and local partners, and convene a special District Board meeting to identify the appropriate response, not limited to any conservation measures or prohibitions listed above. Additionally, because the District's service area covers the entire County, the District can quickly activate four emergency water filling stations that can be used by County residents not served by the District who have experienced disruptions to their water supply. These emergency fill stations were activated in 2015 during the Butte Fire, which burned more than 70,000 acres in Amador and Calaveras Counties.

8.8.1 Local Agency Coordination

CCWD participates in Calaveras County's Multi-Agency Coordinating Group. During emergencies that impact community water supplies, the Multi-Agency Coordinating Group affords CCWD the opportunity to work directly with state and local agency representatives (including the County's Office of Emergency Services) that can offer resources and assistance. The Multi-Agency Coordinating Group and CCWD also maintain close ties to a number of local media representatives to facilitate communication in an emergency.

In 2006, CCWD developed its first Multi-Hazard Mitigation Plan which was subsequently updated in August 2012. This plan identifies mitigation actions for a variety of hazards including dam failure, severe winter weather, and wildfire, and maintains the District's eligibility for hazard mitigation funding to address long-term reliability needs. The Plan is included in **Appendix N**; sections are summarized below.

8.8.2 Power Interruption

Whether by fire, snowstorm or rolling blackout, the District has experienced numerous occasions in which power has been interrupted. In response, CCWD has improved communications systems, automated equipment operation through Supervisory Control and Data Acquisition (SCADA) implementation, and purchased stationary and portable generators to maintain at least a minimum level of water delivery. Stationary generation units automatically start upon power interruption and can be controlled and monitored remotely through CCWD's SCADA system.

8.8.3 Dam Failure

As dams throughout the state continue to age, the risk associated with dam failure increases. While the risk of a dam failure within the District's service area is low, the District participates in the Annual

Emergency Action Plan meetings with the appropriate local agencies. These meetings educate appropriate District staff on dams of concern, particularly related to flooding, public safety measures, and loss of services.

8.8.4 Severe Winter Weather

During the winter, high elevations within the District's service area can experience heavy snowfall. Caltrans and Calaveras County are often busy clearing county roads and highways and cannot always clear private passage to District facilities in the event of extended power outages. Therefore the District must rely on staff and snow removal equipment in order to not only fuel standby generators but also access pump stations, lift stations, and treatment plants in order to continue serving customers. The District is committed to increasing the amount of District-owned snow removal equipment and/or snow plows that can be attached to the District's truck fleet.

8.8.5 Wildfire

Much of Calaveras County is at high to very high wildfire risk due to vegetative fuels, topography, and weather. Damaging fires could occur each year and many of the District's water supply infrastructure is located within high risk fire zones; the operations of these facilities are critical lifeline utilities for the public and critical for fire protection. The most recent example is the Butte Fire, which ignited in September 2015 and burned more than 70,000 acres in Amador and Calaveras Counties. As a result of this fire, the District's Sheep Ranch facilities were evacuated and the District provided bottled water to Sheep Ranch customers and others affected by the Butte Fire. To reduce the potential for losses during a fire and increase the likelihood of uninterrupted service after a wildfire, the District is committed to maintaining the recommended 100-foot defensible space around facilities, as well as installing fire-resistant control panels. The District also has standby power generation at most facilities, where feasible, as a health and safety protection measure for the region. Historically, power has been lost for extended periods of time during wildfires. The District is also committed to implementing pipeline improvements identified in water master plans to provide adequate fire flows for communities within the District's service area.

8.9 Minimum Supply Next Three Years

The minimum water supply available during each of the next three years (2016-2018) is provided in **Table 8-6**. Recycled water is not subject to cutbacks due to drought and thereby has 100 percent reliability and is not included in this table (assumed to be the amount of recycled water supply projected for 2020).

Table 8-6: Minimum Supply Next Three Years (AFY) (DWR Table 8-4)

	2016	2017	2018
Available Water Supply (AFY)	85,052	82,106	79,212

9 Demand Management Measures

The unpredictable water supply and ever-increasing demand on California's complex water resources resulted in a coordinated effort by DWR, water utilities, environmental organizations, and other interested groups to develop a list of urban demand management measures (DMMs) or best management practices (BMPs) for conserving water. This consensus-building effort resulted in the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). AB 2067 streamlined the DMM reporting in UWMPs from the 14 specific measures required in the 2010 plans to seven more general measures for the 2015 plans. The following sections provide a comprehensive description of the District's water conservation programs that are currently being implemented along with programs planned for future implementation.

9.1 CCWD's Demand Management Measures

The District signed the CUWCC MOU in 1991 and views conservation as an integral part of its water resource stewardship responsibility. The District implemented many of the DMMs, even prior to the MOU, such as leak detection and repair, 100-percent metered service, metered rates, public information programs, and water waste prohibitions. The District has worked to expand its water conservation program to achieve the largest water savings, and appropriately manages a tiered rate structure to promote water conservation while ensuring water use equity. However, due to the rural nature of the County; diversity in climate, soils, elevation, and geography; and relatively small and dispersed rural population with a large fraction of low income housing; the District is reaching a point where DMM affordability is decreasing. Nevertheless, the District is exploring cost-effective options to meet DMM requirements and the state's 20x2020 requirements. The following sections generally describe CCWD's implementation of the DMMs.

9.1.1 Water Waste Prevention Ordinance

The District maintains a policy that prohibits wasting water. Article II, Section 16 of the CCWD Board Policy states:

Consumer's Negligence or Wasteful Use of Water

Where negligent or wasteful use of water exists on a customer's premises, seriously affecting the general service, the District may discontinue the service if such conditions are not corrected within five (5) days after giving customer written notice of intent to do so.

In July 2010, the District passed Ordinance 2010-02, which updated the Board policy to comply with AB 1420 requirements. AB 1420 amended the Urban Water Management Planning Act so that the eligibility of an agency for any water management funding be conditioned on the implementation of the DMM's described in the California Water Code. The District's Ordinance 2010-02 is included in **Appendix L**.

9.1.2 Metering

All connections within the District are currently metered and the District requires that all new connections be metered. Meters are manually read by qualified CCWD staff roughly every 60 days for the District's bimonthly billing. If a customer's meter has been damaged or is inaccessible, CCWD will bill the water base rate until the meter can be read. Once the meter is accessible and can be read,

the next available meter read will provide the customer's actual usage. The District is actively pursuing grants to fund automatic meter reading (AMR) systems for customers above the snowline. This would ensure that during the winter months, when meters could be inaccessible due to snow, customers with affected meters would still receive bills that reflect their actual water use. The District's long-term goal is to implement AMR technology throughout much of its service areas.

The District recommends that each commercial customer install a dedicated irrigation meter. Upon application for service, customer service staff explain the water usage policy, which requires that commercial customers' water use be evaluated every other year to determine chargeable wastewater equivalency units. Customers with mixed-use meters will find their equivalency rate higher if irrigation usage is included in the computation. Customers with a dedicated irrigation meter have the advantage of a lower chargeable wastewater equivalency along with separate irrigation data, ultimately encouraging the customer to conserve water. The District also recommends drought-tolerant native plants and reduced area turf planting to all residential and commercial customers. Billing inserts and messages remind all customers to inspect and repair all landscape irrigation systems regularly (see **Section 9.1.4**) below for more information on public outreach).

9.1.3 Conservation Pricing

CCWD bills customers bimonthly using standardized, district-wide base rates plus volumetric charges. Since 2007, the District has maintained a three-tier volumetric rate structure that was designed to promote water conservation. The base rate for residential and commercial users includes 1,000 cubic feet (cf) of water per billing period. This rate is multiplied by a capacity multiplier, which is determined by the size of the customer's meter. Customers who use more than 1,000 cf during a single billing period are charged based on the tiered rates. The current rates are discussed in Section 9.2.3.

9.1.4 Public Education and Outreach

Public Outreach

The District believes water conservation education and water awareness are vital to protecting water supplies while meeting the District's growing water needs. Disseminating educational materials to the public is an integral part of the District's commitment to water conservation. CCWD regularly works with the public and other agencies to educate the community about the importance of preserving water resources for all generations.

The District's public information program contains many components. Comprehensive water conservation flyers, drought-themed coloring books for children and handouts are available, along with free water conservation supplies, at the District's public informational meetings and other events. The District maintains a continuously updated website, www.ccwd.org, featuring conservation tips, public information releases, news stories, Board meeting videos, frequently asked questions, general information, and links to local, state and federal agencies, as well as District planning documents and other programs. Additionally, during supply shortages, the District significantly expands its public outreach efforts to inform the public of ways to conserve water and the permanent water waste prohibition policy (see **Section 9.1.1**).

The District's customer service staff performs regular monthly analyses of customer water usage from metering data, comparing current usage data historical consumption. Customers showing unusually high usage in any given billing period are contacted to discuss excessive use and/or alerted to the possibility of a water leak. If staff has reason to believe there is an active leak at a property, the

customer's main shutoff valve is turned off to prevent water waste and the customer is notified. CCWD's field service personnel routinely respond to customer complaints and unusual circumstances involving high water usage.

In order to heighten public awareness of the need for water conservation, the District has prepared an informational display for various local and regional annual events, such as the Calaveras County Fair and Jumping Frog Jubilee. The District's public information officer serves as guest speaker at numerous community meetings and guest lectures in local schools. The District also participates in Calaveras County's Home and Garden Show with a display featuring xeriscape gardening information, conservation tips, an overview of Calaveras County's water supply system and by distributing water conservation supplies and brochures. District facility tours are available to the public at dedication events and upon request. Additionally, the District hosts an annual native plant sale that is sponsored by the Sierra Foothills Chapter of the California Native Plant Society. Hundreds of plants are made available to community members along with a wide variety of educational booths ranging from water efficiency to native plant literature.

One of the District's most effective efforts in 2015 was the formation of "Calaveras Conserves," a countywide conservation group that includes every major water supplier in the County. This eight-member group collaborated to create a website, www.calaverasconserves.com, where county residents can find mandatory water conservation restrictions for every water district in Calaveras County in one place. Additionally, members pooled funds to make hundreds of road signs that read "Use Water Wisely," which were placed in prominent locations throughout the County to promote conservation (see **Figure 9-1**). This group continues to meet quarterly and is an excellent platform for water purveyors to collaborate and work together toward achieving common goals.

Figure 9-1: Calaveras Conserves Sign

School Education

The District believes that one of the best methods of educating the general public about water conservation achieved through educating students. All of CCWD's school education programs are designed to support education standards while fostering resource conservation and environmental stewardship.

The District's Public Information Officer/Conservation Coordinator works closely with the Calaveras County Superintendent of Schools to arrange classroom presentations throughout the County. All schools within CCWD's service area have an open invitation to ask CCWD to make in-class presentations, which usually consist of information about the water cycle, where Calaveras County water comes from, drought, and water conservation.

CCWD has sponsored a water awareness program in the third grade classrooms of each of Calaveras County's 10 elementary schools. The in-class presentation is approximately 50 minutes in length and includes a video, demonstrations, charts, worksheets, work booklets and student participation, all of which provide information on water systems, water quality, the water cycle, and the importance of water conservation. Water conservation materials are provided for students to take home and share with their families. CCWD also sponsors Adopt-A-Watershed field trips in conjunction with local school science programs. The District's community and school programs receive in-kind donations from local merchants and coverage in local newspapers. Facility tours are available to the public at dedication events and upon request.

CCWD also financially supports the Stewardship Through Education, LLC. (STE) program through a partnership with the Upper Mokelumne River Watershed Authority. Available online at www.steonline.org, STE's mission is to "promote youth stewardship of local watersheds through closely coordinated programs and activities with a variety of community partners, participating schools, agencies, organizations, cities, and counties."

STE was born with the idea to build a bridge between agency and government managers of water resources and community youth. TheUMRWA partnering with the Central Sierra Resource Conservation and Development Council (RC&D), recognized the validity of the establishment of such a program. Since the establishment of this unique educational program, STE, with the support and backing of CCWD, CPUD, Amador County Water Agency, the Central Sierra RC&D Council, EBMUD, Jackson Valley Irrigation District, Alpine County Water Agency, and others have implemented several activities to bridge this gap.

Each year, the District offers two $500 scholarships to graduating high school seniors at three local high schools. These scholarships are awarded to students who write the best essays addressing the topics of water resources in Calaveras County, drought and water conservation.

9.1.5 Programs to Assess and Manage Distribution System Real Loss

District operations staff perform regular inspection and maintenance of water distribution systems in order to detect and repair leaks. Treated water data are recorded on a daily basis. The District regularly compares production to sales records to identify water loss within the distribution system and assist in leak detection. Customers are contacted if a leak is suspected.

For this 2015 UWMP, the District conducted a water audit using the AWWA Water Audit software, which is included in **Appendix I** results of the audit are further discussed in **Chapter** 4.

9.1.6 Water Conservation Program Coordination and Staffing Support

The District has employed a designated Water Conservation Coordinator since 2005. The Conservation Coordinator position is funded through the Administrative Services Department budget, and the water conservation coordinator's duties are as follows:

- Managing and conducting public outreach
- Planning and management of the District's conservation program
- Administering and coordinating public meetings
- Disseminating public information
- Communicating with media including, print, radio and television
- Coordinating and implementing public and school education programs
- Distributing and tracking water conservation supplies
- Managing conservation information displayed on the website and social media
- Completing other duties related to the District's commitment to water conservation

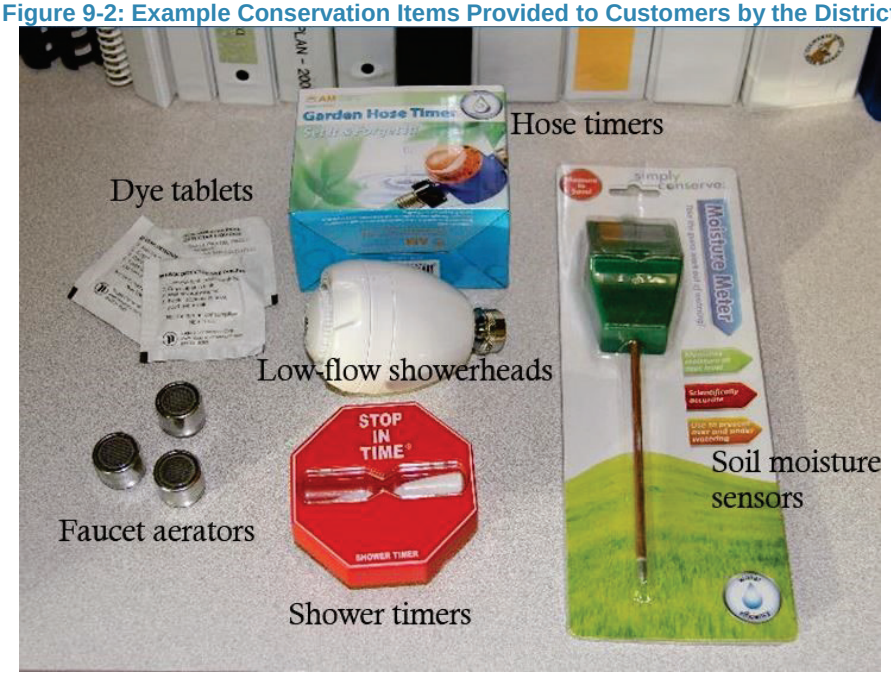
9.1.7 Other Demand Management Measures

Rebates and Giveaways

The District offers a number of rebates to its customers, including smart irrigation controllers, high-efficiency toilets, high efficiency clothes washers, and irrigation upgrades. Customers must attach a copy of their dated sales receipt showing the device meets CCWD's specifications. Covered devices in each category are eligible for up to a combined $150 maximum rebate, if purchased on or after November 12, 2014. Rebates are limited to one rebate per item per water service account (with the exception of toilets) on a first-come, first-served basis. Rebates are posted as a credit adjustment on the customer's service account as entered on the application.

In addition to rebates, the District also provides customers with a wide variety of free conservation supplies. These supplies include: toilet leak detection dye tablets, faucet aerators, five-minute shower timers, low-flower showerheads, automatic shut-off hose timers and soil moisture sensors (see **Figure 9-2**). Customers are limited to one of each item per household, and supplies are distributed on a first-come, first-served basis. These supplies are also distributed at community meetings, school presentations and are available at the District headquarters.

Figure 9-2: Example Conservation Items Provided to Customers by the District



By request, District staff will also perform an on-site water audit free of charge to determine connection fees and estimate usage. During this on-site audit, CCWD's water usage review policy is explained to the customer, including that the policy provides incentives for the customer to reduce water usage as a means to minimize their water and wastewater bills. Commercial customers, particularly high demand water users such as laundromats and car washes, are encouraged to install water saving and water recycling equipment to reduce their water use.

9.2 Implementation over the Past Five Years

The following sections describe the District's implementation of each of the DMM's over the past five years.

9.2.1 Water Waste Prevention Ordinance

During the past five years, the District has maintained its water waste prevention ordinance as part of Article II, Section 16 of the District's Board Policy. This ordinance is included in **Appendix L**.

9.2.2 Metering

All District customers are metered and any new connections within the past five years were required to be metered upon installation.

9.2.3 Conservation Pricing

As discussed in Section 9.1.3, District customers are charged a bimonthly fixed rate for 1,000 cf, and at a tiered volumetric rate for amounts more than 1,000 cf. Over the past five years, the District has adjusted rates three times to respond to changing conditions within the service areas, including drought. The most recent rate adjustment, effective September 1, 2014, was approved by the Board on July 10, 2013. This current rate structure includes a charge of $113.56 for the first 1,000 cf per billing period for customers with 5/8" meter sizes (standard residence). Residences with larger

meters are charged a base rate multiplier corresponding to the sizes of their meters. **Table 9-1**, below, shows the capacity multiplier based on the size of a customers' meters.

Table 9-1: Capacity Multipliers

Meter Size	Multiplier
5/8" (standard residence)	1
3/4"	1.5
1"	2.5
1.5"	5
2"	8
3"	16
4"	25
6"	50

For use over 1,000 cf, customers are charged volumetrically based on a three-tiered structure. For amounts from 1,001 cf to 6,000 cf, standard residential customers are charged $1.44 per 100 cf; for amounts from 6,001 to 12,000 cf, customers are charged $1.80 per 100 cf; and for amounts over 12,000 cf, customers are charge $2.30 per 100 cf. These tiers are summarized below in **Table 9-2**.

Table 9-2: Tiered Water Consumption Rates

Tier	Volume (cf)	Rate (per 100 cf)
1	1,001 – 6,000	$1.44
2	6,001 – 12,000	$1.80
3	Over 12,000	$2.30

Capacity multipliers are also applied to the tiers and billing. For example, a customer with a 1" meter has a multiple of 2.5 and a bimonthly base rate of $283.90 ($113.56 x 2.5) for 2,500 cf (1,000 cf x 2.5). Additionally, Tier 1 for this customer would be from 2,501 to 15,000 cf, Tier 2 would be 15,001 cf to 30,000 cf and Tier 3 would be over 30,000 cf.

9.2.4 Public Education and Outreach

Public Outreach

Over the past five years, the District has participated in a number of activities related to public education, including conducting audits. The District measures the effectiveness of audits by a customer's water usage reported from the meter reads. In the past five years, the District has and

performed 60 audits. Because the District continually monitors customer usage, the District was able to notify customers immediately when usage trends higher than normal.

In July 2015, the District made several improvements to its bimonthly bills that provide customers with powerful tools to monitor their water usage. Customers can see water use for the prior three years, as well as the percentage saved compared to 2013 for each billing cycle, given that 2013 is the baseline year for the State Water Board mandated use reductions. Customers can also see the average gallons used per day.

Over the past five years, the District has maintained its website, performing a complete update in 2015 that created a much more user-friendly platform. The website is updated regularly with news releases, conservation tips, frequently asked questions, general information, and links to local, state and federal agencies.

In 2014 and 2015, the District also attended nearly 30 local and regional fairs and community events, including the Calaveras County Fair and Jumping Frog Jubilee. While the District did not attend a number of events in 2011 through 2013, efforts were increased in 2014 and 2015 as a result of the drought and additional staffing. During the Fair, the District teamed up with five other water districts in the County to staff a water conservation booth. Water conservation pamphlets and free water conservation supplies were given to members of the public. The District also participated in Calaveras County's Home and Garden Show with a display featuring an overview of the District's six service areas, photos of water supply sources, an overview of the Capital Renovation and Replacement Program and water conservation tips.

In both 2014 and 2015, the District participated in more than 20 public speaking engagements. As with community events, the District did participate in a number of speaking engagements in 2011 through 2013; however, efforts were increased in 2014 and 2015 as a result of the drought and additional staffing. Topics at community events included a detailed overview of water resources in Calaveras County, drought and water conservation strategies, along with customized topics for each group.

Every April, the District hosts a native plant sale at its headquarters in collaboration with the California Native Plant Society's Sierra Foothills Chapter. This event attracts nearly 100 people and more than 400 native, drought tolerant plants are sold to community members. In addition to offering plants for sale, a series of booths offer a wide variety of information about water conservation.

School Education

Every year, CCWD sponsors a water awareness program in the third grade classrooms of each of Calaveras County's 10 elementary schools. The in-class presentations are roughly 50 minutes and include a video, demonstrations, charts, worksheets, work booklets and student participation. This program provides information on water systems, water quality, the water cycle, and the importance of water conservation. The culmination of this program includes providing the students with take-home materials. CCWD continues to sponsor Adopt-A-Watershed field trips in conjunction with local school science programs, sponsoring up to five field trips each year over the past five years.

CCWD provides funding for STE, which reaches more than 1,200 elementary students each year. The program seeks to bridge the gap that exists between schools and communities by giving students

opportunities to experience hands-on activities using communities and local watersheds as classrooms. The program offers between 15 and 20 field trips per year, provides in-class instruction and professional development opportunities for teachers. An extensive curriculum was also developed by STE, which provides teaches with pre-planned lessons for students that can be presented before and after field trips. A more extensive four-month curriculum that focuses on watersheds is also available and is taught in 22 classrooms throughout the region. A very popular program run by STE is the Classroom Aquarium Education Project. This program takes hundreds of elementary students on a field trip to the Mokelumne River Fish Hatchery, where they can view salmon spawning and learn about raising fish. Eggs from the hatchery are given to students to raise in their classrooms, and students return to the river in the spring to release thousands of small fish they raised. CCWD partners with the Department of Fish and Wildlife and other regional water agencies to fund this valuable program.

The District's Public Information Officer/Conservation Coordinator works closely with the Calaveras County Superintendent of Schools to arrange classroom presentations throughout the County. All schools within CCWD's service area have an open invitation to ask CCWD to make in-class presentations, which generally consist of information about the water cycle, where Calaveras County water comes from, drought, and water conservation. Each year, the District provides nearly 10 guest lectures to local schools.

The District offers two $500 scholarships to graduating high school seniors at three local high schools each year. These scholarships are awarded to students who write the best essays regarding a specific water resources topic in Calaveras County, centered around drought and water conservation. Essays are chosen by a committee of CCWD staff members and awarded to students by the Board of Directors.

9.2.5 Programs to Assess and Manage Distribution System Real Loss

The District estimates that approximately $200,000 is spent per year on leak detection and repairs. This value fluctuates annually depending on extent of repair or replacement projects scheduled. For instance, in 2011, CCWD applied for and was awarded a $1.48 million grant under Proposition 84 Round 1 for the West Point Water Main and Tank Replacement Project. This project, completed in 2013, replaced key elements of West Point's water system, which was estimated to be losing about 25 percent of the treated water produced due to leaking tanks, leaking pipelines, and outdated meters. The District implemented an aggressive Capital Renovation and Replacement Program in 2013 that identified roughly $15 million in water transmission project needs through 2021. These projects are expected to replace between 15,000 and 20,000 linear feet of transmission pipelines per year.

9.2.6 Water Conservation Program Coordination and Staffing Support

Over the past five years, the District has maintained a Water Conservation Coordinator dedicated to supporting the District's conservation program. The Coordinator has identified, developed, and implemented conservation efforts including public outreach campaigns, school education events, rebates and giveaways, and annual reporting. The Coordinator also provides support to District customers answering questions about the District's various conservation programs, developing materials for print and Web related to the District's conservation programs and worked closely with regional media outlets.

In 2014 and 2015, the Coordinator developed an enhanced Water Conservation Program to meet the voluntary and mandatory conservation standards imposed by Governor Brown. This included three water conservation ordinances (Stages 2.5, 3, and 3.5) a complete update to the District's website with a major focus on conservation, improvements to customers' bills showing water usage savings, bill inserts with watering restrictions and conservation tips, flyers distributed throughout the community, hundreds of road signs, a media campaign to promote water conservation, more than 30 presentations about drought and conservation throughout the community and an expansion of the free water conservation supply program to include toilet leak-detection tablets, faucet aerators, high-efficiency showerheads, five-minute shower timers, soil moisture meters and automatic shut-off hose timers.

Additionally, the coordinator expanded the District's rebate program to include high-efficiency irrigation supplies, smart irrigation controllers, high-efficiency clothes washers, in addition to low-flow toilets. The District's Customer Service Department staff members played supporting roles in educating customers and the public about water conservation. This team effort led to a 29 percent reduction in residential water use in 2015 compared to 2013. Over the past five years, the Coordinator's position was funded through a combination of the Water Resources and the Administrative Services budgets.

9.2.7 Other Demand Management Measures

Rebates and Giveaways

Over the past five years, the District developed a Water Conservation Rebate Program, which offers customers a combined rebate amount of $150. The Program offers up to $75 for Smart Irrigation Controllers that are WaterSense certified by the Environmental Protection Agency (EPA); up to $50 for irrigation efficiency upgrades that convert fixed sprinklers to high efficiency nozzles of 1.1 inches/hour or fewer; conversion of sprinklers to drip irrigation conversion or upgrades; high efficiency clothes washers that have Energy Star labels with a water factor of 5.0 or fewer and that are Consortium for Energy Efficiency rated Tier 2 or 3; and up to $25 for high efficiency toilets that are EPA WaterSense rated and uses no more than 1.28 gallons per flush. To apply for rebates, customers must fill out an application, attach receipts, and submit the request to the District for review. If the information provided meets the District's qualifications, up to $150 is credited to customers' accounts. The rebate program was widely publicized through partnerships with the media, posts on the District's website, bill inserts, via customer service representatives and at community events. More than 30 rebates were provided to customers in 2014 and more than 80 in 2015.

In late 2014, the District significantly expanded it's free water conservation supply giveaway program to include toilet leak-detection tablets, faucet aerators, high-efficiency showerheads, five-minute shower timers, soil moisture meters and automatic shut-off hose timers. The availability of these supplies was widely publicized through a media campaign. In 2014, 500 free items were given to customers. In 2015, nearly 4,000 items were given to customers.

9.3 Planned Implementation to Achieve Water Use Targets

The District will continue implementing the DMMs discussed in this chapter to achieve its 2020 water use goal of 192 GPCD. The District anticipates that reducing water loss will play a large role in meeting its 2020 water use goal; however, all of the District's DMMs work synergistically to reduce water use. Planned implementation of the DMMs are described in the sections below.

9.3.1 Water Waste Prevention Ordinance

The District will add to and amend Article II, Section 16 of the Board Policy, "Consumer's Negligence or Wasteful Use of Water," to adapt to changing conditions within its service area. The District anticipates that this DMM will continue to play an important role in helping the District meet its 2020 GPCD goal.

9.3.2 Metering

The District is currently pursuing grant funding for an AMR pilot program to retrofit older meters in the Ebbetts Pass service area. Currently, some meters in this area are unable to be read during the winter due to heavy snow that covers meter boxes and that makes travel to these meters dangerous. This program would retrofit a portion of the manual read meters with radio read meters to allow continued meter reading throughout the winter. Looking forward, the District is committed to incorporating advanced metering infrastructure throughout the majority of its service areas, funding permitting. This technology would allow the District to rapidly identify leaks, quickly replace malfunctioning meters, provide timely water use information to customers and more effectively promote water conservation. The District also plans to track meter replacement costs, meter reading costs, and estimates of water saved as a result of meter replacement.

9.3.3 Conservation Pricing

Over the next five years, the District plans to continue implementing some form of conservation pricing. The District will continually evaluate potential changes to the current structure based on demands, revenue, and operating expenses. The District is planning to initiate a cost of services analysis by the end of 2016; the recommendations of this study could lead to a new rate structure. However, the District intends to keep some form of conservation pricing in place.

9.3.4 Public Education and Outreach

Public Outreach

The District plans to continue offering public information programs in the future and will update, modify, and enhance these programs based on customer feedback, drought emergencies and other needs. Funding for this DMM comes from the Administrative Services budget, which includes the Conservation Coordinator and Public Information Officer positions, and will include project-specific accounts to track conservation-only public information efforts. The District is planning to further increase public information efforts to publicize many of its expanded programs, including attending community events, hosting educational workshops, Water Conservation Program efforts, water recycling, and regionalization and collaboration efforts to improve water quality and supply reliability. Additionally, CCWD is partnering closely with the Tuolumne County Resource Conservation District, which is implementing a $3.5 million water conservation grant through the T-Stan IRWMP. This collaboration will allow CCWD to access a water efficiency trailer that will be present at community events, assistance with scheduling numerous public workshops each year and funding for signage, flyers and water conservation materials.

School Education

The District plans to hold an annual "Be A Water Saver" poster contest, continue sponsoring the Adopt-A-Watershed field trips, and will continue supporting the STE program. Collaborations with the Calaveras County Superintendent of Schools will continue, and CCWD plans to work closely with local teachers to make presentations in classrooms regarding the water cycle, water resources, drought and water conservation, which includes free conservation booklets and supplies for all

students. In the next five years, the District also plans to collaborate with schools to hold assemblies that will allow the District to reach a larger number of students.

The District will continue offering two $500 scholarships to graduating high school seniors at three local high schools. The District will award these scholarships to students who write the best essays focused on water resources in Calaveras County, drought and water conservation.

The District will continue to monitor and pursue grant opportunities to fund educational programs.

9.3.5 Programs to Assess and Manage Distribution System Real Loss

A large component of the District's Capital Renovation and Replacement Program (Capital R&R) is focused on replacing water distribution mains that have reached the end of their useful lives. Staff has used leak detection technology and failure rate data to prioritize projects that will make the biggest impact on water loss. Several major transmission pipeline replacement projects and distribution upgrades are scheduled in the next seven years at a cost of roughly $15 million, including the Reach 3A, West Point, Reach 1, and Techite replacement projects. Techite was a trade name fiberglass composite material pipe used in the late 1970's and early 1980's that was later found to be defective, rapidly losing its structural integrity prior to reaching its usable life. The District has approximately 11,400 linear feet of this pipeline prioritized for replacement. Additionally, the District is setting aside $200,000 per year to fund the replacement of distribution lines that have reached the end of their useful lives. The rates used to fund the Capital Renovation and Replacement Program have been leveraged by the District to obtain millions in grant funding, which significantly expands the number of projects that can be funded. The District plans to continue identifying and applying for grants and loans, as available, to help fund pipeline and leak repairs, as well as leak detection and improved data collection programs throughout its service area. As funds become available, the District will implement additional programs.

9.3.6 Water Conservation Program Coordination and Staffing Support

The District believes the conservation coordinator and public information officer position is an integral part of a successful conservation program and anticipates funding the position for the foreseeable future. As such, proposed budgets will allocate specific funding for the Water Conservation Coordinator position to perform the necessary functions associated with the position. The Coordinator will help ensure that the DMMs discussed in this chapter are implemented.

9.3.7 Other Demand Management Measures

Rebates and Giveaways

Moving forward, the District will continue offering a selection of water conservation rebates and conservation supply giveaways to its customers. This will be funded by the Water Conservation Budget, which has historically been $30,000 per year.

Low-Impact Development

The District also plans to increase support of low-impact development techniques, including xeriscaping, graywater system development and use, and stormwater recapture. These techniques, whether implemented by individual homeowners or incorporated as part of building/planning codes, help decrease potable water use and can contribute to long-term conservation within the District's service area. The District anticipates that these programs will be further developed as part of its conservation program, in coordination with the County Department of Public Health.

Coordinating with Other Agencies

The District understands the benefit associated with regional coordination. As such, the District is committed to increasing coordination with local and county municipalities for General Plan updates, including the Water Element, and discussing other water management strategies that would provide benefits to the region and CCWD customers. The District's staff and Board Members participate in a variety of utility and water supply coordination efforts within the County and region.

9.4 California Urban Water Conservation Council

CCWD is a signatory to the CUWCC MOU. While the District has not submitted annual reports to the CUWCC for the last four years, the District does collect the information required in the reporting, which has been summarized in this chapter.

10 Plan Adoption, Submittal, and Implementation

This chapter summarizes CCWD's compliance with the State's notification, adoption and submittal procedure for UWMPs.

10.1 Inclusion of all 2015 Data

CCWD conducts its reporting for UWMP preparation on a calendar year basis. As such, this 2015 UWMP includes water use and planning data for the entire 2015 calendar year.

10.2 Notice of Public Hearing

10.2.1 Notice to Cities and Counties

The California Water Code Section 10621(b) stipulates that a water supplier must notify any city or county within which the supplier provides water that it is reviewing and considering changes to the UWMP. This notification must occur at least 60 days before the public hearing. CCWD held the public hearing for the UWMP on May 25, 2016. Notifications were sent to Calaveras County and the City of Angels Camp on March 4, 2016, well in advance of the 60-day requirement. The District also sent notifications to a number of other entities; all entities receiving notifications are listed in **Table 10-1**. A copy of this notice is provided in **Appendix O**.

Table 10-1: Notification to Cities and Counties (DWR Table 10-1)

Names of cities and counties	60 Day Notice	Notice of Public Hearing
Blue Lake Springs Mutual Water Company	✓	✓
Calaveras Chamber of Commerce	✓	✓
Calaveras County Environmental Management Agency	✓	✓
Calaveras County Administrative Department	✓	✓
Calaveras County Planning Department	✓	✓
Calaveras County Public Works Department	✓	✓
Calaveras Planning Coalition	✓	✓
Calaveras Public Utilities District	✓	✓
Central Sierra Environmental Resource Center	✓	✓
City of Angels Camp	✓	✓
Foothill Conservancy	✓	✓
Mokelumne Hill Sanitary District	✓	✓
Murphys Sanitary District	✓	✓
San Andreas Sanitary District	✓	✓
Snowshoe Springs Association	✓	✓

Names of cities and counties	60 Day Notice	Notice of Public Hearing
Union Public Utility District	✓	✓
Utica Water and Power Authority	✓	✓
Valley Springs Public Utility District	✓	✓

10.2.2 Notice to the Public

Government Code 6066 requires that the water supplier notify the public of the public hearing in a local newspaper once a week for two consecutive weeks. The notice must include the time and place of the hearing, as well as the location where the draft UWMP is available for public review. CCWD noticed the public on May 6, 2016 and May 13, 2016 in the Calaveras Enterprise Newspaper. A copy of these notices is provided in **Appendix P**.

In addition to these newspaper notices, CCWD also sent an email to several local stakeholder organizations to inform them of the review schedule and invite them to review the Public Draft of the UWMP during the public comment period. The public comment period ran from May 11, 2016, when the Public Draft was posted, to June 3, 2016. A copy of this email is provided in **Appendix Q**.

10.3 Public Hearing and Adoption

California Water Code 10642 states that prior to adopting the 2015 UWMP, the water supplier must hold a public hearing. The purpose of the public hearing is to allow public input on the Plan, consider economic impacts of the UWMP, and adopt a method for determining the water supplier's water use target. CCWD held a Public Hearing on May 25, 2016. A copy of the agenda is provided in **Appendix R**. The District also held a three and a half week-long public comment period from May 11, 2016 to June 3, 2016. Comments received were addressed by the District in a response to comments matrix, which is included in **Appendix S**.

The District's 2015 UWMP was adopted by the Board of Directors during the June 22, 2016 meeting. A copy of the resolution is provided in **Appendix T**.

10.4 Plan Submittal

CCWD will submit the updated 2015 UWMP to DWR by July 1, 2016 via the approved website. No later than 30 days after the Plan is adopted by CCWD's Board of Directors, CCWD will submit a CD copy of the adopted 2015 UWMP to the California State Library and submit a copy to any city or county to whom CCWD provides water.

10.5 Public Availability

California Water Code 10645 requires that water suppliers, no later than 30 days after filing a copy with DWR, must make the approved Plan available for public review during normal business hours. CCWD will provide a copy of the approved 2015 UWMP to the San Andreas Central Library, leave a copy at the front lobby of CCWD, and post the plan on CCWD's website.

10.6 Amending an Adopted UWMP

Should CCWD amend any portion of the approved 2015 UWMP, the District will follow each of the steps for notification, public hearing, adoption, and submittal that are required for an updated Plan. However, the 60 day notification to cities and counties to whom CCWD supplies water will not be sent again; the notification sent with the original plan addresses the requirement.

11 References

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