

**BELLA VISTA WATER DISTRICT**



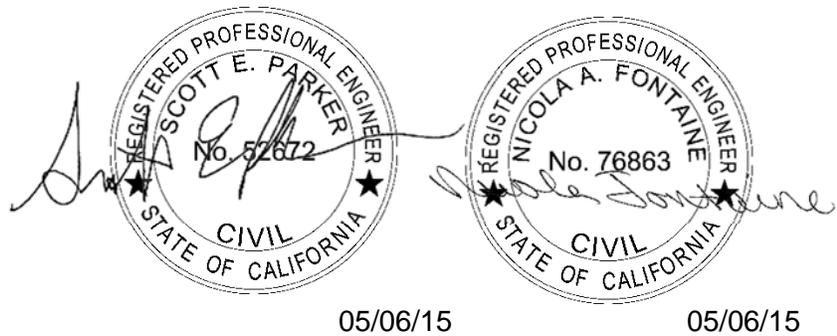
# 2010

## Urban Water Management Plan

FINAL ADOPTED • May 2015



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**BELLA VISTA WATER DISTRICT**  
**2010 URBAN WATER MANAGEMENT PLAN**

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**PLAN PREPARATION****1.1 PURPOSE**

The California Water Code requires urban water suppliers within the state to prepare and adopt Urban Water Management Plans (UWMPs) for submission to the California Department of Water Resources (DWR). The UWMPs, which must be filed every five years, must satisfy the requirements of the Urban Water Management Planning Act (UWMPA) of 1983, including amendments that have been made to the Act and other applicable regulations. The UWMPA requires urban water suppliers servicing more than 3,000 connections or supplying more than 3,000 acre-feet (AF) of water annually, to prepare a UWMP.

The plan may be updated at any time when the urban water supplier believes significant changes have occurred in population, land use, and/or water sources that may affect the contents of the plan. The Bella Vista Water District (District) is behind schedule in its 2010 UWMP submittal principally due to wanting to wait for 2010 Census data and the final Central Valley Project Municipal and Industrial Water Shortage Policy. The Central Valley Project Municipal and Industrial Water Shortage Policy is still a working draft, but the District has decided to move ahead with the 2010 UWMP.

The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water shortage conditions. This report, which was prepared in compliance with the California Water Code, and as set forth in the 2010 guidelines and format established by the DWR, constitutes the District 2010 UWMP.

**1.2 BACKGROUND****1.2.1 Urban Water Management Planning Act**

In 1983, State Assembly Bill 797 modified the California Water Code Division 6 by creating the UWMPA. Several amendments to the original UWMPA, which were introduced since 1983, have increased the data requirements and planning elements to be included in the UWMPs.

Initial amendments to the UWMPA required that total projected water use be compared to water supply sources over the next 20 years, in 5-year increments. Recent DWR guidelines also suggest projecting through a 25-year planning horizon to maintain a 20-year timeframe until the next UWMP update has been completed.

Other amendments require that UWMPs include provisions for recycled water use, demand management measures (DMMs), and a water shortage contingency plan. Recycled water was added in the reporting requirements for water usage and figures prominently in the requirements for evaluation of alternative water supplies, when future projections predict the need for additional water supplies. Water suppliers must also describe their water DMMs that are being implemented or are scheduled for implementation. Each urban water purveyor must coordinate the preparation of the water shortage contingency plan with other urban water purveyors in the area, to the extent practicable.

In addition to the UWMPA and its amendments, there are several other regulations that are related to the content of the UWMP. In summary, the key relevant regulations are:

- Assembly Bill 1420: Requires implementation of DMMs/Best Management Practices (BMPs) and meeting the 20-by-2020 targets to qualify for water management grants or loans.
- Assembly Bill 1465: Requires water suppliers to describe opportunities related to recycled water use and storm water recapture to offset potable water use.
- Amendments SB 610 (Costa, 2001) and AB 901 (Daucher, 2001) (Effective beginning January 1, 2002): Require counties and cities to consider information relating to the availability of water to supply new large developments by mandating the preparation of further water supply assessments (Costa) and water supply planning (Daucher).
- Senate Bill 1087: Requires water suppliers to report single-family residential (SFR) and multi-family residential (MFR) projected water use for lower income areas separately.
- Amendment SB 318 (Alpert, 2004): Requires the UWMP to describe the opportunities for development of desalinated water, including but not limited to, ocean water, brackish water, and groundwater, as long-term supply.
- AB 105 (Wiggins, 2004): Requires urban water suppliers to submit their UWMPs to the California State Library.
- Senate Bill x7-7: Requires development and use of new methodologies for reporting population growth estimates, base per capita use, and water conservation. This water bill also extended the 2010 UWMP adoption deadline for retail agencies to July 1, 2011. An agency can choose from four methods to establish their interim (2015) and year 2020 water conservation targets.

### **1.2.2 Previous Urban Water Management Plan**

The District did not prepare a 2005 UWMP. The District has prepared a 2012 Federal Water Management Plan (FWMP), third draft dated September 2014, for the United States Bureau of Reclamation (USBR). The FWMP contains components similar to UWMPs. Updates to the FWMP are required every five years under the Central Valley Improvement Act of 1992 and Section 201(b) of the Reclamation Reform Act of 1982.

### 1.2.3 Resource Maximization

The District recognizes the importance of maintaining a high quality reliable water supply. Although water is a renewable resource, it is limited. A long-term reliable supply of water is essential to protect the local and state economy. The main focus for the District is to provide high quality water, maximize the efficient use of water, and promote conservation.

## 1.3 PLAN PREPARATION

This 2010 UWMP was prepared by Carollo Engineers in compliance with the UWMPA (California Water Code §10610 et seq.) and the Water Conservation Bill of 2009 (SBX7-7). Contact information for the District and Carollo Engineers is included in the Contact Sheet provided at the beginning of this document.

All water delivered by the District to its customers is treated to the same standards, regardless whether the water is used for domestic or agricultural purposes. Therefore, this UWMP includes water used for agricultural purposes in all calculations and projections.

This section includes specific information on how the UWMP was prepared, coordinated with other agencies and the public, adopted, and implemented.

### 1.3.1 Coordination

The UWMPA requires that the UWMP identify the water agency's coordination with appropriate nearby agencies; see excerpt below.

*10620 (d) (2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.*

*10621 (b). Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.*

*10635 (b). The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.*

The District coordinated its efforts with relevant agencies and parties to ensure that the data and issues discussed in the plan are presented accurately. Table 1 summarizes how the UWMP preparation was coordinated.

<b>Table 1 Coordination with Appropriate Agencies (Guidebook Table 1) 2010 Urban Water Management Plan Bella Vista Water District</b>								
<b>Coordinating Agencies</b>	<b>Participated in Developing the Plan</b>	<b>Notified of UWMP Update</b>	<b>Commented on the Draft</b>	<b>Attended Public Meeting</b>	<b>Was Contacted for Assistance</b>	<b>Was Sent a Copy of the Draft Plan<sup>(1)</sup></b>	<b>Was Sent a Notice of Intention to Adopt<sup>(1)</sup></b>	<b>Not Involved No Information</b>
Bella Vista Water District - District Engineer	✓		✓	✓	✓			
Bella Vista Water District – General Manager	✓		✓	✓	✓			
Bella Vista Water District – Board		✓		✓		✓		
Mountain Gate Community Services		✓				✓	✓	
Anderson-Cottonwood Irrigation District (ACID)		✓				✓	✓	
City of Shasta Lake		✓				✓	✓	
Shasta County Water Agency (SCWA)		✓				✓	✓	
City of Redding		✓				✓	✓	
Department of Water Resources (DWR)					✓			
United States Bureau of Reclamation (USBR)		✓						
County of Shasta		✓						
General Public (Website and Publication/Posting)		✓		✓		✓	✓	
<b>Notes: “Guidebook Table X” refers to a specific table in the “Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan” by DWR. (1) Sent notice that draft UWMP was available on District website.</b>								

The District provided formal written notification to the USBR, Shasta County (County), Shasta County Water Agency (SCWA), City of Redding, Anderson-Cottonwood Irrigation District (ACID), Mountain Gate Community Services District (CSD), and the City of Shasta Lake that the District’s UWMP was being updated. In accordance with the UWMPA, this notification was provided at least 60 days prior to the public hearing of the plan. Electronic copies of the final UWMP will be provided to the USBR, County, SCWA, City of Redding, ACID, and the City of Shasta Lake no later than 30 days after its submission to DWR. Appendix A contains copies of outreach documents.

### **1.3.1.1 Public Participation**

The UWMPA requires that the UWMP show the water agency solicited public participation; see excerpt below.

*10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published ... After the hearing, the plan shall be adopted as prepared or as modified after the hearing.*

On April 13, 2015 and April 21, 2015, the District placed a notice in the Redding Record Searchlight and the East Valley Times (local newspapers) stating that its UWMP was being updated and that a public hearing would be conducted to address comments and concerns from members of the community. The notice stated that a public review period would be scheduled through April 27, 2015. A copy of this notification and proof of publication is included in Appendix A. The Draft 2010 UWMP was made available for public inspection at the District offices, located at 11368 East Stillwater Way, Redding, as well as at the District's website.<sup>1</sup>

The District public hearing was held on April 27, 2015. The hearing provided an opportunity for the District's customers and employees to learn and ask questions about the current and future water supply of the District. No comments were received during the public review period.

### **1.3.2 Plan Adoption, Submittal, and Implementation**

The District prepared this 2010 UWMP during the first quarter of 2015. The plan was adopted at the public hearing held on April 27, 2015 (see Board of Directors Resolution in Appendix B) followed by submittal of the UWMP to DWR. Within 30 days of submitting the UWMP to DWR, the adopted UWMP will be available for public review during normal business hours at the locations specified for viewing of the Draft 2010 UWMP, submitted to the California State Library, the County, and USBR.

## **1.4 ABBREVIATIONS AND DEFINITIONS**

To conserve space and improve readability, the following abbreviations are used in this report. The abbreviations are spelled out in the text the first time the phrase or title is used in each Chapter and subsequently identified by abbreviation only within that Chapter.

AB                      Assembly Bill

ACID                    Anderson-Cottonwood Irrigation District

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<sup>1</sup> [www.bvwd.org](http://www.bvwd.org)

AF	Acre-Feet
AFY	Acre-Feet per Year
ASR	Aquifer Storage and Recovery
AWWA	American Water Works Association
BMPs	Best Management Practices
BVWD	Bella Vista Water District
CDPH	California Department of Public Health
CF	Cubic Feet
CFS	Cubic Feet per Second
CII	Commercial/Industrial/Institutional
County	Shasta County
CSA	Community Services Area
CSD	Community Services District
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
DDW	California Division of Drinking Water
District	Bella Vista Water District
DOF	California Department of Finance
DMMs	Demand Management Measures
DWR	California Department of Water Resources
EOMR	Extraordinary Operations, Maintenance, and Replacement Program
ETo	Evapotranspiration
FWMP	Federal Water Management Plan
°F	Degrees Fahrenheit
gpcd	Gallons per Capita per Day

gpm	Gallons per Minute
GWP	Groundwater Management Plan
HCF	Hundred Cubic Feet
I-5	Interstate 5
MFR	Multi-Family Residential
MGD	Million Gallons per Day
MG	Million Gallon
M&I	Municipal & Industrial
PG&E	Pacific Gas and Electric
RAWC	Redding Area Water Council
RGWB	Redding Area Groundwater Basin
RHNA	Regional Housing Need Allocation
RHNP	Regional Housing Need Plan
SB	Senate Bill
SCWA	Shasta County Water Agency
SFR	Single-Family Residential
TCRCD	Tehama County Resources Conservation District
USBR	United States Bureau of Reclamation
UWMP	Urban Water Management Plan
UWMPA	Urban Water Management Planning Act
WEF	Water Environment Foundation
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

Definitions of terms used throughout the report are included below

IRRIGATION WATER (aka AGRICULTURAL WATER) - Water delivered to consumers for use primarily in the commercial production of agricultural crops or livestock including domestic use incidental thereto.

MUNICIPAL AND INDUSTRIAL (M&I) WATER - Water used for domestic, commercial, industrial, and human use for purposes such as the drinking, cooking, bathing and the watering of landscaping.

DOMESTIC (or RESIDENTIAL) WATER USE - Water for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens or watering of pasture for animals (e.g., horses) which are kept for personal enjoyment.

COMMERCIAL WATER USE - Water used for motels, hotels, restaurants, office buildings, other commercial facilities, and institutions.

INDUSTRIAL WATER USE - Water used for industrial purposes such as fabrication, processing, washing, and cooling, and includes such industries as steel, chemical and allied products, paper and allied products, mining, and petroleum refining.

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## SYSTEM DESCRIPTION

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) include a description of the water purveyor's service area and various aspects of the area served including climate, population, and other demographic factors; see excerpt below.

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following: (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.*

### 2.1 SERVICE AREA PHYSICAL DESCRIPTION

The Bella Vista Water District (District) is located northeast of the City of Redding in western Shasta County (County). The District encompasses approximately 34,360 acres (54 square miles) generally extending from Churn Creek Road on the west, the community of Palo Cedro on the southeast, the community of Mountain Gate on the northwest, and Salt Creek at Highway 299 on the northeast. Approximately one-third of the District is located within the City of Redding and serves City residents.

The District contains Shasta-Tehama-Trinity Joint Community College and Simpson University, four elementary schools, Foothill High School, and Mountain View Middle School. In addition to residential, rural, commercial, and public institutional customers, the District serves water to agricultural and aquaculture customers. The water is used for growing strawberries, grapes, fruit and nut trees, alfalfa, pasture, vegetables, and a few fish farms. Aquaculture water use is combined with agricultural water use for reporting purposes.

The District is situated in the Northern end of the Sacramento Valley on generally level to slightly undulating terrain. The main streams, Cow Creek, Dry Creek, Stillwater Creek, Clough Creek, and Churn Creek drain in a southerly direction. The topography is characterized by a series of alternate, narrow stream valleys and relatively smooth terraces. The northern portion of the area has uneven terrain. The wooded, rolling hills in the north gradually give way to gently sloping treeless plains to the south. To the east of these plains, Cow Creek has entrenched, forming a long, narrow valley some 100 feet below the surface of the plains. East of Cow Creek, the plateau continues at about the same elevation. Elevations in the District range from approximately 430 feet in the southeast (Cow Creek) to 760 feet above sea level in the north (Bear Creek Road). The District utilizes a pressurized pipeline distribution system with variable speed pumps and pressure/regulation tanks to

provide water at service points with varying elevations (2012 Federal Water Management Plan [FWMP]). The District currently has ten pressure zones (Figure 1).

### **2.1.1 Description of Transmission, Treatment, and Distribution Facilities**

The District was formed on June 4, 1957 to provide agricultural and domestic water to the area northeast of the City of Redding. The District's water supply comes from two sources, the Sacramento River (under a water service contract with the United States Bureau of Reclamation) and five deep groundwater wells that draw from the Redding Area Groundwater Basin, Enterprise Sub-Basin located along the southerly boundary of the District. Figure 2 shows the District water service area and the main distribution system components (water pipelines, pump stations, wells, and water tanks). The water system consists of five tanks, nine pumping plants, the main treatment plant, five wells, and over 200 miles of pipeline from 4-inch to 54-inch in diameter. All of the water is pumped at least once, and much of it is pumped through at least two pumping stations.

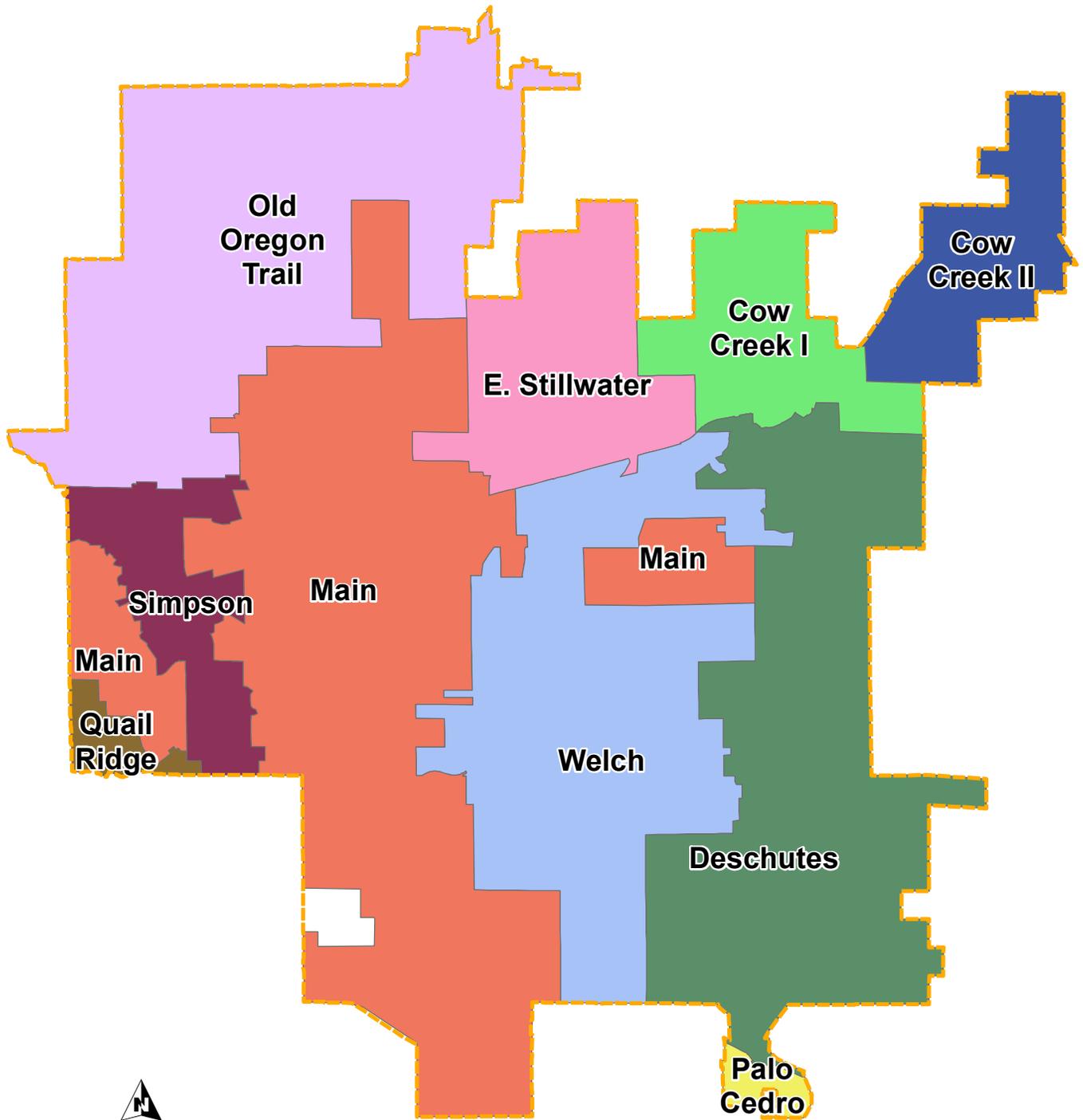
All water delivered by the District to its customers is treated to the same standards, regardless whether the water is used for domestic or agricultural purposes. The District currently operates under Domestic Water Supply Permit No. 01-02-08(P)002 through the California Division of Drinking Water (DDW), formerly California Department of Public Health (CDPH).

Surface water is pumped from the Sacramento River at the Wintu Pumping Plant, which is outside of the District boundary on the north side of the river below Hilltop Drive. From the Wintu Pumping Plant water is sent to a surge tank and then to the Water Treatment Plant (WTP) located on Canby Road immediately northeast of the Mount Shasta Mall (near Quail Ridge on Figure 2). River water is first treated with chlorine at the Wintu Pumping Plant and then filtered at the WTP utilizing in-line pressure filters. Polymer is used at the WTP to aid the filtration process.

Treatment of groundwater at the District's five wells consists of oxidation of iron and manganese using chlorine, followed by absorption of the iron and manganese oxides in pressure filters.

### **2.1.2 Climate**

The District's climate is characterized by hot dry summers and mild winters with an average annual rainfall of approximately 33.7 inches. Approximately 80 percent of the average annual precipitation occurs between November and April. Evapotranspiration (ETo) values, which serve as indicators of how much water is required to maintain healthy agriculture and landscaping, range from 1.25 inches during January to 8.39 inches in July. Temperature, rainfall, and ETo averages for the District are presented in Table 2.

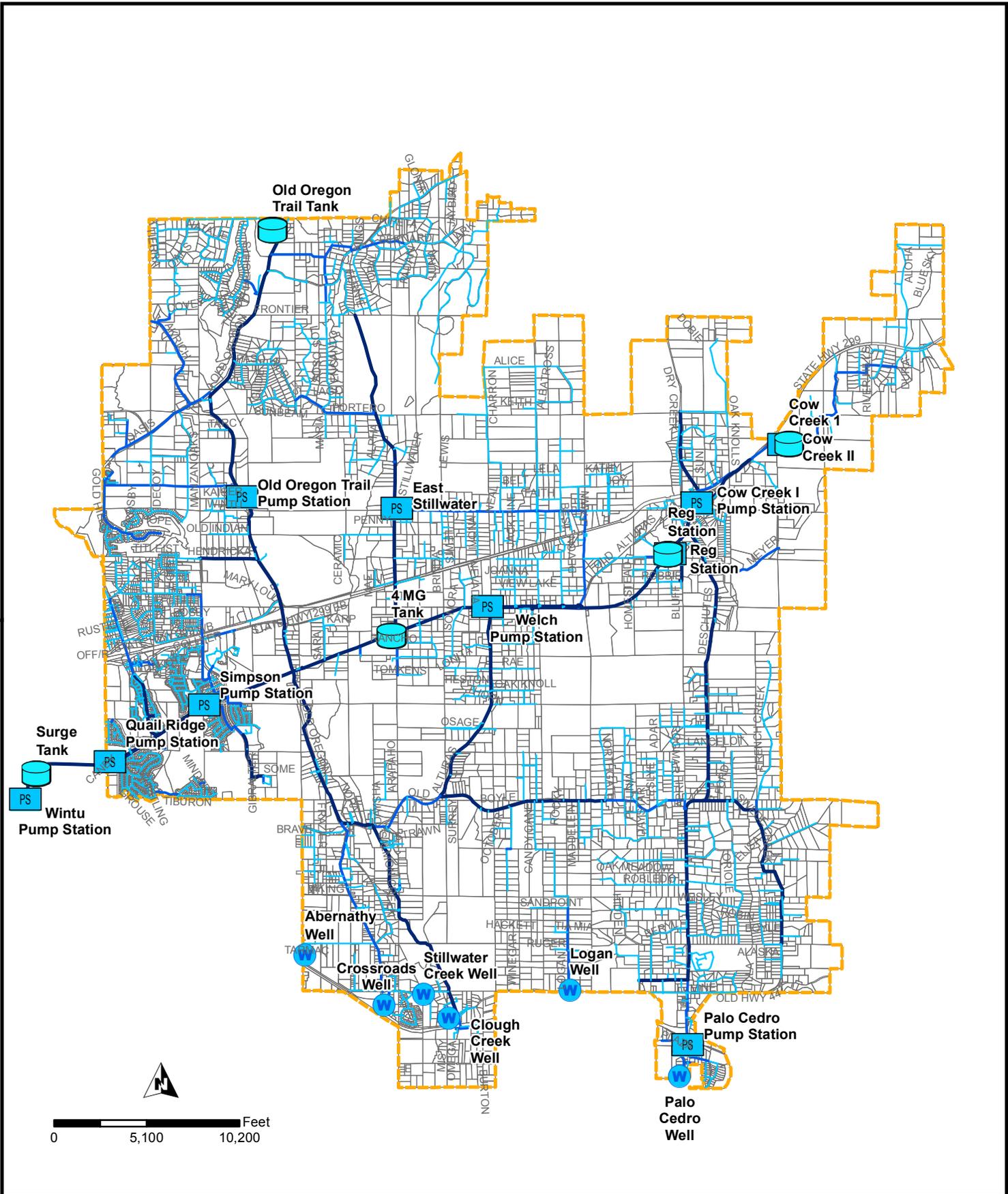


**Legend**

- |                       |               |                  |             |
|-----------------------|---------------|------------------|-------------|
| BVWD Boundary         | Cow Creek II  | Main             | Quail Ridge |
| <b>Pressure Zones</b> | Deschutes     | Old Oregon Trail | Simpson     |
| Cow Creek I           | E. Stillwater | Palo Cedro       | Welch       |

**EXISTING PRESSURE ZONES**

FIGURE 1  
 BELLA VISTA WATER DISTRICT  
 2010 URBAN WATER MANAGEMENT PLAN



**Legend**

- BVWD Boundary
- Tanks
- W Wells
- PS Pump Stations
- Water Main**
- 8" or Less
- 10" to 14"
- Greater than 16"

**EXISTING WATER SYSTEM**

FIGURE 2  
 BELLA VISTA WATER DISTRICT  
 2010 URBAN WATER MANAGEMENT PLAN

<b>Table 2 Climate Characteristics 2010 Urban Water Management Plan Bella Vista Water District</b>				
<b>Month</b>	<b>Standard Monthly Average ETo<sup>(1)</sup> (inches)</b>	<b>Monthly Average Rainfall<sup>(2)</sup> (inches)</b>	<b>Monthly Average Temperature<sup>(2)</sup> (°F)</b>	
			<b>Minimum</b>	<b>Maximum</b>
January	1.25	6.32	36.6	55.4
February	1.97	5.57	39.1	59.7
March	3.50	4.47	42.5	64.7
April	4.98	2.37	46.3	70.8
May	6.90	2.08	53.5	80.5
June	8.11	0.79	61.2	89.9
July	8.39	0.10	65.9	98.7
August	7.39	0.15	62.8	97.1
September	5.57	0.51	57.8	91.8
October	3.88	1.96	49.6	78.8
November	1.86	3.39	40.9	63.3
December	1.17	5.96	36.1	55.0
<b>Annual</b>	<b>54.97</b>	<b>33.68</b>	<b>49.4</b>	<b>75.5</b>
<b>Notes:</b>				
(1) Source: California Irrigation Management Information System (CIMIS) Station 224 Shasta College.				
(2) Source: Western Regional Climate Center Redding Muni AP, California (047304). Represents monthly average from September 1986 to January 2015.				

## 2.2 SERVICE AREA POPULATION

This section summarizes historical, current, and projected population trends in the District. Population projections are essential to the planning process and form the basis for most planning decisions, yet projecting future growth is far from an exact science given the complex set of variables that can affect the rate of growth. Typically, projections are developed by taking past patterns and combining them with assumptions regarding the future to obtain an estimate of future growth rates.

The alternative method for service area population found in Appendix A of the Methodologies for Calculating Baseline and Compliance per Capita Urban Water Use (October 1, 2010) was used to estimate population. Population estimates were determined by anchoring the year 2000 residential connections to the year 2000 Census data, followed by scaling the estimate forward and backward using active connections.

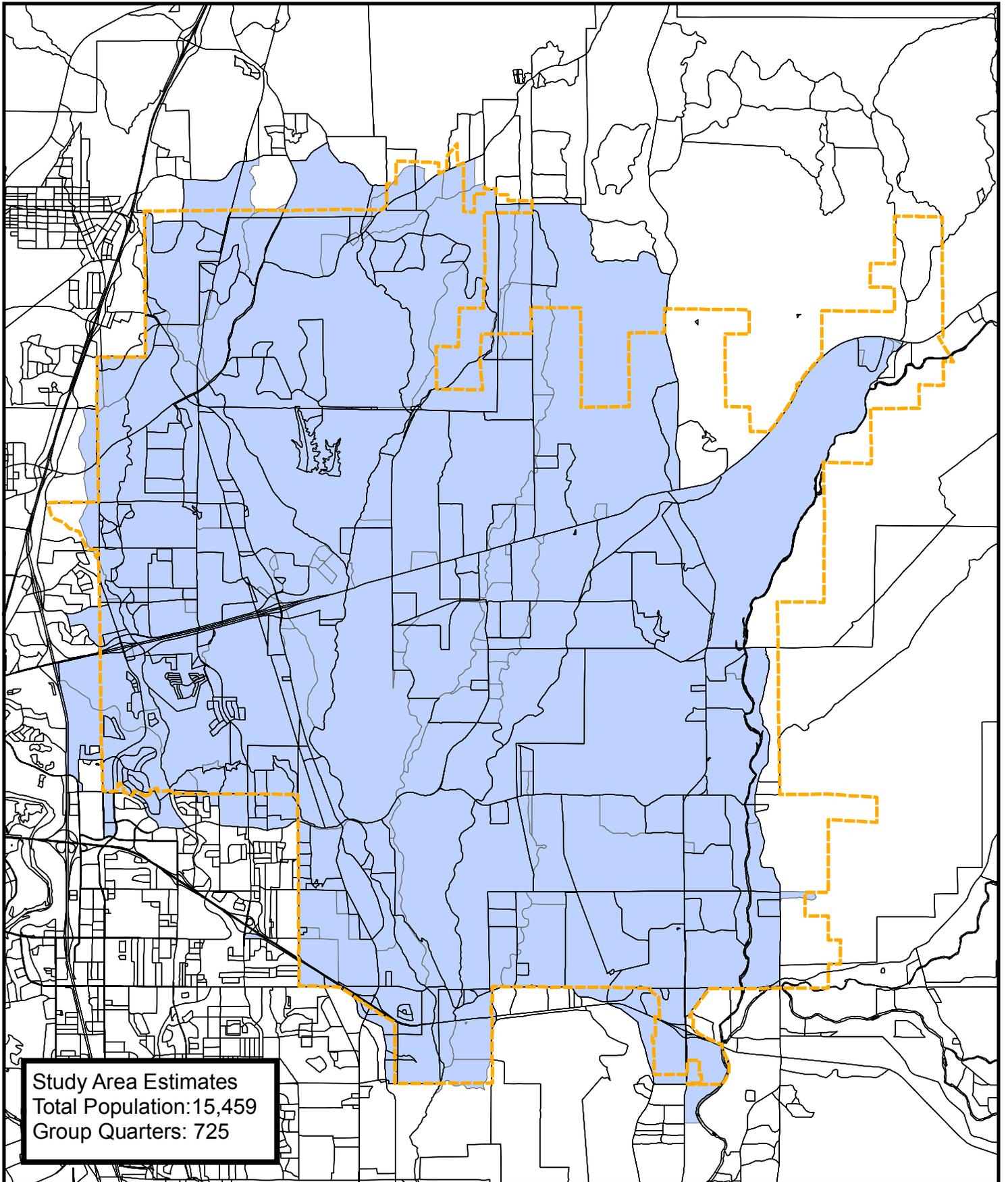
Using a map of the year 2000 service boundary and the current GIS files, the census blocks, defined by the U.S. Census Bureau, that lie in the boundary were identified. Several census blocks straddled the service area boundary. In cases where the blocks had 50 percent or more of the block inside the service area boundary the entire block was included. Likewise, if 50 percent or more of the block was outside of the service area boundary it was not included. Figure 3 presents a map of the census blocks used for analysis with the 2000 service area boundary.

The census blocks identified fell into six block groups and then into several census tracts. The blocks, block groups, and census tracts were used to link the selected blocks with their corresponding population data. The total population, group quarters population by group quarter type, and the total population in occupied housing units by tenure by units in structure were downloaded off the census website and used to estimate the year 2000 population data. The estimated year 2000 population was 15,459 (refer to Figure 3).

The District has only recently begun to report single-family and multi-family connections separately. Therefore, a single ratio was developed for the year 2000. Connections for the baseline years are grouped into a residential category that includes single-family and multi family connections (Table 3). Also included in the table is a list of agricultural connections, which were assumed to have one residence per connection. The residential and agricultural connections were summed prior to calculating the single ratio. The single ratio for persons per connection for the year 2000 was calculated at 3.25. This ratio was applied to the years in the baseline period as presented in Table 3 to estimate the population over the baseline period.

In 2006, the number of agricultural connections dropped significantly due to provisions of the renewed water service contract with the United States Bureau of Reclamation and District efforts to comply and to identify customers that should be in the rural customer class versus the agricultural customer class. The agricultural customers are required to have a property with at least two acres of cultivated land under irrigation and dedicated to commercial crop production, a meter at least a one-inch in size, a business plan, crops or livestock sales or documented barter, and improvements to land (including, but not limited to buildings, irrigation systems, corrals, fencing, fruit or nut trees, vines, etc.). The customers that did not meet these requirements were moved to the rural residential customer category beginning in 2006.

The same process for determining population was applied to the 2010 census data to check the accuracy of the single ratio. Figure 4 presents a map of the census blocks used for analysis with the 2010 service area boundary. Using the 2010 service area boundary the 2010 population was determined to be 17,619. This is within four percent of the estimated population. The District will continue to gather data on the single-family and multi-family connections to improve the accuracy of the population estimates for future UWMP updates.



Study Area Estimates  
 Total Population: 15,459  
 Group Quarters: 725

**Legend**

- 2000 Census Blocks for Analysis
- BVWD Boundary



**CENSUS BLOCKS  
 USED FOR ANALYSIS 2000**

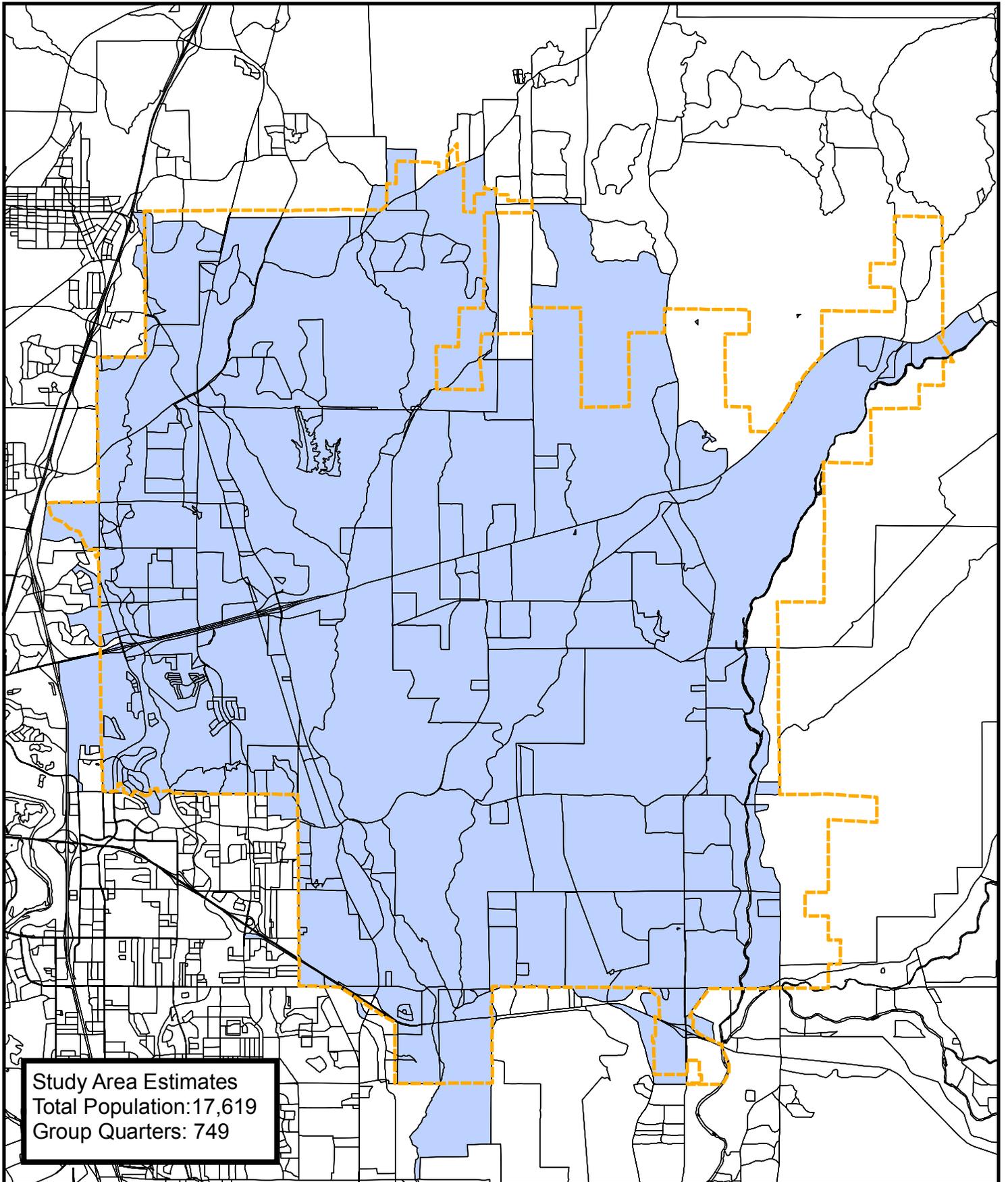
FIGURE 3  
 BELLA VISTA WATER DISTRICT  
 2010 URBAN WATER MANAGEMENT PLAN

**Table 3 Alternative Methodology for Service Area Population Estimate  
2010 Urban Water Management Plan  
Bella Vista Water District**

<b>Calendar Year</b>	<b>Residential Connections<sup>(1)</sup></b>	<b>Agricultural Connections<sup>(2)</sup></b>	<b>Census Population<sup>(3)</sup></b>	<b>Population Estimate<sup>(4)</sup></b>
1995	3,878	498		14,221
1996	3,915	512		14,387
1997	4,033	534		14,842
1998	3,891	528		14,361
1999	4,060	562		15,020
2000	4,168	589	15,459	15,459
2001	4,359	642		16,252
2002	4,632	648		17,159
2003	4,768	635		17,558
2004	4,885	654		18,000
2005	5,049	624		18,436
2006	5,363	365		18,614
2007	5,507	281		18,809
2008	5,381	280		18,397
2009	5,362	277		18,325
2010	5,386	275	17,619	18,397

**Notes:** "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.

- (1) Source: Department of Water Resources Public Water System Statistics and District data.
- (2) Assumes one residence per agricultural connection.
- (3) Source: 2000 Census, 2000 service area boundary, 2010 Census, 2010 service area boundary.
- (4) Single ratio calculated at 3.25. Single ratio used because SFR and MFR connections are not separated over the baseline. This also includes rural customers.



Study Area Estimates  
 Total Population: 17,619  
 Group Quarters: 749

**Legend**

-  BVWD Boundary
-  2010 Census Blocks for Analysis



0 5,000 10,000 Feet

**CENSUS BLOCKS  
 USED FOR ANALYSIS 2010**

FIGURE 4  
 BELLA VISTA WATER DISTRICT  
 2010 URBAN WATER MANAGEMENT PLAN

Selecting a population growth rate for this UWMP is challenging due to impacts from the recession and the fluctuations in the estimated population over the baseline period. The California Department of Finance (DOF) anticipates that the County annual average growth rate will be 0.95 percent from 2010 through 2050. Based on the District service area being largely comprised of agricultural and rural-residential parcels, a slightly lower 0.90 percent annual average growth rate was assumed for the District service area. The current and projected population for the District is contained in Table 4.

<b>Table 4      Population - Current and Projected (Guidebook Table 2) 2010 Urban Water Management Plan Bella Vista Water District</b>							
Service Area	Years						Data Source
	2010	2015	2020	2025	2030	2035	
Population <sup>(1)</sup>	17,619	18,426	19,270	20,153	21,077	22,042	See Note 2
<b>Notes:</b> "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR. (1) Service area population is defined as the population served by the distribution system. (2) 2010 Census data and an estimated 0.9 percent average annual growth rate.							

### 2.2.1 Other Demographic Factors

The District is predominately zoned rural residential. This land use type has a large impact on water use. Rural residential and agricultural customers have properties at least two acres or larger and therefore use more water than a typical single-family or multi family residential connections. A small portion of the District adjacent to the City of Redding is considered a Disadvantaged Community by the State of California (Disadvantaged Communities Mapping Tool).

## 2.3 PLANNED DEVELOPMENT

The UWMPA requires that the UWMP identify the major developments within the agency's service area that would require water supply planning; see excerpt below.

10910. (a) Any city or county that determines that a project, as defined in section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

10912. For the purpose of this part, the following terms have the following meanings:

10912 (a) "Project" means any of the following:

- (1) A proposed residential development of more than 500 dwelling units.
- (2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
- (3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
- (4) A proposed hotel or motel, or both, having more than 500 rooms.
- (5) A proposed industrial, manufacturing or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
- (6) A mixed-use project that includes one or more of the projects specified in this subdivision.
- (7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

Interstate 5 (I-5), California State Highway 299 and California State Highway 44 serve as the primary transportation corridors in the County connecting the District to other communities, jobs, and services. As such, the areas along the highway corridors are anticipated to experience the most growth in the future. A portion of the City of Redding, which lies within the District boundary near I-5 has seen steady growth during the past 30 years. As the City of Redding expands into the District and formerly rural land is converted to denser residential use, additional water demand and service connections will result. Rural parcels outside of the City of Redding limits and within the unincorporated areas of Shasta County will likely continue to be divided into smaller lots but will remain zoned rural residential, which also create increased demand and require new connections. Other than these trends, no other significant planned development or land-use changes are foreseen for the near future.

## SYSTEM DEMANDS

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) identify the quantity of water supplied to the agency's customers including a breakdown by user classification; see excerpt below.

*10631 (e) (1) Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:*

*(A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and (I) Agricultural.*

*(2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.*

This section describes the baseline (base daily per capita daily) water use, the interim and urban water use targets, water system demands, water demand projections, and water use reduction plan.

### 3.1 BASELINES AND TARGETS

The UWMPA requires that the UWMP identify the baseline water demand, urban water use target, and interim urban water use target for the Bella Vista Water District (District); see excerpt below.

*10608.20 (e) (1) An urban retail water supplier shall include in its urban water management plan...due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.*

The base daily per capita use is the first step in determining the Districts various urban water use targets over the 20-year planning horizon. The current per capita use sets the baseline on which the urban and interim water use targets are determined. These targets are necessary to judge compliance with the 2020 use reductions set forth in the Water Conservation Bill of 2009.

#### 3.1.1 Baseline

The first step in developing the baseline water use for the District is determining the applicable range of years for which the baseline average will be calculated. The UWMPA stipulates an agency may use either a 10 or 15-year average to determine its baseline. If 10 percent of total water deliveries in 2008 were from recycled water, then the agency can use

a 15-year average baseline. Since the District did not have any recycled water deliveries in 2008, a 10-year average was used for baseline determination. In addition to the 10-year baseline, a 5-year baseline is also calculated, which is used to establish the minimum criteria for the District's use reduction targets. A summary of the baseline ranges are presented in Table 5. Note that agricultural connection usage is included in 2008 total water deliveries quantity.

<b>Table 5 Base Period Ranges (Guidebook Table 13) 2010 Urban Water Management Plan Bella Vista Water District</b>			
<b>Base</b>	<b>Parameter</b>	<b>Value</b>	<b>Units</b>
10-Year Base Period	2008 total water deliveries	14,477	AFY
	2008 total volume of delivered recycled water	0	AFY
	2008 recycled water as a percent of total deliveries	0	Percent
	Number of years in base period	10	Years
	Year beginning base period range	1995	
	Year ending base period range	2004	
5-Year Base Period	Number of years in base period	5	Years
	Year beginning base period range	2003	
	Year ending base period range	2007	
<p><b>Notes:</b> "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR. AFY = Acre-Feet per Year</p>			

The data used to calculate the 10-year baseline is included in Table 6. The UWMPA requires a continuous range, with the end of the range ending between December 31, 2004 and December 31, 2010, be used for baseline determination. Note that agricultural connection usage is included in baseline gross water use reported in Table 6. Appendix C contains a summary of the gross water usage calculation. The data used to calculate the 5-year baseline is included in Table 7.

<b>Table 6 Base Daily Per Capita Water Use – 10-Year Range (Guidebook Table 14) 2010 Urban Water Management Plan Bella Vista Water District</b>				
<b>Sequence Year</b>	<b>Calendar Year</b>	<b>Distribution System Population<sup>(1)</sup></b>	<b>Daily System Gross Water Use<sup>(2)</sup> (mgd)</b>	<b>Annual Daily Per Capita Water Use (gpcd)</b>
Year 1	1995	14,221	10.8	758
Year 2	1996	14,387	12.2	847
Year 3	1997	14,842	12.6	849
Year 4	1998	14,361	10.3	717
Year 5	1999	15,020	14.0	934
Year 6	2000	15,459	12.4	805
Year 7	2001	16,252	14.0	861
Year 8	2002	17,159	15.7	917
Year 9	2003	17,558	14.6	832
Year 10	2004	18,000	15.0	835
<b>Base Daily Per Capita Water Use</b>				<b>836</b>
<p><u>Notes:</u> "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.  mgd = million gallons per day; gpcd = gallons per capita per day</p> <p>(1) Source: Alternative methodology for population estimate, refer to Table 3.  (2) Source: Department of Water Resources Public Water System Statistics and USBR Consumption Reports.</p>				

<b>Table 7 Base Daily Per Capita Water Use – 5-Year Range (Guidebook Table 15) 2010 Urban Water Management Plan Bella Vista Water District</b>				
<b>Sequence Year</b>	<b>Calendar Year</b>	<b>Distribution System Population<sup>(1)</sup></b>	<b>Daily System Gross Water Use<sup>(2)</sup> (mgd)</b>	<b>Annual Daily Per Capita Water Use (gpcd)</b>
Year 1	2003	17,558	14.6	832
Year 2	2004	18,000	15.0	835
Year 3	2005	18,436	13.0	705
Year 4	2006	18,614	13.1	706
Year 5	2007	18,809	12.4	659
<b>Base Daily Per Capita Water Use</b>				<b>748</b>
<p>Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.  mgd = million gallons per day; gpcd = gallons per capita per day  (1) Source: Alternative methodology for population estimate, refer to Table 3.  (2) Source: Department of Water Resources Public Water System Statistics and USBR Consumption Reports.</p>				

### 3.1.2 Targets

The UWMPA requires urban water suppliers to determine the interim and urban water use targets for 2015 and 2020, respectively. Four target methods have been developed, and identify the specific steps water suppliers shall follow to establish these targets. A brief description of each method, as well as the water use calculated using each methodology is included below.

#### 3.1.2.1 Method 1 – 80 Percent of Base Daily Per Capita Water Use

Method 1 requires an urban water supplier to first determine the base daily per capita use. In order to determine the target using Method 1, 80 percent of the base daily per capita use (10-year base period) is calculated. Based on the 10-year baseline daily per capita use of 836 gallons per capita per day (gpcd) determined previously (Table 6), the target use for Method 1 is 668 gpcd.

#### 3.1.2.2 Method 2 – Performance Standards

Method 2 requires water suppliers to use baseline commercial, industrial, institutional, indoor residential, and landscaped area water use to calculate a water use target. Based on

the nature of the data required to determine a target using Method 2, it is not feasible for the District to use this methodology.

### **3.1.2.3 Method 3 – 95 Percent of Hydrologic Region Target**

Method 3 requires water suppliers to use the hydrologic region target to calculate a water use target for 2020. A map showing the California hydrologic regions and 2020 conservation goals is included in the final *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 UWMP*. In order to determine the target using Method 3, 95 percent of the region-specific conservation goal is calculated. Based on a target of 176 gpcd for the Sacramento River region, the Method 3 target is 167 gpcd. Note that this target is not applicable for determining a target since the District has included agricultural use in the baseline calculations.

### **3.1.2.4 Method 4 – Savings by Water Sector**

Method 4 identifies water savings obtained through identified practices and subtracts them from the base daily per capita water use value identified for the water supplier. The water savings identified that can be used to reduce the base daily per capita water use value include:

- Indoor residential use savings
- Metered savings (not applicable since District is fully metered)
- Commercial, industrial, and institutional (CII) savings
- Landscape and water loss savings

To calculate the CII savings, a retail water supplier must have data for the entire baseline period used in the base daily per capita water use calculation. The District has metered CII usage data for the entire baseline. The CII gpcd and the landscape and water loss savings gpcd were calculated from historical data. The default indoor residential use savings of 15 gpcd was used. The target use for Method 4 is 666 gpcd. Appendix D contains the target calculator outputs.

### **3.1.2.5 Minimum Water Use Reduction Requirement**

The final step in determining the applicability of the water use target for the District is to confirm that the water use targets meet the minimum reduction requirements as defined by the California Department of Water Resources (DWR). To confirm the target, the 5-year average baseline (748 gpcd) previously determined (Table 7) is used. In order to meet the minimum criteria, the chosen 2020 target must fall below 95 percent of the 5-year baseline, which for the District is 710 gpcd.

### 3.1.3 Summary of Baselines and Targets

Based on the calculations above, the District’s water use target for 2020 is 668 gpcd. Based on the 10-year baseline of 836 gpcd, the 2015 interim water use target is 752 gpcd. This 2020 target was determined using Method 1. According to the DWR guidelines, the 2020 target is valid since it is less than the target confirmation criteria of 710 gpcd. A summary of the various baselines, targets, and the final and interim targets are summarized in Table 8.

<b>Table 8 Baseline and Targets Summary 2010 Urban Water Management Plan Bella Vista Water District</b>									
<b>Baselines<sup>(1)</sup> (gpcd)</b>		<b>Target Determination Methods (gpcd)</b>				<b>Minimum Reduction Requirement<sup>(6)</sup> (gpcd)</b>	<b>Target<sup>(7)</sup> (gpcd)</b>	<b>Interim Target<sup>(8)</sup> (gpcd)</b>	
<b>10-Year</b>	<b>5-Year</b>	<b>1<sup>(2)</sup></b>	<b>2<sup>(3)</sup></b>	<b>3<sup>(4)</sup></b>	<b>4<sup>(5)</sup></b>				
836	748	668	n/a	167	666	710	668	752	
<p><u>Notes:</u> gpcd = gallons per capita per day</p> <p>1. Refer to Table 5, Table 6, and Table 7 for source of data.</p> <p>2. Method 1 – 80 percent of the 10-year base daily per capita water use.</p> <p>3. Method 2 – Insufficient data is available to determine an Urban Water Use Target.</p> <p>4. Method 3 – 95 percent of the Regional Target.</p> <p>5. Method 4 – Savings by Water Sector.</p> <p>6. Defined as 95 percent of the 5-year base daily per capita water use.</p> <p>7. Urban Water Use Target determined using Method 1.</p> <p>8. Interim Urban Water Use Target is the average of the 10-year baseline and the Target.</p>									

### 3.2 WATER DEMANDS

Water demands served by the District are primarily agricultural and domestic (residential, rural, commercial/public institutional, and landscape irrigation). All connections in the District are metered. The District will be investigating the establishment of additional customer classifications (e.g., multi-family) in order to provide a better match with the customer types listed in the UWMP Guidebook Tables and enable the District to segregate these types of uses in the future. Table 9 and Table 10 describe the actual number of connections and associated annual water deliveries by customer sector for the years 2005 and 2010, respectively. Note that these tables, and subsequent water delivery and demand tables include agricultural use, which could be a larger demand than shown in water years without agricultural water allocation reductions.

Water included under “other” is metered and used for construction water, emergency intertie water, and run to waste and other use at the Water Treatment Plant (WTP). Construction water is metered using portable fire hydrant meters rented by contractors.

These meters can be attached to any fire hydrant within the District, subject to the approval by the District.

<b>Table 9 Water Deliveries – Actual 2005 (Guidebook Table 3) 2010 Urban Water Management Plan Bella Vista Water District</b>					
	<b>2005</b>				
	<b>Metered</b>		<b>Not Metered</b>		<b>Total</b>
<b>Water Use Sectors</b>	<b># of accounts</b>	<b>Deliveries AFY</b>	<b># of accounts</b>	<b>Deliveries AFY</b>	<b>Deliveries AFY</b>
Residential	5,049	4,986	0	0	4,986
Commercial/Institutional	337	2,020	0	0	2,020
Industrial	0	0	0	0	0
Landscape Irrigation	0	0	0	0	0
Agriculture	624	7,525	0	0	7,525
Other <sup>(1)</sup>	0	28	0	0	28
<b>Total</b>	<b>6,010</b>	<b>14,560</b>	<b>0</b>	<b>0</b>	<b>14,560</b>
<p><b>Notes:</b> “Guidebook Table X” refers to a specific table in the “Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan” by DWR.            AFY = Acre-Feet per Year            Source: 2005 DWR Public Water System Statistics.            (1) Water included under “other” is metered and used for construction water, emergency intertie water, and run to waste and other use at the water treatment plant.</p>					

<b>Table 10 Water Deliveries – Actual 2010 (Guidebook Table 4) 2010 Urban Water Management Plan Bella Vista Water District</b>					
	<b>2010</b>				
	<b>Metered</b>		<b>Not Metered</b>		<b>Total</b>
<b>Water Use Sectors</b>	<b># of accounts</b>	<b>Deliveries AFY</b>	<b># of accounts</b>	<b>Deliveries AFY</b>	<b>Deliveries AFY</b>
Residential	5,386	5,024	0	0	5,024
Commercial/Institutional	317	829	0	0	829
Industrial	0	0	0	0	0
Landscape Irrigation	36	528	0	0	528
Agriculture	275	3,627	0	0	3,627
Other <sup>(1)</sup>	0	31	0	0	31
<b>Total</b>	<b>6,014</b>	<b>10,039</b>	<b>0</b>	<b>0</b>	<b>10,039</b>

Notes: “Guidebook Table X” refers to a specific table in the “Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan” by DWR.  
AFY = Acre-Feet per Year  
Source: 2010 DWR Public Water System Statistics  
(1) Water included under “other” is metered and used for construction water, emergency intertie water, and run to waste and other use at the water treatment plant.

Future account and water use projections are shown in Table 11, Table 12, and Table 13. To project the number of connections per customer sector, it was assumed that the number of connections will grow consistently with the projected water demands; this is based on the relative distribution of customer types, accounts, and water use reported for 2010. However, the customer sector water deliveries in Table 11, Table 12, and Table 13 are only general estimates of projected use, and may vary significantly based on future development and water conservation measures taken by each customer sector. Ultimately, the implementation, magnitude, and type of future development will determine the distribution of water use per customer sector.

<b>Table 11 Water Deliveries – Projected 2015 (Guidebook Table 5) 2010 Urban Water Management Plan Bella Vista Water District</b>					
	<b>2015</b>				
	<b>Metered</b>		<b>Not Metered</b>		<b>Total</b>
<b>Water Use Sectors</b>	<b># of accounts</b>	<b>Deliveries AFY</b>	<b># of accounts</b>	<b>Deliveries AFY</b>	<b>Deliveries AFY</b>
Residential	5,633	7,767	0	0	7,767
Commercial/Institutional	332	1,282	0	0	1,282
Industrial	0	0	0	0	0
Landscape Irrigation	38	816	0	0	816
Agriculture	288	5,607	0	0	5,607
Other	0	48	0	0	48
<b>Total</b>	<b>6,290</b>	<b>15,520</b>	<b>0</b>	<b>0</b>	<b>15,520</b>
<p>Notes: “Guidebook Table X” refers to a specific table in the “Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan” by DWR. AFY = Acre-Feet per Year</p>					

<b>Table 12 Water Deliveries – Projected 2020 (Guidebook Table 6) 2010 Urban Water Management Plan Bella Vista Water District</b>					
	<b>2020</b>				
	<b>Metered</b>		<b>Not Metered</b>		<b>Total</b>
<b>Water Use Sectors</b>	<b># of accounts</b>	<b>Deliveries AFY</b>	<b># of accounts</b>	<b>Deliveries AFY</b>	<b>Deliveries AFY</b>
Residential	5,891	7,220	0	0	7,220
Commercial/Institutional	347	1,191	0	0	1,191
Industrial	0	0	0	0	0
Landscape Irrigation	39	759	0	0	759
Agriculture	301	5,213	0	0	5,213
Other	0	45	0	0	45
<b>Total</b>	<b>6,578</b>	<b>14,428</b>	<b>0</b>	<b>0</b>	<b>14,428</b>
<p>Notes: “Guidebook Table X” refers to a specific table in the “Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan” by DWR. AFY = Acre-Feet per Year</p>					

<b>Table 13 Water Deliveries – Projected 2025, 2030, 2035 (Guidebook Table 7) 2010 Urban Water Management Plan Bella Vista Water District</b>						
	<b>2025</b>		<b>2030</b>		<b>2035</b>	
	<b>Metered</b>		<b>Metered</b>		<b>Metered</b>	
<b>Water Use Sectors</b>	<b># of accounts</b>	<b>Deliveries AFY</b>	<b># of accounts</b>	<b>Deliveries AFY</b>	<b># of accounts</b>	<b>Deliveries AFY</b>
Residential	6,161	7,551	6,443	7,897	6,738	8,259
Commercial/ Institutional	363	1,246	379	1,303	397	1,363
Industrial	0	0	0	0	0	0
Landscape Irrigation	41	794	43	830	45	868
Agriculture	315	5,452	329	5,701	344	5,962
Other	0	47	0	49	0	51
<b>Total</b>	<b>6,879</b>	<b>15,089</b>	<b>7,194</b>	<b>15,780</b>	<b>7,524</b>	<b>16,503</b>
Notes: “Guidebook Table X” refers to a specific table in the “Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan” by DWR. AFY = Acre-Feet per Year						

Table 14 shows the projected water demands from 2010 through 2035 with and without conservation. The demand projections with conservation are based on the District’s per capita water use targets for 2015 and 2020. The demand projections without conservation are based on the District’s 10-year baseline water use.

<b>Table 14 Projected Water Demands 2010-2035 2010 Urban Water Management Plan Bella Vista Water District</b>					
<b>Year</b>	<b>Distribution System Population</b>	<b>Projected Water Use</b>			
		<b>w/ Conservation <sup>(1)</sup></b>		<b>w/o Conservation <sup>(2)</sup></b>	
		<b>(mgd)</b>	<b>(AFY)</b>	<b>(mgd)</b>	<b>(AFY)</b>
2010	17,619	14.7	16,489	14.7	16,489
2015	18,426	13.9	15,520	15.4	17,245
2020	19,270	12.9	14,428	16.1	18,035
2025	20,153	13.5	15,089	16.8	18,861
2030	21,077	14.1	15,780	17.6	19,725
2035	22,042	14.7	16,503	18.4	20,629

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.  
AFY = Acre-Feet per Year; mgd = million gallons per year

(1) Demand projections with conservation are based on the District's gpcd targets for 2015 and 2020.

(2) Demand projections without conservation are based on the District's selected 10-year baseline water use.

### 3.2.1 Sales to Other Agencies

The District periodically sells treated water to other agencies for emergencies or to assist them in meeting demands during an outage required for maintenance or construction. All outgoing flows require manual activation. Due to the nature of these connections, the District does not have projected sales for these agencies. Therefore, Guidebook Table 9 has not been included in this UWMP.

### 3.2.2 Other Water Demands

Additional water uses and losses in the District's service area are presented in Table 15. Additional water losses are not accounted for in Table 9 through Table 14.

### 3.2.3 Total Water Demands

The District's total water demands, based on the figures presented in Table 9 through Table 13 and Table 15, are summarized in Table 16.

<b>Table 15 Additional Water Uses and Losses (Guidebook Table 10) 2010 Urban Water Management Plan Bella Vista Water District</b>							
<b>Water Use<sup>(1)</sup></b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
Saline Barriers	0	0	0	0	0	0	0
Groundwater Recharge	0	0	0	0	0	0	0
Conjunctive Use	0	0	0	0	0	0	0
Raw Water	0	0	0	0	0	0	0
Recycled Water	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
System Losses <sup>(2)</sup>	587 <sup>(3)</sup>	1,043 <sup>(4)</sup>	991	921	963	1,007	1,053
<b>Total, AFY</b>	<b>587</b>	<b>1,043</b>	<b>991</b>	<b>921</b>	<b>963</b>	<b>1,007</b>	<b>1,053</b>

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.  
AFY = Acre-Feet per Year

(1) Any water accounted for in Guidebook Tables 3 through 7 are not included in this table (Table 9 through Table 13 in this report).

(2) 2005 and 2010 are system losses calculated with the AWWA software. System losses ranged between four to seven percent between 2011 and 2014 using AWWA software. For future projections, system losses have been assumed to be six percent of the water produced (2011 to 2014 average loss).

(3) System losses in 2005 were four percent.

(4) Systems losses in 2010 were nine percent.

<b>Table 16 Total Water Use (Guidebook Table 11) 2010 Urban Water Management Plan Bella Vista Water District</b>							
<b>Water Use</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
Total water deliveries <sup>(1)</sup>	14,560	10,039	15,520	14,428	15,089	15,780	16,503
Sales to other water agencies <sup>(2)</sup>	0	0	0	0	0	0	0
Additional water uses and losses <sup>(3)</sup>	587	1,043	991	921	963	1,007	1,053
<b>Total, AFY</b>	<b>15,147</b>	<b>11,082</b>	<b>16,126</b>	<b>14,991</b>	<b>15,678</b>	<b>16,396</b>	<b>17,148</b>

Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan" by DWR.  
AFY = Acre-Feet per Year

(1) Data from Table 9 through Table 13.

(2) Done on an emergency basis. No planned future sales.

(3) Data from Table 15.

### **3.2.4 Agricultural Demands**

The allocations for agricultural water (Irrigation) and municipal and industrial (M&I) water are treated differently by the United States Bureau of Reclamation (USBR) for Central Valley Project (CVP) water. Under the current draft M&I Shortage Policy, in water shortage years, the water allocation for M&I is not reduced until the allocation for Irrigation (agricultural) water is reduced below 75 percent of contract entitlement. When the allocation of Irrigation water has been reduced below 75 percent and there are still necessary water reductions, both the M&I and Irrigation allocations will be reduced. The M&I will be reduced until it reaches 75 percent of adjusted historical use, and the Irrigation allocation will be reduced until it reaches 50 percent of contract entitlement. When M&I is reduced to 50 percent or less, the Irrigation allocation will be zero percent. This occurred in both 2014 and 2015. It is important to note that during normal water years the District's agricultural (Irrigation) demand can be significant.

On April 13, 2009, the District adopted a Supplemental Water Program (Resolution 09-02) which provides the District's agricultural water customers, who bear a disproportionate share of curtailment in shortage years, the option of having the District obtain supplemental supply on their behalf on an individual subscription basis. It is anticipated that shortage year subscriptions for agricultural water will be fulfilled through CVP water transfers into the District pursuant to Section 3405(a) of Public Law 102-575, Title 34, of the Central Valley Project Improvement Act (CVPIA).

### **3.2.5 Lower Income Household Water Use Projections**

The information contained below is based on the District's *Policy for Water Services for Affordable Housing* (under Resolution 07-01, adopted January 22, 2007) and the California Department of Housing and Community Development *Regional Housing Need Determination and Plan for the Fifth Housing Element Update* (June 30, 2012).

The District's *Policy for Water Services for Affordable Housing* states that the District will ensure that priority for water services be given to proposed developments that include housing units affordable to lower income households. The District will not deny or condition the approval of an application for service to, or reduce the amount of services applied for by, a proposed development that includes housing units affordable to lower income households, unless the Board of Directors makes specific written findings that the denial, condition, or reduction is necessary due to the existence of one or more of the following:

- The District does not have sufficient water supply as defined in Government Code Section 66473.7(a)(2), or is operating under a water shortage emergency as defined in Water Code Section 350, or does not have sufficient water treatment or distribution capacity to serve the needs of the proposed development, as demonstrated by a written engineering analysis and report.

- The District is subject to a compliance order issued by the State Department of Drinking Water that prohibits new water connections.
- The developer has failed to agree to reasonable terms and conditions relating to the provision of service generally applicable to development projects seeking service from District, including, but not limited to, the requirements of local, state, or federal laws and regulations or payment of a fee or charge imposed pursuant to Government Code Section 66013.

The California Department of Housing and Community Development provided Shasta County (County) with the *Regional Housing Need Determination and Plan for the Fifth Housing Element Update* that contained the final determination of Regional Housing Need Allocation (RHNA) and a Regional Housing Need Plan (RHNP) for the County. The RHNA utilized the American Community Survey data since only partial demographic data was available from the 2010 Census and the California Department of Finance (DOF). The DOF determined the County’s regional housing need to be a minimum of 2,200 units for the 5.5-year projection period from January 1, 2014 through June 30, 2019.

The RHNP distributed the 2,200 units by percentage to three cities (Anderson, Redding, Shasta Lake) and unincorporated areas of the County. The majority of the District service area lies within the unincorporated areas of the County. The percentage the RHNP distributed to the unincorporated areas was 34 percent (755 units) of the 2,200 units. Following the procedure in the RHNP, the share for the District water service area was calculated based on the County and District projected populations through the planning period. Table 17 projects water demands associated with new lower income water users through year 2035. It should be noted that the low income demand projections presented in Table 17 are included in the total water use projections provided in Table 9 through Table 13, and Table 16. As the District continues to gather data on the single-family and multi-family connections, the projected low income water demands can be separated into those customer categories.

<b>Table 17 Low Income Projected Water Demands (Guidebook Table 8) 2010 Urban Water Management Plan Bella Vista Water District</b>					
<b>Low Income Water Demands</b>	<b>Water Use (AFY)</b>				
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
Residential	282	262	272	282	292
<b>Total, AFY</b>	<b>282</b>	<b>262</b>	<b>272</b>	<b>282</b>	<b>292</b>
<b>Notes:</b> “Guidebook Table X” refers to a specific table in the “Guidebook to Assist Urban Water Suppliers to Prepare of 2010 Urban Water Management Plan” by DWR. AFY = Acre-Feet per Year					

### 3.3 WATER DEMAND PROJECTIONS

Since the District purchases water from the USBR, the USBR is considered a wholesale supplier by DWR. Table 18 includes demand projections provided to the USBR.

<b>Table 18 Retail Agency Demand Projections Provided to Wholesale Suppliers (Guidebook Table 12) 2010 Urban Water Management Plan Bella Vista Water District</b>							
<b>Wholesaler</b>	<b>Contracted Volume<sup>(1)</sup> AFY</b>	<b>2010<sup>(2)</sup></b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
U.S. Bureau of Reclamation	24,578	9,731	16,511	15,349	16,052	16,788	17,557
Total	<b>26,114</b>	<b>9,731</b>	<b>16,511</b>	<b>15,349</b>	<b>16,052</b>	<b>16,788</b>	<b>17,557</b>
<p>Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.            AFY = Acre-Feet per Year            (1) Contract 24,578 AF.            (2) In 2010, the District diverted 9,731 AF of its USBR Water Contract.            (3) Demand projections include conservation based on the District's per capita water use targets for 2015 and 2020 and additional water uses and losses.</p>							

### 3.4 WATER USE REDUCTION PLAN

The District determined its 10-year baseline water use and urban water use targets in accordance with the methods described in the DWR 2010 UWMP Guidebook. After doing so, it is evident that the District did meet the interim target for 2015 (752 gpcd) in 2010 (509 gpcd). However, the allocation for agricultural use was reduced significantly in 2009 and 2010, which significantly affects the gpcd calculation. In 2008, the District met the 2015 target with a use of 702 gpcd.

If the District can maintain and improve water consumption rates, it is anticipated to meet 2020 conservation goals. However, if consumption rates begin to rise, the District must implement additional conservation measures to meet its 2020 goals. In all of its conservation programs, the District will avoid placing a disproportionate burden on any customer sector to reach its 2020 water use target.

In an effort to conserve water and meet water use targets the District has revised the Water Shortage Contingency Plan Stage 1 water conservation measures to apply to normal water supply conditions (refer to Section 5.3). This means that the additional measures will be followed by the District's customers at all times to aid in water conservation.

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**SYSTEM SUPPLIES**

This section describes the sources of water available to the Bella Vista Water District (District).

**4.1 WATER SOURCES**

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) include a description of the agency's existing and future water supply sources for the next 20 years. The description of water supplies must include detailed information on the groundwater basin such as water rights, determination if the basin is in overdraft, adjudication decree, and other information from the groundwater management plan; see excerpt below.

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a) [to 20 years or as far as data is available]. If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:*

*10631 (b) (1) A copy of any groundwater management plan adopted by the urban water supplier...*

*10631 (b) (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or board has adjudicated the rights to pump groundwater...For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted...*

*10631 (b) (3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic records.*

*10631 (b) (4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonable available, including, but not limited to, historic use records.*

The District's water supply is a combination of a long-term renewable Water Service Contract with the United States Bureau of Reclamation (USBR), groundwater, and a long-term transfer agreement with the Anderson-Cottonwood Irrigation District (ACID). Contracts for these supplies are included in Appendix E. The District has interties with several local agencies in which emergency transfers of water can be made.

Table 19 summarizes the annual entitlement under each contract/agreement. Each contract/agreement is detailed separately below. The interties are not included in the table since they are intended for emergency use.

<b>Table 19 Water Supply Contracts and Agreements 2010 Urban Water Management Plan Bella Vista Water District</b>			
<b>Water Supplier</b>	<b>AFY</b>	<b>Source</b>	<b>Availability Period(s)</b>
US Bureau of Reclamation (USBR)	24,578	USBR CVP	The contract water-year is for the period of March 1 through February 28
Anderson-Cottonwood Irrigation District (ACID)	1,536	USBR CVP Transfer	April 1 through October 31 each year
<b>Notes:</b> AFY = Acre-Feet per Year; CVP = Central Valley Project (1) In 2010, the District treated 11,327 AF of CVP water through the WTP.			

#### **4.1.1 United States Bureau of Reclamation Contract**

The District entered into a long-term renewal contract with the USBR (Contract No. 14-06-200-851A-LTR1) that authorizes the District to divert from the Sacramento River a specified quantity of the water supply created by the Central Valley Project (CVP). The original contract was signed in 1964 and interim contract renewals were continued uninterrupted until a long-term contract was executed in February 2005, that allows the District to divert up to 24,578 acre-feet per year (AFY) of CVP water for agricultural (Irrigation) and municipal and industrial (M&I) purposes, subject to shortages pursuant to USBR's M&I Shortage Policy. The contract is effective from March 1, 2005 to February 28, 2030. The contract includes a permanent assignment of 578 acre-feet (AF) of CVP water from Shasta County Water Agency (identified as contract 14-06-200-3367Y).

Provisions in the contract allow for the renewal of the contract for successive periods and to increase or decrease the quantity of water available to the District. The District is required under the contract to prepare and implement a water conservation program for all water diverted from USBR sources. The water conservation plan must be submitted to USBR for approval every five years. The District submits a Federal Water Management Plan (FWMP) to the USBR for review and approval to satisfy this requirement.

The contract states that USBR will use all reasonable means to guard against shortages in the quantity of water available to the District. However, the contract also states that no liability shall accrue against the United States if shortages occur due to drought or other causes, which are beyond the control of the United States. During drought conditions, CVP diversions can be cut back significantly, as was the case in 1992 when M&I allocations

were reduced to 50 percent of historical use in the region and in 2015 when they were reduced to 25 percent CVP-wide.

The percent reduction is applied to the historical average of the District's actual M&I water usage over the prior three unconstrained water years. Agricultural use can be reduced by as much as 100 percent in shortage years (refer to Section 3.2.4).

#### **4.1.2 Anderson-Cottonwood Irrigation District Transfer Agreement**

The District has a long-term transfer agreement with the ACID for 1,536 AFY of CVP water, subject to shortage curtailment. The agreement is effective from November 24, 2008 to February 28, 2045. ACID sells and transfers the water under its USBR Sacramento River Settlement Contract (14-06-2000-3346A-R-1) for diversion of CVP water from the Sacramento River. This transfer is available to the District between April 1 and October 31. Shortage provisions for this Settlement Contract state: "In a Critical Year, the Contractor's Base Supply and Project Water agreed to be diverted during the period April through October of the Year in which the principal portion of the Critical Year occurs and, each monthly quantity of said period shall be reduced by 25 percent.

#### **4.1.3 Shasta County Water Agency Assignment**

As mentioned previously, the Shasta County Water Agency (SCWA) permanently assigned 578 AF of CVP water (identified as contract 14-06-200-3367Y) to the District's USBR contract.

#### **4.1.4 McConnell Foundation Purchase Agreements**

The District has not purchased water from the McConnell Foundation since 2009. The McConnell Foundation has a USBR contract to receive 5,100 AF of CVP water each year, without any shortage provision curtailment. The District could request to purchase water from the McConnell Foundation in the future if needed to supplement its supply. However, the District does not presently plan to purchase water from the McConnell Foundation in non-shortage years.

#### **4.1.5 Colusa Transfer Agreement**

For several years, the District has requested, and the USBR has denied, the carryover or "rescheduling" of conserved CVP project supply from one year to the next despite a specific contract provision that allows for rescheduling subject to USBR's approval. Absent a rescheduling option, in 2013 the District had temporarily surplus CVP supply that would be otherwise unutilized and forfeited at the end of the water year (February 28, 2014). To ensure the water was beneficially utilized and to assist another CVP water agency with a supply shortage, the District entered into temporary (1 year) water transfer agreements with both the Colusa County and Glide Water Districts.

#### **4.1.6 Emergency Use Interties**

The District has interties with the City of Redding, the City of Shasta Lake, Palo Cedro, and Mountain Gate Community Services District (CSD). These interties are restricted contractually for emergency use and physically by pressure and flow rate. All the interties require manual activation, can operate in either direction, and can sustain pressure and flow when needed. Pumping is also required for the City of Shasta Lake and Mountain Gate CSD interties. One of the District's incoming interties with the City of Redding (Quail Ridge Pump Station) will open automatically if the water pressure on the District side drops below a set value.

#### **4.1.7 Wholesale Supplies**

The USBR is considered a wholesale supplier by the Department of Water Resources (DWR). Refer to Table 18 for the demand projections provided to USBR.

#### **4.1.8 Water Supply Summary**

Table 20 summarizes the current and projected water supply sources for the District through 2035. USBR amounts are based on projected use and do not represent the entire supply that may be available that year.

#### **4.1.9 Water Treatment Plant Filter Backwash Water Recycling**

The District captures and recycles process water (i.e., filter backwash effluent and rinse-to-waste) produced at the Water Treatment Plant (WTP). The District completed the construction of a backwash water pump station in 2011. Since that time the District no longer releases water from its filter backwash settling ponds into Dry Gulch, Churn Creek and ultimately into the Sacramento River. Currently, the backwash recycling pumps return the supernatant from the settling ponds to the headworks of the plant, where it is combined with influent raw water.

This water recycling at the WTP reduces the amount of water that the District diverts from the Sacramento River or pumps from groundwater wells and provides a reliable source of much needed water during shortages. Between 2011 and 2013, the WTP recycled an average of 3.6 percent per year of what was pumped from the Sacramento River. In 2014, the WTP recycled 5.0 percent of what was pumped from the Sacramento River.

The amount of filter backwash water recycled is not included in the water supply summary, as it offsets diversion and pumping and is not considered a recycled water supply.

<b>Table 20 Water Supplies in Normal Years - Current and Projected (Guidebook Table 16) 2010 Urban Water Management Plan Bella Vista Water District</b>						
<b>Water Supply Sources</b>	<b>Projected Supply (AFY)</b>					
	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
US Bureau of Reclamation (USBR) <sup>(1)</sup>	9,731	16,511	15,349	16,052	16,788	17,557
Supplier-Produced Groundwater <sup>(2)</sup>	78	Varies	Varies	Varies	Varies	Varies
Supplier-Produced Surface Water	0	0	0	0	0	0
<b>Transfers In</b>						
Anderson-Cottonwood Irrigation District (ACID) <sup>(3)</sup>	1,536	1,152	1,536	1,536	1,536	1,536
Exchanges In	0	0	0	0	0	0
Recycled Water	0	0	0	0	0	0
Desalinated Water	0	0	0	0	0	0
Other	0	0	0	0	0	0
<b>Total</b>	<b>11,345</b>	<b>17,663</b>	<b>16,885</b>	<b>17,588</b>	<b>18,324</b>	<b>19,093</b>
<p><b>Notes:</b> "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.  AFY = Acre-Feet per Year  (1) Contract 24,578 AF.  (2) The groundwater supply fluctuates between years due to variable operation (Section 4.2).  (3) Transfer agreement 1,536 AF. Actual 2015 transfer shown.</p>						

## 4.2 GROUNDWATER

The District is located in the northern area of the Redding Area Groundwater Basin, Enterprise Sub-basin (Groundwater Basin Number 5-6.04) and Millville Sub-basin (Groundwater Basin Number 5-6.05), which contains the main water-bearing geologic units in the northern Sacramento Valley.

The District joined the SCWA, City of Redding, City of Shasta Lake, and several other local agencies as a member of the Redding Area Water Council (RAWC). The RAWC is a consortium of public agencies. RAWC was formed in 1993 as a forum to address the severe local impacts to water supplies during the 1986 to 1992 drought. The RAWC prepared the Coordinated AB 3030 Groundwater Management Plan (GMP) for the Redding Area Groundwater Basin in 1998 and updated it in 2007 (Appendix F). The DWR does not identify the Redding Area Groundwater Basin as being over drafted nor expected to become over drafted. The purposes of the GMP are to avoid or minimize conditions that

adversely affect groundwater availability and quality in the Plan area and to develop a management program that addresses data collection and protects and enables reasonable use of the groundwater resources of the Redding Area Groundwater Basin.

Table 21 contains descriptions of the groundwater basin that underlie the service area. The District extracts groundwater from the Enterprise Sub-basin of the Redding Area Groundwater Basin. Appendix G contains Bulletin 118 for the Enterprise Sub-basin and the Millville Sub-basin. Based on the current sub-basin boundaries, all of the District wells are within the Enterprise Sub-basin. If the District constructs new wells in the Millville Sub-basin further information on that sub-basin will be included in future UWMPs.

<b>Table 21 Groundwater Basins 2010 Urban Water Management Plan Bella Vista Water District</b>			
<b>Basin name(s)</b>	<b>Size (square miles)</b>	<b>Usable Capacity (AF)</b>	<b>Safe Yield (AFY)</b>
Redding Area Groundwater Basin	510	5.5 million	Unknown (1)
Enterprise Sub-basin	95	Unknown	332 (2)
Millville Sub-basin <sup>(3)</sup>	106	Unknown	Unknown
<p><b>Notes:</b> Source: Shasta County Water Agency; Redding Groundwater Basin Management Plan EIR (2007) and the Bella Vista Water District 2012 Federal Water Management Plan. AFY = Acre-Feet per Year</p> <p>(1) No safe yield has been established for the Redding Area Groundwater Basin, but groundwater modeling as part of the Coordinated AB 3030 Groundwater Management Plan indicates that the Redding Area Groundwater Basin is resilient to severe drought conditions and is able to recover with one year of normal rainfall. (Source: Shasta County Water Agency)</p> <p>(2) Represents the 2008-2012 annual average groundwater production by Bella Vista Water District, which had no detriment to other basin users.</p> <p>(3) The District does not currently extract groundwater from this sub-basin.</p>			

The Enterprise Sub-basin comprises the portion of the Redding Area Groundwater Basin bounded on the west and southwest by the Sacramento River, on the north by the Klamath Mountains, and on the east by Little Cow Creek and Cow Creek. Annual precipitation within the basin ranges from 29 to 41 inches, increasing to the north. Recharge to the principal aquifer formation is mostly by infiltration of stream flows. Infiltration of applied water and stream flows, and direct infiltration of precipitation are the main sources of recharge in the sub-basin (Bulletin 118).

#### **4.2.1 Groundwater Levels**

Groundwater levels fluctuate seasonally approximately 5 to 10 feet and, for the semi-confined wells, between 10 to 15 feet for normal and dry years (Bulletin 118). Measurements of groundwater have shown levels start dropping in early spring and continue to decline through the summer until early September. Maximum levels are usually reached by February (GMP). Overall, there does not appear to be any increasing or

decreasing trends in groundwater levels and over the long-term levels have remained steady. There are seasonal fluctuations, as mentioned above, and there are some fluctuations caused by climatic patterns, but overall levels have not changed significantly over the period of record (GMP).

#### 4.2.2 Groundwater Quality

The predominant water quality mineral classification in the Enterprise Sub-basin is magnesium-sodium bicarbonate. Sodium bicarbonate and sodium chloride type waters are also found. Locally high concentrations of iron and manganese occur in the sub-basin (Bulletin 118). The groundwater extracted by the District is treated for iron and manganese prior to distribution.

#### 4.2.3 Groundwater Pumped

The District currently has five groundwater wells located along the southerly boundary of the District (refer to Figure 2). The District's groundwater production is metered at each of its wells. Table 22 presents the volume of water pumped each year between 2006 and 2010 from the District's five wells.

<b>Table 22 Groundwater – Volume Pumped (Guidebook Table 18) 2010 Urban Water Management Plan Bella Vista Water District</b>						
<b>Basin name(s)</b>	<b>Metered or Unmetered<sup>(1)</sup></b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Enterprise Sub-basin of the Redding Area Groundwater Basin	Metered	1,294	177	523	932	78
Total groundwater pumped (AFY)		1,294	177	523	932	78
Groundwater as a percent of total water supply		8%	1%	3%	8%	1%
<p><b>Notes:</b> "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR. AFY = Acre-Feet per Year (1) Annual volume represents the sum of five metered wells.</p>						

The wide variation in quantity pumped is due to variable operation. Operation of these wells has been limited to drought periods, periods when surface source water (CVP water) turbidity exceeds economically feasible treatment parameters, periods when either the Wintu Pump Station or the District's Water Treatment Plant have been down for maintenance and/or construction, and during peak demands in the summer when the District has difficulties maintaining water levels in the four million gallon (MG) Tank.

The five groundwater wells in service can produce 2,400 to 2,800 acre feet (AF) of water annually combined. The combined maximum capacity of the wells is approximately 3,500 gallons per minute (gpm), or about 5 million gallons per day (mgd). However, the wells can only be utilized about 50 to 75 percent of the time due to operational constraints. The wells also act as a backup water supply when the Wintu Pump Station is not operating. Pumping

and treating the well water is 1.5 to 2 times more expensive than CVP water. The District controls monthly operation and maintenance cost by utilizing the wells on an as-needed basis, typically during the winter when river turbidity is high and District-wide water demand drops to approximately 3 to 4 mgd. The full capacity of all the wells is greater than what is used during the non-irrigation season. Assuming a 50 percent utilization, their annual capacity is approximately 2,800 AF. However, due to the variable operation of the wells the volume projected to be pumped cannot be estimated (Table 23).

<b>Table 23 Groundwater – Volume Projected to be Pumped (Guidebook Table 19) 2010 Urban Water Management Plan Bella Vista Water District</b>					
<b>Basin name(s)</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
Redding Area Groundwater Basin Enterprise Sub-basin	Varies	Varies	Varies	Varies	Varies
Total groundwater pumped (AFY)	Varies	Varies	Varies	Varies	Varies
Groundwater as a percent of total water supply	Varies	Varies	Varies	Varies	Varies
<b>Notes:</b> "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR. AFY = Acre-Feet per Year (1) The groundwater supply fluctuates between years due to variable operation.					

In 1990, Lawrence and Associates prepared a report entitled *Feasibility Study for the Expansion of Groundwater Supplies for the Bella Vista Water District*. The development of groundwater supplies of up to 12.2 mgd was determined to be feasible. The District's 2005 Master Plan recommended the drilling of one additional well within the 10-year planning horizon of the Master Plan and additional wells beyond the 10-year planning horizon. The Master Plan is due to be updated within the next two years and the drilling of additional wells will be evaluated as part of the Master Plan update.

### 4.3 CONJUNCTIVE USE

Conjunctive use of groundwater and surface water is vital to optimize the water demand/supply balance within the District during dry years as discussed in Section 4.2.3. Other forms of conjunctive use, such as storing surface water in a groundwater basin during wet years is not currently performed by the District.

Beginning in March 2015, the District began a pilot study for aquifer storage and recovery (ASR). ASR can provide the opportunity for temporary storage of surface water supplies underground. Depending on the results of the pilot study an ASR program may be developed to utilize existing and potentially new groundwater injection/extraction wells. It is anticipated that data for extraction and percent recovery will be gathered and analyzed in 2015.

## 4.4 TRANSFER OPPORTUNITIES

The UWMPA requires the UWMP to address the opportunities for development of short- or long-term transfer or exchange opportunities; see excerpt below.

*10631 (d. Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.*

Water transfers can be an effective incentive for improved water management, as well as a way to promote water conservation, particularly in shortage years. The USBR - Mid-Pacific Region facilitates transfers of both CVP and non-CVP water. The transfer of CVP-water may occur as long as it is consistent with the transfer provisions set forth in §3405(a) of the Central Valley Project Improvement Act (CVPIA) (Title 34 of Public Law 102-575), and the transfer of non-CVP water is consistent with California State Law. The CVPIA authorizes all individuals or districts who receive CVP water under water service or repayment contracts, water rights settlement contracts, or exchange contracts to transfer, subject to certain terms and conditions, all or a portion of the water subject to such contract to any other California water users or water agency, State or Federal agency, Indian Tribe, or private non-profit organization for project purposes or any purpose recognized as beneficial under applicable State law. Non-CVP water transfers requiring the use of Federal facilities for conveyance and/or storage are supported through annual Warren Act contracts.

Water transfers are an important water management tool the District has utilized to augment supply to partially offset the impacts of reduced CVP allocations as a result of drought and regulatory requirements that have reduced the yield from the CVP. The District has been a party to both short- and long-term water transfers as a transferee, receiving transferred water in shortage years and occasionally as a transferor in years when the District is unable to carryover or otherwise temporarily store any remaining CVP supply.

The District does not currently have any new transfer opportunities identified; therefore, the UWMP Guidebook Transfer and Exchange Opportunities table is not included in this UWMP.

## 4.5 DESALINATED WATER OPPORTUNITIES

The UWMPA requires that the UWMP address the opportunities for development of desalinated water, including ocean water, brackish water, and groundwater; see excerpt below.

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631 (i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long term supply.*

At the present time, the District does not foresee any opportunities for the use of desalinated water, including ocean water, brackish ocean water, and brackish groundwater, as a long-term supply. Brackish water (in the “Chico Formation” underlies portions of the District including below portions of the Redding Area Groundwater Basin. However, since previous studies have indicated that suitable groundwater supplies exist within portions of the District’s service area, the development of brackish groundwater supplies is not anticipated in the next 25 years.

## **4.6 RECYCLED WATER OPPORTUNITIES**

The UWMPA requires that the UWMP address the opportunities for development of recycled water, including the description of existing recycled water applications, quantities of wastewater currently being treated to recycled water standards, limitations on the use of available recycled water, an estimate of projected recycled water use, the feasibility of said projected uses, and practices to encourage the use of recycled water; see excerpt below.

*10633. Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier’s service area.*

Recycled water opportunities are very limited within the District. The only municipal wastewater treatment plant (WWTP) in proximity to the District is the City of Shasta Lake’s WWTP. The District has cooperated with the City of Shasta Lake in exploring the potential and feasibility of conveyance of treated wastewater to landscape irrigation customers within the District. However, absent significant grant funding for the construction of the necessary transmission and distribution system, the project was determined not economically feasible.

The District does not currently have any recycled water opportunities identified for the future, therefore the UWMP Guidebook Recycled Water tables are not included in this UWMP. If recycled water opportunities occur in the future, the District would develop methods to encourage recycled water use.

### **4.6.1 Wastewater Collection, Treatment Systems, and Disposal**

The domestic wastewater generated within the District is treated primarily with septic systems with a portion going to the City of Redding WWTP. The UWMP Guidebook Wastewater Tables are not included in this UWMP since the District does not operate or own a WWTP. Table 24 summarizes the collection and treatment systems servicing the District.

<b>Table 24 Wastewater Collection/Treatment Systems Servicing the District 2010 Urban Water Management Plan Bella Vista Water District</b>				
<b>Wastewater Agency/ Treatment Plant Name</b>	<b>Treatment Level</b>	<b>Volume, AF</b>	<b>Method of Disposal</b>	<b>Notes</b>
City of Redding Stillwater WWTP	Tertiary	4,508	Sacramento River (4,083 AF) Irrigation (19 AF)	1,2,3
Shasta County Public Works CSA #8	Secondary	101	Land Application	4
Private Septic Systems	Primary	Unknown	Private property leach fields	
<p><b>Notes:</b> AF = Acre-feet; CSA = Community Services Area</p> <p>(1) Source: City of Redding 2010 Urban Water Management Plan.</p> <p>(2) WWTP is operated by the City of Redding. It is not owned or operated by the District.</p> <p>(3) Total 2010 Stillwater WWTP effluent. Includes services area both within and outside of the District service area.</p> <p>(4) Source: Shasta County Public Works Staff.</p>				

## 4.7 FUTURE WATER PROJECTS

The UWMPA requires that suppliers describe water supply projects and programs that may be undertaken to meet the projected water demands, see excerpt below.

*10631 (h). (Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.*

The District anticipates that it will need to drill additional wells in the future in order to provide increased water supplies for the District during both short-term and long-term periods of water shortage. The drilling of an additional five groundwater wells were anticipated in the District's recent Master Plan.

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## WATER SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING

This chapter describes the reliability of the Bella Vista Water District's (District) water supplies, including a discussion of the District's water shortage contingency plan, as well as potential supply disruptions associated with water quality issues and drought.

### 5.1 WATER SUPPLY RELIABILITY

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) address the reliability of the agency's water supplies. This includes supplies that are vulnerable to seasonal or climatic variations. In addition, an analysis must be included to address supply availability in a single-dry year and in multiple-dry years; see excerpt below.

*10631 (f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions."*

*10631 (c) (2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.*

There are two aspects of supply reliability that can be considered. The first relates to immediate service needs and is primarily a function of the availability and adequacy of the supply facilities. The second aspect is climate-related, and involves the availability of water during mild or severe drought periods. This section examines the reliability of the water supply available to the District, under both normal and dry conditions.

The District depends on its long-term contract to purchase water from the United States Bureau of Reclamation (USBR) and their groundwater wells. The USBR contract to take water from the Sacramento River is the District's main source of water. During low rainfall years, the District's allocation can be reduced significantly depending upon the USBR water supply projections. To secure a more reliable water supply for existing development and to guard against potential multi-year shortages, the District entered into a long-term transfer agreement with the Anderson-Cottonwood Irrigation District (ACID).

The need for the transfer arises from shortages caused by a relatively inelastic demand and potential future reduced CVP allocations due to natural changes in hydrology and regulatory induced shortages. The transfer is part of an ongoing effort to optimize the use of water within the Redding area. The District also has interties with the City of Redding, the City of Shasta Lake, Palo Cedro (CSA 8), and Mountain Gate Community Services District (CSD) in case of short-term emergencies.

Table 25 contains a summary of factors affecting water supply reliability that may pose an opportunity for inconsistency in supply. Environmental factors represent supply restrictions that may be imposed due to downstream water temperature, quality, and quantity objectives. Climatic factors represent potential restrictions due to drought conditions.

<b>Table 25 Factors Resulting in Inconsistency of Supply (Guidebook Table 29) 2010 Urban Water Management Plan Bella Vista Water District</b>							
<b>Water Supply Sources<sup>(1)</sup></b>	<b>Specific Source Name</b>	<b>Limitation Quantification</b>	<b>Legal</b>	<b>Environmental</b>	<b>Water Quality</b>	<b>Climatic</b>	<b>Additional Information</b>
USBR Water Service Contract	CVP	Note 2,3	X	X	X	X	
Anderson-Cottonwood Irrigation District Sacramento River Settlement Contract	CVP	Note 2,3	X	X	X	X	
Redding Area Groundwater Basin Enterprise Sub-basin		Note 3		X	X		
<p><b>Notes:</b> "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.</p> <p>(1) From Guidebook Table 16 (Table 20 in this report).</p> <p>(2) Quantity dependent on USBR allocations.</p> <p>(3) Water quality factors include potential contaminants due to activities occurring near the source/watershed.</p>							

The District, as a water provider that is predominantly reliant upon the Central Valley Project (CVP), is subject to significant water supply uncertainty and shortages due to dry hydrologic conditions, compounded by operational and regulatory constraints both directly and indirectly related to the Endangered Species Act. Much of the previously available yield from the CVP is no longer available to Water Service Contractors as a result of regulatory actions and court rulings that mandate reoperation and water releases for environmental purposes. This reallocation of water supply over the last couple of decades with no added storage to offset these impacts means the District is likely to experience shortages more frequently and more severely in the future (2012 Federal Water Management Plan). The water supply reliability goal of the District is to meet 100 percent of demand in normal years.

## **5.2 WATER QUALITY**

The UWMPA requires that the UWMP include a discussion of water quality impacts on the reliability of an agency's water supplies; see excerpt below.

*10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631 and the manner in which water quality affects management strategies and supply reliability.*

The District's water sources include surface water from the Sacramento River and groundwater from the Redding Area Groundwater Basin. The water quality of both sources are vulnerable to activities occurring near the source and in the watershed.

The river is most vulnerable to the following activities associated with contaminants detected in the water supply: metal plating/finishing/fabricating, wood/pulp/paper processing and mills, and drinking water plants. The river is also considered most vulnerable to the following activities not associated with any detected contaminants: concentrated aquatic animal production facilities, historic waste dumps/landfills, landfills/dumps, historic mining operations, and wastewater treatment plants and disposal facilities above Shasta Dam (FWMP, 2012).

The District's well sources are considered most vulnerable to the following activities not associated with any detected contaminants: lumber processing and manufacturing, septic systems, sewer collection systems, historic waste dumps/landfills, automobile-gas stations, and utility stations-maintenance areas (FWMP, 2012).

Water quality does not have a significant effect on water management strategies or reliability due to the good quality of the surface water and groundwater supplies. Due to the nature of the potential water quality impacts described above, no future unaddressed impacts have been identified and the potential quantitative impacts cannot be established. Therefore, the UWMP Guidebook: Water Quality Supply Impacts Table has not been included in this UWMP. The District's drinking water meets all applicable water quality regulations (See Appendix H for a copy of the District's 2013 Water Quality Report).

### **5.3 WATER SHORTAGE CONTINGENCY PLANNING**

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses specified issues; see excerpt below.

*10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*

*10632 (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.*

The UWMPA requires that the District develop stages of action to be undertaken during a catastrophic interruption of water supply or the District's water treatment facilities that could include flooding, major fire emergencies, regional power outage, earthquake, water contamination, and acts of sabotage. In response to these possibilities, the District has

developed an Emergency Response Plan, which includes appropriate personnel listings, resource inventories, locations for emergency operations centers, response procedures, and the steps necessary to resume normal operations. The plan contains a section on the water system including alternative water sources communication procedures, these procedures are consistent with guidelines prepared by the California State Office of Emergency Services.

In 1992, the District developed and adopted a four stage “Drought Contingency Plan” that applied to all customers (April 1992). A copy of the 1992 Water Shortage Contingency Plan is included in Appendix I.

In 2009, which was considered a critically dry year by the USBR, the District adopted four resolutions concerning water shortages (Appendix J). Resolution 09-01 declared a water shortage emergency and enacted Stage 4 of the water shortage contingency plan. Resolution 09-02 adopted a supplemental water program for agricultural and aquaculture customers due to a significant reduction in CVP water available for those purposes. Resolution 09-03 enacted water shortage emergency measures and included restrictions, surcharges and prohibitions above that included in Resolution 09-01. Resolution 09-06 superseded 09-01 and 09-03 and included revised restrictions, surcharges, and prohibitions.

In 2014, a critically dry year, the District issued resolutions 14-03, 14-04 and 14-05 (Appendix K). Resolution 14-03 declared a water shortage emergency and enacted shortage measures. Resolution 14-04 enacted revised shortage measures. Resolution 14-05 superseded 14-03 and 14-04 and included revised restrictions, prohibitions, and an excessive use penalty.

In 2015, the District adopted an updated Municipal and Industrial (M&I) Water Shortage Contingency Plan (Resolution 15-04). A water supply allotment for each customer class was also adopted in 2015 (Resolution 15-05) to equitably distribute the available water to the customers and to ensure an adequate supply for human consumption, sanitation, and fire protection. The adopted M&I Water Shortage Contingency Plan and water supply allotment resolutions are included in Appendix L.

### **5.3.1 Water Shortage Emergency**

The District’s Policy Manual states that all pertinent provisions of the Water Code of the State of California and other applicable laws of the State shall govern when matters are not specifically set forth or provided in the policy. This allows the Board to declare a water shortage emergency and enact water use restrictions on all District customers pursuant to California Water Code Section 350 et seq.

### **5.3.2 Stages of Action in Response to Water Supply Shortages**

The stages of action described below are from the adopted M&I Water Shortage Contingency Plan (Appendix L). The goal of the Water Shortage Contingency Plan is to

provide a prioritized and orderly staged response depending on shortage severity and to ensure an adequate supply of water to meet the public health and safety needs of the District customers at all times.

To manage a water supply shortfall condition, five demand reduction stages have been defined in the M&I Water Shortage Contingency Plan. The total demand reduction goal for each stage increases from less than 15 percent to 70 percent or more of normal demand from Stage 1 to Stage 5. The stages are summarized in Table 26. The District defines a water supply shortage as the difference between demand and the sum of the reduced CVP allocation and additional secure sources of supply.

<b>Table 26 Water Shortage Contingency – Rationing Stages to Address Water Supply Shortages (Guidebook Table 35) 2010 Urban Water Management Plan Bella Vista Water District</b>		
<b>Stage No.</b>	<b>Water Supply Conditions</b>	<b>% Shortage</b>
1	Normal Water Supply (Water Supplies 85% to 100% of Normal)	Up to 15%
2	Moderate Water Shortage (Water Supplies 70% to 85% of Normal)	15-30%
3	Severe Water Shortage (Water Supplies 50% to 70% of Normal)	30-50%
4	Extreme Water Shortage (Water Supplies 30% to 50% of Normal)	50-70%
5	Critical Water Shortage (Water Supplies less than 30% of Normal)	70% or more
Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Water Suppliers in the Preparation of a 2010 Urban Water Management Plan" by DWR.		

Many of the stage measures are communicated to District customers by way of billing inserts, newspaper advertising, on the District's webpage ([www.bvwd.org](http://www.bvwd.org)), and by verbal communication as District Staff and personnel interact with the consumers.

Appendix M contains a table of customer measures during each water shortage stage. This table will be distributed to customers when a Stage is declared to provide information on the measures required for the current water supply condition. Water uses regulated or prohibited under the Water Shortage Contingency Plan are considered to be nonessential; and continuation of such uses during times of water shortage or other emergency water supply condition are deemed to constitute a waste of water which subjects the offender(s) to surcharges, penalties, and/or fines.

The customer reduction goals by stage, shown in the table in Appendix M, vary by customer type to achieve the overall desired reduction goal for the stage, while acknowledging the constraints various customer classes may have in effecting short-term demand reduction. Alternative allocations may be considered at the time a given stage is

implemented. The District recognizes that reductions for commercial and public institutional customers can have significant economic impacts. Therefore, it is proposed to keep requested landscape irrigation reductions to commercial and public institutional customers lower than for residential, rural, and agricultural customer classes. It was also recognized that multi-family residential water users have primarily indoor water use and cannot reduce their water use as much as single-family residences, which typically use nearly half or more of their annual water use for outdoor purposes.

### **5.3.3 Central Valley Project Water Shortage Policy**

As mentioned previously, the District serves residential, rural, commercial, and institutional customers as well as agricultural customers. The CVP places these uses into two categories; municipal and industrial (M&I) and agricultural. The CVP M&I Water Shortage Policy (working draft October 2010) was developed by the USBR to (1) define water shortage terms and conditions applicable to all CVP M&I contractors, as appropriate; (2) establish CVP water supply levels that would sustain urban areas during droughts, and during severe or continuing droughts would assist the M&I contractors in their efforts to protect public health and safety; and (3) provide information to M&I contractors for development of drought contingency plans. USBR's current M&I Water Shortage Policy provides for a minimum allocation of 75 percent of adjusted historical use until agricultural allocations fall below 25 percent. If agricultural allocations fall below 25 percent, M&I allocations are further reduced; when agricultural allocations are reduced to zero, M&I allocations can be reduced to 50 percent or less including a public health and safety allocation of gallons per day per household. In 2015, the initial allocation was zero percent (0 percent) for agriculture and 25 percent of the historical M&I use over the last three unconstrained years (a reduction of 75 percent).

A M&I water supply shortage is the difference between total municipal and industrial (M&I) demands and the sum of the reduced CVP allocation and additional secure sources of supply for M&I purposes. In a severe water supply shortage (including a "Water Shortage Emergency" declared by the governor of the state of California), the USBR could reduce CVP water deliveries to the District to a public health and safety water supply level, provided CVP water is available. In such an emergency, the District's CVP allocation and groundwater supply will be sufficient to satisfy human consumption, sanitation, and fire protection requirements in accordance with Water Code Section 350 et seq.

### **5.3.4 Demand Reduction Triggering Mechanisms**

A water reduction stage is implemented if a water supply shortfall is forecast for the upcoming year. The estimate of the supply shortfall is only a preliminary projection, even as late in the water year as March. Although the criteria described in the District's water supply contract will be used to determine District's CVP water allocation, these criteria define District's water supply allocation relative to a period of historical use. Historical use is defined by the M&I Water Shortage Policy as the average quantity of CVP M&I water put to beneficial use within the service area during the prior three years of water deliveries,

unconstrained by the availability of CVP water. The M&I Water Shortage Policy also recognizes that certain circumstances may require adjustment of the historical use such as growth, extraordinary water conservation measures, or availability and use of non-CVP water supplies. The level of supply shortfall is expressed as a percent of the normally occurring demand that would need to be reduced to meet the available supplies. Available supplies include CVP, ACID long-term transfer, and groundwater. This percent reduction is matched to the total reduction goal shown in Table 26 to select the appropriate stage. Additional factors to be considered in implementing a water reduction stage include the following:

- Time and circumstances permitting, stages should be stepped through without skipping stages. This avoids drastic and sometimes unnecessary actions that may cause problems for the District including loss of customer confidence, financial shortfall, and difficulties implementing the emergency water reduction program.
- Customer response to the current stage may either require the District to implement the next stage or remain at a current stage. The stages allow the District to note the customer's response to less severe stages before implementing the stricter stages.
- Predictions of demand and supply are not always accurate. To help determine if the water reduction program is achieving expected results, demands should be monitored monthly during Stage 1, weekly during Stages 2 and 3, and daily during Stages 4 and 5.

The estimate of the water supply shortage is rough and a contingency should be made to err on the side of achieving a more than adequate water reduction level. Additions to the actions and methods shown in Appendix M may be adjusted by future resolutions.

### **5.3.5 Mandatory Prohibitions**

Mandatory prohibitions on water wasting include use of potable water for street cleaning, washing paved or hard-surfaced areas, using single pass cooling systems in new connections, and failure to repair a controllable leak of water. Table 27 contains mandatory prohibitions and the water shortage stage when they are enacted.

<b>Table 27 Water Shortage Contingency – Mandatory Prohibitions (Guidebook Table 36) 2010 Urban Water Management Plan Bella Vista Water District</b>	
<b>Prohibitions</b>	<b>Stage</b>
Water shall be used for beneficial uses only; all unnecessary and wasteful uses of water are prohibited (District Policy Manual Section 143)	ALL
Water shall be confined to the customer’s property and shall not be allowed to run-off to adjoining properties or to the roadside ditch or gutter. Care shall be taken not to water past the point of saturation.	ALL
Free-flowing hoses for any use shall be prohibited. Customers shall use automatic shutoff devices on any hose or filling apparatus in use.	ALL
Irrigated landscaped areas shall include efficient irrigation systems (e.g., drip irrigation, timed sprinklers, rain sensors, low-flow spray heads, etc.)	ALL
Faulty sprinklers, breaks, and/or leaks within the customer’s plumbing system shall be repaired within specified working days or less by Stage after the customer is notified or discovers the break	ALL
All pools, spas, and ornamental fountains/ponds shall be equipped with a recirculation pump, and be constructed to be leak-proof	ALL
No connections having single-pass cooling systems or non-recirculating systems	ALL
Swimming pool/spa covers encouraged to prevent evaporative water loss	ALL
Fines for wasteful use of water	ALL
Pool draining and refilling shall be allowed only for health, maintenance, or structural considerations	1,2
Washing of any impermeable surfaces or hardscapes, except where necessary for health, esthetic or sanitary purposes, is prohibited	1,2
Restaurants and bars shall serve water only upon request	2 and above
Reduce indoor and outdoor water use by specified % for each stage	2 and above
Use of landscape irrigation systems for all customers, including parks and school grounds, shall be limited to between one hour before sunset and one hour after sunrise. Sprinkler irrigation systems may be run outside of these hours for testing, but not for more than 5 minutes per cycle and only long enough to verify proper operation and make sprinkler adjustments to reduce evaporation	2 and above
Application of potable water to outdoor landscapes during or within 48 hours after measureable rainfall	2 and above
Construction meters and fire hydrant meters will be monitored for efficient water use.	2 and above
Operators of hotels and motels offer patrons the option of not having their towels and linens washed daily.	3

<b>Table 27 Water Shortage Contingency – Mandatory Prohibitions (Guidebook Table 36) 2010 Urban Water Management Plan Bella Vista Water District</b>	
<b>Prohibitions</b>	<b>Stage</b>
Autos or equipment shall be washed only with buckets or hoses with shutoff nozzles	3
Charges for water use exceeding customer’s water allotment	3 and above
Landscape irrigation limited to the days per week specified by stage. Limitation does not apply to drip, bubbler, or soaker irrigation hardware or emitters, watering by hand-held bucket, or hose equipped with shutoff nozzle	3 & 4
Autos or equipment shall be washed only at commercial establishments that use recycled or reclaimed water	4
Pools, artificial lakes, ponds or stream filled prior to Stage 4 shall not be emptied and refilled	4 & 5
Filling of new pools, artificial lakes, ponds, and streams is prohibited. Water use for ornamental ponds and fountains is prohibited.	4 & 5
Potable water use for ornamental ponds and fountains is prohibited	4 & 5
Washing of any impermeable surfaces or hardscapes, except where necessary for public health or safety, is prohibited	4 & 5
Water from District fire hydrants and blow-offs for construction purposes is prohibited	4 & 5
Flushing of mains, sewer, or fire hydrants is prohibited except for emergencies and essential operations	4 & 5
<u>Notes:</u> “Guidebook Table X” refers to a specific table in the “Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan” by DWR.	

### 5.3.6 Consumption Reduction Methods

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses methods to reduce consumption; see excerpt below.

*10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*

*10632 (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.*

*10632 (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.*

*10632 (f) Penalties or charges for excessive use, where applicable.*

Table 28 contains consumption reduction methods by water shortage stage with projected reduction.

<b>Table 28 Water Shortage Contingency – Consumption Reduction Methods (Guidebook Table 37) 2010 Urban Water Management Plan Bella Vista Water District</b>		
Consumption	Stage	Projected Reduction
Public education	All	Up to 10%
Excess water use penalties and water shortage pricing	3-5	10% to 50% or more
Voluntary rationing	1 & 2	Up to 10%
Mandatory rationing	3-5	10% to 50% or more
<b>Notes:</b> “Guidebook Table X” refers to a specific table in the “Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan” by DWR.		

### 5.3.7 Penalties and Charges

The penalties or charges for excessive use during water shortages are summarized in Table 29.

<b>Table 29 Water Shortage Contingency – Penalties and Charges (Guidebook Table 38) 2010 Urban Water Management Plan Bella Vista Water District</b>	
Penalties or Exceedance Charges	Stage When Penalty Takes Effect
Administrative fine per day or occurrence for uncorrected violations	2
Excess Use Penalty Change Tier 1 greater than 100% of Allotment	3
Excess Use Penalty Change Tier 2 greater than 120% of Allotment	3
<b>Notes:</b> “Guidebook Table X” refers to a specific table in the “Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan” by DWR.	

### 5.3.8 Mechanism for Determining Actual Reductions in Water Use

The UWMPA requires that the UWMP include a means to determine the actual water use reduction in the event of a water shortage; see excerpt below.

*10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*

*10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.*

Demands must be monitored frequently during emergency water shortages to enable the District to effectively manage the balance between supply and demand. In normal water supply (Stage 1) conditions, production and pumping amounts are recorded daily. Totals are reported monthly to the District Engineer. During Stage 2 and 3 water shortage conditions, weekly production and pumping amounts are reported to the District Engineer to compare the weekly data to the targets to verify that the reduction goal is being met. During a Stage 4 or 5 water shortage, a daily production and pumping report will be provided to the District Engineer to verify that the reduction goal is being met.

### 5.3.9 Analysis of Revenue Impacts of Reduced Sales during Shortages

According to the UWMPA, the UWMP is required to include an urban water shortage contingency analysis that addresses the financial impacts from reduced water sales and proposed measures to overcome deficits (e.g., development of a reserve account or special rate adjustments); see excerpt below.

*10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*

*10632 (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.*

*10632 (g) An analysis of the impacts of each of the proposed measures to overcome those revenue and expenditure impacts, such as the development of reserves and rate adjustments.*

The revenue sources available to the District include water sales, system connection fees, interest income, special assessments, reserves, and other non-operating revenues including various grants.

The District currently maintains a specific M&I Rate Stabilization Fund to help mitigate the revenue impacts of a prolonged drought. There may be additional outside funding sources made available to water agencies under a water emergency situation (Stages 3 through 5).

### 5.3.10 Water Shortage Contingency Resolution or Ordinance

The California Water Code requires that the District develop mandatory provisions and a draft water shortage contingency resolution as part of the UWMP to reduce water use, including prohibitions against specific wasteful practices, such as gutter flooding. The District has adopted a Water Shortage Contingency Plan (Appendix L). The District's Board of Directors must be kept well informed of the shortage status to enable them to make timely and appropriate decisions on the following actions:

- Declaration of water shortage emergency
- Adoption of Emergency Water Reduction Plan
- Frequent assessment of water shortage status
- Adoption of resolutions to change stages as necessary
- Coordination with customers on the development and implementation of the plan

## 5.4 DROUGHT PLANNING

This section considers the District's water supply reliability during three water scenarios: average year, single-dry year, and multiple-dry year period. These scenarios are defined as follows:

- **Average year:** a year in the historical sequence that most closely represents median runoff levels and patterns. It is defined as the median runoff over the previous 30 years or more. This median is recalculated every 10 years.
- **Single-dry year:** generally considered to be the lowest annual runoff for a watershed since the water-year beginning in 1903. Suppliers should determine this for each watershed from which they receive supplies.
- **Multiple-dry year period:** generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903.

Historical curtailments in the District's supply have occurred during drought years. The specific years identified for average, single-dry, and multiple-dry water years presented in Table 30 were developed based on historical California Department of Water Resources (DWR) runoff records for the Sacramento Valley.

<b>Table 30 Basis of Water Year Data (Guidebook Table 27) 2010 Urban Water Management Plan Bella Vista Water District</b>	
<b>Water Year Type</b>	<b>Base Year(s)</b>
Average Water Year(1)	2004
Single-Dry Water Year	2014
Multiple-Dry Water Years	2007-2009 (2)
<p><u>Notes:</u> "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Water Suppliers in the Preparation of a 2010 Urban Water Management Plan" by DWR.</p> <p>(1) Historical DWR records for the sequence 1974-2014 were reviewed and coordinated with the available District water supply records.</p> <p>(2) Historical DWR multiple-dry water years were from 1985 to 1992 and 2007 to 2009. The impacts of the multiple-dry years in 2007 to 2009 were not seen in the District's USBR diversions until 2009 to 2011. Therefore, the historical data from 2009 to 2011 was used.</p>	

The area experienced a severe drought from 1985 to 1992 and from 2007 to 2009. The impacts of the multiple-dry years in 2007 to 2009 were not seen in the District's USBR diversions until 2009 to 2011. Therefore, the historical data from 2009 to 2011 was used to represent the impact of multiple-dry water years. Table 31 and Table 32 reflect the 2009 to 2011 multiple-dry year period discussed above. The year 2014 was selected for the single-dry year because the District's USBR contract water supply allocation was reduced by 50 percent.

Table 31 contains the actual USBR Water Contract volume that was available and diverted for each of the water year types, as a percentage of the average water year that occurred in 2004. Table 32 presents the available supply by water source. Groundwater has not been included due to the variable operation of the wells (refer to Section 4.2). The multiple dry year ACID transfer is based on the 2015 25 percent reduction, which represents the current worst-case supply for that transfer agreement.

<b>Table 31 Supply Reliability – Historical Conditions (Guidebook Table 28) 2010 Urban Water Management Plan Bella Vista Water District</b>				
<b>Average Water Year<sup>(1)</sup> AFY</b>	<b>Single-Dry Water Year<sup>(2)</sup> AFY</b>	<b>Multiple-Dry Water Years<sup>(3)</sup> AFY</b>		
		<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
12,665	3,544	6,794	9,731	9,289
<b>Percent of Average Year:</b>	<b>28%</b>	<b>54%</b>	<b>77%</b>	<b>73%</b>
<p>Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Water Suppliers in the Preparation of a 2010 Urban Water Management Plan" by DWR. AFY = Acre-Feet per Year</p> <p>(1) Amount shown for 2004 is the quantity diverted by the District under their USBR contract. (2) Amount shown for 2014 is the quantity diverted by the District under their USBR contract. (3) Amount shown for 2009-2011 is the quantity diverted by the District under their USBR contract.</p>				

<b>Table 32 Supply Reliability – Current Water Sources (Guidebook Table 31) 2010 Urban Water Management Plan Bella Vista Water District</b>				
<b>Water Supply Sources</b>	<b>Average Water Supply Year AFY</b>	<b>Multiple-Dry Water Years</b>		
		<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
USBR – Sacramento River	12,665	6,794	9,731	9,289
Anderson-Cottonwood Irrigation District transfer – Sacramento River	1,536	1,152	1,152	1,152
Redding Area Basin, Enterprise Sub-basin – Groundwater	Varies	Varies	Varies	Varies
<b>Total Water Supply:</b>	<b>14,201</b>	<b>7,946</b>	<b>10,883</b>	<b>10,441</b>
<b>Percent of Average Year:</b>		<b>56%</b>	<b>77%</b>	<b>74%</b>
<p>Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Water Suppliers in the Preparation of a 2010 Urban Water Management Plan" by DWR. AFY = Acre-Feet per Year</p> <p>(1) Average water supply year assumes 2004 USBR allocation and full ACID transfer amount. (2) Multiple dry year USBR quantities based on the percentages determined in Table 31. (3) The groundwater supply fluctuates between years due to variable operation (Section 4.2).</p>				

#### 5.4.1 Minimum Supply Available for the Next Three Years

The California Water Code requires that the District estimate the minimum water supply available at the end of 12, 24, and 36 months, assuming the driest three-year historic supply shortage. The historical multiple-dry year curtailments for 2009 through 2011 are shown in Table 31 and the estimated current supply reliability is shown in Table 32.

In 2014, the District's USBR allocation was reduced significantly. The curtailment is determined by applying a percent reduction to the average District M&I usage from water years 2011 to 2013. Water year is defined as March through February. The District's USBR contract average M&I usage from water years starting in March 2011 through February 2014 was 7,313 acre-feet (AF), leaving the District an allocation of less than 3,700 AF for M&I usage in 2014 (50 percent reduction). The allocation for agricultural use was reduced to zero percent for the 2014 water year. In 2014, the District delivered 5,785 AF of treated water to M&I customers (CVP and groundwater). At this time, a minimum water supply of less than 5,700 AF for M&I usage should be assumed for the next three year water supply shortage.

#### 5.4.2 Supply and Demand for Average Water Year

Assuming the District can meet the water use targets it will not exceed the supplies during an average water year (Table 33). Note that the supply and demand totals include agricultural use.

<b>Table 33 Supply and Demand Comparison- Average Year (Guidebook Table 32) 2010 Urban Water Management Plan Bella Vista Water District</b>					
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
Supply Totals <sup>(1)</sup>	17,663	16,885	17,588	18,324	19,093
Demand Totals <sup>(2)</sup>	16,511	15,349	16,052	16,788	17,557
Difference	1152	1,536	1,536	1,536	1,536
Difference as % of Supply	7%	9%	9%	8%	8%
Difference as % of Demand	7%	10%	10%	9%	9%
<b>Notes:</b> "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR. AFY = Acre-Feet per Year (1) Refer to Table 20 in this report. (2) Demand totals include conservation based on water use targets. Refer to Table 16 in this report.					

#### 5.4.3 Supply and Demand for a Single-Dry Water Year

During a single-dry year, USBR allotments for M&I use can be reduced by 50 percent or more and agricultural allotments can be reduced to zero percent. Table 34 provides an estimate of the projected single-dry year supply and demand totals based on the percentage of average year calculated in Table 31. Demand reductions due to water shortage stage rationing measures and a reduction to zero percent agricultural allocation are not included in the demand estimates shown in Table 34. The agricultural amounts were maintained to show the impact of a single-dry year for the consideration of the supplemental supply program the District offers to agricultural customers. Groundwater would be used during water shortage years to make up a portion of the difference.

<b>Table 34      Supply and Demand Comparison - Single-Dry Year (Guidebook Table 33) 2010 Urban Water Management Plan Bella Vista Water District</b>					
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
Supply Totals <sup>(1)</sup>	4,943	4,725	4,922	5,127	5,343
Demand Totals <sup>(2)</sup>	16,511	15,349	16,052	16,788	17,557
Difference	-11,568	-10,624	-11,130	-11,660	-12,214
Difference as % of Supply	-234%	-225%	-226%	-227%	-229%
Difference as % of Demand	-70%	-69%	-69%	-69%	-70%
<p>Notes: "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.  AFY = Acre-Feet per Year</p> <p>(1) Supply determined using the percentage in Table 31 and the supply in Table 20 of this report.  (2) Demand totals include conservation based on water use targets. Refer to Table 16 in this report.</p>					

#### **5.4.4      Supply and Demand for Multiple-Dry Water Year Periods**

During a multiple-dry year period, USBR allotments for M&I use can be reduced by 50 percent or more and agricultural allotments can be reduced to zero percent. Table 35 provides an estimate of the projected multiple-dry year supply and demand totals based on the percentage of average year calculated in Table 31. Demand reductions due to water shortage stage rationing measures and a reduction to as much as zero percent agricultural allocation are not included in the demand estimates shown in Table 35. The agricultural amounts were maintained to show the impact of a multiple-dry year for the consideration of the supplemental supply program the District offers to agricultural customers. Groundwater would be used during water shortage years to make up a portion of the difference.

<b>Table 35 Supply and Demand Comparison - Multiple-Dry Year (Guidebook Table 34) 2010 Urban Water Management Plan Bella Vista Water District</b>						
		<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
Multiple-Dry Year First Year Supply	Supply Totals	9,475	9,058	9,435	9,830	10,242
	Demand Totals	16,511	15,349	16,052	16,788	17,557
	Difference	-7036	-6,291	-6,617	-6,958	-7,315
	Difference as % of Supply	-74%	-69%	-70%	-71%	-71%
	Difference as % of Demand	-43%	-41%	-41%	-41%	-42%
Multiple-Dry Year Second Year Supply	Supply Totals	13,571	12,973	13,514	14,079	14,670
	Demand Totals	16,511	15,349	16,052	16,788	17,557
	Difference	-2940	-2,375	-2,538	-2,709	-2,887
	Difference as % of Supply	-22%	-18%	-19%	-19%	-20%
	Difference as % of Demand	-18%	-15%	-16%	-16%	-16%
Multiple-Dry Year Third Year Supply	Supply Totals	12,955	12,384	12,900	13,439	14,003
	Demand Totals	16,511	15,349	16,052	16,788	17,557
	Difference	-3556	-2,965	-3,152	-3,348	-3,553
	Difference as % of Supply	-27%	-24%	-24%	-25%	-25%
	Difference as % of Demand	-22%	-19%	-20%	-20%	-20%
<p><b>Notes:</b> "Guidebook Table X" refers to a specific table in the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan" by DWR.  AFY = Acre-Feet per Year</p> <p>(1) Supply determined using the percentage in Table 31 and the supply in Table 20 of this report.  (2) Demand totals include conservation based on water use targets. Refer to Table 16 in this report.</p>						

## DEMAND MANAGEMENT MEASURES

This chapter presents an analysis of the demand management measures (DMMs) contained in the Urban Water Management Planning Act (UWMPA), as well as the Bella Vista Water District (District) existing efforts to further develop their water conservation program; see excerpt below.

*10631 (f)(1) and (2) Describe and provide a schedule of implementation for each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:*

*(A) Water survey programs for single-family residential and multifamily residential customers.; (B) Residential plumbing retrofit.; (C) System water audits, leak detection, and repair.; (D) Metering with commodity rates for all new connections and retrofit of existing connections.; (E) Large landscape conservation programs and incentives.; (F) High-efficiency washing machine rebate programs.; (G) Public information programs.; (H) School education programs.; (I) Conservation programs for commercial, industrial, and institutional accounts.; (J) Wholesale agency programs.; (K) Conservation pricing.; (L) Water conservation coordinator.; (M) Water waste prohibitions.; and (N) Residential ultra-low-flush toilet replacement programs.*

*10631 (f)(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.*

*10631 (f)(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.*

*10631 (g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:*

*(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; and (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.*

### 6.1 INTRODUCTION

The California Urban Water Conservation Council (CUWCC) was created to increase efficient water use statewide. CUWCC's goal is to integrate urban water conservation Best Management Practices (BMPs) into the planning and management of California's water resources. The District reports on BMPs for agricultural and urban contractors in their Federal Water Management Plan (FWMP). This chapter summarizes the District's efforts implementing BMPs and the relationship to UWMPA DMMs.

Table 36 shows the relationship of the CUWCC's BMPs and the UWMPA DMMs.

<b>Table 36 Relationship of UWMPA DMMs and CUWCC BMP's 2010 Urban Water Management Plan Bella Vista Water District</b>	
<b>UWMPA - DMM</b>	<b>CUWCC – Category and BMP</b>
1 Water Survey Programs for Single-Family and Multi-Family Residential Customers	Programmatic: Residential BMP 3.1 Residential Assistance Program BMP 3.2 Landscape Water Survey
2 Residential Plumbing Retrofit	Programmatic: Residential BMP 3.1 Residential Assistance Program
3 System Water Audits, Leak Detection and Repair	Foundational: Utility Operations – Water Loss Control BMP 1.2 Water Loss Control
4 Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	Foundational: Utility Operations – Metering BMP 1.3 Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections
5 Large Landscape Conservation Programs and Incentives	Programmatic: Landscape BMP 5 Landscape
6 High Efficiency - Washing Machine Rebate Program	Programmatic: Residential BMP 3.3 High Efficiency - Washing Machine Financial Incentive Program
7 Public Information Programs	Foundational: Education – Public Information Programs BMP 2.1 Public Information Programs
8 School Education Programs	Foundational: Education – School Education Programs BMP 2.2 School Education Programs
9 Conservation Programs for Commercial, Industrial, and Institutional Accounts	Programmatic: Commercial, Industrial, and Institutional BMP 4 Commercial, Industrial, and Institutional
10 Wholesale Agency Programs	Foundational: Utility Operations – Operations BMP 1.1.3 Wholesale Agency Assistance Programs
11 Conservation Pricing	Foundational: Utility Operations – Pricing BMP 1.4 Retail Conservation Pricing
12 Water Conservation Coordinator	Foundational: Utility Operations – Operations BMP 1.1.1 Conservation Coordinator
13 Water Waste Prohibition	Foundational: Utility Operations – Operations BMP 1.1.2 Water Waste Prevention
14 Residential Ultra-Low Flush Toilet Replacement Program	Programmatic: Residential BMP 3.4 WaterSense Specification (WSS) Toilets

The District is committed to water conservation and has implemented several policies and on-going programs that promote and encourage water conservation.

## 6.2 DMM 1: WATER SURVEY PROGRAMS FOR SINGLE-FAMILY AND MULTI-FAMILY RESIDENTIAL CUSTOMERS

This program consists of offering water audits to single-family (SFR) and multi-family (MFR) residential customers. Audits include reviewing water usage history with the customer, instructing the customer in meter reading, identifying leaks inside and outside the home, and recommending improvements. Residents are generally provided with recommendations for improvements and water conservation literature.

The District performs audits on-demand and has performed them in the past. Literature and retrofit kits are available at District offices. The Automatic Meter Read (AMR) meters installed on just over 50 percent of connections (residential, commercial, institutional, landscape, and agriculture) identify continuous use and flag the account. The District notifies customers of high use, continuous use (indicating a leak or other problem) and out of range use. These events can cause the customer to request an audit. The District's program for implementation of DMM 1 (BMP 3.1 and 3.2) is summarized in Table 37.

<b>Table 37 Summary of District Implementation of DMM 1 2010 Urban Water Management Plan Bella Vista Water District</b>			
<b>DMM1 BMP Category</b>		<b>Available Service to Customer</b>	<b>District Actions</b>
3.1	Residential Assistance Program	AMR (Automatic Meter Read) detects possible leaks by flagging 24-hour meter movement (no stopped meter for two consecutive hours).	When a flag is noticed, District staff checks for leaks at the meter. If none are found the customer is notified of possible leak(s) on their side of the meter.
		Current and historical customer water use information is available to all District customers upon signing into their online account.	Allows customers to review usage and discuss with District and request an audit.
		Customer service representatives are available to answer customer questions and address concerns.	District staff available during normal business hours, Monday through Friday.
3.2	Landscape Water Survey	District will negotiate with two local irrigation contractors—Ewing and Amigo—about offering workshops on efficient landscape irrigation procedures and performing landscape irrigation audits to a few large water users.	Pending negotiations with contractors, implementation will begin in the future.

### **6.3 DMM 2: RESIDENTIAL PLUMBING RETROFIT**

This DMM involves enforcement of plumbing fixture efficiency standards and encourages programs to retrofit existing inefficient fixtures with newer reduced flow fixtures. This retrofit program focuses on plumbing installed prior to 1992, in part due to the passage of the Federal Energy Policy Act of 1992, which restricted all newly manufactured faucets and showerheads to a flow of 2.5 gallons per minutes (Department of Water Resources [DWR], August 1994).

The CUWCC estimates that a low-flow showerhead retrofit will save approximately 2.9 gallons per capita per day (gpcd) on post-1980 homes and 7.2 gpcd on pre-1980 constructed homes. The average savings for a toilet retrofit is 1.3 gpcd on pre-1980 constructed homes. The effectiveness of this DMM is based upon the percentage of customers that install low-flow fixtures.

Full implementation of this DMM is not feasible for the District. The District does offer literature and water conservation kits with retrofit materials at District offices to encourage plumbing retrofits. However, enforcement of this DMM is not feasible for the District since they are not a City or County. The District has to rely on Shasta County (County) or the City of Redding (City) Building Departments and the real estate process to identify these requirements to homeowners.

### **6.4 DMM 3: SYSTEM WATER AUDITS, LEAK DETECTION, AND REPAIR**

This DMM focuses on the water distribution system itself, and includes water audits, leak detection, and repair. The first step in a water audit is relatively straightforward, involving comparison of the amount of water produced with the amount of water delivered to customers. The difference is termed “unaccounted water,” which includes actual losses (leaks) in the distribution system, authorized but unmetered use (e.g., hydrant flushing and firefighting), unauthorized water use, and meter error. The best way to evaluate the effectiveness of this program is to compare water production data at the water treatment plant with water consumption from the District’s customers.

The District offers leak detection kits at the District offices and uses the American Water Works Association (AWWA) water audit and loss control software. The entire District is metered which allows the District to routinely calculate water losses.

The District also has a proactive program for replacement of aged infrastructure and conducts a prompt and efficient repair program. The District will continue to review data and identify leaks for repair, perform reviews of the AWWA audit information to determine if a full-scale system audit is warranted, and perform distribution leak detection when warranted. The District’s program for implementation of DMM 3 (BMP 1.2) is summarized in Table 38.

<b>Table 38 Summary of District Implementation of DMM 3 2010 Urban Water Management Plan Bella Vista Water District</b>	
<b>Program</b>	<b>Description</b>
Proactive replacement of aged portions of distribution system	The USBR-owned distribution system, originally installed in the mid 1960's, is estimated to have a life span of 75-100 years. The District budgets money annually for pipeline replacement as part of its Extraordinary Operations, Maintenance, and Replacement (EOMR) Program. Replacement rate will be approximately 4 percent per year beginning in 2040. The District's 2014-2015 budgets include money for a detailed pipeline replacement/rehabilitation study.
Efficient crew response to reports of system leaks	When a leak is reported or identified, a work order is written and Distribution Department staff are sent out to investigate the leak. The staff promptly responds to all reported leaks, typically within 15 minutes. If the leak is reported outside of normal business hours, there is an on-call person required to respond to the location within 30 minutes. No systematic leak detection program currently exists.
Annual calculation of system-wide water loss using AWWA water budget software.	Percent non-revenue water has been decreasing, down to 7.0% in 2012 from 11.7% in 2008. The District has been actively replacing the older and larger meters in the District, which is likely the major reason for the decrease in non-revenue water. The District has also been replacing water lines that have had a history of failures.
Meter replacement program	Goal is to have all of the meters either replaced or rebuilt on a 20-year cycle. Annual meter replacement rate is 1/15 of total in order to overcome backlog and to reach equilibrium of replacing any given meter every 20 years. Smaller meters are typically replaced, while it can be more economical to rebuild larger meters. The District is also installing more compound meters or mag meters for the larger meters in order to register water usage at lower flow rates during periods of reduced water allocations.

The budget for the DMM 3 program through 2015 is shown below.

- 2012 - \$42,750 and 680 staff hours
- 2013 - \$43,600 and 680 staff hours
- 2014 - \$44,470 and 680 staff hours
- 2015 - \$45,360 and 680 staff hours

## **6.5 DMM 4: METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS**

Assembly Bill No. 514 (AB 514) became law in 2003 and promulgated that all Central Valley Project (CVP) municipal contractors are required to install water meters on all residential and commercial services constructed prior to 1992. This bill was enacted in order to prevent the loss of water supplies by CVP municipal contractors, which fail to comply with federal water metering requirements. AB 514 applies to all municipal water suppliers that receive CVP water.

Installing water meters and billing for actual water use provides a strong incentive for customers to use less water and equalizes service cost for each customer to their actual use (high water users would pay a more equitable share of the system costs). Water metering can reduce exterior landscape water use and can also achieve a modest reduction in interior water use.

All of the District customers are metered and all new connections are required to be metered. Rates include a volumetric component. The rate schedule is updated annually and is easily accessible on the District website. Current and historical water use data is available to customers online when they sign into their account.

The District purchases both Irrigation (agricultural) and Municipal and Industrial (M&I) water from the CVP through their U.S. Bureau of Reclamation (USBR) contract. Both types of water are defined in the contract, and USBR rates for Irrigation water are significantly less than for M&I water. The District charges customers for water using four different customer classes and rate schedules: residential/commercial/public-institutional rate, rural rate, agricultural rate, and aquaculture rate. Each water rate schedule is broken down into two components: a base charge and a volumetric commodity charge. The bi-monthly base charge per service connection does not provide for any water, but only for offsetting the cost of providing water service and maintaining/improving the District facilities. The commodity charge is a unit charge for the amount of water used. Each rate schedule has different commodity charge rate tiers, with increasing unit water costs in the higher tiers.

The residential/commercial/public-institutional rate is used for charging urban water customers. Nearly all customers with properties smaller than two acres are billed using this rate structure. All customers under the residential/ commercial/public-institutional rate pay the same base rate, but the residential/commercial customers have a different tiered volumetric charge than the public-institutional customers.

The rural rate is similar to the residential/commercial/public-institutional rate but is only available to properties at least two acres or larger and with a one-inch or larger meter. The rural rate was originally established for agricultural properties that did not meet the requirements for receiving irrigation water and was set at a level higher than the agricultural

rate but lower than the residential rate. The rural usage rate schedule has a base rate that is the same as the residential/ commercial/public-institutional rate but has wider tiers at the same volumetric rates.

The agricultural rate is used for customers owning properties eligible for USBR irrigation water, that is, land primarily used in the commercial production of agricultural crops or livestock, including incidental domestic use. Customers desiring to fall under the agricultural rate must have: a property with at least two acres of cultivated land under irrigation and dedicated to crop production, a meter at least a one-inch in size, a business plan, crops or livestock sales or documented barter, and improvements to land (including, but not limited to buildings, irrigation systems, corrals, fencing, fruit or nut trees, vines, etc.).

The aquaculture rate schedule has the same base rate as the agricultural rate but has wider tiers at the same volumetric costs. The aquaculture rate is available to customers involved in the production of fish or aquatic plants under controlled conditions, and does not include farm pond environments where fish are present and fee for fishing enterprises. There are less than five customers within the District using this rate.

The budget for the DMM 4 program through 2015 is shown below.

- 2012 - \$140,180 and 9,228 staff hours
- 2013 - \$142,980 and 9,230 staff hours
- 2014 - \$145,840 and 9,230 staff hours
- 2015 - \$148,760 and 9,230 staff hours

## **6.6 DMM 5: LARGE LANDSCAPE CONSERVATION PROGRAMS AND INCENTIVES**

Water demand by large landscape water users can be managed by providing water audits and incentives for water conservation. The first consideration of this measure begins with identifying large irrigators and their water use, followed by development of a program for regular auditing (at least one every five years), with provisions that include water conservation training and information, with financial incentives.

The District received a grant in 2010 that provided smart controllers to schools and the District performed audits of landscape use. The District promotes the County and the City of Redding Water Efficient Landscape requirements to its customers. The District does not develop water use budgets and does not have a regular program for audits. If funding was available the District could conduct a feasibility study to assess the benefits and costs of installing dedicated landscape meters for customers with large landscape areas and develop an implementation program if appropriate. The District's program for implementation of DMM 5 (BMP 5) is summarized in Table 39.

<b>Table 39 Summary of District Implementation of DMM 5 2010 Urban Water Management Plan Bella Vista Water District</b>	
<b>Program</b>	<b>Description</b>
Water-Efficient Landscape Education	Co-sponsor (with City of Redding) of water-efficient landscape classes, hosted by Turtle Bay, a local museum complex.
Commercial/Institutional landscape surveys/audits	Tehama County Resource Conservation District (TCRCD) currently provides free audits to District Agricultural customers. District will negotiate with TCRCD and others regarding offering landscape audits to larger institutional customers for payment.
Shasta College CIMIS Station (Station #224) - District supplied initial materials and data collection instruments and will provide ongoing maintenance to the station.	The new station provides District customers with irrigation-related data and support to help improve irrigation scheduling and water use efficiency.

## **6.7 DMM 6: HIGH-EFFICIENCY WASHING MACHINE REBATE PROGRAMS**

Typically, a high-efficiency washing machine rebate program would offer a \$35 to \$150 rebate to qualifying customers who install high-efficiency washing machines. Pacific Gas and Electric (PG&E) is the energy provider for the area and offers rebates for high-efficiency washing machines. For PG&E customers, the washer rebate is \$50 per installation, up to \$150 per customer, if the high-efficiency washing machine meets PG&E's requirements<sup>2</sup>.

The District's website has a link to the *California's Water Conservation Resource- Save our Water* website that provides water conservation tips, recommends use of front-loading washing machines, and customers can search for rebates. Notifying customers of the rebate in billing inserts may be a method of increasing the number of water efficient washing machines installed and could improve water conservation within the District.

The District is not pursuing this type of program due to staffing and funding constraints and that PG&E has a rebate program for District customers that use their services.

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<sup>2</sup> [waterenergysavings.com](http://waterenergysavings.com)

## 6.8 DMM 7: PUBLIC INFORMATION PROGRAMS

Public information programs for water demand management includes coordination with other agencies and provision of programs promoting water conservation, speakers for the media or community groups, public service announcements, water conservation bill inserts, and water use comparisons on customer's bills. The District has an on-going public information program and posts large signs about conserving water in the service area. In addition to the District's efforts, the USBR performs public outreach on water conservation. The District's program for implementation of DMM 7 (BMP 2.1) is summarized in Table 40.

<b>Table 40 Summary of District Implementation of DMM 7 2010 Urban Water Management Plan Bella Vista Water District</b>	
Program	Description
In 2012 the District newsletter was sent to customers six times per year (bi-monthly) with their bills. Starting in July 2013 newsletter is published strictly online.	Includes seasonal water conservation tips, updates on water allocations, and District news concerning infrastructure improvement projects, board decisions, educational events, and budgetary decisions.
Water Smart Gardening web hosting.	Water Smart Gardening links posted on District's website.
Actively maintain District website: <a href="http://www.bvwd.org">www.bvwd.org</a>	Features daily water saving tip, educational links, District news, policies, and rates.
California Water Series: an annual two-evening speaker series focusing on California water issues.	The events, held in September/October of each year, are co-sponsored by multiple northern California water agencies, including the District. Free to the public, three to four presentations each evening.
Water-conservation exhibit	Co-sponsor (with City of Redding) a water-conservation exhibit at Turtle Bay Museum
Tours of water treatment and pumping facilities to college students and District board members.	Though a Vulnerability Assessment recommended against promoting tours open to the general public, the District gives tours to Shasta College classes and District board members on a regular basis in order to educate and increase awareness among current and future stakeholders and decision-makers in the water industry.
Fix-a-leak classes/seminars—this program was hosted successfully by the City of Redding in 2013, and the District plans to collaborate in order to hold local workshops.	The District and the City of Redding Water Utility plan to hold two free "Fix-a-leak" workshops at Home Depot and Lowe's hardware. The District plans to become an EPA WaterSense partner as a result of investigating the best options for promoting conservation and complying with this BMP.

The District has an ongoing public information program. The budget for the program through 2015 is shown below.

- 2012 - \$1,590 and 166 staff hours
- 2013 - \$1,620 and 170 staff hours
- 2014 - \$1,650 and 170 staff hours
- 2015 - \$1,680 and 170 staff hours

## 6.9 DMM 8: SCHOOL EDUCATION PROGRAMS

Components of this DMM include provision of education materials, instructional assistance, and classroom presentations. The District's program for implementation of DMM 8 (BMP 2.2) is summarized in Table 41.

<b>Table 41 Summary of District Implementation of DMM 8 2010 Urban Water Management Plan Bella Vista Water District</b>	
<b>Program</b>	<b>Description</b>
Lending library available to and promoted among local elementary, middle, and high school teachers.	District plans to purchase grade-level appropriate, standards-correlated educational materials, through organizations such as Project Wet and <a href="http://watereducation.org">watereducation.org</a> , for classroom use. Resources will be promoted through periodic use of an educator email list procured through school administrators.
School assembly presentations to reach a large number of students with water conservation message.	District plans to co-sponsor an educational theater company to visit the Redding area and provide water conservation assemblies to multiple local elementary and/or middle schools
Poster/Photo/Video contest—promotes water conservation messages among elementary, middle and high school students.	District plans to investigate working with local educators to hold a water-conservation themed poster/video/photo contest for area children and youth.

The District has an ongoing school education program. The budget for the program through 2015 is shown below.

- 2012 - \$1,200
- 2013 - \$1,220

- 2014 - \$1,250
- 2015 - \$1,280

Similar to a public information program, a school education program can also be one of the best tools to conserve water. The AWWA and the Water Education Foundation (WEF) provide educational material for youth to explain the water cycle and pollution, and to promote water conservation, including videos, bookmarks, games, and water experiments. The District could improve its school education program by notifying schools of the materials available from AWWA and WEF. The Water Conservation Coordinator, discussed in DMM 12, could enhance the program by meeting with school principals and educators to promote classroom presentations. The effectiveness of this program is determined by the number of students and schools that participate.

## **6.10 DMM 9: CONSERVATION PROGRAMS FOR COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL ACCOUNTS**

Implementation of water conservation for CII customers includes identifying the largest water users among CII customers, offering audits and incentives sufficient to conserve water, and providing follow-up audits as needed.

At this time, all commercial and institutional customers are metered and charged for water usage in accordance with their metered use. The District does not have any industrial customers.

The District plans to offer partial subsidies to several high-use commercial customers to cover water audits performed by a local Green Plumbing Certified plumbing company. Implementation depends on negotiations with the plumbing company. As mentioned in DMM 5, the District provided smart controllers to schools and performed audits.

The District provides water audits and water conservation information to their metered customers upon request. Current and historical customer water use information is available to all District customers upon signing into their online account.

The best way to determine the effectiveness of this DMM is to monitor the actual water use. In the future, the District could monitor the water use of the commercial and institutional customers, and assess demand characteristics and water use patterns. Historic data can be compared to current average annual water use for each account type.

## **6.11 DMM 10: WHOLESALE AGENCY PROGRAMS**

This DMM applies to wholesale agencies only and therefore is not applicable to the District.

## 6.12 DMM 11: CONSERVATION PRICING

Water conservation is encouraged through a pricing system that rewards customers who use less water with financial incentives, while high water users are charged a higher rate. Often this is implemented through a tiered pricing system.

The District has an increasing-tier water rate schedule. Each billing category includes three increasingly expensive volumetric price tiers. The tiers provide customers with a monetary incentive to conserve. The District plans to perform a rate study to update their tiered rates in the future. The budget for the program through 2015 is shown below.

- 2012 - \$26,000 and 5,279 staff hours
- 2013 - \$26,520 and 5,280 staff hours
- 2014 - \$27,050 and 5,280 staff hours
- 2015 - \$27,590 and 5,280 staff hours

## 6.13 DMM 12: WATER CONSERVATION COORDINATOR

This DMM entails designating a water conservation coordinator responsible for managing water conservation efforts, developing progress reports, promoting water conservation to agency staff, and evaluating the results of efforts.

Don Groundwater of the District is the designated Conservation Coordinator. Don coordinates all District conservation activities and goals, including the coordinating the preparation of annual FWMP updates. All these tasks further the goals and objectives in the USBR BMPs Guidelines and UWMPA DMMs.

Name: Don Groundwater	Title: District Engineer
Address: 11368 E. Stillwater Way, Redding, CA 96003-9510	
Telephone: (530) 241-1085 ext. 114	E-mail: dgroundwater@bvwd.org

The effectiveness of this DMM is determined by the work performed by the Water Conservation Coordinator. The budget for the program through 2015 is shown below.

- 2012 - \$970 and 811 staff hours
- 2013 - \$990 and 810 staff hours
- 2014 - \$1,010 and 810 staff hours
- 2015 - \$1,030 and 810 staff hours

## **6.14 DMM 13: WATER WASTE PROHIBITIONS**

This DMM involves adoption of an ordinance prohibiting water waste. The District's policy on wasting water is found in the District Policy Manual (Appendix N), Section 143, and states the following:

"No customer shall permit leaks or otherwise waste water, whether intentionally or negligently. In the event that water is wastefully or negligently used on a customer's premises, District shall have the right to discontinue service to the premises and shall have the right to enter upon the premises for the purpose of disconnecting the service."

In addition, the following sections of the District's Policy Manual detail the enforcement of District policies: 444. Discontinuance (Non-Compliance with Regulations), 461. Prohibited Acts, 462. Determination of Violation, and 463. Penalties. District crews follow up with property owners on water waste calls/tips and District crews place water waste door hangers at properties in which they notice water waste (broken sprinklers, water flowing off property, etc.)

The effectiveness of this DMM can be determined by a decrease in violators. The number of citations and violations should be reported and reviewed annually. If an area is determined to have excessive violations, the District could implement a specific public outreach program informing the public.

## **6.15 DMM 14: RESIDENTIAL ULTRA-LOW FLUSH TOILET REPLACEMENT PROGRAMS**

This DMM involves implementation of programs for replacing existing high-water-using toilets with ultra-low flush (1.28 gallons or less) toilets in SFR and MFR. Full implementation of this DMM is not feasible or enforceable for the District since they are not a City or County. The District has to rely on the County or the City of Redding Building Departments and the real estate process help with replacement of toilets<sup>3</sup>. The District offers literature at District offices to encourage retrofits and provides a link to the Save our Water website on their website that recommends installation of a high-efficiency toilet to save 19 gallons per person per day. The District will not be pursuing this program due to feasibility, staffing, and funding constraints. The program would be revisited if funding were available.

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<sup>3</sup> County and City Building Codes have adopted the California Plumbing Code, which requires that all new residential construction and major remodels or renovations of existing homes install low flow fixtures, including low flow toilets.

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**CLIMATE CHANGE**

The potential water supply and demand effects related to climate change have not been included in this Urban Water Management Plan (UWMP).

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**COMPLETED UWMP CHECKLIST**

A completed Urban Water Management Plan (UWMP) checklist is attached.

**Table I-2 Urban Water Management Plan checklist, organized by subject**

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Additional clarification	UWMP location
<b>PLAN PREPARATION</b>				
4	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)		Chapter 1 Section 1.3
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		Chapter 1 Section 1.3 Appendix A
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		Appendix B
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)		Chapter 1 Section 1.3
55	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642		Chapter 1 Section 1.3 Appendix A
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		Appendix A
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		Appendix B
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		Chapter 1 Chapter 3 Chapter 6

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		Chapter 1 Section 1.3
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Chapter 1 Section 1.3
<b>SYSTEM DESCRIPTION</b>				
8	Describe the water supplier service area.	10631(a)		Chapter 2 Section 2.1 Figures 1 & 2
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Chapter 2 Section 2.1 and 2.2
10	Indicate the current population of the service area	10631(a)		Chapter 2 Section 2.2
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)		Chapter 2 Section 2.2 Tables 3 & 4
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Chapter 2 Section 2.2
<b>SYSTEM DEMANDS</b>				
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)		Chapter 3 Section 3.1
2	<i>Wholesalers:</i> Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. <i>Retailers:</i> Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)		Not Applicable
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		Not Applicable Until 2015

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Additional clarification	UWMP location
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (A) single-family residential, (B) multifamily, (C) commercial, (D) industrial, (E) institutional and governmental, (F) landscape, (G) sales to other agencies, (H) saline water intrusion barriers, groundwater recharge, conjunctive use, and (I) agriculture.	10631(e)(1)		Chapter 3
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)		Table 18 [To be included in Appendix A]
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		Chapter 3 Table 17
<b>SYSTEM SUPPLIES</b>				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)		Chapter 4 Section 4.1
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)		Chapter 4 Section 4.2
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		Chapter 4 Section 4.2
16	Describe the groundwater basin.	10631(b)(2)		Chapter 4 Section 4.2
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		Not Applicable
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate "not applicable" in the UWMP location column.	10631(b)(2)		Not Applicable

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Additional clarification	UWMP location
19	For groundwater basins that are not adjudicated, provide information as to whether DWR has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition. If the basin is adjudicated, indicate "not applicable" in the UWMP location column.	10631(b)(2)		Chapter 4 Section 4.2.1
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	10631(b)(3)		Chapter 4 Section 4.2.3
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)		Chapter 4 Section 4.2.3
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Chapter 4 Section 4.4
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		Chapter 4 Section 4.7
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		Chapter 4 Section 4.5
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		Chapter 4 Section 4.6
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)		Chapter 4 Section 4.6
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		Not Applicable
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		Not Applicable

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Additional clarification	UWMP location
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)		Chapter 4 Section 4.6
49	The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	10633(e)		Not Applicable
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)		Not Applicable
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		Not Applicable
<b>WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING <sup>b</sup></b>				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		Chapter 5 Sections 5.3 & 5.4 Chapter 6
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		Chapter 5 Sections 5.1 & 5.4
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)		Chapter 5 Section 5.1
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		Chapter 5 Section 5.3
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)		Chapter 5 Section 5.4

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Additional clarification	UWMP location
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		Chapter 5 Section 5.3 Appendix I
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		Chapter 5 Section 5.3 Appendix M
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)		Chapter 5 Section 5.3 Appendix M
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Chapter 5 Section 5.3
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		Chapter 5 Section 5.3
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Chapter 5 Section 5.3
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Chapter 5 Section 5.3
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634		Chapter 5 Section 5.2

No.	UWMP requirement <sup>a</sup>	Calif. Water Code reference	Additional clarification	UWMP location
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		Chapter 5 Section 5.4
<b>DEMAND MANAGEMENT MEASURES</b>				
26	Describe how each water demand management measure is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)		Chapter 6
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Chapter 6
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)		Not Available
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)		Chapter 6
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)		Not Applicable