



2010

Urban Water Management Plan

Final Adopted • August 2014



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City of Shasta Lake
2010 Urban Water Management Plan
Contact Sheet

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The Water supplier is a: **Municipality**


The Water supplier is a: **Retailer**

Utility services provided by the water supplier includes: **Water, Electric, Sewer, Recycled Water**

This Agency is a Bureau of Reclamation Contractor

This Agency is not a State Water Project Contractor


08/19/14


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City of Shasta Lake

2010 URBAN WATER MANAGEMENT PLAN

FINAL ADOPTED
August 19, 2014



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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 3,000 or more 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 City of Shasta Lake (City) is behind schedule in its 2010 UWMP submittal principally due to wanting to wait for 2010 Census data and ongoing discussions between the City and the United States Bureau of Reclamation (USBR) regarding water supply sources and reliability. The City is currently seeking funding for a water supply enhancement project to improve reliability of the City's water supply.

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 drought 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 City 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. The UWMPA requires inclusion of a water shortage contingency plan, which meets the specifications, set forth therein. 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. 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. Water suppliers must also describe their water DMMs that are being implemented or are scheduled for implementation.

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 stormwater 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 planning (Daucher) and Water Supply Assessments (Costa).
- 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

Pursuant to the UWMPA, the City previously prepared an UWMP in 2005, which was approved and adopted on February 7, 2006. Following adoption, the 2005 UWMP was submitted to and formally approved by DWR. This 2010 UWMP report serves as an update to the 2005 UWMP.

1.2.3 Resource Maximization/Import Minimization

The City 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 City is to provide high quality water, maximize the efficient use of water, and promote conservation.

1.3 PLAN PREPARATION

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

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 City 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.

Table 1 Coordination with Appropriate Agencies (Guidebook Table 1) 2010 Urban Water Management Plan City of Shasta Lake								
Coordinating Agencies	Participated in Developing the Plan	Notified of UWMP Update	Commented on the Draft	Attended Public Meetings	Was Contacted for Assistance	Was Sent a Copy of the Draft Plan	Was Sent a Notice of Intention to Adopt	Not Involved No Information
City of Shasta Lake – City Manager	✓	✓	✓	✓	✓	✓	✓	
City of Shasta Lake – Development Services	✓	✓	✓	✓	✓	✓	✓	
City of Shasta Lake – Public Works Department	✓	✓	✓	✓	✓	✓	✓	
City of Shasta Lake – Finance Department		✓			✓	✓	✓	
City of Shasta Lake – Wastewater Utility	✓	✓	✓		✓	✓	✓	
City of Shasta Lake – Water Utility	✓	✓	✓	✓	✓	✓	✓	
Anderson Cottonwood Irrigation District (ACID)		✓				✓	✓	
Bella Vista Water District (BVWD)		✓	✓		✓	✓	✓	
Shasta County Water Agency (SCWA)		✓				✓	✓	
City of Redding		✓				✓	✓	
Department of Water Resources (DWR)					✓			
California Urban Water Conservation Council (CUWCC)					✓			
United States Bureau of Reclamation (USBR)		✓				✓	✓	
County of Shasta		✓				✓	✓	
General Public (Website and Publication/Posting)		✓				✓	✓	
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.								

The City provided formal written notification to the USBR, Shasta County (County), Shasta County Water Agency (SCWA), City of Redding, Anderson Cottonwood Irrigation District (ACID), and Bella Vista Water District (BVWD) that the City'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 BVWD 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 July 29, 2014 and August 5, 2014, the City placed a notice in the Redding Record Searchlight (Local newspaper) 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 August 19, 2014. A copy of this notification is included in Appendix A. The Draft 2010 UWMP was made available for public inspection at the City of Shasta Lake City Hall, located at 1650 Stanton Drive, Shasta Lake Gateway Library, 1646 Stanton Drive, as well as the City's website.¹

The City held a public hearing on August 19, 2014. The hearing provided an opportunity for the City's customers, residents, and employees to learn and ask questions about the current and future water supply of the City. At the hearing, the UWMP was discussed.

1.3.2 Plan Adoption, Submittal, and Implementation

The City prepared this 2010 UWMP during the summer of 2014. The plan was adopted at a public hearing by its City Council on August 19, 2014 (see City Council 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, and submitted to 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.

ACID	Anderson Cottonwood Irrigation District
AF	acre-feet
AFY	acre-feet per year

¹ www.cityofshastalake.org

BMPs	Best Management Practices
BVWD	Bella Vista Water District
CCF	Hundred Cubic Feet
CCR	California Code of Regulations
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CF	Cubic Feet
CFS	Cubic Feet Per Second
City	City of Shasta Lake
County	Shasta County
CSD	Community Services District
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
DOF	California Department of Finance
DMMs	Demand Management Measures
DWR	California Department of Water Resources
DWSAP	Drinking Water Source Assessment Program
EDD	California Employment Development Department
EIR	Environmental Impact Report
ETo	Evapotranspiration
°F	Degrees Fahrenheit
gpcd	Gallons Per Capita Per Day
gpm	Gallons Per Minute
I-5	Interstate 5
MFR	Multi-Family Residential

MGD	Million Gallons Per Day
MG	Million Gallons
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
RAWC	Redding Area Water Council
RHNP	Regional Housing Needs Plan
RWA	Regional Water Authority
RWQCB	Regional Water Quality Control Board
SCWA	Shasta County Water Agency
SDAPUD	Shasta Dam Area Public Utility District
SFR	Single-Family Residential
SWRCB	State Water Resources Control Board
USBR	United States Bureau of Reclamation
UWMP	Urban Water Management Plan
UWMPA	Urban Water Management Planning Act
WTP	Water Treatment Plant
WWTF	Wastewater Treatment Facility

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 City of Shasta Lake (City) is located north of Redding in western Shasta County (County). The City is located along the Interstate 5 (I-5) corridor, south of Lake Shasta and the Shasta Dam. The closest neighboring communities are Bella Vista, Redding, and Shasta to the south, Lakehead to the north, and French Gulch to the west.

The City is located within the upper Churn Creek, Stillwater Creek, and Moody Creek watersheds. The developed areas of the City are gently rolling with numerous small creeks tributary to the three major drain-ways. The southern portion of the City is flatter, which then becomes hilly with steep slopes towards the northern boundary. The northern portion of the City is generally undeveloped land. Elevations in the City range from a high of about 1,280 feet above sea level at the northern ridge to a low of about 670 feet at the southern boundary. The majority of the community lies between the intermediate elevations of 800 and 900 feet (Water Management Plan 2011 Criteria, April 2014).

The City, incorporated in 1993, provides water, sewer, recycled water, storm drain, and electric services to the residents of the City. Water service is provided to all residential, commercial, and industrial customers, and for fire protection services. The City provides recycled water for industrial reuse and irrigation of a portion of I-5.

The City limits comprise 10.9 square miles. The water service area encompasses the entire City limits. Figure 1 shows the City limits, water service area, and the main distribution system components (large diameter pipelines and water tanks). The Water Treatment Plant (WTP) is located outside of City limits, north of Fisherman's Point adjacent to Shasta Dam.

2.1.1 Description of Transmission, Treatment, and Distribution Facilities

In 1945, the City water system began with the establishment of the Shasta Dam Area Public Utility District (SDAPUD) that was organized to serve the unincorporated communities of Central Valley, Summit City, Project City, and Pine Grove. A long-term (40 years) water contract was signed in 1948 with the USBR. In 1954, the USBR replaced transmission piping and increased pump capacity and storage at the Reclamation Dam facilities. At the same time, piping was extended to serve the area then known as the Buckeye County Water District (City of Redding).

In 1966, SDAPUD constructed a 2.0 million gallon per day (MGD) filtration plant approximately one mile northwest of Central Valley, just above Toyon Government Camp. Capacity improvements to this plant occurred over the next 24 years until 1990, when a new treatment plant at Fisherman's Point replaced the old facility. Additional improvements to the distribution and storage facilities were implemented by the SDAPUD until 1993, at which time; the City was incorporated and acquired control of the water system from SDAPUD (Water Management Plan 2011 Criteria, April 2014).

The City water supply is surface water diverted from Shasta Lake. The diversion point is at the face of Shasta Dam, where there are two intakes (750 and 950 feet above sea level). Raw water is pumped to the Fisherman's Point Water Treatment Plant (WTP) via the USBR Raw Water Pumping Station located at the base of Shasta Dam.

The Fisherman's Point WTP is capable of treating and distributing a maximum of approximately 9.72 mgd and consists of filtration (Micro-Floc Trident) and disinfection with chlorine. The distribution system includes approximately 60 miles of pipelines consisting of steel, cast iron, asbestos cement, and polyvinyl chloride piping. Most of the steel piping is pre-1960 vintage with a large portion of smaller diameter mains (less than 5-inch) being installed prior to 1950. There is approximately 42,240 feet of undersized steel pipe over 45 years old that is in need of replacement (Water Management Plan 2011 Criteria, April 2014).

The City has nine (9) treated water storage tanks, totaling 6.12 million gallons (MG), and one (1) raw water storage tank. The City has ten (10) pressure zones and 20 pressure regulating stations located throughout the City.

2.1.2 Climate

The City's climate is characterized by hot dry summers and mild winters with an average annual rainfall of approximately 61.82 inches. Approximately 79 percent of the average annual precipitation occurs between November and March. Evapotranspiration (ETo) values, which serve as indicators of how much water is required to maintain healthy agriculture and landscaping, range from 1.04 inches during January to 8.73 inches in July. Temperature, rainfall, and ETo averages for the City are presented in Table 2.

Table 2 Climate Characteristics 2010 Urban Water Management Plan City of Shasta Lake				
Month	Standard Monthly Average ETo⁽¹⁾ (inches)	Monthly Average Rainfall⁽²⁾ (inches)	Monthly Average Temperature⁽²⁾ (°F)	
			Minimum	Maximum
January	1.04	11.12	38.9	52.5
February	1.81	10.05	41.0	56.7
March	3.46	8.74	43.0	61.3
April	5.03	4.37	47.7	68.5
May	6.62	2.58	54.8	77.5
June	7.91	1.30	62.2	86.0
July	8.73	0.20	68.3	95.2
August	7.40	0.40	66.6	93.7
September	5.75	1.05	62.3	87.8
October	4.06	3.40	54.4	75.2
November	1.80	7.86	45.6	60.5
December	1.13	10.74	40.1	53.1
Annual	54.74	61.82	52.1	72.3
<u>Notes:</u>				
1. Source: California Irrigation Management Information System (CIMIS) Station 224 Shasta College. Represents monthly average ETo from January 2013 to May 2014.				
2. Source: Western Regional Climate Center Shasta Dam (048135). Represents monthly average from January 1943 to March 2013.				

2.2 SERVICE AREA POPULATION

This section summarizes historical, current, and projected population trends in the City. 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. These projections serve to provide the City insight on the type and quantity of future growth as well as guidance regarding future planning activities; therefore, such planning activities can only be as effective as the ability to anticipate population growth.

The population of the City increased from approximately 100 people in 1938 to 2,600 people in 1945 due to the construction of Shasta Dam. After incorporation of the City in 1993, the California Department of Finance (DOF) extrapolated the population of the City from 1990 census data as 8,783 people. The population increased to 9,008 in 2000 (Census 2000) and to 10,164 in 2010 (Census 2010). Figure 2 shows the historical population based on information gathered from the DOF. The DOF estimates population each year based on the number of building permits issued, residential units destroyed, requests for new electrical connections, etc.

Selecting a population growth rate for this UWMP update is challenging due to impacts from the recession and the differing expected growth rates reported for the area. The City's General Plan (1999) projected buildout to 2050 based on an average growth rate of 1.58 percent and the 2005 UWMP projected a 2.09 percent growth rate. The 2009-2014 Housing Element expected a 0.5 percent growth rate and reported that the growth rate from 2000 through 2009 was 1.37 percent. The DOF anticipates that the County annual average growth rate will be 0.95 percent from 2010 through 2050.

In early 2014, a draft Environmental Impact Report (EIR) was published for the Mountain Gate at Shasta project that estimated a slow to moderate annual average growth rate of the City between 0.5 and 1.0 percent through 2023 based on the trends of the last 10 years and the recent economic recession. Based on this information a growth rate of 0.75 percent annually was utilized to project the population through 2035. These numbers will be updated in subsequent UWMP updates after the City's General Plan is updated. The current and projected population for the City is contained in Table 3.

Table 3 Population - Current and Projected (Guidebook Table 2) 2010 Urban Water Management Plan City of Shasta Lake							
	Years						
Service Area	2010	2015	2020	2025	2030	2035	Data Source
Population ⁽¹⁾	10,164	10,252	10,642	11,047	11,468	11,905	See Note 2
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.							
1. Service area population is defined as the population served by the distribution system.							
2. 2010 Census data and an estimated 0.75 percent average annual growth rate.							

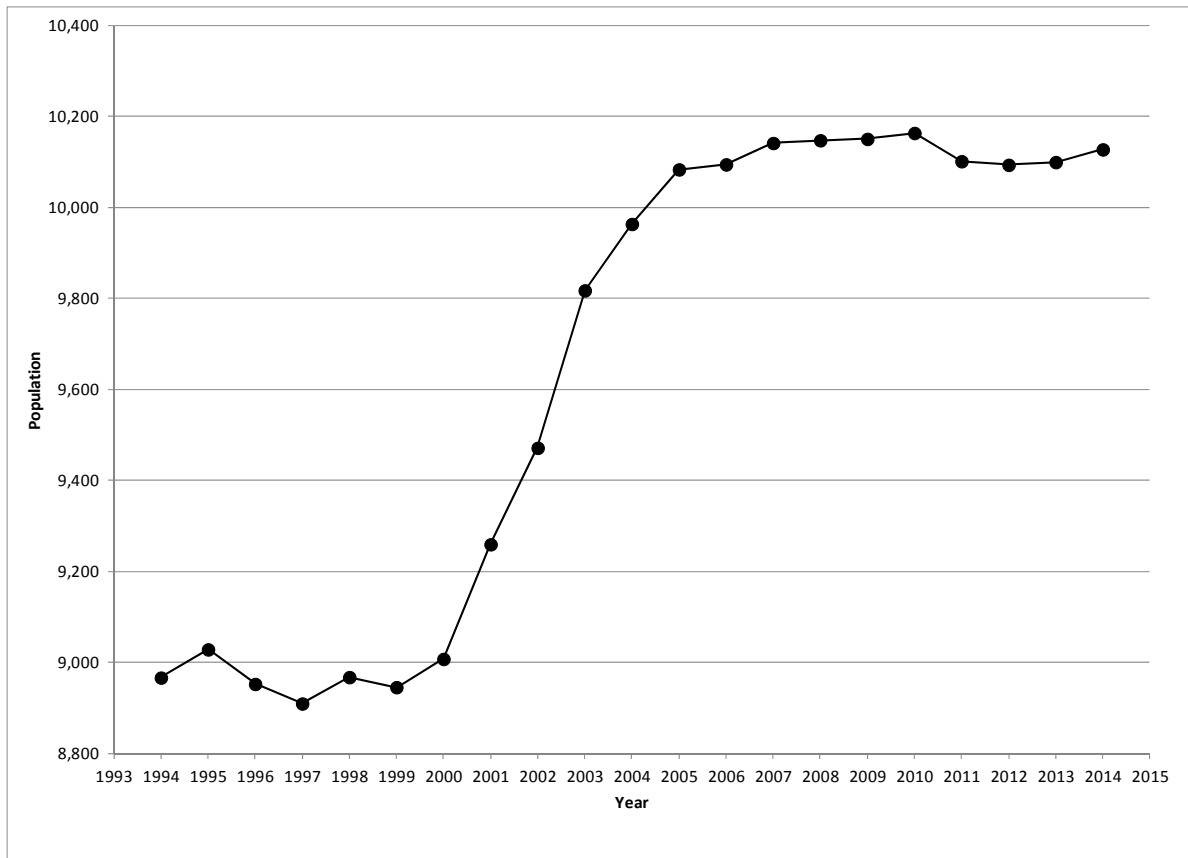


Figure 2 Historical and Projected Population

2.2.1 Other Demographic Factors

This section summarizes and analyzes demographic information from the 2010 Census. Analyzing demographic data can yield important information about possible shifts in demand for City water service.

The median age in the City is 38.8, with 78.6 percent of the population being over 16 years of age. The population is split 49.9 to 50.1 percent male to female, respectively. The number of housing units was 4,209 and the median household income for the City was \$42,901 in 2010 (2010 Census). The 2010 Census data showed that 53.3 percent of the 10,164 residents in the City are considered low moderate income, with an 80 percent of median income of \$35,116 compared to the State average of \$48,706. This defines the entire incorporated area of the City as a Disadvantaged Community.

The California Employment Development Department (EDD) reported an 18.1 percent unemployment rate for 2012 and a 14.8 percent unemployment rate for 2013.

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.*

This UWMP will serve as a foundational document for water analyses that may be required for future projects and water transactions, including water planning documentation required by California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and other environmental laws.

At this time, the only planned development meeting the definition of "Project" is the Mountain Gate at Shasta project. This project as proposed includes between 829 and 1,604 dwelling units and up to 195,584 square feet of nonresidential development on approximately 590 acres. A draft EIR was recently prepared (April 2014) for this project which included preparation of a long-term water supply assessment for the project pursuant to the CEQA and the California Water Code.

This project has assumed that the City will provide water service and that a 1.0 MG water storage tank will be constructed near the project site, with a water main constructed from the proposed tank to the project. The project also intends to use recycled water within the project boundaries to the extent practicable. There is an existing recycled water main near the southern part of the project area.

I-5 serves as the primary transportation corridor in the County connecting the City to other communities, jobs, and services. As such, the areas along the I-5 corridor are anticipated to experience the most growth in the future. Recent subdivisions and planned projects are located in this area.

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 City of Shasta Lake (City); 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 City's 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 City is determining the applicable range and 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 recycled water deliveries in 2008 were greater than 10 percent of the total water deliveries, a 15-year average was used for baseline determination. In addition to the 15-year baseline, a 5-year baseline is also calculated, which is used to establish the minimum criteria for the City's use reduction targets. A summary of the 2008 total and recycled water deliveries, 15-year baseline range, and 5-year baseline range is included in Table 4.

Table 4 Base Period Ranges (Guidebook Table 13) 2010 Urban Water Management Plan City of Shasta Lake			
Base	Parameter	Value	Units
10-to 15- Year Base Period	2008 total water deliveries	2,853	AFY
	2008 total volume of delivered recycled water	684	AFY
	2008 recycled water as a percent of total deliveries	24	Percent
	Number of years in base period	15	Years
	Year beginning base period range	1996	
	Year ending base period range	2010	
5-Year Base Period	Number of years in base period	5	Years
	Year beginning base period range	2006	
	Year ending base period range	2010	
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.			

The data used to calculate the 15-year baseline is included in Table 5. 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. If a City has process water data over the 15-year baseline period that meets UWMPA exclusion requirements, the City can exclude process water from the gross water use. The City does not currently have industrial process water data for the 15-year baseline.

Table 5 Base Daily Per Capita Water Use – 15-Year Range (Guidebook Table 14) 2010 Urban Water Management Plan City of Shasta Lake				
Sequence Year	Calendar Year	Distribution System Population⁽¹⁾	Daily System Gross Water Use⁽²⁾ (mgd)	Annual Daily Per Capita Water Use (gpcd)
Year 1	1996	8,953	1.9	211
Year 2	1997	8,910	1.8	207
Year 3	1998	8,968	1.7	195
Year 4	1999	8,946	2.0	225
Year 5	2000	9,008	2.0	220
Year 6	2001	9,289	2.0	214
Year 7	2002	9,516	2.3	241
Year 8	2003	9,875	2.2	221
Year 9	2004	10,038	2.3	229
Year 10	2005	10,180	2.2	212
Year 11	2006	10,195	2.4	240
Year 12	2007	10,237	2.3	224
Year 13	2008	10,243	2.5	248
Year 14	2009	10,269	2.2	217
Year 15	2010	10,164	2.0	201
Base Daily Per Capita Water Use				220
<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.</p> <p>1. Source: Department of Finance and Census (2000 and 2010).</p> <p>2. Source: Department of Water Resources Public Water System Statistics</p>				

The data used to calculate the 5-year baseline is included in Table 6. The UWMPA requires a continuous range, with the end of the range ending between December 31, 2007 and December 31, 2010, be used for baseline determination.

Table 6 Base Daily Per Capita Water Use – 5-Year Range (Guidebook Table 15) 2010 Urban Water Management Plan City of Shasta Lake				
Sequence Year	Calendar Year	Distribution System Population⁽¹⁾	Daily System Gross Water Use⁽²⁾ (mgd)	Annual Daily Per Capita Water Use (gpcd)
Year 1	2006	10,195	2.4	240
Year 2	2007	10,237	2.3	224
Year 3	2008	10,243	2.5	248
Year 4	2009	10,269	2.2	217
Year 5	2010	10,164	2.0	201
Base Daily Per Capita Water Use				226
<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.</p> <p>1. Source: Department of Finance and Census (2010).</p> <p>2. Source: Department of Water Resources Public Water System Statistics</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 (15-year base period) is calculated. Based on the 15-year baseline daily per capita use of 220 gallons per capita per day (gpcd) determined previously (Table 5), the target use for Method 1 is 176 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 City 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.

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 City 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 City 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 184 gpcd.

3.1.2.5 Minimum Water Use Reduction Requirement

The final step in determining the applicability of the water use target for the City 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 (226 gpcd) previously determined (Table 6) is used. In order to meet the minimum criteria, the chosen use 2020 target must fall below 95 percent of the 5-year baseline, which for the City is 215 gpcd.

3.1.3 Summary of Baselines and Targets

Based on the water use targets calculated above, the City's water use target for 2020 is 184 gpcd. Based on the 15-year baseline of 220 gpcd, the 2015 interim water use target is 202 gpcd. This 2020 target was determined using Method 4. According to the DWR guidelines, the 2020 target is valid since it is less than the target confirmation criteria of 215 gpcd. A summary of the various baselines, use target determined based on various methodologies, and the final use target and interim target are summarized in Table 7.

Table 7 Baseline and Targets Summary 2010 Urban Water Management Plan City of Shasta Lake								
Baselines⁽¹⁾ (gpcd)		Target Determination Methods (gpcd)				Minimum Reduction Requirement⁽⁶⁾ (gpcd)	Target⁽⁷⁾ (gpcd)	Interim Target⁽⁸⁾ (gpcd)
15-Year	5-Year	1⁽²⁾	2⁽³⁾	3⁽⁴⁾	4⁽⁵⁾			
220	226	176	n/a	167	184	215	184	202
Notes:								
1. Refer to Tables 4, 5, and 6 for source of data.								
2. Method 1 – 80 percent of the 15-year base daily per capita water use.								
3. Method 2 – Insufficient data is available to determine an Urban Water Use Target.								
4. Method 3 – 95 percent of the Regional Target.								
5. Method 4 – Savings by Water Sector.								
6. Defined as 95 percent of the 5-year base daily per capita water use.								
7. Urban Water Use Target determined using Method 1.								
8. Interim Urban Water Use Target is the average of the 15-year baseline and the Target.								

3.2 WATER DEMANDS

Water demands served by the City are primarily residential, commercial/institutional, industrial, and landscape irrigation. All connections in the City are metered. Tables 8 and 9 describe the actual number of connections and associated annual water deliveries by customer sector for the years 2005 and 2010, respectively.

**Table 8 Water Deliveries – Actual 2005 (Guidebook Table 3)
2010 Urban Water Management Plan
City of Shasta Lake**

	2005				
	Metered		Not Metered		Total
Water Use Sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Deliveries AFY
Single-Family Residential	3,383	1,821	0	0	1,821
Multi-Family Residential	110	112	0	0	112
Commercial/Institutional	187	277	0	0	277
Industrial	11	203	0	0	203
Landscape Irrigation	0	0	0	0	0
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	3,691	2,413	0	0	2,413

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.
Source: 2005 DWR Public Water System Statistics.

Table 9 Water Deliveries – Actual 2010 (Guidebook Table 4) 2010 Urban Water Management Plan City of Shasta Lake					
	2010				
	Metered		Not Metered		Total
Water Use Sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Deliveries AFY
Single-Family Residential	3,351	1,637	0	0	1,637
Multi-Family Residential	99	92	0	0	92
Commercial/Institutional	193	285	0	0	285
Industrial	10	271	0	0	271
Landscape Irrigation	0	0	0	0	0
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	3,653	2,285	0	0	2,285
<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. Source: 2010 DWR Public Water System Statistics.</p>					

Future account and water use projections are shown in Table 10, Table 11, and Table 12. 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 10, Table 11, and Table 12 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.

Table 13 shows the projected water demands from 2010 through 2035 with and without conservation. The demand projections with conservation are based on the City's per capita water use targets for 2015 and 2020. The demand projections without conservation are based on the City's selected 15-year baseline water use.

**Table 10 Water Deliveries – Projected 2015 (Guidebook Table 5)
2010 Urban Water Management Plan
City of Shasta Lake**

	2015				
	Metered		Not Metered		Total
Water Use Sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Deliveries AFY
Single-Family Residential	3,380	1,664	0	0	1,664
Multi-Family Residential	100	94	0	0	94
Commercial/Institutional	195	289	0	0	289
Industrial	10	275	0	0	275
Landscape Irrigation	0	0	0	0	0
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	3,685	2,322	0	0	2,322

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.

**Table 11 Water Deliveries – Projected 2020 (Guidebook Table 6)
2010 Urban Water Management Plan
City of Shasta Lake**

	2020				
	Metered		Not Metered		Total
Water Use Sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Deliveries AFY
Single-Family Residential	3,509	1,573	0	0	1,573
Multi-Family Residential	104	88	0	0	88
Commercial/Institutional	202	274	0	0	274
Industrial	10	260	0	0	260
Landscape Irrigation	0	0	0	0	0
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	3,825	2,195	0	0	2,195

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.

**Table 12 Water Deliveries – Projected 2025, 2030, 2035 (Guidebook Table 7)
2010 Urban Water Management Plan
City of Shasta Lake**

	2025		2030		2035	
	Metered		Metered		Metered	
Water Use Sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY
Single-Family Residential	3,642	1,633	3,781	1,695	3,925	1,759
Multi-Family Residential	108	92	112	95	116	99
Commercial/ Institutional	210	284	218	295	226	306
Industrial	11	270	11	280	12	291
Landscape Irrigation	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0
Other	0	0	0	0	0	0
Total	3,971	2,278	4,122	2,365	4,279	2,455

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.

Table 13 Projected Water Demands 2010-2035 2010 Urban Water Management Plan City of Shasta Lake					
Year	Distribution System Population	Project Water Use			
		w/ Conservation ⁽¹⁾		w/o Conservation ⁽²⁾	
		(mgd)	(AFY)	(mgd)	(AFY)
2010	10,164	2.2	2,508	2.2	2,508
2015	10,252	2.1	2,322	2.3	2,530
2020	10,642	2.0	2,195	2.3	2,626
2025	11,047	2.0	2,278	2.4	2,726
2030	11,468	2.1	2,365	2.5	2,830
2035	11,905	2.2	2,455	2.6	2,938

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. Demand projections with conservation are based on the City's per capita water use targets for 2015 and 2020.
2. Demand projections without conservation are based on the City's selected 15-year baseline water use.

3.2.1 Sales to Other Agencies

The City sells treated water to the City of Redding and periodically to the Bella Vista Water District (BVWD). The amounts sold to both agencies between 2005 and 2013 are shown in Table 14. The sales to Redding are associated with the Summit City Pressure Zone Agreement and pressure changes to the system. It is an automatic connection based on system pressures. The City currently has no plans to sell water to BVWD in the future. The intertie with BVWD is a manual connection.

Table 14 Sales to City of Redding and Bella Vista Water District 2005 – 2013 2010 Urban Water Management Plan City of Shasta Lake		
Year	Water Use (AFY)	
	City of Redding	Bella Vista Water District
2005	8.21	40.05
2006	27.11	2.13
2007	26.91	0.60
2008	31.06	0.00
2009	26.57	10.79
2010	22.07	0.00
2011	24.05	0.00
2012	28.01	0.00
2013	30.12	0.00

Notes: Information from City billing records.

The Water Delivery Agreement with the City of Redding covers a zone within the Redding sphere of influence called the Summit City Pressure Zone. A portion of the Summit City Pressure Zone lies within the incorporated boundaries of the City of Shasta Lake and a portion lies within the unincorporated area of Shasta County (County), but within the City of Redding sphere of influence. The water purchased by the City of Redding from the Bureau of Reclamation (USBR) under the Buckeye Contract (Contract No. 14-06-00-5272A) is treated at the City of Shasta Lake's Water Treatment Plant (WTP) and conveyed to the Summit City Pressure Zone. The City of Redding pays the City of Shasta Lake, at the tiered residential rate, for the water delivered to the Summit City Pressure Zone, less the USBR contract costs charged to the City of Redding.

The 2005 and 2010 actual sales to the City of Redding and BVWD as well as the projected sales through 2035 are contained in Table 15.

Table 15 Sales to Other Water Agencies (Guidebook Table 9) 2010 Urban Water Management Plan City of Shasta Lake							
Agency	Water Use (AFY)						
	2005	2010	2015	2020	2025	2030	2035
Bella Vista Water District	40.05	0.00	0.00	0.00	0.00	0.00	0.00
City of Redding ⁽¹⁾	8.21	22.07	30.0	30.0	30.0	30.0	30.0
Total, AFY	48.26	22.07	30.0	30.0	30.0	30.0	30.0
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. Predicted sales to Redding are based on the agreement amount of 30 AF.							

3.2.2 Other Water Demands

Additional water uses and losses in the City's service area are presented in Table 16. Additional water losses are accounted for in Table 8 through Table 12.

Table 16 Additional Water Uses and Losses (Guidebook Table 10) 2010 Urban Water Management Plan City of Shasta Lake							
Water Use⁽¹⁾	2005	2010	2015	2020	2025	2030	2035
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	336	284	344	112	112	112	112
Other ⁽²⁾	295	257	262	249	258	267	276
System Losses ⁽³⁾	68	59	60	57	59	61	63
Total, AFY	698	600	667	419	429	440	451
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.							
1. Any water accounted for in Guidebook Tables 3 through 7 are not included in this table (Table 8 through 12 in this report).							
2. Other includes water lost during treatment at the WTP (filter backwash, etc). It is estimated that 2.3 percent of the raw water is lost due to consumptive use.							
3. System losses are assumed to be 10.0 percent of the water produced.							

3.2.3 Total Water Demands

The City's total water demands, based on the figures presented in Table 8 through Table 12 and 16, are summarized in Table 17.

Table 17 Total Water Use (Guidebook Table 11) 2010 Urban Water Management Plan City of Shasta Lake							
Water Use	2005	2010	2015	2020	2025	2030	2035
Total water deliveries ⁽¹⁾	2,413	2,285	2,322	2,195	2,278	2,365	2,455
Sales to other water agencies ⁽²⁾	48.3	22.1	30	30	30	30	30
Additional water uses and losses ⁽³⁾	698	600	667	419	429	440	451
Total, AFY	3,160	2,907	3,019	2,644	2,737	2,835	2,936
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. 1. Data from Tables 8 through 12 and 14. 2. Data from Table 15. 3. Data from Table 16.							

3.2.4 Lower Income Household Water Use Projections

The information contained below is based on the 2009-2014 Housing Element and the 2010 Census. The 2010 Census reported that 53.3 percent of the 10,164 residents in the City are considered low moderate income. Table 18 projects water demands associated with lower income water users through year 2035. It should be noted that the lower income demand projections presented in Table 18 are included in the total water use projections provided in Table 8 through Table 12, and Table 14.

Table 18 Low Income Projected Water Demands (Guidebook Table 8) 2010 Urban Water Management Plan City of Shasta Lake					
Low Income Water Demands	Water Use (AFY)				
	2015	2020	2025	2030	2035
Single Family Residential	887	838	870	903	938
Multi-Family Residential	50	47	49	51	53
Total, AFY	937	885	919	954	990
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.					

3.3 WATER DEMAND PROJECTIONS

Since the City purchases water from the USBR, the USBR is considered a wholesale supplier by DWR. Table 19 includes demand projections provided to the USBR.

Table 19 Retail Agency Demand Projections Provided to Wholesale Suppliers (Guidebook Table 12) 2010 Urban Water Management Plan City of Shasta Lake							
Wholesaler	Contracted Volume⁽¹⁾ AFY	2010⁽²⁾	2015	2020	2025	2030	2035
U.S. Bureau of Reclamation	4,430	2,572	3,019	2,644	2,737	2,835	2,936
Total		2,572	3,019	2,644	2,737	2,835	2,936
<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.</p> <p>1. Contract 4,430 AF. Includes original contract (4,400 AF) plus the 30 AF reallocated from the Summit City Pressure Zone Agreement with the City of Redding.</p> <p>2. In 2010, USBR allowed 100 percent of the allocation, but the City only used 2,572 AF.</p> <p>3. Demand projections include conservation based on the City's per capita water use targets for 2015 and 2020.</p>							

3.4 WATER USE REDUCTION PLAN

The City determined its 15-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 City met the interim target for 2015 (202 gpcd) in 2010 (201 gpcd). If the City can maintain and improve water consumption rates, it will meet 2020 conservation goals. However, if consumption rates begin to rise above interim water use goals, the City must implement additional conservation measures to meet its 2020 goals. In all of its conservation programs, the City will avoid placing a disproportionate burden on any customer sector to reach its 2020 water use target.

SYSTEM SUPPLIES

This section describes the sources of water available to the City of Shasta Lake (City).

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 City's water supply is a combination of a long-term (40 years) contract with the United States Bureau of Reclamation (USBR) and long- and short-term agreements with surrounding agencies and water suppliers. The City has inter-ties with the City of Redding and Bella Vista Water District (BVWD) in which transfers of water can be made. In conjunction with the Redding Area Water Council (RAWC), the City is exploring the issue of transfers of local groundwater for temporary water supply during shortages. In addition, the USBR is determining the feasibility of raising Shasta Dam to increase storage, which would ultimately increase the reliability of the main water source.

Table 20 summarizes the annual entitlement under each contract/agreement. Each contract/agreement is detailed separately below.

Table 20 Water Supply Contracts and Agreements 2010 Urban Water Management Plan City of Shasta Lake			
Water Supplier	AFY	Source	Term
US Bureau of Reclamation (USBR) ⁽¹⁾	4,430	CVP	40 years
Shasta County Water Agency (SCWA)	50	CVP	Annual
Anderson-Cottonwood Irrigation District (ACID) ⁽²⁾	2,000	CVP	40 years
MCM Properties ⁽³⁾	325	CVP	40 years
McConnell Foundation	Varies	CVP	Annual
City of Redding	224	GW	Annual
Notes:			
1. Contract 4,430 AF. Includes original contract (4,400 AF) plus the 30 AF reallocated from the Summit City Pressure Zone Agreement with the City of Redding.			
2. Transfer not currently approved by USBR due to Cold Water Pool (CWP) issues.			
3. Transfer not currently approved by USBR due to Cold Water Pool (CWP) issues.			

4.1.1 United States Bureau of Reclamation Contract

The City entered into a long-term contract with the USBR (Contract No. 4-7-20-W1134-LTR1) that authorizes the City to divert from Shasta Lake a specified quantity of the water supply created by the Central Valley Project (CVP). The contract was entered into in March 2005, and allows the City to divert up to 4,400 AF per year from Shasta Lake for municipal and industrial purposes. The contract is effective from March 1, 2005 to February 28, 2045.

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 City. The City is required under the contract to prepare and implement a water conservation program for all water diverted from the USBR sources. This program must be submitted to USBR for approval every five years. The 2005 UWMP was submitted to USBR for review and approval to satisfy this requirement. Upon completion, this UWMP will be submitted to USBR for review.

The contract states that USBR will use all reasonable means to prevent shortages in the quantity of water available to the City. 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 they were reduced by 50 percent in the region. The percent reduction is applied to the historical average of the City's actual water usage over the prior three water years.

Currently the City only uses about 60 percent of the USBR allocation during an average year. However, during drought years, this allocation can be reduced drastically. In 2014, the average water usage over the prior three years was 2,582 AF. The allocation reduction is 50 percent, resulting in approximately 1,291 AF available to the City for the current water year.

In an effort to improve reliability of this source, the City sent a comment letter (September 25, 2013) to the USBR regarding the Draft Environmental Impact Statement for the Shasta Lake Water Resources Investigation (enlargement of Shasta Dam) in which they requested that USBR dedicate 4,600 AF of the newly impounded water to the City's base allocation of 4,400 AF, increasing the total long-term allocation to 9,000 AF. The probability of the City receiving the additional allocation is unknown.

4.1.2 City of Redding Summit City Pressure Zone Agreement

In 2004, the City entered into a long-term agreement with the City of Redding to provide service to a portion of the southwest section of the City, known as the Summit City Pressure Zone. Prior to this agreement, the area was served by the City of Redding. The City treats water and delivers it to the City of Redding through an intertie to provide water service to parcels within the Zone that are located in the unincorporated area of Shasta County. The City invoices the City of Redding monthly for this water through a master water meter.

The agreement allowed the City to acquire 30 AF of the 40 AF CVP water allocated to the Summit City Pressure Zone. This supply is subject to constraints discussed above with the USBR contract.

4.1.3 MCM Properties Transfer Agreement

The City has a long-term transfer agreement with MCM Properties Inc. (MCM) for 325 AF of CVP water. The agreement is effective from March 1, 2006 to February 28, 2045. MCM sells and transfers the water under USBR contract 7827A for diversion of CVP water from the Sacramento River. If supply is available, the City may request an additional 132 AF annually. The City has first right to this water if MCM determines water is available. The City would divert this water at Lake Shasta. This supply is subject to constraints discussed above with the USBR contract.

This transfer agreement was put on hold due to Cold Water Pool (CWP) issues that were identified from a National Environmental Policy Act (NEPA) compliance analysis of the transfer proposal. Subsequently, a transfer agreement with ACID, detailed in the following subsection, was also put on hold due to CWP issues. On February 28, 2008, the USBR required an environmental review for the proposed MCM and ACID transfers following a Temperature Impact Analysis. ACID and MCM withdrawals are on the Sacramento River whereas the transferred water would be through Lake Shasta. The USBR indicated that withdrawal of water from Lake Shasta would potentially affect downstream river

temperatures through impacts to the CWP and result in detrimental impacts to fish. Therefore, these transfers have not been approved due to the CWP issues. The City has not received water from MCM to date.

4.1.4 Anderson Cottonwood Irrigation District Transfer Agreement

The City has a long-term transfer agreement with the Anderson Cottonwood Irrigation District (ACID) for 2,000 AF of CVP water. The agreement is effective from April 24, 2008 to February 28, 2045. ACID sells and transfers the water under USBR contract 3346A-R-1 for diversion of CVP water from the Sacramento River. This transfer is available to the City between April 1 and October 31. The City would divert this water at Lake Shasta. This supply is subject to constraints discussed above with the USBR contract. As of April 18, 2014, ACID's USBR supply was cut by 25 percent.

As discussed above, this transfer has not been approved by the USBR due to CWP issues. The USBR did approve 140 AF of the ACID transfer in 2008 after the Temperature Impact Analysis. Since that time, the City has not received water from the ACID agreement, which is on hold until further analysis of the CWP issues.

4.1.5 Shasta County Water Agency Contract

On March 3, 1998 the City entered into a contract with the Shasta County Water Agency (SCWA) to purchase 50 AF per year. SCWA has a contract with the USBR (Contract No. 14-06-2003367A) to receive water from Shasta Lake and Whiskeytown Lake. SCWA approves the 50 AF on an annual basis. On March 13, 2013, the City requested SCWA permanently assign 50 AF to the City under a long-term agreement. Implementation of a permanent transfer agreement will be evaluated after the completion of this UWMP update. This supply is subject to constraints discussed above with the USBR contract.

4.1.6 McConnell Foundation Purchase Agreement

The City has entered into short-term annual purchase agreements with the McConnell Foundation since 2001. The McConnell Foundation has a USBR contract to receive 5,100 AF of CVP water each year. The City requests to purchase water from the McConnell Foundation when needed to make up for the reduction in water supply. The City has used the McConnell agreements to supplement its supply during USBR restrictions on Lake Shasta diversions. In Shasta County, the only unrestricted water contractor not impacted by the CWP is the McConnell Foundation.

4.1.7 Centerville Community Services District

From 2002 to 2004, the City purchased 240 AF of water annually from the Centerville Community Services District. At this time, the City is not considering renewing this agreement.

4.1.8 Siddiqui Family Partnership

In 2003, the City had a purchase agreement with the Siddiqui Family Partnership to purchase 220 AF of CVP water. At this time, the City is not considering renewing this agreement.

4.1.9 Bella Vista Water District Agreement

The City has a purchase agreement with the Bella Vista Water District (BVWD) to receive up to 250 AF per year at the intertie location that connects their water systems. This agreement was effective December 7, 1999 and is renewed in five-year terms. The agreement expired in 2004 and has not been renewed.

4.1.10 City of Redding Agreement

The City has an agreement to purchase up to 224 AF per year of groundwater from the City of Redding. This agreement was effective August 7, 2007 and is renewed in one-year terms. The City has not purchased groundwater from the City of Redding since 2005.

4.1.11 Wholesale Supplies

The USBR is considered a wholesale supplier by DWR. Table 21 shows the existing City USBR contract supply and planned wholesale supply sources.

Table 21 Wholesale Supplies – Existing and Planned Sources of Water (Guidebook Table 17) 2010 Urban Water Management Plan City of Shasta Lake							
Wholesaler	Contracted Volume⁽¹⁾ AFY	2010⁽²⁾	2015	2020	2025	2030	2035
U.S. Bureau of Reclamation	4,430	2,572	3,019	2,644	2,737	2,835	2,936
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. <ol style="list-style-type: none"> 1. Contract 4,430 AF. Includes original contract (4,400 AF) plus the 30 AF reallocated from the Summit City Pressure Zone Agreement with the City of Redding. 2. In 2010, USBR allowed 100 percent of the allocation, but the City only used 2,572 AF. 3. Demand projections include conservation based on the City's per capita water use targets for 2015 and 2020. 							

4.1.12 Water Supply Summary

Table 22 summarizes the current and projected water supply sources for the City through 2035.

Table 22 Water Supplies - Current and Projected (Guidebook Table 16) 2010 Urban Water Management Plan City of Shasta Lake						
Water Supply Sources	Projected Supply (AFY)					
	2010	2015	2020	2025	2030	2035
US Bureau of Reclamation (USBR) ⁽¹⁾	2,572	3,019	2,644	2,737	2,835	2,936
Supplier-Produced Groundwater	0	0	0	0	0	0
Supplier-Produced Surface Water	0	0	0	0	0	0
Transfers In						
Anderson-Cottonwood Irrigation District (ACID) ⁽²⁾	0	0	2000	2000	2000	2000
MCM Properties ⁽³⁾	0	0	325	325	325	325
Shasta County Water Agency (SCWA) ⁽⁴⁾	50	50	50	50	50	50
McConnell Foundation ⁽⁵⁾	0	varies	varies	varies	varies	varies
Exchanges In	0	0	0	0	0	0
Recycled Water	284	344	112	112	112	112
Desalinated Water	0	0	0	0	0	0
Other	0	0	0	0	0	0
Total	2,906	3,413	5,131	5,224	5,322	5,423
<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.</p> <ol style="list-style-type: none"> 1. Contract 4,430 AF. Reduced to 1,291 AF in 2014 due to drought conditions. 2. Transfer agreement 2,000 AF. Transfer not currently approved by USBR due to Cold Water Pool (CWP) issues. 3. Transfer agreement 325 AF. Transfer not currently approved by USBR due to CWP issues. 4. Transfer agreement 50 AF. 5. Annual agreement. The amount varies based on USBR allocation projections and City needs. 						

4.2 GROUNDWATER

The City is located north of the Redding Groundwater Basin (identified as Groundwater Basin Number 5-6.04 by the Department of Water Resources) which contains the main water-bearing geologic units in the northern Sacramento Valley. The geology underlying the City is characterized mainly by dense, relatively un-fractured meta-volcanic rock (Copley greenstone). Wells completed in the Copley greenstone generally have very low yields (less than 10 gpm). Less dense, probably more highly fractured black shale, the Kennett formation underlies the northeastern corner of the City. Wells of record completed in the Kennett formation within the City have similar or slightly higher yields than those completed in the Copley greenstone.

Chico formation rocks underlie the extreme south portion of the City. The Chico formation generally has poor water quality, and wells completed in this area of the City generally have low yields. A small area of Red Bluff formation occurs in the southeastern corner of the City.

Most wells of record within the City have very low yields (less than 10 gpm). The highest yielding wells near the City are those of the Mountain Gate Community Services District (two wells that average 200 gpm each).

The area with the best potential groundwater yield within the City's sphere of influence is the northeastern corner. This area appears to have a similar geologic setting to that of the Mountain Gate Community Services District well area. The Kennett formation has been mapped in that area, and there appears to be at least two fracture zones running through the area. Geologic conditions may not match exactly those of the Mountain Gate area, however, and it cannot be stated with certainty that yields similar to those at Mountain Gate can be obtained.

In 1996, the City joined the SCWA, the City of Redding, and several other local agencies as a member of the Redding Area Water Council (RAWC). The RAWC is a consortium of public and private 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 for the Redding Groundwater Basin in 1998 and updated it in 2007. The DWR does not identify the Redding Groundwater Basin as being over drafted nor expected to become over drafted.

The purposes of the Plan 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 Basin.

The City does not operate groundwater wells within the City limits for water supply. The 1998 Master Water Plan determined it was not feasible to obtain any significant water supply from groundwater wells inside the City limits. Therefore, the UWMP Tables for Historic and Projected Groundwater Pumping are not included in this UWMP.

The countywide water resource master plan proposes possible conjunctive use of groundwater for the City. This would involve diverting ACID water out of Shasta Lake for the City while the City pumped groundwater out of a future well into the ACID canal. The feasibility of this use is not known at this time.

4.3 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.

The City does not currently have any new transfer opportunities identified. Two long-term agreements (MCM and ACID) the City has in place are on hold due to CWP issues. A planned future water supply project (Section 4.6), if implemented, would allow the City to receive the water from the existing transfer agreements. The UWMP Guidebook table Transfer and Exchange Opportunities is not included this UWMP as the City is exploring options to fully utilize existing agreements.

4.4 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 City 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 since the City is not located near the coast or a brackish groundwater source.

4.5 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.

4.5.1 Wastewater Collection, Treatment Systems, and Disposal

The City manages wastewater collection and treatment within the city limits. All of the wastewater flows from the City (excluding storm water run-off), are collected and treated at the City's Wastewater Treatment Facility (WWTF), which produces disinfected tertiary recycled water per the recycled water criteria defined by the California Department of Public

Health under California Administrative Code, Division 4, Title 22, California Code of Regulations (CCR). The Wastewater collection system consists of approximately 270,000 feet of gravity sewer line, seven raw sewage lift stations, and 18,000 feet of force mains.

The WWTF was upgraded in 1995 to an average dry weather flow capacity of 1.3 MGD and a peak wet weather capacity of 5.2 MGD. The WWTF consists of a head-works with a mechanical bar screen unit, oxidation ditch, mixed liquor pump station, two secondary clarifiers, two traveling bridge filter units, chlorine contact basin, aerobic digester, sludge storage basins, emergency storage basin and 400-AF reservoir. The upgraded plant was designed to meet Title 22 requirements for golf course irrigation and for eventually expansion to 2.3 MGD. According to the 2005 Wastewater System Master Plan, there is space available at the WWTF to expand to approximately 4.4 MGD.

The treated effluent is discharged to either Churn Creek, the Reclaimed Water Reservoir for use in the recycled water distribution system, or the Irrigation Pump Station for irrigation of pastureland. The City irrigates approximately 40 acres of City pastureland surrounding the treatment plant site.

From October 15 - April 15 the City is allowed to discharge treated water to Churn Creek, a tributary of the Sacramento River, provided there is a 10:1 dilution factor in the creek. Discharge is allowed from two discharge locations. 001 discharges water directly from the end of the WWTF to Churn Creek. 002 discharges water from the reclaimed reservoir to Churn Creek downstream from location 001 discharge. Effluent discharged to Churn Creek is dechlorinated.

Recycled water that cannot be discharged to Churn Creek due to the time of year or to drought conditions (reduced Creek flows) is stored in the 400-AF reservoir. The 2005 Wastewater System Master Plan indicated that the ability to discharge treated effluent would limit new development and recommended that the City seek additional recycled water users or develop a direct discharge to the Sacramento River.

Within the next five years, the City plans to upgrade the WWTF to enable year-round direct discharge of its effluent to Churn Creek, which will limit the amount of reclaimed water available for other uses. Once complete, the 400-AF reservoir will be abandoned. The plant upgrades will include four deep-bed filters, ultraviolet (UV) disinfection, and conversion of the chlorine contact basin into a reclaimed water storage basin. The reclaimed water storage basin will be used for chlorine contact for reclaimed, backwash, and utility water demand. UV disinfected effluent will be discharged directly to the Creek.

Between 2005 and 2013, the WWTF received an average annual flow of approximately 345 million gallons or just less than 1.0 mgd. As the WWTF was designed to meet Title 22 requirements, all of the flow discharged meets recycled water standards. Table 23 contains current and projected wastewater volumes collected within the City limits. Table 24 contains the volumes of WWTF discharged to Churn Creek. Discharge to the creek is limited to October through April and is further limited by dilution factor. It has been assumed that the

discharge to the creek will remain stable until upgrades to the WWTF are completed. The average percent of creek discharge to WWTF flow from 2005 to 2013 was 68 percent. These tables will be updated in subsequent UWMPs once the City's General Plan and Wastewater Master Plan have been updated and the WWTF has been upgraded.

Table 23 Recycled Water – Wastewater Collection and Treatment (Guidebook Table 21) 2010 Urban Water Management Plan City of Shasta Lake							
Type of Wastewater	2005	2010	2015	2020	2025	2030	2035
Wastewater Collected and Treated in Service Area (AFY) ⁽¹⁾	1,176	1,167	1,064	1,456	1,647	1,893	2,240
Volume that meets recycled water standard ⁽²⁾	1,176	1,167	1,064	1,456	1,647	1,893	2,240
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. Projected values for 2015 through 2035 based on the 2013 actual influent flow, 2009 Recycled Water Facilities Plan, 2005 Wastewater Master Plan, City Master Sewer Plan, and the Mountain Gate at Shasta EIR. Numbers represent Average Dry Weather Flow.							
2. Entire volume of the treated effluent meets recycled water standards.							

Table 24 Recycled Water – Non-Recycled Wastewater Disposal (Guidebook Table 22) 2010 Urban Water Management Plan City of Shasta Lake							
Method of Disposal	Treatment Level	2010	2015	2020	2025	2030	2035
Discharge to Churn Creek (AFY)	Title 22	921	722	988	1,117	1,285	1,520
Total		921	722	988	1,117	1,285	1,520
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. Projected discharge to the creek based on the average percent of total flow discharged from 2005-2013, 68 percent. This will increase after the upgrades to the WWTF are complete.							

4.5.2 Current and Projected Recycled Water Use

The City provides recycled water to Sierra Pacific Industries (SPI), Knauf Insulation, and the California Department of Transportation (Caltrans). SPI utilizes the recycled water for soaking log decks for fire prevention, Knauf for landscape and turf irrigation, and Caltrans for irrigation of the Shasta Dam Boulevard interchange on I-5. Recycled water is also used to irrigate the pastureland at the WWTF.

The 2005 UWMP reported that in 2005 approximately 364 AF of recycled water was used in the City for irrigation of log decks, process water for manufacturing, landscape irrigation, and irrigation of pastureland at the WWTF. The 2005 UWMP did not make recycled water use projections for 2010. Therefore, the 2010 actual recycled water use cannot be compared to that projected in 2005. Table 25 contains the recycled water used in 2010 within the City.

Table 25 2010 Recycled Water Use Compared to 2005 UWMP Use Projections (Guidebook Table 24) 2010 Urban Water Management Plan City of Shasta Lake		
User Type	Volume (AFY)	
	2010 Actual	2005 Projection for 2010⁽¹⁾
Agricultural Irrigation ⁽²⁾	203.6	Not available
Landscape Irrigation ⁽³⁾	13.9	Not available
Commercial Irrigation ⁽⁴⁾	33.1	Not available
Golf Course Irrigation	0	Not available
Wildlife Habitat	0	Not available
Wetlands	0	Not available
Industrial Reuse ⁽⁵⁾	33.6	Not available
Groundwater Recharge	0	Not available
Seawater Barrier	0	Not available
Geothermal Energy	0	Not available
Indirect Potable Reuse	0	Not available
Total	284.2	Not available
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. The 2005 UWMP did not include projections for recycled water use in 2010. 2. Spray irrigation of City pastureland. 3. Irrigation by the California Department of Transportation. 4. Landscape and turf irrigation by Knauf Fiberglass. 5. Soaking of log decks by Sierra Pacific Industries.		

Since 2005, the City has continued to supply recycled water to the existing customers and provide irrigation water for the pastureland surrounding the WWTF. Table 26 estimates the potential future recycled water use. These numbers may be adjusted in the future to reflect changes in City operation after the WWTF upgrade, a change in the dilution factor to Churn Creek, an update to the General Plan and Wastewater Master Plan, new customers, and regulations governing the production and uses of recycled water.

Caltrans has recently requested an additional 5 million gallons (MG) per year (15.4 AF) of recycled water for irrigation of additional interchanges on the I-5 corridor. A reclaimed water balance performed by WaterWorks Engineers (May 7, 2014) that took the WWTF upgrade, existing recycled water usage, and future Caltrans use into account, stated that there would be sufficient capacity to provide recycled water to the three current recycled water users and provide Caltrans with the additional supply they requested.

Table 26 Recycled Water – Potential Future Use (Guidebook Table 23) 2010 Urban Water Management Plan City of Shasta Lake							
User Type	Description	Feasible?	Volume (AFY)				
			2015⁽¹⁾	2020	2025	2030	2035
Agricultural Irrigation ⁽²⁾	City pasture	Yes	232	0	0	0	0
Landscape Irrigation	I-5 landscape	Yes	33	33	33	33	33
Commercial Irrigation ⁽³⁾	Knauf	Yes	35	35	35	35	35
Golf Course Irrigation		Yes	0	0	0	0	0
Wildlife Habitat ⁽⁴⁾		No	0	0	0	0	0
Wetlands		No	0	0	0	0	0
Industrial Reuse ⁽³⁾	SPI	Yes	44	44	44	44	44
Groundwater Recharge		No	0	0	0	0	0
Seawater Barrier		No	0	0	0	0	0
Geothermal Energy		No	0	0	0	0	0
Indirect Potable Reuse		No	0	0	0	0	0
Total			344	112	112	112	112
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. 2015 estimates based on the results of the 2014 City of Shasta Lake WWTF Future Reclaimed System Water Balance Technical Memorandum. 2. Volume reflects the average usage from 2009 to 2013. The City will no longer have recycled water available for the spray fields once the upgrades to the WWTF are complete. 3. Volumes reflect the 2014 Water Balance. Future use unknown due to potential new customers. 4. The discharge to Churn Creek may be considered beneficial use recycled water use in future UWMP updates.							

4.5.3 Potential Uses of Recycled Water

The service area for BVWD contains a number of agricultural water users and two golf courses, all located in reasonable proximity to the end of the City's existing recycled water pipeline. A Recycled Water Facilities Planning Report prepared by PACE Engineering in 2009, identified one potentially viable site in BVWD (Tierra Oaks Golf Course) primarily due to its proximity to the existing recycled water pipeline. This site could potentially use 400 AF annually. Additionally the Mountain Gate at Shasta Project has indicated they will use recycled water within the project boundaries if it is available. The amount that could potentially be distributed to the Mountain Gate at Shasta Project is unknown.

Other potential uses of recycled water within the City could include:

- Urban (park and streetscape) landscape irrigation,
- Residential irrigation,
- School landscape irrigation, and,
- Dual-plumbed business/commercial developments.

The above potential uses are typical urban uses of recycled water that do not require potable water, but do require treatment to meet certain recycled water standards outlined in the California Code of Regulations Title 22. Depending on the City's operational plan after the WWTF upgrade, condition of the recycled water distribution system, and feasibility to expand the recycled water distribution system, the City may expand its use of recycled water.

4.5.4 Encouraging Recycled Water Use

The City encourages the use of recycled water by commercial and industrial water customers. The City will continue to be proactive in public education regarding the safety and reliability of recycled water for both irrigation and process uses. The rate for recycled water is currently \$0.172 per 100 cubic feet compared to \$1.27 per 100 cubic feet for potable water. This provides a financial incentive to the existing customers and future customers.

Due to the pending WWTF upgrades, current recycled water rates, the long historical use of the three current recycled water customers, and the results of the reclaimed water balance performed by WaterWorks Engineers, there is not currently a need to provide further financial incentives to encourage recycled water use over the planning period. Therefore, the UWMP Guidebook Table Methods to Encourage Recycled Water Use is not included in this UWMP. If projects occur, methods to encourage recycled water use can be developed to maximize project benefits. If warranted the UWMP Guidebook table will be included in the subsequent UWMP update.

4.5.5 Recycled Water Use Optimization Plan

The City prepared a WWTF Future Reclaimed System Water Balance (WaterWorks Engineers, 2014) to determine the reclamation capacity of the WWTF and a Recycled Water Facilities Planning Report (PACE Engineering, 2009) that evaluated the feasibility of other recycled water customers in the surrounding areas. These documents are included in Appendix D.

4.6 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.

In an effort to withdraw the full transfer amounts from ACID and MCM, the City requested DWR Integrated Regional Water Management (IRWM) grant funding for a project to divert the transferred water through the BVWD’s water intake on the Sacramento River, treat the water, and then deliver it to the City via the intertie with the BVWD. The project will include infrastructure improvements to BVWD’s and the City’s treatment, pumping, distribution systems, and the existing intertie pump station. In a letter of support from the USBR dated June 11, 2014, it stated that by withdrawing water at the BVWD intake in the Sacramento River, the CWP issues are essentially eliminated as compared to diverting that same volume from Lake Shasta.

If implemented, this project would allow the City to withdraw the full transfer amounts from the ACID and MCM transfer. Table 27 summarizes the future water supply project. This project will allow the City to utilize existing long-term transfer agreements and ensure a sustainable water supply and reliability for the City. Note that the reductions are based on percent reductions determined for USBR allocations from historical records (refer to Section 4.1.1) and may not reflect the actual reductions implemented.

Table 27 Future Water Supply Projects (Guidebook Table 26) 2010 Urban Water Management Plan City of Shasta Lake								
Project Name	Projected Start Date	Projected Completion Date	Potential Project Constraints	Projected Annual Supply (AFY)				
				Normal Year	Single Dry Year	Multiple Dry First Year	Multiple Dry Second Year	Multiple Dry Third Year
City of Shasta Lake Water Supply Enhancement Project	4/1/16	12/31/17	IRWM Funding USBR Allocations	2,325	1,070	1,790	1,558	2,093
Total				2,325	1,070	1,790	1,558	2,093

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.

WATER SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING

This chapter describes the reliability of the City's water supplies, including a discussion of the City'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 City of Shasta Lake (City), under both normal and dry conditions.

The City depends heavily on its long-term contract to purchase water from the United States Bureau of Reclamation (USBR) for 4,430-Acre Feet (AF) per year. This contract to take water from Shasta Lake is the City's main source of water. During low rainfall years, the City's allocation can be reduced by up to 50 percent depending upon the USBR water supply projections. For this reason, the City has constructed two inter-ties with neighboring entities in case of an emergency. For the last few years, the City has purchased supplemental water from the Shasta County Water Agency (SCWA) and the McConnell Foundation under short-term contracts. A long-term contract with SCWA is being evaluated. The City also has long-term contracts with MCM Properties (MCM) and Anderson Cottonwood Irrigation District (ACID), which have not been utilized due to Cold Water Pool (CWP) issues identified by the USBR.

Unfortunately, short-term contracts are very insecure from the standpoint of reliability and cost fluctuations. Additionally, the ACID and MCM long-term contracts have not been

reliable due to CWP issues. Thus, in an effort to withdraw the full transfer amounts from ACID and MCM, the City requested DWR Integrated Regional Water Management (IRWM) grant funding for a project to divert the transferred water through the BVWD's water intake on the Sacramento River, treat the water, and then deliver it to the City via the intertie with the BVWD.

In addition, the City provided a comment letter to USBR on the Draft Environmental Impact Statement for the Shasta Lake Water Resources Investigation (Enlargement of Shasta Dam). As partial mitigation for the social disruptions, traffic impacts, and revenue losses predicted to result from this project, the City requested USBR dedicate 4,600 AF of the newly impounded water to the City's base allocation of 4,400 AF, increasing its total long-term allocation to 9,000 AF. This would provide a sustainable water supply and reliability for the City. Without a sustainable and reliable water supply, future growth and industrial/commercial growth could be delayed for the City.

Table 28 contains a summary of factors affecting water supply reliability and 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.

Table 28 Factors Resulting in Inconsistency of Supply (Guidebook Table 29) 2010 Urban Water Management Plan City of Shasta Lake							
Water Supply Sources⁽¹⁾	Specific Source Name	Limitation Quantification	Legal	Environmental	Water Quality	Climatic	Additional Information
USBR Contract	CVP	Note 2	X	X		X	
Anderson Cottonwood Irrigation District	CVP	Note 2	X	X		X	
MCM Properties	CVP	Note 2	X	X		X	
Shasta County Water Agency	CVP	Note 2	X	X		X	
McConnell Foundation	CVP	Note 3	X				
<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.</p> <ol style="list-style-type: none"> From Guidebook Table 16 (Table 22 in this report). Quantity dependent on USBR allocations and USBR approval of transfers. Quantity based on annual agreement amount. 							

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 water quality from Shasta Lake is very good. The Lake is most vulnerable to contaminants from recreational activities. Water quality does not have a significant affect on water management strategies or reliability due to the high quality of the surface water supply. 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 City's drinking water meets all applicable water quality regulations (See Appendix E for a copy of the City'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 City develop stages of action to be undertaken during a catastrophic interruption of water supply or the City's water treatment facilities that could include flooding, major fire emergencies, regional power outage, an earthquake, water contamination, and acts of sabotage. In response to these possibilities, the City has developed an Emergency/Disaster 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 procedures for the distribution of potable water in a disaster, these procedures are consistent with guidelines prepared by the California State Office of Emergency Services. A copy of the Emergency Response Plan is included in Appendix F.

In 1994, the City prepared and adopted a Water Shortage Contingency Plan detailing the stages of action to be undertaken during a reduction in water supply. This plan has been incorporated into the City's 2000 Water Conservation Plan and subsequent water planning documents. A copy of the 1994 Water Shortage Contingency Plan and the 2000 Water Conservation Plan are included in Appendix G.

5.3.1 Water Shortage Emergency

The City’s Municipal Code allows the City Council to declare a water shortage emergency and enact water use restrictions on all city customers. The Municipal Code was updated to include the rationing stages and newly identified mandatory conservation measures for each stage. A copy of Ordinance CC 14-236, adopted by City Council on September 16, 2014, is included in Appendix H.

5.3.2 Stages of Action in Response to Water Supply Shortages

In addition to actions, the City is required to develop mandatory prohibitions against specific water use during shortages and consumption reduction methods in the most restrictive stages, including up to a 50 percent reduction in water supply. The City must also identify specific water supply conditions, which are applicable to each stage. The stages of action in response to water supply shortages, including up to a 50 percent reduction in water supply are summarized in Table 29.

During each stage of action, the City shall conduct an extensive water conservation program, which may include information posted on the City’s website, handouts, mailers, newspaper notices, and radio/television advertisement. The City also shall have available indoor and outdoor water conservation retrofit kits for all customers.

Table 29 Water Shortage Contingency – Rationing Stages to Address Water Supply Shortages (Guidebook Table 35) 2010 Urban Water Management Plan City of Shasta Lake				
Stage No.	Type	Water Supply Conditions	Shortage	Demand Reduction Goal
1	Voluntary	Reduction in Agency Water Supply: Water Shortage Alert	Up to 10%	10%
2	Mandatory	Reduction in Agency Water Supply: Moderate Water Shortage	11-20%	20%
3	Mandatory	Reduction in Agency Water Supply: Emergency Water Shortage	21-30%	30%
4	Mandatory	Reduction in Agency Water Supply: Severe Water Shortage	31-40%	40%
5	Mandatory	Reduction in Agency Water Supply or a Catastrophic Interruption in Water Supply: Critical Water Shortage Emergency	41-50%	50%
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.				

5.3.2.1 Stage 1: Water Shortage Alert

The City's supply (treatment) and/or distribution system is able to meet much of or most of the water demands of its customers in the immediate future. Some restrictions are encouraged in an effort to reduce water consumption.

Type of Program: Voluntary

Triggering Mechanism: A cutback in available water supply of up to 10 percent.

Consumption Limits: All customers would be requested to reduce consumption by 10 percent.

Requested Consumer Actions: Customers would be requested to implement voluntary Stage 1 measures.

Stage 1: Water Shortage Alert	
1.	Water shall be used for beneficial uses only; all unnecessary and wasteful uses of water shall be prohibited.
2.	Water from landscape irrigation shall be confined to the consumer's property and shall not be allowed to run off to adjoining property or to the roadside ditch or gutter.
3.	Water shall not be used for washing cars, boats, trailers, or other vehicles by hose without a shutoff nozzle and bucket, except to wash such vehicles at commercial or fleet vehicle washing facilities.
4.	Water shall not be used to wash buildings, structures, sidewalks, walkways, driveways, parking lots, open ground or other hard surfaced areas except where necessary for public health or safety.
5.	Free-flowing hoses for any use shall be prohibited. Customers shall use automatic shutoff devices on any hose or filling apparatus.
6.	Faulty sprinklers and/or breaks within the customer's plumbing system shall be repaired within twenty-four (24) hours after the customer is notified or discovers the break.
7.	All wading/portable pools, spas, and ornamental fountains/ponds shall be equipped with a recirculating pump, and shall be constructed to be leak-proof. Swimming pool/spa covers are encouraged to prevent evaporative water loss.
8.	All large water users, such as industrial uses, schools, supermarkets, civic/government buildings, etc., shall develop a Water Conservation Plan indicating a 10 percent reduction in water usage and submit the Plan to the City's Water Conservation Coordinator for approval within thirty calendar days.
9.	Use of landscape irrigation systems for all customers, including parks and school grounds, shall be limited between the hours of 9:00 P.M. and 9:00 A.M. to reduce evaporation.
10.	Irrigated landscaped areas shall include efficient irrigation systems (e.g., drip irrigation systems, timed sprinklers, rain sensors, low-flow spray heads, etc.)
11.	All new development shall be required to install low flow devices (i.e., toilets and shower heads) pursuant to California Building Code standards.
12.	Restaurant customers shall receive water only upon request.

5.3.2.2 Stage 2 Moderate Water Shortage

There is a probability that the City's supply (treatment) and/or distribution system will not be able to meet all water demands of City customers with the City's available water supply for the current water year. Additional restrictions apply in an effort to increase the conservation by 10 percent above Stage 1.

Type of Program: Mandatory

Triggering Mechanism: A cutback in available water supply of 11 to 20 percent.

Consumption Limits: All customers would be required to reduce consumption by 20 percent.

Required Consumer Actions: Customers would be required to comply with Stage 1 restrictions (becomes mandatory in Stage 2) and the mandatory Stage 2 restrictions.

Stage 2: Moderate Water Shortage	
1.	Water use for ornamental ponds and fountains shall be prohibited.
2.	All large water users, such as industrial uses, schools, supermarkets, civic/government buildings, etc., shall develop or update their Water Conservation Plans and submit the Plan to the City's Water Conservation Coordinator for approval within thirty (30) calendar days. The Plan shall address all rationing stages of this Chapter as follows: Stage 2: Demonstrate a 20 percent reduction in water usage; Stage 3: Demonstrate a 30 percent reduction in water usage; Stage 4 Demonstrate a 40 percent reduction in water usage; Stage 5: Demonstrate a 50 percent reduction in water usage.
3.	Parks and school grounds shall be watered at night only between the hours of 9:00 P.M. and 9:00 A.M., no more than three nights per week, and shall achieve a 20 percent reduction in water use. The reduction shall be measured based on the amount of water used in the previous calendar month compared to the same calendar month in the previous year.
4.	Use of landscape irrigation systems for all other customers shall be limited between the hours of 9:00 P.M. and 9:00 A.M. no more than three nights per week. The limitation for times does not apply to: a. Drip, bubbler, or soaker irrigation hardware or emitters; b. Use of an irrigation system for the express purposes of repairing or completing routine maintenance. c. Watering by use of a hand-held bucket or similar container or a hand-held hose equipped with shut-off nozzle. d. Watering by use of a hose-end sprinkler with a radius of not more than ten (10) feet if such sprinkler causes no overspray or runoff to adjoining property or to the roadside ditch or gutter.
5.	All City water customers who do not comply with the reduced consumption amount shall be required to install retrofit kits.
6.	The City will implement excessive water use penalties or tier water rates to discourage excessive water use and shall penalize water customers who fail to meet the reduced consumption amount.

5.3.2.3 Stage 3 Emergency Water Shortage

There is a probability that the City's supply (treatment) and/or distribution system will not be able to meet all water demands of City customers with the City's available water supply for the current water year. Additional restrictions apply in an effort to increase the conservation by 10 percent above Stage 2.

- Type of Program:** Mandatory
- Triggering Mechanism:** A cutback in available water supply of 21 to 30 percent.
- Consumption Limits:** All customers would be required to reduce consumption by 30 percent.
- Required Consumer Actions:** Customers would be required to comply with Stage 1 restrictions (becomes mandatory in Stage 3) and the mandatory Stage 2 and Stage 3 prohibitions.

Stage 3: Emergency Water Shortage
1. Parks and school grounds shall be watered at night only between the hours of 9:00 P.M. and 9:00 A.M., no more than two nights per week, and shall achieve a 30 percent reduction in water use.
2. Use of landscape irrigation systems for all other customers shall be limited between the hours of 9:00 P.M. and 9:00 A.M. no more than two nights per week for a maximum total run time of 15 minutes per station per night. The limitation for times does not apply to: a. Drip, bubbler, or soaker irrigation hardware or emitters; b. Use of an irrigation system for the express purposes of repairing or completing routine maintenance. c. Watering by use of a hand-held bucket or similar container or a hand-held hose equipped with shut-off nozzle. d. Watering by use of a hose-end sprinkler with a radius of not more than ten (10) feet if such sprinkler causes no overspray or runoff to adjoining property or to the roadside ditch or gutter.
3. Installation of irrigated landscaping for all new development shall be deferred pursuant to a written Agreement with the City.
4. No new landscape irrigation systems shall be installed on developed parcels. This restriction shall not apply to the replacement of inefficient irrigation systems with systems that incorporate water-savings technologies, such as the installation of high efficiency sprinkler heads, weather-based irrigation controllers, and/or drip irrigation systems.

5.3.2.4 Stage 4 Severe Water Shortage

The City's supply (treatment) or distribution system will not be able to meet all demands of City customers with the City's available water supply for the current water year. Additional restrictions apply in an effort to increase the conservation by 10 percent above Stage 3.

Type of Program: Mandatory

Triggering Mechanism: A cutback in available water supply of 31 - 40 percent.

Consumption Limits: All customers would be required to reduce consumption by 40 percent for the duration of the water emergency.

Required Consumer Actions: Customers would be required to comply with all Stage 1 restrictions (become mandatory in Stage 4) and the mandatory Stage 2, Stage 3, and Stage 4 prohibitions.

Stage 4: Severe Water Shortage	
1.	Water use shall be restricted so as to meet the minimum requirements for personal health and safety. Priority shall be given to supplying adequate water to ensure public/community health and safety (i.e., fire suppression, medical, veterinarian, and educational institutions).
2.	Swimming pools that have been filled prior to Stage 4 shall not be emptied and refilled.
3.	Filling of new swimming pools is prohibited as of the effective date of the Stage 4 declaration.
4.	Flushing of sewers and fire hydrants shall be prohibited except in cases of emergency.
5.	No potable water from the City system shall be used for construction purposes, such as dust control, compaction, or trench jetting.

5.3.2.5 Stage 5 Critical Water Shortage Emergency

The City's supply (treatment) or distribution system will not be able to meet all demands of City customers with the City's available water supply for the current water year. The City is experiencing a major failure of supply, storage, or distribution facility. The City is not able to meet all customer water requirements with Stage 4 measures.

Type of Program: Mandatory

Triggering Mechanism: A cutback in available water supply of 41-50 percent.

Consumption Limits: All customers would be required to reduce consumption by 50 percent for the duration of the water emergency.

Required Consumer Actions: Customers would be required to comply with all Stage 1 restrictions (become mandatory in Stage 5) and the mandatory Stage 2, Stage 3, Stage 4, and Stage 5 prohibitions.

Stage 5: Critical Water Shortage Emergency	
1.	No new residential development shall be permitted unless the developer has submitted a complete building permit application to the City prior to the Stage 5 declaration.
2.	Use of landscape irrigation systems for all customers shall be prohibited. Using a hand-held container for watering is allowed. Watering by use of a hand-held bucket or similar container or a hand-held hose equipped with shut-off nozzle is allowed.

Table 30 contains mandatory prohibitions and the water shortage stage when they are enacted.

Table 30 Water Shortage Contingency – Mandatory Prohibitions (Guidebook Table 36) 2010 Urban Water Management Plan City of Shasta Lake	
Prohibitions	Stage When
Water shall be used for beneficial uses only; all unnecessary and wasteful uses of water shall be prohibited.	2
Water from landscape irrigation shall be confined to the consumer's property and shall not be allowed to run off to adjoining property or to the roadside ditch or gutter.	2
Water shall not be used for washing cars, boats, trailers, or other vehicles by hose without a shutoff nozzle and bucket, except to wash such vehicles at commercial or fleet vehicle washing facilities.	2
Water shall not be used to wash buildings, structures, sidewalks, walkways, driveways, parking lots, open ground or other hard surfaced areas except where necessary for public health or safety.	2
Free-flowing hoses for any use shall be prohibited. Customers shall use automatic shutoff devices on any hose or filling apparatus.	2
Faulty sprinklers and/or breaks within the customer's plumbing system shall be repaired within twenty-four (24) hours after the customer is notified or discovers the break.	2
All wading/portable pools, spas, and ornamental fountains/ponds shall be equipped with a recirculating pump, and shall be constructed to be leak-proof. Swimming pool/spa covers are encouraged to prevent evaporative water loss.	2
Use of landscape irrigation systems for all customers, including parks and school grounds, shall be limited between the hours of 9:00 P.M. and 9:00 A.M. to reduce evaporation.	2
Irrigated landscaped areas shall include efficient irrigation systems (e.g., drip irrigation systems, timed sprinklers, rain sensors, low-flow spray heads, etc.)	2
All new development shall be required to install low flow devices (i.e., toilets and shower heads) pursuant to California Building Code standards.	2
Restaurant customers shall receive water only upon request.	2
Water use for ornamental ponds and fountains shall be prohibited.	2
All large water users, such as industrial uses, schools, supermarkets, civic/government buildings, etc., shall develop or update their Water Conservation Plans and submit the Plan to the City's Water Conservation Coordinator for approval within thirty (30) calendar days. The Plan shall address all rationing stages of this Chapter as follows: Stage 2: Demonstrate a 20 percent reduction in water usage; Stage 3: Demonstrate a 30 percent reduction in water usage; Stage 4 Demonstrate a 40 percent reduction in water usage; Stage 5: Demonstrate a 50 percent reduction in water usage.	2

<p>Parks and school grounds shall be watered at night only between the hours of 9:00 P.M. and 9:00 A.M., no more than three nights per week, and shall achieve a 20 percent reduction in water use. The reduction shall be measured based on the amount of water used in the previous calendar month compared to the same calendar month in the previous year.</p>	2
<p>Use of landscape irrigation systems for all other customers shall be limited between the hours of 9:00 P.M. and 9:00 A.M. no more than three nights per week.</p> <p>The limitation for times does not apply to:</p> <ul style="list-style-type: none"> a. Drip, bubbler, or soaker irrigation hardware or emitters; b. Use of an irrigation system for the express purposes of repairing or completing routine maintenance. c. Watering by use of a hand-held bucket or similar container or a hand-held hose equipped with shut-off nozzle. d. Watering by use of a hose-end sprinkler with a radius of not more than ten (10) feet if such sprinkler causes no overspray or runoff to adjoining property or to the roadside ditch or gutter. 	2
<p>All City water customers who do not comply with the reduced consumption amount shall be required to install retrofit kits.</p>	2
<p>The City will implement excessive water use penalties or tier water rates to discourage excessive water use and shall penalize water customers who fail to meet the reduced consumption amount.</p>	2
<p>Parks and school grounds shall be watered at night only between the hours of 9:00 P.M. and 9:00 A.M., no more than two nights per week, and shall achieve a 30 percent reduction in water use.</p>	3
<p>Use of landscape irrigation systems for all other customers shall be limited between the hours of 9:00 P.M. and 9:00 A.M. no more than two nights per week for a maximum total run time of 15 minutes per station per night.</p> <p>The limitation for times does not apply to:</p> <ul style="list-style-type: none"> a. Drip, bubbler, or soaker irrigation hardware or emitters; b. Use of an irrigation system for the express purposes of repairing or completing routine maintenance. c. Watering by use of a hand-held bucket or similar container or a hand-held hose equipped with shut-off nozzle. d. Watering by use of a hose-end sprinkler with a radius of not more than ten (10) feet if such sprinkler causes no overspray or runoff to adjoining property or to the roadside ditch or gutter. 	3
<p>Installation of irrigated landscaping for all new development shall be deferred pursuant to a written Agreement with the City.</p>	3

No new landscape irrigation systems shall be installed on developed parcels. This restriction shall not apply to the replacement of inefficient irrigation systems with systems that incorporate water-savings technologies, such as the installation of high efficiency sprinkler heads, weather-based irrigation controllers, and/or drip irrigation systems.	3
Water use shall be restricted so as to meet the minimum requirements for personal health and safety. Priority shall be given to supplying adequate water to ensure public/community health and safety (i.e., fire suppression, medical, veterinarian, and educational institutions).	4
Swimming pools that have been filled prior to Stage 4 shall not be emptied and refilled.	4
Filling of new swimming pools is prohibited as of the effective date of the Stage 4 declaration.	4
Flushing of sewers and fire hydrants shall be prohibited except in cases of emergency.	4
No potable water from the City system shall be used for construction purposes, such as dust control, compaction, or trench jetting.	4
No new residential development shall be permitted unless the developer has submitted a complete building permit application to the City prior to the Stage 5 declaration.	5
Use of landscape irrigation systems for all customers shall be prohibited. Using a hand-held container for watering is allowed. Watering by use of a hand-held bucket or similar container or a hand-held hose equipped with shut-off nozzle is allowed.	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.	

5.3.2.6 Consumption Reduction Methods

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses methods to reduce consumption; see except 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 31 contains consumption reduction methods by water shortage stage with projected reduction.

Table 31 Water Shortage Contingency – Consumption Reduction Methods (Guidebook Table 37) 2010 Urban Water Management Plan City of Shasta Lake		
Consumption	Stage When	Projected Reduction
Public education	All	10%
Excess water use penalties and water shortage pricing	2-5	11-50%
Voluntary rationing	1	11%
Mandatory rationing	2-5	11-50%
No building permits issued for new residential development	5	41-50%
<small>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.</small>		

5.3.2.7 Penalties and Charges

The penalties or charges for excessive use during water shortages are summarized in Table 32.

Table 32 Water Shortage Contingency – Penalties and Charges (Guidebook Table 38) 2010 Urban Water Management Plan City of Shasta Lake	
Penalties or Charges⁽¹⁾	Stage When Penalty Takes Effect
<p>Customers violating the mandatory regulations and restrictions on water use set forth by the City shall be penalized as follows:</p> <p>First Violation: The City shall provide notice of the violation and a copy of the applicable mandatory water use restrictions to the current property owner and/or billing address.</p> <p>Second Violation: The City shall issue a written warning and notice that additional violations may result in penalties or termination of service.</p> <p>Third Violation: A third violation within twelve calendar months of the second violation shall result in a penalty not to exceed \$100.00.</p> <p>Fourth Violation: A fourth violation within twelve calendar months of the third violation shall result in a penalty not to exceed \$200.00.</p> <p>Fifth and Subsequent Violations: A fifth violation and subsequent violations within twelve calendar months of the fourth violation shall result in a penalty not to exceed \$500.00.</p> <p>Each separate day or portion thereof in which any violation of the mandatory water use restrictions occurs, or continues without a good faith effort by the customer to correct the violation, shall constitute a separate violation.</p> <p>The amount of all penalties shall be added to the next water bill thirty days after the date of the written notice of the violation if not paid in full or protested.</p> <p>In addition to any penalties, the City may disconnect and/or terminate a customer’s water service. If water service is disconnected, it shall be restored only upon payment of the connection charge fixed by City Council.</p> <p>Violations may also be redressed by civil action. In addition to being subject to prosecution, any person who violates any of the mandatory water use restrictions may be made the subject of a civil action. Appropriate civil action includes, but is not limited to, injunctive relief and cost recovery.</p>	<p style="text-align: center;">2</p>

<p><u>Excess Water Use Penalties:</u></p> <p>Residential</p> <ul style="list-style-type: none"> • Consumption of 1,001 – 5,000 cubic feet (CF) per month: \$0.30 per 100 CF penalty • Consumption over 5,001 CF per month: \$2.50 per 100 CF penalty <p>Non-Residential</p> <ul style="list-style-type: none"> • Consumption over 1,001 CF: \$0.50 per 100 CF penalty 	<p>2</p>
<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. 1.The charges shown are from the 1994 Plan. It is likely these fees will be updated in a revised Plan.</p>	

5.3.3 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.

Reductions in water use for each user can be determined based on meter readings.

5.3.4 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.

Annually during the budget process, the City forecasts the revenues expected for the upcoming year. At that time, shortfalls in revenues relating to water shortage will be identified and rate adjustments recommended. The City shall monitor water revenues and expenses closely to evaluate whether “water shortage” adjustments to water rates are required. Additional costs would indeed be associated with increased monitoring during water shortage situations, namely due to an increase in the hours required monitor customer accounts. The additional costs associated with this effort, however, are not expected to significantly impact City revenues and expenditures.

5.3.5 Water Shortage Contingency Resolution or Ordinance

The California Water Code requires that the City 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 City has adopted a Water Shortage Contingency Plan and has incorporated the restrictions, which would become effective immediately during a declared “Water Shortage Emergency” into the City Municipal Code (Ordinance 08-194), refer to Section 5.3 for specific restrictions. The Municipal Code was updated to include rationing stages and newly identified mandatory water conservation measures for each stage.

5.4 DROUGHT PLANNING

This section considers the City’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.

Since the City’s water supply in future years will come from Shasta Lake, seasonal and climatic changes will impact the availability of water. Historical curtailments in the City’s supply occurred during drought years. The specific years identified for average, single-dry, and multiple-dry water years presented in Table 33 were developed based on historical DWR runoff records for the Sacramento Valley and the availability of City records.

The City was incorporated in 1993; therefore accurate water supply records are only available for 1993 through 2014. Although the area experienced a severe drought from 1985 to 1992, and from 2007 through 2009. Table 33 and Table 34 reflect the 2007 through 2009 drought since accurate water supply records were available. The year 2014 was selected for the single-dry year because the City’s water supply allocation was reduced to 1,291 AF.

Table 33 Basis of Water Year Data (Guidebook Table 27) 2010 Urban Water Management Plan City of Shasta Lake	
Water Year Type	Base Year(s)
Average Water Year ⁽¹⁾	2004
Single-Dry Water Year	2014
Multiple-Dry Water Years ⁽²⁾	2007-2009
<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.</p> <p>1. Historical DWR records for the sequence 1974-2013 were reviewed and coordinated with the available City water supply records since City incorporation.</p> <p>2. Historical DWR multiple-dry water years were from 1985 through 1992 and 2007 through 2009. The latter was selected due to the availability of accurate water supply records.</p>	

Table 34 contains the actual water supply that was available for each of the water year types, as a percentage of the average water year that occurred in 2004. The quantity reflects the amount diverted by the City under their USBR contract and does not include transfers from SCWA. Table 35 shows the available supply by water source including transfer agreements. Table 35 assumes that the Water Supply Enhancement Project is completed and the supply is available in 2020 (refer to Table 27).

Table 34 Supply Reliability – Historical Conditions (Guidebook Table 28) 2010 Urban Water Management Plan City of Shasta Lake				
Average Water Year⁽¹⁾ AFY	Single-Dry Water Year⁽²⁾ AFY	Multiple-Dry Water Years⁽²⁾ AFY		
		Year 1	Year 2	Year 3
2,802	1,291	2,170	1,867	2,522
Percent of Average Year:	46	77	67	90
<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.</p> <p>1. Amount diverted by the City in 2004 under their USBR contract. Full allotment of 4,430 AF was not used.</p> <p>2. Actual water supply available for each year identified in Table 33.</p>				

Table 35 Supply Reliability – Current Water Sources (Guidebook Table 31) 2010 Urban Water Management Plan City of Shasta Lake				
Water Supply Sources	Average Water Supply Year AFY	Multiple-Dry Water Years		
		Year 1	Year 2	Year 3
USBR – Shasta Lake	2,802	2,170	1,867	2,522
USBR – Sacramento River ⁽¹⁾ (ACID and MCM transfers)	0	0	0	0
USBR – Shasta Lake (SCWA transfer)	50	50	50	50
McConnell Foundation ⁽²⁾	0	Varies	Varies	Varies
Percent of Average Year:		78	67	90
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.				
1. This allocation is not approved due to Cold Water Pool issues. Once the Water Supply Enhancement Project is completed an allocation of 2,325 AF will be available.				
2. The agreement amount is based on the City’s request for that water year.				

5.4.1 Minimum Supply Available for the Next Three Years

The California Water Code requires that the City estimate the minimum water supply available at the end of the 12, 24, and 36 months, assuming the driest three-year historic supply shortage. The historical multiple-dry year curtailments for 2007 through 2009 are shown in Table 34. In 2014, the USBR curtailment reduced the City’s allocation to 1,291 AF for the water year. The curtailment is determined by applying a percent reduction to the average City water produced from water years 2011 to 2013. Water year is defined as March through February. At this time, a minimum water supply of 1,291 AF should be assumed.

5.4.2 Supplies and Demands for Average Water Year

During an average water year, a combined delivery of up to 4,430 AF of water is available to the City under its USBR contract. However, the City typically uses 60 percent of this allotment. Future citywide demands, assuming the City can meet the water use targets, and the Water Supply Enhancement Project is completed will not exceed the supplies (Table 36).

Table 36 Supply and Demand Comparison- Average Year (Guidebook Table 32) 2010 Urban Water Management Plan City of Shasta Lake					
	2015	2020	2025	2030	2035
Supply Totals ⁽¹⁾	3,413	5,131	5,224	5,322	5,423
Demand Totals ⁽²⁾	3,019	2,644	2,737	2,835	2,936
Difference	394	2,487	2,487	2,487	2,487
Difference as % of Supply	12	48	48	47	46
Difference as % of Demand	13	94	91	88	85
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. Refer to Table 22 in this report. 2020-2035 supplies assume that the Water Supply Enhancement Project is completed.					
2. City wide demand totals include conservation based on water use targets. Refer to Table 17 in this report.					

5.4.3 Supplies and Demands for a Single-Dry Water Year

During a single-dry year, the USBR allotments can be reduced by 50 percent. Table 37 provides an estimate of the projected single-dry year supply and demand totals. Demand reductions due to water shortage stage rationing measures are not included in the single-dry year demand estimates.

Table 37 Supply and Demand Comparison - Single-Dry Year (Guidebook Table 33) 2010 Urban Water Management Plan City of Shasta Lake					
	2015	2020	2025	2030	2035
Supply Totals ⁽¹⁾	1,572	2,364	2,407	2,452	2,499
Demand Totals ⁽²⁾	3,019	2,644	2,737	2,835	2,936
Difference	-1,446	-280	-330	-383	-437
Difference as % of Supply	-92	-12	-14	-16	-18
Difference as % of Demand	-48	-11	-12	-14	-15
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. 2020-2035 supplies assume that the Water Supply Enhancement Project is completed.					
2. City wide demand totals include conservation based on water use targets. Refer to Table 17 in this report.					

5.4.4 Supply and Demand for Multiple-Dry Water Year Periods

The multiple-dry year supplies were developed based on the DWR Sacramento Valley runoff tables and available water supply data (refer to Table 33). Table 38 provides an estimate of the projected multiple-dry year supply and demand totals. Demand reductions due to water shortage stage rationing measures are not included in the multiple-dry year demand estimates.

Table 38 Supply and Demand Comparison - Multiple-Dry Year (Guidebook Table 34) 2010 Urban Water Management Plan City of Shasta Lake						
		2015	2020	2025	2030	2035
Multiple-Dry Year First Year Supply	Supply Totals	2,643	3,973	4,046	4,121	4,200
	Demand Totals	3,019	2,644	2,737	2,835	2,936
	Difference	-376	1,330	1,309	1,287	1,264
	Difference as % of Supply	-14	33	32	31	30
	Difference as % of Demand	-12	50	48	45	43
Multiple-Dry Year Second Year Supply	Supply Totals	2,274	3,418	3,481	3,546	3,613
	Demand Totals	3,019	2,644	2,737	2,835	2,936
	Difference	-745	775	744	711	677
	Difference as % of Supply	-33	23	21	20	19
	Difference as % of Demand	-25	29	27	25	23
Multiple-Dry Year Third Year Supply	Supply Totals	3,072	4,618	4,702	4,790	4,881
	Demand Totals	3,019	2,644	2,737	2,835	2,936
	Difference	53	1,974	1,965	1,955	1,945
	Difference as % of Supply	2	43	42	41	40
	Difference as % of Demand	2	75	72	69	66
<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.</p> <ol style="list-style-type: none"> 2020-2035 supplies assume that the Water Supply Enhancement Project is completed. City wide demand totals include conservation based on water use targets. Refer to Table 17 in this report. 						

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 City of Shasta Lake (City) 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. A Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) was developed and has been signed by over 150 water suppliers and other concerned parties. The City became a signatory to the MOU in 1994 and is therefore

a member of the CUWCC. The purpose of the MOU was to expedite implementation of reasonable water conservation measures in urban areas and to establish appropriate assumptions for use in calculating estimates of reliable future water conservation savings. The MOU includes definitions, implementation, requirements, and water savings assumptions for each BMP (another term for DMM). Table 39 shows the relationship of the CUWCC's BMPs and the UWMPA DMMs.

Table 39 Relationship of UWMPA DMMs and CUWCC BMP's 2010 Urban Water Management Plan City of Shasta Lake	
UWMPA - DMM	CUWCC – Category and BMP
A 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
B Residential Plumbing Retrofit	Programmatic: Residential BMP 3.1 Residential Assistance Program
C System Water Audits, Leak Detection and Repair	Foundational: Utility Operations – Water Loss Control BMP 1.2 Water Loss Control
D 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
E Large Landscape Conservation Programs and Incentives	Programmatic: Landscape BMP 5 Landscape
F High Efficiency - Washing Machine Rebate Program	Programmatic: Residential BMP 3.3 High Efficiency - Washing Machine Financial Incentive Program
G Public Information Programs	Foundational: Education – Public Information Programs BMP 2.1 Public Information Programs
H School Education Programs	Foundational: Education – School Education Programs BMP 2.2 School Education Programs
I Conservation Programs for Commercial, Industrial, and Institutional Accounts	Programmatic: Commercial, Industrial, and Institutional BMP 4 Commercial, Industrial, and Institutional
J Wholesale Agency Programs	Foundational: Utility Operations – Operations BMP 1.1.3 Wholesale Agency Assistance Programs
K Conservation Pricing	Foundational: Utility Operations – Pricing BMP 1.4 Retail Conservation Pricing
L Water Conservation Coordinator	Foundational: Utility Operations – Operations BMP 1.1.1 Conservation Coordinator
M Water Waste Prohibition	Foundational: Utility Operations – Operations BMP 1.1.2 Water Waste Prevention
N Residential Ultra-Low Flush Toilet Replacement Program	Programmatic: Residential BMP 3.4 WaterSense Specification (WSS) Toilets

In accordance with the MOU, the City files annual reports to the CUWCC outlining progress towards implementing the BMPs. Council members can submit their most recent BMP Report with their Urban Water Management Plan (UWMP) to address the urban water conservation issues in the UWMPA. The City's CUWCC Annual Report for 2013 and AB 1420 Self-Certification Statements are contained in Appendix I.

The City is committed to water conservation and has implemented several policies and on-going programs that promote and encourage water conservation. In addition, the City has several drought-specific programs that can be implemented if water supplies become limited and the need for more intensive water conservation becomes necessary.

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, plumbing retrofit kits, and water conservation literature. In addition to the items typically included in water audits, the City will develop an irrigation schedule for the customer and provide flappers, washers, showerheads, and dye tablets to customer as needed. The availability of these services and materials is advertised on the City website and notices are placed in the utility bills.

The City annually collects information on the number of SFR and MFR accounts in the service area, the number of SFR and MFR accounts offered surveys and the number that completed surveys. The City's program began in October 2000, with the intent to target new customers, customers that complain about billing, and customers with unusually high water bills first.

The best way to evaluate the effectiveness of implemented water surveys is periodic review of water use for customers that have received surveys. The water usage for customers that have completed the audit process will be compared to previous years to evaluate effectiveness. Evaluation of the data collected and contacting more customers would help the City to improve the effectiveness.

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 (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 constructed 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 only.

The City supplies plumbing retrofit materials and education in conjunction with water surveys and audits. Indoor and outdoor water conservation kits with retrofit materials are available at the Utility Customer Service Counter and also in the Planning/Building Division.

The indoor kits include low-flow showerheads, pipe tape, a swivel faucet aerator, a standard faucet aerator, a "Toilet Tummy," and leak detection dye tablets. The outdoor water conservation kits include a moisture meter, rain and sprinkler gauge, garden hose repair kits, 7-spray hose nozzle, and a hose timer. The kits are available to anyone, regardless of the age of the home. In 2014, the City distributed 100 indoor conservation kits and 100 outdoor conservation kits and recently ordered an additional 100 of each kit.

The effectiveness of this DMM is based upon the percentage of customers that install low-flow fixtures. The goal is to collect data on the number of non-retrofitted pre-1992 SFR and MFR in the service area and the number of retrofit kits distributed and installed. To improve the effectiveness of this measure the City should notify/distribute retrofit kits to SFR and MFR customers in pre-1992 residences until 75 percent of SFR and MFR are retrofitted.

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 City has completed and submitted results of the American Water Works Association (AWWA) water audits and loss control with its CUWCC reports. The entire City is metered which allows the City to routinely calculate water losses.

When a complaint is lodged regarding a potential water leak, the City takes swift action to identify and repair the given leak as warranted. The replacement scope, schedule, and financing of aging distribution components will be evaluated in the Water Master Plan scheduled to be updated in 2015.

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 City's customers.

To improve the effectiveness the City should continue to review data and identify leaks for repair, perform an annual review of the AWWA audit information to determine if a full-scale system audit is warranted, and perform distribution leak detection when warranted and cost-effective.

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. In order to comply with AB 514, the City is required to:

- Install water meters on all service connections to residential and commercial buildings constructed prior to January 1992, no later than January 1, 2013.
- Begin charging customers for water based on actual volume used, commencing no later than March 1, 2013.

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 City customers are metered and are billed volumetrically. The best way to evaluate the effectiveness of metering is periodic review of customer water use.

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.

Currently the City has several customers with dedicated irrigation meters. A water use budget has not been developed for these customers. The City plans to establish a separate billing code for tracking purposes for all separate irrigation meters to ensure appropriate monitoring in the future. This will include auditing and preparing water budgets for these customers based on landscaped area.

The City could conduct a feasibility study to assess the benefits and costs of installing dedicated landscape meters for all Commercial, Institutional, and Industrial (CII) accounts and develop an implementation program if appropriate.

Pursuant to State law (Government Code Section 65591 et seq.), the City adopted (2010) a Water Efficient Landscape Ordinance (Appendix J). The ordinance defines standards and procedures for design, installation, and management of landscapes.

6.7 DMM 6: HIGH-EFFICIENCY WASHING MACHINE REBATE PROGRAMS

Typically, a high-efficiency washing machine rebate program is offered by the electric provider. Shasta Lake is the energy provider for the service area. For customers, the washer rebate is \$150 per installation if the high-efficiency washing machine meets requirements (Energy Star Modified Energy Factor 2.2 or greater, and Water Factor of 6.0 or less) and the hot water is supplied by an electric water heater.

The City's website has a link to the rebate program and the City of Shasta Lake Water Conservation page that provides water conservation tips and recommends use of front-loading washing machines. Notifying customers of the rebate as a method of increasing the number of water efficient washing machines could improve water conservation within the City.

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 daily water use comparisons on customer's bills.

The City has an ongoing public information program. The budget for the program in 2012 and 2013 was \$6,000. The budget for 2014 and 2015 is \$8,000 each year. The activities include:

1. Providing flyers/brochures to customers
2. Including bill inserts/messaging promoting water conservation
3. Providing water conservation information/tips on the City website and at City Hall
4. Conducting a "Water Awareness Week"
5. Providing tours of the Water and Wastewater Treatment Plants

In addition to the City's efforts, the US Bureau of Reclamation (USBR) performs public outreach on water conservation.

The effectiveness of this program is determined by the amount of information available to the community. The City will track the number of brochures distributed, special events attended, and other activities pursued to promote water conservation. Records of customer responses and any commentary regarding the information provided will be maintained and reviewed by the City.

6.9 DMM 8: SCHOOL EDUCATION PROGRAMS

Components of this DMM include provision of education materials, instructional assistance, and classroom presentations. The City does not have an active school education program but plans to implement a program over the next five years if budgetary and workload constraints allow. The City is actively pursuing grant funding to purchase educational materials. The City has, when requested, provided speakers and educational materials to the local schools regarding water conservation.

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 City 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 CII customers are metered and charged for water usage in accordance with their metered use. The City provides water audits and water conservation information to their metered customers upon request.

The best way to determine the effectiveness of this DMM is to monitor the actual water use. The City should monitor the water use of the CII customers, and assess demand characteristics and water use patterns. Historic data can be compared to current average annual water use for each account type.

The City could consider characterizing all CII accounts to verify standard industrial classification (SIC) codes, to aid in efficiently targeting suitable water conservation programs to customers.

6.11 DMM 10: WHOLESALE AGENCY PROGRAMS

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

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 City has an increasing-tier water and sewer rate schedule.

6.13 DMM 12: WATER CONSERVATION COORDINATOR

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

The City has a designated water conservation coordinator (Tony Thomasy) that supervises BMP implementation, evaluates effectiveness and communicates program goals to the community. The effectiveness of this DMM is determined by the work performed by the Water Conservation Coordinator.

6.14 DMM 13: WATER WASTE PROHIBITIONS

This DMM involves adoption of an ordinance prohibiting water waste. City Council Ordinance CC 14-236 (Appendix H) provides a mechanism which the City can use to enforce water conservation measures and declare a water shortage emergency. The Ordinance establishes a five-stage rationing plan based on the City's available water supply.

The City adopted a Water Conservation Plan (2000) that incorporated the City's 1994 Water Shortage Contingency Plan. The Contingency Plan includes a four-stage drought management plan that includes voluntary actions and mandatory prohibitions depending on the USBR allocation reduction. A copy of the 2000 Water Conservation Plan and the 1994 Water Shortage Contingency Plan are included in Appendix G. The City's water shortage contingency plan and municipal code will be updated in the near future (refer to Section 5.3).

The effectiveness of this DMM can be determined by a decrease in violators. The number of citations and violations should be reported annually. If an area is determined to have excessive violations, the City should 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. The City does not currently have a replacement program or a retrofit on resale ordinance.

The City's Building Code has 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. The City will investigate the possibility of adopting a retrofit at time of resale ordinance.

CLIMATE CHANGE

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

COMPLETED UWMP CHECKLIST

A completed Urban Water Management Plan checklist is attached.

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

No.	UWMP requirement ^a	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
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 ^a	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
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Chapter 2 Section 2.1 Figures 1
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 Figure 2 Table 3
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 Table 3
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Chapter 2 Section 2.2
SYSTEM DEMANDS				
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 ^a	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)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030.	Chapter 3 Section 3.2 Tables 8-14
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 19 [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 Section 3.2
SYSTEM SUPPLIES				
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)		Not Applicable
16	Describe the groundwater basin.	10631(b)(2)		Not Applicable
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 ^a	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)		Not Applicable
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)		Not Applicable
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)		Not Applicable
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Chapter 4 Section 4.3
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 4.6
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 4.4
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 4.5
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)		Chapter 4 Section 4.5
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)		Chapter 4 Section 4.5
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)		Chapter 4 Section 4.5

No.	UWMP requirement ^a	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 4.5
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)		Chapter 4 Section 4.5
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)		Chapter 4 Section 4.5
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		Chapter 4 Section 4.5
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING ^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 Section 5.1
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 ^a	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 F
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 H
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 H
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 Appendix H
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 ^a	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
DEMAND MANAGEMENT MEASURES				
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)		Chapter 6
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)		Appendix I



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