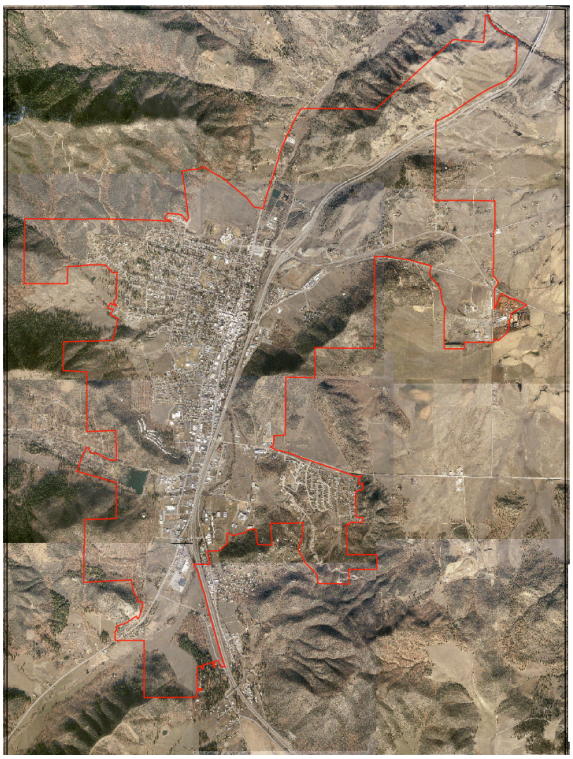
2010-11 URBAN WATER MANAGEMENT PLAN



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Adopted June 16, 2011

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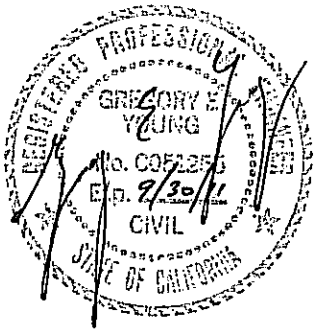
City of Yreka

2010 Urban Water Management Plan

Prepared by

Tully & Young
Comprehensive Water Planning



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CITY OF YREKA, CALIFORNIA

2010 UWMP

LIST OF TABLES

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CHAPTER 1. INTRODUCTION

This City of Yreka has a long history of providing water for municipal and industrial purposes to its residents, businesses and nearby landowners. Since the gold rush era of the 1800s, the City of Yreka has used a variety of surface water and groundwater sources to supply water to meet the needs of its expanding population and changes in industry. Just recently, the City of Yreka reached a key water service connection threshold, thereby requiring it to prepare its first Urban Water Management Plan (UWMP) consistent with the requirements of the California Water Code.

The City of Yreka is an incorporated municipality in Northern California at an elevation of 2,500 feet. The City of Yreka provides retail water service to a population of about 7,300 persons through about 3,022 connections for residential, commercial, industrial, institutional, and landscape demands. This UWMP documents the City of Yreka's current and future water supplies and demands, and discusses relevant drivers of water demands and demand management potential, as well as supply reliability. This section provides background information regarding the UWMP, coordination with other agencies, and public participation and adoption of the plan.

Note To DWR

The City of Yreka has written this UWMP primarily as a water resources planning tool and secondarily to satisfy the requirements of the Urban Water Management Planning Act. The body of the document presents and discusses data that DWR requests in its UWMP Guidebook. Data from the body of the document has been transferred into DWR Tables consistent with the organization of the tables in Section N of the UWMP Guidebook. These tables are completed and presented as **Appendix A-1** to facilitate DWR's review of the City of Yreka's 2010 UWMP.

Also, this UWMP has been reviewed for adequacy according to the UWMP Checklist as contained in Section I of the UWMP Guidebook. A completed checklist is included as **Appendix A-2**.

1.1 Urban Water Management Planning Act

The Urban Water Management Planning Act (UWMPA) requires every urban water supplier to prepare an urban water management plan pursuant to California Water Code (CWC) § 10630 et seq.[1] An "urban water supplier" is a supplier, either publicly or privately owned, providing water for municipal purposes either

[1] CWC § 10640.

directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually."[2] Furthermore, a "customer" is defined as "a purchaser of water."[3]

The City of Yreka serves approximately 3,022 connections and supplies about 2,700 acre-feet per year (af/yr).[4] Because all of the City of Yreka's service connections fit the definition of a "customer" under CWC § 10612, the City of Yreka exceeds the customer threshold for preparation of a UWMP. The City of Yreka is therefore preparing its 2010 UWMP in compliance with the UWMPA.

1.2 Public Participation and Agency Coordination

The UWMPA requires a water purveyor to coordinate the preparation of its UWMP with other appropriate agencies in and around its service area. This includes coordination with other water suppliers that share a common source, water management agencies, and relevant public agencies. The City of Yreka coordinated preparation of its UWMP with the entities listed in **Table 1-1**.

Specifically, the City of Yreka notified the County of Siskiyou and the Karuk Tribe regarding the City of Yreka's preparation of an UWMP by letter sent March 17, 2011.[5]

Table 1-1 – Public and Agency Coordination

Coordinating Agencies and Entities	Participated in developing the plan	Commented on the draft	Attended public meetings	Contacted for assistance	Sent a copy of the draft plan	Sent a notice of intention to adopt	Not involved/no information
County of Siskiyou						X	
Karuk Tribe						X	
"High Water Users"							
Public Involvement			X			X	

1.3 Plan Adoption

Prior to adoption of its UWMP, the City of Yreka held a public hearing regarding its UWMP on May 19, 2011. A draft of the UWMP was made available for public inspection at the City of Yreka, City Hall. General notice of the public hearing was provided through publication of the hearing date and time in the Siskiyou Daily News on May 6, 2011 and May 13, 2011.[6] As part of its public hearing, the City of Yreka received community input regarding its implementation plan for complying with the water conservation requirements contained in CWC § 10608.20 et seq., including the implementation plan's economic impacts.[7] Public

[2] CWC § 10617
[3] CWC § 10612.
[4] AWWA M36 Water Audit and Balance for the City of Yreka for the 2009 water year. The City of Yreka has 2,958 "Active Service Connections," and 64 "Inactive Service Connections."
[5] Notification letters are included in **Appendix B-3**.
[6] See **Appendix B-2** for copies of the published notices.
[7] CWC § 10608.26

comments were requested at the public hearing and there were none. Also, at the public hearing, the City of Yreka adopted the method for determining its urban water use target pursuant to CWC § 10608.20(b). The City of Yreka adopted its 2010 UWMP on June 16, 2011.[8]

1.4 Resource Maximization and Import Minimization

The City of Yreka uses various water management tools to maximize water resources. Specifically, the City of Yreka focuses on increasing water use efficiency and upgrading water supply and delivery facilities. It will implement efficient water management programs as appropriate to ensure compliance with recently adopted state mandates requiring increased efficiency in both the indoor and outdoor sectors.

1.5 Plan Organization

This UWMP is organized as follows:

- Chapter 2 provides a description of the City of Yreka's service area, demographic characteristics and climate;
- Chapter 3 describes the City of Yreka's current and future water supplies and the reliability of the supplies;
- Chapter 4 details the demands on the City of Yreka's system, including the past and future estimated demands;
- Chapter 5 provides a description of current and future recycled water use in the City of Yreka's service area;
- Chapter 6 discusses the City of Yreka's demand management measures;
- Chapter 7 outlines the City of Yreka's water shortage contingency plan;
- Chapter 8 compares the City of Yreka's supplies and demands in normal and dry years.
- The appendices include background information and necessary supporting documents.

[8] The resolution adopting the 2010 UWMP is in Appendix B-1.

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CHAPTER 2. SERVICE AREA, DEMOGRAPHICS AND CLIMATE

2.1 City of Yreka Service Area

2.1.1 Service Area Description

The City of Yreka is a municipal jurisdiction in Siskiyou County that serves about 2,700 af/yr of water to approximately 7,300 persons. Currently, the City of Yreka serves approximately 3,022 connections. The City of Yreka serves water to customers both inside and outside its municipal boundary. Almost all water service is treated water though there are a limited number of raw water M&I deliveries to customers directly from the City of Yreka's Fall Creek Transmission line prior to treatment at the City of Yreka water treatment plant.

The City of Yreka maintains has developed and maintains raw water supply infrastructure, a water treatment plant, and water storage and distribution facilities. Raw water supplies are obtained from two sources – Fall Creek and Yreka Creek. The City of Yreka's primary raw water supply is from Fall Creek. The City of Yreka conveys Fall Creek water through a transmission line that begins about 23 miles northeast of the City of Yreka at the Fall Creek point of diversion. The City of Yreka's water treatment plant is located about 7 miles from the city limits along the Fall Creek transmission line. Currently, the treatment plant has a capacity of 7.0 million gallons per day (mgd), with a net output of about 6.4 mgd given down time for backwash periods. Maximum daily flow through the treatment plant is about 5.4 mgd. The treatment plant site could accommodate additional filters to allow the City of Yreka to treat water at a rate as high as water may be diverted and delivered under its Fall Creek water right. The City of Yreka uses seven treated water storage reservoirs to meet peak demands. Total treated water storage capacity is 5.48 million gallons (mg). Also, the City of Yreka distribution system contains about 310,000 feet of 1-inch to 14-inch diameter pipeline.

The City of Yreka has also developed and maintained another raw water supply on Yreka Creek. If needed as an emergency backup supply, the City of Yreka has the capability of diverting water from the underflow of Yreka Creek using the North Well located south of the City of Yreka's wastewater treatment plant. The City of Yreka can deliver water produced from its North Well for M&I purposes throughout its service area, though the California Department of Public Health requires boil water notices to be issued when the water is used.

2.1.2 Service Area Demographics

The City of Yreka is an incorporated city in Siskiyou County. The California Department of Finance (DOF) has prepared population projections in ten-year intervals through 2050 for

Siskiyou County, though the projection does not contain an estimate for the City of Yreka alone. Based on historic data (1995-2010), the City of Yreka population has comprised about 16% of total county population.[9] Assuming the Siskiyou County population increases consistent with the DOF projections, and the City of Yreka population is approximately 16% of total county population, then the City of Yreka population may be estimated as shown in Table 2-1.[10]

Table 2-1 – Siskiyou County and City of Yreka Population Projections

Year	Siskiyou County	City of Yreka
1995	44,781	7,422
2000	44,493	7,298
2005	45,672	7,265
2010	47,109	7,537
2015	49,196	7,871
2020	51,283	8,205
2025	53,505	8,561
2030	55,727	8,916
2035	58,192	9,311
2040	60,656	9,705

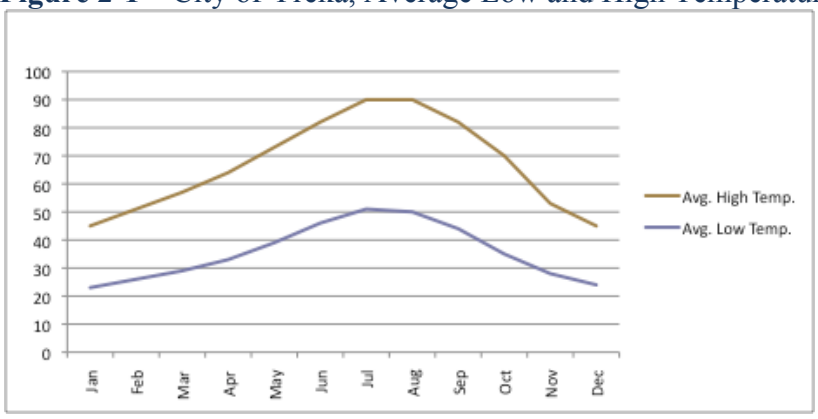
Note: City of Yreka Population Includes People Outside the City Limits Receiving Water

2.1.3 Climate

Figure 2-1 shows the average high and low temperature for the City of Yreka. Typically, July and August are the hottest months of the year with an average high temperature of 90 degrees Fahrenheit.[11] December and January are typically the coolest months of the year, with an average temperature of about 24 degrees.

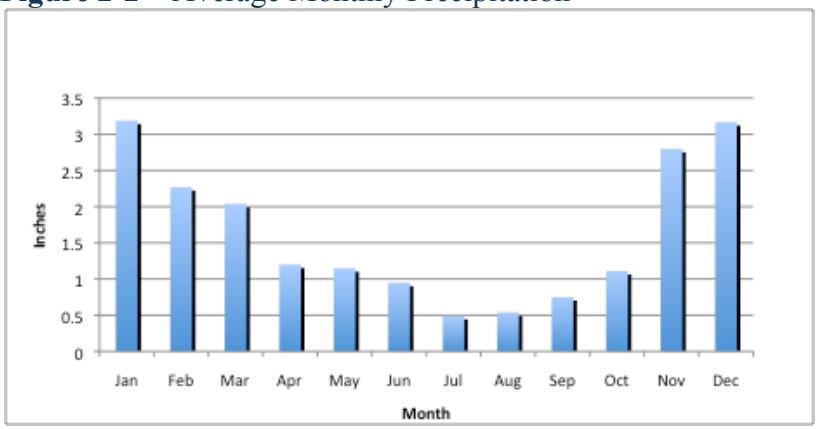
[9] Calculated based on figures in *State of California, Department of Finance, E-4 Population Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark*. Sacramento, California, May 2010.
[10] 2015, 2025 and 2035 population projections are extrapolated from the preceding and succeeding ten-year estimate. Also, the "Current" City of Yreka population is estimated as part of the Baseline Daily Per Capita Use. See Table 4-18 in Chapter 4. This is slightly different than the 2010 population used in Table 4-5, which is calculated as a percent of County population for consistency with in the population-to-developed-acreage calculation.
[11] Graphic developed based on data from weather.com.

Figure 2-1 – City of Yreka, Average Low and High Temperature



Precipitation in the City of Yreka typically averages about 20 inches/year. The wettest months are December and January, and the driest months are typically July and August. **Figure 2-2** shows the average precipitation in the City of Yreka by month.[12]

Figure 2-2 – Average Monthly Precipitation



For purposes of documenting reference evapotranspiration (ETo), the California Irrigation Management Information System (CIMIS), Reference Evapotranspiration Zones map provides the most reliable reference evapotranspiration for the City of Yreka.[13] The CIMIS Zones Map indicates that the City of Yreka lies within Zone 10, which it describes as a cool, high elevation area with strong summer sunlight. As shown in **Table 2-2**, the annual ETo in Zone 10 is 49.1 inches. For comparison, Appendix A of the California Model Water Efficient Landscape Ordinance (MWELO) estimates that the ETo for the City of Yreka is 39.3 inches. While the MWELO Appendix A ETo may ultimately serve as a basis for estimating outdoor demands for future connections in the City of Yreka, the City of Yreka will use the CIMIS Zone Map ETo where appropriate to calculate water demand in the 2010

[12] Graphic developed based on data from weather.com.
[13] California Irrigation Management Information System, Reference Evapotranspiration Zones Map, 1999.

UWMP to ensure that the demand estimate is conservative and supplies can be compared accordingly.

Table 2-2 – Reference Evapotranspiration

Month	CIMIS Zone Map (inches)	MWELO App. A (inches)
January	0.9	0.6
February	1.7	0.9
March	3.1	2.1
April	4.5	3.0
May	5.9	4.9
June	7.2	5.8
July	8.1	7.3
August	7.1	6.5
September	5.1	4.3
October	3.1	2.5
November	1.5	0.9
December	0.9	0.5
Total	49.1	39.3

CHAPTER 3. WATER SUPPLY CONDITIONS

Chapter 3 describes the City of Yreka's existing and planned water supplies. Currently, 100 percent of the City's water comes from surface supplies. As discussed in Chapter 5, the City does not currently use groundwater or recycled water, but is evaluating potential recycled water use opportunities. The City of Yreka plans to rely on its surface supplies to meet demands through 2035 – the planning horizon of the 2010 UWMP.

The City of Yreka's water supplies are secured through six water rights. Three rights are adjudicated rights based on pre-1914 claims. The adjudicated rights are recognized in the Shasta River Adjudication Proceeding, Judgment and Decree, No. 7035 (Decree No. 7035). Three additional rights are based on one permit and two licenses issued by the State Water Resources Control Board (SWRCB). The six rights are summarized in **Table 3-1**.

Table 3-1 – City of Yreka Water Rights

Water Right	Priority Date	Quantity	Water Source	Purpose of Use	Area Served
SWRCB Permit # 15379	1966	6300 af/yr	Fall Creek	Domestic and Municipal Use	Yreka and Surrounding Regions
SWRCB License # 6037	1955	1214 af/yr	Yreka Creek Underflow	Municipal Use	City of Yreka and Vicinity
SWRCB License # 9850	1958	285 af/yr	Greenhorn Creek	Recreation and Standby Municipal Use	City of Yreka
Adjudicated Right (¶ 501)	1869	1.0 cfs (1/1-12/31)	Greenhorn Creek	Domestic and Municipal Use	City of Yreka
Adjudicated Right (¶ 502)	1870	1.0 cfs (1/1-12/31)	Greenhorn Creek	Domestic, Municipal and Irrigation Use	City of Yreka; Specified Ag. Lands
Adjudicated Right (¶ 503)	1889	4.0 cfs (1/1-12/31)	Yreka Creek	Domestic and Municipal Use	City of Yreka

3.1 Permitted and Licensed Appropriative Rights

Since the early 1970s, the City of Yreka has relied on two appropriative water rights to provide water for domestic and municipal purposes. The two appropriative rights are from different water sources – Fall Creek, tributary to the Klamath River, and Yreka Creek, tributary to the Shasta River. Fall Creek water is transported through the Fall Creek transmission line to the City's water treatment plant. Yreka Creek water is diverted, when necessary, nearer the city boundaries, as a backup water supply. A third water supply controlled by the City is from Greenhorn Creek. The purpose of use of this right is listed as recreation and standby municipal use. These three water supplies are summarized in **Table 3-2**. Based on the nature of each right, it is subject to a certain risk of reduction, which is discussed in **Section 3.7**.

Table 3-2 – City of Yreka Permitted and Licensed Water Rights[14]

Water Right	Priority Date	Volume (af/yr)	Water Source	Purpose of Use	Area Served
Permit # 15379	1966	6,300	Fall Creek	Domestic and Municipal Use	Yreka and Surrounding Regions
License # 6037	1955	1,214	Yreka Creek Underflow	Municipal Use	City of Yreka and Vicinity
License # 9850	1958	285	Greenhorn Creek	Recreation; Standby Municipal Use	City of Yreka

3.1.1 Fall Creek Water Right

The City's 6,300 acre-foot/year (af/yr) entitlement is based on a permitted appropriative right (Permit 15379) from Fall Creek with a priority date of 1966. The City's 1966 right provides for a maximum diversion rate of 15 cubic feet per second (cfs) and a maximum annual diversion quantity of 6,300 acre-feet per year.[15] A 2010 State Water Resources Control Board (SWRCB) order amended the water right to provide for a place of use under the right that includes an area that encompasses the City of Yreka service area.[16] The Fall Creek water right is subject to a permit condition that requires the City of Yreka to bypass a minimum flow of 15.0 cfs or the natural flow of the stream whenever it is less than 15.0 cfs.[17]

Table 3-2 provides the quantity of water that the City of Yreka is authorized to divert at the Fall Creek point of diversion. The annual diversion amount over the past five years has been within the range of 2,600-3,000 af/yr and the five-year average is 2,780 af/yr, as shown in **Table 3-3**.

Table 3-3 – Fall Creek Diversion

Year	Acre Feet
2005	2,886
2006	3,004
2007	2,652
2008	2,748
2009	2,610
Average	2,780

[14] The SWRCB permit and licenses for these rights are contained in **Appendix C-1**.
[15] Permit 15379 provides for a maximum diversion rate of 15.0 cfs, and an annual diversion quantity of no more than 6,300 af/yr. The average diversion rate that is equal to 6,300 af/yr is 8.7 cfs.
[16] The service area is depicted on a map filed by the City of Yreka with the SWRCB on October 30, 2007. Map is in **Appendix C-2**.
[17] Permit condition #7 of Amended Permit 15379.

3.1.1.1 Legal, Environmental, Water Quality and Climatic Factors Affecting Supply

Application of Water to Beneficial Use

The last permit extension that the City of Yreka received from the SWRCB was issued in 1996 and provided for an extension until December 31, 2005. Once the SWRCB issues a permit for a water right, a permittee has a specified time to show application of water to beneficial use. Typically, a water right holder will apply for an extension of time to show application of the permitted right to beneficial use if full application is not achieved by the date specified in the permit. The City of Yreka is in the process of petitioning for a permit extension and is preparing a California Environmental Quality Act (CEQA) analysis of the potential environmental impacts associated with an increase from the quantity of water (currently) diverted to the permitted amount of 6,300 af/yr. The City of Yreka anticipates that the SWRCB will ultimately approve its extension petition, because the City of Yreka has an adopted General Plan and Water Master Plan indicating a need for the entire 6,300 af/yr to meet buildout demands. Also, the City of Yreka's CEQA analysis indicates that there will not be any significant environmental impacts if the SWRCB grants an extension of time for the City of Yreka to put water to beneficial use.

City of Yreka Fall Creek Instream Flow Requirement

Permit 15379 requires that the City of Yreka bypass a minimum flow of 15.0 cfs or the natural channel flow of the stream whenever it is less than 15.0 cfs.[18]

Ultimately, this condition could have an impact on the reliability of the Fall Creek right if flows in Fall Creek are limited. Given the fact that the City of Yreka's average diversion rate is currently 4.0 cfs, and its maximum diversion rate is about 8.0 cfs, the instream flow condition may not have been an issue to date. Yet, if the City of Yreka ultimately has a need to divert as much as 15.0 cfs, it may not be able to do so at certain times of the year if flows in Fall Creek are somehow limited. The potential impact of this condition on the reliability of the City of Yreka's Fall Creek water right is analyzed in **Section 3.7**.

PacifiCorp's Powerhouse Operations

The City of Yreka's diversion of water from Fall Creek is closely connected to the operation of PacifiCorp's Fall Creek hydropower generating facility and its diversions from Spring Creek. PacifiCorp diverts water from Fall Creek upstream of the City of Yreka under Statements of Diversion and Use S015372 and S015373. PacifiCorp claims a maximum non-consumptive diversion right to 50 cfs based on pre-1914 claims and diversion rights from an adjacent creek under Oregon law (discussed below). Recent Statements of Diversion and

[18] See condition #7 in Amended Permit 15379. Also, see California Department of Fish and Game protest dated December 2, 1966.

Use indicate that PacifiCorp's non-consumptive diversion from Fall Creek averages between 33-36 cfs per month.[19] While there may have been average Fall Creek flows at PacifiCorp's point of diversion greater than 33-36 cfs in each of these years, there is no longer a USGS gage on Fall Creek to determine whether the flows were greater than the quantity diverted by PacifiCorp.

Recently, PacifiCorp received affirmation of its right to divert up to 16.5 cfs from Spring Creek under Oregon law.[20] While PacifiCorp appears to have secured a right to divert up to 16.5 cfs under Oregon law, it is not certain whether PacifiCorp has resumed Spring Creek diversions since the 2008 order was issued. Moreover, FERC relicensing may have an impact on PacificCorp's Spring Creek diversions. FERC may impose two conditions on PacifiCorp's federal hydropower permit – no diversions from Spring Creek to Fall Creek from June 1 through September 15 and a 4 cfs bypass requirement in Spring Creek the remainder of the year.[21] Given that the FERC conditions may result in PacifiCorp being unable to divert water during the driest part of the year to Fall Creek, the supply analysis in **Section 3.7** considers Fall Creek flows absent diversions from Spring Creek to Fall Creek during the months of June through September in order to most conservatively assess supply reliability

Because PacifiCorp's right is non-consumptive, and the majority of the diverted water returns to Fall Creek, it is sufficient to know how much PacifiCorp is diverting to determine the quantity of water available for the City of Yreka to divert downstream. Again, recent filings with the SWRCB indicate average diversions in the range of 33-36 cfs.

Klamath River Agreements

Klamath Basin Restoration Agreement: According to the Klamath Basin Restoration Agreement (KBRA), the Klamath Hydroelectric Project (FERC No. 2082), located on the Klamath River and its tributaries, blocks the upstream passage of anadromous fish and other fish and has other impacts as a result of flow regulation.[22] The KBRA is intended to: (i) restore and sustain natural production of fish that naturally occupied the Klamath River Basin; (ii) establish reliable water and power supplies which sustain agricultural uses and communities and national wildlife refuges; (iii) contribute to the public welfare and the sustainability of all Klamath Basin communities.[23]

[19] Supplemental Statements of Diversion and Use S015372 and S015373 filed with the SWRCB for the reporting years 2003, 2004, and 2005.
[20] *Taylor v. PacifiCorp*, Case 19, Claim 218, Contest 12, Oregon Water Resources Department. June 2008.
[21] Final EIS for Relicensing Klamath Hydroelectric Project No. 2082, November 16, 2007, pp. 5-42 -- 5-44.
[22] Part 1.2.1, Klamath Basin Restoration Agreement, for the Sustainability of Public and Trust Resources and Affected Communities, February 18, 2010.
[23] Part 1.3, KBRA.

Specifically, the Fisheries Program of the KBRA is intended to restore and sustain natural production of Fish Species throughout the Klamath River Basin … and for reestablishment and maintenance of the ecological functionality and connectivity of fish habitat.[24] It provides for reintroduction of anadromous species throughout their historic range above Iron Gate Dam and provides that the focus of habitat restoration and monitoring is to be the Klamath River Basin.

Klamath Hydroelectric Settlement Agreement: The Klamath Hydroelectric Settlement Agreement (KHSA) establishes a process for removal of "hydroelectric facilities" and operation of the hydroelectric project until that time. "Hydroelectric facilities" include specific hydropower facilities, within the jurisdictional boundary of FERC Project No. 2082: Iron Gate Dam, Copco No. 1 Dam, Copco No. 2 Dam, and J.C. Boyle Dam and appurtenant works currently licensed to PacifiCorp.[25]

Both KBRA and KHSA could have an impact on the City of Yreka's ability to divert water under its Fall Creek water right if there is a need to consider fish reintroduction or dam removal projects on Klamath tributaries to achieve KBRA and KHSA objectives.

3.1.2 Yreka Creek Water Right

The City of Yreka holds licensed appropriative right 6037 (License 6037) for diversion of subsurface flow from Yreka Creek with a priority date of 1955. License 6037 provides for a diversion of 1.68 cfs between January 1 and December 31, which is equivalent to approximately 1,216 af/yr. Since the early 1970s, the City of Yreka has used its Yreka Creek supply as an emergency back up water supply to its Fall Creek water supply. Water has been used intermittently from Yreka Creek over the past 40 years. The City of Yreka has consistently filed progress reports as well as Reports of Licensee with the SWRCB, with the most current report having been submitted for the period 2005, 2006 and 2007.

The City of Yreka has submitted a Petition for Change to expand the place of use under License 6037, so that it includes the entire municipal service area served (at the time of the petition) by the City of Yreka under Permit 15379 (i.e., Fall Creek Right). Because the water supply from Yreka Creek under License 6037 remains an important backup supply for the City of Yreka, this UWMP will assume that a maximum annual quantity of 1,216 af/yr is available to the City of Yreka for its long-term planning purposes.

[24] Part 9.2.1, KBRA. Klamath River Basin or Klamath Basin shall mean: the lands tributary to the Klamath River in Oregon and California. (Part 1.7)
[25] Part 1.7, Klamath Basin Restoration Agreement, for the Sustainability of Public and Trust Resources and Affected Communities, February 18, 2010.

3.1.2.1 Legal, Environmental, Water Quality and Climatic Factors Affecting Supply

Water Quality Issues

The Yreka Creek water supply serves as an important emergency water supply for the City of Yreka. Water quality issues associated with the Yreka Creek water supply have historically required the City of Yreka to issue boil order notices when the water is used in the municipal system to meet demands. Nevertheless, the City of Yreka anticipates that the water quality issues can be managed such that the Yreka Creek supply may serve as a reliable supply during an emergency of limited duration.

Legal Issues

License 6037 is subject to claims recognized in Decree No. 7035 and the riparian claims on Yreka Creek. According to SWRCB documents, some portion of adjudicated right holders still exercise their rights.[26] Yet, because no formal diversion records are maintained, it is not possible to determine the extent to which water is diverted under rights adjudicated in Decree No. 7035. Moreover, some diversions may exist under riparian claims, but it is not possible to determine the extent to which those claiming riparian rights are diverting water without a more thorough analysis of diversion records. The City of Yreka has maintained its right to divert water under License 6037 in the face of these outstanding claims.

The City of Yreka has successfully diverted water under the right. Prior to the City of Yreka relying solely on its Fall Creek water right (pre-1971), the City of Yreka reported full use of the Yreka Creek water supply (1,215 af/yr) for at least the period 1969, 1970 and 1971. Thus, even in the face of the adjudicated rights and riparian claims, the City of Yreka has been able to use Yreka Creek water to the full extent of its licensed right.

3.1.3 Greenhorn Creek Water Right

The City of Yreka holds licensed appropriative right 9850 (License 9850) for diversion of water from Greenhorn Creek for recreational and standby municipal uses. The licensed right is for a diversion of 285 af/yr for collection to storage and withdrawal. The priority date of this right is 1958. While the water right provides for standby municipal use, since the early 1970s, the City of Yreka has used this supply for recreational purposes only by diverting water to storage in Greenhorn Reservoir. The City of Yreka has consistently filed progress reports as well as Reports of Licensee, with the most current report having been submitted for the period 2005, 2006 and 2007. In these most recent reports, as well as prior reports, the City of Yreka has consistently reported annual diversions to storage of 285 af/yr.

[26] SWRCB Decision 1475, In the Matter of Application 24461 of Yreka Airpark Inc. to Appropriate from Yreka Creek in Siskiyou County, October 20, 1977.

3.2 Adjudicated Appropriative Rights

The City of Yreka is listed as the owner of three water rights in Decree No. 7035.[27] The three rights are described in **Table 3-4**.

Table 3-4 – City of Yreka - Adjudicated Water Rights

Water Right	Priority Date	Rate (cfs)	Water Source	Purpose of Use	Area Served	Reference
Adjudicated Right (¶ 501)	1869	1.0 (1/1-12/31)	Greenhorn Creek	Domestic and Municipal Use	City of Yreka	Decree No. 7035, ¶ 501
Adjudicated Right (¶ 502)	1870	1.0 (1/1-12/31)	Greenhorn Creek	Domestic, Municipal and Irrigation Use	City of Yreka; Specified Ag. Lands	Decree No. 7035, ¶ 502
Adjudicated Right (¶ 503)	1889	4.0 (1/1-12/31)	Yreka Creek	Domestic and Municipal Use	City of Yreka	Decree No. 7035, ¶ 503

Decree No. 7035 reflects a final determination of rights on Yreka Creek and Greenhorn Creek.[28] The priority of all adjudicated rights on Yreka Creek and its tributaries are based upon diversion and application of water to beneficial use. In times of shortage, those with the earliest priority dates (as reflected in Table 10 of Decree No. 7035) are permitted to receive water to the full extent of their right prior to a more junior appropriator being entitled to divert any water.

Once perfected, maintenance of a right, through application of water to beneficial use, becomes critical in the face of claims of forfeiture.[29] Importantly, there is an exception to the beneficial use requirement for a municipality in CWC § 106.5 which could prove valuable for the City of Yreka.[30] For the City of Yreka to use CWC § 106.5, if other water right holders have been using water that the City of Yreka would otherwise be entitled to divert under the adjudication, it could argue that a necessity exists such that it is asserting its right to use the water that other water users had come to rely on in the interim. The necessity could arise if another water supply were not reliable enough to meet the City of Yreka's long-term water supply needs and the City of Yreka needed to use its Yreka Creek supply.

Greenhorn and Yreka Creek are included in the same prioritization schedule – "Yreka Creek and Tributaries." The total quantity of adjudicated rights listed in Decree No. 7035 for Yreka Creek and Tributaries is 36.008 cfs.[31] As mentioned in the prior section, a portion of the adjudicated rights are still exercised, though no formal diversion records are maintained, and

[27] See **Appendix C-3** for relevant sections of Decree No. 7035.
[28] CWC § 2773.
[29] CWC § 1241.
[30] CWC § 106.5 provides that "… the right of a municipality to acquire and hold rights to the use of water should be protected to the fullest extent necessary for existing and future uses, but that no municipality shall … prevent the appropriation and application of water in excess of its reasonable and existing needs to useful purposes by others subject to the rights of the municipality to apply such water to municipal uses as and when necessity therefore exists."
[31] Table 10, Decree No. 7035.

therefore it is not currently possible to determine the extent to which water is diverted under rights adjudicated in Decree No. 7035.[32] Importantly, the adjudicated rights on Yreka Creek are subject to claims of riparian right holders.[33]

3.2.1 1889 Yreka Creek Adjudicated Right

The City of Yreka's 1889 Yreka Creek right provides for a 4.0 cfs diversion during the period of January 1 through December 31 of each year. A 4.0 cfs diversion for a year equals 2,890 acre-feet. As a water right distinct from License 6037, the right to 2,890 af/yr exists in addition to the 1,216 af/yr available under License 6037. The Yreka Creek right is 23rd in priority in the Yreka Creek and Tributaries schedule in Decree No. 7035. The total flow allocated to entities with higher priorities than the City of Yreka is 24.378 cfs.[34]

3.2.1.1 Legal, Environmental, Water Quality and Climatic Factors Affecting Supply

Statement of Diversion and Use

The uncertainty surrounding the existing use of adjudicated rights on Yreka Creek makes the City of Yreka's diversion priority under Decree No. 7035 unclear, and therefore makes the reliability of the supply difficult to assess.

3.2.2 1869 and 1870 Greenhorn Creek Adjudicated Rights

The City of Yreka's two adjudicated rights on Greenhorn Creek exist separate and apart from License 9850. Both the 1869 and 1870 rights are for 1.0 cfs each for domestic and municipal purposes in the City of Yreka. Also, the 1870 right has irrigation as a listed use on specified lands.

3.2.2.1 Legal, Environmental, Water Quality and Climatic Factors Affecting Supply

Similar to the 1889 Yreka Creek right, the City of Yreka's diversion priority under its adjudicated Greenhorn Creek rights is uncertain given that diversions are not tracked pursuant to Decree No. 7035, and therefore makes the reliability of the supply difficult to assess.

3.3 Groundwater Supplies

The City of Yreka overlies the Shasta Valley Groundwater Basin (DWR Basin 1-4). According to DWR Bulletin 118-3, the complexity of the region with respect to the extensive network of volcanic recharge/storage areas makes it difficult to estimate groundwater

[32] SWRCB, Decision No. 1475, October 20, 1977. According to the 1998 Summary of Operations for Watermaster Service in Northern California, Yreka Creek is not included in the Shasta River Watermaster Service Area. (p. 98)
[33] Summary of Operations for Watermaster Service in Northern California, 1998 Season, Department of Water Resources, October, 2000, p. 98.
[34] The entities with higher priorities than the City of Yreka may have more limited periods of use than the City of Yreka as many of the rights are for irrigation purposes.

storage. A 1991 survey estimated that withdrawals for agricultural and municipal purposes were about 50,000 af/yr and 2,210 af/yr respectively. The Shasta Valley Groundwater Basin is not adjudicated and DWR has neither identified the basin as overdrafted nor projected that the basin will be in overdraft. Because the City of Yreka neither currently produces nor plans to produce groundwater, neither historic nor future groundwater production is analyzed in this UWMP.

3.4 Desalination

Currently, the City does not use desalinated water nor does it plan to use desalinated water in the future.

3.5 Transfer and Exchange Opportunities

The City of Yreka does not engage in water transfers or exchanges and but may do so in the future.

3.6 Current and Projected Water Supplies

The current and projected water supplies available under the City of Yreka' six water rights discussed in Section 3.2 are provided in **Table 3-5**. The total available supply under the six water rights is 12,134 af/yr.

Table 3-5 – Current and Projected Surface Water Supplies

Year	2010	2015	2020	2025	2030	2035
Water Supply	**af/yr**	**af/yr**	**af/yr**	**af/yr**	**af/yr**	**af/yr**
Fall Creek (P15379)	6,300	6,300	6,300	6,300	6,300	6,300
Yreka Creek (L6037)	1,214	1,214	1,214	1,214	1,214	1,214
Greenhorn Creek (L9850)	285	285	285	285	285	285
1889 Yreka Creek	2,890	2,890	2,890	2,890	2,890	2,890
1869 Greenhorn Creek	723	723	723	723	723	723
1870 Greenhorn Creek	723	723	723	723	723	723
Total	12,134	12,134	12,134	12,134	12,134	12,134

The City of Yreka plans to rely on its Fall Creek and licensed Yreka Creek and Greenhorn Creek water rights for the comparison of projected supplies and demands in the UWMP. These rights provide supplies that are sufficiently reliable for long-term water supply planning at this point in time. The City of Yreka will take steps to ensure it retains its adjudicated water rights, and will include the relevant water supply quantities in future planning documents as appropriate.

3.7 Supply Reliability

3.7.1 Fall Creek Water Supply Reliability

Analysis of the City of Yreka's Fall Creek supply indicates 100% reliability in average years and 100% reliability in single and multiple dry years, though pumping at the maximum allowable rate of 15.0 cfs may be restricted in some months in both normal and dry years. The reliability analysis is based on the USGS flow records for the period 1933-1959, with an adjustment made for the potential introduction of Spring Creek water to Fall Creek during that time period.[35] Reliability is also assessed in light of the City of Yreka's bypass flow obligation in Amended Permit 15379 and PacifiCorp's potential 5.0 cfs bypass flow requirement at its Fall Creek diversion.[36]

3.7.1.1 Normal Year

Both historic flow data reported by USGS for the period 1933-1959 and recent diversions reported by PacifiCorp in its Statements of Diversion and Use support the conclusion that the City of Yreka's Fall Creek water right is reliable in normal years because it should be able to divert water at the maximum rate under its water right in most years. Fall Creek flow records at the USGS Gage 11512000 near the confluence of Fall Creek and the Klamath River exist for the period April 1933 to September 1959. As shown in **Table 3-6**, the mean monthly flow for the period was at least 33 cfs.

Table 3-6 – Monthly Mean Flow at USGS Gage 11512000, 1933-1959

Month	cfs
January	46
February	51
March	49
April	45
May	38
June	35
July	34
August	33
September	34
October	35
November	37
December	43

In analyzing flow records, some consideration needs to be made for the extent to which Pacific Power & Light Company (PacifiCorp's prior name) may have been diverting from

[35] The Spring Creek adjustment is made because FERC may impose relicensing conditions on PacifiCorp's Spring Creek diversions, which may limit the amount of water pumped from Spring Creek to Fall Creek and thereby limit downstream water supplies available to the City of Yreka.

[36] The potential PacifiCorp bypass flow requirement is considered because FER may impose relicensing conditions on PacifiCorp's Fall Creek diversion, which may increase the bypass flow requirement on its Fall Creek diversion from 0.5 cfs to 5.0 cfs.

Spring Creek because potential limitations on PacifiCorp's ability to divert from Spring Creek may have an impact on the amount of water available in Fall Creek. Records indicate that Pacific Power & Light Company was diverting about 4 cfs during the period flow records were kept at the USGS gage.[37] Even if Pacific Power & Light Company had not been diverting 4.0 cfs, there would naturally have been about 29.0 cfs in Fall Creek at the lowest point of the year. Historically, Pacific Power & Light Company would have been able to divert this entire quantity (minus 0.50 cfs to meet its federal hydroelectric permit requirement). With a 5.0 cfs bypass requirement, under similar hydrologic conditions, PacifiCorp's diversion would be limited to about 24.0 cfs in the driest months under average hydrologic conditions. During the same dry months, the City of Yreka would be able to divert about 14.0 cfs under Permit 15379 because of its 15.0 cfs bypass flow requirement.[38] **Table 3-7** outlines projected flows of Fall Creek under normal conditions in light of the considerations just discussed.

Table 3-7 – Estimate of Total Divertible Flows In Normal Years

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mean Monthly Discharge for 1933-1959 (cfs)	46	51	49	45	38	35	34	33	34	35	37	43	480
Without Spring Creek (- 4 cfs) (cfs)	42	47	45	41	34	31	30	29	30	31	33	39	n/a
Spring Creek "Add Back" (+ 4 cfs, except June - Sept.) (cfs)	46	51	49	45	38	31	30	29	30	35	37	43	n/a
City - Total Divertible Flow (cfs) (-15 cfs for City of Yreka's bypass flow)	31	36	34	30	23	16	15	14	15	20	22	28	n/a

3.7.1.2 Single-Dry Year

The single dry year water supply reliability analysis uses the lowest runoff year for the period 1933-1959 at the USGS gage. In 1939, total mean monthly discharge was 357 cfs. As shown in **Table 3-8**, when monthly discharge is reduced by 4.0 cfs to account for the potential that PacifiCorp was diverting water from Spring Creek, 4.0 cfs is "added" to Fall Creek during all months except June through September, and the City of Yreka's 15.0 cfs bypass flow requirement is included, the total divertible flow dips to a law of 9.0 cfs. With only 9.0 cfs available in the driest months, the City of Yreka's ability to divert water at the maximum allowable rate under Amended Permit 15379 would be limited.

[37] Yreka Domestic Water Supply Project, Fall Creek Supply, Feasibility Study, November, 1966, p. 16.

Table 3-8 – Single Driest Year Divertible Flows

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mean Monthly Discharge - 1939 (cfs)	30	32	35	30	29	28	28	28	29	28	29	33	358
Without Spring Creek (- 4 cfs) (cfs)	26	28	31	26	25	24	24	24	25	24	25	29	n/a
Spring Creek "Add Back" (+ 4 cfs, except June - Sept.) (cfs)	30	32	35	30	29	24	24	24	25	28	29	33	n/a
City - Total Divertible Flow (cfs) (-15 cfs for City of Yreka's bypass flow)	15	17	20	15	14	9	9	9	10	13	14	18	n/a

3.7.1.3 Multiple-Dry Year Period

The results of the multiple-dry year period analysis are similar to the single dry year. With the same adjustments in estimated flows made as that for the normal and single-dry year, **Table 3-9** shows total divertible flows dipping to a low of 9.0 cfs in the first dry year, 8.0 cfs in the second dry year, and 9.0 cfs in the third dry year. With only 8.0-9.0 cfs available in the driest months under similar hydrologic conditions during a multiple dry year period, the City of Yreka's ability to divert water at the maximum allowable rate under Amended Permit 15379 would be limited, though it should be able to divert nearly the entire maximum annual quantity under Permit 15379 if diverting at an average rate of 8.7 cfs.

Table 3-9 – Monthly Divertible Flow for a Multiple Dry Year Period

Dry Year 1	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mean Monthly Discharge - 1939 (cfs)	30	32	35	30	29	28	28	28	29	28	29	33	358
Without Spring Creek (- 4 cfs) (cfs)	26	28	31	26	25	24	24	24	25	24	25	29	n/a
Spring Creek "Add Back" (+ 4 cfs, except June - Sept.) (cfs)	30	32	35	30	29	24	24	24	25	28	29	33	n/a
City - Total Divertible Flow (cfs) (-15 cfs for City of Yreka's bypass flow)	15	17	20	15	14	9	9	9	10	13	14	18	n/a

Dry Year 2	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mean Monthly Discharge - 1940 (cfs)	34	44	44	37	29	27	28	27	29	30	30	33	392
Without Spring Creek (- 4 cfs) (cfs)	30	40	40	33	25	23	24	23	25	26	26	29	n/a
Spring Creek "Add Back" (+ 4 cfs, except June - Sept.) (cfs)	34	44	44	37	29	23	24	23	25	30	30	33	n/a
City - Total Divertible Flow (cfs) (-15 cfs for City of Yreka's bypass flow)	19	29	29	22	14	8	9	8	10	15	15	18	n/a

Dry Year 3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mean Monthly Discharge - 1941 (cfs)	33	37	30	32	30	29	28	28	29	29	31	40	376
Without Spring Creek (- 4 cfs) (cfs)	29	33	26	28	26	25	24	24	25	25	27	36	n/a
Spring Creek "Add Back" (+ 4 cfs, except June - Sept.) (cfs)	33	37	30	32	30	25	24	24	25	29	31	40	n/a
City - Total Divertible Flow (cfs) (-15 cfs for City of Yreka's bypass flow)	18	22	15	17	15	10	9	9	10	14	16	25	n/a

Based on the forgoing discussion, there are limitations on the City of Yreka's ability to divert water under Permit 15379. Specifically, there are may be months in dry (and potentially normal) years when the City of Yreka's ability to divert water at the maximum authorized rate of 15.0 cfs could be limited. Nevertheless, even with the conceivable flow limitations, the City of Yreka could divert its allowable annual quantity of 6,300 acre-feet in almost all years if diverting at least at an average rate of 8.7 cfs (instantaneous constant rate necessary to divert 6,300 af/yr).

3.7.2 Yreka Creek Water Supply Reliability

Given the limited amount of flow data on Yreka Creek, it is difficult to determine the reliability of the City of Yreka's two surface water supplies – License 6037 or its 1889 Adjudicated Right. The City of Yreka's use data for License 6037 dates back to 1957, when the City of Yreka first filed a report with the SWRCB indicating about 1,300 af of use for the year. Ultimately, in 1959, the SWRCB licensed this right for a maximum of 1.68 cfs, which

is equivalent to an annual average of 1,214 acre-feet. The City of Yreka showed maximum use of this quantity of water in Reports of Licensee to the SWRCB for the years 1960-1971.

Currently, the City of Yreka is not able to claim that there is reliably more than 1.68 cfs available for it to divert from Yreka Creek when License 6037 is combined with its 1889 Yreka Creek right. Thus, the City of Yreka estimates that a reliable supply of 1.68 cfs will be available in a normal year from Yreka Creek.

As for a dry year, SWRCB reports from the time the City of Yreka was attempting to secure a license (1959) indicate that the yield for the City of Yreka during the dry 1959 summer may have been 55-60% of estimated average yield. Thus, for purposes of a long-term supply projection during a single dry and multiple dry year period, the UWMP estimates that 50% of 1,216 af is available, or 608 af/yr.

3.7.3 Greenhorn Creek Water Supply Reliability

As for Greenhorn Creek, the City of Yreka estimates that 285 af/yr is available under License 9850 for standby municipal and industrial purposes in normal years. As for a dry year, because the Greenhorn Creek watershed drains to Yreka Creek, the hydrology is assumed to be similar. Thus, it is assumed that 50% of the water supply under License 9850 is available in a dry year.

Similar to the 1889 Yreka Creek right, without reliable diversion records and flow data the City of Yreka cannot reasonably project the reliability of the Greenhorn Creek supplies under the 1869 and 1870 adjudicated Greenhorn Creek rights.

3.7.4 Water Supply Projects and Programs

Currently, the City does not have any water supply projects nor does the City have any planned water supply projects

3.7.5 Summary of Supply Reliability

Based on the forgoing analysis, the City of Yreka should include the following reliability schedule in its 2010 UWMP for the Fall Creek and Yreka Creek supplies.

Table 3-10 – Water Supply Reliability in Normal, Single Dry and Multiple Dry Years

Source	Normal Year		Single Dry Year		Multiple Dry Years	
	Reliability	Acre Feet	Reliability	Acre Feet	Reliability	Acre Feet
Fall Creek (P15379)	100%	6,300	100%	6,300	100%	6,300
Yreka Creek (L6037)	100%	1,214	50%	608	50%	608
Greenhorn Creek (L9850)	100%	285	50%	143	50%	143
Total		7,799		7,051		7,051

CHAPTER 4. WATER DEMAND CONDITIONS

Chapter 4 contains a projection of future water demands for the City of Yreka. The projection will be used to consider the sufficiency of available water supplies.

4.1 Historic and Current Water Demand

This section describes the historic number of water service connections and demand by connection type to provide an indication of the distribution of demands by customer sector. In 2005, the City of Yreka had approximately 2,876 metered connections. Also, the City of Yreka delivered water to city parks on an unmetered and unbilled basis. Total park demand was estimated in the City of Yreka's 2005 Water Master Plan to be approximately 98 af/yr. The City of Yreka also has another group of unmetered/unbilled demands that city staff recently estimated consumes approximately 54 af/yr.[39] As shown in **Table 4-1**, total water consumption, excluding system losses was about 2,187 acre-feet.

Table 4-1 – 2005 Connections and Water Use

Land Use	Metered		Not Metered		Total
Residential	**Connections**	**Demand (af/yr)**	**Connections**	**Demand (af/yr)**	**Demand (af/yr)**
Single Family Residential	2,183	1,035	-	-	1,035
Multi-Family Residential	183	304	-	-	304
Non-Residential	**Connections**	**Demand (af/yr)**	**Connections**	**Demand (af/yr)**	**Demand (af/yr)**
Commercial	458	530	-	-	530
Industrial	9	103	-	-	103
Landscape Irrigation	43	63	-	-	63
Other	-	-	-	-	-
City Parks (est.)	-	-	-	98	98
Other Unbilled/Unmetered (est.)	-	-	-	54	54
Total	2,876	2,035	-	152	2,187

Currently, as shown in **Table 4-2,** the City of Yreka has nearly 2,958 "Active" connections. The City of Yreka also currently serves water to 64 "Inactive" connections, bringing the total number of connections to 3,022.[40] **Table 4-2** presents the current annual water demand based on 2009 data, by customer category. In 2009, the City of Yreka classified water demands according to the following customer categories: Single Family Residential, Multi-Family Residential, Commercial/Institutional, Industrial, Landscape Irrigation, and Other. Similar to 2005, the City of Yreka had about 150 af/yr in unmetered/unbilled demands, including city parks and other unmetered/unbilled demands. **Table 4-2** presents the City of

[39] 2009 Water Audit and Balance Backup Information Report. It is assumed this demand existed to some extent in 2005.
[40] "Active" connections receive water monthly and are billed volumetrically. "Inactive" connections receive water intermittently, and are billed a base rate, yet because there is a consistent annual demand are included in the historic connection count.

Yreka's current water demand by customer category. Currently, total water consumption, as reflected by 2009 data, is 2,243 acre-feet, excluding system losses. For the period 2005-2009, the annual water demand in the City of Yreka was about 2,240 af/yr, excluding losses associated with operations of the treated water system.[41]

Table 4-2 – Current Connections and Water Demand

Land Use	Metered		Not Metered		Total
Residential	**Connections**	**Demand (af/yr)**	**Connections**	**Demand (af/yr)**	**Demand (af/yr)**
Single Family Residential	2,232	1,005	-	-	1,005
Multi-Family Residential	194	358	-	-	358
Non-Residential	**Connections**	**Demand (af/yr)**	**Connections**	**Demand (af/yr)**	**Demand (af/yr)**
Commercial	465	575	-	-	575
Industrial	8	80	-	-	80
Landscape Irrigation	49	70	-	-	70
Other	10	4	-	-	4
City Parks (est.)	-	-	-	98	98
Other Unbilled/Unmetered (est.)	-	-	-	54	54
Total	2,958	2,091	-	152	2,243

4.2 Projected Water Demand

The water demand projection for the City of Yreka is based on the land use data in the City of Yreka's 2002 General Plan (2002 General Plan). The 2002 General Plan contains an estimate of "Developed" and "Underdeveloped" acreage in the City of Yreka (as of 2002). For this analysis, the "Developed" acreage, with limited exceptions, represents the current land-use condition.[42] Future land-use is projected by estimating the number of additional acres that would need to be developed to support the projected population. Residential unit projections are made based on refinements to maximum residential unit densities, as presented in the 2002 General Plan. Ultimately, unit demand factors are assigned to projected units and non-residential acres to arrive at a 2035 water demand estimate.

4.2.1 Current Land Use

The land-use based water demand projection first requires identification of existing land uses in the City of Yreka water service area. When unit demand factors are applied to the existing land uses, total demand should be similar to the quantity of water produced by the City of Yreka's water treatment plant (while considering inactive and unbilled/unmetered deliveries).

Non-Residential Acreage: **Table 4-3** presents the Developed acres as shown in Table 1-7 of the 2002 General Plan (City Developed Acres). **Table 4-3** also shows adjusted Developed acres based on a set of assumptions described in the remainder of this section (Developed

[41] The 2009 estimate for losses associated with operations of the treated water system includes system losses in the distribution system (264 acre-feet in 2009) and treatment plant backflush losses (64 acre-feet in 2009).
[42] "Developed" acreage is obtained from Table 1-7 of the City of Yreka's 2002 General Plan.

Acres – Adjusted). The Developed Acres - Adjusted acreage for each non-residential category is used to project the water demand for each category.[43]

The values in the Developed Acres – Adjusted category were calculated based on a set of assumptions related to existing water demands and calculated unit water demand factors. First, gross acreage for the "Industrial" category was estimated to be about 48 acres as a result of dividing the 2009 water demand (80 af) by the unit demand for "Industrial" uses in the 2005 Water Master Plan (1.66 af/ac).[44]

The "Open Space" acreage estimate was calculated by assuming that the category comprises school demands, because park demands are not metered, and therefore would not be part of the existing acreage with a water demand. A review of electronic mapping sources indicates that schools comprise about 110 acres in the City of Yreka.[45] Using a unit demand factor of 3.0 af/ac for schools, the total current demand for the Open Space category is estimated to be 330 af/yr.[46] The demand total of 330 af/yr was subtracted from the 2009 water demand for the Commercial/Institutional customers (575 af), as reported in the 2009 Public Water System Statistics report (2009 PWSS) so that the Open Space and Commercial/Institutional demands could be reported separately in **Table 4-15**.

Though the 2002 General Plan combines parks and schools in the Open Space category, the two have been separated in **Table 4-3** so that additional park acreage can be considered separately and assigned a unique unit demand factor. Thus, in **Table 4-3**, 20 acres was included in the Parks category to give the category proper weighting as a percentage of total developed acreage.[47]

Next, the demand for the Historic Downtown land use was estimated assuming it has a unit demand factor similar to the General Commercial category - 1.66 af/ac. At 16 acres, the total demand would be 27 af/yr. When the estimated Open Space demand and the Historic Downtown demand are combined, the total is about 355 af/yr. Assuming these two demands

[43] The calculated total values in the Developed Acres – Adjusted category were reduced slightly in **Table 4-3** to account for additional residential growth between 2003 and 2010. The reduction is made to set the developed acres to population ratio described in Section 4.2.2. The acreage is added back for purposes of calculating the 2010 demand.
[44] 1.66 af/ac is the calculated unit demand for the net acreage in the land use category as shown in **Table 4-8**.
[45] The schools that were mapped are Evergreen, Gold Street, Jackson, Yreka High School and College of the Siskiyous.
[46] The unit demand factor of 3.0 af/ac is derived by assuming 25% of land cover is for indoor uses at 2.0 af/ac and 50% of the land cover is for outdoor uses at 5.0 af/ac (ETo of 49.1 in./yr, and 80% irrigation efficiency). The remaining 25% of land cover is for hardscapes such as parking lots and non-irrigated playground areas. Note that this unit demand factor is different from the Open Space unit demand factor in **Table 4-8** because it is only intended to account for school unit demand.
[47] The park acreage is based on the park demand estimate in the 2005 Water Master Plan (98 af/yr) and assumes ETo in Yreka is 49.1 inches/year and irrigation efficiency is 80%. An irrigation efficiency of 80% was selected because, according to UC Cooperative Extension and the Department of Water Resources, "A representative range of efficiencies for landscape systems is proposed … to be from 65% to 90%," and "A system which is well designed and operated can have an efficiency range of 80% to 90%." A Guide to Estimating Irrigation Water Needs from Landscape Plants in California, University of California Cooperative Extension and California Department of Water Resources, August, 2000.

are captured in the total demand for the Commercial/Institutional category in the 2009 PWSS report, the demand for the General Commercial category is 220 af/yr. Assuming 1.66 af/ac, Developed acreage in the General Commercial category would be about 133 acres.[48]

Table 4-3 – Baseline Acreage and Unit Allocation

Land Use	Baseline Acreage and Adjustments				Baseline Unit Density and Adjustments		
Residential	**City Developed Acres (GP, Table 1-7)**	**Developed Acres - Adjusted**	**Adjusted Developed as % of Total Acreage**	**2003-2010 Additional Acreage**	**Gross Units/Acre (GP, Table 1-8)**	**Net Units/Acre**	**Total Units**
Residential Agricultural (RA)	100	97	6%	2	2	1	147
Low Density Residential (LDR)	713	697	41%	16	4	3	2,104
Medium Density Residential (MDR)	72	48	3%	1	10	8	368
High Density Residential (HDR)	167	94	6%	2	15	10	962
Non-Residential							
General Commercial (GC)	201	130	8%	3	n/a	n/a	n/a
Historic Downtown (HD)	16	16	1%	0	n/a	n/a	n/a
Industrial (IND)	363	47	3%	1	n/a	n/a	n/a
Open Space (schools) (OS)	298	108	6%	2	n/a	n/a	n/a
Roads/Highways (R/H)	441	430	25%	10	n/a	n/a	n/a
Parks	n/a	20	1%	0	n/a	n/a	n/a
Totals	2,371	1,687	100%	39			3,581

Assigned Residential Units: Existing residential units were estimated for purposes of developing a demand projection in **Table 4-15**. Units were estimated by first developing a unit density based on existing planning documents. The 2002 General Plan presents maximum gross acre densities, as shown in **Table 4-3** (Gross Units/Acre). To estimate existing residential units, the unit densities are adjusted in **Table 4-3** to account for the topography of the City of Yreka, where significant slopes are common, and existing development has likely been limited to some extent.[49] Also, the maximum unit density was adjusted to account for streets, parking, setbacks, minimum lot sizes, and other design criteria established in the zoning ordinance.[50] The adjusted unit densities appear as "Net Units/Acre" in **Table 4-3**.

With the unit densities set, Developed acres are estimated until a unit count for the Residential Agricultural (RA) and Low Density Residential (LDR) categories approximates the existing Single Family connection count based on the 2009 PWSS reports. Also, Developed acreage for the Medium-Density Residential (MDR) and High-Density Residential (HDR) categories was reduced until the total unit count was consistent with the

[48] The General Commercial unit demand was calculated from the unit demand factor presented in Table 12 of the 2005 Water System Master Plan, and adjusted to reflect the net acreage unit demand, as presented in **Table 4-8**.
[49] The 2009 Housing Element has identified steep slopes, the 100-year floodplain, access and special status species as a limiting factor for significant portions of vacant lands. While these factors may account for the land remaining vacant, it is also assumed to have been a factor limiting existing development. See Appendix A at A-34, as well as Table A-42 in the 2009 Housing Element for an indication of the factors limiting development in and around the City of Yreka.
[50] City of Yreka, 2002 General Plan, p. 1-6. The unit densities (net units/acre) for the RA, LDR and MDR categories, as shown in Table 4-3, are all about 75% of the maximum unit density. Roads could account for 15-20% of the reduction, and the limiting factors in the Housing Element could easily account for the additional reduction. The HDR category was set at 10 units/acre because the zoning designations for the City of Yreka's high density multi-family zones indicate that the density applies when there are at least 10/units acre.

Department of Finance's Housing Unit estimates as of January 1, 2010. **Table 4-4** contains the Department of Finance estimate of both population and housing units in the City of Yreka as of January 1, 2010.[51] Assuming "Detached" units, as presented in **Table 4-4**, include the RA and LDR categories from the City of Yreka's General Plan, the total estimated number of units (2,251) is nearly similar to DOF's estimate of 2,257 units. As for the MDR and HDR unit estimates in **Table 4-3**, the total number of units in DOF's Attached, 2 to 4 Units, 5+ Units, and Mobile Homes categories was used to calibrate the unit densities. Total estimated units in **Table 4-3** for the MDR and HDR categories is 1,330 and for the representative categories in **Table 4-4**, the total number of units is 1,322. Ultimately, the total number of residential units in **Table 4-3** nearly matches the number in **Table 4-4**.

Table 4-4 – Population and Housing Estimate, January 1, 2010

Population	
Household	7,195
Group Quarters	220
Total	7,415

Unit Type	Housing Units
Detached	2,257
Attached	140
2 to 4 Units	296
5 + Units	633
Mobile Homes	253
Total	3,579

Statistics	
Occupied Units	3,375
Percent Vacant	5.7%
Persons Per Household	2.13

4.2.2 Projected Land Use

Residential units and non-residential acreage is projected by using a Developed acreage to population ratio. The 2003 population was divided by the "Developed Acres-Adjusted" in **Table 4-3**. The result is a "Developed" acres to population ratio of .23 acres/person.[52] The ratio of .23 acres/person was used to establish the total Developed acreage in each five-year

[51] State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark. Sacramento, California, May 2010. It should be noted that the City of Yreka uses the DOF estimates in its planning documents. (See Table A-21 of the 2009 Housing Element.)

[52] The calculated total values in the "Developed Acres – Adjusted" category were reduced slightly in **Table 4-3** to account for additional residential growth between 2003 and 2010 such that the current residential unit counts and acreage totals are consistent with the 2010 DOF figures as explained in Section 4.2.1. The "2003-2010 Additional Acreage" is shown in **Table 4-3**. Both categories are used to set the percentage of "Developed" acreage in each land-use category for purposes of the demand projection.

projection increment through 2035, as shown in **Table 4-5**. Total estimated additional acreage between 2010 and 2035 is 406 acres.[53]

Table 4-5 – Projected Total Additional Developed Acreage

Year	2003 (Baseline)	2010	2015	2020	2025	2030	2035
Population	7,367	7,537	7,871	8,205	8,561	8,916	9,311
Developed Acreage (Effective)	1,687	1,726	1,802	1,879	1,960	2,042	2,132
Proportion (Acreage/Population)	23%	23%	23%	23%	23%	23%	23%
Additional Acreage	-	39	76	76	81	81	90

In **Table 4-6**, the total additional Developed acreage in **Table 4-5** in each five-year increment is distributed among the land-use categories in **Table 4-3** based on the proportion of acres in each land-use category to total acres (2003 % of Total Acreage) as reflected in **Table 4-3**.[54]

Table 4-6 – Additional Acreage by Land Use Category

Residential	2010	2015	2020	2025	2030	2035	Totals
Residential Agricultural	2.2	4.4	4.4	4.7	4.7	5.2	25.6
Low Density Residential	16.1	31.6	31.6	33.6	33.6	37.3	183.9
Medium Density Residential	1.1	2.2	2.2	2.3	2.3	2.6	12.7
High Density Residential	2.2	4.3	4.3	4.5	4.5	5.0	24.8
Non-Residential							
General Commercial	3.0	5.9	5.9	6.3	6.3	7.0	34.3
Historic Downtown	0.4	0.6	-	-	-	-	1.0
Industrial	1.1	2.1	2.1	2.3	2.3	2.5	12.4
Open Space (schools)	2.5	4.9	4.9	5.2	5.2	5.8	28.5
Parks	0.5	0.9	0.9	1.0	1.0	1.1	5.3
Roads/Highways	9.9	19.5	19.5	20.8	20.8	23.0	113.4
Total	29.7	85.6	75.7	80.6	80.6	89.4	441.9

To estimate the City of Yreka's water demand through 2035, all of the non-residential acreage in **Table 4-6** is multiplied by a unique non-residential unit demand factor for each category. For the residential land-uses, additional acreage in **Table 4-6** is used to first estimate the number of additional residential units. **Table 4-7** presents the cumulative quantity of residential units for each time step through 2035. To project residential demand in **Table 4-15**, the additional units in **Table 4-7** are multiplied by a unique residential unit demand factor.

[53] The additional developed acres estimate is within the range of the 2002 General Plan, in which 1,500-3,300 additional persons was estimated to require 250-500 additional acres of developed land.

[54] The additional acreage totals were checked against the "Underdeveloped" acreage totals in Table 1-7 of the General Plan. All totals except the Historic Downtown total was less than the "Underdeveloped" acreage listed in the 2002 General Plan. Since only one "Underdeveloped" acre in the Historic Downtown category was available, total additional acreage is assumed to be limited to one acre.

Table 4-7 – Additional Residential Units

Land Use Category	2010	2015	2020	2025	2030	2035
Residential	# of Units	# of Units	# of Units	# of Units	# of Units	# of Units
Residential Agricultural	3	10	16	23	30	38
Low Density Residential	48	141	234	333	432	542
Medium Density Residential	8	25	41	58	76	95
High Density Residential	22	64	107	152	198	248
Total	81	240	398	567	736	923

4.2.3 Baseline Unit Demand Factors

The baseline unit demand factors in **Table 4-9** are based on those developed in the 2005 Water Master Plan (2005 WMP). **Table 4-8** presents the unit demand factors shown in Table 12 of the 2005 Water Master Plan on a per acre and per unit basis.[55] Because the 2005 WMP presents unit demand factors on a gross acreage basis, and the water demand in **Table 4-15** is calculated on a net acreage basis, **Table 4-8** includes a net acreage unit demand factor estimate (Net Est.).[56]

The net acreage unit demand factor estimates were compared to the historic annual unit demand factors in the City of Yreka's PWSS reports. In the 2009 PWSS, the average Single Family connection unit demand factor was 0.45 af/unit/yr. The 2005-2009 PWSS average unit demand factor for the Single Family connection category was 0.48 af/unit/yr. While the unit demand factors for the General Plan land-use designations in **Table 4-8** and the PWSS reports are comparable, it is notable that the PWSS Single-Family connection unit demand factor appears to be heavily weighted towards a single-family land use in the more dense Low Density category, tending towards the Medium Density category, as shown in **Table 4-8**. This would indicate that LDR units shown in **Table 4-4** are likely more similar to MDR housing than to RA housing conditions.

[55] Table 12 of the 2005 Water Master Plan presents the unit demand factors as a Maximum Day Demand (MDD). Average day demand is calculated based on the ratio of 2.25 MDD/ADD (see Table 11 of the 2005 Water Master Plan). To calculate demand factors by unit, either the specific density or the mid-range density was selected.

[56] An adjustment of 15% was used for the Residential Agricultural and Low Density designations. An adjustment of 10% was used for the Medium and High Density designations.

Table 4-8 – 2005 Water Master Plan Unit Demand Factors [57]

Land Use Category		GAL/AC/DAY*		AF/AC/YR*		AF/DU/YR	AF/DU/YR
Residential	**Density**	**MDD**	**Avg. Day**	**MDD**	**Avg. Day**	**Gross Est.**	**Net Est.**
Residential Agricultural	**0.5**	1,600	711	1.8	0.8	1.59	1.87
Low Density Residential - 1	**1**	2,500	1,111	2.8	1.24	1.24	1.46
Low Density Residential - 2	**2**	3,750	1,667	4.2	1.9	0.93	1.10
Low Density Residential - 3	**3.0-4.0**	4,600	2,044	5.2	2.3	0.65	0.77
Medium Density Residential	**5.0-12.0**	6,000	2,667	6.7	3.0	0.35	0.39
High Density Residential	**up to 20**	8,000	3,556	9.0	4.0	0.25	0.28
Non-Residential							
General Commercial		3,000	1,333	3.4	1.5		1.66
Historic Downtown		3,000	1,333	3.4	1.5		1.66
Industrial		3,000	1,333	3.4	1.5		1.66
Open Space (parks/schools)		6,800	3,022	7.6	3.4		3.76

Given that the LDR units in **Table 4-3** are likely more similar to MDR housing than to RA housing conditions, the baseline Low Density residential unit demand factor was estimated to be slightly less than the 2005-2009 PWSS Single Family connection average of 0.45 af/unit/yr, as shown in **Table 4-9**. The unit demand factors for the MDR and HDR land use categories are 0.34 af/unit/yr and 0.24 af/unit/yr given the variability in unit densities, the number of units per connection and the fact that the LDR category appears to be heavily weighted towards a density at the higher end of the LDR range, which shows a trend towards lower unit demands than may be typical for a similarly classified land use in a neighboring jurisdiction.[58]

For the non-residential land use categories, a gross to net acreage adjustment was made for the General Commercial, Historic Downtown and Industrial categories to account for roads and topography limitations.[59] For the Open Space land use category, a unit demand factor of 3.0 af/ac/yr was used.[60] To estimate future Parks demand in **Table 4-15**, the unit demand factor of 3.48 af/ac was calculated by assuming future use is 85% of ETo (as published for Zone 10 in the CIMIS Reference Evapotranspiration Zones Map).[61] Baseline unit demand factors, given the forgoing considerations, are presented in **Table 4-9**. Adjustments to these baseline unit demand factors are discussed in **Section 4.2.5.3**.

[57] The Open Space/Park unit demand factor shown in **Table 4-8** is the result of adjusting the 2005 WMP Table 12 value to more closely reflect the values seen in neighboring jurisdictions. This value is still higher than the value used in **Table 4-9**, which is the baseline value used to project demand for the Open Space category, because it is intended to capture the unit demand for parks as well as schools. Since the City of Yreka's parks are not metered, demand is estimated separately as a total demand.

[58] The relationship to land-use classifications in neighboring jurisdictions is relevant because unit demand factors in the 2005 WMP were used to estimate unit demand factors for the City of Yreka.

[59] The adjustment appears as a 10% increase in the unit demand factors.

[60] Estimate of 3.0 af/ac/yr is explained in Section 4.2.1.

[61] The MWELO provides for Special Landscape Areas to have a demand of 100% of ETo, but it is assumed that the City of Yreka will seek to maintain high efficiency landscape applications at its facilities to set a positive conservation example for its customers.

Table 4-9 – 2010 UWMP Baseline Unit Demand Factors

Residential	AF/Unit/yr
Residential Agricultural	0.84
Low Density Residential	0.42
Medium Density Residential	0.34
High Density Residential	0.24
Non-Residential	**AF/Acre/yr**
General Commercial	1.66
Historic Downtown	1.66
Industrial	1.66
Open Space (schools)	3.00
Parks (Future Only)	3.48
Roads/Highways	0.00

4.2.4 Water Losses

As a member of the California Urban Water Conservation Council (CUWCC), the City of Yreka has performed a water audit pursuant to CUWCC Memorandum of Understanding (MOU) Best Management Practice (BMP) 1.2 – Water Loss Control. CUWCC MOU BMP 1.2 requires documentation of an agency's "Apparent" and "Real" losses consistent with the methodology developed by the American Water Works Association (AWWA) for system water audits and loss control programs.[62] The AWWA Water Audit Software defines "Real" losses as those realized through leaks in transmission systems, storage facilities or at service connections. "Apparent" losses are those realized through meter inaccuracies or unknown or unbilled connections and uses (e.g. fire hydrant flushing and construction water). CUWCC MOU BMP 1.2 provides that a benchmark for the performance indicator in terms of water loss standards will be determined after the first four years of data collected and reported by the agency.[63] Furthermore, CUWCC MOU BMP 1.2 provides that beginning in the fifth year of implementation, through the tenth year of performance, agencies shall demonstrate progress in water loss control performance as measured by the AWWA software.[64]

Historically, water losses have been about 14.5% of total water produced at the City of Yreka's water treatment plant.[65] Recent measurements of the difference between total water entering the system (at the treatment plant) and total "Authorized" use (i.e., metered customer use and other unbilled metered and unbilled unmetered uses) indicate that average water losses have been as low as 10.3% (2009), and as high as 15.9% (2006). Yet, the 2007-2009 average is about 12.0% of total water entering the system. **Table 4-10** shows the water losses for the period 2005-2009 as a percentage of treatment plant influent.

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62 "Real" and "Apparent" losses combined equal "Water Losses."
63 CUWCC MOU BMP 1.2.B.(3).
64 CUWCC MOU BMP 1.2.C.(4).
65 Table 9, 2005 WMP. The estimate was derived by calculating the difference between total water produced and total water consumed for the years 1998-2004 and averaging the difference for all seven years. The Unaccounted For Water estimate in Table 9 of the 2005 WMP includes non-metered uses such as City parks, system losses, hydrant flushing, and fire protection.

The estimate in **Table 4-10** includes "Authorized" uses that have historically shown up as "Unaccounted for Water" in the City of Yreka planning documents. The City of Yreka developed water demand estimates for the "Authorized" uses that are unbilled and unmetered. For the period 2005-2009, the estimate of 98 af/yr was used for the unmetered park demand. Also, based on the analysis of unbilled and unmetered consumption in the City of Yreka's 2009 AWWA Water Audit and Balance Backup Information Report, an additional 54 af/yr of water use is estimated for fire flow, line flushing, street cleaning, landscape and limited industrial uses. This quantity of unbilled and unmetered water is added to the treated water consumption values of Total Authorized Use.

Table 4-10 – Annual Quantity of Water Lost

Year	2005	2006	2007	2008	2009	07-09 Avg.
Treatment Plant Influent (AF)	2,597	2,785	2,604	2,677	2,570	2,646
Metered Customer Consumption (AF)	2,035	2,115	2,096	2,088	2,091	2,085
Unmetered Park Consumption (AF)[1]	98	98	98	98	98	98
"Other" Unmetered, Unbilled Consumption (AF)[2]	54	54	54	54	54	54
Treatment Plant Backflush Water (AF)[3]	61	75	51	66	63	63
Total Authorized Use (from TP Inlet) (AF)	2,247	2,342	2,299	2,305	2,306	2,300
Water Loss as a % of TP Influent	13.5%	15.9%	11.7%	13.9%	10.3%	12%
Water Loss as a % of Consumption	15.6%	18.9%	13.3%	16.1%	11.5%	13.6%

1. Quantity estimated for 2005 Water Master Plan
2. Quantity estimated from 2009 AWWA Water Audit and Balance Backup Information Report
3. Difference between Treatment Plant Influent and Effluent

As discussed previously, the City is committed, pursuant to CUWCC MOU BMP 1.2, to following AWWA standards for system water audits, leak detection and repair. Thus, the water demand estimate for the City will use the 2009 water loss percentage as a total of treatment plant influent for the existing condition – 10.3%. Future demand projections will contain an estimate of water loss adjusted from the average loss percentage for the period 2007-2009 (i.e., 12.0%). Over time, the loss percentage will be reduced slightly, assuming some degree of loss control is possible by reducing the quantity of "Real" losses attributable to leaks occurring because of the poor condition of old steel pipes or old meters that are under recording flow.[66] Also, losses may be reduced further by limiting "Apparent" losses by about 10% through a program of meter testing, repair and replacement, along with new technology. A recent analysis of the potential annual loss reduction through 2020 indicates that losses as a percent of influent may be reduced by about 2.8% total over 10 years.[67] Thus, the average loss factor of 13.6% is lowered by 1.4% by 2015 and by 2.8% by 2020.

[66] System condition assumptions obtained from the 2005 Water Master Plan at page 37. The demand estimate will use a loss percentage that reflects losses as a percentage of demand, which is derived from the same numbers as those used to develop the loss percentage as a percentage of supply. The adjustment is necessary because the loss quantity should be the same, but the quantity relative to the demand total is greater than the loss relative to the supply total.

[67] Draft Future Effects of BMPs on Yreka Water Use, City of Yreka, January 5, 2011. Percentage obtained by assuming loss total is reduced by 24.6 million gallons/year. This reduction results in a lowering of the loss percentage from 10.3% to 7.5% of total treatment plant influent.

4.2.5 Unit Demand Factor Adjustments

4.2.5.1 Adjustments to Unit Demand Factors for Existing Connections

As a signatory to the CUWCC Best Management Practices Memorandum of Understanding (CUWCC MOU), the City is committed to implementing best management practices (BMP) designed to achieve water conservation across existing and future demand sectors. Implementing the BMPs should ultimately reduce the unit demand factors for existing connections served by the City.

4.2.5.2 Adjustments to Demand Factors for Future Connections

Given recent state legislation, government regulations, and building trends, the unit demand factor for most connection types added to the City of Yreka's water system in the future should have a lower unit demand than historically seen for each respective connection type. This section describes the key drivers that support the use of unit demand factors that are lower than historically seen in the City. The demand projection presented in **Table 4-15** uses unique unit demand factors for both existing connections and future connections to clearly identify how state conservation mandates might impact unit demands for future connection types.

Water Conservation Objectives

An "urban retail water supplier" is now required to select one of four water conservation targets specified in California Water Code § 10608.20(b) with the statewide goal of achieving a 20-percent reduction in urban per capita water use by 2020.[68] To accommodate development of the baseline water use and conservation target required by CWC § 10608.20(b), an urban retail water supplier is allowed to adopt a 2010 UWMP as late as July 1, 2011. (CWC § 10608.20(j)). As required by CWC § 10608.20, an urban water supplier's ultimate target will require reductions in per capita urban water use from past levels. To reach its ultimate target, an urban water supplier will probably need to institute water conservation measures in its existing service area, and also require new service areas to use efficient indoor infrastructure and landscape features.

Indoor Infrastructure Requirements

In January, 2010, the California Building Standards Commission adopted the statewide mandatory Green Building Standards Code (CAL Green Code), which will require the installation of water-efficient indoor infrastructure for each newly constructed building or structure constructed on or after January 1, 2011. The CAL Green Code will apply to the

[68] An "urban retail water supplier" is a water supplier, …, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes. CWC § 10608.12(p).

planning, design, operation, construction, use and occupancy of every newly constructed building or structure. Future development projects in the City are likely to include new "buildings and structures," as defined under the CAL Green Code, and the projects will therefore need to satisfy the indoor water use infrastructure standards.

The CAL Green Code requires residential and nonresidential water efficiency and conservation measures for new buildings and structures that will reduce the overall potable water use in the building by 20%. The 20% water savings can be achieved in one of the following ways: (1) installation of plumbing fixtures and fittings that meet the 20% reduced flow rate specified in the CAL Green Code, or (2) by demonstrating a 20% reduction in water use from the building "water use baseline."[69]

California Model Water Efficient Landscape Ordinance

In 2006, the California Legislature enacted, and the Governor signed, the Water Conservation in Landscaping Act (Gov. Code §§ 65591-65599), which requires the Department of Water Resources to update the Model Water Efficient Landscape Ordinance (MWELO). On September 10, 2009, the Office of Administrative Law (OAL) approved the updated MWELO, which requires that a local agency adopt the provisions of the MWELO by January 1, 2010.[70] Because the City of Yreka is a "local agency" under the MWELO, it must require "project applicants" to prepare plans consistent with the requirements of MWELO for review and approval.[71]

The provisions of the MWELO are applicable to:

- 1. New construction and rehabilitated landscapes for public agency projects and private development projects with a landscape area greater than 2,500 square feet requiring a building or landscape permit, plan check or design review;[72]
- 2. New construction and rehabilitated landscapes which are developer-installed in single-family and multi-family projects with a landscape area equal to or greater than

[69] For Residential construction, Sec. 4.303.1 provides the residential water conservation standard and Table 4.303.2 identifies the infrastructure requirements to meet this standard. Table 4.303.1 and Worksheets WS-1 and WS-2 are to be used in calculating the baseline and the reduced water use if Option 2 from Sec. 4.303.1 is selected. For Non-Residential construction, Sec. 5.303.2 provides the water conservation standard as well as the baseline and reduced flow rate infrastructure standards. Table 5.303.2.3 identifies the infrastructure requirements to meet this standard. Also, if the 20% reduction from the water use baseline standard is selected from Sec. 5.303.2, Table 5.303.2.2 is to be used to set the baseline along with Worksheets WS-1 and WS-2. Note that Worksheets WS-1 and WS-2 incorporate both residential and non-residential fixtures, yet the water use is still to be analyzed by "building or structure" as specified in Chapter 1, Sec. 101.3.
[70] The MWELO is contained in CCR Tit. 23, Sec. 490 et seq.
[71] "Local Agency" means a city or county, including a charter city or charter county, that is responsible for adopting and implementing the ordinance. The local agency is also responsible for the enforcement of this ordinance, including but not limited to, approval of a permit and plan check or design review of a project. CCR Tit. 23, Sec. 491(ii).
[72] CCR Tit. 23, Sec. 490.1.

2,500 square feet requiring a building or landscape permit, plan check, or design review;[73]

- 3. New construction landscapes which are homeowner provided and or homeowner hired in single-family and multi-family residential projects with a total project landscape area equal to or greater than 5,000 square feet requiring a building or landscape permit, plan check or design review;[74]
- 4. Existing landscapes installed before January 1, 2010 and greater than an acre in size.

The MWELO provision likely to have a significant effect on the new and rehabilitated landscapes greater than 2,500 and 5,000 square feet respectively (#1-3 above) is the preparation of a Landscape Design Plan with a water budget that is 70% of reference evapotranspiration.[75] As for the landscapes installed before January 1, 2010 greater than one acre in size (#4 above), for the landscapes with a water meter, the local agency may conduct analyses, surveys and audits to provide recommendations to water users to reduce landscape water use to 80% of reference ETo.[76] For those landscapes greater than one acre without a meter, a local agency shall administer water conservation programs designed to prevent waste.[77]

The MWELO also "highly recommends" use of a dedicated landscape meter on landscape areas smaller than 5,000 square feet, and requires weather-based irrigation controllers or soil-moisture based controllers or other self-adjusting irrigation controllers for irrigation scheduling in all irrigation systems.[78] The MWELO provides a methodology to calculate total water use based upon a given plant factor and irrigation efficiency.[79] Finally, the MWELO requires the landscape design plan to delineate hydrozones (based upon plant factor) and then assign a unique valve for each hydrozone (low, medium, high water use).[80]

It is difficult to predict the ultimate impact of the MWELO requirements on water demand. While the requirement is for development of a landscape design plan that uses plants and features that are estimated to use no more than 70% of ETo, some provision must be made

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[73] *Id.*
[74] *Id.*
[75] CCR, Tit. 23, Sec. 492.4. The MWELO has an exception for "Special Landscape Areas (SLA)," which are defined as a landscape area dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface. The SLAs can have a water demand of 100% of ETAF in the maximum applied water calculation.
[76] CCR, Tit. 23, Sec. 493.1.
[77] *Id.*
[78] CCR Tit. 23, Sec. 492.7(a)(1)(A)-(B).
[79] In calculating Estimated Total Water Use, the MWELO requires use of at least a 71% irrigation efficiency factor. Assuming 71% irrigation efficiency, the average plant factor must be 0.50. It would be possible to stay within the water budget if the average plant factor were higher than 0.50 by designing a system with an irrigation efficiency higher than 71%. The relationship between a Plant Factor (PF) and Irrigation Efficiency (IE) in the Applied Water formula is: AW=(ETo*PF)/IE.
[80] CCR Tit. 23, Sec. 492.3(a)(2)(A) and 492.7(a)(2).

for the inherent tendency to overwater even with irrigation controllers installed, piecemeal changes in landscape design, reductions in irrigation efficiency through product use, and limited resources for enforcement in the absence of dedicated irrigation meters.

For these reasons, outdoor water use may more reasonably be 85% of ETo over a long-term period. 85% of ETo was selected based on a study that supports the assumption that customers tend to apply 16% more water to the landscape than it actually needs.[81] While weather-based irrigation controllers may reduce this number such that only about 2% more water is being applied than is needed, some consideration needs to be made for the factors described above that will impact water use, outside of a controlled study, even when using a weather-based irrigation controller. These factors will likely result in overuse somewhere between 2% and 16%. Given the uncertainty regarding these impacts, the "overuse" percentage of 16% was used to adjust the MWELO Landscape Plan requirement of 70% of ETo.[82]

California Urban Water Conservation Council Best Management Practices

Some of the CUWCC BMPs that support using per unit demands that are lower than such demands in the City's existing service area include Landscape Surveys (BMP 3), which could be designed for the City of Yreka in such a way as to try to ensure the MWELO Landscape Design requirements remain in place in the field.[83] BMP 3 also requires interior surveys for Single and Multi-Family Residential customers, which could help determine whether customers are continuing to use water-efficient indoor appliances (e.g., those meeting the CAL Green Code specifications).[84]

Also, the CUWCC MOU recommends identifying opportunities for installation of dedicated irrigation meters, monitoring progress through billing, and then providing site-specific assistance for accounts 20% over budget. (CUWCC BMP 5) Taking the CUWCC recommendation one step further, the recently adopted CAL Green Code requires installation of separate meters or submeters in nonresidential construction landscapes that are between 1,000 and 2,500 square feet. Thus, irrigation submeters will be in place at many, if not all, nonresidential sites. The City of Yreka can use this meter data and provide site-specific assistance which should help maintain a level of water use consistent with its water use planning assumptions.

[81] http://www.irwd.com/Conservation/FinalETRpt[1].pdf.
[82] Dividing 70% by 84% (difference between 1.0 and .16) results in an adjusted figure of approximately 85%.
[83] CUWCC BMP 3 provides that MOU signatories should perform site-specific landscape water surveys that shall include checking the irrigation system and timers for maintenance and repairs; estimating landscaped area; and developing a customer irrigation schedule based on precipitation, climate and landscape conditions.
[84] CUWCC MOU BMP 3 specifically provides that an MOU signatory should offer site-specific leak detection assistance, including a water conservation survey, water efficiency suggestions and/or an inspection, as well as providing WaterSense rated showerheads and faucet aerators.

Also, as a signatory to the CUWCC MOU, the City of Yreka commits to conducting public information campaigns and school education programs.[85] These educational campaigns will help reinforce water conservation oriented behavior in the City, which can help minimize year-round water use indoors and moderate outdoor use during the peak irrigation season.

Two additional BMPs that will help moderate water demands associated with future water service connections in the City are (1) the use of a water conservation coordinator, and (2) enactment and enforcement of a water waste prohibition.[86] The City of Yreka currently has both a water conservation coordinator and an adopted water waste ordinance.[87] Both could have an impact on water use in the City of Yreka, because the coordinator will be assigned to manage water conservation programs and city staff will be authorized to enforce the ordinance.

The CUWCC MOU BMPs should have a long-term impact on the City's ability to manage water use throughout its service area. Through targeted outreach, the City can encourage continued customer use of highly efficient fixtures, appliances and irrigation systems, emphasize the need to retain efficient landscape plantings, and also minimize otherwise wasteful uses. The City's commitment to implementing these agreements should help obtain and maintain water use efficiency improvements.

4.2.5.3 Unit Demand Factor Adjustment Summary

The unit demand factors for both the existing and future land-uses are adjusted over time based on the factors discussed in both **Sections 4.2.5.1** and **4.2.5.2**. For the existing connections, a reduction in unit demands will be most likely associated with implementation of CUWCC MOU BMPs 3 and 4. Assuming a concerted effort to implement the CUWCC MOU BMPs, the existing Residential and Industrial land-use unit demand factors are reduced by 5% by 2015 and by 10% by 2020, when compared to the baseline values in **Table 4-9**.[88] The baseline unit demand factors in **Table 4-9** for the Commercial, Landscape Irrigation and Other land uses are reduced by only 2.5% by 2015 and 5% by 2020.[89] **Table 4-11** shows the demand factor reductions through 2035 for existing connections compared to baseline factors in **Table 4-9**.

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[85] CUWCC MOU BMP 2.1 provides that a signatory should "Implement a public information program to promote water conservation, including providing speakers to employers and at public events, providing information on customers' bills showing use for the last billing period compared to the same period the year before." This BMP also requires a messaging campaign. BMP 2.2 requires implementation of a school education program to promote water conservation, including working with schools to provide instructional assistance, educational material and classroom presentations.

[86] CUWCC MOU BMP 1.1(A) provides that a signatory shall designate a person as the agency's responsible conservation coordinator for program management. BMP 1.1(A) also requires a signatory to enact, enforce or support … ordinances … that (1) prohibit water waste … and (2) address irrigation, landscape, and industrial, commercial, and other design inefficiencies.

[87] The City of Yreka's existing water waste prohibition authority is contained in Section 12.04.090 of the City of Yreka Municipal Code.

[88] Draft Future Effects of BMPs on Yreka Water Use, City of Yreka, January 5, 2011.

[89] Draft Future Effects of BMPs on Yreka Water Use, City of Yreka, January 5, 2011.

Table 4-11 – Demand Factor Reductions for Existing Connections from Baseline

Type	2015	2020	2025	2030	2035
Existing Res. & Industrial	5%	10%	10%	10%	10%
Existing Comm. HD, OS	2.5%	5%	5%	5%	5%

Table 4-12 presents the unit demand factor reduction progression from the baseline values in **Table 4-9** for each specific land use category.

Table 4-12 – Unit Demand Factors for Existing Connections

Connection Type	Units	Baseline	2015	2020	2025	2030	2035
Residential Agricultural	af/unit/yr	0.84	0.80	0.76	0.76	0.76	0.76
Low Density Residential	af/unit/yr	0.42	0.40	0.38	0.38	0.38	0.38
Medium Density Residential	af/unit/yr	0.34	0.32	0.31	0.31	0.31	0.31
High Density Residential	af/unit/yr	0.24	0.23	0.22	0.22	0.22	0.22
General Commercial	af/ac/yr	1.66	1.62	1.58	1.58	1.58	1.58
Historic Downtown	af/ac/yr	1.66	1.62	1.58	1.58	1.58	1.58
Industrial	af/ac/yr	1.66	1.58	1.49	1.49	1.49	1.49
Open Space	af/ac/yr	3.00	2.93	2.85	2.85	2.85	2.85
Roads/Highways	af/ac/yr	0.00	0.00	0.00	0.00	0.00	0.00

The unit demand factors for the future land-uses assume application of two key programs, designed specifically to reflect lower unit demands associated with new development. As described in **Section 4.2.5.2**, implementation of the CAL Green Code and the MWELO in new developments should result in unit demands that are at least 20% less than the baseline values in **Table 4-9**.

Table 4-13 shows how the future unit demand factor for each land-use category could be at least 20% less than the unit demand factor for each category. To develop the unit demand factors in **Table 4-13**, the portion of the baseline unit demand factor attributable to indoor and outdoor uses is estimated. With a percentage assigned to indoor and outdoor uses respectively, unique reductions to indoor and outdoor unit demand factors can be made based on the assumptions described above. Notably, the CAL Green Code should result in unit demand factors that are 20% less than baseline values. Also, assuming newly constructed landscapes must comply with the MWELO, new landscapes may use as much as 32% less water than baseline values.[90]

[90] The comparison assumes existing ETo is 49.1 in./yr. and irrigation efficiency is 80%. It also assumes future landscapes use no more than 85% of ETo.

Table 4-13 – Potential Unit Demand Factors for Future Land Uses

Connection Type	Res. Type	Demand Area	% of Demand	Existing	Future
				af/unit/yr	af/unit/yr
Single Family	Residential Agriculture	Indoor	50%	0.42	0.34
		Outdoor	50%	0.42	0.29
		Total	100%	0.84	0.62
	Low Density Residential	Indoor	50%	0.21	0.17
		Outdoor	50%	0.21	0.14
		Total	100%	0.42	0.31
Multi-Family	Medium Density Residential	Indoor	65%	0.22	0.18
		Outdoor	35%	0.12	0.08
		Total	100%	0.34	0.26
	High Density Residential	Indoor	65%	0.16	0.12
		Outdoor	35%	0.08	0.06
		Total	100%	0.24	0.18
Non-Residential Connection Type		Demand Area	% of Demand	Existing	Future
				af/ac/yr	af/ac/yr
Commercial/Downtown		Indoor	50%	0.83	0.66
		Outdoor	50%	0.83	0.56
		Total	100%	1.66	1.23
Industrial		Indoor	80%	1.33	1.06
		Outdoor	20%	0.33	0.23
		Total	100%	1.66	1.29
Open Space		Indoor	30%	0.90	0.72
		Outdoor	70%	2.10	1.43
		Total	100%	3.00	2.15

To ensure that the demand projection in **Table 4-15** is conservatively estimated, the values in **Table 4-14** are used for future land uses. Thus, unit demand factors are for future units and land uses are 20% less than baseline values shown in **Table 4-12**. For future Parks acreage, the unit demand factor is estimated as 85% of ETo.[91]

Table 4-14 – Unit Demand Factors for Future Land Uses

Connection Type	Units	2015	2020	2025	2030	2035
Residential Agricultural	af/unit/yr	0.67	0.67	0.67	0.67	0.67
Low Density Residential	af/unit/yr	0.34	0.34	0.34	0.34	0.34
Medium Density Residential	af/unit/yr	0.27	0.27	0.27	0.27	0.27
High Density Residential	af/unit/yr	0.19	0.19	0.19	0.19	0.19
General Commercial	af/ac/yr	1.33	1.33	1.33	1.33	1.33
Historic Downtown	af/ac/yr	1.33	1.33	1.33	1.33	1.33
Industrial	af/ac/yr	1.33	1.33	1.33	1.33	1.33
Open Space (schools)	af/ac/yr	2.40	2.40	2.40	2.40	2.40
Parks	af/ac/yr	3.48	3.48	3.48	3.48	3.48
Roads/Highways	af/ac/yr	0.00	0.00	0.00	0.00	0.00

[91] The MWELO provides for Special Landscape Areas to have a demand of 100% of ETo, but it is assumed that the City of Yreka will seek to maintain high efficiency landscape applications at its facilities to set a positive conservation example for its customers.

4.3 Total Water Demand

This section provides a detailed water demand projection for the City of Yreka. The land use, unit demand factor, loss, and operations assumptions explained in Section 4.1 and 4.2 are incorporated into the long-term demand projections. Adjustments are made to the unit demand factors and the loss factor, as discussed in the previous sections. Also, the demand for the Park, Other Unmetered/Unbilled and Treatment Plant Process uses are identified separately because total water use has historically been reported as a total demand value. The Park demand is reduced by 12.5% by 2015 and 25% by 2020 assuming metering and ETo-based water budgets are developed.[92] The future demand for the other Unmetered/Unbilled uses are reduced according to the percentages used for the Residential and Industrial connections because the uses are most similar to other industrial uses. **Table 4-15** presents a detailed demand projection through 2035 that is built on the forgoing assumptions.

[92] Draft Future Effects of BMPs on Yreka Water Use, City of Yreka, January 5, 2011.

Table 4-15 – Demand Projection for City of Yreka

	Demand Factors[1] (af/conn./year)						Quantity (du)[2]						Demand (af/year)[2]					
Land-use Category	**Current**	**2015**	**2020**	**2025**	**2030**	**2035**	**Current**	**2015**	**2020**	**2025**	**2030**	**2035**	**Current**	**2015**	**2020**	**2025**	**2030**	**2035**
Residential Agricultural																		
Existing	0.84	0.80	0.76	0.76	0.76	0.76	147	147	147	147	147	147	123	117	111	111	111	111
Future	0.00	0.67	0.67	0.67	0.67	0.67	0	10	16	23	30	38	0	7	11	16	20	25
Low Density Residential																		
Existing	0.42	0.40	0.38	0.38	0.38	0.38	2104	2104	2104	2104	2104	2104	884	839	795	795	795	795
Future	0.00	0.34	0.34	0.34	0.34	0.34	0	141	234	333	432	542	0	47	79	112	145	182
Medium Density Residential																		
Existing	0.34	0.32	0.31	0.31	0.31	0.31	368	368	368	368	368	368	125	119	113	113	113	113
Future	0.00	0.27	0.27	0.27	0.27	0.27	0	25	41	58	76	95	0	7	11	16	21	26
High Density Residential																		
Existing	0.24	0.23	0.22	0.22	0.22	0.22	962	962	962	962	962	962	231	219	208	208	208	208
Future	0.00	0.19	0.19	0.19	0.19	0.19	0	64	107	152	198	248	0	12	21	29	38	48
												Residential Demand =	1,363	1,368	1,348	1,399	1,451	1,508

	Demand Factors[1] (af/conn./year)						Quantity (acres)[2]						Demand (af/year)[2]					
Land-use Category	**Current**	**2015**	**2020**	**2025**	**2030**	**2035**	**Current**	**2015**	**2020**	**2025**	**2030**	**2035**	**Current**	**2015**	**2020**	**2025**	**2030**	**2035**
General Commercial																		
Existing	1.66	1.62	1.58	1.58	1.58	1.58	133	133	133	133	133	133	220	215	209	209	209	209
Future	0.00	1.33	1.33	1.33	1.33	1.33	0.0	8.9	14.8	21.1	27.3	34.3	0	12	20	28	36	46
Historic Downtown																		
Existing	1.66	1.62	1.58	1.58	1.58	1.58	16	16	16	16	16	16	27	26	25	25	25	25
Future	0.00	1.33	1.33	1.33	1.33	1.33	0.0	1.0	1.0	1.0	1.0	1.0	0	1	1	1	1	1
Industrial																		
Existing	1.66	1.58	1.49	1.49	1.49	1.49	48	48	48	48	48	48	80	76	72	72	72	72
Future	0.00	1.33	1.33	1.33	1.33	1.33	0	3	5	8	10	12	0	4	7	10	13	16
Open Space (Schools)																		
Existing	3.00	2.93	2.85	2.85	2.85	2.85	110	110	110	110	110	110	330	322	314	314	314	314
Future	0.00	2.40	2.40	2.40	2.40	2.40	0	7	12	18	23	28	0	18	29	42	55	68
Roads/Highways																		
Existing	0.00	0.00	0.00	0.00	0.00	0.00	440	440	440	440	440	440	0	0	0	0	0	0
Future	0.00	0.00	0.00	0.00	0.00	0.00	0	29	49	70	90	113	0	0	0	0	0	0
Parks (need footnote here)																		
Existing	n/a	n/a	n/a	n/a	n/a	n/a	20	20	20	20	20	20	98	85	73	73	73	73
Landscape Irrigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	70	56	56	56	56	56
Future	0	3.48	3.48	3.48	3.48	3.48	0	1	2	3	4	5	0	5	8	11	15	18
Other (unbilled, unmetered)[5]																		
Current	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	54	51	49	49	49	49
												Non-Residential Demand =	879	871	863	890	917	947
Treatment Plant Process Demand	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	63	0	0	0	0	0
												Total Demand =	2,305	2,238	2,211	2,289	2,368	2,455
												Distribution Losses =	264	273	239	247	256	265

	Current	**2015**	**2020**	**2025**	**2030**	**2035**
Total Demand (Treated) =	2,569	2,511	2,450	2,537	2,624	2,720

4.3.1 Anticipated Water Demand

The City of Yreka has experienced "boom and bust" economic cycles since the time it was settled in 1851 as a gold mining community. Throughout these economic up and down periods, the City of Yreka has secured water supplies to meet existing demands and for those future demands it has reasonably anticipated based on economic trends. First, the 1850s gold rush brought thousands of miners to the region where the City of Yreka would ultimately incorporate in 1857. In 1852, the estimated population of Yreka was 5,000 persons.[93] To accommodate the early residents and the economic growth that the City of Yreka experienced in its infancy, the City of Yreka secured two water rights on Greenhorn Creek by 1870 and one on Yreka Creek by 1889. Over the years that the City of Yreka was securing these rights, its population was dwindling with the downturn in the gold rush economy, and by 1870, the City of Yreka had about 1,000 persons.[94] The City population only increased slightly over the next fifty years to a total of 1,300 persons by 1920.

Over the next 45 years, however, with the development of timber resources in the region, the City of Yreka experienced 3.1% compounded annual population growth, such that by 1965 its estimated population was 5,175 persons.[95] By 1965, the City of Yreka's average annual demand for its population alone was about 1,500 af/yr, with a maximum day demand of about 2.6 million gallons day (4.2 cfs).[96] By 1964, the City of Yreka had six lumber mills.[97] These lumber mills used water from the City of Yreka to irrigate logs and for various manufacturing purposes. Based on modern analogous lumber mills, the total average annual demand per lumber mill is approximately 200 acre-feet per year or cumulatively as much as 1200 acre-feet per year.[98] The City of Yreka anticipated continued growth in the lumber industry consistent with the historic trend, which would have increased the population as well, thereby resulting in a rise in both industrial and domestic water demands.

During this economic boom, the City of Yreka sought a more secure water supply by to accommodate existing and future residents and businesses. Ultimately, the City of Yreka secured a permit for a diversion from Fall Creek in 1967 that provides for diversion of 6,300 af/yr at a maximum rate of 15.0 cfs. This water supply was to cover both the growing population as well as the industrial and commercial growth.

The City of Yreka then constructed diversion and transmission facilities to accommodate pumping at the maximum allowable rate and to transport water approximately 20 miles to the

[93] 1966 Fall Creek Feasibility Study, p. 3.
[94] 1966 Fall Creek Feasibility Study, p. 4.
[95] 1966 Fall Creek Feasibility Study, p. 4.
[96] 1966 Fall Creek Feasibility Study, p. 10.
[97] Memorandum from City of Yreka Planning Department, May 2011
[98] Based on existing lumber mill water use data in the City of Lincoln, California. Lumber mill usage can be higher or lower depending upon the size of the facility, the evapotranspiration rates, and the lumber processing volumes.

City's water treatment plant. Since development of the diversion works, transmission line and treatment plant, the City of Yreka has watched the timber industry disappear. By May of 2011, the lumber industry in Yreka all but disappeared. With the downturn in the lumber industry, the City of Yreka's population leveled off and the City has not seen the population increase as it reasonably anticipated when it secured its Fall Creek water right in 1967. Not only could the City of Yreka not have reasonably anticipated the disappearance of the timber industry, it could not reasonably stop it from disappearing.

While the downturn in the timber economy has resulted in the City of Yreka having the ability to divert more water from Fall Creek than there is demand on its system, the City of Yreka anticipates using its permitted quantity of water to serve future residents and businesses. The City of Yreka has estimated that it may need as much as 15.9 mgd (max. day) to serve all potential demands in its authorized place of use for its Fall Creek water right permit.[99] This is well in excess of its permitted maximum diversion rate of 9.7 mgd (i.e., 15 cfs), which is the rate at which the City of Yreka anticipates diverting water to meet peak demands during the summer once annual demand reaches 6,300 af/yr. While the City of Yreka cannot point to specific municipal development projects that will occupy undeveloped land in its water service area, it anticipates serving future demands with Fall Creek supplies. It is primed for industrial growth in a number of sectors through the security of its water supply. Thus, the supply the City of Yreka is authorized to divert under its Fall Creek right is extremely valuable because it will allow it to serve not only the urban demands it anticipates but also the other economic demands it expects to develop.

4.3.2 Water Demand Projections for Low-Income Housing

An UWMP is to include a projection of the residential water demand 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.[100] According to the City of Yreka's 2009 General Plan Housing Element Update, 34.8 percent of the City's households fall below the "low income" threshold.[101] The Housing Element Update shows a population of 7,290 and 3,127 households in 2000. This results in an average of 2.32 people per household. Using the service area populations form **Table 2-1** and the average people per household, an estimate of households can be calculated. Then by using the unit demand factors from **Table 4-15** for the residential connections and the

[99] See Table 11 in 2005 Water Master Plan.

[100] See CWC § 10631.1. HSC § 50079.5. (a) "Lower income households" means persons and families whose income does not exceed the qualifying limits for lower income families as established and amended from time to time pursuant to Section 8 of the United States Housing Act of 1937. The limits shall be published by the department in the California Code of Regulations as soon as possible after adoption by the Secretary of Housing and Urban Development. In the event the federal standards are discontinued, the department shall, by regulation, establish income limits for lower income households for all geographic areas of the state at 80 percent of area median income, adjusted for family size and revised annually.

[101] 2009 City of Yreka General Plan Housing Element Update at A-2. The City of Yreka's General Plan Housing Element table A-7 identifies the income limits from the 2000 US Census.

associated loss factor, total demand for low-income housing units is projected in **Table 4-16** along side total residential demand.[102] The projected water demand for low-income units in **Table 4-16** is included in the total City of Yreka demand projected in **Table 4-15** because affordable units are assumed to be part of the overall mix of housing units. Thus, the demand values in **Table 4-16** should not be added to the values in **Table 4-15** when considering total demand for the City of Yreka.

Table 4-16 – Low Income Water Demand Projection

Year	2015	2020	2025	2030	2035
Total Residential Demand (Acre Feet)	1,505	1,483	1,539	1,596	1,659
Low Income Demand (Acre Feet)	107	211	323	435	560

4.4 Baseline Daily Per Capita Water Use

Pursuant to California Water Code § 10608.20 et seq., an urban retail water supplier must document baseline daily per capita water use, develop both an urban water use target and an interim water use target, and then document compliance daily per capita water use.[103] Documentation of compliance must include the bases for determining the estimates, including references to supporting data.

4.4.1 Water Use Targets

Pursuant to CWC § 10608.20(a), the City of Yreka plans to adopt the following urban water use target: (1) 80% of its baseline per capita daily water use. The City of Yreka must meet its urban water use target by December 31, 2020, and its interim water use target by December 31, 2015.[104]

4.4.2 Baseline Per Capita Daily Water Use

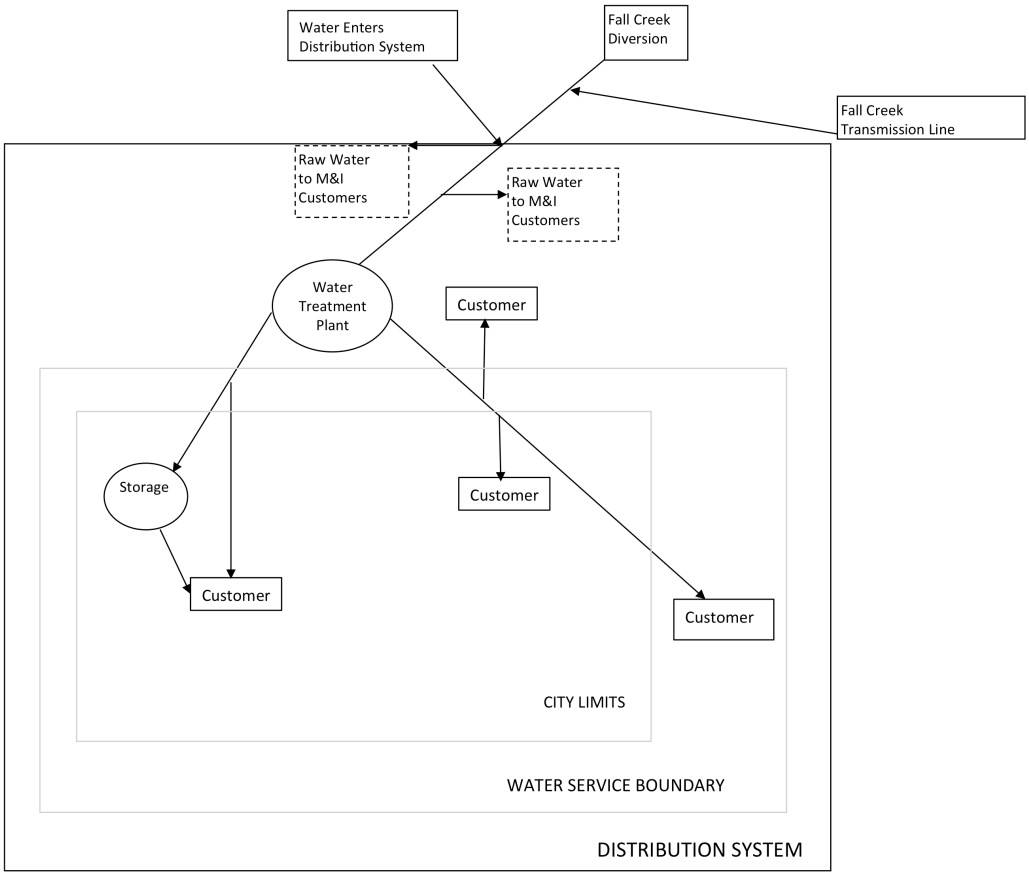
The City of Yreka has estimated its "Baseline per capita daily water use" by assessing water treatment plant production records and historic population data for the period 1995-2010.[105] The City of Yreka has defined its "distribution system" to include those customers it serves with municipal water, whether it be to customers outside the city limits but inside the water service boundary, or to those outside the city limits and outside the water service boundary,

[102] This calculation assumes 10% low density, 25% medium density, and 65% high density all with a 10% loss factor.
[103] An "urban retail water supplier" is a water supplier that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually. CWC 10608.12(p). The City of Yreka supplies water directly to more than 3,000 end users.
[104] An urban retail water supplier's "interim urban water use target" is the midpoint between the urban retail water supplier's base daily per capita water use and the urban retail water supplier's urban water use target for 2020. (CWC § 10608.12(j)).
[105] "Base daily per capita water use" means "an urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010. (CWC § 10608.12(b)(1)) "Gross water use" is defined as the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding recycled water, water in long-term storage, water conveyed to another urban water supplier, and possibly water delivered for agricultural use. (CWC § 10608.12(g))

including customers receiving raw water from the Fall Creek transmission line prior to final treatment. The City of Yreka's "distribution system" is depicted graphically in **Figure 4-1**.

Water enters the City of Yreka's distribution system at the point of delivery of water to the first municipal and industrial customer along its Fall Creek raw water transmission line to the water treatment plant.[106] The water enters the distribution system untreated and is subsequently treated at the City of Yreka's water treatment plant "downstream" of the raw water deliveries to M&I customers.

Figure 4-1[107] – City of Yreka Water Distribution System



[106] See *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use*, October 1, 2010, p. 15, which provides that "In some systems, some retail customers receive water for municipal and industrial uses directly from transmission canals and pipes, in which case the retail water supplier may treat the sections of the transmission canals and pipes delivering water to the retail M&I customers as part of its distribution system." Also, the California Code of Regulations (CCR) provides definitions for specific beneficial uses. Specifically, "Municipal uses" means the use of water for the municipal water supply of a city, town, or similar population group, … for any beneficial purpose. 23 C.C.R., § 663. "Domestic use" is the use of water in homes, resorts, motels, … including … irrigation of not to exceed one-half acre of lawn, shrubbery or gardens. 23 C.C.R., § 660. "Irrigation use" includes an application of water to the production of irrigated crops or the maintenance of large areas of lawn, shrubbery, or gardens. 23 C.C.R., § 661.

[107] Figure 4-1 is representative of the various paths that water entering the distribution system may take on its way to water service customers and is not intended to represent the City of Yreka's entire water distribution system.

4.4.2.1 Calculation of "Base Daily Per Capita Water Use"

Table 4-17 presents the City of Yreka's Gross Water Use. Specifically the Fall Creek supply, measured as the water treatment plant influent and the deliveries to raw water customers along the Fall Creek transmission line, is presented in both millions of gallons (MG) and in acre-feet (AF). During the period 1995-2010, the annual quantity of water treatment plant influent has been within the range of 2,300 to 2,800 af/yr.

Table 4-17 – Gross Water Use

Year	Million Gallons	Acre Feet
1995	891.0	2,734
1996	860.3	2,640
1997	834.8	2,562
1998	756.6	2,322
1999	844.9	2,593
2000	821.8	2,522
2001	860.8	2,642
2002	876.9	2,691
2003	877.8	2,694
2004	933.0	2,863
2005	846.2	2,597
2006	907.6	2,785
2007	848.4	2,604
2008	872.2	2,677
2009	837.3	2,570
2010	768.3	2,358

The City of Yreka estimated population throughout the distribution system consistent with the Department of Water Resources' methodology.[108] The City of Yreka is a "Category 1" urban water supplier because about 99% of its water service area overlaps with the city boundaries. Therefore, the City of Yreka may use population data published by the California Department of Finance's (DOF) demography unit.[109]

Table 4-18 presents the City of Yreka's estimated population for the period 1995-2010. DOF presents historic population data as the population on file with the Department of Finance at the beginning of the listed year within the city limits of the City of Yreka.[110] For this analysis, the population on file at the beginning of the listed year is used as the population for the previous year because the population at the end of the year is likely to be more reflective of the population demanding water throughout the year, as listed in Table **4-**

[108] See Methodology 2: Service Area Population in Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use, October 1, 2010.
[109] *Id.* at 26.
[110] For 2000-2010 historic population estimate, see State of California, Department of Finance, E-4 Population Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark. Sacramento, California, May 2010. For the 1995-1999 historic population estimate, see State of California, Department of Finance, E-4 Historical Population Estimates for City, County and the State, 1991-2000, with 1990 and 2000 Census Counts. Sacramento, California, August 2007.

18. Because DOF has not yet estimated the City of Yreka's population on January 1, 2011, the 2009 population, as listed in **Table 4-18** is used for 2010 as well.[111]

The population for those customers outside the city limits is estimated by multiplying the number of connections by the estimated persons per connection. The number of connections in 2007 was 36 based on the City of Yreka's October 30, 2007 filing with the SWRCB. This number of connections was estimated back through 1995. The same number of connections is assumed from 2007 through 2010. Based on a per connection population assumption of 2.27 persons, as estimated by the U.S. Census Bureau in 2000, the population ranges from about 68 persons in 1995 up to 82 persons in 2010.[112] **Table 4-18** indicates that the City of Yreka's water service population has remained very stable over the past 15 years.

Table 4-18 – Population Receiving Water Service, 1995-2010

Year	City Population (End of Year)	Population Served Outside City Limits	Total Population Served
1995	7,422	68	7,490
1996	7,401	68	7,469
1997	7,362	68	7,430
1998	7,296	68	7,364
1999	7,284	68	7,352
2000	7,298	70	7,368
2001	7,285	73	7,358
2002	7,367	73	7,440
2003	7,367	75	7,442
2004	7,336	75	7,411
2005	7,265	77	7,342
2006	7,310	79	7,389
2007	7,410	82	7,492
2008	7,432	82	7,514
2009	7,415	82	7,497
2010	7,415	82	7,497

Table 4-19 presents the City of Yreka's daily per Capita water use for each year for the period 1995-2010. Daily per capita use is estimated based on the Gross Water Use and Population values derived for each year, as discussed in the previous section. Daily per capita use has varied annually from about 280 gpcd to 325 gpcd, with some years as high as 330-345 gpcd.

[111] Given the City of Yreka's very limited growth over the past few years, using the same population in 2010 as the estimate for 2009 is reasonable.
[112] Table DP-1. Profile of General Demographic Characteristics: 2000, Yreka City, California. U.S. Census Bureau, Census 2000.

Table 4-19 – Base Daily Per Capita Water Use

Base Years	Population	Gross Water Use (af/yr)	Daily Per Capita Use (gpcd)
1995	7,490	2,734	326
1996	7,469	2,640	316
1997	7,430	2,562	308
1998	7,364	2,322	281
1999	7,352	2,593	315
2000	7,368	2,522	306
2001	7,358	2,642	321
2002	7,440	2,691	323
2003	7,442	2,694	323
2004	7,411	2,863	345
2005	7,342	2,597	316
2006	7,389	2,785	337
2007	7,492	2,604	310
2008	7,514	2,677	318
2009	7,497	2,570	306
2010	7,497	2,358	281

Table 4-20 presents the Base Daily Per Capita Water Use estimates for the City of Yreka. For the purpose of calculating its Target Water Use (see **Section 4.4.2.3**), the City of Yreka will select the 1999-2008 period as its Base Daily Per Capita Water Use. The average value for the 1999-2008 period was 321 gallons per capita day.

Table 4-20 – Base Period Daily Per Capita Water Use

Per Capita Use	
Period	**gpcd**
1995-2004	316
1996-2005	315
1997-2006	317
1998-2007	318
1999-2008	321
2000-2009	320
2001-2010	318

4.4.2.2 Target Water Use

As discussed in **Section 4.4.1**, the City of Yreka will select the target that requires it to achieve 80% of its Baseline Daily Per Capita Water Use in 2020. As shown in **Table 4-21**, a 20% reduction from the Base Daily Per Capita Water Use for the period 1999-2008 will require the City of Yreka to reach 257 gpcd by 2020. The City of Yreka's Interim Water Use Target is 289 gpcd, which it must achieve by 2015.

Table 4-21 – Target Water Use

Base Use Period	80% of Base Use	90% of Base Use
1995-2004	253	285
1996-2005	252	284
1997-2006	254	286
1998-2007	254	286
1999-2008	257	289
2000-2009	256	288
2001-2010	254	286

4.4.2.3 Minimum Water Use Reduction Requirement

CWC § 10608.22 requires a determination of a minimum water use reduction requirement. An urban retail water supplier's 2020 water use target must be no more than 95% of the average gross water use over a continuous five-year period ending no earlier than December 31, 2007 and no later than December 31, 2010. The City of Yreka's 2020 water use target is 257 gpcd. For each of the five-year periods ending no earlier than December 31, 2007 and no later than December 31, 2010, 95% of average daily use is greater than the 2020 water use target, as shown in **Table 4-22**. Therefore, 257 gpcd will remain as the 2020 target.

Table 4-22 – 5-Year Base Daily Per Capita Use

5-Yr. Average Base Daily Per Capita Use		95% of Base Daily
Period	gpcd	gpcd
2003-2007	326	310
2004-2008	325	309
2005-2009	317	302
2006-2010	310	295

4.4.3 Compliance Daily Per Capita Water Use

In 2015, the City of Yreka will report its "compliance daily per capita water use."[113] Pursuant to CWC § 10608.40, the City of Yreka will report to DWR its progress in meeting its urban water use targets in its UWMP that will be submitted by December 31, 2015 pursuant to CWC § 10631. The City of Yreka will file an update with its 2020 UWMP as well.

4.4.4 Present and Proposed Measures, Programs and Policies to Achieve Reductions[114]

The City of Yreka anticipates realizing a reduction in water demand to meet the 2020 gpcd target through implementation of CUWCC MOU BMPs 1.2(5), 1.3(2), 1.3(4), 3(1), 3(2), and

[113] "Compliance daily per capita water use" means the gross water use during the final year of the reporting period, reporting in gallons per capita per day. "Reporting period" means the years for which an urban retail water supplier reports compliance with the urban water use targets. (CWC 10608.12.)

[114] CWC § 10608.36.

4. Implementation of BMP 1.2(5), as well as 1.3(4), as explained in section 4.2.3, will control water losses over time. The City of Yreka also anticipates that the implementation of BMP 1.3(2), along with BMP 5.1, including installation of meters and establishment of ETo based water budgets could help reduce existing water demands in the City's parks and at the fairgrounds by 25%. Also, the City, through implementation of BMPs 3(1) and 3(2), anticipates water savings in the residential sector through the continued implementation of water efficiency and landscape surveys . In the commercial, institutional and industrial (CII) sectors, the City of Yreka anticipates that with education, higher water rates and other BMPs, water use in the CII sectors will see 5% reduction in water use pursuant to BMP 4.

To realize a reduction in total water demand, the City of Yreka will implement the CAL Green Code to ensure that future residential and nonresidential buildings and structures are achieving a 20% reduction in water demand compared to the existing buildings in similar land use categories. Also, the City of Yreka will implement and enforce the MWELO for new and rehabilitated landscapes in the City of Yreka.

SECTION 5. RECYCLED WATER

Section 5 provides a summary of the City of Yreka's wastewater facilities, wastewater flows, and recycled water use within the City of Yreka's water service area.

5.1 General Description of Wastewater Treatment System

The City operates and maintains a 1.3 million gallon per day (mgd) wastewater treatment plant facility located between Highway 263 (North Main Street) and Yreka Creek approximately 600 feet north of the intersection of Montague Road (Highway 3) and Highway 263.

The City of Yreka operates a complete mix activated sludge treatment plant. Wastewater enters the plant at the head works, which provides screening to remove the large non-treatable debris for disposal at the landfill. The wastewater flows to an aeration basin that contains organisms which are part of the "activated sludge". The wastewater is mixed and aerated with the activated sludge which feeds on the organic material in the wastewater.

The combined wastewater flocculates, forming larger and denser particles, and is then sent to the secondary clarifiers, where the sludge is settled out and separated from the liquid portion of the wastewater. Most of the settled sludge is returned to the aeration basin to start the process again. The remaining sludge is pumped to the aerobic digester, where the organisms continue to reduce the organic matter to a more stable state. The sludge in the digester is pumped to the dewatering system, which is designed to reduce the amount of water in the sludge prior to transport to the drying beds. When the sludge is dry enough, the product is considered biosolids, and is applied to approved farm land to produce grain hay for stock feed.

The liquid portion of the wastewater in the clarifiers is sent to the chlorine contact basin, where chlorine is added and allowed time to disinfect the water. After treatment the effluent is tested for the presence of coliform bacteria and then sent to the percolation ponds for disposal.

5.2 Current and Potential Wastewater Flow in the City of Yreka

Currently, the City of Yreka's average dry-weather wastewater flow is 0.71 mgd.[115] Because the quantity of wastewater collected and treated is related to the population and water use, current and projected water demand is used to estimate the average dry-weather wastewater volume that the City of Yreka is likely to realize through 2035. For the period 2005-2009,

[115] 2008 Water and Wastewater Rate Study, Table 21.

.71 mgd would have been equal to about 36% of average annual authorized water demand during the period.[116] Future wastewater collection and treatment volume is estimated as 36% of projected end-user water demand, excluding losses. **Table 5-1** provides a wastewater volume estimated through 2035.

Table 5-1 – Wastewater Collection and Treatment

	Current	2015	2020	2025	2030	2035
Wastewater Collected and Treated (af/yr)	797	796	786	814	842	873
Volume that Meets Recycled Water Standard (af/yr)	0	0	0	0	0	0

5.3 Current and Projected Wastewater Reuse in the City of Yreka

As discussed in Section 5.1, the City of Yreka uses secondary treatment prior to discharge to percolation ponds. Thus, the City of Yreka does not currently deliver treated wastewater to customers for either potable or non-potable uses, and all water that is treated is disposed. The City of Yreka anticipates that it will maintain secondary treatment for the foreseeable future, and all wastewater treated, as estimated in **Table 5-1**, will be disposed. Because the City of Yreka has not previously prepared an UWMP, it is not possible to compare projected recycled water uses in its 2010 UWMP to previous projections.

With secondary treatment, the reuse opportunities are limited to some degree to limited landscaping uses and agricultural irrigation where the water does not contact the edible portion of the crop (e.g., irrigation of pasture land). Also, certain industrial uses of secondary treated water are allowable. Notably, parks and playgrounds, school grounds, residential landscaping, unrestricted-access golf courses and food crops where recycled water contacts the edible portion of the crop, are all excluded uses for secondarily treated wastewater but allowed if treated to a tertiary level.

There are future landscape projects that may be able to use tertiary treated wastewater for irrigation purposes. For example, Yreka High School may renovate their athletic fields, at which time it may be possible to plumb the irrigation system for use of treated wastewater given the potential volume of water use at such facilities and its proximity to the City of Yreka's wastewater treatment facilities.[117] Yet, use of treated wastewater at school grounds requires additional treatment and disinfection, so it needs to be determined whether it would be economically feasible to develop such treatment when the benefits of water savings are considered.

Since the current treatment level of the wastewater allows for some agricultural and industrial uses, and they are the highest water use type the city would consider for recycled water, the City would assess these potential consumers over spending money for treatment

[116] Authorized demand include metered water consumption, treatment plant
[117] Potential project mentioned in communication with Steve Neill and Rob Taylor.

plant upgrades. And, because of the regional geography, wide scale recycled water use for industrial and agricultural purposes would require pumping plants and other engineering facilities in order to be feasible and reliable.

5.4 Future Actions to Encourage Recycled Water Use

The City of Yreka has no current recycled water use and plans for water use are still in early stages. As such, there are no specific actions that the City is planning to take in order to encourage recycled water use in specific industries or agriculture. However, the City is committed to investigating recycled water use for industry and agriculture and this plan provides the impetus for these activities. More importantly, the City has considered that there are a number of things it could do to encourage recycled water use including requiring recycled water use by future industry or giving financial incentives for its use.

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CHAPTER 6. WATER DEMAND MANAGEMENT MEASURES

6.1 Overview of Implementation

The UWMPA requires that an UWMP include a description of the urban water supplier's water demand management measures.[118] CWC § 10631 also provides that members of the CUWCC shall be deemed in compliance with the UWMPA demand management measure requirements by complying with all the provisions of the CUWCC MOU and by submitting the annual reports.[119]

As a signatory to the CUWCC MOU, the City of Yreka is committed to implementing best management practices (BMP) designed to achieve water conservation across existing and future demand sectors. The CUWCC MOU requires that a water utility implement only the BMPs that are economically feasible. The City of Yreka's continued implementation of the CUWCC BMPs should reduce some of the unit demand factors for its existing connections and help maintain the unit demand factors for future connections, which the City of Yreka expects to be lower than historically realized for the same connection type.

The City of Yreka is preparing its first report to the CUWCC. This report will satisfy the requirement for this chapter as specified in CWC §§ 10631(f)-(g). The most recent annual report is attached in **Appendix B-4** and is consistent with the law.

6.2 Fully, Partially and Non-Implemented Measures Described

The CUWCC has organized BMPs into five categories. Two categories, Utility Operations and Education, are "Foundational BMPs," because they are considered essential activities. The remaining BMPs are considered "Programmatic" and are organized into Residential, Commercial, Industrial, and Institutional and Landscape Categories.

The specific BMPs are generally identified in **Table 6-1** along with an indication of the BMPs that the City of Yreka is currently implementing and those it plans to implement.

[118] CWC § 10631.
[119] CWC § 10631(j).

Table 6-1 – California Urban Water Conservation Council Best Management Practices

CUWCC BMP Number	BMP Description	Implementation	
		Current	Planned
1.1	Staff and maintain the position of trained conservation coordinator	Y	Y
	Enact and enforce an ordinance designed to prevent water waste	Y	Y
	Enact and enforce an ordinance designed to promote efficient design in new development	Y	Y
	Enact and enforce an ordinance designed to facilitate water shortage response measures	N	Y
1.2	Compile standard water audit and balance annually	Y	Y
	Improve data accuracy and completeness of water audit during first four years	N/A	Y
	Develop economic value analysis	N/A	Y
	Develop water loss component analysis at least once every four years	N/A	Y
	During 5th through 10th year, demonstrate progress in water loss control	N/A	Y
1.3	Require meters for all new connections	Y	Y
	Complete meter installations for all connections no later than July 1, 2012	N	Y
	Initiate volumetric billing for all metered customers	Y	Y
	Written plan, policy or program that includes meter census, testing and repair schedule; and replacement schedule	N	Y
	Assess feasibility of moving mixed-use metered landscape uses to dedicated landscape	N	Y
1.4	Develop conservation pricing for water rates	Y	Y
	Develop conservation pricing for sewer rates	Y	Y
2.1	Maintain active public information program to promote and educate about conservation	Y	Y
2.2	Maintain an active school education program to educate students about water conservation	Y	Y
3	Develop Residential Assistance Program - including leak detection assistance, conservation surveys, and efficiency suggestions, as well as provision of high-efficiency appliances	Y	Y
	Perform site-specific landscape water surveys	Y	Y
	Provide financial incentives for, or institute ordinances requiring, purchase of efficient clothes washers	N	N
	Provide incentives or ordinances for replacement of toilets using 3.5 or more gpf	N	N
	Water Sense specifications for building permits	N	N
4	Implement measures to achieve water savings for CII accounts of 10% compared to baseline water use (i.e., 2008 water use by CII accounts)	N	Y
	Implement unique CII water conservation measures	N	Y
5	Identify accounts with dedicated irrigation meters and assign an ETo based budget of no more than an average of 70% of ETo); Recreational areas may be so designated and may use up to 100% of ETo)	N	Y
	Provide notices to those with budgets	N	Y
	Offer site-specific technical assistance to those accounts at least 20% over budget	N	Y
	Target and market landscape surveys to CII accounts with mixed-use meters, and those CII accounts with large landscapes; then offer financial incentives to both (by July 1 of year following year Yreka signs MOU; Annually 9% of dedicated and 1.5% of mixed use or non-metered will receive assistance)	N	Y

CHAPTER 7. WATER SHORTAGE CONTINGENCY PLAN

7.1 Stages of Action

The City of Yreka is in the process of developing a Water Shortage Contingency Plan, which will be based on a Water Efficiency ordinance that the City of Yreka plans to adopt.[120] The Water Shortage Contingency Plan will provide a water shortage stage identification process based on the extent to which the City of Yreka's projected water supplies are short of its projected water demands. **Table 7-1** shows the stages of action the City of Yreka will use.

Table 7-1 – Water Supply Shortage Stages of Action

Stage No.	Water Supply Conditions	% Shortage
1	Basic; Supply Will Meet All Demands	None
2	Water Alert, Supplies Will Probably Not Meet Demands	Up to 10%
3	Water Warning; Supplies Will Not Meet Expected Demands	11-20%
4	Water Crisis; Supplies Not Meeting Current Demands	21-35%
5	Water Emergency; Failure of Supply , Storage or Distribution System	Up to 50%

7.2 Minimum Supply Available

Based on the analysis of water supplies in Chapter 3, the City of Yreka would have 3,899 af/yr available if normal year supplies (as shown in **Table 3-10**), were reduced by 50%.

7.3 Catastrophic Interruption

Table 7-2 – Actions During Supply Interruption Caused by a Catastrophe

Possible Catastrophe	Summary of Actions
Regional Power Outage	Command chain is defined that dispatches crews to operate generators and monitor operations. Criteria and procedures provided to return system to normal operation. A plan contains contact information for responsible parties and support services. Water shortage contingency plan stages will be implemented as required by the situation.
Earthquake	Command chain is defined that dispatches crews to inspect infrastructure and critical operations. Operations response crews assigned to monitor system operations and modify as necessary. Communication command chain is defined to coordinate with other local water agencies and emergency response officials as necessary. Criteria and procedures provided to return system to normal operation. A plan contains contact information for responsible parties and support services. Water shortage contingency plan stages will be implemented as required by the situation.

7.4 Mandatory Prohibitions

To reduce the amount of water used, the City of Yreka has identified a number of "wasteful" water uses, which the City of Yreka will prohibit at all times. An important "wasteful" use is a limitation on water flowing from property based on excessive irrigation. Also, the City of

[120] A draft of the City of Yreka's ordinance is contained in **Appendix B-5**.

Yreka will limit the use of a free flowing hose for irrigation, unless it is equipped with a sprinkler apparatus. During more sever shortages, the City of Yreka will prohibit street washing and sidewalk cleaning, use of water for construction purposes, and ultimately, the use of water for irrigation purposes in the most sever conditions. **Table 7-3** outlines some of the key prohibitions and the stage when the prohibition becomes mandatory.

Table 7-3 – Water Use Prohibitions

Examples of Prohibitions	Stage When Mandatory
Water may not flow from property because of an excessive application of water beyond practical irrigation rates	1
Free flowing hoses for all uses except landscape irrigation when equipped with sprinkler apparatus	1
Washing of streets, sidewalks or other hardscapes, except for health, sanitation or fire protection purposes	2
Using water for construction purposes, including dust control, compaction or trench jetting	3
Using water to drain or refill swimming pools or artificial lakes, ponds, or streams	4
Using water for ornamental ponds or fountains, except to maintain existing vegetation or fish/animal life	4
Landscape or pasture irrigation, including parks or public grounds	5

7.5 Revenue Impacts Under the WSCP

The City of Yreka expects revenue impacts with a reduction in water sales as a result of a reduction in water use under a water shortage contingency plan. During a water supply shortage, reduced revenue and higher operating and maintenance costs may occur because of

- 1. Reduced water deliveries.
- 2. Pumping costs associated with use of North Well.
- 3. Higher administration costs for billing changes, customer notifications, customer inquires, customer usage (office/field) monitoring, and promoting greater conservation.

During a catastrophic interruption as described in **Section 7.3** these impacts would be more significant. The minor impacts from small and short-term shortages could likely be absorbed into normal operating expenses but catastrophic interruptions might not. To address this potential shortfall condition, higher rates and steeper fines for waste could be implemented. And the City could also access emergency funding sources.

7.6 Measuring Consumption Reduction

The City of Yreka measures the quantity of water consumed by its customers through the use of meters at the point of delivery to each customer. The aggregate of these meter readings will be used to compare current consumption in light of actions taken under a water shortage contingency plan to consumption in prior years. The difference between these readings will serve as a measure of the amount of water conserved.

CHAPTER 8. WATER SUPPLY VERSUS DEMAND COMPARISON

The purpose of this chapter is to compare the total water supply sources available to the City of Yreka 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.

8.1 Normal Water Year Supply Demand Comparison

Under this water supply scenario, the City of Yreka would anticipate full availability of its Fall Creek, Yreka Creek and Greenhorn Creek supplies, as shown in **Table 8-1** for each five-year increment through 2035. Using the demand projections in **Table 4-15**, the following comparison table was developed for a normal hydrologic year. As shown in Table 8-1, the City of Yreka projects adequate water supplies through 2035 because water supplies remain stable and demand increases only slightly over this time period due to implementation of long-term water efficiency measures.

Table 8-1 – Supply and Demand Comparison (Normal Year)

Demand (af/yr)	Current	2015	2020	2025	2030	2035
Treated Demand	2,569	2,511	2,450	2,537	2,624	2,720
Total	2,569	2,511	2,450	2,537	2,624	2,720

Supply (af/yr)	Current	2015	2020	2025	2030	2035
Fall Creek (P15379)	6,300	6,300	6,300	6,300	6,300	6,300
Yreka Creek (L6037)	1,214	1,214	1,214	1,214	1,214	1,214
Greenhorn Creek (L9850)	285	285	285	285	285	285
Total	7,799	7,799	7,799	7,799	7,799	7,799

Difference	5,230	5,288	5,349	5,262	5,175	5,079
Difference as % of Supply	67%	68%	69%	67%	66%	65%
Difference as % of Demand	204%	211%	218%	207%	197%	187%

8.2 Single Dry-Year Supply and Demand Comparison

In a single dry year condition, the City of Yreka anticipates a reduction in water supplies consistent with the projection in **Table 3-10**. Based on the reliability analysis for the City of Yreka's Fall Creek water supply in Chapter 3, the City of Yreka is projecting full availability of its annual entitlement from Fall Creek – 6,300 af/yr. As for its Yreka Creek and Greenhorn Creek supplies, the City of Yreka anticipates a 50% reduction in the availability of these supplies based on indications in SWRCB records during the dry 1959 summer that the Yreka Creek (and tributary) supplies were about 55-60% of normal.

As for the City of Yreka's water demand in a single dry year condition, the City of Yreka's treated water demand is increased to reflect the generalized expansion of the landscape irrigation season due to limited rainfall in the single driest year. An adjustment factor of 5 percent is applied to the normal-year demands based on various analyses of the difference

between maximum ETo and average ETo over an average 5-10 year period. As shown in **Table 8-2**, the City of Yreka projects adequate water supplies through 2035 because water supplies remain stable and demand increases only slightly over this time period due to implementation of long-term water efficiency measures.

Table 8-2 – Supply and Demand Comparison (Single Driest-Year)

Demand (af/yr)	Current	2015	2020	2025	2030	2035
Treated Demand	2,697	2,637	2,572	2,664	2,755	2,857
Total	2,697	2,637	2,572	2,664	2,755	2,857

Supply (af/yr)	Current	2015	2020	2025	2030	2035
Fall Creek (P15379)	6,300	6,300	6,300	6,300	6,300	6,300
Yreka Creek (L6037)	608	608	608	608	608	608
Greenhorn Creek (L9850)	143	143	143	143	143	143
Total	7,051	7,051	7,051	7,051	7,051	7,051

Difference	4,353	4,413	4,478	4,387	4,295	4,194
Difference as % of Supply	62%	63%	64%	62%	61%	59%
Difference as % of Demand	161%	167%	174%	165%	156%	147%

8.3 Multiple Dry Year Supply and Demand Comparison

Under this water supply scenario, the City of Yreka anticipates many of the same conditions that were assumed for the single-dry year analysis, including: (1) a shortage in availability of supplies (see Chapter 3), and (2) increases in projected demands as represented in the driest-year scenario. However, to represent a multiple dry year period, a five-year water supply projection is made for each 5-year reporting increment. Water supplies within each year of the five-year block follow a pattern of four dry years, followed by one normal year.

To reflect the demands in each of the intervening years in the five-year block, the following assumptions are made:

- The fifth year, a normal year, reflects the estimated demand for the next standard 5-year increment (e.g. the 2015, 2020, 2025, etc. demand from Table 8-1 through 8-3 for each zone).
- Demand in the four prior years reflects a linear growth between each 5-year standard increment, but with the demand adjustments made to increase some demands.

This resulting analysis has been represented in **Table 8-3**. The analysis only covers the 5-year blocks through 2035. During each multiple dry year period projected in **Table 8-3**, the City of Yreka anticipates adequate water supplies being available.

Table 8-3 – Supply and Demand Comparison (Multiple Dry Years)

Part A: 2011 through 2015					
Demand (af/yr)	**2011**	**2012**	**2013**	**2014**	**2015**
Total	2,685	2,685	2,685	2,685	2,511
Supply (af/yr)	**2011**	**2012**	**2013**	**2014**	**2015**
Total	7,051	7,051	7,051	7,051	7,799
Difference	4,365	4,365	4,365	4,365	5,288
Difference as % of Supply	62%	62%	62%	62%	68%
Difference as % of Demand	163%	163%	163%	163%	211%

Part B: 2016 through 2020					
Demand (af/yr)	**2016**	**2017**	**2018**	**2019**	**2020**
Total	2,624	2,624	2,624	2,624	2,450
Supply (af/yr)	**2016**	**2017**	**2018**	**2019**	**2020**
Total	7,051	7,051	7,051	7,051	7,799
Difference	4,426	4,426	4,426	4,426	5,349
Difference as % of Supply	63%	63%	63%	63%	69%
Difference as % of Demand	169%	169%	169%	169%	218%

Part C: 2021 through 2025					
Demand (af/yr)	**2021**	**2022**	**2023**	**2024**	**2025**
Total	2,590	2,590	2,590	2,590	2,537
Supply (af/yr)	**2021**	**2022**	**2023**	**2024**	**2025**
Total	7,051	7,051	7,051	7,051	7,799
Difference	4,460	4,460	4,460	4,460	5,262
Difference as % of Supply	63%	63%	63%	63%	67%
Difference as % of Demand	172%	172%	172%	172%	207%

Part D: 2026 through 2030					
Demand (af/yr)	**2026**	**2027**	**2028**	**2029**	**2030**
Total	2,682	2,682	2,682	2,682	2,624
Supply (af/yr)	**2026**	**2027**	**2028**	**2029**	**2030**
Total	7,051	7,051	7,051	7,051	7,799
Difference	4,369	4,369	4,369	4,369	5,175
Difference as % of Supply	62%	62%	62%	62%	66%
Difference as % of Demand	163%	163%	163%	163%	197%

Part E: 2031 through 2035					
Demand (af/yr)	**2031**	**2032**	**2033**	**2034**	**2035**
Total	2,775	2,775	2,775	2,775	2,720
Supply (af/yr)	**2031**	**2032**	**2033**	**2034**	**2035**
Total	7,051	7,051	7,051	7,051	7,799
Difference	4,275	4,275	4,275	4,275	5,079
Difference as % of Supply	61%	61%	61%	61%	65%
Difference as % of Demand	154%	154%	154%	154%	187%

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