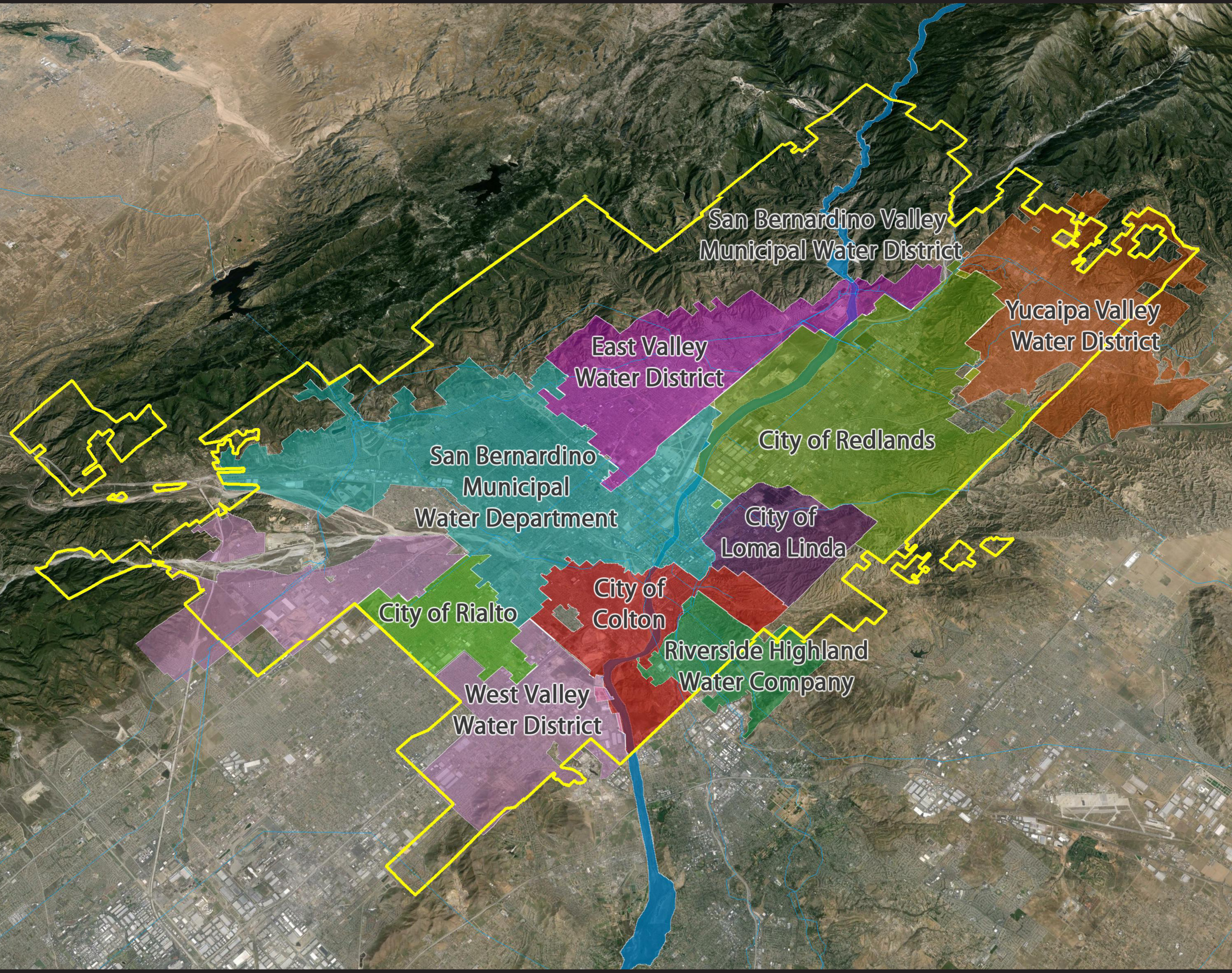
2015 San Bernardino Valley Regional

Urban Water Management Plan



• June 2016•

WSC
WATER SYSTEMS CONSULTING, INC.

2015 San Bernardino Valley Regional Urban Water Management Plan

Prepared for:

San Bernardino Valley Municipal Water District
East Valley Water District
City of Loma Linda
City of Redlands
City of San Bernardino Municipal Water Department
West Valley Water District
Yucaipa Valley Water District
City of Colton
City of Rialto
Riverside Highland Water Company

June 2016

DRAFT

Prepared by:

WSC
Water Systems Consulting, Inc.

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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
AB	Assembly Bill
Accord	Seven Oaks Accord
AF	acre foot
AFY	acre feet per year
AHHG	Area of Historic High Groundwater
AMR	Automatic Meter Reader
APA	Administrative Procedures Act
AWWA	American Water Works Association
BBW	Beaumont Basin Watermaster
BDCP	Bay Delta Conservation Plan
Bear Valley Mutual	Bear Valley Mutual Water Company
Big Bear Municipal	Big Bear Municipal Water District
BMP	Best Management Practice
BTAC	Basin Technical Advisory Committee
CAL Green Code	2013 California Green Building Standards Code

CALWARN	California Water/Wastewater Agency Response Network
CAT	Climate Action Team
CCF	hundred cubic feet
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFS	cubic feet per second
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Irrigation System
Colton	City of Colton
Conservation District	San Bernardino Valley Water Conservation District
CUWCC	California Urban Water Conservation Council
CSUSB	California State University San Bernardino
CVP	Central Valley Project
DCR	DWR SWP Delivery Capacity Report
DDW	SWRCB Division of Drinking Water
Delta	Sacramento-San Joaquin River Delta
DFW	California Department of Fish and Wildlife
DIP	Ductile Iron Pipe
DMM	Demand Management Measure
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
ERNIE	Emergency Response Network of the Inland Empire
ESA	Endangered Species Act
ET	Evapotranspiration
ETo	Reference Evapotranspiration
EVWD	East Valley Water District
FWC	Fontana Water Company
GAC	granulated activated carbon
GIS	Geographic Information System
GPCD	gallons per capita per day
GPM	gallons per minute
HCP	Upper Santa Ana River Habitat Conservation Plan
HECW	High Efficiency Clothes Washer
HET	High Efficiency Toilet
IERCD	Inland Empire Resources Conservation District
IRWMP	Integrated Regional Water Management Plan
IX	ion exchange
JPA	Joint Powers Authority
KAF	thousand acre feet
KAFY	thousand acre feet per year

LAFCO	Local Agency Formation Commission
Loma Linda	City of Loma Linda
MAF	million acre-feet
MCL	Maximum Contaminant Level
Metropolitan	The Metropolitan Water District of Southern California
MF	Multi-family
MG	million gallons
MGD	million gallons per day
MOU	Memorandum of Understanding
MSL	Mean Sea Level
MTBE	Methyl Tertiary Butyl Ether
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OCWD	Orange County Water District
OWOW	SAWPA One Water One Watershed IRWMP
PCE	perchloroethylene
Plan	Regional Urban Water Management Plan for San Bernardino Valley
PVC	polyvinyl chloride
QWEZ	Qualified Water Efficient Landscaper
Redlands	City of Redlands
RHWC	Riverside Highland Water Company
RIX	Rapid Infiltration and Extraction
RPA	Reasonable and Prudent Alternative
RUWMP	Regional Urban Water Management Plan
RWQCB	Regional Water Quality Control Board
SAF	San Andreas Fault
SANBAG	San Bernardino Association of Governments
SAR	Santa Ana River
SARI	Santa Ana Regional Interceptor
SARWQCB	Santa Ana Regional Water Quality Control Board
SAWPA	Santa Ana Watershed Project Authority
SBBA	San Bernardino Basin Area
SBMWD	City of San Bernardino Municipal Water Department
SBX7-7	Senate Bill 7 of Special Extended Session 7
SCAG	Southern California Association of Governments
SF	Single Family
SGPWA	San Gorgonio Pass Water Agency
SOC	Synthetic Organic Chemicals
SOI	Sphere of Influence
State Water	State Water Project Water

SWP	State Water Project
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TCE	trichloroethylene
ULFT	Ultra-Low Flush Toilet
USARW	Upper Santa Ana River Watershed
USAWRA	Upper Santa Ana Water Resources Association
UV	ultraviolet
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act
Valley District	San Bernardino Valley Municipal Water District
VOC	volatile organic compound
WBIC	Weather Based Irrigation Controller
Western	Western Municipal Water District of Riverside County
WSCP	water shortage contingency plan
WVWD	West Valley Water District
WFF	Water Filtration Facility
WRCC	Western Regional Climate Center
WRWFF	Wochholz Regional Water Recycling Facility
WSS	Water Sense Specification
WTP	water treatment plant
WWTP	waste water treatment plant
YVRWFF	Yucaipa Valley Regional Water Filtration Facility
YVWD	Yucaipa Valley Water District

Executive Summary

This Urban Water Management Plan (Plan) is a tool that provides a summary of anticipated supplies and demands for the years 2015 to 2040. This document was prepared for the following agencies within the San Bernardino Valley Municipal Water District service area:

- San Bernardino Valley Municipal Water District (wholesale water agency)
- East Valley Water District
- City of Loma Linda
- City of Redlands
- City of San Bernardino Municipal Water Department
- West Valley Water District
- Yucaipa Valley Water District
- City of Colton
- City of Rialto
- Riverside Highland Water Company

Figure ES-1 illustrates the geographic location of the agencies participating in this Regional Urban Water Management Plan (RUWMP). This Plan was prepared consistent with the Urban Water Management Plan Act (Act), the Water Conservation Act of 2009 (SB X7-7) and the Department of Water Resources (DWR) Guidebook for Urban Water Suppliers.

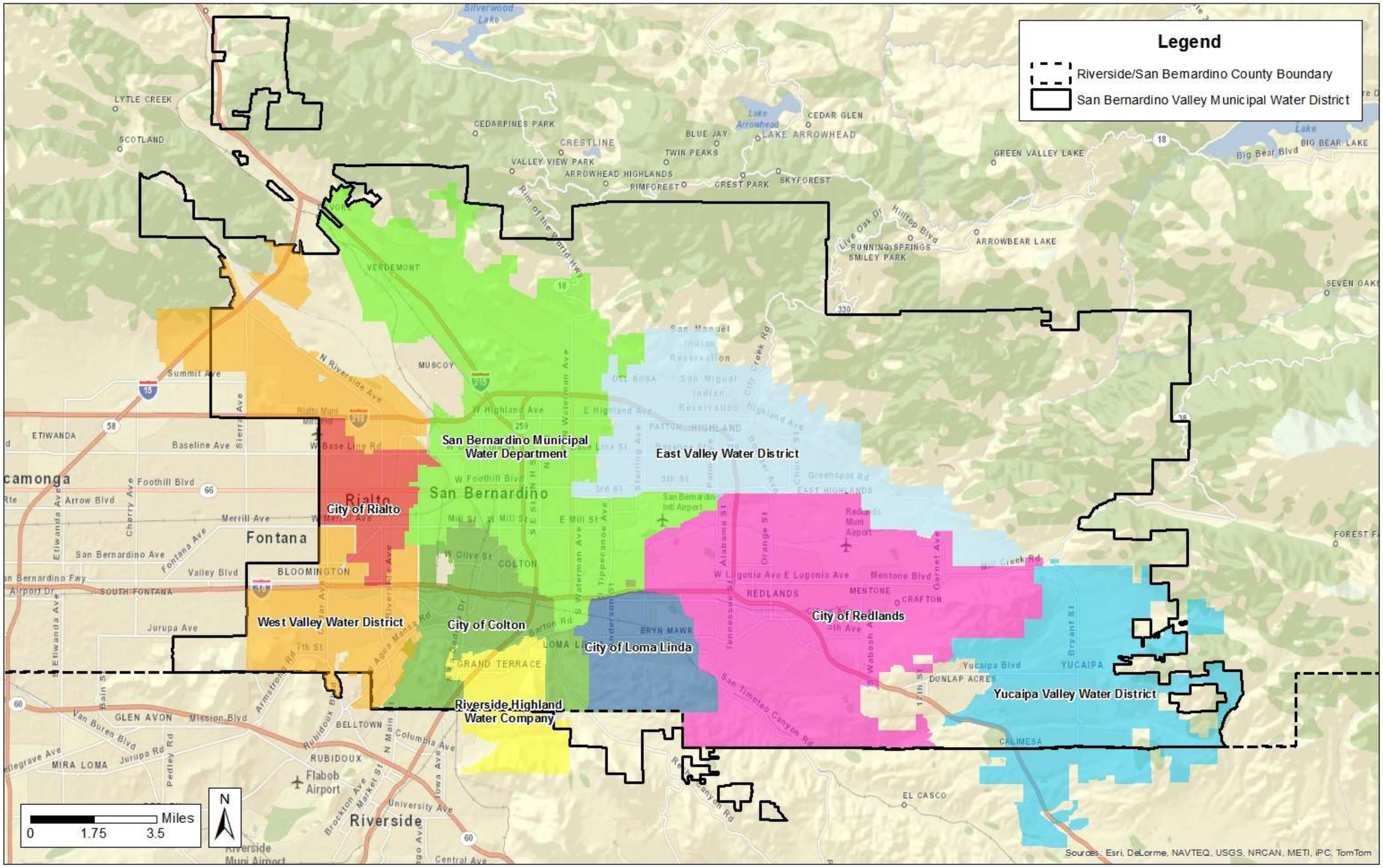

Figure ES-1-1. San Bernardino Valley Municipal Water District Service Area

Urban Water Management Plan Requirements

The Urban Water Management Plan Act requires evaluation of the following:

- Whether supplies will be sufficient to meet demands during the following hydrologic year types
    - Normal/average year
    - Single dry year
    - Multiple dry year sequence;
- Existing baseline water use in terms of gallons per capita per day (GPCD) (applies only to retail water suppliers);
- Targets for future water use consistent with the Water Conservation Act of 2009 (SB X7-7) which seeks a 20 percent reduction in per capita water use by 2020;
- Demand Management Measures (DMMs) implemented or planned for implementation as well as the methods proposed for achieving future water use targets;
- Water shortage contingency planning; and
- Notification and coordination with other water agencies, land use entities, and the community.

Meeting Demands in Normal, Single-Dry, and Multiple Dry Year Periods

Water Supplies

The participating agencies meet most of their demands with local groundwater and surface water. Imported water from the State Water Project (SWP) is also an important element of the supply portfolio. Recycled water makes up a relatively small part of existing supplies, but a number of programs are being planned that would increase the use of recycled water. The supplies used in 2015 by the agencies participating in the RUWPM are summarized in the figure below.

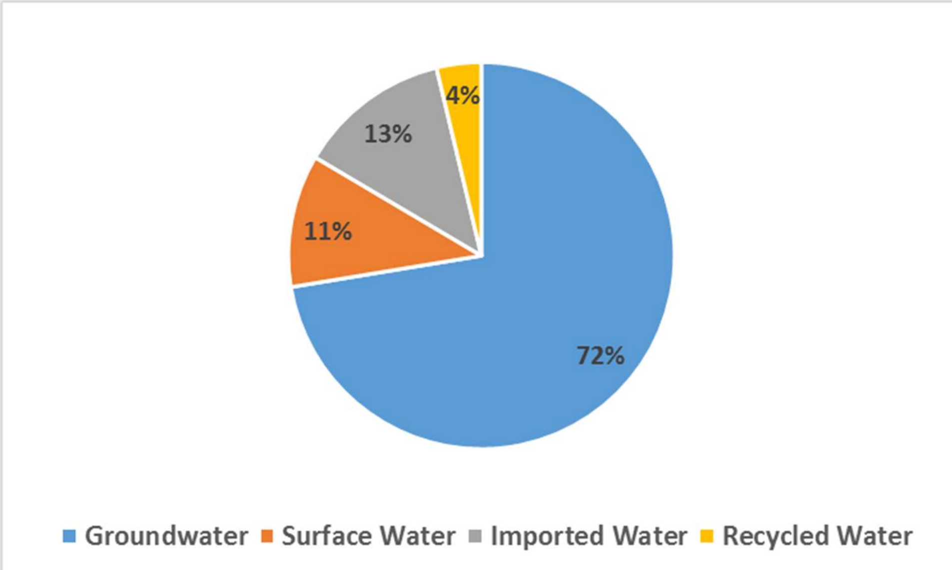

Figure ES-1-2. 2015 Supply Sources Utilized by Agencies Participating in RUWMP

An overview of water supplies is provided in Chapter 2, and the water sources available to each agency are presented in the individual agency chapters.

Water Demands

Each retail agency has prepared an estimate of its water demands through 2040. These demands are summarized in the figure below. The total demands are lower than the forecast in the 2010 RUWMP. The recent drought and mandatory water conservation measures have reduced demands considerably from the estimates that were presented in the 2010 RUWMP.

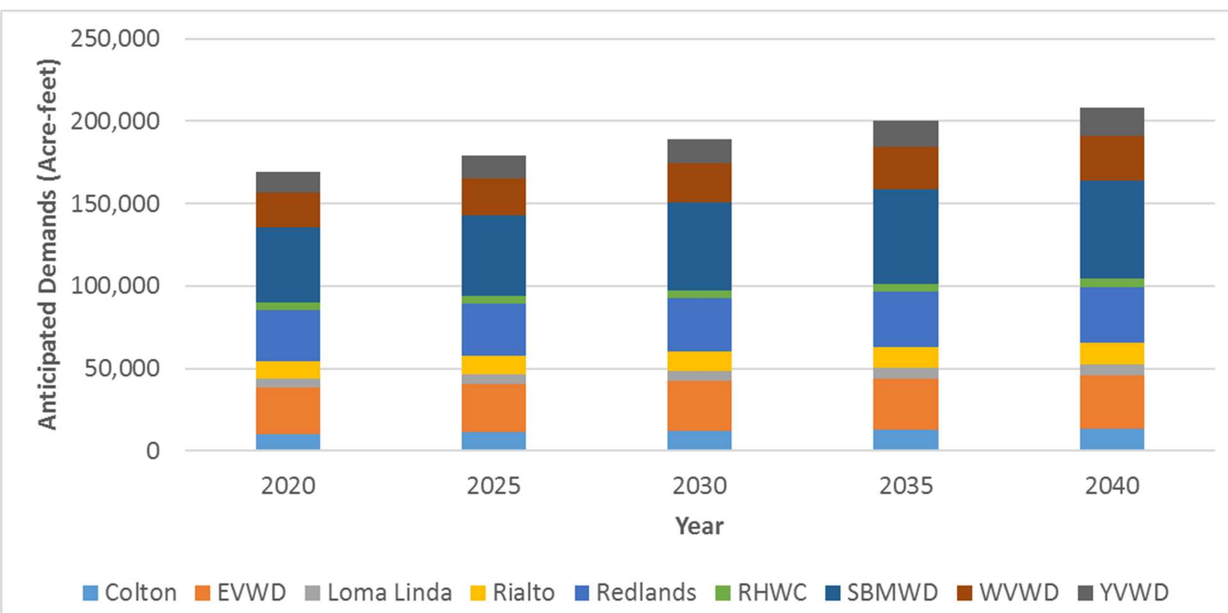

Figure ES-1-3. Anticipated Total Demands for Agencies Participating in RUWMP

Supplies versus Demands

The UWMP Act requires urban water suppliers to compare projected water use with the expected water supply for a 20-year period. Chapter 4 presents a regional comparison of supplies and demands. In addition, each retail agency's individual chapter includes a comparison of the agency's anticipated supplies and demands through 2040. The agencies participating in this RUWMP have identified adequate supplies to meet anticipated demands through 2040.

Compliance with the Water Conservation Act of 2009 (SBX7-7)

The Water Conservation Act of 2009 (SB X7-7) provides the regulatory framework to support a statewide reduction in urban per capita water use. Each retail water supplier must demonstrate compliance with SB X7-7 by determining its baseline water consumption and then establishing a future water use target in gallons per capita per day (GPCD).

Each agency calculated its baseline water use and its water use target in 2010. However, DWR provided a new interactive tool for estimating service area population for the 2015 UWMP cycle. Therefore, this report includes updated calculations of baseline water use and the 2020 water use target for each retail agency. These values are summarized in the figure below.

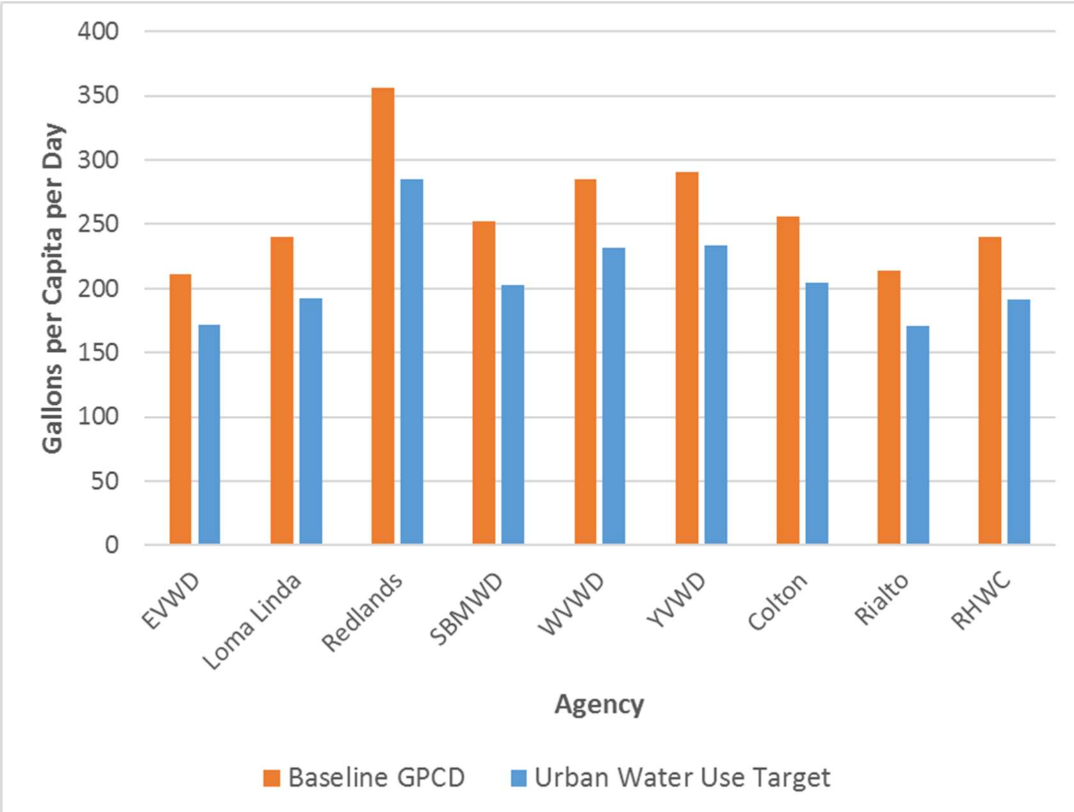

Figure ES-1-4. Baseline Water Use and Compliance Targets for Participating Agencies

Demand Management Measures

Demand Management Measures (DMMs) are used by each water supply agency to manage and reduce water consumption. The DWR Guidebook identifies categories of DMMs for which retail and wholesale agencies should report their progress. The individual chapters for each agency (Chapters 6 through 15) include a discussion of each agency's DMMs, and how they plan to maintain water use below the compliance targets established by SB X7-7.

Water Shortage Contingency Planning

Water supplies may be interrupted or reduced significantly through drought, natural disaster such as earthquake, a regional power outage, or a toxic spill that prevents delivery due to poor water quality. All of the participating agencies adopted the Upper Santa Ana River Watershed Integrated Regional Water Management Plan, which includes strategies and projects to overcome water shortages during emergencies. In addition, all the agencies participate in the Emergency Response Network of the Inland Empire (ERNIE) which is a water/wastewater mutual aid network within San Bernardino and Riverside counties.

Each of the retail water agencies (as detailed in the chapters for each retail agency) has identified voluntary and mandatory conservation measures that will go into effect during different stages of water shortage.

Notification and Coordination Requirements

The UWMP Act encourages input to an UWMP. Specifically, the UWMP Act requires:

- That each urban water supplier notifies any city or county within which the supplier provides water, with at least 60 days' notice of the public hearing on its UWMP.
- Prior to adopting a plan, an urban water supplier shall hold a public hearing. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier at least once 14 days prior to the hearing and again 7 days prior to the hearing.
- Prior to adopting a plan, a retail water supplier shall conduct at least one public hearing to allow community input regarding the urban retail water supplier's implementation plan for complying with SB X7-7, to consider the economic impacts of the urban retail water supplier's implementation plan for complying with SB X7-7, and to adopt a method for determining its urban water use target.
- Within 30 days of adoption, an urban water supplier shall file a copy of the plan with DWR, the California State Library, and any city or county within which the supplier provides water. No later than 30 days after filing a copy of a plan with DWR, an urban water supplier shall make the plan available for review during normal business hours.

The agencies participating in this RUWMP sent letters to cities and counties, as well as other water agencies, notifying them of RUWMP preparation and soliciting input to the Plan. Notification letters were sent in February and March 2016. Each agency published hearing notices consistent with UWMP Act requirements. Hearings were conducted by each agency regarding the selection of water use targets, the implementation plan for complying with SB X7-7, and the potential economic impacts of complying with SB X7-7.

Following adoption, the Plan will be available during normal business hours at the administrative offices of each agency:

San Bernardino Valley Municipal Water District	380 E. Vanderbilt Way San Bernardino, CA
East Valley Water District	31111 Greenspot Road Highland, CA
City of Loma Linda	Department of Public Works 2551 Barton Road Loma Linda, CA
City of Redlands	Municipal Utilities Department and Engineering Department 35 Cajon Street Redlands, CA
City of San Bernardino Municipal Water Department	Water Department 300 N. D Street San Bernardino, CA
West Valley Water District	855 W. Baseline Road Rialto, CA
Yucaipa Valley Water District	12770 Second Street Yucaipa, CA
City of Colton	Public Works and Utility Services Department 160 S. 10th Street Colton, CA
City of Rialto	335 West Rialto Avenue Rialto CA
Riverside Highland Water Company	12374 Michigan Street Grand Terrace CA

Following adoption, the RUWMP will be submitted to DWR, the California State Library, and all the cities and counties within the service areas of the participating agencies.

1 Introduction

1.1 Overview

This document presents the 2015 Regional Urban Water Management Plan (Plan) for the San Bernardino Valley area, represented by the San Bernardino Valley Municipal Water District (Valley District) service area, and nine participating retail water purveyors: City of Colton, East Valley Water District, City of Loma Linda, City of Redlands, City of Rialto, Riverside Highland Water Company, City of San Bernardino Municipal Water Department, West Valley Water District, and Yucaipa Valley Water District.

This chapter describes the general purpose of the Plan, discusses Plan implementation, and provides general information about Valley District, the retail purveyors, and service area characteristics.

1.2 Purpose

The California Water Code requires urban water suppliers within the state to prepare and adopt Urban Water Management Plans (UWMPs) for submission to the California Department of Water Resources (DWR). The UWMPs, which are required to be filed every five years, must satisfy the requirements of the Urban Water Management Planning Act (UWMP Act) of 1983, including amendments that have been made to the UWMP Act and other applicable regulations. The UWMP Act requires urban water suppliers servicing 3,000 or more connections, or supplying more than 3,000 acre-feet (AF) of water annually, to prepare an UWMP. For wholesale water agencies without retail connections, the requirement is triggered by the annual delivery of 3,000 AF or more.

An UWMP is a planning tool that generally guides the actions of urban water suppliers. It provides managers and the public with a broad perspective on a number of water supply issues. It is not a substitute for project-specific planning documents, nor was it intended to be when mandated by the State Legislature. For example, the Legislature mandated that a plan include a section which “describes the opportunities for exchanges or water transfers on a short-term or long-term basis.” (California Urban Water Planning Act, Article 2, Section 10630[d].) The identification of such opportunities, and the inclusion of those opportunities in a general water service reliability analysis, neither commit a water management agency to pursue a particular water exchange/transfer opportunity, nor precludes a water management agency from exploring exchange/transfer opportunities not identified in the plan. The preparation or adoption of an UWMP is not subject to review under the California Environmental Quality Act (CEQA) (Water Code section 10652). Before an urban water supplier is able to implement any potential future sources of water supply identified in a plan, detailed project plans are prepared and approved, financial and operational plans are developed, and all required environmental analysis is completed.

This Plan is intended to function as a planning tool to guide broad-perspective decision making by the management of water suppliers. It is important that this Plan be viewed as a long-term, general planning document, rather than as an exact blueprint for supply and demand management. Water management in California is not a matter of certainty, and planning projections may change in response to a number of factors. From this perspective, it is appropriate to look at the Plan as a general planning framework, not a specific action plan. It is an effort to generally answer a series of planning questions including:

- What are the potential sources of supply and what is the reasonable probable yield from them?
- What is the probable demand, given a reasonable set of assumptions about growth and implementation of good water management practices?
- How well do supply and demand figures match up, assuming that the various probable supplies will be pursued by the implementing agency?

Using these “framework” questions and resulting answers, the implementing agency will pursue feasible and cost-effective options and opportunities to meet demands. Valley District and the retail water purveyors will explore enhancing water supplies from traditional sources such as the State Water Project (SWP), as well as other options, including groundwater extraction, water recycling, storm water capture, and water banking/conjunctive use. Specific planning efforts will be undertaken in regard to each option, involving detailed evaluations of how each option would fit into the overall supply/demand framework, how each option would impact the environment, and how each option would affect customers. The objective of these more detailed evaluations would be to find the optimum portfolio of conservation and supply programs that ensure that the needs of the customers are met.

The UWMP Act requires preparation of a plan that:

- Accomplishes water supply planning over a minimum 20-year period in five year increments. (Valley District and the purveyors are going beyond the requirements of the Act by developing a plan which spans 25 years.)
- Identifies and quantifies adequate water supplies, including recycled water, for existing and future demands, in normal, single-dry, and multiple-dry years. (Valley District and the purveyors are going beyond the requirements of the Act by evaluating a single wet year scenario in addition to the required scenarios.)
- Documents conservation programs to encourage efficient use of urban water supplies.

Senate Bill X7-7 (SB X7-7), also known as the Water Conservation Act of 2009, which was incorporated into the UWMP Act in 2009, requires that all water suppliers increase water use efficiency with the overall goal to decrease per-capita water consumption within the state by 20 percent by the year 2020. SB X7-7 required DWR to develop certain criteria, methods, and standard reporting forms through a public process that could be used by water suppliers to establish their baseline water use and determine their water conservation targets. SBX 7-7 and guidance prepared by DWR specify methodologies for determining the baseline water demand, 2015 interim urban water use target, and the 2020 urban water use targets. The baseline and targets were required to be reported in the 2010 UWMP for each urban retail water supplier, but the baselines and targets have been re-calculated in this Plan to reflect updated service area population data. This Plan is required to assess compliance with the 2015 interim urban water use target and monitor progress toward compliance with the 2020 urban water use target.

Valley District and the retail water purveyors wish to deliver a sufficient, reliable, and high quality water supply for their customers, even during dry periods. Based on conservative water supply and demand assumptions over the next 25 years, in combination with conservation of non-essential demand during certain dry years, the Plan successfully achieves this goal.

1.3 Organization of the Plan

This Plan is organized to act as the 2015 UWMP for Valley District as a wholesale supplier. This Plan also acts as the 2015 UWMP for the nine retail purveyors participating in the plan. Together, these parts comprise the 2015 Regional Urban Water Management Plan (RUWMP).

Chapters 1 through 5 of the Plan focus on the regional analysis for the Valley District service area, serving as a “common base” on which the individual purveyor analyses rely. Regional data presented in Chapters 2 and 3 informs the individual retail purveyor analysis. Analysis of individual water agencies is provided in Chapters 6 through 15.

Each individual purveyor chapter provides service area information with 25-year projections, a description of water sources and reliability of supply, transfer and exchange opportunities, water use by customer type and timeframe (past, present, and projected), as well an evaluation of demand management measures.

Throughout this report, water volume is represented in units of acre-feet (AF). Data have been compiled on a calendar year basis.

A checklist to ensure compliance of this Plan with the Act requirements is provided for each agency in Appendix Q.

1.4 Implementation of the Plan

This Plan has been prepared for Valley District, a wholesale water supplier, and for the following retail purveyors:

- East Valley Water District
- City of Loma Linda
- City of Redlands
- City of San Bernardino Municipal Water Department
- West Valley Water District

- Yucaipa Valley Water District
- City of Colton
- City of Rialto
- Riverside Highland Water Company

These ten urban water suppliers have coordinated the preparation of this Plan. The purpose of jointly preparing the Plan was to facilitate a consistent evaluation of water sources common to the various agencies, to take advantage of group knowledge and experience, and to reduce preparation costs. However, each agency has reviewed, will adopt, and will implement the portions of this Plan relevant to their agency. Errors or omissions by any one participant in this Plan should not invalidate the information put forward by the other agencies who participated in Plan preparation.

1.4.1 Joint Preparation of the Plan

Water purveyors are permitted by DWR to work together to develop a cooperative regional plan. This approach has been adopted by the Valley District and the nine purveyors which are jointly sponsoring the current Plan. Agency coordination for this Plan is summarized in Table 1-1.

1.4.2 Plan Adoption

Valley District and the retail purveyors adopted the 2015 RUWMP in June 2016. Following adoption and within 30 days of Board approval, the RUWMP was submitted to DWR, the California State Library, and any city or county within which Valley District or any of the purveyors provides water supplies. Resolutions adopting the RUWMP are provided in Appendix D.

This plan includes all information necessary to meet the requirements of Water Conservation Act of 2009 (Wat. Code, §§ 10608.12-10608.64) and the Urban Water Management Planning Act (Wat. Code, §§ 10610-10656).

1.4.3 Public Outreach

The water purveyors have encouraged community participation in water planning. Interested groups were informed about the development of the Plan along with the schedule of public activities. Copies of the Draft Plan were made available at the water purveyors' offices and websites, and notices sent to the cities, and the Counties of San Bernardino and Riverside, as well as to interested parties as identified in Table 1-1.

Copies of the public outreach materials are included in Appendix C.

Table 1-1 Agency Coordination Summary

Agency	Participated in UWMP	Received Copy of Draft	Commented on Draft	Attended Public Meetings	Contacted for Assistance	Sent Notice of Intent to Adopt	Not Involved
San Bernardino Valley Municipal Water District	X					X	
City of Colton	X					X	
City of Loma Linda	X					X	
City of Redlands	X					X	
City of San Bernardino	X					X	
East Valley Water District	X					X	
West Valley Water District	X					X	
Yucaipa Valley Water District	X					X	
Riverside Highland Water Company	X					X	
City of Rialto	X					X	
Baseline Garden Mutual Water Company						X	
Bear Valley Mutual Water Company						X	
Beaumont-Cherry Valley Water District						X	
Big Bear Mutual Water District						X	
Cal. State San Bernardino/Water Resources Institute						X	
City of Beaumont						X	
City of Calimesa						X	
City of Fontana						X	
City of Grand Terrace						X	
City of Highland						X	
City of Riverside						X	
City of Yucaipa						X	
County of Riverside						X	
County of San Bernardino						X	
Fontana Water Company						X	
Fontana Union Water Company						X	
Inland Empire Resources Conservation District						X	

Agency	Participated in UWMP	Received Copy of Draft	Commented on Draft	Attended Public Meetings	Contacted for Assistance	Sent Notice of Intent to Adopt	Not Involved
Muscoy Mutual Water Company						X	
San Bernardino County – Land Use Services Department						X	
San Bernardino County Local Agency Formation Commission (LAFCO)						X	
San Bernardino National Forest, US Forest Service						X	
San Bernardino Valley Water Conservation District						X	
San Gorgonio Pass Water Agency						X	
Santa Ana Watershed Project Authority						X	
South Mesa Water Company						X	
Terrace Water Company						X	
Western Heights Mutual Water Company						X	
Western Municipal Water District						X	
Yucaipa-Calimesa Joint Unified School District						X	

1.5 Water Agencies of the San Bernardino Valley

1.5.1 San Bernardino Valley Municipal Water District

Valley District was formed in 1954, under the Municipal Water District Act of 1911 (California Water Code Section 71000 et seq.) as a regional agency to plan a long-range water supply for the San Bernardino Valley. Valley District imports water into its service area through participation in the SWP and manages groundwater storage within its boundaries, and also provides stormwater disposal, recreation, and fire protection services. Valley District does not deliver water directly to retail water customers.

Valley District covers about 325 square miles mainly in southwestern San Bernardino County, about 60 miles east of Los Angeles. It spans the eastern two-thirds of the San Bernardino Valley, the Crafton Hills, and a portion of the Yucaipa Valley and includes the cities and communities of San Bernardino, Colton, Loma Linda, Redlands, Rialto, Fontana, Bloomington, Highland, East Highland, Grand Terrace, Mentone, and Yucaipa. Figure 1-1 shows Valley District's service area, along with the service areas of the retail water purveyors.

Valley District is responsible for long-range water supply management, including importing supplemental water, and is responsible for storage management of most of the groundwater basins within its boundaries and for groundwater extraction over the amount specified in the Orange County and Western Judgments explained below. Valley District has specific responsibilities for monitoring groundwater supplies in the San Bernardino Basin Area (SBBA) and Rialto-Colton Subbasin, and for a portion of the minimum Santa Ana River (SAR) flow required at the Riverside Narrows.

Valley District has developed a "cooperative recharge program" that is being successfully implemented to help replenish groundwater, using both SWP water and local runoff. Valley District takes delivery of SWP water at the Devil Canyon Power Plant Afterbay, which is located just within its northern boundary. The SWP water is conveyed 17 miles eastward to various spreading grounds and agricultural and wholesale domestic delivery points in the SBBA. Water is also conveyed westward for direct delivery in the Rialto-Colton Subbasin.

In the 1960s, dry conditions resulted in the over-commitment of water resources in the SAR watershed which led to lawsuits between water users in the upper and lower watersheds regarding both surface flows and groundwater. The lawsuits culminated in 1969 in the Orange County and Western Judgments. Under the terms of the judgments, Valley District became responsible for providing a portion of the specified SAR base flow to Orange County and for replenishing the SBBA under certain conditions. If the conditions of either judgment are not met by the natural water supply, including new conservation, Valley District is required to deliver supplemental water to offset the deficiency. The judgments resolved the major water rights issues that had prevented the development of long-term, region-wide water supply plans and established specific objectives for the management of the groundwater basins.

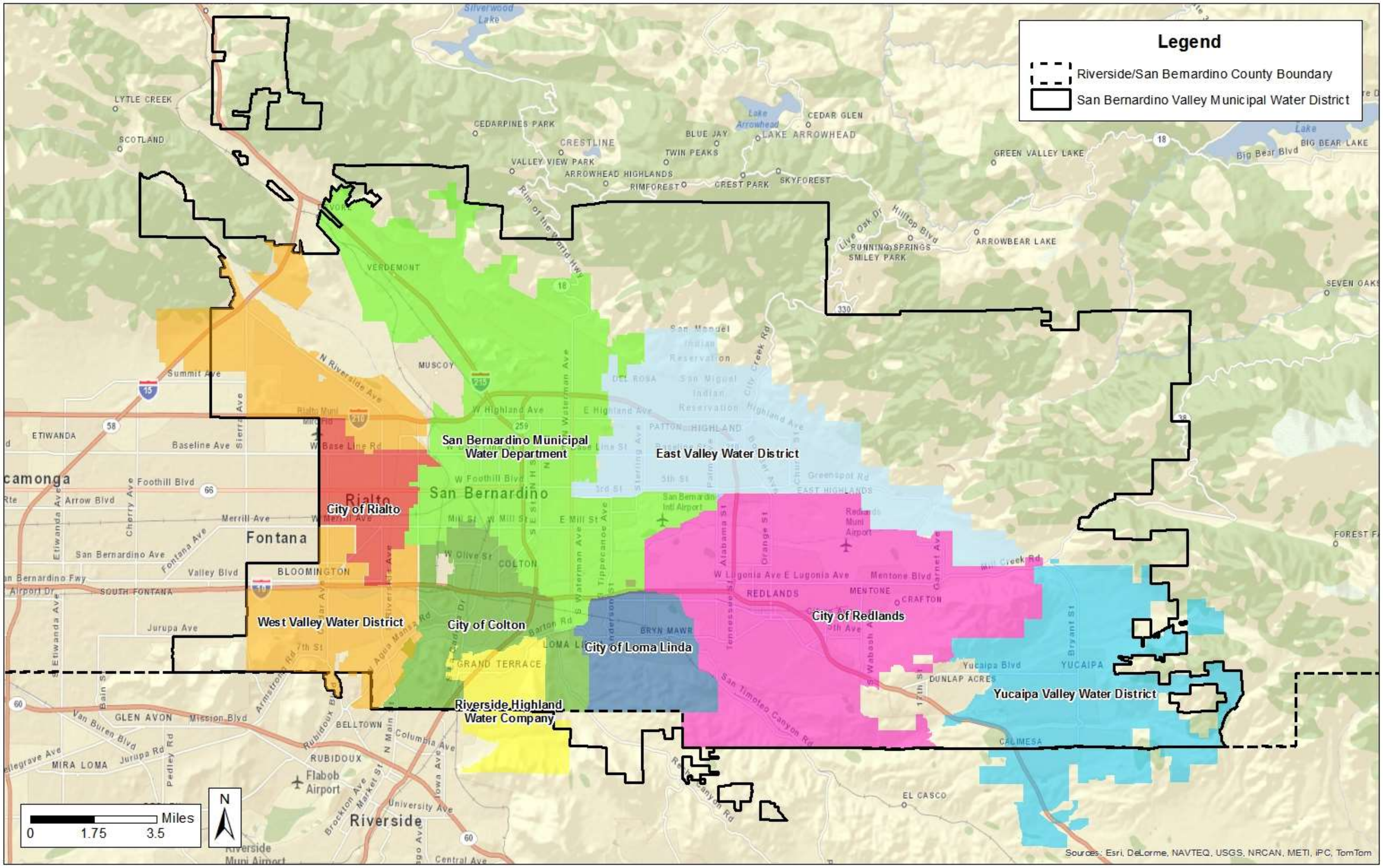

Figure 1-1. San Bernardino Valley Municipal Water District Service Area

Court-appointed Watermaster committees administer both Judgments; as a member of the Watermaster committees, Valley District is directly responsible for ensuring that groundwater and surface water resources are effectively managed for the benefit of the region.

Valley District participated in the development of the 2010 San Bernardino Valley RUWMP.

1.5.2 Retail Water Purveyors

A total of nine retail water purveyors in the Valley District service area participated in the development of this RUWMP. Seven also participated in the 2010 RUWMP, and two new purveyors have joined the RUWMP for 2015.

1.5.2.1 East Valley Water District

East Valley Water District (EVWD) is a special district formed in 1954 through an election by local residents who wanted water service by a public water agency. Originally called the East San Bernardino County Water District, it was formed to provide domestic water service to the agriculturally-based communities of Highland and East Highland. The name of the agency was changed from East San Bernardino County Water District to East Valley Water District in 1982. EVWD now serves the generally urban areas of the City of Highland, a portion of the City of San Bernardino, and a small portion of the unincorporated County. The district has a service area of approximately 33.5 square miles. EVWD's current water supplies are surface water from the Santa Ana River, groundwater from the SBBA, and imported water purchased from Valley District. EVWD is proposing to provide wastewater treatment service and to develop a recycled water system for groundwater recharge. Figure 1-2 illustrates the EVWD service area.

EVWD participated in the 2010 San Bernardino Valley RUWMP.

1.5.2.2 City of Loma Linda

The City of Loma Linda (hereafter Loma Linda) was incorporated in 1970. The Public Works Department provides potable water service to an area of approximately 7.8 square miles that includes the Veterans Administration Hospital and the Loma Linda Community Hospital. Loma Linda does not provide water service to the Loma Linda University Campus or Medical Center facilities, which operate on a separate self-contained system. Loma Linda's primary water supply is groundwater from the SBBA. Loma Linda also has two emergency connections to the City of San Bernardino and one to the City of Redlands to meet its supplemental needs. Loma Linda also provides wastewater collection service. Figure 1-3 illustrates the Loma Linda service area.

Loma Linda participated in the 2010 San Bernardino Valley RUWMP.

1.5.2.3 City of Redlands

For more than 90 years, the City of Redlands (hereafter Redlands) has been providing high-quality drinking water to the Redlands and Mentone areas. The water utility service area generally coincides with the area designated by the Local Area Formation Commission (LAFCO) as the City and its sphere of influence. The service area encompasses 36 square miles inside the Redlands city boundaries and a relatively small area outside the city boundaries, but within the sphere of influence. Redlands supplies a blend of local groundwater, local surface water, and imported water purchased from Valley District. Redlands also owns and operates a sewer collection system and the Redlands Wastewater Treatment Facility, which can treat 7.2 million gallons per day (mgd) of wastewater for industrial and irrigation purposes, including supplying water to the Southern California Edison Mountainview Power Plant. Figure 1-4 illustrates the Redlands service area.

Redlands participated in the 2010 San Bernardino Valley RUWMP.

1.5.2.4 City of San Bernardino

The City of San Bernardino is served by a municipal utility, the San Bernardino Municipal Water Department (SBMWD). SBMWD was created as a municipal utility by Article 9 of the City of San Bernardino Charter. The SBMWD water service area is approximately 45 square miles, providing water to approximately 200,000 persons in the City of San Bernardino and unincorporated areas of San Bernardino County. SBMWD produces all of its water supply from wells in the SBBA. In addition to potable water, SBMWD provides wastewater collection and treatment services and is developing a recycled water system for groundwater recharge and non-potable reuse. Figure 1-5 illustrates the SBMWD service area.

SBMWD participated in the 2010 San Bernardino Valley RUWMP.

1.5.2.5 West Valley Water District

West Valley Water District (WVWD) is a public agency of the State of California and was formed in 1952 under the name of the Bloomington County Water District. Since that time, West Valley has gone through several name changes and has acquired numerous other water suppliers with water rights dating back over 100 years. WVWD is located primarily within southwestern San Bernardino County and a small portion within northern Riverside County. The majority of WVWD's service area lies within Valley District's boundaries. WVWD's service area is approximately 31 square miles, serving portions of the Cities of Rialto, Fontana, Colton, and Jurupa Valley, and unincorporated areas of San Bernardino County. WVWD utilizes water from five groundwater basins and treats surface water from Lytle Creek and SWP water at its 14.4-mgd Oliver P. Roemer Water Filtration Facility to serve over 20,000 water service connections. Figure 1-6 illustrates the WVWD service area.

WVWD participated in the 2010 San Bernardino Valley RUWMP.

1.5.2.6 Yucaipa Valley Water District

Yucaipa Valley Water District (YVWD) is a special district that provides water supply, treatment, and distribution, recycled water supply and distribution services, and wastewater collection and treatment. Formed in 1971, YVWD acquired many of the private water companies serving the Yucaipa Valley. Its most recent consolidations of water services occurred with the acquisition of the Harry V. Slack Water Company in 1987 and the Wildwood Canyon Mutual Water

Company in 1992. YVWD serves customers in the Cities of Calimesa and Yucaipa, and portions of Riverside and San Bernardino Counties. Figure 1-7 illustrates the YVWD service area.

YVWD participated in the 2010 San Bernardino Valley RUWMP.

1.5.2.7 City of Colton

The City of Colton is a community founded in 1875 and incorporated in 1887. The City of Colton (hereinafter, Colton), through the Water and Wastewater Division of its Public Utilities Department, provides water service to a majority of the residents and businesses located within Colton's corporate boundary, as well as to those in certain adjacent unincorporated areas of San Bernardino County. All of Colton's water supply is local groundwater pumped from the SBBA, the Rialto-Colton sub basin, and the Riverside North sub basin. Figure 1-8 illustrates the Colton service area.

Colton participated in the 2010 San Bernardino Valley RUWMP.

1.5.2.8 City of Rialto

The City of Rialto is provided water service by three different water agencies: the City of Rialto municipal water system through its water system operator (Veolia, through Rialto Water Services), the West Valley Water District (WVWD), and the Fontana Union Water Company (FUWC). Each agency has its own water supply and resources, and must meet its demands through those resources. The City of Rialto municipal water system provides potable, non-potable, and recycled water at retail to customers primarily within the City of Rialto and serves approximately one-half of the population of the City, or approximately 54,000 customers as of December, 2015. The service area is essentially the incorporated area of the City of Rialto located between Interstate 10 and State Route 210.

The City's water supply sources include local surface water from Lytle Creek, groundwater from five local groundwater basins, and water purchased from Valley District and delivered through the Baseline Feeder. Surface water treatment of Lytle Creek water is provided by the Oliver P. Roemer Water Filtration Facility owned and operated by WVWD. Rialto owns a portion of the capacity of that plant. Rialto also has an agreement to purchase excess SBBA water form SBMWD, when available. Rialto provides wastewater collection and treatment services for its residents and some residents of the City of Fontana through an Extra-Territorial Agreement. Rialto currently provides recycled water service to the California Department of Transportation for landscape irrigation. Figure 1-9 illustrates the Rialto service area.

The City of Rialto prepared a separate UWMP in 2010 and did not participate in the 2010 San Bernardino Valley RUWMP.

1.5.2.9 Riverside Highland Water Company

The Riverside Highland Water Company (RHWC) provides domestic and irrigation water services to the City of Grand Terrace, portions of the City of Colton, and portions of the unincorporated areas of the Counties of San Bernardino and Riverside. RHWC's service area lies partially within the Valley District service area and partially within the service area of Western Municipal Water District (Western). RHWC's customers include single and multi-family residential, commercial, industrial and agricultural users. The RHWC service area is approximately 85 percent built-out and has several developments currently under construction or approved by the planning departments of the governing agencies. RHWC obtains water from the Lytle Creek Subbasin, the SBBA, the Rialto-Colton Subbasin, Riverside North and Riverside South Basins. Figure 1-10 illustrates the RHWC service area.

RHWC prepared a separate 2010 UWMP and did not participate in the 2010 San Bernardino Valley RUWMP.

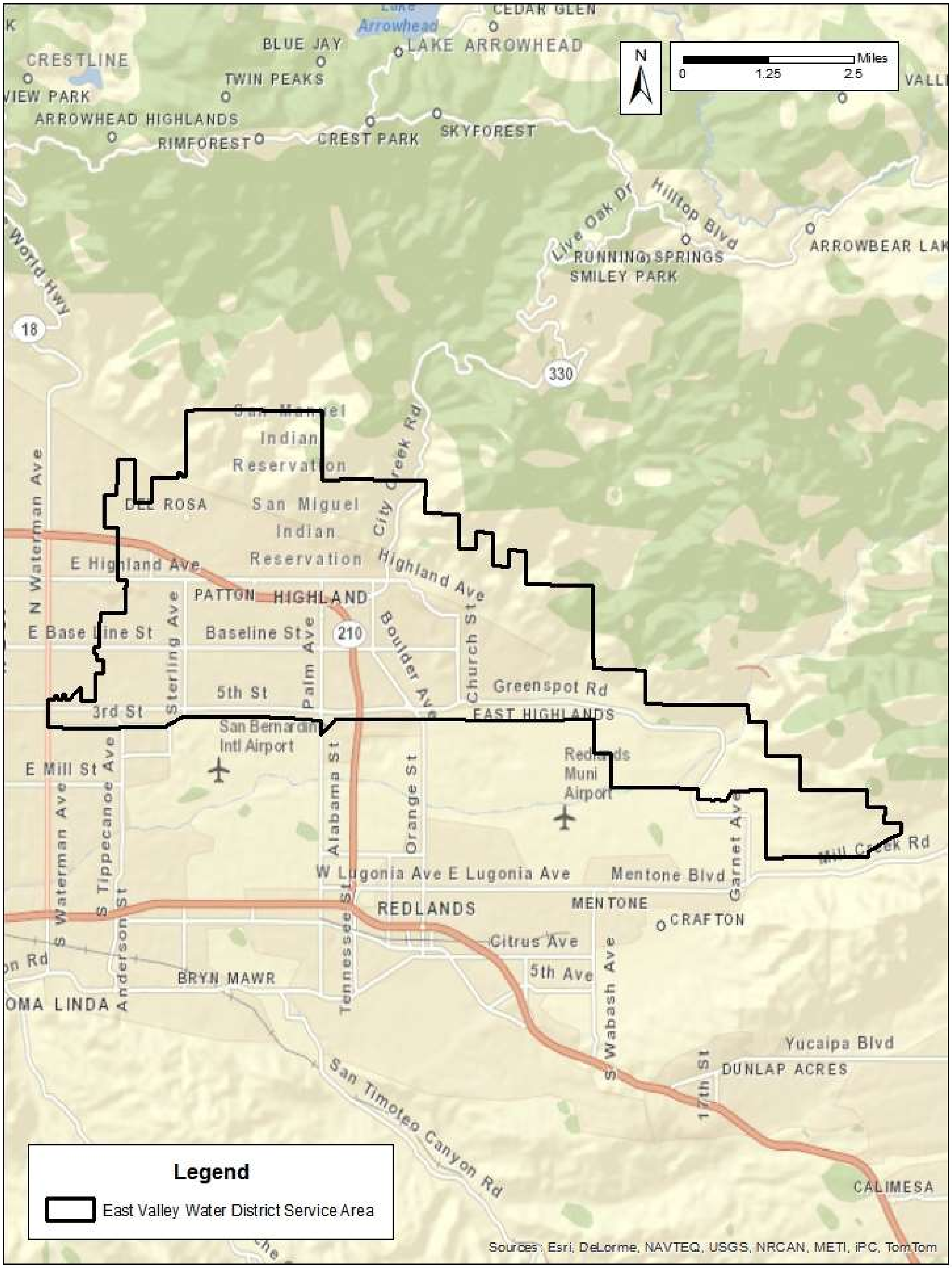

Figure 1-2. East Valley Water District Service Area

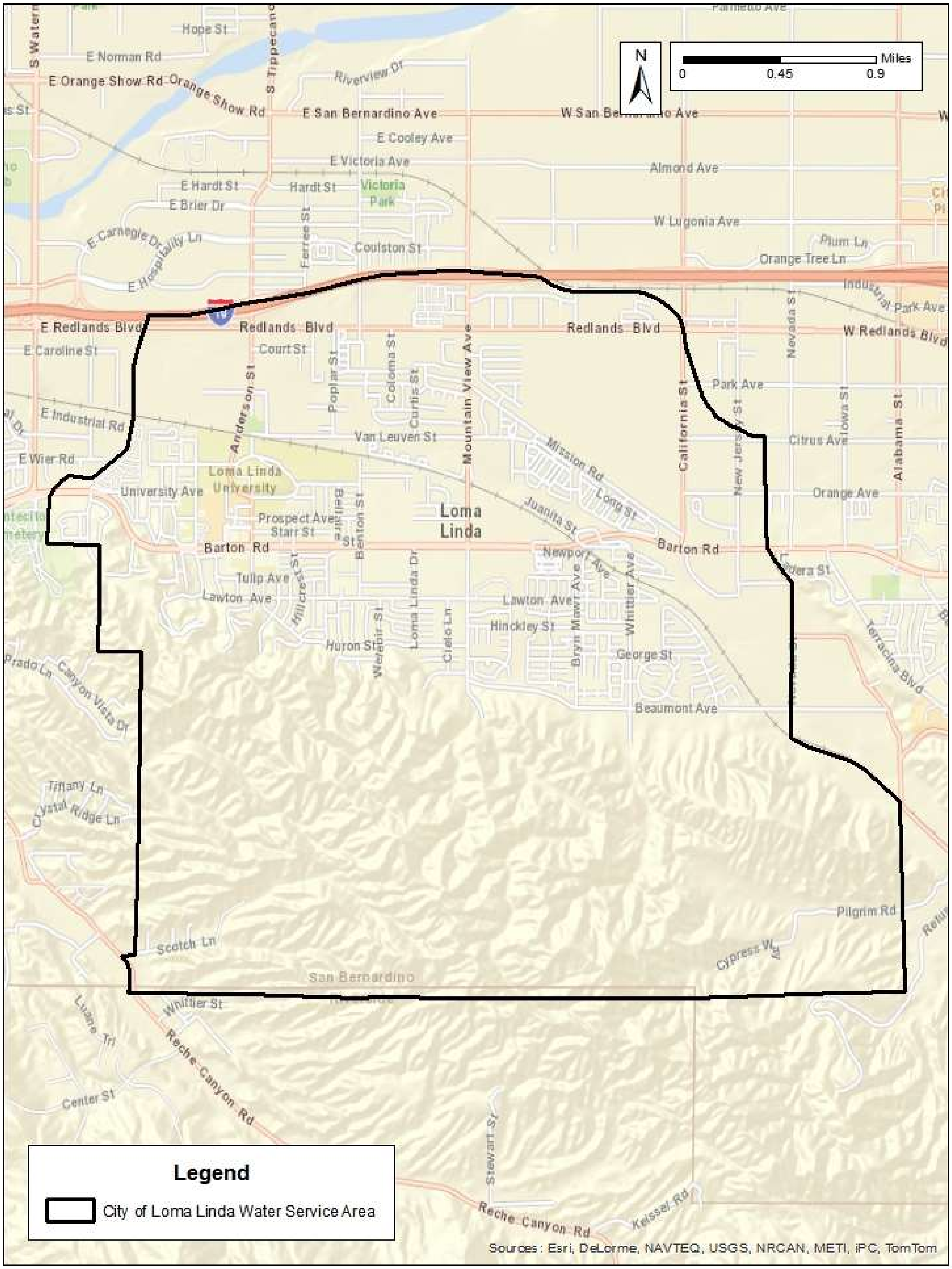

Figure 1-3. City of Loma Linda Service Area

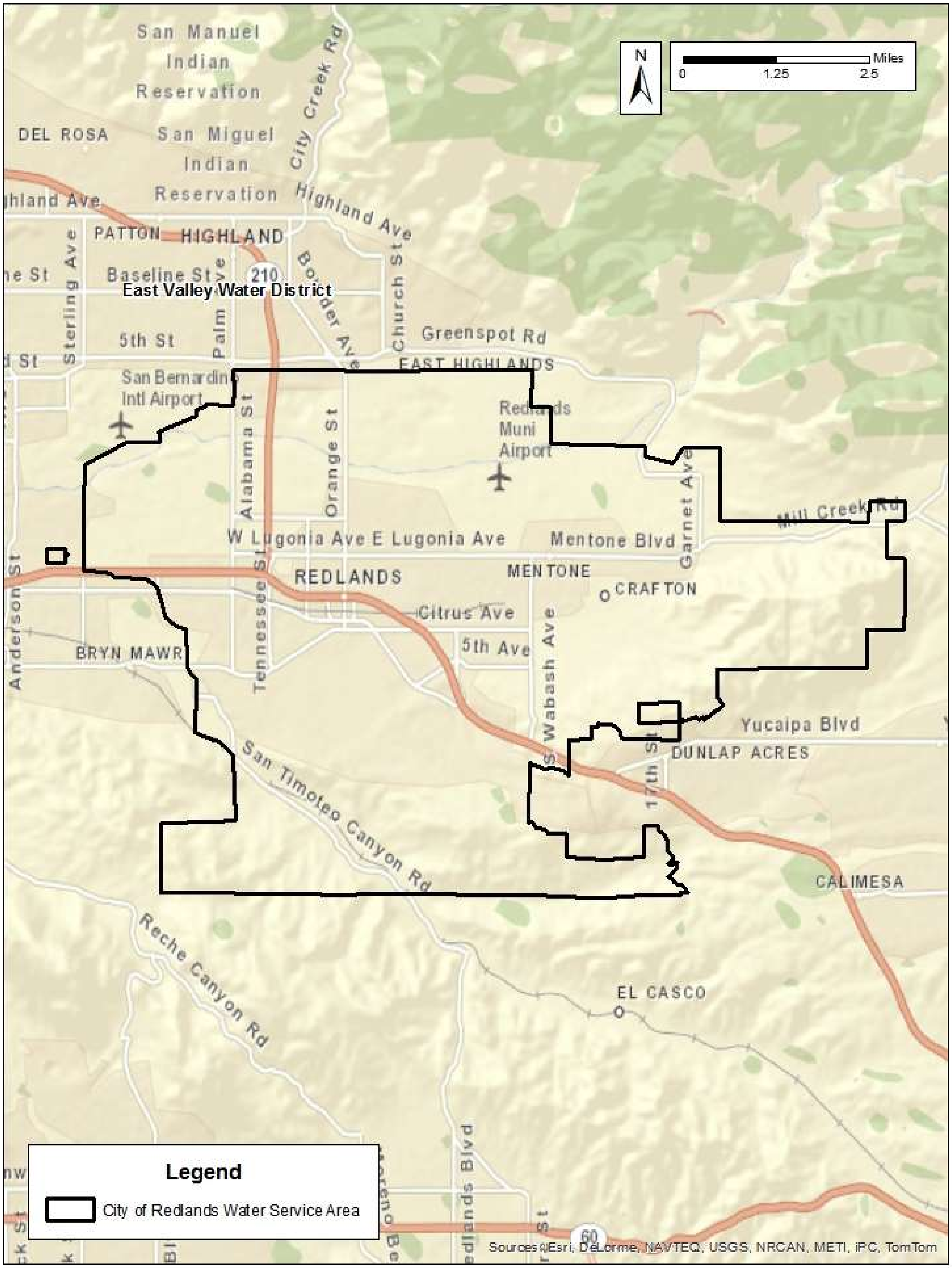

Figure 1-4. City of Redlands Service Area

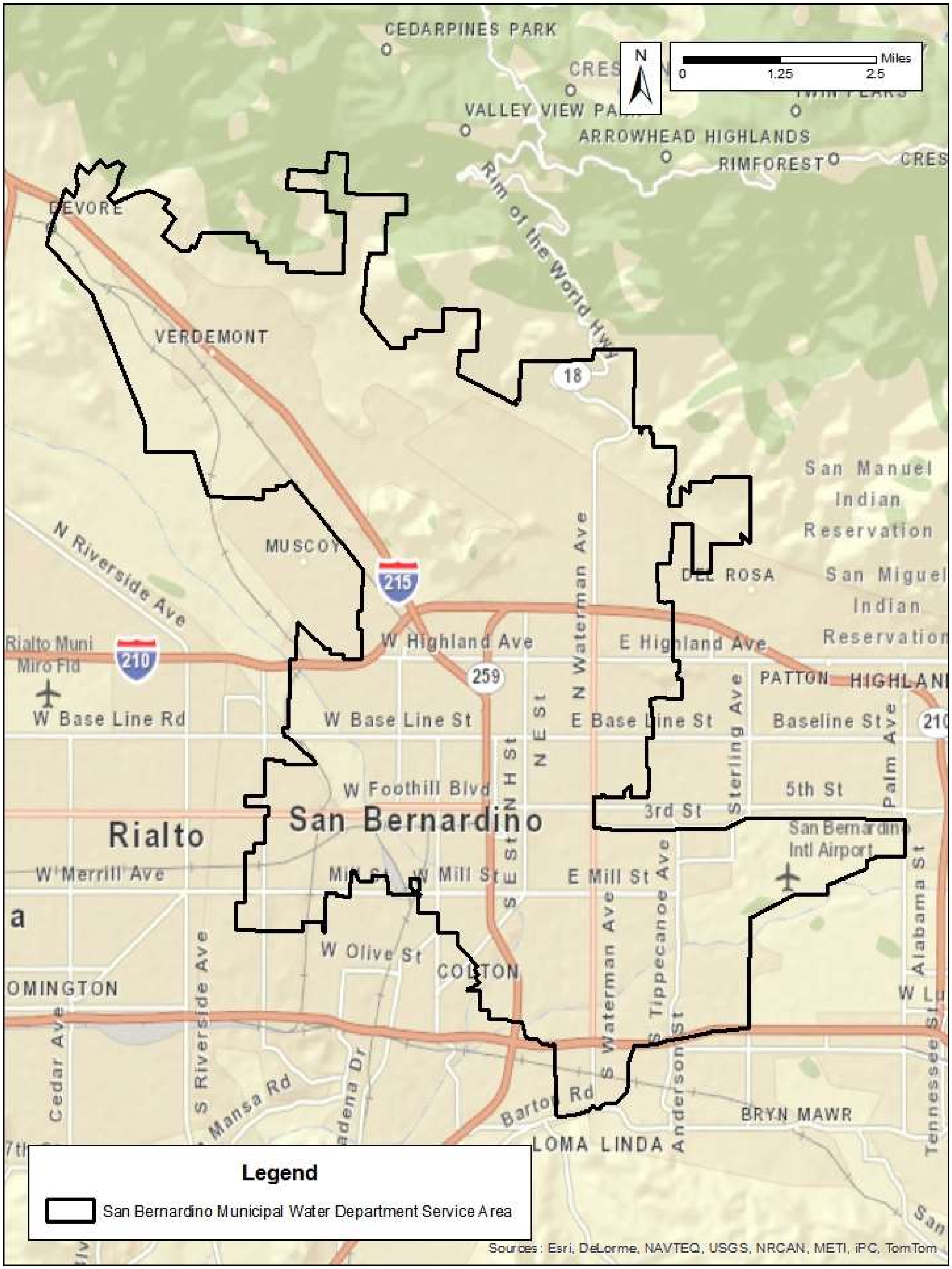

Figure 1-5. City of San Bernardino Municipal Water Department Service Area

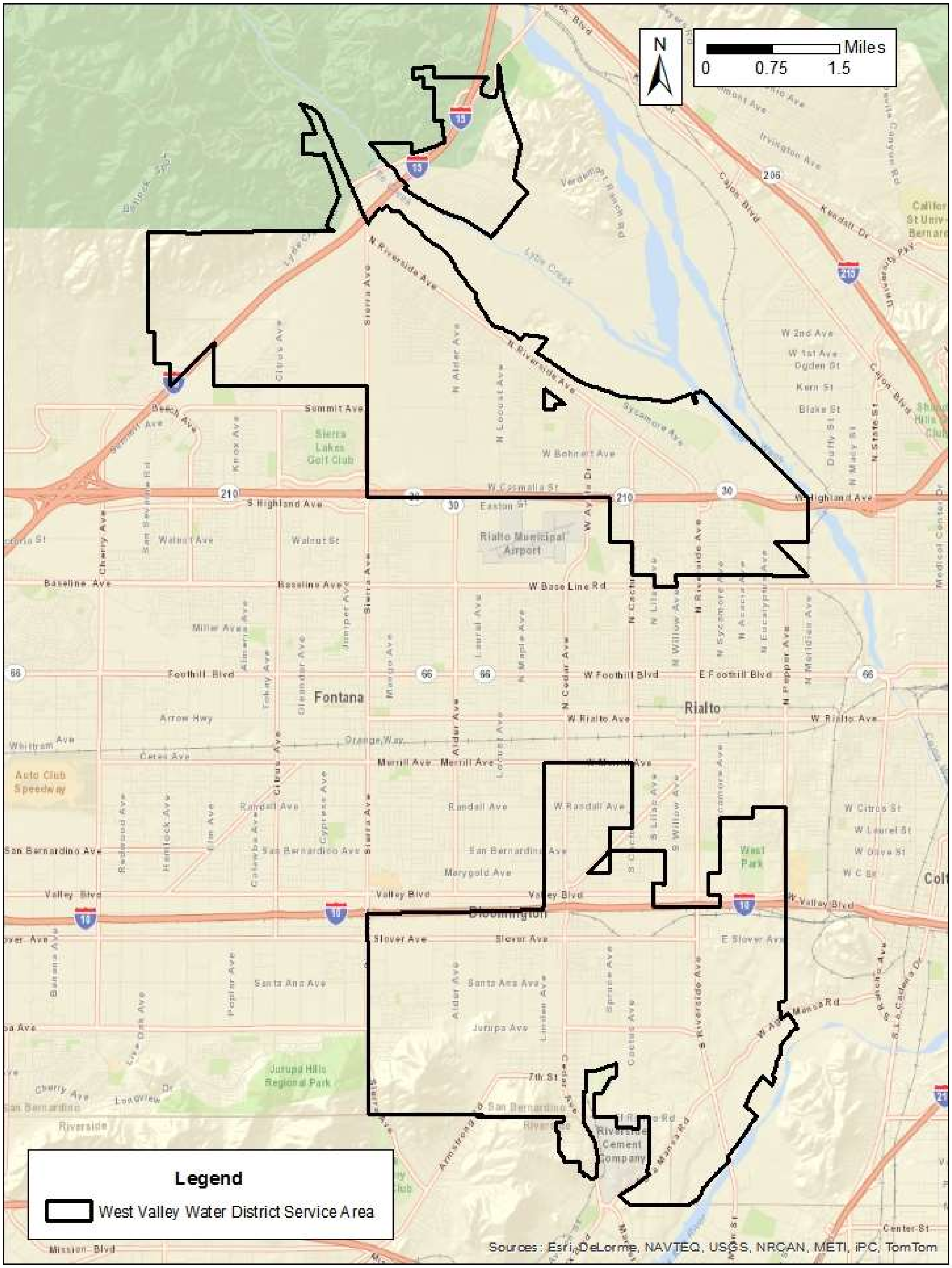

Figure 1-6. West Valley Water District Service Area

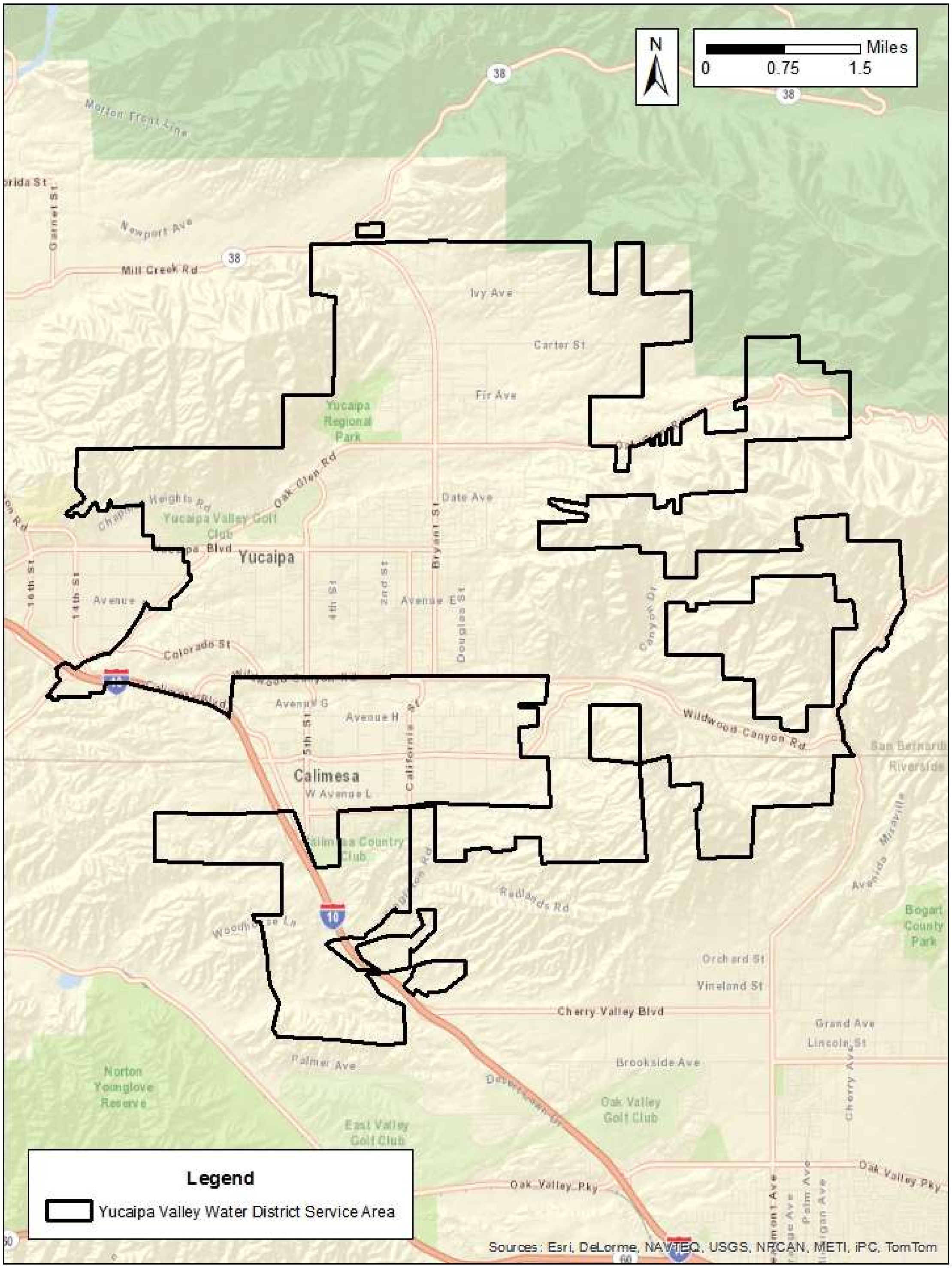

Figure 1-7. Yucaipa Valley Water District Service Area

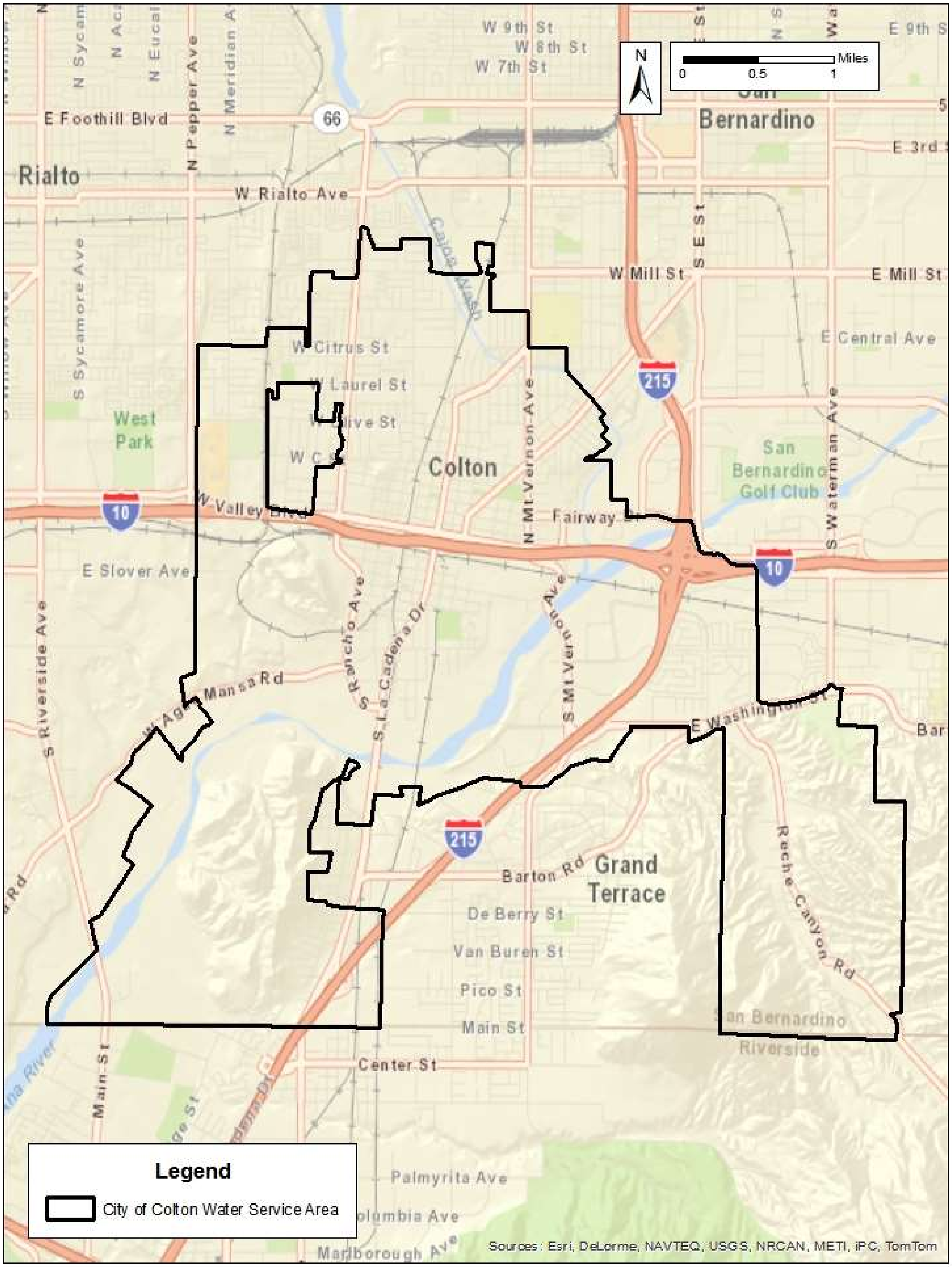

Figure 1-8. City of Colton Service Area

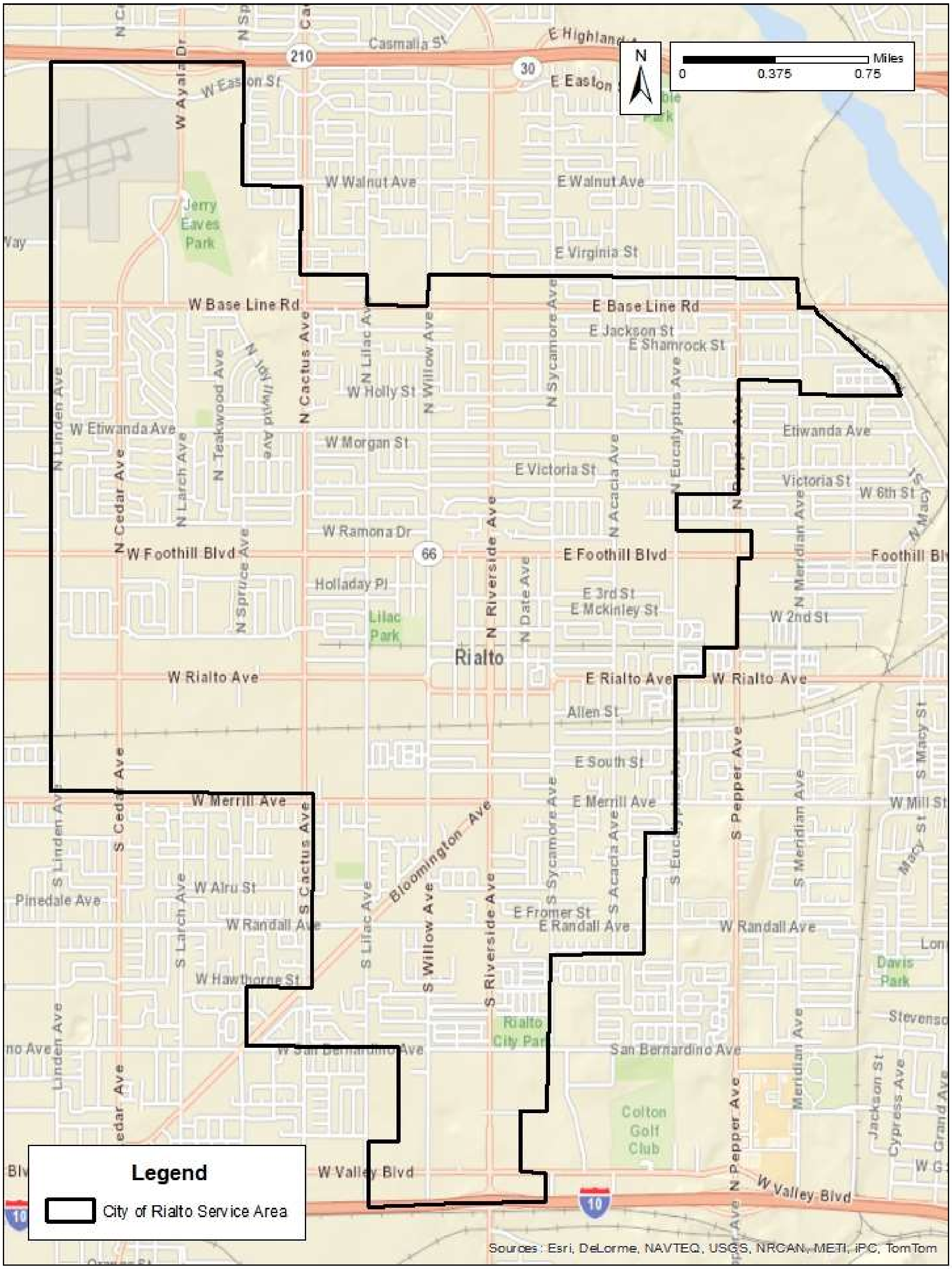

Figure 1-9. City of Rialto Service Area

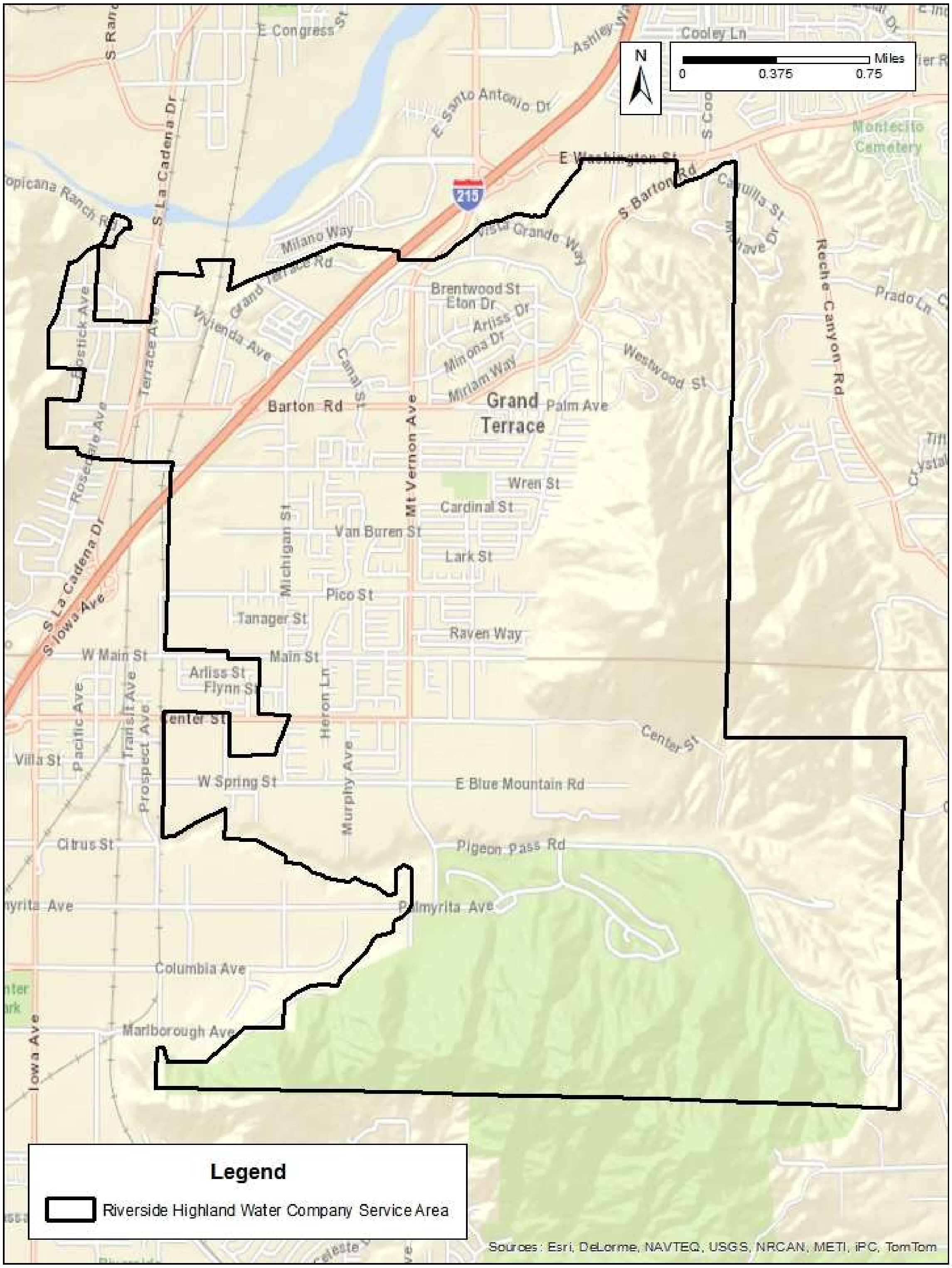

Figure 1-10. Riverside Highland Water Company Service Area

1.5.3 Other Retail Water Providers

Other retail water providers within the Valley District service area that provide water but which are not participants in this RUWMP include: Fontana Union Water Company, Bear Valley Mutual Water Company, Fontana Water Company, Muscoy Mutual Water Company, South Mesa Water Company, Terrace Water Company, and Western Heights Mutual Water Company.

1.6 Climate

Climate is a primary factor affecting water management in the San Bernardino Valley.

1.6.1 Regional Climate

The climate in the San Bernardino Valley is characterized by relatively hot, dry summers and cool winters with intermittent precipitation. The largest portion (73 percent) of average annual precipitation occurs during December through March, and rainless periods of several months are common in the summer. Precipitation is nearly always in the form of rain in the lower elevations and mostly in the form of snow beyond approximately 6,000 feet above mean sea level (MSL) in the San Bernardino Mountains.

Mean annual precipitation ranges from approximately 10 inches near Riverside to approximately 30 inches in the upper San Bernardino Mountains. The historical record indicates that a period of above-average or below-average precipitation can last more than 30 years, such as the dry period that extended from 1947 to 1977. The region has been experiencing an ongoing drought since about 1999.

Three types of storms produce precipitation in the Santa Ana River Basin: general winter storms, local storms, and general summer storms. General winter storms usually occur from December through March. They originate over the Pacific Ocean as a result of the interaction between polar Pacific and tropical Pacific air masses and move eastward over the basin. These storms, which often last for several days, reflect orographic (i.e., land elevation) influences and are accompanied by widespread precipitation in the form of rain and, at higher elevations, snow. Local storms cover small areas, but can result in high intensity precipitation for durations of approximately six hours. These storms can occur any time of the year, either as isolated events or as part of a general storm, and those occurring during the winter are generally associated with frontal systems (a “front” is the interface between air masses of different temperatures or densities). General summer storms can occur in the late summer and early fall months in the San Bernardino area, although they are infrequent.

Table 1-2 shows average monthly climate data for the mountains and valley areas in the region.

Table 1-2 Climatological Data

	Mountain[1]			Valley[2]		
Month	**Average Temperature (°F)**	**Average Precipitation (in.)**	**Average Standard ETo (in.)**	**Average Temperature (°F)**	**Average Precipitation (in.)**	**Average Standard ETo (in.)**
January	34.1	4.49	1.94	52.4	3.22	2.53
February	35.2	4.09	2.39	54.6	3.25	2.87
March	38.0	3.06	4.03	56.7	2.86	4.30
April	43.0	1.32	5.22	60.9	1.29	5.38
May	50.7	0.48	6.67	65.6	0.47	5.82
June	58.4	0.14	7.06	71.3	0.09	6.76
July	64.2	0.74	6.44	77.7	0.04	7.38
August	63.3	0.97	5.92	77.7	0.15	7.09
September	57.5	0.53	4.80	73.9	0.33	5.51
October	48.8	0.82	3.67	66.5	0.71	3.97
November	39.9	2.00	2.27	58.6	1.32	2.89
December	34.0	3.21	1.60	53.3	2.38	2.38
Totals						

Notes: [1]Mountain precipitation and temperature for NOAA weather station 040741 in Big Bear Lake; data from 1960 through 2015; http://wrcc.dri.edu; ETo data for CIMIS weather station 199 in Big Bear Lake; http://wwwcimis.water.ca.gov/

[2]Valley precipitation and temperature for NOAA weather station 047723 in San Bernardino; data from 1893 through 2004; http//wrcc.dri.edu; ETo data for CIMIS weather station 44 at University of California, Riverside; http://wwwcimis.water.ca.gov/

1.6.2 Potential Effects of Global Climate Change

A topic of growing concern for water planners and managers is climate change and the potential impacts it could have on California's future water supplies. The Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IRWMP) included an assessment of the potential impacts of climate change. The IRWMP Climate Change Vulnerability Assessment Checklist is included in Appendix F of this Plan. A summary of the IRWMP discussion is included here.

Recent climate change modeling for the SAR watershed suggests that a changing climate will have multiple effects on the Region. Adaptation and mitigation measures will be necessary to account for these effects.

The IRWM Region's currently consistent climate with hot summers and cool winters with mild precipitation, and rain in low elevations with snow in higher elevations, would change as temperatures increase, resulting in less precipitation as snow which would affect the snow pack. Increased precipitation as rain would make it more difficult to capture storm flows and store them for drier periods.

The Intergovernmental Panel on Climate Change has vetted and approved 112 climate models based on projections in greenhouse gas emissions and associated changes in precipitation and temperature. The models show that in the future the number of days over 95°F will increase in multiple locations. The Region chose two cities with different temperature ranges to compare the increase across the entire watershed. The cities of Riverside and Big Bear were used to see the projections of the number of days that would be above 95°F. The results are shown in Table 1-3.

Table 1-3 Days per Year exceeding 95°F

City	Historical (°F)	2020 (°F)	2050 (°F)	2070 (°F)
Riverside	43	58	72	82
Big Bear	0	0	2	4

The number of high temperature days in Riverside is expected to double between the present and 2070. Similar increases in temperature can be anticipated throughout Valley District's service area. These increased temperature levels will increase water demands across the watershed mainly for agricultural and irrigation purposes. The higher temperature days in Big Bear have the potential to affect the forest ecosystem and the snow related recreational activities in the area.

The forest ecosystems in the San Bernardino National Forest are currently on the decline. Alpine and subalpine forests are anticipated to decrease in area by fifty to seventy percent by 2100. It is believed that increased greenhouse gas emissions are a primary factor contributing to the decline of these fragile ecosystems.

While high elevation ecosystems decline, the severity of future floods is likely to increase. The likelihood of a 200-year storm event or longer is anticipated to be significantly higher in 2070. This increases the potential for negative impacts on nearby infrastructure. Furthermore, storms are expected to be more severe but less frequent. Despite these assumptions, the aftermath of a severe storm is highly variable.

In addition to changes in ecosystems and storm severity, warmer temperatures may also decrease the annual amount of snowfall and increase the instance of rain in higher elevations. This alteration of precipitation type is likely to cause negative impacts for snow-related recreational activities characteristic of the area's ski resorts. From a local standpoint, Big Bear and Snow Valley both lie below 3000 meters above MSL and are anticipated to experience a decline in snowpack by 2070. Furthermore, it is projected that there will be a decrease in overall winter precipitation of the area by 2070. On a larger scale, the increased temperatures could affect the Sierra Nevada Mountains in a similar way, threatening the reliability of the SWP.

1.6.3 Addressing Climate Change

Climate change can be addressed in two ways, mitigation and adaptation. Mitigation focuses on reducing the carbon emissions for water treatment and transportation. Decreasing carbon emissions for water treatment and transportation may also result in reduced energy costs for water purveyors. These measures will also help in compliance of the California Global Warming Solutions Act (Assembly Bill 32 or AB 32). Adaptation addresses operational changes that need to be made in order to accommodate the increasing temperatures, the increased possibility for severe flooding, and the decreasing precipitation as snow predicted by the climate models.

Plans for greenhouse gas mitigation focus on the relationship between water and energy. This relationship can be quantified and projections for future trends can be developed. The California Global Warming Solutions Act requires greenhouse gas levels to be reduced to their 1990 level by the year 2020.

A Greenhouse Gas Emissions Calculator was developed as part of a Basin Study of the Santa Ana River in a partnership between the Santa Ana Watershed Project Authority (SAWPA) and the United States Bureau of Reclamation (Reclamation). The calculator showed that for the Upper SAR watershed, the most appropriate ways to effectively reduce the volume of carbon emissions related to water treatment and meet AB 32 goals would be to reduce imported water usage and increase local supply usage and water use efficiency.

2 Regional Water Sources

This chapter describes the water resources available to Valley District and the retail purveyors for the 25-year period covered by the Plan. Both currently available and planned supplies are discussed.

2.1 Wholesale Water Supplies

This section provides a description of wholesale water supplies, entitlements to those supplies and current and planned wholesale water supplies.

2.1.1 Imported Water Supplies

Imported water is available to Valley District from the California State Water Project (SWP), which is the largest state-built, multi-purpose water project in the country. It was authorized by the California State Legislature in 1959, with the construction of most initial facilities completed by 1973. The SWP is a water storage and delivery system of reservoirs, aqueducts, power plants and pumping plants. Its main purpose is to store water and distribute it to 29 State Water Contractors in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California. Of the contracted water supply, approximately 70 percent goes to urban users and 30 percent goes to agricultural users. The SWP makes deliveries to two-thirds of California's population. It is maintained and operated by the California Department of Water Resources (DWR). The SWP is also operated to improve water quality in the Sacramento-San Joaquin Delta, control Feather River flood waters, provide recreation, and enhance fish and wildlife. Valley District is the fifth largest State Water Contractor, with an annual maximum entitlement of 102,600 acre-feet (AF).

The SWP includes 34 storage facilities, reservoirs and lakes, 20 pumping plants, four pumping-generating plants, five hydro-electric plants, and approximately 701 miles of aqueducts and pipelines. The primary water source for the SWP is the Feather River, a tributary of the Sacramento River. Water released from Oroville Dam on the Feather River flows down natural river channels to the Sacramento-San Joaquin River Delta (Delta). While some SWP supplies are pumped from the northern Delta into the North Bay Aqueduct, the vast majority of SWP supplies are pumped from the southern Delta into the 444-mile-long California Aqueduct. The California Aqueduct conveys water along the west side of the San Joaquin Valley to Edmonston Pumping Plant, where water is pumped over the Tehachapi Mountains. The aqueduct then divides into the East and West Branches.

The San Bernardino Valley lies on the East Branch of the California Aqueduct, and Valley District takes delivery of SWP water at the Devil Canyon Power Plant just northwest of California State University, San Bernardino. From this location, SWP water can be delivered in several directions in State facilities or in transmission systems belonging to State Water Contractors. Valley District can deliver water to the west via the San Gabriel Valley Municipal Water District Pipeline (Valley District owns capacity in this pipeline) or to the east through the East Branch Extension of the SWP. Once the bonds have been paid off in 2035, the taxpayers in Valley

District's service area will have invested over $1.23 billion for their share of the SWP storage and delivery system.

Each SWP contractor's SWP Water Supply Contract includes a "Table A," which lists the maximum amount of water an agency is entitled to throughout the life of the contract. The Table A amount is each contractor's proportionate share, or "allocation," of the SWP water supply. However, actual deliveries of SWP water each year vary, based mainly on the amount of precipitation (for other factors, see Section 2.1.3 below).

While the primary supply of water available from the SWP is allocated Table A supply, SWP supplies in addition to Table A water are periodically available, including "Article 56C" carryover water, "Article 21" water, "Turnback Pool" water, and DWR "Dry Year Purchase Programs". Pursuant to the long-term water supply contracts, SWP contractors have the opportunity to carry over a portion of their allocated water approved for delivery in the current year for delivery during the next year. Valley District has exercised this option in the past. Contractors can also "carry over" water under Article 56C of the SWP long-term water supply contract with advance notice when they submit their initial request for Table A water, or within the last three months of the delivery year. The carryover program was designed to encourage the most efficient and beneficial use of water and to avoid obligating the contractors to "use or lose" the water by December 31 of each year. The water supply contracts state the criteria for carrying over Table A water from one year to the next. Normally, carryover water is water that has been exported during the year, has not been delivered to the contractor during that year, and has remained stored in the SWP share of San Luis Reservoir to be delivered during the following year. Storage for carryover water no longer becomes available to the contractors if it interferes with storage of SWP water for project needs.

Article 21 water (which refers to the SWP contract provision defining this supply) is water that may be made available by DWR when excess flows are available in the Delta (i.e., when Delta outflow requirements have been met, SWP storage south of the Delta is full, and conveyance capacity is available beyond that being used for SWP operations and delivery of allocated and scheduled Table A supplies). Article 21 water is made available on an unscheduled and interruptible basis and is typically available only in average to wet years, generally only for a limited time in the late winter.

In wet periods, the amount of water available may exceed the amount of storage in the SWP system. During these times, State Water Contractors may have excess SWP water. In the past, when excess water was available to Valley District, it sold the excess SWP water to the Metropolitan Water District of Southern California (MWDSC).

Table 2-1 presents historical total SWP water deliveries to Valley District.

Table 2-1. Historical State Water Project Deliveries to Valley District

Calendar Year	Total Deliveries (AF)
2010	49,406
2011	38,126
2012	112,972
2013	30,585
2014	6,452
Source: 2015 DWR Delivery Capability Report	

2.1.1.1 SWP Contractors Explanation of SWP Contract Term

The Department of Water Resources (DWR) provides water supply from the State Water Project (SWP) to 29 SWP Contractors (Contractors) in exchange for Contractor payment of all costs associated with providing that supply. DWR and each of the Contractors entered into substantially uniform long-term water supply contracts (Contracts) in the 1960s with initial 75-year terms, which will begin to expire in 2035. While the Contracts provide for continued water service to the Contractors beyond the initial term, efforts are currently underway to extend the Contracts to improve financing for the SWP.

The majority of the capital costs associated with the development and maintenance of the SWP is financed using revenue bonds. These bonds have historically been sold with 30-year terms. It has become more challenging in recent years to affordably finance capital expenditures for the SWP because bonds used to finance these expenditures are limited to terms that only extend to the year 2035, less than 30 years from now. To ensure continued affordability of debt service to Contractors, it is necessary to extend the term of the Contracts, which will allow DWR to continue to sell bonds with 30-year terms.

Negotiations on extending the Contracts took place between DWR and the Contractors during 2013 and 2014, and were open to the public. The following terms were agreed to and are currently the subject of analysis under the requirements of the California Environmental Quality Act (CEQA) (Notice of Preparation dated September 12, 2014):

- Extend the term of the 29 Water Supply Contracts to December 31, 2085;
- Provide for increased SWP financial operating reserves during the extended term of the Contracts;
- Provide additional funding mechanisms and accounts to address SWP needs and purposes;
- Develop a revised payment methodology with a corresponding billing system that better matches the timing of future SWP revenues to future expenditures.

It is anticipated that the term of the SWP Contracts will be extended to December 31, 2085 and the data and information contained in this UWMP reflect that assumption to improve coordination between supply and demand projections beyond the year 2035 as provided in the UWMP Act. (CWC Section 10631(b).)

2.1.2 Imported Water Supply Reliability

The amount of SWP water delivered to State Water Contractors in a given year depends on a number of factors, including the demand for the supply, amount of rainfall, snowpack, runoff, water in storage, pumping capacity from the Delta, and legal/regulatory constraints on SWP operation. Water delivery reliability depends on three general factors: the availability of water, the ability to convey water to the desired point of delivery, and the magnitude of demand for the water. Urban SWP contractors' requests for SWP water, which were low in the early years of the SWP, have been steadily increasing over time. Regulatory constraints have changed over time, becoming more restrictive.

DWR prepares a biennial report to assist SWP contractors and local planners in assessing the near and long-term availability of supplies from the SWP. DWR issued its most recent update, the 2015 DWR State Water Project Delivery Capability Report (DCR), in July 2015. In the 2015 update, DWR provides SWP supply estimates for SWP contractors to use in their planning efforts, including for use in their 2015 UWMPs. The 2015 DCR includes DWR's estimates of SWP water supply availability under both current and future conditions.

DWR's estimates of SWP deliveries are based on a computer model that simulates monthly operations of the SWP and Central Valley Project systems. Key assumptions and inputs to the model include the facilities included in the system, hydrologic inflows to the system, regulatory and operational constraints on system operations, and projected contractor demands for SWP water. For example, the 2015 DCR uses the following assumptions to model current conditions: existing facilities, hydrologic inflows to the model based on 82 years of historical inflows (1922 through 2003), current regulatory and operational constraints, and contractor demands at maximum Table A amounts. The Bay Delta Conservation Plan (BDCP) is a large project intended to help mitigate for the environmental problems and restore the delivery capability for the SWP.

In spring 2015, DWR announced that BDCP would move from a Section 10 permit to a Section 7 permit process under the Federal Endangered Species Act. As a practical matter, this split the project into two distinct parts known as California WaterFix (Alternative 4A), the conveyance portion, and California EcoRestore, the restoration portion. California WaterFix is Alternative 4A in the recirculated environmental document, and the preferred alternative. Alternative 4A is different than any of the future scenarios modeled by DWR in the DCR. The California WaterFix project is currently in the environmental review process which is not anticipated to be final until at least 2016. In addition, several regulatory and legal requirements must be met prior to construction.

To evaluate SWP supply availability under future conditions, the 2015 DCR included four model studies. The first of the future-conditions studies, the Early Long Term (ELT) scenario, used all of the same model assumptions for current conditions, but reflected changes expected to occur from climate change, specifically, a 2025 emission level and a 15 cm sea level rise. The other three future-conditions include varying model assumptions related to the California WaterFix, such as changes to facilities and/or regulatory and operational constraints.

This UWMP uses the ELT scenario in the 2015 DCR to estimate future SWP supply availability because it is based on existing facilities and regulatory constraints, with hydrology adjusted for the expected effects of climate change. This scenario is consistent with the studies DWR has used in its previous SWP Delivery Reliability Reports for supply availability under future conditions.

The estimated long-term average availability for Valley District from the 2015 DCR is shown in Table 2-2.

Table 2-2. Wholesale Water Supplies Available (Long-term Average)

Wholesaler (Supply Source)	2020	2025	2030	2035	2040
State Water Project					
% of Table A Amount Available	61%	61%	61%	61%	61%
Anticipated Deliveries (AFY)	63,000	63,000	63,000	63,000	63,000
Source: 2015 DWR Delivery Capability Report					

The 2015 DCR includes a probability curve for each contractor's estimated delivery of Table A water. The curve for Valley District is shown in Figure 2-1.

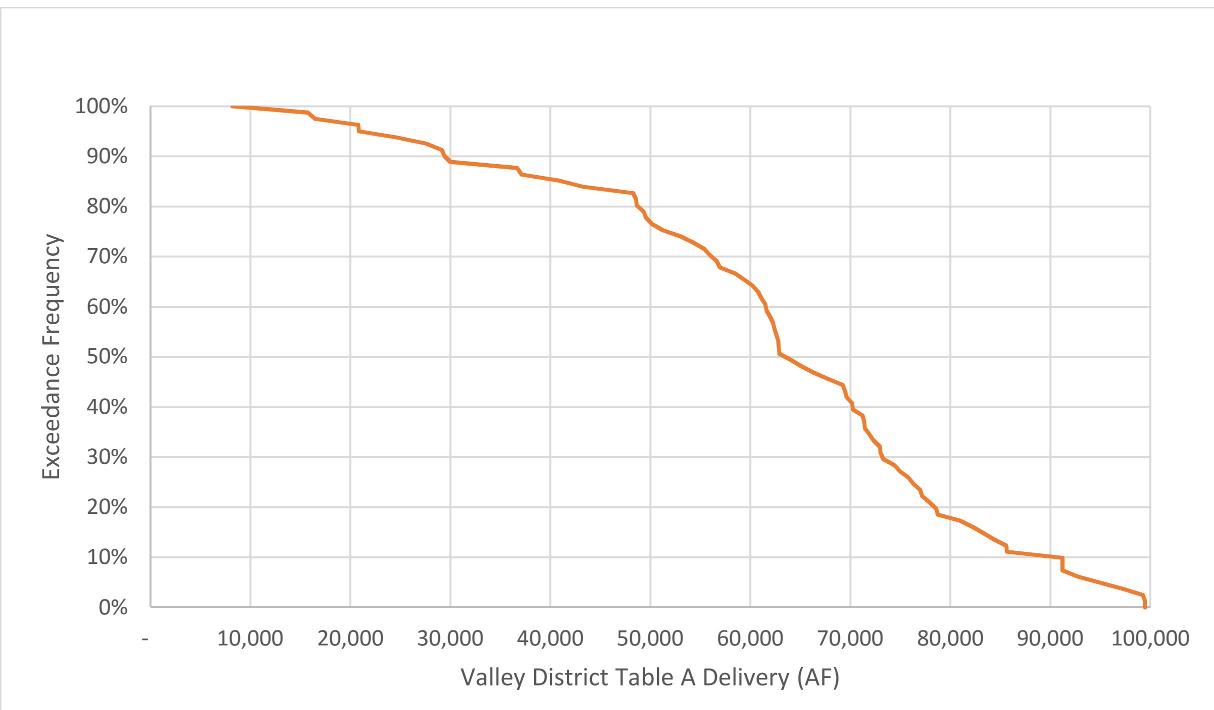

Figure 2-1. Estimated Table A Deliveries Probability Curve for Valley District (2015 DWR DCR)

Table 2-3 summarizes estimated SWP supply availability to Valley District in a single-dry year (based on a repeat of the worst-case historic hydrologic conditions of 2014) and over a multiple-dry year period (based on a repeat of the worst-case historic four-year drought of 1931 to 1934). The table also shows estimated delivery in a wet year, based on a repeat of hydrologic conditions of 1983.

Table 2-3 Estimated Wholesale Supply Reliability

Wholesale		Single Wet Year (1983)	Single Dry Year (2014)	Multiple Dry Year (1931-34)
State Water Project				
	% of Table A Amount Available	98%	5%	33%
	Anticipated Deliveries (AFY)	100,548	5,130	33,858
Source: 2015 DWR Delivery Capability Report				

As urban contractor demands increase in the future, the amount of water turned back and available for purchase will likely diminish. In critical dry years, DWR has formed Dry Year Water Purchase Programs for contractors needing additional supplies. Through these programs, water is purchased by DWR from willing sellers in areas that have available supplies and is then sold by DWR to contractors willing to purchase those supplies. Because the availability of these supplies is somewhat uncertain, they are not included as supplies available to Valley District in this Plan. However, Valley District's access to these supplies when they are available may enable it to improve the reliability of its SWP supplies beyond the values used throughout this report. The main strategy Valley District will use to supplement supplies in dry years is by storing water in wet years so that it can be used in dry years. Valley District is developing two conjunctive use programs that would be used for this purpose and would, hopefully, reduce, or eliminate, the need to participate in the DWR dry year programs.

2.1.2.1 Explanation of 2014 SWP Water Supply Allocation

The extremely dry sequence from the beginning of January 2013 through the end of 2014 was one of the driest two-year periods in the historical record. Water year 2013 was a year with two hydrologic extremes. October through December 2012 was one of the wettest fall periods on record, but was followed by the driest consecutive 12 months on record. Accordingly, the 2013 SWP supply allocation was a low 35 percent of SWP Table A amounts. The 2013 hydrology ended up being even drier than DWR's conservative hydrologic forecast, so the SWP began 2014 with reservoir storage lower than targeted levels and less stored water available for 2014 supplies. Compounding this low storage situation, 2014 also was an extremely dry year, with runoff for water year 2014 the fourth driest on record. Due to extraordinarily dry conditions in 2013 and 2014, the 2014 SWP water supply allocation was a historically low 5 percent of Table A amounts. The dry hydrologic conditions that led to the low 2014 SWP water supply allocation were extremely unusual, and to date have not been included in the SWP delivery estimates presented in DWR's 2015 Delivery Capability Report. It is anticipated that the hydrologic record used in the DWR model will be extended to include the period through 2014 during the next update of the model, which is expected to be completed prior to issuance of the next update to the biennial SWP DCR. For the reasons stated above, this UWMP uses a conservative assumption that a 5-percent allocation of SWP Table A amounts represents the "worst case" scenario.

2.2 Local Water Supplies

Local precipitation that runs off in local streams or soaks into the ground, called "groundwater", meets nearly ¾ of the regional demand. This section provides a description of local surface water and groundwater management in the San Bernardino Valley, including court judgments, groundwater management plans, and groundwater pumping rights.

The groundwater basins utilized by RUWMP agencies are depicted in Figure 2-2. The figure also shows the San Bernardino Basin Area (SBBA), which encompasses several named basins, including the Bunker Hill and Lytle Creek Basins.

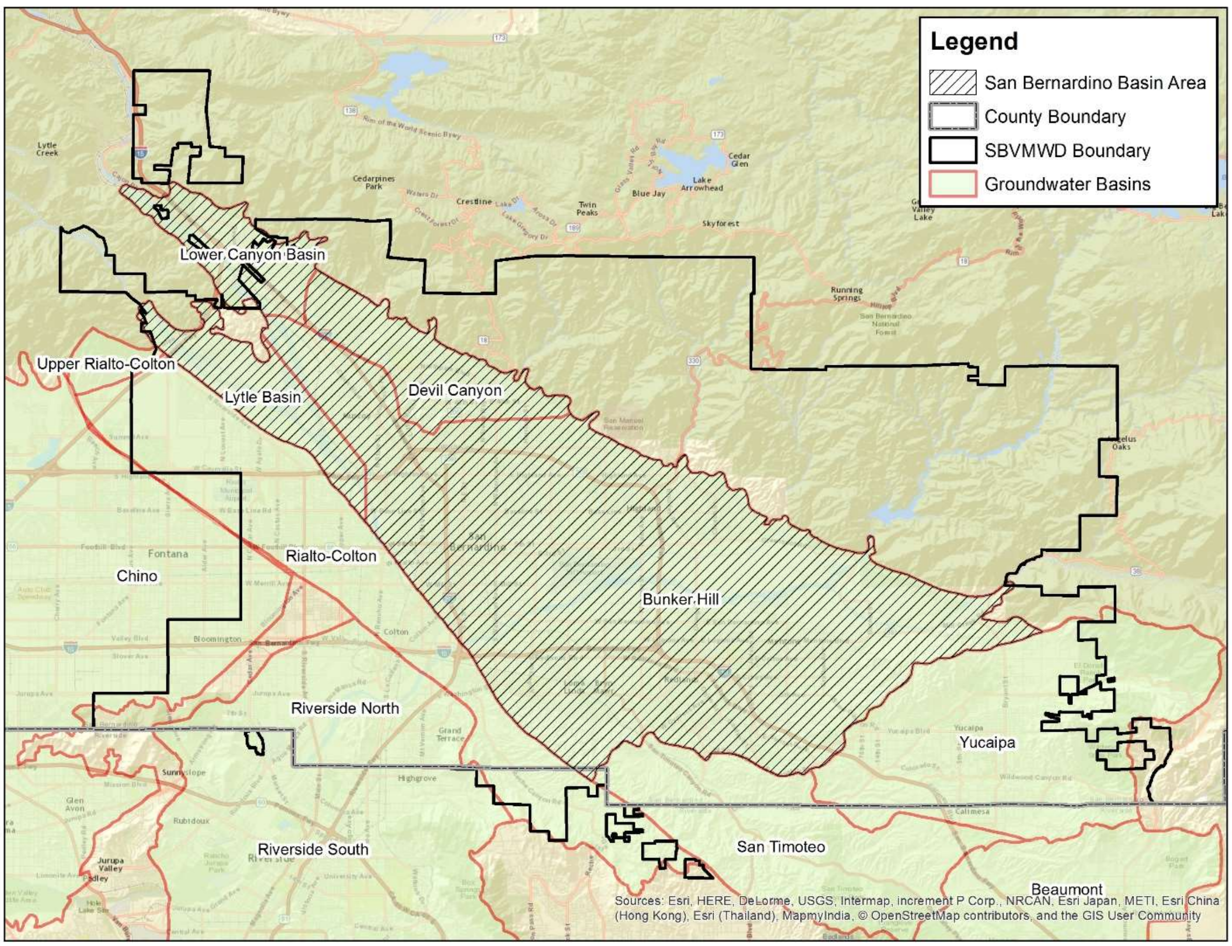

Figure 2-2. Groundwater Basins of the San Bernardino Valley Area

The basins of the RUWMP area are among the most rigorously managed in the State. Planning and management efforts evaluating needs and supplies have been established for most of the basins within the watershed through the next 20 to 40 years. Groundwater extractions and conditions are monitored and tracked by the Western-San Bernardino Watermaster and the Basin Technical Advisory Committee.

2.2.1 San Bernardino Basin Area

The San Bernardino Basin Area (SBBA) was defined by, and adjudicated in gross, by the Western-San Bernardino Judgment (Western Judgment) in 1969. The SBBA has a surface area of approximately 141 square miles and lies between the San Andreas and San Jacinto faults. The basin is bordered on the northwest by the San Gabriel Mountains and Cucamonga fault zone; on the northeast by the San Bernardino Mountains and San Andreas fault zone; on the east by the Banning fault and Crafton Hills; and on the south by a low, east-facing escarpment of the San Jacinto fault and the San Timoteo Badlands. Alluvial fans extend from the base of the mountains and hills that surround the valley and coalesce to form a broad, sloping alluvial plain in the central part of the valley. The SBBA encompasses the Bunker Hill sub basin (DWR Number 8.02-06) defined by DWR and also includes a small portion of the Yucaipa Basin (8-02.07) and Rialto-Colton Basin (8-02.04) as defined by DWR. The SBBA also encompasses surface water.

The Western Judgment established the natural safe yield of the SBBA to be a total of 232,100 AF per year (AFY) for both surface water diversions and groundwater extractions (the Western Judgment is provided in Appendix I). Surface water is diverted from Mill Creek, Lytle Creek, and the SAR. The average surface water diversions in the SBBA for direct use from 1968 to 2000 were 39,000 AFY.

The Western Judgment allocates 64,862 AFY of the safe yield, which equates to 27.95 percent, to the Plaintiffs. The Plaintiffs include the City of Riverside (the successor to the Riverside Water Company and the Gage Canal Company), Riverside Highland Water Company, Meeks & Daley Water Company, and Regents of the University of California. The Riverside County agencies may not exceed their allocation unless they participate in “New Conservation” (explained below).

The Non-Plaintiffs’ (agencies within San Bernardino County) rights were defined in the Judgment as 167,238 AFY, which equates to 72.05 percent of the safe yield. San Bernardino agencies are allowed to extract more than 167,238 AFY from the SBBA, as long as they import and recharge a like amount of water into the SBBA. The Western-San Bernardino Watermaster provides an annual accounting of both the plaintiff and non-plaintiff extractions and a comparison to the safe yield. The Watermaster bases the Valley District replenishment water requirement on the cumulative accounting of non-plaintiff extractions. If the cumulative extractions are less than the cumulative safe yield, there is a groundwater “credit” in the basin. In years when cumulative extractions are greater than their allocation, a “debit” is given. Recharge is also required to offset the export of water outside the SBBA in excess of the amount recorded during the base period (1959-1963). Credits are earned for any new supplies such as stormwater capture. As of the accounting performed for the 2015 Annual Western-San Bernardino Watermaster Report, the Non-Plaintiffs have 104,994 AF of net credit accumulated in the SBBA and are, therefore, not required to recharge. Although there is no recharge requirement under the Judgment, the Non-Plaintiffs have continued to recharge the SBBA.

2.2.1.1 Lytle Creek Sub basin

Lytle Creek Basin is part of the SBBA, and it is not identified as a separate sub-basin in DWR Bulletin 118-2003; however, the sub basin is an integral part of the Upper Santa Ana Valley Groundwater Basin and a major recharge area for both the Bunker Hill and Rialto-Colton sub basins. Historically, local agencies have recognized Lytle Creek sub basin as a distinct groundwater sub basin. In the Western Judgment, the Bunker Hill and Lytle Creek sub basins are combined into the SBBA. However, the three separate water-bearing zones and intervening confining zones of the Bunker Hill sub basin are not observed in the Lytle sub basin. Sediments within the Lytle sub basin are, for the most part, highly permeable, and the aquifer has a high specific yield. High permeability and specific yield tend to result in an aquifer that responds rapidly to changes in inflow (precipitation and streamflow) and outflow (groundwater pumping, streamflow, and subsurface outflow).

Lytle Creek sub basin is adjoined on the west by the Rialto-Colton sub basin along the Lytle Creek fault, and on the east and southeast by the Bunker Hill sub basin along the Loma Linda fault and Barrier G. The northwestern border of the sub basin is delineated by the San Gabriel Mountains, and runoff from the mountains flows south/southeast through Lytle and Cajon Creeks into the basin.

Numerous groundwater barriers are present within Lytle Creek sub basin, resulting in six compartments within the sub basin. Barriers A through D divide the northwestern portion of the sub basin into five sub-areas and the southeastern portion of the sub basin comprises the sixth sub-area. Barrier F divides the northwestern sub-areas from the southeastern sub-area. Studies have shown that the groundwater barriers are less permeable with depth. When groundwater levels are high during wet years, more leakage occurs across the barriers than when groundwater levels are lower (i.e., during dry years). The amount of pumping in each sub-area, in large part, controls the movement of groundwater across the barrier within the older alluvium but not the younger alluvium.

It is important to note that the water rights in Lytle Creek are set forth in long-standing court judgments governing the rights of the parties in that basin. The Lytle Creek Basin was adjudicated under the 1924 Judgment No. 17,030 from the Superior Court of San Bernardino County and is managed by the Lytle Creek Water Conservation Association, which is made up of the successors to the stipulated parties of the judgment (a copy of the 1924 judgment is provided in Appendix J).

Table 2-4 shows historical extractions from the SBBA for years 2010-2014.

Table 2-4. Historic Groundwater Extractions and Surface Water Diversions from SBBA (AFY)

Entity	2010	2011	2012	2013	2014
Non-Plaintiffs					
Bear Valley Mutual Water Company (a)	17,524	16,862	15,560	15,259	17,102
City of Colton (a)	4,740	4,783	6,222	5,170	4,879
East Valley Water District (a)	18,120	18,408	19,538	18,796	17,896
City of Loma Linda (a)	4,863	5,401	5,776	5,571	5,449
City of Redlands (a)	28,960	31,908	31,918	29,641	29,100
City of Rialto (a)	5,325	3,377	3,109	4,082	4,132
San Bernardino Valley MWD (a)	291	618	3,790	7,485	8,178
City of San Bernardino (a)	49,185	50,331	50,250	46,853	44,798
West Valley Water District (a)	7,986	7,697	8,637	7,723	6,397
Yucaipa Valley Water District (a)	166	97	120	220	154
Other Agencies in San Bernardino and Private Entities (b)	16,474	19,288	23,053	17,597	15,062
Subtotal for Non-Plaintiffs					
Plaintiffs					
Riverside Highland Water Company (c)	1,136	1,655	2,135	2,873	2,077
Agencies in Riverside County (d)	52,987	54,151	60,159	60,885	57,072
Subtotal for Plaintiffs					
Total	**207,757**	**214,576**	**230,267**	**222,155**	**212,296**

Notes:

(a) Data from Volume 1 of the Western-San Bernardino Watermaster Annual Report for 2015.

(b) Includes Crafton Water Company, Devore Water Company, Fontana Union Water Company, Loma Linda University, Mentone Citrus Growers, Mount Vernon Water Company, Mountain View Generating Station, Muscoy Mutual Water Company, San Bernardino County – Facility Management, Tennessee Water Company, Terrace Water Company, and Redlands water Company. Data from Volume 1 of the Western-San Bernardino Watermaster Annual Report for 2015.

(c) Riverside-Highland Water Company's service area extends into both San Bernardino and Riverside counties. However, Riverside-Highland Water Company is a Plaintiff within the Western Judgment and therefore extractions for Riverside-Highland are typically included with those of Riverside County entities. Data from Table No. 11, Western-San Bernardino Watermaster Annual Report for 2015.

(d) Includes Agua Mansa Water Company and Meeks & Daley Water Company, Regents of the University of California, and the City of Riverside. Data from Table Nos. 10, 12, and 13 of the Western-San Bernardino Annual Report for 2015.

2.2.2 Rialto-Colton Sub basin (DWR 8-02.04)

The Rialto-Colton sub basin underlies a portion of the upper Santa Ana Valley in southwestern San Bernardino County and northwestern Riverside County. This sub basin is about 10 miles long and varies in width from about 3.5 miles in the northwestern part to about 1.5 miles in the southeastern part. This sub basin is bounded by the San Gabriel Mountains on the northwest, the San Jacinto fault on the northeast, the Badlands on the southeast, and the Rialto-Colton fault on the southwest. The Santa Ana River cuts across the southeastern part of the basin. The basin generally drains to the southeast, toward the Santa Ana River. Warm and Lytle

Creeks join near the southeastern boundary of the basin and flow to meet the Santa Ana River near the center of the southeastern part of the sub basin.

The principal recharge areas are Lytle Creek, Reche Canyon in the southeastern part, and the Santa Ana River in the south-central part. Lesser amounts of recharge are provided by percolation of precipitation to the valley floor, underflow, and irrigation and septic returns. Underflow occurs from fractured basement rock and through the San Jacinto fault in younger Santa Ana River deposits at the south end of the sub basin and in the northern reaches of the San Jacinto fault system. Groundwater recharge has been augmented through the use of spreading basins.

The groundwater extractions in the Rialto-Colton Basin are governed by the Rialto Basin Decree and the Western Judgment. The Western Judgment uses the terminology "Colton Basin Area". Fontana Water Company (FWC), the City of Rialto, the City of Colton, and West Valley Water District are subject to the Rialto Basin Decree, entered on December 22, 1961, by the Superior Court for the County of San Bernardino. Entitlement extractions for any given water year (October 1 to September 30) are affected by groundwater elevations between March and May for three specific "index" wells (Duncan Well, Willow Street Well, and Boyd Well). Under specified conditions, groundwater extractions may be limited during certain months.

The Western Judgment requires the average lowest static water levels in three index wells in the Rialto-Colton Basin and Riverside North Basins to be no lower than 822.04 feet above mean sea level (MSL). If the water levels fall below 822.04 feet above MSL, Valley District is obligated to recharge the basin with imported water or reduce extractions. Extractions for use in Riverside County are limited to 3,381 AFY.

The safe yield for the Rialto-Colton Basin was not defined by the Western Judgment or the Rialto Basin decree. Extractions during the five-year base period of the Western Judgment, 1959 to 1963, were, on average, 11,731 AFY.

Since the safe yield has not been determined for the Rialto-Colton Basin, the average extraction from 1996-2005 of 17,300 AFY was reported in the 2015 Upper Santa Ana River Watershed IRWMP as the sustainable supply from the Rialto-Colton Basin.

2.2.3 Riverside-Arlington Sub-basin (DWR 8-02.03)

The Riverside-Arlington sub basin underlies part of the Santa Ana River Valley in northwest Riverside County and southwest San Bernardino County. This sub basin is bounded by impermeable rocks of Box Springs Mountains on the southeast, Arlington Mountain on the south, La Sierra Heights and Mount Rubidoux on the northwest, and the Jurupa Mountains on the north. The northeast boundary is formed by the Rialto-Colton fault, and a portion of the northern boundary is a groundwater divide beneath the community of Bloomington. The Santa Ana River flows over the northern portion of the sub basin. Annual average precipitation ranges from about 10 to 14 inches. The Riverside-Arlington sub basin is replenished by infiltration from Santa Ana River flow, underflow past the Rialto-Colton fault, intermittent underflow from the Chino sub basin, return irrigation flow, and deep percolation of precipitation.

The Western Judgment includes the Riverside Basin Area which consists of a portion of the Riverside-Arlington sub-basin upstream of Riverside Narrows. Groundwater extractions in the Riverside North Groundwater Basin (the portion of the Riverside Basin Area in San Bernardino County) are governed by the Western Judgment. Extractions for use in San Bernardino County are unlimited, provided that water levels at three index wells in the Rialto-Colton and Riverside North Basins stay above 822.04 feet MSL. Extractions from the Riverside North Basin for use in Riverside County are limited to 21,085 AFY.

2.2.4 Yucaipa Sub basin (DWR 8-02.07)

The Yucaipa sub basin underlies the southeast part of San Bernardino Valley. It is bounded on the northeast by the San Andreas fault, on the northwest by the Crafton fault, on the west by the Redlands fault and the Crafton Hills, on the south by the Banning fault, and on the east by the Yucaipa Hills. The average annual precipitation ranges from 12 to 28 inches. This part of the San Bernardino Valley is drained by Oak Glen, Wilson, and Yucaipa Creeks south and west into San Timoteo Wash, a tributary to the Santa Ana River.

Dominant recharge to the sub basin is from percolation of precipitation and infiltration within the channels of overlying streams, particularly Yucaipa and Oak Glen Creeks; underflow from the fractures within the surrounding bedrock beneath the sub basin; and artificial recharge at spreading grounds.

The Yucaipa Subbasin is not adjudicated; however, a groundwater management plan (AB 3030 Plan) is underway to proscribe collective management of the subbasin. According to a recent study, the Yucaipa Basin has a sustainable yield of approximately 9,600 AFY and a storage capacity totaling more than 356,000 AF. From 2007 to 2012, artificial recharge efforts increased the total groundwater storage in the Yucaipa Basin to 1998 levels. In the last few years, groundwater storage levels have bene going down as the area relies on stored groundwater to get through the drought.

With ample storage, ability to recharge the basin by spreading surface waters, and apparent flexibility in managing groundwater levels without subsidence problems, the Yucaipa subbasin could be conjunctively managed both to meet normal annual demands and to meet water resource needs in the event of a drought and curtailment or loss of inconsistent surface water supplies, resulting in a highly reliable water supply. Current goals are to secure agreements to not pump beyond the safe yield of the basin, supplementing supplies with imported surface water. Valley District, YVWD, Redlands, San Gorgonio Pass Water Agency (SGPWA), South Mesa Water Company, Western Heights Water Company, and the City of Yucaipa are currently working together to develop a basin wide conjunctive use program in the Yucaipa Basin.

2.2.5 San Timoteo Sub basin (DWR 8-02.08)

The San Timoteo Sub basin is largely outside of the Valley District service area, but is one of the sources used by YVWD. The San Timoteo sub basin underlies Cherry Valley and the City of Beaumont in southwestern San Bernardino and northwestern Riverside counties. The sub basin is bounded to the north and northeast by the Banning fault and impermeable rocks of the San Bernardino Mountains, Crafton Hills, and Yucaipa Hills; on the south by the San Jacinto fault; on the west by the San Jacinto Mountains; and on the east by a topographic drainage divide with the Colorado River hydrologic region. The surface is drained by Little San Gorgonio Creek and San Timoteo Canyon to the Santa Ana River. Average annual precipitation ranges from 12 to 14 inches in the western part to 16 to 18 inches in the eastern part of the sub basin.

Holocene-age alluvium, which consists of unconsolidated clay, silt, sand, and gravel, is the principal water-bearing unit in this sub basin. The alluvium, which is probably thickest near the City of Beaumont, thins toward the southwest and is not present in the central part of the sub basin. The Pliocene-Pleistocene-age San Timoteo Formation consists of alluvial deposits that have been folded and eroded. These deposits are widely distributed and principally composed of gravel, silt, and clay, with comparatively small amounts of calcite-cemented conglomerate. The clasts are chiefly granitic, with lesser amounts of volcanic and metamorphic pebbles and cobbles. The total thickness of the San Timoteo Formation is estimated to be between 1,500 and 2,000 feet, but logs of deep wells near the central part of the sub basin indicate water-bearing gravels to depths of only 700 to 1,000 feet.

The Banning and Cherry Valley faults and two unnamed faults in the northeast part of the sub basin offset impermeable basement rocks, stepping down to the south. Water levels change across the Banning fault, dropping 100 to 200 feet to the south. In the western part of the sub basin, water levels drop to the south about 75 feet across the Loma Linda fault and about 50 feet across the San Timoteo barrier. In the northeastern part of the sub basin, water levels drop to the south across two unnamed faults. Each of these faults appears to disrupt groundwater movement in the sub basin.

Groundwater is replenished by subsurface inflow and percolation of precipitation, runoff, wastewater discharge, and imported water. Runoff and imported water are delivered to streambeds and spreading grounds for percolation. The San Timoteo Subbasin is not adjudicated, and reliable estimates of total groundwater extractions are not available. However, water table elevations within the San Timoteo Subbasin have not declined over the years which is likely due to the constant flow of treated wastewater from YVWD that flows through San Timoteo Creek.

2.2.5.1 Beaumont Groundwater Basin

DWR considers the Beaumont Groundwater Basin to be composed of three other groundwater basins, primarily the San Timoteo sub basin, the Upper Santa Ana Valley Groundwater Basin (No. 8-02), and the San Gorgonio Pass Sub basin (No. 7-21.04). Locally, the Beaumont Basin is treated as a distinct basin. The Beaumont Basin is outside of the Valley District service area, but is one of the sources used by YVWD.

The Beaumont Basin is located in northwestern Riverside County, south of the Yucaipa Basin. The basin eventually drains to San Timoteo Creek, a tributary of the Santa Ana River, and covers approximately 26 square miles. Groundwater elevations generally slope from the northeast to southwest in the basin.

Groundwater within the basin is predominantly found in Holocene age alluvium and in the San Timoteo Formation. While the San Timoteo Formation extends to depths in excess of 1,500 feet, water bearing sediments within the Beaumont Basin exist to depths of 700 to 1,000 feet. Estimates for total groundwater storage capacity within the basin vary. The Beaumont Basin storage capacity is estimated at approximately 1,000,000 AF.

In February 2004, the San Timoteo Watershed Management Authority filed a judgment adjudicating the groundwater rights in the Beaumont Basin and assigned the Beaumont Basin Watermaster (BBW) with the authority to manage the groundwater basin. The Beaumont Basin Watermaster is comprised of managers from the Beaumont Cherry Valley Water District, City of Banning, City of Beaumont, South Mesa Mutual Water Company, and YVWD. The Beaumont Basin Watermaster originally established a long-term yield for the Beaumont Basin of 8,560 AFY. The safe yield is reevaluated every ten years and on April 1st 2015, the BBW approved the adoption of Resolution 2015-01 (2013 Reevaluation of the Beaumont Basin Safe Yield Report and Redetermination of the Safe Yield of the Beaumont Basin), which reduced the safe yield to 6,700 AFY.

The Judgement includes a controlled overdraft (temporary surplus) provision that allows extraction up to 160,000 AF over the 10-year period immediately following the Judgement inception. During the first 10 years, the agencies could extract 16,000 AFY; after the first 10 years, extractions are limited to the amount each agency has in storage or credit. Agencies must provide the BBW with funds necessary to replace any amount of overproduction that may have occurred over a 5-year consecutive period. During the past four years, the Watermaster reports annual groundwater extractions in the basin that range from 11,800 to 15,100 AFY, with 2014 representing the third highest production year since the Judgement was in place. YVWD pumping from the Beaumont basin was 1,198 AF in 2014.

The adjudication of the Beaumont Basin has defined overlying and appropriator pumping rights and also allows for supplemental water to be stored and recovered from the basin. The Beaumont Basin, under this adjudication, is considered to be in a condition of overdraft with assigned maximum annual overlying production rights of 8,650 AF. YVWD has a right to an operating yield of 2,552 AFY from the Beaumont Basin, which consists of 381 AF of appropriative right and 2,173 AF of Controlled Overdraft and Supplemental Water Recharge Allocation. YVWD can deliver amounts in addition to the 2,552 AF as supported from overlying water right holders.

2.2.6 Chino Sub basin (DWR 8-02.01)

Fontana Water Company, the City of Rialto, and WVWD extract water from Chino Sub basin, an adjudicated basin managed by the Chino Basin Watermaster. The Chino Sub basin lies in the southwest corner of San Bernardino County. The Chino Sub basin is bordered to the east by the Rialto-Colton fault. In the other three directions, the Chino Sub basin is ringed by impermeable mountain rock, the San Gabriel Mountains to the north, the Jurupa Mountains and Puente Hills to the south and southwest. Average annual precipitation across the basin is 17 inches. This part of the San Bernardino Valley is drained by San Antonio Creek and Cucamonga Creek southerly to the Santa Ana River.

On January 2, 1975, several Chino Basin producers filed suit in California State Superior Court for San Bernardino County (the "Court") to settle the problem of allocating water rights in the Chino Basin. On January 27, 1978, the Court entered a judgment in Chino Basin Municipal Water District v. City of Chino et al. adjudicating water rights in the Chino Basin and establishing the Chino Basin Watermaster. The Judgment adjudicated all groundwater rights in Chino Basin and contains a physical solution to meet the requirements of water users having rights in or dependent upon the Chino Basin. The Judgment also appointed the Watermaster to account for and implement the management of the Chino Basin. The Judgment declared that the initial operating safe yield of the Chino Basin is 145,000 AFY. The Basin is managed through implementation of the Chino Optimum Basin Management Plan. Per the Judgment, WVWD has a minimum of approximately 1,000 AFY of extraction rights. Extractions above that amount must be replenished with SWP water through a program with the Chino Basin Watermaster.

2.2.7 No Man's Land Sub basin

Fontana Water Company and the City of Rialto extract water from a small area believed by some to be an unadjudicated groundwater basin between the Chino Basin and the Rialto-Colton Basin known as "No Man's Land." Water rights in the area, the hydrogeological nature of this area, as well as the quantities of water produced in this area, are the subject of a lawsuit currently pending in the Superior Court for the County of San Bernardino entitled San Bernardino Valley Municipal Water District et al. v. San Gabriel Valley Water Co. et al., Case No. CVDS1311085.

2.3 Local Water Management

2.3.1 Western Judgment

The Western Judgment, entered simultaneously with the Orange County Judgment, settled rights within the upper Santa Ana River watershed to ensure that those resources would be sufficient to meet the flow obligations in the lower Santa Ana River watershed set by the Orange County Judgment (Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Superior Court of Riverside County, Case No. 78426 [April 17, 1969]). Toward this end, the Western Judgment generally provides for:

- A determination of safe yield of the SBBA at 232,100 AFY;

- Establishment of specific amounts (64,862 AF) of water that can be extracted from the SBBA by plaintiff parties (parties in Riverside County). This is equal to 27.95 percent of safe yield;
- An obligation of Valley District to provide replenishment for any extractions from the SBBA by non-plaintiffs (entities in the Valley District service area) in aggregate in excess of 167,238 AF, or72.05 percent of safe yield;
- An obligation of Western to replenish the Colton Basin Area and the Riverside North Basins if extractions for use in Riverside County in aggregate exceed 3,381 AF and 21,085 AF respectively; and
- An obligation of Valley District to replenish the Colton Basin Area and Riverside North Basin Areas if water levels are lower than 822.04 MSL in specified index wells.

The Western Judgment identifies regional representative agencies to be responsible, on behalf of the numerous parties bound thereby, for implementing the replenishment obligations and other requirements of the judgment. The representative entities for the Western Judgment are Valley District and Western. Valley District acts on behalf of all non-plaintiffs (San Bernardino County agencies) and Western acts on behalf of the Plaintiffs (Riverside County agencies). Plaintiff parties with specific rights to produce 27.95 percent of the safe yield from the SBBA are the City of Riverside, Riverside Highland Water Company, Meeks & Daley Water Company, and the Regents of the University of California.

The Western Judgment contemplates that the parties will undertake “new conservation” which is defined as any increase in replenishment from natural precipitation which results from operation of works and facilities not in existence as of 1969, other than works installed to offset losses from flood control channelization. The Western Judgment specifies that the parties to the Judgment have the right to participate in any new conservation projects, provided they pay the appropriate share of the cost. The net effect of new conservation is an increase in pumping rights by the Plaintiffs and “credits” for the non-Plaintiffs. A copy of the Western Judgment is provided in Appendix I.

In 2013, both the Plaintiffs and Non-Plaintiffs agreed to participate in the cost to capture water that historically flowed to the ocean. This New Conservation was due to the construction and operation of the Seven Oaks Dam. The 2015 Annual Report for the Western-San Bernardino Annual Report increases the rights for both Parties as shown in Table 2-5.

Table 2-5. Adjusted SBBA Rights Due to New Conservation Allocation

Parties	Percentage	Safe Yield Allocation (AF)	New Conservation Allocation (AF)	Adjusted Right (AF)
Non- Plaintiffs	**72.05%**	**167,238**	**5,507**	**172,745**
Plaintiffs	**27.95%**	**64,862**	**2,136**	**66,998**
City of Riverside		52,199	1,719	53,918
Riverside Highland Water Company		4,294	141	4,435
AM and MD Water Company		7,833	258	8,091
Regents of the University of California		536	18	554
Total Sum of Extractions	**100%**	**232,100**	**7,643**	**239,743**

2.3.2 Orange County Judgment

In 1963, the Orange County Water District (OCWD) filed suit against substantially all water users in the area tributary to Prado Dam seeking adjudication of water rights on the Santa Ana River. The litigation ultimately involved over 4,000 served water users and water agencies, the four largest of which were OCWD, Valley District, Western, and the Chino Basin Municipal Water District (now the Inland Empire Utilities Agency). Given the magnitude of the potential litigation, these four districts and other parties developed a settlement that was approved by the Orange County Superior Court in a stipulated judgment entered on April 17, 1969, Orange County Water District v. City of Chino et al., Case No. 117628 (Orange County Judgment). The Orange County Judgment imposes a physical solution that requires parties in the upper Santa Ana River watershed to deliver a minimum quantity of water to points downstream including Riverside Narrows and Prado Dam. A provision of the Orange County Judgment related to conservation establishes that, once the flow requirements are met, the Upper Area parties "may engage in unlimited water conservation activities, including spreading, impounding, and other methods, in the area above Prado Reservoir." The Orange County Judgment is administered by the five-member Sana Ana River Watermaster that reports annually to the court and the four representative agencies. Valley District, the Inland Empire Utilities Agency, and Western nominate one member each to the Watermaster, OCWD nominates two members, and members are appointed by the court. A copy of the Orange County Judgment is provided in Appendix H.

2.3.3 1961 Rialto Basin Decree

The Rialto Basin Decree was described previously in Section 2.2.2. A copy of the Rialto Basin Decree is provided in Appendix K.

2.3.4 Seven Oaks Accord

On July 21, 2004, Valley District, Western, the City of Redlands, EVWD, Bear Valley Mutual Water Company, Lugonia Water Company, North Fork Water Company, and Redlands Water Company signed a settlement agreement known as the Seven Oaks Accord (Accord). The Accord calls for Valley District and Western to recognize the prior rights of the water users for a portion of the natural flow of the Santa Ana River. In exchange, the water users agree to withdraw their protests to the water right application submitted by Valley District on behalf of itself and Western. All the parties to the Accord have agreed to support the granting of other necessary permits to allow Valley District and Western to divert water from the Santa Ana River. By means of the Accord, Valley District agreed to modify its water right applications to incorporate implementation of the Accord. Additionally, the Accord requires Valley District and Western to develop a groundwater spreading program in cooperation with other parties, “that is intended to maintain groundwater levels at the specified wells at relatively constant levels, in spite of the inevitable fluctuations due to hydrologic variation.” In response, local agencies included groundwater management in the USARW IRWMP and have collectively prepared a Regional Water Management Plan annually since 2008.

2.3.5 Integrated Regional Water Management Plan

The Valley District service area is incorporated into two Integrated Regional Water Management Plans.

The Santa Ana Watershed Project Authority (SAWPA) was formed in 1968 as a planning agency and was transformed in 1972 through a change in its mission to plan and build facilities that would protect the water quality of the SAR watershed. SAWPA is a Joint Powers Authority, classified as a Special District (government agency) in which it carries out functions useful to its member agencies: Inland Empire Utilities Agency, Eastern Municipal Water District, Orange County Water District, Valley District, and Western. SAWPA developed an Integrated Regional Water Management Plan (IRWMP) for the entire SAR watershed titled the One Water One Watershed (OWOW) Plan. This broad planning document is the framework for overall water management in the watershed and is largely based upon the planning efforts of its member agencies. The OWOW Plan is a “macro-level” plan that is consistent with DWR’s *California Water Plan* (Bulletin 160) and State Water Resources Control Board’s (SWRCB) Strategic Plan, Watershed Management Initiative, and the basin planning process.

The 2015 Upper Santa Ana River Watershed IRWMP (USARW IRWMP) provides data for the OWOW Plan. By focusing on a finer scale, the USARW IRWMP reveals that the Upper SAR watershed has several unique water management challenges and issues. The purpose of the USARW planning process is to focus on local issues specific to the upper watershed and to assess water management opportunities in greater detail. This collaborative process addresses some of the long-term water management strategies of the Upper SAR watershed and will greatly contribute to protecting and enhancing reasonable and beneficial uses of the watershed’s water resources. This planning process is a part of the overall SAR water management planning process and is in agreement with past and current SAWPA regional planning initiatives. In addition, several agencies in the IRWM Region, including Valley District, also take part in SAWPA planning efforts.

The 2015 USARW IRWMP serves as an update to the IRWMP developed in 2007 and was developed by the following agencies:

1. Big Bear Lake Department of Water and Power

2. Big Bear City Community Services District
3. City of Loma Linda
4. City of Redlands Municipal Utilities and Engineering Department
5. City of Rialto
6. City of Riverside Public Utilities Department
7. East Valley Water District
8. Fontana Union Water Company
9. San Bernardino County Flood Control District
10. San Bernardino Municipal Water Department
11. San Bernardino Valley Municipal Water District
12. San Bernardino Valley Water Conservation District
13. San Gorgonio Pass Water Agency
14. West Valley Water District
15. City of Yucaipa
16. Yucaipa Valley Water District

The primary purpose of the USARW IRWMP is to provide a roadmap for the management of water resources in the area to ensure long-term, reliable water supply availability for the IRWM Region. The first step in developing this roadmap is the formulation of broad water management goals and more specific water management objectives that can help achieve those goals. The IRWMP identifies four key goals:

1. Improve water supply reliability
2. Balance flood management and increase stormwater recharge
3. Improve water quality
4. Improve habitat and open space

The USARW IRWMP also identifies 15 specific and measurable objectives to support achievement of the four goals. The USARW IRWMP stakeholders formed a Basin Technical Advisory Committee (BTAC) to facilitate implementation of the IRWMP.

Future updates of the OWOW Plan and the USARW IRWMP will build on the water supply and demand information presented in this RUWMP.

2.3.6 Annual Regional Water Management Plan

The BTAC develops the annual water management plan. Participation in the BTAC is open to any interested agency. The agencies currently participating in the BTAC are:

- City of Loma Linda
- City of Redlands Municipal Utilities and Engineering Department
- City of Rialto
- City of Riverside Public Utilities Department
- Western Municipal Water District
- San Bernardino Valley Municipal Water District

- East Valley Water District
- Bear Valley Mutual Water Company
- West Valley Water District
- San Bernardino Municipal Water Department
- San Bernardino Valley Water Conservation District
- Yucaipa Valley Water District
- San Bernardino County Flood Control District
- City of Colton

The BTAC works cooperatively and strives to make decisions by consensus. It focuses on long-term management of water resources by implementing the strategies in the USARW IRWMP. Currently, BTAC meets monthly with the primary purpose of providing technical advice for the management of local resources to the Western-San Bernardino Watermaster agencies, Western Municipal Water District and Valley District.

2.3.7 Settlement Agreement with San Bernardino Valley Water Conservation District

Valley District, Western, and the San Bernardino Valley Water Conservation District entered into a settlement agreement on August 9, 2005 whereby the agencies will work cooperatively to develop an annual groundwater management plan. Since both parties are members of the BTAC, this requirement is being met by the BTAC's Regional Water Management Plan, which largely emphasizes groundwater management.

2.4 Transfers, Exchanges, and Groundwater Banking Programs

2.4.1 Transfers and Exchanges

Transfers and exchanges are discussed in chapters for each individual agency.

2.4.2 Groundwater Banking Programs

As stated previously, storing water in local groundwater basins for later use during droughts is one of the primary management strategies in the USARW IRWMP. Valley District has been conducting groundwater recharge activities in the SBBA since 1972. The San Bernardino Valley Water Conservation District and its predecessors have conducted water conservation (groundwater recharge) activities since 1912 in areas that overlie the SBBA.

The USARW IRWMP evaluated additional conjunctive use scenarios and concluded that they were feasible. Conjunctive use projects currently under development in the Valley District Service area are described in Section 2.6.3.

2.5 Local Water Supply Reliability

2.5.1 Groundwater Quality

Groundwater quality varies among the Region's groundwater basins, particularly in the subbasins of the Upper SAR due to geology and faulting patterns and recharge points, and from anthropogenic sources of contamination. Much of the groundwater sampling and evaluation was reported in California's Groundwater Bulletin 118 and in the 2015 IRWMP. Groundwater quality is regularly monitored and reported to the Regional Water Quality Control Board - Santa Ana Region.

Valley District and the retail agencies participate in regional efforts to monitor water quality. As part of efforts to use SWP Water to recharge local groundwater basins, Valley District prepares a triennial report for the Santa Ana RWQCB. Each report documents the water quality of SWP Water, as indicated by TDS and nitrogen, in comparison to the applicable groundwater objectives. Reports for different basins are prepared on a rotating schedule to provide a more robust view of water quality. Reports are prepared for groundwater recharge in Bunker Hill A, Bunker Hill B and portions of the Lytle Creek, Rialto, Yucaipa, San Timoteo, Colton and Riverside Basins Management Zones.

Valley District prepared a report for the Yucaipa and San Timoteo Basins in 2015, as well as one for the Bunker Hill A and B, Lytle, and Rialto-Colton Management Zones. The reports found that the TDS and nitrogen levels in the SWP Water were typically below the applicable groundwater objective for the groundwater management zone.

Valley District, Western, the City of Riverside, and the City of San Bernardino are collaborating on the development of a water quality model for the Riverside and Arlington Groundwater Basins. The model will be used to evaluate the potential impacts of groundwater recharge on basin TDS and nitrate levels.

2.5.2 Salinity Objectives

The 1995 Water Quality Control Plan for the Santa Ana River Basin, as amended in 2004, contains water quality objectives for nitrogen and total dissolved solids (collectively called "Salinity Objectives") in groundwater. These standards were set with the objective of protecting long-term conjunctive use of the basin. In June 2007, multiple water entities in the Upper Santa Ana River watershed and the SARWQCB entered into a Cooperative Agreement to "Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basins." The Cooperative Agreement is intended to allow parties that recharge imported water within the Santa Ana Region to continue recharge while monitoring and improving groundwater basin quality. Specifically, the Cooperative Agreement requires parties that undertake groundwater recharge with imported water to:

- collect data on ambient water quality in each groundwater management zone;
- track the amount and quality of imported water recharged in each groundwater management zone;
- project ambient water quality in each groundwater management zone for the subsequent 20 years; and
- report the data described above every 3 years.

As part of the 2007 IRWMP, entities in the SBBA evaluated how and if nitrogen and TDS levels could impact the ability to use imported water for recharge. Modeling performed for the IRWMP found that historic yearly and monthly SWP nitrogen levels were always lower than the lowest ambient level in any of the groundwater management zones. Thus nitrogen is not anticipated to limit the use of SWP water in the San Bernardino Valley. However, review of SWP water quality data indicates that in some dry-year and multiple dry-year periods, SWP water TDS levels could exceed ambient groundwater TDS levels. However, since SWP water project supplies would be limited in dry-periods to between 12,300 to 35,900 AFY, and since TDS levels would be much lower during other times, the long-term impacts are difficult to quantify.

In January 2008, Valley District entered into an agreement with the SARWQCB which requires the development of a water quality report every three years. The intent of this report is to identify any potential water quality issues early on so they can be mitigated and to avoid any long-term impacts.

At the current time, water quality is not expected to limit the use of SWP water. However, water quality issues are constantly evolving. Agencies of the San Bernardino Valley will continue to take action to protect and treat supply when needed, but it is well recognized water quality treatment can have significant costs.

2.5.3 Inland Empire Brine Line

The Inland Empire Brine Line (herafter “Brine Line”), the portion of the Santa Ana Regional Interceptor (SARI) owned by SAWPA, was built over a period of 25 years (1975-2000) to collect and transport industrial brine that could not be treated at local (inland) wastewater treatment facilities. The Brine Line runs from the City of San Bernardino to a point just downstream of the Prado Dam. Another branch of the Brine Line runs from Lake Elsinore northwesterly until joining the Brine Line. The two branches combine into one branch and extend through Orange County to an ocean outfall. The entire SARI is 93 miles long. In 2012, YVWD constructed a thirteen mile Yucaipa Valley Brine Line to convey brine from YVWD’s Wochholz Regional Water Recycling Facility to the Brine Line. The Brine Line is a tremendous asset to the Valley District service area by enabling the transport of salts out of the area.

2.5.4 Chino and Yucaipa Basins Salt Management

The buildup of TDS and nitrogen in groundwater is an on-going water quality challenge in the Chino and Yucaipa basins. Despite the construction and operation of the Brine Line, a salt imbalance remains. Modeling performed by SAWPA has indicated that water from the Chino and Yucaipa basins could consistently exceed the 500 mg/L secondary MCL in the future if mitigation measures are not taken.[1]

[1] EPA has established National Secondary Drinking Water Regulations. EPA does not enforce these "secondary MCLs." They are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. These contaminants are not considered to present a risk to human health at the secondary MCL.

SAWPA's Salinity Management Plan identifies potential long-term options to address the need for additional salt removal, including:

- Best management practices: source control measures aimed at reducing salt mass balances that would otherwise be discharged to ground or surface waters, or introduced into the wastewater stream. Examples include: eliminating salt-based domestic water softening devices, promoting the use of low-salt detergents, addressing salt runoff, and implementing pre-treatment programs.
- Desalters for water supply: Increase the amount of water desalted so as to create blended water with salinity less than 500 mg/L.
- Desalters for wastewater: Avoid adding salt to groundwater by adding desalination to all or a portion of the wastewater effluent stream. Providing advanced treatment to secondary effluent would also increase the possibility of reusing the effluent, including indirect potable water reuse via groundwater recharge or surface storage augmentation.
- Brine concentration: Increase the efficiency of desalters to limit the amount of liquid waste included in the brine stream entering the SARI.

WVWD can pump water from the Chino Basin, and YVWD can pump water from the Yucaipa Basin. Both these agencies recognize that groundwater from these basins may require treatment for TDS and nitrates.

2.5.5 Known Groundwater Contaminant Plumes

The SBBA has the following groundwater contaminant plumes:

- The Crafton-Redlands plume, with trichloroethylene (TCE) and lower levels of perchloroethylene (PCE), debromochloropropane (DBCP) and perchlorate;
- The Norton Air Force Base TCE and PCE plume, stretching 2.5 miles from its source and contaminating 100,000 AF of groundwater;
- The Muscoy and Newmark plumes near the Shandon Hills, which are Superfund sites with TCE and PCE; and
- The Santa Fe plume with PCE, TCE, and 1,2 dichloroethylene (1,2-DCE)

Other plumes include:

- Rialto Area Perchlorate Plume (Rialto-Colton Basin)
- North Riverside Basin MTBE Contamination (Riverside North Basin)

Separately from the foregoing remediation efforts, Fontana Water Company currently operates and maintains a groundwater remediation project at its Plant F10 pursuant to a long-term agreement with San Bernardino County, the owner and operator of the Mid Valley Sanitary Landfill and corresponding Clean-Up and Abatement Order issued to San Bernardino County by the RWQCB. The 5,000-gallons per minute (gpm) treatment plant utilizes liquid phase granular activated carbon to treat for volatile organic compounds including, but not limited to, PCE, TCE, 1,1-DCE, and cis-1,2-DCE. The plant treats and removes those contaminants from groundwater extracted from both the Rialto-Colton and No Man's Land sub basins.

2.5.5.1 Crafton-Redlands Plume

Two commingled plumes, comprising the Crafton-Redlands plume, have impacted water supply wells for the cities of Riverside, Redlands, and Loma Linda, including Loma Linda University wells. One plume contains TCE and the other perchlorate; both are in the upper 300 to 400 feet of groundwater. TCE has been measured in water supply wells at over 100 parts per billion (ppb), over 20 times the MCL of 6 ppb. Currently, however, water supply well concentrations are around 7 ppb. Perchlorate is present in water supply wells at concentrations up to 77 ppb.

As required by the Santa Ana Regional Water Quality Control Board (SARWQCB), the Lockheed Martin Corporation (Lockheed) has prepared contingency plans to address impacts of the plume on water supply wells. These include blending, treatment, and/or providing alternative water supply sources. The plumes are currently being captured by the City of Riverside's Gage Well Field. Lockheed has installed granular activated carbon treatment units at some of the gage wells to remove TCE and has installed ion exchange units on some of these wells for the removal of perchlorate.

2.5.5.2 Norton Air Force Base Plume

The Norton Air Force Base plume, located just to the southwest of the former installation in the City of San Bernardino, is a major contaminant plume, consisting primarily of TCE and PCE. The plume has impaired 10 wells owned by the City of Riverside and the City of San Bernardino. Cleanup efforts by the Air Force, consisting of soil removal, soil gas extraction, and groundwater treatment, have significantly reduced this plume. The treatment plants now operate in a standby mode.

2.5.5.3 Newmark and Muscoy Plumes

Within the City of San Bernardino, the Newmark plume and the Muscoy plume consist primarily of PCE. The plumes have impacted San Bernardino water supply wells. Under the federal Superfund Program, the U.S. Environmental Protection Agency (EPA) has implemented cleanup of these plumes, including use of groundwater extraction and treatment using granulated activated carbon. The treated water is then used to supplement the City of San Bernardino's potable water supply. It appears that cleanup efforts will be adequate to protect 32 down-gradient water supply wells. However, groundwater model simulations suggest that containment of the plume will need additional extraction wells that will result in pumping of at least 14,000 AFY.

2.5.5.4 Sante Fe Plume

The Santa Fe groundwater plume consists primarily of 1,2-DCE, TCE, and PCE. This plume is currently being monitored.

2.5.5.5 Rialto Area Perchlorate Plume

Since 2002, the SARWQCB has been conducting an investigation of groundwater contamination in the area of the City of Rialto. The focus of the investigation has been facilities located on a 160-acre site in Rialto. The site has also been designated as a Superfund site by the US EPA. In 2005 the SARWQCB Executive Officer issued a Cleanup and Abatement Order and subsequent amendments naming a number of responsible parties. Since that time, the Cleanup and Abatement Order has been the subject of challenges in petitions filed by entities named as parties responsible for the contamination. The ongoing legal wrangling and persistent chemical contamination by TCE, perchlorate, and nitrates has required both WVWD and the City of Rialto to avoid use of certain wells and certain water sources.

WVWD and the City of Rialto have planned and designed a wellhead treatment system to protect local groundwater supplies. The wellhead treatment system will use a fluidized bed biological treatment system to breakdown perchlorate to chloride, and nitrate to nitrogen gas. The system will treat groundwater at a rate of about 2,000 gpm. WVWD and the City plan to treat groundwater pumped from two existing wells: Rialto Well No. 6 and WVWD Well No. 11. The Groundwater Wellhead Treatment System Project represents a scientific first in California; utilizing a state-approved biological treatment process employing micro-organisms to destroy the perchlorate and other contaminants in drinking water and minimize the need for waste handling and disposal.

The Groundwater Wellhead Treatment System Project will allow WVWD to restore a portion of its groundwater basin supply. Given the treatment to be provided by the Groundwater Wellhead Treatment System Project, the Rialto Area Perchlorate Plume is not anticipated to further negatively affect WVWD supply. However, water quality issues are constantly evolving. Agencies of the San Bernardino Valley will continue to take action to protect and treat supply when needed, but it is well recognized that water quality treatment can have significant costs.

2.5.5.6 North Riverside Basin MTBE Contamination

In 1988, the SARWQCB issued a Cleanup and Abatement Order to the SFPP Colton Fuel Terminal (owned by Kinder Morgan) located in Bloomington, California. The Terminal, which is located just south of the I-10 freeway on the east side of Riverside Avenue, is a bulk petroleum storage and distribution facility which was built in the 1950s. It currently occupies 82 acres and contains 32 refined petroleum product tanks and fuel-loading racks where transport tanker trucks are filled.

In response to the Cleanup and Abatement Order, a monitoring and extraction well network for the Terminal was constructed. It consists of 131 wells in and around the Terminal as well as 14 soil vapor extraction wells. The site samples for Benzene, methyl tertiary butyl ether (MTBE) and tertiary butyl alcohol (TBA).

WVWD has identified that a few wells located near the Terminal are vulnerable to MTBE contamination. Two WVWD wells are located south of the Terminal. Wells No. 40 and 41 are sampled monthly. No MTBE has been detected in these wells or any other WVWD Wells.

WVWD will continue to monitor MTBE in its wells. Existing technologies are available to treat groundwater affected by MTBE (air stripping, granulated activated carbon, biofiltration, advanced oxidation processes). For these reasons, MTBE is not anticipated to create a long-term effect on water supplies. It is recognized however, that treatment of supplies can have significant costs and delay the full use of a supply source.

2.5.6 Summary of Water Quality Impacts on Supply Reliability

Water quality is monitored, tracked, and addressed by implementing treatment, as necessary. In addition to the groundwater plumes described above, there are other contaminants in the basin, including but not limited to nitrate and DBCP, which can require treatment. There are also emerging contaminants and new water quality regulations which could increase the level of required treatment. Based on current conditions and knowledge, water quality is not anticipated to affect regional water supply reliability.

2.6 Planned Water Supply Projects and Programs

The USARW has collaborated to manage the region's unique water supply, water quality, flood, and habitat challenges. These challenges are key considerations in the implementation of new water supply projects and are reflected in the goals of the USARW IRWMP.

2.6.1 Water for Habitat

The region is home to a variety of threatened or endangered species. No projects may be completed without obtaining permits from the wildlife agencies. Rather than obtaining permits on a project-by-project basis, the agencies in the region decided to collectively apply for one permit for their proposed projects. This approach is believed to be better for the environment, less costly and faster than obtaining permits one at a time.

The Upper Santa Ana River Habitat Conservation Plan (HCP) is a collaborative effort currently underway among the water resource agencies of the SAR watershed, in partnership with the United States Fish and Wildlife Service, California Department of Fish and Wildlife, and several other government agencies and stakeholder organizations. The purpose of the HCP is to develop a comprehensive plan that provides sufficient water for species and allows the water agencies to construct their projects. The HCP will specify how species and their habitats will be protected and managed in the future and will provide the incidental take permits needed by the water resource agencies under the Federal and State endangered species acts to maintain, operate, and improve their water resource infrastructure. In addition to the HCP, there are multiple environmental and ecological management plans currently in place, including the Western Riverside County Multi-Species Habitat Conservation Plan and Upper Santa Ana Wash Land Management and Habitat Conservation Plan.

2.6.2 Recycled Water

Development of recycled water in a strategy in the USARW IRWMP. Although recycling wastewater is costly, it is very reliable. Although it is costly, it is also highly reliable since there will be flows to wastewater plants whether the weather is wet or dry. For that reason, recycled water is often labeled “drought-proof”. Because it is the costliest supply, the region has not heavily developed this supply choosing instead to develop other, less costly supplies first. The recent drought highlighted the advantage of having a drought-proof supply, like recycled water, as a part of the regional water portfolio. This led to Valley District and the agencies within its service area, as well as Western and the City of Riverside, to prepare a Regional Recycled Water Concept Study. This is a collaborative process to identify recycled water projects that maximize regional benefits to water supply reliability, water quality, and habitat sustainability. The stakeholder group is targeting development of 10,000 to 12,000 AFY of new recycled water supply in the near term, with that volume expanding in the future as population growth in the area generates additional recycled water supply. The recycled water projects identified in this process will also be incorporated into the HCP analysis to ensure that implementation of these projects supports both water supply and habitat sustainability.

Currently, some individual agencies are using recycled water for non-potable reuse. Recycled water produced in the Valley District service area that is not currently used for non-potable reuse is discharged to the SAR or its tributaries and has become a critical source of water that sustains habitat in natural rivers and streams, including the Santa Ana Sucker, which is a Federally listed endangered species. Development of new recycled water supplies in the upper SAR watershed must be balanced with the need to conserve and maintain this habitat.

Potential recycled water supplies for each retailer are described in their respective chapters. Anticipated recycled water supplies are included in the regional summary of supplies.

2.6.3 Conjunctive Use Projects

One of the foundational water management strategies in the USARW IRWMP is conjunctive use which has been generally described as using our groundwater basins to store water that is available in wet years so that it is available to be pumped out during dry years (dry year yield). Groundwater modeling for the IRWMP concluded that conjunctive use is feasible. In February 2012, the Basin Technical Advisory Committee (BTAC) recommended a cumulative total of 40,000 acre-feet per year of dry year yield. This capacity represents an efficient, initial project size with the possibility to expand to as much as 80,000 acre-feet per year.

Valley District, in cooperation with water agencies throughout the Santa Ana River Watershed and in cooperation with agencies within its service area have been developing a comprehensive conjunctive use program in the San Bernardino Basin Area (SBBA). The two programs will share facilities, wherever possible, to reduce costs. The watershed-scale program is called the Santa Ana River Conservation and Conjunctive Use Program (SARCCUP) and the local program is called the Bunker Hill Conjunctive Use Program (BHCUP). Both programs will benefit the retail water agencies within Valley District’s service area by increasing water levels and by providing an alternate source of water in dry years. The programs will collectively store up to 112,500 acre-feet in the SBBA which will provide up to 37,500 acre-feet per year of dry year yield initially for up to 3 consecutive years. The portion of these projects available to agencies in

Valley District's service area is 88,500 (36,000 + 52,500) acre-feet of storage and 29,500 (12,000 + 17,500) acre-feet of dry year yield.

2.6.4 Groundwater Recharge

In addition to the ongoing recharge operations throughout the Valley District service area, this section describes new recharge projects that are currently being developed.

2.6.4.1 Cactus Basin Recharge

Valley District is working cooperatively with the San Bernardino County Flood Control District (Flood Control) to recharge SWP supplemental water in the Cactus Basins, which would recharge high quality water into the Rialto-Colton sub basin. The project includes the construction of new basins 3 and 3A, which are being built for flood control. Basin development will include the construction of a bypass pipeline to manage flood flows. To optimize the joint use of these basins for flood control, the recharge is planned to occur during the dry-season, from April to October.

2.6.5 Stormwater Capture

One of the goals of the USARW IRWMP is to balance flood management and increase stormwater recharge. Stormwater management has been an ongoing challenge in the USARW Region and flood control facilities, such as detention basins, have provided much needed control of these flows. While conveying flood water safely through the upper SAR watershed is of critical importance, detaining runoff for recharge is also desirable. The region's groundwater managers are working with flood control agencies to optimize the use of these flood control facilities to increase the recharge of stormwater into the groundwater basin. The goal is to strike a balance between flood control and recharge that will ensure protection from flooding, while providing additional supplies to meet growing future demands and to supplement these supplies during drought years.

2.6.5.1 Santa Ana River Enhanced Recharge Project

The Enhanced Recharge Project is located on the Santa Ana River and will divert up to 500 cubic feet per second (cfs) and up to approximately 80,000 AFY. Water will be temporarily captured at the Seven Oaks Dam and diverted flows will flow to recharge basins for recharge into the SBBA or be delivered for direct use through the first phase of the Plunge Pool Pipeline. This project is estimated to provide up to 12,000 acre-feet per year.

2.6.5.2 Active Recharge Project

The Active Recharge Project is envisioned to help better manage surface water available to the SBBA. In 2015, a stormwater flow and capture analysis was performed to determine:

- The volume of surface water which has historically migrated out of the SBBA,
- The volume of surface water that is generated internally within the SBBA as the result of historical and on-going urbanization of the SBBA,

- The quantity of stormwater that is generated by the major tributary creeks to the Santa Ana River,
- The location and preliminary (conceptual) designs of potential new stormwater capture facilities that could maximize the capture and recharge of surface water flows,
- Potential environmental constraints for each of the selected tributaries,
- Potential modifications to existing retention basins and spreading grounds to further increase surface water capture and recharge, and
- The volume of potential additional recharge to the SBBA and the effect to surface water volumes leaving the SBBA that will occur as a result of implementation of an active recharge project (this remaining flow out of the SBBA would be available for recharge in the proposed Riverside North Aquifer Storage and Recovery Project; see Section 2.6.5.3).

The study included preparation of proposed conceptual designs for new and improved existing surface water capture and recharge facilities in areas of the tributary creeks having the greatest stormwater flows and the least amount of environmental constraints. The project stakeholders are currently working to refine the conceptual designs and estimates of recharge.

2.6.5.3 Riverside North Aquifer Storage and Recovery

The Riverside North Aquifer Storage and Recovery Project is a proposed storm water capture project located in the southern portion of the City of Colton and north of the City of Grand Terrace. The project consists of proposed in-channel and off-channel recharge. The proposed off-channel recharge facility location is along the west side of the Santa Ana River and proposes the construction of up to eight individual recharge basins encompassing approximately 25 acres. The in-channel recharge basin proposes construction of an inflatable dam across the Santa Ana River channel, which can be raised and lowered depending on the amount of water flowing in the river.

This project is estimated to provide up to 12,800 acre-feet of water per year. The in-channel and off-channel water captured will be recharged into the Riverside North sub basin and a portion of the retained water will be diverted to the Riverside Canal pipeline for direct use.

2.7 Development of Desalination

2.7.1 Opportunities for Brackish Water and/or Groundwater Desalination

Desalination, or desalting, is a process to create drinking water from water containing higher salt levels. Desalination can use a thermal distillation process or a membrane process (such as electrodialysis or reverse osmosis). All desalination processes produce a brine waste stream that must be disposed. The need for brackish groundwater desalting is somewhat limited in the San Bernardino Valley.

Although elevated salts are currently not a concern in the San Bernardino Valley, elevated salts are an issue for retailers that overlie the San Timoteo Groundwater Basin where agencies in this basin are considering implementing desalter operations. The area is fortunate to have a Brine

Line which can transport non-reclaimable waste, by gravity, from the City of San Bernardino Wastewater Reclamation Plant to the Orange County Sanitation District's treatment plant.

2.7.2 Opportunities for Seawater Desalination

Seawater desalination would require two major components:

1. The development or financial contribution to a seawater desalination facility and associated facilities (e.g., brine disposal facility); and
2. The exchange of a like amount of SWP water for the amount of water desalted.

The development of (or financial participation in) a new seawater desalination project, while costly, is being investigated and implemented by other wholesale and retail water agencies in southern California. Because the San Bernardino Valley is an inland area, participation in desalination would require agencies in the San Bernardino Valley to join with other water purveyors in the development of a coastal desalination facility and then receive water from the SWP supplies of other participants via an exchange. Due to conveyance requirements, it is not cost-effective for the San Bernardino Valley to receive direct delivery of desalted ocean water.

Seawater desalination is an alternative that is technically viable. However, production and treatment costs have historically been several times higher than those of groundwater costs and SWP costs with conventional treatment. San Bernardino Valley agencies will continue to evaluate the viability of desalinated water supplies.

2.8 Anticipated Regional Water Supply Sources in Normal, Wet, Dry, and Multiple Dry Years

The following tables summarize anticipated regional water supply sources in normal, wet, dry, and multiple dry year periods. These tables summarize the supplies available to the region as a whole, not just the agencies participating in the RUWMP.

Table 2-6. Regional Water Supply – Normal Year (AF)

Water Source	2020	2025	2030	2035	2040
Surface Water					
SBBA Surface Water	33,620	33,620	33,620	33,620	33,620
Oak Glen	500	500	500	500	500
Sub-Total Surface Water	34,120	34,120	34,120	34,120	34,120
Groundwater					
SBBA Groundwater	139,125	139,125	139,125	139,125	139,125
Rialto-Colton	17,300	17,300	17,300	17,300	17,300
Riverside North	30,100	30,100	30,100	30,100	30,100
Yucaipa	9,600	9,600	9,600	9,600	9,600
Beaumont	2,552	2,552	2,552	2,552	2,552
No Man's Land	1,000	1,000	1,000	1,000	1,000
Chino	900	900	900	900	900
Active Recharge Program	10,000	10,000	10,000	10,000	10,000
Sub-Total Groundwater	210,577	210,577	210,577	210,577	210,577
SWP Water					
Expected SWP Allocation	63,000	63,000	63,000	63,000	63,000
Direct Deliveries	36,607	37,388	37,758	38,502	37,858
SWP into Storage	26,393	25,612	25,242	24,498	25,142
Return Flow Direct Deliveries	13,179	13,460	13,593	13,861	13,629
Sub-Total SWP Water	76,179	76,460	76,593	76,861	76,629
Recycled Water					
City of Redlands, City of San Bernardino, East Valley Water District, Yucaipa Valley Water District	19,839	27,148	34,208	41,168	48,228
Total All Supplies	**340,715**	**348,305**	**355,498**	**362,726**	**369,554**

Notes:

(a) The San Bernardino Basin is managed whereby total safe yield is a combination of Surface Water and Groundwater totaling 239,743 AFY. Per the Western Judgment, supply available to the Valley District service area is 172,745 AFY. A decrease in available surface water in any given year does not change available yield from the basin.

(b) Assumes SWP Water is stored in wet years so that it can supplement lower deliveries of SWP water in dry years.

(c) The Watermaster estimates a 36% return from the direct deliveries of SWP in the SBBA.

(d) Does not include SWP water from San Gorgonio Pass Water Agency.

(e) Estimates of Direct Deliveries and Recycled Water from Chapters 7 through 15 of this RUWMP.

Table 2-7. Regional Supply - Single Wet Year (AF)

Water Source	2020	2025	2030	2035	2040
Surface Water					
SBBA Surface Water	37,000	37,000	37,000	37,000	37,000
Oak Glen	500	500	500	500	500
Sub-Total Surface Water	37,500	37,500	37,500	37,500	37,500
Groundwater					
SBBA Groundwater	135,745	135,745	135,745	135,745	135,745
Rialto-Colton	17,300	17,300	17,300	17,300	17,300
Riverside North	30,100	30,100	30,100	30,100	30,100
Yucaipa	9,600	9,600	9,600	9,600	9,600
Beaumont	2,552	2,552	2,552	2,552	2,552
No Man's Land	1,000	1,000	1,000	1,000	1,000
Chino	900	900	900	900	900
Active Recharge Program	20,000	20,000	20,000	20,000	20,000
Sub-Total Groundwater	217,197	217,197	217,197	217,197	217,197
SWP Water					
Expected SWP Allocation	100,550	100,550	100,550	100,550	100,550
Direct Deliveries	36,607	37,388	37,758	38,502	37,858
SWP into Storage	63,941	63,160	62,790	62,046	62,690
Return Flow Direct Deliveries	13,179	13,460	13,593	13,861	13,629
Sub-Total SWP Water	113,729	114,010	114,143	114,411	114,179
Recycled Water					
City of Redlands, City of San Bernardino, East Valley Water District, Yucaipa Valley Water District	19,839	27,148	34,208	41,168	48,228
Total All Supplies	**388,265**	**395,855**	**403,048**	**410,276**	**417,104**

Notes:

(a) The San Bernardino Basin is managed whereby total safe yield is a combination of Surface Water and Groundwater totaling 239,743 AFY. Per the Western Judgment, supply available to the Valley District service area is 172,745 AFY. A decrease in available surface water in any given year does not change available yield from the basin.
(b) Assumes SWP Water is stored in wet years so that it can supplement lower deliveries of SWP water in dry years.
(c) The Watermaster estimates a 36% return from the direct deliveries of SWP in the SBBA.
(d) Does not include SWP water from San Gorgonio Pass Water Agency
(e) Estimates of Direct Deliveries and Recycled Water from Chapters 7 through 15 of this RUWMP.

Table 2-8. Regional Water Supply – Single Dry Year (AF)

Water Source	2020	2025	2030	2035	2040
Surface Water					
SBBA Surface Water	12,869	12,865	12,860	12,855	12,855
Oak Glen	175	175	175	175	175
Sub-Total Surface Water	13,044	13,040	13,035	13,030	13,030
Groundwater					
SBBA Groundwater	159,876	159,880	159,885	159,890	159,890
Rialto-Colton	17,300	17,300	17,300	17,300	17,300
Riverside North	30,100	30,100	30,100	30,100	30,100
Yucaipa	9,600	9,600	9,600	9,600	9,600
Beaumont	2,552	2,552	2,552	2,552	2,552
No Man's Land	1,000	1,000	1,000	1,000	1,000
Chino	900	900	900	900	900
Active Recharge Program	0	0	0	0	0
Sub-Total Groundwater	221,328	221,332	221,337	221,342	221,342
SWP Water					
Expected SWP Allocation	5,130	5,130	5,130	5,130	5,130
Direct Deliveries	36,607	37,388	37,758	38,502	37,858
SWP from Storage	57,870	57,870	57,870	57,870	57,870
Return Flow Direct Deliveries	1,847	1,847	1,847	1,847	1,847
Sub-Total SWP Water	64,847	64,847	64,847	64,847	64,847
Recycled Water					
City of Redlands, City of San Bernardino, East Valley Water District, Yucaipa Valley Water District	19,839	27,148	34,208	41,168	48,228
Total All Supplies	**319,058**	**326,367**	**333,427**	**340,387**	**347,447**

Notes:

(a) The San Bernardino Basin is managed whereby total safe yield is a combination of Surface Water and Groundwater totaling 239,743 AFY. Per the Western Judgment, supply available to the Valley District service area is 172,745 AFY. A decrease in available surface water in any given year does not change available yield from the basin.

(b) Assumes SWP Water is stored in wet years so that it can supplement lower deliveries of SWP water in dry years.

(c) The Watermaster estimates a 36% return from the direct deliveries of SWP in the SBBA.

(d) Does not include SWP water from San Gorgonio Pass Water Agency.

(e) Estimates of Direct Deliveries and Recycled Water from Chapters 7 through 15 of this RUWMP.

Table 2-9. Regional Water Supply – Multiple Dry Year (AF)

Water Source	2020	2025	2030	2035	2040
Surface Water					
SBBA Surface Water	8,074	8,074	8,074	8,074	8,074
Oak Glen	175	175	175	175	175
Sub-Total Surface Water	8,249	8,249	8,249	8,249	8,249
Groundwater					
SBBA Groundwater	164,671	164,671	164,671	164,671	164,671
Rialto-Colton	17,300	17,300	17,300	17,300	17,300
Riverside North	30,100	30,100	30,100	30,100	30,100
Yucaipa	9,600	9,600	9,600	9,600	9,600
Beaumont	2,552	2,552	2,552	2,552	2,552
No Man's Land	1,000	1,000	1,000	1,000	1,000
Chino	900	900	900	900	900
Active Recharge Program	0	0	0	0	0
Sub-Total Groundwater	226,123	226,123	226,123	226,123	226,123
SWP Water					
Expected SWP Allocation	33,860	33,860	33,860	33,860	33,860
Direct Deliveries	36,607	37,388	37,758	38,502	37,858
SWP from Storage	29,140	29,140	29,140	29,140	29,140
Return Flow Direct Deliveries	12,190	12,190	12,190	12,190	12,190
Sub-Total SWP Water	75,190	75,190	75,190	75,190	75,190
Recycled Water					
City of Redlands, City of San Bernardino, East Valley Water District, Yucaipa Valley Water District	19,839	27,148	34,208	41,168	48,228
Total All Supplies	**329,401**	**336,710**	**343,770**	**350,730**	**357,790**

Notes:

(a) The San Bernardino Basin is managed whereby total safe yield is a combination of Surface Water and Groundwater totaling 239,743 AFY. Per the Western Judgment, supply available to the Valley District service area is 172,745 AFY. A decrease in available surface water in any given year does not change available yield from the basin.

(b) Assumes SWP Water is stored in wet years so that it can supplement lower deliveries of SWP water in dry years.

(c) The Watermaster estimates a 36% return from the direct deliveries of SWP in the SBBA.

(d) Does not include SWP water from San Gorgonio Pass Water Agency.

(e) Estimates of Direct Deliveries and Recycled Water from Chapters 7 through 15 of this RUWMP.

2.9 Water Use Efficiency

Water conservation programming for each of the retail water agencies can be found in their specific chapter.

Valley District has also supported the retail agencies in its service area with the following regional water conservation programs:

1. iEfficient.com: provides information and guides water customers to their specific rebates,
2. Weather Based Irrigation Controllers Program
3. Water Saving Garden Friendly: promotes low water use plants including plant sales at Home Depot stores and other stores and nurseries
4. water conservation demonstration garden and California State University San Bernardino
5. Inland Empire Landscape Contest: promotes water efficient landscapes by offering prizes for attractive installations
6. Turf removal programs
7. Inland Solar Challenge: high school students write a report about water conservation

These programs were coordinated and supported by Valley District to help retailers with their conservation objectives and are further discussed in Chapter 6.

3 Regional Water Use

This chapter describes anticipated water demands in the Valley District service area for imported water, groundwater, and surface water. Specific water use by sector and demands for each of the retail water agencies participating in the RUWMP are detailed in the chapter for that agency.

3.1 Imported Water Recharge to Maintain Sustainability of Local Groundwater Supplies

As detailed in Section 2.2.1, groundwater sustainability in the SBBA is maintained by comparing cumulative extractions to cumulative safe yield. Whenever the cumulative extractions exceed the cumulative safe yield, recharge is required. In the SBBA, the amount of recharge is offset by any "return flow" from sources outside of the safe yield calculation, namely, the amount of imported water and the amount of water extracted above the safe yield. To simplify the analysis in this report, it will not account for cumulative extractions and recharge. Instead, whenever the total extractions exceed the estimated safe yield, recharge of a like amount will be required. The offsets for return flow used in the SBBA will also be used for the other basins as shown in the below tables.

Table 3-1. Estimate of Potential Recharge Obligation in the SBBA (AF)

	2020	2025	2030	2035	2040
Potential Pumping					
City of Colton	6,783	6,994	7,408	7,991	7,991
East Valley Water District	28,312	32,150	36,042	39,992	39,992
City of Loma Linda	6,418	6,814	7,236	7,683	7,683
City of Redlands	55,496	55,564	55,632	55,696	55,696
City of Rialto	5,620	5,620	5,620	5,620	5,620
City of San Bernardino	52,671	54,730	56,866	59,082	59,082
West Valley Water District	15,000	19,500	22,500	25,000	25,000
Fontana Water Company	15,100	15,100	15,100	15,100	15,100
Marygold Mutual Water Company	1,500	1,500	1,500	1,500	1,500
Muscoy Mutual Water Company	2,100	2,100	2,100	2,100	2,100
Terrace Water Company	900	900	900	900	900
Other/Private	19,600	19,300	19,000	19,000	19,000
Total Estimated Demands by Non-Plaintiffs	**217,000**	**227,772**	**237,404**	**247,164**	**247,164**
Adjusted Safe Yield with New Conservation	172,745	172,745	172,745	172,745	172,745
Over extraction (Safe Yield minus Extractions)	(44,255)	(55,027)	(64,659)	(74,419)	(74,419)
Return flow from extractions above the safe yield (36% of extractions above the safe yield of 172,745 AF).	15,932	19,810	23,277	26,791	26,791
Return flow credits for imported water deliveries	10,097	10,378	10,511	10,779	10,547
Potential Replenishment Obligation/Credit	**(18,226)**	**(24,839)**	**(30,870)**	**(36,849)**	**(37,081)**

Notes:

(a) Data from Chapters 7 through 15 for retail agencies in this UWMP

(b) Data from 2015 IRWMP for Fontana Water Company, Marygold Mutual WC, Muscoy Mutual WC, Terrace WC, Other/Private.

(c) The Watermaster estimates a 36% return from the direct deliveries of SWP in the SBBA.

(d) Obligation/credit equal to over-extraction less the return flow from extractions above the safe yield and return flow credits for imported water deliveries.

Table 3-2. Estimate of Potential Recharge Obligation in the Rialto-Colton Basin (AF)

	2020	2025	2030	2035	2040
Potential Pumping					
City of Colton	4,375	4,511	4,778	5,154	5,154
City of Rialto	1,456	1,456	1,456	1,456	1,456
West Valley Water District	6,000	6,000	6,000	6,000	6,000
Fontana Water Company	7,600	7,600	7,600	7,600	7,600
RPU	2,728	2,728	2,728	2,728	2,728
Other/Private	2,100	2,100	2,100	2,100	2,100
Total Estimated Demands	**24,259**	**24,395**	**24,662**	**25,038**	**25,038**
Estimated Safe Yield from 2015 IRWMP	17,300	17,300	17,300	17,300	17,300
Over extraction (Safe Yield minus Extractions)	(6,959)	(7,095)	(7,362)	(7,738)	(7,738)
Return flow from extractions above the safe yield	2,505	2,554	2,650	2,786	2,786
Potential Replenishment Obligation/Credit	**(4,454)**	**(4,541)**	**(4,712)**	**(4,952)**	**(4,952)**

Notes:
(a) Data from Chapters 7 through 15 for retail agencies in this UWMP
(b) Data from 2015 IRWMP for Fontana Water Company, RPU, Other/Private.
(c) The Watermaster estimates a 36% return from extractions over the safe yield.
(d) Obligation/credit equal to over-extraction less the return flow from extractions above the safe yield and return flow credits for imported water deliveries.

Table 3-3. Estimate of Potential Recharge Obligation in the Riverside North Basin (AF)

	2020	2025	2030	2035	2040
Potential Pumping					
City of Colton	1,450	1,495	1,584	1,708	1,708
City of Rialto	1,000	1,000	1,000	1,000	1,000
West Valley Water District	2,500	3,500	4,000	4,500	4,500
Riverside Highland WC	4,000	4,000	4,000	4,000	4,000
San Bernardino RIX Overextraction	7,900	7,900	7,900	7,900	7,900
RPU	12,902	12,902	12,902	12,902	12,902
Other/Private	6,000	6,000	6,000	6,000	6,000
Total Estimated Demands	**35,752**	**36,797**	**37,386**	**38,010**	**38,010**
Estimated Safe Yield from 2015 IRWMP	30,100	30,100	30,100	30,100	30,100
Over extraction (Safe Yield minus Extractions)	(5,652)	(6,697)	(7,286)	(7,910)	(7,910)
Return flow from extractions above the safe yield	2,035	2,411	2,623	2,848	2,848
Potential Replenishment Obligation/Credit	**(3,617)**	**(4,286)**	**(4,663)**	**(5,062)**	**(5,062)**

Notes:
(a) Data from Chapters 7 through 15 for retail agencies in this UWMP
(b) Data from 2015 IRWMP for RPU, Other/Private.
(c) The Watermaster estimates a 36% return from extractions over the safe yield.
(d) Obligation/credit equal to over-extraction less the return flow from extractions above the safe yield and return flow credits for imported water deliveries.

3.2 Demands for Imported Water

In addition to recharge operations undertaken by Valley District, imported water is also used to make direct deliveries to several retail water producers and used in-lieu of releases from Big Bear Lake.

3.2.1 Demands for Direct Deliveries

Delivering water directly to water treatment plants is the most efficient way to utilize imported water because there are less losses when compared to groundwater recharge. Several retail water producers have water treatment plants to treat imported water. The City of San Bernardino uses the ground as a filter (Sweetwater Turnout on Valley District's Foothill Pipeline), recharging imported water and then immediately extracting it downstream using wells. The following agencies have indicated that they anticipate taking direct delivery of imported water: East Valley Water District, the City of Redlands, City of San Bernardino, West Valley Water District, Yucaipa Valley Water District, Fontana Water Company, and Crestline-Lake Arrowhead Water Company.

3.2.2 Other Obligations for Imported Water

Bear Valley Mutual Water Company (Bear Valley Mutual) constructed the original Bear Valley Dam in 1884 to create Big Bear Lake as a storage reservoir for their customers, downstream farmers. In 1964, the residents of Big Bear Lake formed the Big Bear Municipal Water District (Big Bear Municipal) in an effort to eliminate Lake releases to Bear Valley Mutual so that the lake level would remain high for recreational use and tourism. After more than a decade of litigation, a Judgment was executed in 1977 which reduced the amount of Lake releases to Bear Valley Mutual. Under the terms of this Judgment, Big Bear Municipal purchased from Bear Valley Mutual the lake bottom, Bear Valley Dam, and the right to utilize and manage the surface of Big Bear Lake for recreation and wildlife. In return, deliveries to Bear Valley Mutual were capped at a total of 65,000 AF in any ten-year period. These deliveries can be made in the form of Lake releases or can be provided from other sources "in-lieu" of Lake releases (in-lieu deliveries). In-lieu deliveries to Bear Valley Mutual are preferable to Big Bear Municipal since they do not result in water being removed from the lake.

In 1996, Big Bear Municipal entered into a water purchase agreement with Valley District. For an annual payment to Valley District, this agreement provides that when the Lake is at specified levels, no water will be released from the Lake to meet the downstream water needs. Instead, Valley District provides Bear Valley Mutual with in-lieu water from the SWP or any other available sources authorized under the Judgment. This historic agreement helped Big Bear Municipal achieve its mission of Lake stabilization while providing Bear Valley Mutual with the water it needs for its customers. Under the terms of the Agreement, Bear Valley Mutual may request any amount of delivery for a given year, provided that the total of all their requested deliveries do not exceed 65,000 AF in any ten-year period. Bear Valley Mutual's typical request each year has been the ten-year average, or 6,500 AFY.

The Judgment directed the in-lieu water program be monitored through a series of accounts that are managed by the Big Bear Watermaster Committee. The three-member committee consists of one representative from each of the three member agencies: Big Bear Municipal Water District, Bear Valley Mutual Water Company and San Bernardino Valley Water Conservation District. This is a committee whose sole responsibility is to monitor the "physical solution" set forth in the Judgment. The basic premise behind the physical solution is the comparison of Big Bear Municipal's actual Lake management versus Bear Valley Mutual's historic management. Big Bear Municipal is then responsible for making up any net groundwater deficiency in the San Bernardino basin which may occur as a result of maintaining a higher Lake level than would have occurred under Bear Valley Mutual's historic operations. The amount of the deficiency or surplus is maintained in the basin make-up water account (commonly referred to as "basin compensation account"). A number of other accounting mechanisms are in place to calculate totals for Lake releases, inflow, spills, evaporation, wastewater export and other related data. An annual Watermaster report is prepared documenting the annual accounting procedures.

3.2.3 Storage of Imported Water

One of the primary water management strategies in the San Bernardino Valley is to store imported water when it is available so that it can be used during drought periods. The amount of SWP water that is planned to be stored for later pumping is shown in Table 3-4.

3.2.4 Total Anticipated Demands on Imported Water from Valley District

Table 3-4 summarizes potential total demands for imported water from Valley District during the period of this Plan.

Table 3-4. Estimated Total Demands for Imported Water from Valley District 2020 to 2040 (AF)

	2020	2025	2030	2035	2040
Retail Agencies Receiving SWP Water					
East Valley Water District	8,960	8,960	8,960	8,960	8,960
City of Redlands	1,500	2,000	2,500	3,000	3,000
West Valley Water District	7,000	7,000	7,000	7,000	7,000
Yucaipa Valley Water District	10,587	10,868	10,738	10,982	10,338
Crestline Lake Arrowhead Water Company	60	60	60	60	60
Fontana Water Company	2,000	2,000	2,000	2,000	2,000
Total Direct Deliveries(a)	**30,107**	**30,888**	**31,258**	**32,002**	**31,358**
Big Bear Municipal Water District/Big Bear Lake	6,500	6,500	6,500	6,500	6,500
Total Demands	36,607	37,388	37,758	38,502	37,858
Potential Obligation in SBBA	18,226	24,839	30,870	36,849	37,081
Potential Obligation in Rialto-Colton	4,454	4,541	4,712	4,952	4,952
Potential Obligation in Riverside North	3,617	4,286	4,663	5,062	5,062
Total Demand Applied to Imported Water	**62,904**	**71,054**	**78,003**	**85,366**	**84,954**

Notes:

(a) Demands for imported water for East Valley Water District, City of Redlands, West Valley Water District, and Yucaipa Valley Water District provided as part of this RUWMP. Demands for Crestline Lake Arrowhead Water Company and Fontana Water Company estimated from 2015 IRWMP.

3.2.5 Yucaipa Valley Water District Demands for Imported Water from San Gorgonio Pass Water Agency

Yucaipa Valley Water District, in addition to receiving imported water from Valley District, can also receive imported water from San Gorgonio Pass Water Agency (SGPWA). YVWD's estimated demand for imported water from SGPWA is shown in Table 3-5. Additional discussion of these demands is included in Chapter 12.

Table 3-5. Estimated Demands for Imported Water from San Gorgonio Pass Water Agency 2020 to 2040 (AF)

Wholesale Source	2020	2025	2030	2035	2040
YVWD Purchase from SGPWA	4,313	5,007	5,758	6,735	6,051

3.3 Demands for Recycled Water

In addition to regional water sources (SBBA water and other local surface and groundwater, imported water), some water agencies have plans to use recycled water. Table 3-6 summarizes the anticipated future demand for recycled water.

Table 3-6. Estimated Demands for Recycled Water 2020 to 2040 (AF)

Agency	2020	2025	2030	2035	2040
City of Redlands	3,040	3,290	3,290	3,290	3,290
City of Rialto	20	20	20	20	20
City of San Bernardino	5,600	7,800	10,300	12,800	12,800
East Valley Water District	6,700	6,700	6,700	6,700	6,700
Yucaipa Valley Water District	4,479	5,038	5,598	6,158	6,718
Total Recycled Water	**19,839**	**22,848**	**25,908**	**28,968**	**29,528**
Notes: Further details about recycled water use are included in each agency's individual chapter.					

3.4 Water Losses

In accordance with DWR requirements, the individual retail agencies have quantified their water losses, using the American Water Works Association (AWWA) Water Audit process, and their total nonrevenue water, using the difference between production and sales. Water lost through leaks represents a loss of revenue for the retail agencies and increases the amount of groundwater or surface water that must be produced. Because the region relies so heavily on groundwater, this water is not permanently lost; it eventually contributes to recharge of the local groundwater basin. Each individual agency's chapter discusses nonrevenue water and estimated losses.

3.5 Total Demands by Agency

Table 3-7 presents an estimate of total demands for agencies within Valley District.

Table 3-7. Total Demand by Agency 2020 to 2040 (AF)

	2020	2025	2030	2035	2040
City of Colton	10,458	11,301	11,978	12,698	13,462
East Valley Water District	28,234	29,333	30,253	31,210	32,206
City of Loma Linda	5,200	5,527	5,875	6,245	6,638
City of Rialto	10,583	11,216	11,886	12,597	13,350
City of Redlands	33,148	34,233	35,067	35,901	35,901
Riverside Highland Water Company	4,107	4,294	4,492	4,702	4,923
City of San Bernardino	45,969	49,094	53,339	57,623	59,449
West Valley Water District	20,799	22,256	23,802	25,492	27,312
Yucaipa Valley Water District	12,891	13,751	14,730	15,815	17,009
Subtotal of Agencies Participating in RUWMP	**171,390**	**181,004**	**191,423**	**202,283**	**210,250**
Fontana Water Company	44,613	45,700	45,700	45,700	45,700
Marygold Mutual Water Company	1,500	1,500	1,500	1,500	1,500
Muscoy Mutual Water Company	2,100	2,100	2,100	2,100	2,100
Terrace Water Company	900	900	900	900	900
Crestline Lake Arrowhead Water Company	60	60	60	60	60
Big Bear Municipal Water District	6,500	6,500	6,500	6,500	6,500
Other/Private	19,600	19,300	19,000	19,000	19,000
Total	**246,663**	**257,064**	**267,183**	**278,043**	**286,010**
10% reliability Margin	24,666	25,706	26,718	27,804	28,601
Total Including Reliability Margin	**271,329**	**282,771**	**293,902**	**305,847**	**314,611**
Notes: (a) Demands for participating agencies from Chapters 7 through 15 of this UWMP. (b) Demands for non-participating agencies estimated from 2015 IRWMP.					

Two major factors that affect water usage are weather and water conservation. Historically, when the weather is hot and dry, water usage increases. The increases vary according to the number of consecutive years of hot, dry weather and the conservation activities imposed. During cool-wet years, historical water usage has decreased to reflect less water usage for external landscaping. Past studies have indicated that demands increase 6 to 12 percent during dry periods. For this analysis it is estimated that demands will increase 10 percent during dry periods, unless otherwise stated in the individual agency chapters.

In recent years, water conservation has become an increasingly important factor in water supply planning in California. Since 2005, there have been a number of regulatory changes related to conservation including new standards for plumbing fixtures, a new landscape ordinance, a state universal retrofit ordinance, metering and billing requirements, new Green Building standards, demand reduction goals and more. SB X7-7 requires a 20-percent reduction in urban per capita water use in California by December 31, 2020 ("20 by 2020"). The bill requires each urban retail water supplier to determine their "base daily per capita water use," develop an urban water use target for year 2020, and set a 2015 interim urban water use target. For the 2015 UWMP cycle, DWR established updated requirements for the use of census data in estimating historic service area populations. Therefore, retail agencies have re-calculated their baseline water use and their targets for the 2015 RUWMP. The individual retail agency chapters (Chapters 7 through 15) provide information on compliance with SB X7-7 for the retail agencies participating in this plan.

4 Comparison of Regional Supplies and Demands

The UWMP Act requires urban water suppliers to assess water supply reliability by comparing total projected water use with the projected water supply over the next twenty years or beyond in 5 year increments. The UWMP Act also requires an assessment for a single-dry year and multiple-dry year period. In addition, the Plan participants have elected to assess a wet year scenario to help support the goal of maximizing the use and storage of wet year supplies for later use during dry periods.

Chapter 2 provided information about regional water supplies during a normal year, while Chapter 3 provided information on total demands by the participants in this UWMP. This section compares available supplies for regional water supplies to demands for these sources. A discussion of the supplies and demands by retail agency are described in Chapters 7 through 15.

4.1 Normal / Average Water Year

Table 4-1 provides a comparison of regional water supplies and demands for a normal year for the agencies participating in the RUWMP. Table 4-1 demonstrates that adequate regional supplies are anticipated for years 2020 to 2040 under normal/average conditions.

Table 4-1. Normal Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	266,615	288,152	307,621	327,562	333,794
Demand Totals	171,390	181,004	191,423	202,283	210,250
Difference	95,226	107,148	116,198	125,279	123,544

4.2 Single Wet Year

Table 4-2 provides a comparison of supplies and demands for a single wet year for the agencies participating in the RUWMP. This demonstrates that a supply surplus is anticipated in wet years, which presents an opportunity to store this excess supply. This information will help water resource managers in the San Bernardino Valley as they continue to develop strategies and projects to maximize the use of wet year supplies to improve water supply reliability in dry years.

Table 4-2. Wet Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	275,695	297,232	316,701	336,642	342,874
Demand Totals	155,540	164,279	173,754	183,636	190,926
Difference	120,155	132,953	142,947	153,006	151,948

4.3 Single Dry Year

Table 4-3 provides a comparison of regional water supplies and demands for a single dry year for the agencies participating in the RUWMP. The single-dry year is generally the lowest annual runoff for a water source in the record. Table 4-3 anticipates adequate regional water supplies for years 2020 to 2040 under single-dry year conditions.

Table 4-3. Single Dry Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	242,119	262,957	282,110	301,155	309,055
Demand Totals	178,017	188,124	199,142	210,617	218,991
Difference	64,102	74,833	82,969	90,539	90,064

4.4 Multiple Dry Years

Table 4-4 provides a comparison of regional water supplies and demands for a multiple-dry year period for the agencies participating in the RUWMP. The multiple-dry year period is generally the lowest annual runoff for a three year or more consecutive period. Table 4-4 anticipates adequate regional supplies for years 2020 to 2040 under multiple-dry year conditions.

Table 4-4. Multiple Dry Years Supply and Demand Comparison (AF)

Year	Totals	2020	2025	2030	2035	2040
First Year	Supply Totals	247,564	268,416	287,594	306,669	314,589
	Demand Totals	174,224	184,224	195,172	206,582	215,004
	Difference	73,341	84,192	92,422	100,087	99,585
Second Year	Supply Totals	245,489	266,338	285,512	304,584	312,504
	Demand Totals	170,530	180,170	190,614	201,502	209,559
	Difference	74,959	86,168	94,898	103,083	102,945
Third Year	Supply Totals	242,459	263,307	282,480	301,550	309,470
	Demand Totals	165,179	174,404	184,303	194,626	202,319
	Difference	77,280	88,902	98,177	106,924	107,151

5 Regional Water Shortage Contingency Planning

5.1 Overview

Water supplies may be interrupted or reduced significantly through drought, natural disaster such as earthquake, a regional power outage, or a toxic spill that prevents delivery due to poor water quality. This chapter describes regional planning for such emergencies. Specific water shortage contingency planning for each agency is discussed in Chapters 7 through 15.

5.2 Coordinated Planning

As part of the IRWMP (San Bernardino Valley Municipal Water District, January 2015), agencies in the region developed a water shortage contingency plan. The water shortage contingency plan provides a framework for implementing specific measures to deal with water shortages during emergencies. The plan provides specific actions that should be taken to ensure critical water needs of the region are met during a period in which water supplies are cut by 50 percent.

Furthermore, nearly all of the retailers in the San Bernardino Valley participate in the Emergency Response Network of the Inland Empire (ERNIE). ERNIE is a water/wastewater mutual aid network within San Bernardino and Riverside counties. ERNIE meets monthly and provides regular training for utilities in emergency response and long-term emergency planning.

The 2015 IRWMP included an assessment entitled Vulnerability to Catastrophic Interruption of Water Supply and Disaster Preparedness, which is included in Appendix F of the IRWMP.

5.3 Actions to Prepare for Catastrophic Interruption

This section addresses vulnerability of the region's water supply system to catastrophic events that may interrupt the water deliveries in the Region. Given the presence of the San Andreas Fault, San Jacinto Fault and many other faults, a large magnitude earthquake is generally considered the most likely and "worst case" natural disaster for the region. The other possible catastrophic interruptions such as regional power failure, terrorist attack, or other man-made or natural catastrophic event would cause similar conditions but would likely not be as severe. For purposes of this report, a major earthquake is defined as an earthquake on the San Andreas Fault (SAF) on the order of 8.0.

The San Bernardino Valley is a seismically active area of Southern California. Four major fault zones are found in the region, including the San Jacinto Fault, the Chino-Corona segment of the Elsinore Fault, the Cucamonga Fault, and the SAF. Numerous other minor faults associated with these larger fault structures may also present substantial hazards. The SAF is a right-lateral strike-slip fault that runs approximately 800 miles through western and southern California. The fault marks a transform boundary between the Pacific Tectonic Plate and the North

American Tectonic Plate. In Southern California, the SAF runs along the southern base of the San Bernardino Mountains, crosses through Cajon Pass, and continues northwest along the northern base of the San Gabriel Mountains. Historical records indicate that massive earthquakes have occurred in the central section of the SAF in 1857 and in the northern section in 1906 (the San Francisco Earthquake). In 1857, an estimated magnitude 8+ earthquake occurred on the San Andreas Fault rupturing the ground for 200 to 275 miles, from near Cholame to Cajon Pass and possibly as far south as San Gorgonio Pass. The recurrence interval for a magnitude 8 earthquake along the total length of the fault is estimated to be between 50 and 200 years. It has been over 150 years since the 1857 rupture.

5.3.1 Facility Reliability

The following sections summarize the findings of the Vulnerability to Catastrophic Interruption of Water Supply and Disaster Preparedness prepared for the IRWMP. These findings have been developed from a search of literature reporting the impacts of major earthquakes and limited work by water purveyors.

5.3.1.1 Reliability of Groundwater Wells

Review of post-earthquake lifeline performance reports reveals little discussion of groundwater well failure. However, loss of commercial power, damage to electrical equipment and above ground appurtenances, or damage to the distribution system may effectively put wells out of service. Liquefaction, especially in areas where there are high groundwater levels between depths of 5 to 50 feet, may cause ground settlement and interfere with continued well operation. No discussion of the performance of wellhead treatment systems during earthquakes was found. This may be due to the limited amount of well head treatment in place during prior earthquakes. As wellhead treatment typically includes purchased equipment installed in a field location, there is significant opportunity for lapses in the seismic design. The groundwater basin and the groundwater production wells are a reliable part of the water supply system for the San Bernardino area.

5.3.1.2 Reliability of Pipelines

Pipelines are generally the most fragile part of a water system. Generally, damage is a function of displacement rather than shaking. Empirical algorithms have been developed to predict seismic reliability of pipelines.

5.3.1.3 Reliability of Pump Stations

Past earthquakes indicate that the structural and mechanical elements of a pump station are highly resistant to earthquake damage. The most likely failures are to the electrical equipment and loss of commercial power. Most pump stations are either equipped with an automatic transfer switch to enable connection to a permanent standby generator or have an electrical outlet for connection to a mobile generator.

5.3.1.4 Reliability of Surface Water Treatment Facilities

The major elements of a surface water treatment system are typically concrete structures that are very resistant to damage. However, these facilities include a large variety of mechanical equipment, much of it long and lightweight and subject to damage not only from the direct force of an earthquake, but also from the wave action created by the earthquake. Similar to a pump station, power supply and electrical equipment are fragile. However, treatment facilities also are constructed with provisions for standby power, either permanent or temporary.

5.3.1.5 Reliability of the State Water Project

While little specific information was found on anticipated damage to the SWP, the high susceptibility of the Santa Ana Valley Pipeline (California Aqueduct) is recognized. A major vulnerability of the SWP is the Sacramento-San Joaquin Delta. The SWP does have a Business Resumption Plan and an Emergency Operations Plan.

5.3.1.6 Length of Outages

Length of water service outages vary by earthquake and by purveyor. The Loma Prieta earthquake affected a large number of separate systems. The San Jose Water Company serves most of San Jose and all of Los Gatos. Los Gatos was hard hit and half of the water customers lost water service. In San Francisco, the worst hit area was the Marina District. Both fires and liquefaction affected the district. East Bay Municipal Water District serves 1.1 million customers and suffered $3.7 million in damage. Damage included a break in a 60-inch raw water line. After the Northridge earthquake, the Los Angeles Aqueducts Nos. 1 and 2 were in and out of service for temporary and permanent repairs over several months; these facilities were not critical at that time. Alternate supplies were available and drought conditions limited supply to these aqueducts.

Valley District's Emergency Operations Plan includes estimates for repair of Valley District facilities. Electrical and pipe repairs are estimated to take 35 to 77 days. Pump repairs are estimated to take 168 to 273 days. In summary, the Region should prepare for up to a four-month outage.

5.3.2 Existing Strategies

Valley District and the purveyors recognize that water availability through the SWP is intermittent. As a result, Valley District's "Rules for Service" require that all of its customers have a 100 percent backup for any amount of water they order from the SWP.

The primary regional contingency strategy is groundwater storage. During an outage of the statewide system, agencies would rely primarily on local groundwater supplies. One of the primary management strategies in the IRWMP is to store water in wet years so that it is available in dry years. However, any additional stored water would also be available during a water shortage.

A second strategy for addressing water supply during an emergency is system redundancy and interconnections between purveyors. Table 5-1 lists the interties between purveyors in the San Bernardino Valley.

Finally, Valley District has identified alternative conveyance facilities which could be used in the event of a failure of one of Valley District's pipelines. For example, Valley District has an agreement with Metropolitan Water District of Southern California which could allow the use of the Inland Feeder Pipeline to bypass a large portion of the District's primary delivery pipeline, the Foothill Pipeline.

Table 5-1. System Interties between Retail Agencies

Agencies	Direction	Capacity (MGD)
City of San Bernardino/East Valley Water District	Either	4
City of San Bernardino/City of Riverside	To San Bernardino	2
City of San Bernardino/West Valley Water District	Either	3
City of San Bernardino/Loma Linda	To Loma Linda	5
City of San Bernardino/Colton	To Colton	3
City of San Bernardino/Rialto	Either	3.6
City of San Bernardino/Riverside Highland Water Company	To Riverside Highland Water Company	3
Fontana/Cucamonga Valley	Either	3.6
West Valley Water District/Fontana	Either	
West Valley Water District/Rialto	Either	
West Valley Water District/Colton	To Colton	
City of Redlands/City of Loma Linda	To Loma Linda	1
Source: 2015 IRWMP		

All of the retail agencies that are included in this RUWMP are also members of the BTAC. The BTAC works together on an annual basis to review water supplies and evaluate how to prioritize and distribute any shortage of SWP supplies. During a shortage, it is anticipated that the first priority for any SWP water would be direct deliveries.

5.3.3 Strategies to Improve Regional Preparedness

Based on the recommendations in the 2015 IRWMP, the following strategies were identified to enhance regional disaster preparedness.

- Valley District is planning to implement seismic improvements for high priority facilities, including the Foothill Pipeline, Santa Ana River Connector, Morton Canyon Connector, and Greenspot pipeline.
- Projects are proposed that could provide production and conveyance system redundancies for regional facilities. These include:
  - The BHCUP, which could provide backup well production capacity needed for retail water agencies when SWP supplies have been severed.
  - The Central Feeder/EBX2 Intertie, which provides an additional connection between Valley District's system and DWR's system, and could be used to bypass a portion of Valley District's conveyance system in the event of failure.
- Consider the opportunities that Big Bear Lake presents as an emergency source of water after an earthquake that interrupts SWP deliveries for many weeks.

- A catastrophic earthquake may cause loss of electricity for an indeterminate amount of time. In order to ensure water supplies in the immediate aftermath and weeks following a major earthquake, it is critical to have back-up generators or internal combustion engines for important production wells throughout the Region.
- Valley District is also developing a storage program to help meet direct delivery demands during a shortage on the SWP. The current storage program includes the DWR Carryover Storage Program, the Yuba Accord and the DWR Dry Year Water Transfer Program. Valley District is also evaluating "upstream" groundwater banks located along the California Aqueduct.

5.3.4 General Response Strategies

The San Andreas Fault, which traverses the length of the southern San Joaquin Valley, could impact the State Water Project. The California Division of Mines and Geology has stated that two of the aqueduct systems that import water to southern California (including the California Aqueduct) could be ruptured by displacement on the San Andreas Fault. The situation would be further complicated by physical damage to pumping equipment and local loss of electrical power.

DWR has an Aqueduct Outage Plan for restoring the California Aqueduct to service should a major break occur, which it estimates would take approximately four months to repair. Limitations on supplies of groundwater and/or imported water for an extended period, due to power outages and/or equipment damage, could result in severe water shortages until the supplies could be restored.

The public would be asked to reduce consumption to minimum health and safety levels, extending the supply in treated water storage a number of days. This would provide sufficient time to restore a significant amount of groundwater production. After the groundwater supply is restored, the pumping capacity of the retail purveyors could meet the reduced demand until such time that the imported water supply was reestablished. Updates on the water situation would be made as often as necessary.

Valley District's water sources are generally of good quality, and no insurmountable problems resulting from industrial or agricultural contamination are foreseen. If contamination did result from a toxic spill or similar accident, the contamination would be isolated and should not significantly impact the total water supply. In addition, such an event would be covered by the purveyors Emergency Response Plan.

5.3.5 SWP Emergency Outage Scenarios

In addition to earthquakes, the SWP could experience other emergency outage scenarios. Past examples include slippage of aqueduct side panels into the California Aqueduct near Patterson in the mid-1990s, the Arroyo Pasajero flood event in 1995 (which also destroyed part of Interstate 5 near Los Banos) and various subsidence repairs needed along the East Branch of the Aqueduct since the 1980s. All these outages were short-term in nature (on the order of weeks), and DWR's Operations and Maintenance Division worked diligently to devise methods to keep the Aqueduct in operation while repairs were made. Thus, the SWP contractors experienced no interruption in deliveries.

One of the SWP's important design engineering features is the ability to isolate parts of the system. The Aqueduct is divided into "pools." Thus, if one reservoir or portion of the California Aqueduct is damaged in some way, other portions of the system can still remain in operation.

Other events could result in significant outages and potential interruption of service. Examples of possible nature-caused events include a levee breach in the Delta near the Harvey O. Banks Pumping Plant, a flood or earthquake event that severely damages the Aqueduct along its San Joaquin Valley traverse, or an earthquake event along either the West or East Branches. Such events could impact some or all SWP contractors south of the Delta.

The response of DWR, Valley District and other SWP contractors to such events would be highly dependent on the type and location of any such events. In typical SWP operations, water flowing through the Delta is diverted at the SWP's main pumping facility, located in the southern Delta, and is pumped into the California Aqueduct. During the relatively heavier runoff period in the winter and early spring, Delta diversions generally exceed SWP contractor demands and the excess is stored in San Luis Reservoir. Storage in SWP aqueduct terminal reservoirs, such as Pyramid and Castaic Lakes, is also refilled during this period. During the summer and fall, when diversions from the Delta are generally more limited and less than contractor demands, releases from San Luis Reservoir are used to make up the difference in deliveries to contractors. The SWP share of maximum storage capacity at San Luis Reservoir is 1,062,000 AF.

In addition to SWP storage south of the Delta in San Luis and the terminal reservoirs, a number of contractors have stored water in groundwater banking programs in the San Joaquin Valley, and many also have surface and groundwater storage within their own service areas. Two scenarios that could impact the delivery of SWP supply, previously banked supplies or other supplies delivered to it through the California Aqueduct are described below. For each of these scenarios, it was assumed that an outage of six months could occur. Valley District's ability to meet demands during the worst of these scenarios is presented following the scenario descriptions.

5.3.5.1 Scenario 1: Levee Breach New Banks Pumping Plant

As demonstrated by the June 2004 Jones Tract levee breach and previous levee breaks, the Delta's levee system is fragile. The SWP's main pumping facility, Banks Pumping Plant, is located in the southern Delta. Should a major levee in the Delta near these facilities fail catastrophically, salt water from the eastern portions of San Francisco Bay would flow into the Delta, displacing the fresh water runoff that supplies the SWP. All pumping from the Delta would be disrupted until water quality conditions stabilized and returned to pre-breach conditions. The re-freshening of Delta water quality would require large amounts of additional Delta inflows, which might not be immediately available, depending on the time of year of the levee breach. The Jones Tract repairs took several weeks to accomplish and months to complete; a more severe breach could take much longer, during which time pumping from the Delta might not be available on a regular basis.

Assuming that the Banks Pumping Plant would be out of service for six months, DWR could continue making at least some SWP deliveries to all southern California contractors from water stored in San Luis Reservoir. The water available for such deliveries would be dependent on the storage in San Luis Reservoir at the time the outage occurred and could be minimal if it occurred in the late summer or early fall when San Luis Reservoir storage is typically low. Valley District water stored in groundwater banking programs in the San Joaquin Valley may also be available for withdrawal and delivery to Valley District.

5.3.5.2 Scenario 2: Complete Disruption of the California Aqueduct in the San Joaquin Valley

The 1995 flood event at Arroyo Pasajero demonstrated vulnerabilities of the California Aqueduct (the portion that traverses the San Joaquin Valley from San Luis Reservoir to Edmonston Pumping Plant). Should a similar flood event or an earthquake damage this portion of the aqueduct, deliveries from San Luis Reservoir could be interrupted for a period of time.

In any of these SWP emergency outage scenarios, DWR and the SWP contractors would coordinate operations to minimize supply disruptions. Depending on the particular outage scenario or outage location, some or all of the SWP contractors south of the Delta might be affected. But even among those contractors, potential impacts would differ given each contractor's specific mix of other supplies and available storage. During past SWP outages, the SWP contractors have worked cooperatively to minimize supply impacts among all contractors. Past examples of such cooperation have included certain SWP contractors agreeing to rely more heavily on alternate supplies, allowing more of the outage-limited SWP supply to be delivered to other contractors, and exchanges among SWP contractors, allowing delivery of one contractor's SWP or other water to another contractor, with that water being returned after the outage was over.

5.3.6 Emergency Freshwater Pathway Description (Sacramento-San Joaquin Delta)

DWR has estimated that in the event of a major earthquake in or near the Delta, regular water supply deliveries from the SWP could be interrupted for up to three years, posing a substantial risk to the California business economy. Accordingly, a post-event strategy has been developed which would provide necessary water supply protections. The plan has been coordinated through DWR, the Army Corps of Engineers (Corps), Bureau of Reclamation, California Office of Emergency Services (Cal OES), the Metropolitan Water District of Southern California, and the State Water Contractors. Full implementation of the plan would enable resumption of at least partial deliveries from the SWP in less than six months.

5.3.7 DWR Delta Flood Emergency Management Plan

DWR has developed the Delta Flood Emergency Management Plan to provide strategies for a response to Delta levee failures, which addresses a range of failures up to and including earthquake-induced multiple island failures during dry conditions when the volume of flooded islands and salt water intrusion are large. Under such severe conditions, the plan includes a strategy to establish an emergency freshwater pathway from the central Delta along Middle River and Victoria Canal to the export pumps in the south Delta. The plan includes the pre-positioning of emergency construction materials at existing and new stockpiles and warehouse sites in the Delta, and development of tactical modeling tools (DWR Emergency Response Tool) to predict levee repair logistics, water quality conditions, and timelines of levee repair and suitable water quality to restore exports. The Delta Flood Emergency Management Plan has been extensively coordinated with state, federal and local emergency response agencies. DWR, in conjunction with local agencies, the Corps and Cal OES, regularly conduct simulated and field exercises to test and revise the plan under real time conditions.

DWR and the Corps provide vital Delta region response to flood and earthquake emergencies, complementary to an overall Cal OES structure. Cal OES is preparing its Northern California Catastrophic Flood Response Plan that incorporates the DWR Delta Flood Emergency Management Plan. These agencies utilize a unified command structure and response and recovery framework. DWR and the Corps, through a Draft Delta Emergency Operations Integration Plan (April 2015), would integrate personnel and resources during emergency operations.

5.3.8 Levee Improvements and Prioritization

The DWR Delta Levees Subvention Program has prioritized, funded, and implemented levee improvements along the emergency freshwater pathway and other water supply corridors in the central and south Delta region. These efforts have been complementary to the DWR Delta Flood Emergency Management Plan, which along with use of pre-positioned emergency flood fight materials in the Delta, relies on pathway and other levees providing reasonable seismic performance to facilitate restoration of the freshwater pathway after a severe earthquake. Together, these two DWR programs have been successful in implementing a coordinated strategy of emergency preparedness for the benefit of SWP and CVP export systems.

Significant improvements to the central and south Delta levee systems along Old and Middle Rivers began in 2010 and are continuing to the present time at Holland Island, Bacon Island, Upper and Lower Jones Tracts, Palm Tract and Orwood Tract. This complements substantially improved levees at Mandeville and McDonald Islands and portions of Victoria and Union Islands. Together, levee improvements along the pathway and Old River levees consisting of crest raising, crest widening, landside slope fill and toe berms, meet the needs of local reclamation districts and substantially improve seismic stability to reduce levee slumping and create a more robust flood-fighting platform. Many urban water supply agencies have participated or are currently participating in levee improvement projects along the Old and Middle River corridors.

6 San Bernardino Valley Municipal Water District

6.1 Description of Agency

Valley District was formed in 1954, under the Municipal Water District Act of 1911 (California Water Code Section 71000 et seq.) as a regional agency to plan a long-range water supply for the San Bernardino Valley. It imports water into its service area through participation in the SWP and manages groundwater storage within its boundaries. Its enabling act includes a broad range of powers to provide water, wastewater and stormwater disposal, recreation, and fire protection services. Valley District is a wholesale water agency and does not deliver water directly to retail water customers.

Valley District covers about 325 square miles mainly in southwestern San Bernardino County, about 60 miles east of Los Angeles. It spans the eastern two-thirds of the San Bernardino Valley including the Crafton Hills and a portion of the Yucaipa Valley. The following cities and communities are within its boundary: Bloomington, Colton, East Highland, Fontana, Grand Terrace, Highland, Loma Linda, Mentone, Redlands, Rialto, San Bernardino, and Yucaipa.

Valley District is responsible for long-range water supply management, including importing supplemental water, and is responsible for managing the San Bernardino Basin Area, Rialto-Colton Basin Area, and Riverside Basin Area per the Western Judgment. It also has responsibility for maintaining flows in the Santa Ana River (SAR) at the Riverside Narrows per the Orange County Judgment. It fulfills its responsibility in the SAR using treated wastewater and fulfills its responsibilities for managing local groundwater basins and by working with the BTAC each year on an annual management plan. For more information, see Chapter 2.

Valley District cooperates in a program to help replenish groundwater basins, using both SWP water and local runoff. It takes delivery of SWP water at the Devil Canyon Power Plant Afterbay, which is located just within the northwestern corner of its boundary. Water can then be conveyed east or west to various treatment plants and spreading grounds. A map illustrating Valley District's service area is shown in Figure 6-1.

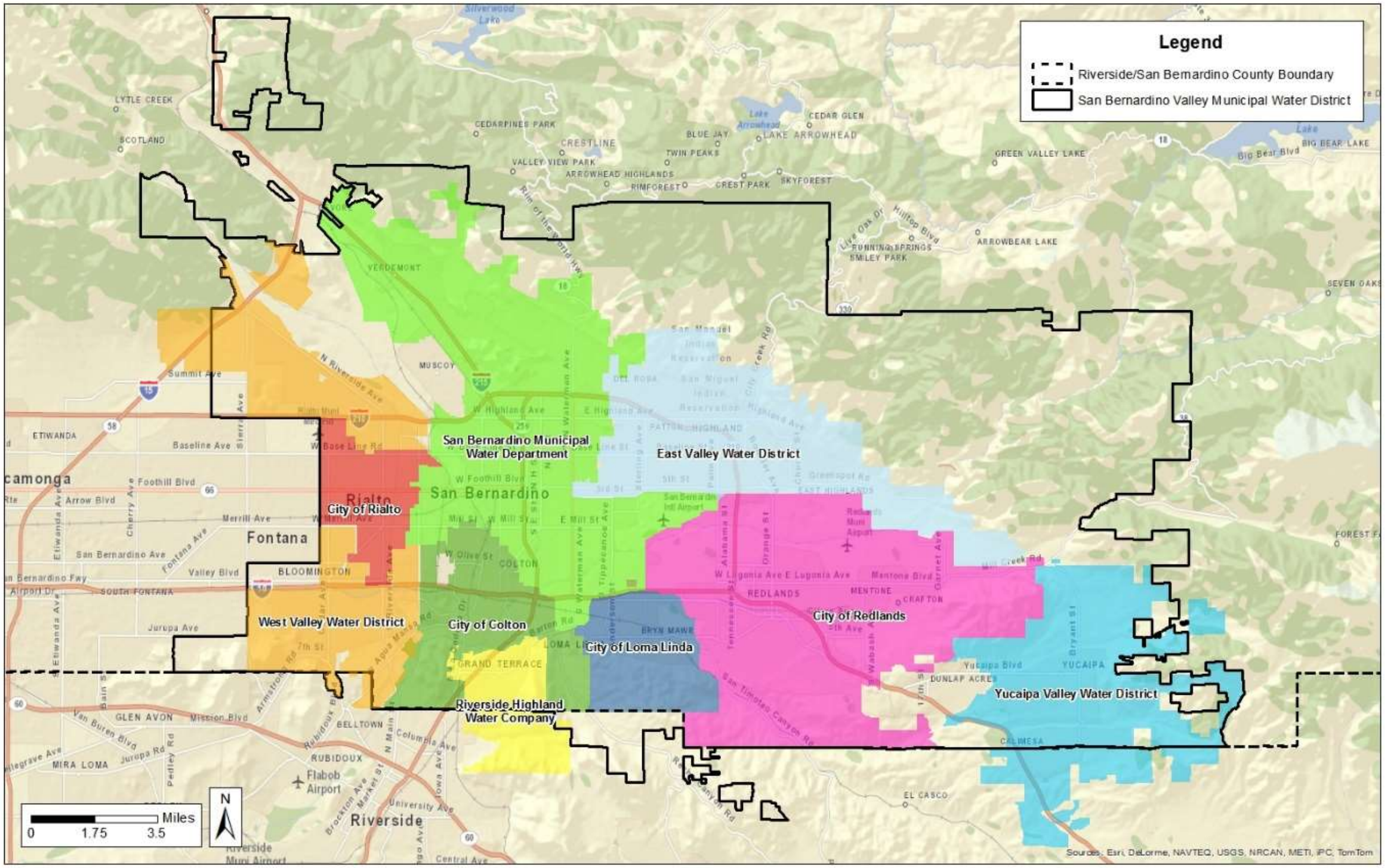

Figure 6-1. Valley District Service Area

The DWR Population Tool was used to intersect the Valley District service area with historic census population data. The estimated 2010 population within the Valley District service area is approximately 662,000. Valley District has prepared an estimate of future population for 2020 to 2040, based on an intersection of Valley District's service area with projections developed by the Southern California Association of Governments (SCAG) in their 2012 Integrated Growth Forecast. The growth rates projected by SCAG were used to estimate future population within Valley District's service area. Population projections are shown in Table 6-1.

Table 6-1. Service Area Population - Current and Projected

	2015	2020	2025	2030	2035	2040
Valley District	690,758	721,223	757,015	794,584	834,017	875,407

6.2 Climate

The climate within Valley District's service area is characterized by warm, dry summers and mild winters with moderate amounts of rainfall. Most of the precipitation occurs during the months of December through March. Table 6-2 presents average climate data for the service area, including temperature, rainfall and reference evapotranspiration (ETo).

Table 6-2. Historical Climate Data

Month	Average Temperature (°F)[1]	Average Precipitation (in.)[1]	Average Standard ETo (in.)[2]
January	52.4	3.22	2.53
February	54.6	3.25	2.87
March	56.7	2.86	4.30
April	60.9	1.29	5.38
May	65.6	0.47	5.82
June	71.3	0.09	6.76
July	77.7	0.04	7.38
August	77.7	0.15	7.09
September	73.9	0.33	5.51
October	66.5	0.71	3.97
November	58.6	1.32	2.89
December	53.3	2.38	2.38
Total		**16.1**	

Notes:
[1]NOAA weather station 0407723 in San Bernardino; data from 1893 through 2004; http://wrcc.dri.edu;
[2]CIMIS weather station 44 at University of California, Riverside; http://wwwcimis.water.ca.gov/

6.3 Supply

As discussed in Chapter 2, Valley District is a State Water Contractor and imports SWP Water into the study area. Valley District also operates groundwater wells that pump from the SBBA. Historical pumping data from the past five (5) years is shown in Table 6-3.

Table 6-3. DWR Table 4-1W. Historical Groundwater Pumping Data (AF)

Groundwater Type	Location or Basin Name	Water Quality	2011	2012	2013	2014	2015
Alluvial Basin	SBBA	Drinking Water	618	3,790	7,485	8,178	6,226
	Total		618	3,790	7,485	8,178	6,226

6.4 Demand Management Measures

In recent years, water conservation has become an increasingly important factor in water supply planning in California. Demand Management Measures (DMMs) are programs and activities through which a water supplier can communicate with their customers and encourage, regulate or incentivize water conservation.

As part of the IRWMP and UWMP process, agencies in the San Bernardino Valley area have formed a group to study and address conservation needs in the San Bernardino Valley. The first step in this process was identifying the costs and benefits of various demand management measures. Special attention was given to those demand management measures that are not cost effective for an individual agency, but which could be cost effective if implemented on as part of a regional collaboration. The second step in the process was to identify the water conservation target, which was done as part of the 2010 UWMP. At the conclusion of Steps 1 and 2, the agencies participating in this UWMP met to coordinate regional implementation of selected conservation actions. The group engaged a Regional Conservation Coordinator. In addition to the programs listed above, the Regional Conservation Coordinator leads public outreach programs and school education programs. The UWMP agencies, along with the Regional Conservation Coordinator, evaluate existing agency resources available to assist with conservation programs and then select conservation programs and processes to be implemented at the regional level. The UWMP agencies utilize the Regional Conservation Coordinator to track conservation actions, conservation successes, and estimate water savings. Valley District has played the primary role in coordinating the IRWMP and UWMP processes and is coordinating the ongoing work of the agencies to implement additional conservation.

The following is a description of Valley District's status in implementing the requirements of the revised California Urban Water Conservation Council (CUWCC) Memorandum of Understanding (MOU). For the 2015 UWMP cycle, DWR made changes to the reporting requirements for DMMs. This discussion is organized to follow the format recommended in the DWR Guidebook for Urban Water Suppliers (Guidebook).

6.4.1 Metering

All of Valley District's connections are metered. Valley District monitors these meters and repairs or replaces them as necessary.

6.4.2 Public education and outreach

Public education and outreach efforts include marketing of rebates and giveaways, communicating water use via water bills, providing school education programs, information booths at fairs and public events, newsletters, informative websites, online tools, social media, or newspaper articles.

Valley District provided $500,000 for a demonstration garden at California State University San Bernardino and is spending $11,000 on maintenance of the garden in 2016. In addition, Valley District is also funding public education classes in the garden during Fiscal Year (FY) 15-16 at a rate of about two per month and is preparing eye-catching posters that will be displayed in the garden. Valley District has also provided almost $400,000 toward the launch of a new, regional public outreach campaign, iEfficient.com. The District also has conservation-related information on its website.

Valley District funds a consultant to provide school education programs to retail agencies in its service area. Currently, the program has focused on the agencies that have most of Valley District's population: West Valley Water District, East Valley Water District, the City of Redlands, and the City of San Bernardino.

In FY 12-13, Valley District began offering courses to adults, in addition to the courses offered to schools. Table 6-4 provides a summary of the outreach that was performed between 2007 and 2015.

Table 6-4. Water Conservation Education Programs Completed by Valley District

Year	School Programs	Adult Programs
2007	2	0
2008	24	0
2009	39	0
2010	55	0
2011	60	0
2012	83	0
2013	100	2
2014	70	80
2015	120	130
Total	553	212

In addition to this educational programming, Valley District has sponsored the Inland Solar Challenge since 2008. This event requires students to build a solar powered boat and to prepare and present a report on a water use efficiency topic.

6.4.3 Water conservation program coordination and staffing support

A part-time coordinator has been assigned to manage water conservation efforts. The position is filled by the Manager of Water Resources. In addition, Valley District utilizes consultants to manage water conservation activities. Valley Soil assists with the Weather Based Irrigation

Controller Program (WBIC), the Inland Empire Resource Conservation District provides public education programs, and CV Strategies coordinates the public outreach program, iEfficient.

6.4.4 Other demand management measures

Valley District is not a retail agency but does support water waste prohibition and water conservation. The District is actively involved in supporting its retailers through a variety of programs including: school education programs to four of its retail agencies (WVWD, EVWD, Redlands, and San Bernardino); allocating funding (over $430,000) towards WBIC incentives; and as the primary contributor ($500,000) to the proposed San Bernardino Valley Water Conservation Demonstration Garden at California State University, San Bernardino.

In addition, Valley District started and has taken a leadership role in developing the iEfficient and Inland Empire Garden Friendly Programs. These programs seek to save water by helping consumers implement “climate appropriate” plants and the installation of drip irrigation systems. This program has corporate sponsors, the largest of which is Home Depot.

6.4.5 Asset management

Valley District is a wholesale water agency with no retail customers, and its system consists of steel pipe that is welded internally and externally. Properly welded joints do not leak. Therefore, the only likely place the pipeline could leak is at delivery points. These points are inspected on a monthly basis and are dry.

6.4.6 Wholesale supplier assistance programs

Valley District is actively involved in supporting its retailers through a variety of programs mentioned above.

Valley District, because it is a wholesale agency, is not directly implementing water survey programs for single-family residential and multi-family residential customers, residential plumbing retrofits, metering with commodity rates, large landscape conservation programs, high efficiency washing machine rebate programs, or CII programs. Rather, Valley District supports the retail agencies with their conservation programs by providing 25% of what they pay to their customers.

In addition, Valley District has also provided up to $200,000 in FY 15-16 for residential turf removal and about $828,000 for turf removal at larger, institutional sites, totaling over $1 million in turf removal. Valley District continues to offer a WBIC program for large water users. Under this program, Valley District pays 50 percent of the costs and the customer pays the other 50 percent of the cost making this a “free” program to the water retailers. Some of the water retailers have chosen to increase the incentive to the customer by splitting the customer portion of the cost with them.

6.5 Water Shortage Contingency Plan

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, a fire or earthquake which damage delivery or storage facilities, chemical spill, or a regional power outage. Section 5 of this UWMP describes water shortage contingency planning for regional water supply sources.

6.6 Supply and Demand Comparisons

The UWMP Act requires urban water suppliers assess water supply reliability by comparing total projected water use with the expected water supply over the next 20 years in 5-year increments. The UWMP Act also requires an assessment of single-dry year and multiple-dry years. These comparisons for the Valley District are presented in Chapter 4 of this UWMP.

6.7 Adoption

Valley District, on behalf of the retail agencies, sent letters to cities and counties, as well as other water agencies, notifying them of RUWMP preparation and soliciting input to the Plan. Notification letters were sent in February and March 2016. Each agency published hearing notices consistent with UWMP Act requirements. Hearings were conducted by each agency regarding the selection of water use targets, the implementation plan for complying with SB X7-7, and the potential economic impacts of complying with SB X7-7.

Valley District held a public hearing to present the draft RUWMP. Valley District provided notice of the public hearing to the cities and counties to which it provides water. These agencies are identified in Appendix C.

Legal public notices for the public hearing were published in the local newspapers and posted at Valley District offices and on the Valley District website. The notice that was published in advance of the public hearing is attached as Appendix C.

Copies of the draft RUWMP were available at the Valley District office located at 380 E Vanderbilt Way, San Bernardino CA 92408 or as a PDF on the Valley District website prior to the public hearing.

The draft Final RUWMP was presented to the Board at a public hearing on June 7, 2016.

The draft Final RUWMP was presented to the Board for adoption on June 22, 2016.

A copy of the resolution adopting the RUWMP is attached as Appendix D.

7 East Valley Water District

7.1 System Description

East Valley Water District (EVWD) is a California Special District, established in 1954, that provides water and wastewater services. EVWD encompasses 30 square miles along the foothills of the San Bernardino Mountains within the cities of San Bernardino and Highland, and the county of San Bernardino. As an agency tasked with managing a critical resource, EVWD is committed to innovative leadership and world class public service.

Figure 7-1 shows the EVWD service area.

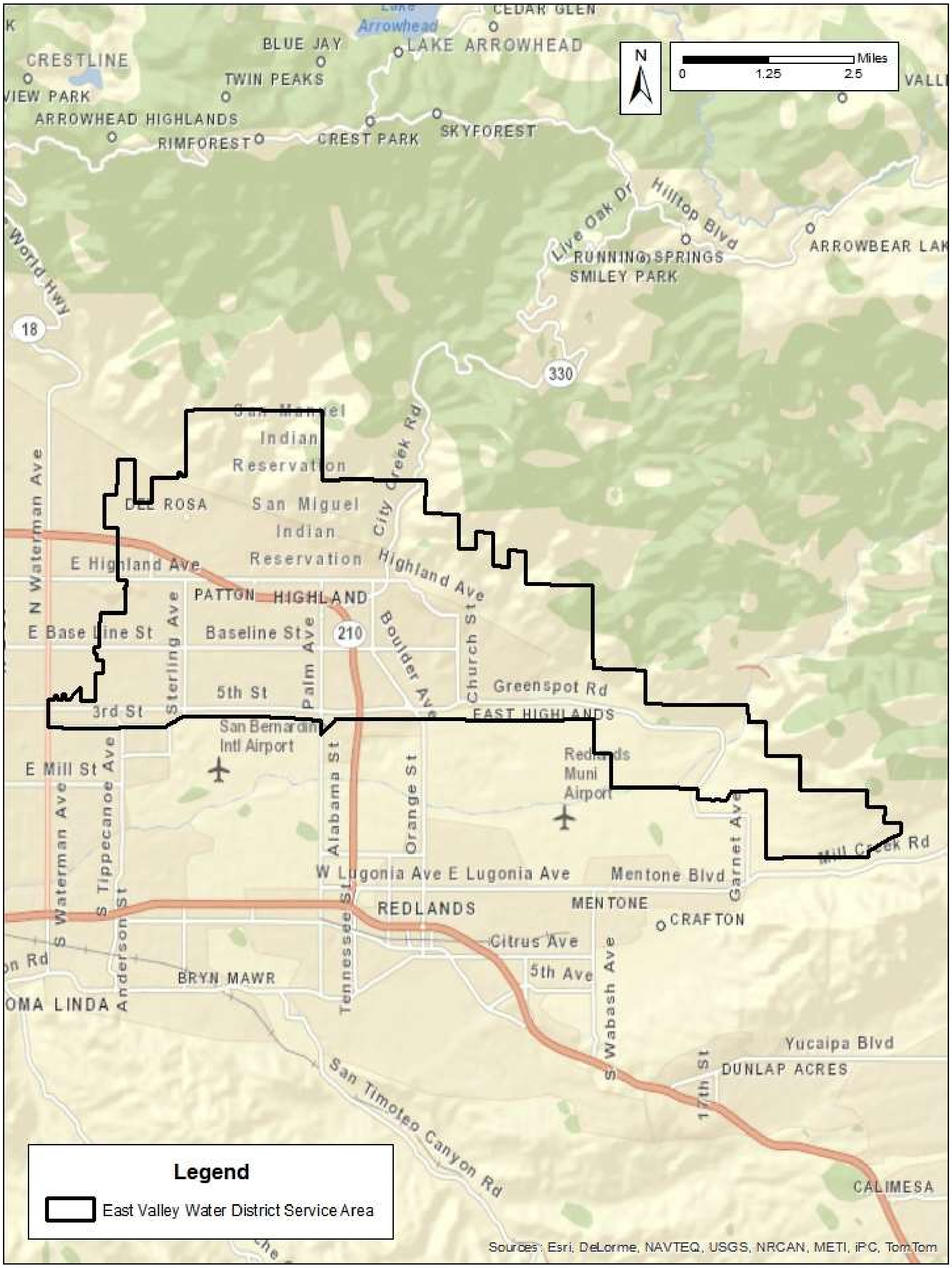

Figure 7-1. East Valley Water District Service Area

The DWR Population Tool was used to intersect the service area boundary in Figure 7-1 with census data to provide population estimates for 1990, 2000, and 2010. Population for intermediate non-census years was estimated using a constant growth rate, as connection data was not available for all the intermediate years. The service area population for 2015 was then estimated using the number of connections in 2010 and 2015.

EVWD competed a 2014 Water Master Plan that included a detailed projection of expected future growth related to proposed developments. These projections from the 2014 Water Master Plan were used to estimate future populations in the service area.

The estimated service area populations are shown in Table 7-1.

Table 7-1. DWR Table 3-1R. Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040
Population Served	104,457	124,062	130,391	135,690	141,205	146,945

7.1.1 Service Area Climate

EVWD is located on the eastern side of the San Bernardino Valley and within the South Coast Hydrologic Region. The climate typically exhibits hot, dry summers and mild, wet winters. Climate is a primary factor that influences water demand within the EVWD service area. Most rainfall occurs during the months of November through April. The hottest and driest period of the year is from June through September. It is not unusual during the summer months to have several consecutive days that the daily temperature exceeds 100 degrees Fahrenheit.

Average temperature, precipitation, and evapotranspiration by month are shown in Table 7-2. Evapotranspiration (ET) is the water lost to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity. ET from a standardized grass surface is commonly denoted as ETo.

Table 7-2. Historical Climate Data

Month	Average Temperature (°F)[1]	Average Precipitation (in.)[1]	Average Standard ETo (in.)[2]
January	52.4	3.22	2.53
February	54.6	3.25	2.87
March	56.7	2.86	4.30
April	60.9	1.29	5.38
May	65.6	0.47	5.82
June	71.3	0.09	6.76
July	77.7	0.04	7.38
August	77.7	0.15	7.09
September	73.9	0.33	5.51
October	66.5	0.71	3.97
November	58.6	1.32	2.89
December	53.3	2.38	2.38
Total		16.1	

Notes:
[1]NOAA weather station 0407723 in San Bernardino; data from 1893 through 2004; http://wrcc.dri.edu;
[2]CIMIS weather station 44 at University of California, Riverside; data from 1986 – 2015; http://wwwcimis.water.ca.gov/

7.2 System Water Use

7.2.1 Water Uses by Sector

EVWD categorizes its water use customers as follows: single family residential, multi-family residential, commercial, irrigation commercial, fire service, bulk water and schools. The few light industrial and governmental/institutional users are included within the commercial category. EVWD's Irrigation/Landscape customers represent approximately one and a half percent of the current metered services and eight (8) percent of the consumptive water use. These customers include parks, large commercial, and community and institutional landscape areas. The land use development trend within the EVWD's service area has historically been from agriculture to residential. In 2000, 86 percent of accounts were residential, growing to 92 percent in 2015. A continuing increase in residential customers is expected. While there are agricultural uses in the EVWD service area, these users do not receive water from EVWD. Actual water deliveries from 2011 through 2015 are provided in Table 7-3.

Fire service connections account for services such as:

- Hydrant Testing and Flushing - Hydrant testing is performed by EVWD. EVWD performs a comprehensive testing program to monitor the level of fire flows available throughout the service area.
- Fire Hydrant Operations by the Fire Department - This represents the use of water for emergencies.

In the past, EVWD has not had water use related to saline barriers, groundwater recharge operations, or recycled water. However, EVWD, like many water agencies, does have some nonrevenue water. Nonrevenue water is the difference between the amount of water produced and the amount of water billed to customers. Over the last four years, nonrevenue water has been approximately 10 percent of water sold within EVWD's system.

Sources of nonrevenue water include:

- Customer Meter Inaccuracies - Customer meters represent one of the main sources of nonrevenue water as they tend to under-represent actual consumption in the water system. EVWD has a replacement program to replace aging meters and a systematic program to replace meters on a 10-year basis.
- Water used for flushing and fire hydrant operations
- Unauthorized uses or theft of water
- Leaks from water lines - Leakage from water pipes is a common occurrence in water systems. A significant number of leaks remain undetected over long periods of time as they are very small; however, these small leaks contribute to the overall nonrevenue water.
- Reservoir overflows - This represents unrecorded water use when reservoirs overflow.

The historic and estimated future demands are shown in Table 7-3 and Table 7-4 in acre feet (AF). The future demands have been estimated by adjusting the 2015 demands for two factors. To account for population growth, the demands were assumed to increase at the same rate as the estimated service area population. To account for potential changes in consumption after the mandatory drought restrictions are phased out, the per-capita consumption was assumed to rebound to the 2020 compliance target.

Table 7-3. DWR Table 4-1R. Demands for Potable Water – Actual (AF)

Use Type	Level of Treatment When Delivered	2011	2012	2013	2014	2015
Single Family	Drinking Water	11,302	11,696	12,012	11,702	9,434
Multi-Family	Drinking Water	0	0	0	0	2,589
Commercial	Drinking Water	5,272	5,462	5,443	5,123	2,181
Irrigation Commercial	Drinking Water	1,756	2,261	1,969	1,978	1,537
Fire Service	Drinking Water	0	0	0	94	0
Other	Drinking Water	237	143	162	109	45
Nonrevenue	Drinking Water	3,835	2,226	2,737	1,132	1,157
	Total	22,401	21,788	22,322	20,138	16,942

Table 7-4. DWR Table 4-2R. Demands for Raw and Potable Water – Projected (AF)

Use Type	Additional Description	2020	2025	2030	2035	2040
Single Family		13,533	14,223	14,801	15,403	16,029
Multi-Family		3,713	3,903	4,061	4,227	4,398
Commercial		3,129	3,289	3,423	3,562	3,706
Irrigation Commercial		2,204	2,317	2,411	2,509	2,611
Other		64	68	70	73	76
Nonrevenue		2,264	2,380	2,477	2,577	2,682
	Total	24,909	26,179	27,243	28,350	29,503

EVWD's total demands including expected recycled water use are shown in Table 7-5. Recycled water is discussed further in Section 7.6.

Table 7-5. DWR Table 4-3R. Total Water Demands (AF)

Demand	2015	2020	2025	2030	2035	2040
Potable and Raw Water	16,942	24,909	26,179	27,243	28,350	29,503
Recycled Water Demand	0	6,700	6,700	6,700	6,700	6,700
Total Water Demand	16,942	31,609	32,879	33,943	35,050	36,203

7.2.2 Distribution System Water Losses

EVWD has an active water loss control program and has performed a water loss audit using the AWWA Manual 36 for FY 2015. The audit results are summarized in Table 7-6.

Table 7-6. DWR Table 4-4R. Water Loss Summary Most Recent 12 Month Period Available

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss

In the near term EVWD will focus on refining its information and identifying categories of real losses. In addition, EVWD will continue its leak detection and water main replacement program. The AWWA water audit methodology will be performed annually and losses carefully monitored.

7.2.3 Estimating Future Water Savings

EVWD is committed to long-range planning to provide a reliable, cost-effective water supply to its customers. EVWD actively monitors water consumption in its service area, in part to prepare required monthly reports for the State Water Resources Control Board.

For this report, EVWD has projected that future demands will increase at a percentage growth rate that incorporates two factors: the percentage growth in service area population, and potential changes in the per-capita consumption. This approach provides estimates for future system-wide demand that can be used for long-range planning.

In the 2015 UWMP, water suppliers have the option of preparing more detailed demand forecasts by estimating demand factors based on land use categories. For example, EVWD could identify typical water use per single family customer and per commercial account. These customer classes can be further sub-divided by lot size, neighborhood, or other variables. The intent is to quantify the estimated water use per customer in different customer classes, and then to forecast how future changes will impact water use within each customer class.

For this document, EVWD has elected not to develop land use-based demand factors and apply future savings from codes and standards. Recent drought regulations have induced significant changes in water consumption patterns, and there is considerable uncertainty as to how demands will change in the future if the drought subsides. Given this uncertainty, EVWD has elected not to quantify passive savings for this UWMP.

7.2.4 Water Use for Lower Income Households

Senate Bill 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing 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.

The EVWD contains three jurisdictions, the City of Highland, the City of San Bernardino, and unincorporated County of San Bernardino. EVWD reviewed the most recent General Plan for each of these entities to determine the percentage of households that are lower income (less than 80 percent of the median household income). EVWD estimated a weighted average of 45 percent of households in the service area are lower income. In the absence of more detailed information, EVWD estimated that this percentage applies to its single-family residential and multi-family residential water use across the service area. The estimated water use for lower-income households is shown in Table 7-7. These demands are included in the projections presented throughout this report.

Table 7-7. Estimated Demands for Lower-Income Households (AF)

Demand	2015	2020	2025	2030	2035	2040
Single Family Residential	4,245	6,090	6,400	6,661	6,931	7,213
Multi-Family Residential	1,165	1,671	1,756	1,828	1,902	1,979
Total	5,410	7,761	8,157	8,488	8,833	9,192

EVWD will not deny or put unreasonable conditions for water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households unless one of the following occurs:

- EVWD specifically finds that it does not have sufficient water supply

- EVWD is subject to a compliance order issued by the State that prohibits new water connections
- the applicant has failed to agree to reasonable terms and conditions relating to the provision of services

The conditions above apply to all applicants and developers.

7.3 SB X7-7 Baselines and Targets

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). EVWD had previously calculated baseline water use and water use targets in the 2010 RUWMP. However, for the 2015 UWMP, DWR has required that agencies use 2010 census data in the calculation of service area populations. EVWD has re-calculated its historic service area population using the DWR Population Tool, and in this section presents an updated calculation of baseline water use and water use targets.

DWR has prepared standardized tables to record and document the calculations required for this section. The standardized tables for EVWD's calculations are included in Appendix O.

7.3.1 Baseline Water Use

Years 1999 to 2008 have been selected for calculation of the 10-year base period, while years 2004 to 2008 have been selected for calculation of the 5-year base period.

EVWD's service area population was calculated using the DWR Population Tool. The GIS-based tool was used to intersect EVWD's service area with census data. The tool directly calculated a service area population for 1990, 2000, and 2010. Populations for intermediate years were estimated using the number of service connections.

The calculation of gross water use begins with the total amount of water that was put into the potable water distribution system by EVWD. Water that was exported to another agency was then subtracted, to leave the amount used by EVWD retail customers.

For the period from 1999 through 2008, the 10-year average Base Daily Per Capita Water Use for EVWD is 215 GPCD; the 5-year is 209 GPCD.

7.3.2 2015 and 2020 Targets

DWR allows agencies to select from four potential methods for calculating the compliance and interim water use targets as set forth by Water Code section 10608.20(b). EVWD has selected Method 4. The Compliance Water Use Target under Method 4 is Base Daily GPCD less:

- Indoor residential water savings of 15 GPCD or an amount determined by use of DWR's "BMP Calculator"
- 20 percent savings on all unmetered uses

- 10 percent savings on Baseline CII (expressed in GPCD)
- 21.6 percent savings on current landscape and water loss uses (expressed as GPCD)

EVWD is choosing to use the default value of 15 GPCD for the indoor residential water savings. EVWD has no unmetered uses. Baseline CII water use was estimated using CII water sales in the year at the midpoint of the baseline range. Baseline CII water use is 56 GPCD.

DWR has provided the following formula for calculating landscape and water loss uses:

= Base Daily Per Capita Water Use - Default Indoor Water Use (70 GPCD) - Baseline CII

Based on this formula, EVWD's landscape and water loss use is:

= 215 GPCD - 70 GPCD - 56 GPCD = 89 GPCD

EVWD's Compliance Water Use Target is calculated as 175 GPCD.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95 percent of a 5-year average. The Maximum Allowable GPCD is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBX7-7 legislation. Specifically, if an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as their target.

Based on 95 percent of the 5-year baseline average, the Maximum Allowable GPCD is 199. The Compliance Water Use Target under Method 4 is less than the Maximum Allowable GPCD, so no adjustments to the Compliance Water Use Target are necessary.

The results are summarized in Table 7-8.

Table 7-8. DWR Table 5-1R. Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD	2015 Interim Target	Confirmed 2020 Target
10-year	1999	2008	215	195	175
5-year	2004	2008	209		

7.3.3 2015 Compliance Daily per Capita Water Use

EVWD's calculated GPCD for 2015 is below the interim water use target. The results are summarized in Table 7-9.

Table 7-9. DWR Table 5-2R. 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Extra-ordinary Events	Economic Adjustment	Weather Normal-ization	Total Adjustments	Adjusted 2015 GPCD	2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015?
145	195	0	0	0	0	145	145	YES

7.4 Demand Management Measures

The goal of the Demand Management Measures (DMM) section in a UWMP is to provide a comprehensive description of the water conservation programs that a supplier has implemented, is currently implementing, and plans to implement in order to meet its urban water use reduction targets.

7.4.1 Water waste prevention ordinances

EVWD has a water shortage contingency plan that identifies the level of shortage, prohibitions and associated consumption reduction, penalties and charges. The Water Shortage Contingency Plan was again addressed in Section 15 of Ordinance 395, adopted on June 1, 2015, which prohibits gutter flooding, non-recirculating fountains, customer plumbing leaks, hosing of hard surfaces, and automatic water serving in restaurants during times of stage 2 and 3 water shortages (Ordinance 395 is included in Appendix G). There are no available estimates on the conservation savings resulting from this DMM or the effects of this DMM on EVWD’s ability to further reduce demand.

7.4.2 Metering

All of EVWD’s customers are metered as are all new connections. EVWD has a meter maintenance and replacement plan. EVWD is in the process of upgrading its meters to Advanced Metering Infrastructure (AMI) meters. EVWD has identified 6,000 meters for replacement during Phase 1 and 18,000 during Phases 2, 3, and 4. EVWD expects to begin this program in 2016.

7.4.3 Conservation pricing

EVWD charges its Residential customers for potable water use in three separate pricing tiers. The first tier is an estimate of indoor water use and the second tier is an estimate of efficient outdoor water use. Tiers one and two are considered in-budget water use and tier three represents inefficient water usage. EVWD charges its Commercial customers differently in that their water budget is based on the customer's historic use for the same billing periods of the prior two years. EVWD calculates an average year demand for a billing period based on the same billing period of the past two years. Commercial customers’ water budget may be adjusted by EVWD. Usage in excess of the water budget is billed at inefficient use Tier 3 pricing. A more thorough explanation of EVWD’s customer billing procedures is given in Section 10 of Ordinance 395, attached in Appendix G.

7.4.4 Public education and outreach

EVWD consistently works to educate the public and increase awareness of the District's projects and programs in the local and regional community. Effective communication is provided through a number of methods from bill inserts, handouts, informative flyers, and direct mail pieces to newspaper and bus shelter advertisements, news releases, social media outreach, and website content. District staff participate in career day and school events, offer tours of District facilities and support community events with information booths. Yard signs, fact sheets, rebate programs, monthly conservation tips, vehicle magnets, banners, educational workshops, and regular staff communication are also part of the District's comprehensive outreach program. Each piece is designed in-house without the use of consultants.

Outreach efforts are used to establish a connection with customers, increase District visibility, promote a transparent operation, and foster an environment of enhanced public service. EVWD also provides school visits and presentations when requested by the school. EVWD meets this demand management measure at all compliance levels.

7.4.5 Programs to assess and manage distribution system real loss

EVWD has an active water loss control program and is in the process of conducting a water audit for FY2016-17. EVWD uses Cityworks work order program to track leaks, flushing, and other non-revenue water sources. Through Cityworks and staying proactive in reviewing water mains throughout the service area, EVWD identifies problem areas in the distribution system that need to be repaired or upgraded. EVWD uses preventative maintenance to ensure safe delivery of water to all of its customers.

7.4.6 Water conservation program coordination and staffing support

EVWD has expanded the conservation program from a single person, to adding a full time conservation coordinator, a part time conservation representative, shared time for outreach staff, and has empowered all District staff to take an active role in the drought response. The programs budget is funded through budget based water rates.

7.4.7 Planned Implementation to Achieve Water Use Targets

EVWD's current per-capita consumption is less than its 2020 compliance target. EVWD expects to continue to implement its current conservation programs to encourage conservation and maintain per-capita consumption below the compliance target.

7.4.8 Other Demand Management Measures

EVWD offers a Weather Based Irrigation Controller Direct installation program that addresses excess watering throughout the year. The program uses advance technology to help replenish the appropriate amount of water lost to evaporation based on varying weather conditions. EVWD also implemented a Water Budget Based Rate Structure in June 2015. This industry best practice increases the Districts ability to address drought challenges. It offers a clear indication of where customers have potential to save, not only from a pricing perspective, but through the presence of Tier 3 water usage.

7.5 System Supplies

EVWD's water supply consists primarily of groundwater from wells in the western portion of the service area. These wells, in the San Bernardino Basin Area (SBBA), supply approximately 80 percent of the total water supply. In addition to groundwater, Plant 134, an 8-MGD water treatment plant, provides surface water from the Santa Ana River and the SWP.

7.5.1 Purchased or Imported Water

Imported water available to EVWD is SWP purchased from Valley District. A description of this supply and its reliability is provided in Chapter 2. EVWD currently supplements its local supply with SWP deliveries from Valley District and in the past this SWP has made up a small amount of EVWD's water supply. EVWD anticipates seeking regular SWP supplies to supplement Santa Ana River water to run Surface Water Treatment Plant 134. Plant 134 was designed to treat Santa Ana River water and SWP and was completed in 1996. In 2013, the plant was upgraded from 4 MGD to 8 MGD of design capacity.

7.5.2 Groundwater

Over the last five years, EVWD has drawn approximately 80 percent of its water supply from wells located within the San Bernardino Basin Area. Currently, 17 wells provide a rated capacity of 27,586 GPM.

EVWD's historical production for the past five years is shown in Table 7-10.

Table 7-10. DWR Table 6-1R. Groundwater Volume Pumped (AF)

Groundwater Type	Location or Basin Name	Water Quality	2011	2012	2013	2014	2015
Alluvial Basin	SBBA	Drinking Water	18,375	18,564	18,898	18,157	13,501
	Total		18,375	18,564	18,898	18,157	13,501

7.5.3 Surface Water

EVWD has current water rights of 5 MGD (4,500 AFY) of Santa Ana River water through stock ownership in the North Fork Mutual Water Company. EVWD is currently the major shareholder in the company and continues to pursue the purchase of additional stock.

7.5.4 Stormwater

EVWD is participating in regional planning efforts to capture additional stormwater for purposes of groundwater recharge.

7.5.5 Wastewater and Recycled Water

7.5.5.1 Recycled Water Coordination

EVWD provides wastewater collection service to its customers. Wastewater treatment is provided by a regional treatment plant, located downstream and outside of EVWD's sphere of influence. A Joint Powers Agreement (JPA) was formed in 1957 between EVWD and the neighboring San Bernardino Municipal Water Department (SBMWD) whereby SBMWD treats all wastewater generated within the EVWD service area.

7.5.5.2 Wastewater Collection, Treatment, and Disposal

Wastewater from the EVWD service area is treated to secondary levels at the San Bernardino Regional Wastewater Reclamation Plant and to tertiary levels at the Rapid Infiltration/Extraction (RIX) Plant. In 1995, SBMWD began operation of RIX to provide additional treatment of secondary effluent from the existing plants of SBMWD and the City of Colton. The RIX plant is located approximately 6 miles southwesterly and downstream of EVWD's southwesterly boundary.

Table 7-11. DWR Table 6-2R. Wastewater Collected within Service Area in 2015

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AF)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
East Valley Water District	Estimated	6,721	City of San Bernardino	San Bernardino Water Reclamation Plant	No	No
	Total Wastewater Collected from Service Area in 2015	6,721				

San Bernardino Valley Municipal Water District, in cooperation with EVWD is in the planning stages for a project that would involve a new treatment plant to produce recycled water. This project, the Sterling Natural Resource Center, is expected to capture approximately 6 mgd (in the first phase) of wastewater generated by customers within EVWD's service area. This new facility would produce recycled water for groundwater recharge.

7.5.5.3 Recycled Water Beneficial Uses

The future beneficial use has been estimated using planning documents prepared for the Sterling Natural Resource Center.

Table 7-12. DWR Table 6-4R. Current and Projected Recycled Water Direct Beneficial Uses within Service Area (AF)

Name of Agency Producing (Treating) the Recycled Water:	East Valley Water District							
Name of Agency Operating the Recycled Water Distribution System:	East Valley Water District							
Supplemental Water Added in 2015	0							
Source of 2015 Supplemental Water	None							
Beneficial Use Type	**General Description of 2015 Uses**	**Level of Treatment**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Groundwater recharge		Tertiary	0	6,700	6,700	6,700	6,700	6,700
Total			0	6,700	6,700	6,700	6,700	6,700

7.5.5.4 Actions to Encourage and Optimize Future Recycled Water Use

EVWD has plans to implement groundwater recharge by 2020. There are no plans to use recycled water for any other purposes in the foreseeable future.

Table 7-13. DWR Table 6-6R. Methods to Expand Future Recycled Water Use

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use (AF)
Sterling Natural Resource Center	Groundwater recharge	2020	6,700

7.5.6 Desalinated Water Opportunities

The development of (or financial participation in) a new seawater desalination project, while costly, is being investigated by other wholesale and retail water agencies in southern California. Because the San Bernardino Valley is an inland area, in order for desalination to work it would be necessary to join with other water purveyors in the development of a coastal desalination facility and then receive water from the SWP supplies of other participants via an exchange. It is not cost-effective for the San Bernardino Valley to receive direct delivery of desalted ocean water.

Seawater desalination is an alternative that is technically viable. However, production and treatment costs have historically been several times higher than those of SWP costs and conventional treatment.

7.5.7 Exchanges or Transfers

EVWD has emergency water supply connections to two adjacent water purveyors (SBMWD and the City of Riverside) to meet needs during periods of lowered groundwater levels, but these are short-term, as needed purchases and are not accounted for as additional water supply.

7.5.8 Future Water Projects

EVWD is currently enhancing its ability to utilize its existing water supply sources through several projects that are in various phases of implementation, from planning to preliminary design to construction. EVWD is evaluating additional projects to meet water demand at build-out conditions. These projects will be implemented as required by development in the service area. Supply sources potentially available to EVWD include:

- Potential new groundwater wells
- Potential new 6 MGD surface water treatment plant in the Harmony area
- Potential regional conjunctive use projects with Valley District

These projects do not increase water supplies available to EVWD, but rather allow EVWD to increase utilization of existing supplies and to make deliveries to the different portions of the service area. EVWD has current water rights of 5 MGD (4,500 AFY) of Santa Ana River water with the ability to expand to about 6.5 MGD (7,300 AFY) through the conversion of remaining agricultural properties and water shares of stock. EVWD holds rights to direct delivery of native surface water, through stock ownership in the North Fork Mutual Water Company. EVWD is currently the major shareholder in the company and continues to pursue the purchase of additional shares. As agricultural land converts to urban uses, EVWD gains not only the new urban demand but the associated water stock shares. These additional supplies are shown in Table 7-14.

Table 7-14. DWR Table 6-7R. Expected Future Water Supply Projects or Programs

Name of Future Projects or Programs	Joint Project with Other Agencies?	Other Agency Names	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Agency (AF)
Sterling Natural Resource Center	Yes	Valley District	New wastewater reclamation plant	2020	Normal	6,700

7.5.9 Summary of Existing and Planned Sources of Water

Table 7-15 summarizes the water resources used by EVWD in 2015, and the projected future supplies are summarized in Table 7-16. The estimated amount of imported water supply shown in Table 7-16 has been estimated by EVWD and provided to Valley District.

Table 7-15. DWR Table 6-8R. Water Supplies - Actual

Water Supply	Additional Detail on Water Supply	2015 Actual Volume (AF)	2015 Water Quality
Groundwater	SBBA	13,501	Drinking Water
Surface Water	Santa Ana River	3,664	Drinking Water
Purchased or Imported Water	SBVMWD Tier 1	2,870	Drinking Water
	Total	20,035	

Table 7-16. DWR Table 6-9R. Water Supplies – Projected (AF)

Water Supply	Additional Detail on Water Supply	Water Quality	2020	2025	2030	2035	2040
Groundwater	SBBA	Drinking Water	21,012	24,850	28,742	32,692	32,692
Surface Water	Santa Ana River	Drinking Water	7,300	7,300	7,300	7,300	7,300
Purchased or Imported Water	SBVMWD Tier 1	Drinking Water	8,960	8,960	8,960	8,960	8,960
Recycled Water	Sterling Natural Resource Center	Tertiary	6,700	6,700	6,700	6,700	6,700
	Total		43,972	47,810	51,702	55,652	55,652

7.6 Water Supply Reliability Assessment

7.6.1 Imported Water

During times of State-wide drought conditions, the availability of SWP may be reduced. These conditions are normally known in advance, providing EVWD with the opportunity to plan for the reduced supply. During a drought period, it is Valley District's priority to make direct deliveries to the water treatment plants operated by Redlands, WVWD, YVWD, SBMWD, and EVWD and to maintain lake levels at Big Bear Lake (Big Bear Lake water also feeds the water treatment plants of Redlands and EVWD). Because EVWD's water treatment plant can use local surface water and imported water, during a single-dry year EVWD may elect to take a small amount of imported water, making more imported water available to other agencies. In this case, EVWD would utilize additional groundwater through groundwater well production from the SBBA. In a multiple dry year Valley District expects between 44,858 AF and 45,910 AF of water to be available, meaning Valley District could fulfill normal direct deliveries to water treatment plants in a multiple-dry year, including the EVWD treatment plant. Table 7-22 and Table 7-23 estimate how imported water supplies available to EVWD may be reduced during drought conditions.

7.6.2 Groundwater

Some of EVWD's wells are impacted by nitrate, perchlorate, fluoride, uranium, and/or VOCs. EVWD has suspended operation at Well 12A. As described below, EVWD has plans in place that will allow these wells to come back on-line. EVWD continues to monitor groundwater contamination and the movement of groundwater contaminant plumes. In response to water quality concerns EVWD has altered operations at other wells to compensate for the reduced capacity and the following actions have been put into place to protect EVWD supply:

- A wellhead treatment facility has been implemented to treat VOCs from Well 28A using granulated activated carbon.
- At Plant 107, wellhead nitrate and perchlorate treatment facility has been put into operation.
- EVWD blends water from Well 39 to deal with high fluoride levels.
- EVWD continues to monitor for nitrates in Wells 25A, 28A, and 9.

These past and ongoing groundwater treatment projects have demonstrated that treatment is an economically viable alternative for handling volatile organic compounds, perchlorate, nitrates, and uranium. To manage the long-term potential for continued groundwater contamination, EVWD has an on-going land acquisition program. EVWD has vacant land available for future facilities. Sites are selected for the development of new wells based on knowledge of the plumes' movement, land availability and engineering feasibility. Based on current conditions water quality is not anticipated to affect EVWD supply reliability. However, water quality issues are constantly evolving. EVWD will take action to protect and treat supplies when needed, but it is recognized that water treatment can have significant costs.

As described in Chapter 2, the SBBA is adjudicated on a safe yield basis. EVWD therefore has the opportunity to develop additional wells and over-extract groundwater under specified conditions contained in the stipulated judgment. The wells in general have provided a stable source of water supply. Past records show that EVWD has not removed any well from its supply source during drought conditions, although, some wells had to be lowered to continue extraction of groundwater. During 1990, the driest year on record for the Southern California, EVWD was impacted only by lowered groundwater levels and increased pumping costs. EVWD maintained full capability to use all wells within its system. As described in Chapter 2, extensive modeling has been used to examine groundwater recharge, groundwater pumping, basin storage, groundwater flow, and groundwater plume location and plume migration.

7.6.3 Reliability by Type of Year

Based on the studies and information listed above it is anticipated that groundwater pumping by EVWD and other SBBA users in the Valley District service area will not be reduced or curtailed during a single-dry or multi-dry year.

7.6.4 Regional Supply Reliability

EVWD currently supplements its local supply with SWP deliveries from Valley District and in the past this SWP has made up a small amount of EVWD's water supply. EVWD anticipates seeking regular SWP supplies to supplement Santa Ana River water to run Surface Water Treatment Plant 134.

7.7 Water Shortage Contingency Planning

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, an earthquake which damages delivery or storage facilities, or a regional power outage. Chapter 5 of this UWMP describes water shortage contingency planning for regional water supply sources (imported water, groundwater). This section focuses on water shortage contingency planning for EVWD.

7.7.1 Stages of Action

Section 15 of Ordinance 395, attached in Appendix G, sets forth a three-stage water shortage contingency plan for the conservation of water. This plan includes voluntary and mandatory conservation measures; key elements are included herein.

7.7.1.1 Stage 1 – Normal Conditions: Voluntary Conservation Measures

Normal conditions shall be in effect when the District is able to meet all the water demands of its customers in the immediate future. During normal conditions all water users should continue to use water wisely, to prevent the waste or unreasonable use of water, and to reduce water consumption to that necessary for ordinary domestic and commercial purposes.

7.7.1.2 Stage 2 – Threatened Water Supply Condition

In the event of a threatened water supply shortage which could affect the District's ability to provide water for ordinary domestic and commercial uses, the Board of Directors shall hold a public hearing at which consumers of the water supply shall have the opportunity to protest and to present their respective needs to the District. The Board may then, by resolution, declare a water shortage condition to prevail, and the conservation measures in Table 7-18 shall be in effect.

7.7.1.3 Stage 3 – Water Shortage Emergency: Mandatory Conservation Measures

In the event of a water shortage emergency in which EVWD may be prevented from meeting the water demands of its customers, the Board of Directors shall, if possible, given the time and circumstances, immediately hold a public hearing at which customers of EVWD shall have the opportunity to protest and to present their respective needs to the Board. No public hearing shall be required in the event of a breakage or failure of a pump, pipeline, or conduit causing an immediate emergency. The General Manager is empowered to declare a water shortage emergency, subject to the ratification of the Board of Directors within 72 hours of such declaration, and the rules in Table 7-18 shall be in effect.

The Ordinance provides for exceptions under certain circumstances, establishes enforcement provisions, defines the methods for declaring and terminating water conservation stages, and provides for the form of notices and decisions of the Board of Directors. The specific water supply conditions for triggering EVWD's mandated conservation measures and the expected reduction in water use are summarized in Table 7-17.

Table 7-17. DWR Table 8-1R. Stages of WSCP

Stage	Percent Supply Reduction	Water Supply Condition
1	0	Normal Conditions
2	10	10% to 15% Supply Reduction
3	50	15% to 50% Supply Reduction

7.7.2 Prohibitions on End Uses

The water use prohibitions for each stage are shown in Table 7-18.

Table 7-18. DWR Table 8-2R. Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	CII - Restaurants may only serve water upon request	Restaurants are not to provide drinking water to patrons except by request.	Yes
2	CII – Lodging establishment must offer opt out of linen service	Hotels and motels must offer their guests the option to not have their linens and towels laundered daily, and must prominently display this option in each room.	Yes
2	Landscape - Limit landscape irrigation to specific days	Upon notice and public hearing, EVWD may determine that the irrigation of exterior vegetation shall be conducted only during specified hours and/or days, and may impose other restrictions on the use of water for such irrigation. The irrigation of exterior vegetation at other than these times shall be considered to be a waste of water.	Yes
2	Landscape - Limit landscape irrigation to specific times	Exterior landscape plans for all new commercial and industrial development shall provide for timed irrigation and shall consider the use of drought resistance varieties of flora. Such plans shall be presented to and approved by EVWD prior to issuance of a water service letter.	Yes
2	Landscape - Limit landscape irrigation to specific times	Public and private parks, golf courses, swimming pools and school grounds which use water provided by the District shall use water for irrigation and pool filling between the hours of 8:00 p.m. and 6:00 a.m.	Yes
2	Landscape - Other landscape restriction or prohibition	Persons receiving water from EVWD who are engaged in commercial agricultural practices, whether for the purpose of crop production or growing of ornamental plants shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. Upon the request of the General Manager, these persons may be required to prepare a plan describing their irrigation practices and equipment, including but not limited to, an estimate of the efficiency of the use of water on their properties.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	Landscape - Restrict or prohibit runoff from landscape irrigation	Any water used on premises that is allowed to escape the premises and run off into gutters or storm drains shall be considered a waste of water.	Yes
2	Other - Prohibit use of potable water for washing hard surfaces	No water provided by EVWD shall be used for the purposes of wash-down of impervious areas, without specific written authorization of the General Manager.	Yes
2	Landscape – Other landscape restriction or prohibition	Medians and bordering parkways located within the right-of-way are prohibited from using potable water to irrigate turf or other high water use plant material as identified by the Water Use Classifications of Landscaping Species (WUCOLS) Guide. Bordering parkways are considered the strips of non-functional ornamental turf adjacent to the street. The continued irrigation and preservation of trees is encouraged.	Yes
2	Other - Require automatic shut of hoses	The washing of cars, trucks or other vehicles is not permitted, except with a hose equipped with an automatic shut-off device, or a commercial facility so designated on EVWD's billing records.	Yes
2	Pools and Spas - Require covers for pools and spas	All residential, public and recreational swimming pools, of all size, shall use evaporation resistant covers and shall re-circulate water. Any swimming pool which does not have a cover installed during periods of non-use shall be considered a waste of water.	Yes
2	Other water feature or swimming pool restriction	Operating a water fountain or other decorative water feature that does not use re-circulated water is prohibited.	Yes
2	CII – Other CII restriction or prohibition	Persons receiving water from the District who are engaged in commercial agricultural practices, whether for the purpose of crop production or growing of ornamental plants shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. Upon the request of the General Manager, these persons may be required to prepare a plan describing their irrigation practices and equipment, including but not limited to, an estimate of the efficiency of the use of water on their properties. Commercial and industrial facilities shall, upon request of the General Manager, provide the District with a plan to conserve water at their facilities. The District will provide these facilities with information regarding the average monthly water use by the facility for the last two-year period, or the State of California approved conservation base year. The facility will be expected to provide the District with a plan to conserve or reduce the amount of water used by that percentage deemed by the Board of Directors to be necessary under the circumstances. After review and approval by the General Manager, the water conservation plan shall be considered subject to inspection and enforcement by the District.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
3	Landscape - Other landscape restriction or prohibition	Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.	Yes
3	Landscape - Prohibit all landscape irrigation	Watering of parks, school grounds, golf courses, lawns, and landscape irrigation is prohibited.	Yes
3	Other - Prohibit use of potable water for construction and dust control	No new construction meter permits shall be issued by EVWD. All existing construction meters shall be removed and/or locked.	Yes
3	Other - Prohibit use of potable water for washing hard surfaces	Washing down of driveways, parking lots or other impervious surfaces is prohibited.	Yes
3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water is prohibited.	Yes
3	Water Features - Restrict water use for decorative water features, such as fountains	Filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes are prohibited.	Yes
3	Landscape – Other landscape restriction or prohibition	Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.	Yes

7.7.3 Penalties, Charges, Other Enforcement of Prohibitions

In the implementation of the water shortage contingency plan, the California Water Code Section 31029 makes any violation of the EVWD's Ordinance a criminal misdemeanor and upon conviction thereof, the violator will be subject to punishment by fine, imprisonment, or both as may be allowed by law. In addition to criminal penalties, violators of the mandatory provisions of the ordinance will be subject to civil action initiated by EVWD, as summarized below:

- First Violation -- Issuance of written notice of violation of water user. The notice shall be given pursuant to the requirements of Section 15.10 of Ordinance 395.
- Second Violation -- For a second violation of Ordinance 395 within a 12-month period, or failure to comply with the notice of violation within 30 days after notice of imposition, a surcharge of $100.00 is hereby imposed for the meter through which the wasted water was supplied.
- Third Violation -- For a third violation of this ordinance within a 12-month period, or for continued failure to comply within 30 days after notice of an imposition of second violation sanctions, a one-month penalty surcharge in the amount of $300.00 is hereby imposed for the meter through which the wasted water was supplied.

- Subsequent Violations -- For any subsequent violation of this Ordinance, while in Stage No. 3, within the twenty-four (24) calendar months after a first violation as provided in Section 15.09.01 hereof, the penalty surcharge provided in Section 15.09.05 hereof shall be imposed and the District may discontinue water service to that customer at the premises or to the meter where the violation occurred. The charge for reconnection and restoration of normal service shall be as provided in the Rules and Regulations of the District. Such restoration of service shall not be made until the General Manager of the District as determined that the water user has provided reasonable assurances that future violations of this Ordinance by such user will not occur.

In the unlikely event of a severe and extended shortage, EVWD would have to implement other alternatives to provide enough water to its constituents. The primary and most desirable alternative would be to develop its surface water supply to make the most use of entitlements to the local surface waters. Factors that affect the feasibility of surface water development include growth of future water demands (after holding rights to surface waters, and the investment in treatment facilities). EVWD could also undertake well drilling to accommodate any long-term system repairs or outages.

7.7.4 Consumption Reduction Methods

EVWD offers various rebates to encourage conservation (i.e. ultra-low flush toilet replacements, high efficiency washing machines, etc.) along with targeted conservation efforts for large users. Additionally, EVWD has implemented budget-based rates, which are structured to encourage water use efficiency.

Table 7-19. DWR Table 8-3R. Stages of WSCP - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
2	Expand Public Information Campaign	Commercial and industrial facilities shall, upon request of the General Manager, provide EVWD with a plan to conserve water at their facilities. EVWD will provide these facilities with information regarding the average monthly water use by the facility for the last two-year period. The facility will be expected to provide EVWD with a plan to conserve or reduce the amount of water used by that percentage deemed by the Board of Director to be necessary under the circumstances. After review and approval by the General Manager, the water conservation plan shall be considered subject to inspection and enforcement by EVWD.

7.7.5 Determining Water Shortage Reductions

Under normal conditions, EVWD prepares monthly production reports which are reviewed and compared to production reports and pumping statistics from prior months and the same period of the prior year. Under shortage conditions, these production reports could be prepared as often as daily.

7.7.6 Revenue and Expenditure Impacts

EVWD makes contributions to a rate stabilization fund contribution in accordance with a District Designated Fund Policy established in July 2010. Funds discussed in the policy include the Rate Stabilization Fund and the Capital Replacement Fund.

In the event of a water shortage, a two-point program will be utilized to meet the fiscal shortfall of reduced water revenues:

1. Reduce operation and maintenance expenses
2. Defer selected capital improvement projects until water shortage situation improves.
3. Rate Stabilization Funds, once accumulated, will serve as a third means of meeting fiscal shortfalls.

7.7.7 Resolution or Ordinance

A Water Shortage Contingency Plan was originally prepared by EVWD in 1992, in response to Assembly Bill 11X (AB 11X) signed into law on October 14, 1991. The bill requires urban water suppliers providing municipal water directly or indirectly to more than 3,000 customers, or supplying more than 3,000 acre-feet of water annually, to draft a water shortage contingency plan in case of a drought for the sixth consecutive year. Plan elements mandated by AB 11X are addressed therein. The Plan was subsequently incorporated into the EVWD Ordinance No. 395 Section 15 – Water Conservation (this is included in Appendix G). This section of the Ordinance addresses water conservation measures the District has adopted for (1) normal conditions, (2) threatened water supply conditions, and (3) emergency water shortage conditions.

7.7.8 Catastrophic Supply Interruption

EVWD has identified system vulnerabilities due to fire, earthquake, and power outages. EVWD has developed an Emergency Response Plan. EVWD has in place back-up power supplies at critical locations within the distribution system. Due to South Coast Air Quality Management Board rules and economic restraints, a back-up power supply source at every plant within EVWD’s system is not feasible. EVWD maintains portable pumps that can be used to transfer water internally, but cannot be used for production. Currently, EVWD’s storage capacity of 27.6 million gallons would provide a potable supply for customers’ non-irrigation uses (assumes implementation of Water Shortage Contingency Plan) for an estimated two to three days. As described above, EVWD participates in multiple mutual aid agreements and has agreements in place for the provision of water supply and/or manpower. In the event of a natural or man-made disaster that could affect the EVWD’s ability to provide a potable water supply for up to thirty days, the following measures will be implemented as required:

1. The Boil Water notification program will be activated. The notice will be provided to local radio stations and newspapers. EVWD will contact the media and City and County agencies. Customers will be notified of supplemental sources of water for cooking and drinking (e.g. swimming pools, water heaters, and bottled water).

2. Irrigation uses of water will immediately be prohibited. Enforcement will occur through a cooperative effort with the Sheriff's Department, City of San Bernardino Police Department and the media.
3. EVWD is a participant in ERNIE a water/wastewater mutual aid network within San Bernardino and Riverside counties. During a Catastrophic Supply Interruption, the Mutual Aid Agreement with ERNIE will be implemented. The General Manager will contact general managers from surrounding agencies to obtain assistance in providing manpower for repairs and/or a supplemental supply of water.
4. A public information program will be initiated. The General Manager will appear on local television and provide daily reports to the local newspaper and radio stations. Members of the Board of Directors will speak to local service clubs and chambers of commerce.

7.7.9 Minimum Supply Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the next three-year period, assuming 2016 to 2018 repeat the driest three-year historic sequence for each water supply source. Table 7-20 shows the estimated minimum supply, given a repeat of historically low conditions on all water supplies. EVWD has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

Table 7-20. DWR Table 8-4R. Minimum Supply Next Three Years (AF)

Available Water Supply	2016	2017	2018
Available Water Supply	31,972	31,972	31,972

7.8 Supply and Demand Assessment

Anticipated supplies and demands for EVWD are compared in the following tables.

Table 7-21. DWR Table 7-2R. Normal Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	43,972	47,810	51,702	55,652	55,652
Demand Totals	31,609	32,879	33,943	35,050	36,203
Difference	12,363	14,931	17,759	20,602	19,449

Table 7-22. DWR Table 7-3R. Single Dry Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	38,672	42,510	46,402	50,352	50,352
Demand Totals	31,609	32,879	33,943	35,050	36,203
Difference	7,063	9,631	12,459	15,302	14,149

Table 7-23. DWR Table 7-4R. Multiple Dry Years Supply and Demand Comparison (AF)

Year	Totals	2020	2025	2030	2035	2040
First Year	Supply Totals	38,672	42,510	46,402	50,352	50,352
	Demand Totals	31,609	32,879	33,943	35,050	36,203
	Difference	7,063	9,631	12,459	15,302	14,149
Second Year	Supply Totals	38,672	42,510	46,402	50,352	50,352
	Demand Totals	31,609	32,879	33,943	35,050	36,203
	Difference	7,063	9,631	12,459	15,302	14,149
Third Year	Supply Totals	38,672	42,510	46,402	50,352	50,352
	Demand Totals	31,609	32,879	33,943	35,050	36,203
	Difference	7,063	9,631	12,459	15,302	14,149

8 Loma Linda

8.1 System Description

Loma Linda, incorporated in 1970, is a municipally-owned retail water utility that provides potable water within the City boundaries. Loma Linda's service area, an area approximately 6,784 acres, or 10.6 square miles in size, is part of the greater San Bernardino-Ontario metropolitan area and also within the boundaries of the Valley District service area. Figure 8-1 shows the Loma Linda service area. Loma Linda estimates that it could grow by an additional 50 percent or about 11,000 persons.

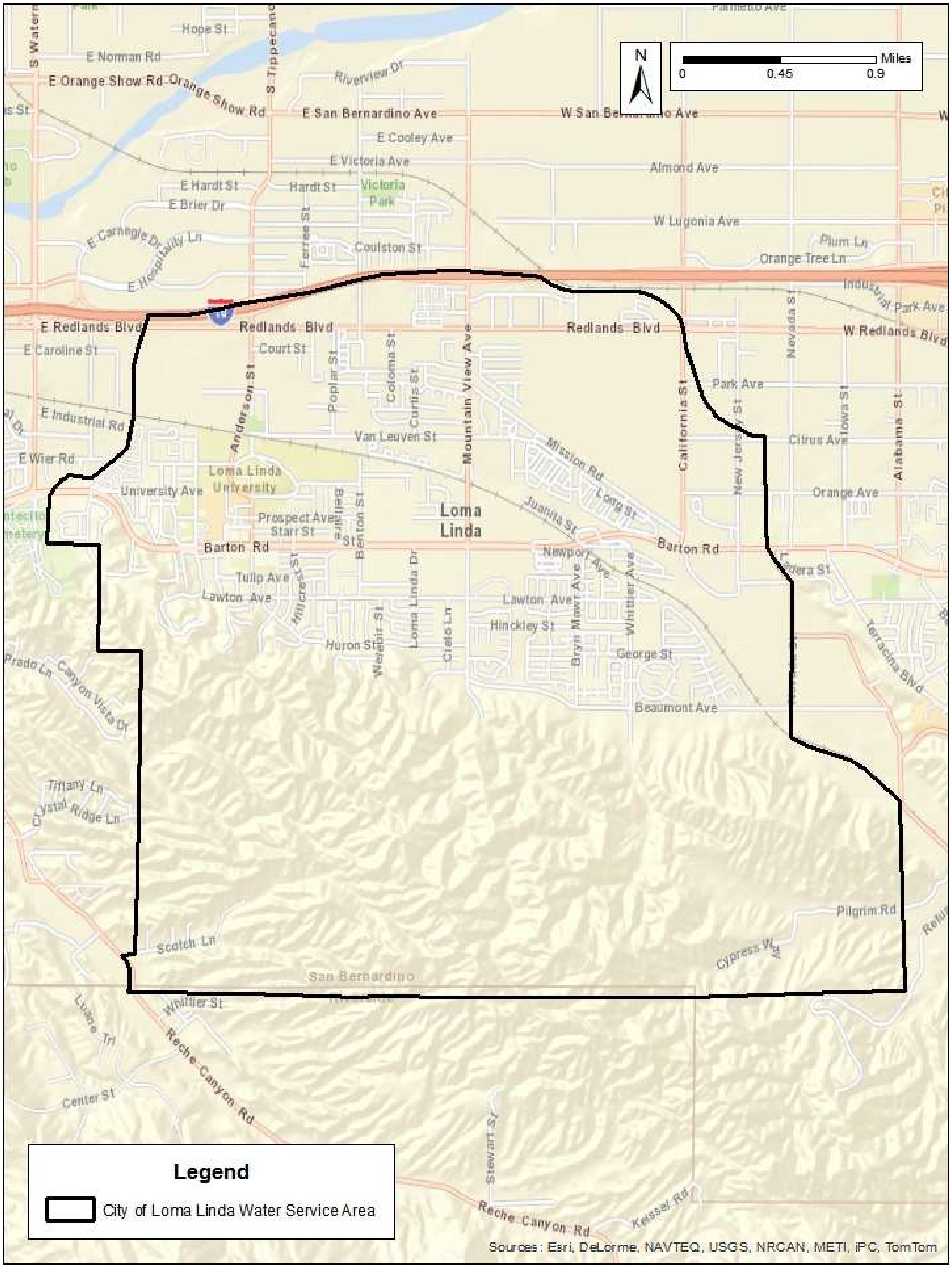

Figure 8-1. City of Loma Linda Service Area

Residential land uses form the largest percentage of developed uses (24 percent), followed by land uses that are categorized as Institutional which make up 9 percent. These uses include medical uses, churches, public facilities, and utilities. Commercial/Industrial makes up the smallest percentage of developed use with 3.5 percent.

Loma Linda University and Loma Linda University Medical Center are located within the limits of the City, but have their own water production and distribution system. With the exception of fire flow, the City does not provide water service to the University on a normal basis. However, the City is the water provider for other large institutional users including the 205-bed Veterans Administration Hospital and the Loma Linda Community Hospital.

Loma Linda's water supply consists primarily of groundwater from six production wells. These wells, in the SBBA, supply nearly 100 percent of the total water supply.

8.1.1 Service Area Population and Demographics

The DWR Population Tool was used to intersect the service area boundary in Figure 8-1 with census data to provide population estimates for 1990, 2000, and 2010. Population for intermediate non-census years was estimated using a constant growth rate, as connection data was not available for all the intermediate years. The service area population for 2015 was then estimated using the number of connections in 2010 and 2015.

For future years, the service area boundary was intersected with data provided by SCAG. As part of the 2012 Adopted Growth Forecast, SCAG has estimated the population in 2020 and in 2035 inside each of approximately 4,000 traffic analysis zones (TAZ) that cover southern California. By intersecting the service area boundary with the TAZ, an expected population growth rate was calculated for the Loma Linda service area. This growth rate was then used to estimate future populations.

The estimated service area populations are shown in Table 8-1.

Table 8-1. DWR Table 3-1R. Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040
Population Served	24,956	26,639	28,315	30,097	31,991	34,004

8.1.2 Service Area Climate

Loma Linda is located on the southeastern side of the San Bernardino Valley and within the South Coast Hydrologic Region. The climate typically exhibits hot, dry summers and mild, wet winters. Most rainfall occurs during the months of November through April. The hottest and driest period of the year is from June through September. It is not unusual during the summer months to have several consecutive days that the daily temperature exceeds 100 degrees Fahrenheit.

Average temperature, precipitation, and evapotranspiration by month are shown in Table 8-2. Evapotranspiration (ET) is the water lost to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity. ET from a standardized grass surface is commonly denoted as ETo.

Table 8-2. Historical Climate Data

Month	Average Temperature (°F)[1]	Average Precipitation (in.)[1]	Average Standard ETo (in.)[2]
January	52.4	3.22	2.53
February	54.6	3.25	2.87
March	56.7	2.86	4.30
April	60.9	1.29	5.38
May	65.6	0.47	5.82
June	71.3	0.09	6.76
July	77.7	0.04	7.38
August	77.7	0.15	7.09
September	73.9	0.33	5.51
October	66.5	0.71	3.97
November	58.6	1.32	2.89
December	53.3	2.38	2.38
Total		16.1	

Notes:
[1]NOAA weather station 0407723 in San Bernardino; data from 1893 through 2004; http://wrcc.dri.edu;
[2]CIMIS weather station 44 at University of California, Riverside (1986-2015); http://wwwcimis.water.ca.gov/

8.2 System Water Use

8.2.1 Water Uses by Sector

Loma Linda categorizes its water use customers into the following: single family residential, multi-family residential, commercial/industrial, and landscape. Loma Linda's landscape customers represent approximately four percent of the current metered services and 18 percent of the consumptive water use. These customers include parks, large commercial, community and institutional landscape areas, and schools. Over 90 percent of Loma Linda's customers are residential. The land use development trend within Loma Linda over the past 25 years has historically been from agriculture to residential. Water deliveries for each customer class for the years 2011 through 2015 are shown in Table 8-3.

Table 8-3. DWR Table 4-1R. Demands for Raw and Potable Water – Actual (AF)

Use Type	Level of Treatment When Delivered	2011	2012	2013	2014	2015
Single Family	Drinking Water	2,514	2,739	2,668	2,683	2,171
Multi-Family	Drinking Water	817	834	806	786	784
Commercial / Institutional	Drinking Water	652	607	547	582	530
Landscape	Drinking Water	800	921	820	926	659
Other	Drinking Water	15	0	0	0	0
Sales/Transfers/Exchanges to other agencies	Drinking Water	0	0	0	1	0
Nonrevenue	Drinking Water	625	677	744	548	538
	Total	5,423	5,800	5,587	5,525	4,682

In the past, Loma Linda has not had water use related to saline barriers, groundwater recharge operations, or recycled water. However, Loma Linda, like all water agencies does have some nonrevenue water. Nonrevenue water is the difference between the amount of water produced and the amount of water billed to customers. Over the last five years, nonrevenue water has been approximately thirteen percent of produced water within Loma Linda's system. However, investigation by the City into this loss rate has shown that a large portion of the loss is a paper loss due to reading and reporting anomalies. The percentage of nonrevenue water was estimated by comparing water production statistics to water sales statistics. Sources of nonrevenue water include:

- Hydrant Testing and Flushing - Hydrant testing is performed by both Loma Linda and the Fire Departments. Loma Linda and the Fire Departments perform a comprehensive testing program to monitor the level of fire flows available throughout the service area.
- Fire Hydrant Operations by the Fire Department - This represents the use of water for emergencies.
- Customer Meter Inaccuracies - Customer meters represent one of the main sources of nonrevenue water as they tend to under-represent actual consumption in the water system.
- Reservoir overflows - This represents unrecorded water use when reservoirs overflow.
- Leaky water lines - Leakage from water pipes is a common occurrence in water systems. A significant number of leaks remain undetected over long periods of time as they are very small; however, these small leaks contribute to the overall nonrevenue water.

Projected water use for 2020 through 2040 is shown in Table 8-4.

Table 8-4. DWR Table 4-2R. Demands for Raw and Potable Water – Projected (AF)

Use Type	Level of Treatment	2020	2025	2030	2035	2040
Single Family	Drinking Water	2,491	2,648	2,814	2,991	3,180
Multi-Family	Drinking Water	900	956	1,016	1,080	1,148
Commercial / Institutional	Drinking Water	608	646	687	731	776
Landscape	Drinking Water	756	804	854	907	965
Other	Drinking Water	0	0	0	0	0
Sales/Transfers/Exchanges to other agencies	Drinking Water	0	0	0	0	0
Nonrevenue	Drinking Water	523	556	591	628	668
Total		5,278	5,610	5,963	6,338	6,737

8.2.2 Distribution System Water Losses

The City monitors annually its nonrevenue water and runs a leak detection program. The program addresses customer requested reviews, nonrevenue water in the City system, and a valve exercise program to identify valves needing repair. The City estimated nonrevenue water to be at about 13 percent in 2015. Since then, some reading and reporting anomalies have been addressed and corrected so Loma Linda has projected 11 percent water loss through 2040.

Loma Linda performed an AWWA Water Audit, attached in Appendix M, which determined the economic value of recovering the water loss, based on the avoided cost of water. The results of total water loss audit are summarized in Table 8-5. Loma Linda will continue its leak detection and main replacement program.

Table 8-5. DWR Table 4-4R. Water Loss Summary Most Recent 12 Month Period Available

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss

8.2.3 Estimating Future Water Savings

Loma Linda is committed to long-range planning to provide a reliable, cost-effective water supply to its customers. Loma Linda actively monitors water consumption in its service area, in part to prepare required monthly reports for the State Water Resources Control Board.

For this report, Loma Linda has projected that future demands will increase at a percentage growth rate that incorporates two factors: the percentage growth in service area population, and potential changes in the per-capita consumption. This approach provides estimates for future system-wide demand that can be used for long-range planning.

In the 2015 UWMP, water suppliers have the option of preparing more detailed demand forecasts by estimating demand factors based on land use categories. For example, Loma Linda could identify typical water use per single family customer and per commercial account. These customer classes can be further sub-divided by lot size, neighborhood, or other variables. The intent is to quantify the estimated water use per customer in different customer classes, and then to forecast how future changes will impact water use within each customer class.

For this document, Loma Linda has elected not to develop land use-based demand factors and apply future savings from codes and standards. Recent drought regulations have induced significant changes in water consumption patterns, and there is considerable uncertainty as to how demands will change in the future if the drought subsides. Given this uncertainty, Loma Linda has elected not to quantify passive savings for this UWMP.

8.2.4 Water Use for Lower Income Households

Senate Bill 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing 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. Loma Linda contains two jurisdictions, the City of Loma Linda and the unincorporated County of San Bernardino.

The City of Loma Linda updated its housing element in 2014. The housing element estimates that approximately 41 percent of all households in the City are "very-low" or "low" income. In the absence of more detailed information, this percentage was assumed to apply to households across the service area.

Table 8-6 shows the estimated future water demands for lower-income households. These demands have been included in the demand projections throughout this report.

Table 8-6. Estimated Demands for Lower-Income Households (AF)

Demand	2015	2020	2025	2030	2035	2040
Single Family Residential	881	1,011	1,075	1,142	1,214	1,291
Multi-Family Residential	318	365	388	412	438	466
Total	1,199	1,376	1,463	1,555	1,653	1,757

8.3 SB X7-7 Baselines and Targets

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). Loma Linda had previously calculated baseline water use and water use targets in the 2010 RUWMP. However, for the 2015 UWMP, DWR has required that agencies use 2010 census data in the calculation of service area populations. Loma Linda has re-calculated its historic service area population using the DWR Population Tool, and in this section presents an updated calculation of baseline water use and water use targets.

DWR has prepared standardized tables to record and document the calculations required for this section. The standardized tables for Loma Linda's calculations are included in Appendix O.

8.3.1 Baseline Water Use

Years 1999 to 2008 have been selected for calculation of the 10-year base period, while years 2004 to 2008 have been selected for calculation of the 5-year base period.

8.3.2 Service Area Population

Loma Linda's service area population was calculated using the DWR Population Tool. The GIS-based tool was used to intersect Loma Linda's service area with census data. The tool directly calculated a service area population for 1990, 2000, and 2010. Populations for intermediate years were calculated by assuming a constant growth rate between census years.

8.3.3 Gross Water Use

Because Loma Linda does not export water to other agencies, the gross water use is equal to the total amount of water produced.

8.3.4 2015 and 2020 Targets

DWR allows agencies to select from four potential methods for calculating the compliance and interim water use targets as set forth by Water Code section 10608.20(b). Loma Linda has selected Method 1, 80 percent of Base Daily Per Capita Water Use, to calculate the agency's 2020 Compliance Water Use Target and Interim Water Use Target. These calculations are summarized in Table 8-7.

Table 8-7. DWR Table 5-1R. Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD	2015 Interim Target	Confirmed 2020 Target
10-year	1999	2008	242.5	218.2	194.0
5-year	2004	2008	244.0		

8.3.5 2015 Compliance Daily per Capita Water Use

Based on 95 percent of the 5-year baseline average, the Maximum Allowable GPCD is 231. The Compliance Water Use Target under Method 1 is less than the Maximum Allowable GPCD, so no adjustments to the Compliance Water Use Target are necessary.

Loma Linda's calculated GPCD for 2015 is below the interim water use target. The results are summarized in Table 8-8.

Table 8-8. DWR Table 5-2R. 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Extra-ordinary Events	Economic Adjust-ment	Weather Normal-ization	Total Adjustments	Adjusted 2015 GPCD	2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015?
167.5	218.2	0	0	0	0	167.5	167.5	YES

8.4 Demand Management Measures

The reporting format for Demand Management Measures (DMMs) in the 2015 UWMP is different than the 2010 UWMP. This discussion has been arranged into the seven sections recommended by DWR in the 2015 UWMP Guidebook.

8.4.1 Water waste prevention ordinances

Loma Linda has enacted Municipal Code Title 13 in Chapter 13.32 Water-efficient Landscape. The code covers new and rehabilitated landscaping for public agencies and private developments requiring permits. The projects must document the following for approval: maximum applied water allowance, estimated applied water use, estimated water use, design plan, irrigation design, irrigation schedule, maintenance schedule, landscape audit, and provision for existing landscape. Decorative water should be recirculated. Additionally, Ordinance 443 (Municipal Code Title 13 in Chapter 13.04.940 to 13.04.1070) prohibits excessive use of water specifically targeting water wash downs, runoff, irrigation, and malfunctioning equipment. Service can be discontinued with excessive use. Both these ordinances support the criteria of this DMM; copies of these ordinances are provided in Appendix G.

8.4.2 Metering

All of the City's residential, commercial and industrial customers are metered and billed bi-monthly with tiered rates. Municipal customers are metered but not billed; the meter reading began for these customers in July 2009. The City has a meter maintenance and replacement program with replacements occurring every 10 years, larger meters every 5 years and annual calibration of the meters at the Veterans Administration Hospital. Over the past five years, the City has upgraded all of their meters to Automatic Meter Readers (AMR).

8.4.3 Conservation pricing

All of Loma Linda's retail customers are metered and billed with tiered rates bimonthly. A tiered rate structure is in place that charges per water unit based on total amount of water used during the billing cycle.

8.4.4 Public education and outreach

Loma Linda is beginning the implementation of a OmniEarth and Dropcountr collaboration program with Santa Ana Watershed Project Authority (SAWPA). This is a public outreach and educational program that targets the top 25 percent of water users and assist them in their efforts to reduce their water use.

8.4.5 Programs to assess and manage distribution system real loss

Loma Linda plans to complete the AWWA Water Audit worksheet annually to assess distribution system loss. Based on water loss analysis, upgrades to the distribution system will be

8.4.6 Water conservation program coordination and staffing support

Agencies should include the name and contact information of the water conservation coordinator(s), the number of staff in the program and a description of program funding.

8.4.7 Planned Implementation to Achieve Water Use Targets

Loma Linda's current per-capita consumption is less than its 2020 compliance target. Loma Linda expects to continue to implement its current conservation programs to encourage conservation and maintain per-capita consumption below the compliance target.

8.5 System Supplies

8.5.1 Purchased or Imported Water

Loma Linda has imported a small amount (1 – 2 AFY) of State Water Project (SWP) water from Valley District over the past five years (2011 – 2015). Loma Linda does not anticipate using SWP water as a future water supply source.

8.5.2 Groundwater

Loma Linda’s primary source of water is groundwater wells within the upper Santa Ana River Basin. The City’s six groundwater wells are located within the SBBA. Replenishment of the basin is from rainfall and snow melt from the surrounding mountains and imported water. Loma Linda current operates five wells, ranging in capacity from 1,000 to 3,300 gallons per minute (gpm), having a total effective production capacity of 9,050 gpm. A sixth well which yields 1,500 gpm is not utilized due to high levels of fluoride.

8.5.2.1 Historical Groundwater Pumping

The City of Loma Linda has facilities to extract water from the SBBA. Loma Linda's historical production for the past five years is shown in Table 8-9.

Table 8-9. DWR Table 6-1R. Groundwater Volume Pumped (AF)

Groundwater Type	Location or Basin Name	Water Quality	2010	2011	2012	2013	2014	2015
Alluvial Basin	SBBA	Drinking Water	4,932	5,422	5,776	5,584	5,524	4,680
	Total		4,932	5,422	5,776	5,584	5,524	4,680

8.5.3 Surface Water

Loma Linda owns 1,020 shares of Bear Valley Mutual Water Company. In 2015, Loma Linda utilized 1.27 AF of water from Bear Valley. Bear Valley Mutual Water Company supplies come from the Santa Ana River and are affected by seasonal and annual variations. To estimate reliability, records from multiple precipitation gauges were reviewed.

8.5.4 Stormwater

Loma Linda is participating in regional planning efforts to capture additional stormwater for purposes of groundwater recharge.

8.5.5 Wastewater and Recycled Water

Loma Linda provides sewer line maintenance and collection services to its customers, while wastewater treatment services are provided under provisions outlined in a Joint Powers Agreement (JPA) with the City of San Bernardino.

8.5.5.1 Recycled Water Coordination

There is an active planning process to use RIX discharge for direct groundwater recharge and non-potable demands. However, the location of the plant makes providing water to customers upstream of the plant (e.g., Loma Linda) cost-prohibitive.

8.5.5.2 Wastewater Collection, Treatment, and Disposal

Wastewater from the Loma Linda service area is treated to secondary levels at the San Bernardino Water Reclamation Plant and to tertiary levels at the RIX Plant. In 1995, the City of San Bernardino began operation of RIX to provide treatment of up to 41 MGD of secondary effluent from the existing plants of the City of San Bernardino and the City of Colton. Currently the RIX plant discharges approximately 33 MGD for recharge to the Santa Ana River.

Table 8-10. DWR Table 6-2R. Wastewater Collected within Service Area in 2015

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AF)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
City of Loma Linda	Estimated	2,465	City of San Bernardino	San Bernardino Water Reclamation Plant	No	No
	Total Wastewater Collected from Service Area in 2015	2,465				

8.5.5.3 Actions to Encourage and Optimize Future Recycled Water Use

The City of Redlands and Loma Linda are examining the potential price of providing recycled water to Loma Linda. If recycled water is cost effective, Loma Linda would encourage the use of non-potable water at facilities such as schools, parks, community centers, car washes and churches. However, use of recycled water in Loma Linda is still in the evaluation stage and at this time recycled water is not accounted for as a potential future supply for Loma Linda.

Table 8-11. DWR Table 6-6R. Methods to Expand Future Recycled Water Use

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Planning	Continue evaluating potential use of recycled water	2020	Not yet defined

8.5.6 Exchanges or Transfers

Loma Linda has several connections to local water systems, including the City of San Bernardino, the City of Redlands and the Loma Linda University which could provide short-term water supplies. The emergency connection with the City of Redlands can yield approximately 507 AFY (314 gpm) to Loma Linda. Loma Linda has two emergency supply connections with the City of San Bernardino, to receive up to 4,033 AFY of water. These connections are available only on an as-needed basis if the water supply is available, and cannot be counted as firm supply capacity. Loma Linda has also installed an interconnection with the Loma Linda University water system as an emergency connection only. There exists no formal agreement for the exchange of water between the City to the University; however, the connection is metered to monitor any exchange of water.

8.5.7 Desalinated Water Opportunities

The need for brackish groundwater desalting is somewhat limited in the San Bernardino Valley. While elevated salts are a concern in the groundwater basins of the Western Judgment (SBBA, Rialto-Colton, Riverside), average TDS levels in all of these basins are currently below 500 mg/L (DWR 2003). However, elevated salts are an issue for retailers that overlie the San Timoteo Groundwater Basin and agencies in this basin are considering implementing desalter operations. The area is fortunate to have a brine line which can transport non-reclaimable waste, by gravity, from the City of San Bernardino Water Reclamation Plant to the Orange County Sanitation District's treatment plant.

The development of (or financial participation in) a new seawater desalination project, while costly, is being investigated by other wholesale and retail water agencies in southern California. Because the San Bernardino Valley is an inland area, in order for desalination to work it would be necessary for agencies in the San Bernardino Valley to join with other water purveyors in the development of a coastal desalination facility and then receive water from the SWP supplies of other participants via an exchange. It is not cost-effective for the San Bernardino Valley to receive direct delivery of desalted ocean water.

Seawater desalination is an alternative that is technically viable. However, production and treatment costs have historically been several times higher than those of SWP costs and conventional treatment.

8.5.8 Future Water Projects

There are currently no planned water supply projects within the Loma Linda service area.

8.5.9 Summary of Existing and Planned Sources of Water

Loma Linda anticipates utilizing a water system almost exclusively supported by groundwater produced by the City of Loma Linda. The groundwater will be supplemented by a small amount (less than a percent) of surface water. Current and project water supply amounts are shown in Table 8-12 and Table 8-13.

Table 8-12. DWR Table 6-8R. Water Supplies - Actual

Water Supply	Additional Detail on Water Supply	2015 Actual Volume (AF)	2015 Water Quality
Groundwater	SBBA	4,680	Drinking Water
Purchased or Imported Water	Valley District	1	Drinking Water
	Total	4,681	

Table 8-13. DWR Table 6-9R. Water Supplies – Projected (AF)

Water Supply	Additional Detail on Water Supply	2020	2025	2030	2035	2040
Groundwater	SBBA	6,418	6,814	7,236	7,683	7,683
Purchased or Imported Water	Valley District	0	0	0	0	0
	Total	6,418	6,814	7,236	7,683	7,683

8.6 Water Supply Reliability Assessment

8.6.1 Constraints on Water Sources

In the past Loma Linda's groundwater supply was impacted by perchlorate from the Redlands-Crafton Plume. The Lockheed Martin Corporation replaced the two Loma Linda wells impaired by perchlorate with two new wells that include wellhead treatment. The City has also had to carefully monitor high arsenic, fluoride, and DBCP in well water. To address arsenic in City water, an arsenic removal facility was installed, providing treatment to two wells. Water from the various wells is blended to further dilute any contaminants and to achieve all applicable health and safety standards.

In addition to groundwater wells, Loma Linda also has various interconnections with adjacent water systems such as the University of Loma Linda, the City of San Bernardino and the City of Redlands, to assist in alleviating localized problems should they arise. Based on current conditions water quality is not anticipated to affect Loma Linda's supply reliability. However, water quality issues are constantly evolving. Loma Linda will take action to protect and treat supply when needed, but it is well recognized water quality treatment can have significant costs.

8.6.2 Reliability by Type of Year

The SBBA is adjudicated on a safe yield basis. Loma Linda therefore has the opportunity to develop additional wells and over-extract groundwater under specified conditions contained in the Western Judgment. The wells in general have provided a stable source of water supply. Extensive modeling has been used to examine groundwater recharge, groundwater pumping, basin storage, groundwater flow, and groundwater plume location and plume migration. Based on these studies, it is anticipated that groundwater pumping by Loma Linda and other SBBA users in the Valley District service area will not be reduced or curtailed during a single-dry or multi-dry year.

8.6.3 Regional Supply Reliability

Loma Linda is committed to minimizing the need to import water from other regions. Loma Linda operates a number of conservation programs to implement various Demand Management Measures.

8.7 Water Shortage Contingency Planning

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, an earthquake which damages delivery or storage facilities, or a regional power outage. An earlier chapter described water shortage contingency planning for regional water supply sources (imported water, groundwater). This section focuses on water shortage contingency planning for Loma Linda.

8.7.1 Stages of Action

Loma Linda's municipal Chapter 13.04 along with Ordinance 443, attached in Appendix G, outlines a three-stage action plan that includes voluntary and mandatory stages of action to be implemented during a water shortage. The key elements are described below along with an outline of specific water supply conditions which are applicable to each stage and the various restrictions and prohibitions included in the ordinance.

8.7.1.1 Stage 1 - Normal Conditions - Voluntary Conservation Measures

Normal conditions shall be in effect when Loma Linda is able to meet all the water demands of its customers in the immediate future. During normal conditions, all water users should continue to use water wisely, to prevent the waste or unreasonable use of water, and to reduce water consumption to that necessary for ordinary domestic and commercial purposes.

8.7.1.2 Stage 2 - Threatened Water Supply Shortage

In the event of a threatened water supply shortage which could affect Loma Linda's ability to provide water for ordinary domestic and commercial uses, the City Council shall hold a public hearing at which consumers of the water supply shall have the opportunity to protest and to present their respective needs to Loma Linda. The City Council may then, by resolution, declare a water shortage condition to prevail, and the following conservation measures shall be in effect.

8.7.1.3 Stage 3 - Water Shortage Emergency - Mandatory Conservation Measures

In the event of a water shortage emergency in which Loma Linda may be prevented from meeting the water demands of its customers, the City Council shall, if possible given the time and circumstances, immediately hold a public hearing at which customers of Loma Linda shall have the opportunity to protest and to present their respective needs to the City Council. No public hearing shall be required in the event of a breakage or failure of a pump, pipeline, or conduit causing an immediate emergency. The Director of Public Services is empowered to declare a water shortage emergency, subject to the ratification of the City Council within seventy-two hours of such declaration.

Table 8-14. DWR Table 8-1R. Stages of WSCP

Stage	Percent Supply Reduction	Water Supply Condition
1	0	Normal Conditions
2	10	Up to 15% Supply Reduction
3	50	15% to 50% Supply Reduction

8.7.2 Prohibitions on End Uses

The water use prohibitions for each stage are shown in Table 8-15.

Table 8-15. DWR Table 8-2R. Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	CII - Restaurants may only serve water upon request	Restaurants are requested not to provide drinking water to patrons except by request.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	Landscape - Limit landscape irrigation to specific days	Upon notice and public hearing, Loma Linda may determine that the irrigation of exterior vegetation shall be conducted only during specified hours and/or days, and may impose other restrictions on the use of water for such irrigation. The irrigation of exterior vegetation at other than these times shall be considered to be a waste of water.	Yes
2	Landscape - Limit landscape irrigation to specific times	Public and private parks, golf courses, swimming pools and school grounds which use water provided by Loma Linda shall use water for irrigation and pool filling between the hours of 6 P.M. and 6 A.M.	Yes
2	Landscape - Other landscape restriction or prohibition	Persons receiving water from the Loma Linda who are engaged in commercial agricultural practices, whether for the purpose of crop production or growing of ornamental plants shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. Upon the request of the director of public services, these persons may be required to prepare a plan describing their irrigation practices and equipment, including but not limited to, an estimate of the efficiency of the use of water on their properties.	Yes
2	Landscape - Other landscape restriction or prohibition	Commercial and industrial facilities shall, upon request of the director of public services, provide Loma Linda with a plan to conserve water at their facilities. Loma Linda will provide these facilities with information regarding the average monthly water use by the facility for the last two-year period. The facility will be expected to provide Loma Linda with a plan to conserve or reduce the amount of water used by that percentage deemed by the City Council to be necessary under the circumstances. After review and approval by the director of public services, the water conservation plan shall be considered subject to inspection and enforcement by Loma Linda.	Yes
2	Landscape - Restrict or prohibit runoff from landscape irrigation	No customer of the Loma Linda or other person acting on behalf of or under the direction of a customer shall cause or permit the use of water for irrigation of landscaping or other outdoor vegetation, plantings, lawns or other growth, to exceed the amount required to provide reasonable or excessive waste of water from such irrigation activities or from watering devices or systems. The free flow of water away from an irrigated site shall be presumptively considered excessive irrigation and waste as defined.	Yes
2	Other - Prohibit use of potable water for washing hard surfaces	No water provided by Loma Linda shall he used for the purposes of Wash down of impervious areas without specific written authorization of the director of public services. Any water used on all premises that is allowed to escape the premises and run off into gutters or storm drains shall be considered a waste of water.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	Other - Require automatic shut of hoses	The washing of cars, trucks or other vehicles is not permitted, except with a hose equipped with an automatic shut-off device, or at a commercial facility designated and so designated on Loma Linda's billing records.	Yes
2	Pools and Spas - Require covers for pools and spas	All residential, public and recreational swimming pools, of all sizes, shall use evaporation resistant covers and shall re-circulate water. Any swimming pool which does not have a cover installed during periods of non-use shall be considered a waste of water.	Yes
3	CII - Restaurants may only serve water upon request	Restaurants shall not serve drinking water to patrons except by request.	Yes
3	Landscape - Prohibit all landscape irrigation	Watering of parks, school grounds, golf courses, lawn watering, and landscape irrigation is prohibited.	Yes
3	Landscape - Prohibit certain types of landscape irrigation	Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.	Yes
3	Other - Prohibit use of potable water for construction and dust control	No new construction meter permits shall be issued by Loma Linda. All existing construction meters shall be removed and/or locked.	Yes
3	Other - Prohibit use of potable water for washing hard surfaces	Washing down of driveways, parking lots or other impervious surfaces is prohibited.	Yes
3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water is prohibited.	Yes
3	Water Features - Restrict water use for decorative water features, such as fountains	Filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes are prohibited.	Yes

8.7.3 Penalties, Charges, Other Enforcement of Prohibitions

Provisions of Ordinance No. 443, Section 16 Water Conservation, prohibit the watering of parks, school grounds, golf courses, lawn washing, landscape irrigation, wash-down of driveways, parking lots or other impervious surfaces, washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water, filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes. Penalties and charges for excessive use are the heart of Ordinance 443 and the strongest incentive for conservation among the users. Service may be terminated to any customer who knowingly and willfully violates any provision of the Water Shortage Plan and Ordinance 443. In addition, civil action penalties by Loma Linda can be enacted as summarized below:

- First Violation – Issuance of written notice of violation of water user.
- Second Violation – A $100 surcharge is imposed on the water meter.
- Third Violation – A $200 surcharge and/or installation of a flow restrictor on the water meter.
- Subsequent Violations – Discontinuance of service.

8.7.4 Consumption Reduction Methods

The consumption reduction methods for each stage are shown in Table 8-16.

Table 8-16. DWR Table 8-3R. Stages of WSCP - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
2	Other	Commercial and industrial facility education on water use.

8.7.5 Determining Water Shortage Reductions

During water shortage, Loma Linda's Director of Public Services will monitor the supply and demand for water on a daily basis to determine the level of conservation required by the implementation or termination of the water conservation plan stages and will notify the City Council of the necessity for the implementation or termination of each stage if a shortage condition occurs. Each declaration of the City Council implementing or terminating a water conservation stage shall be published at least once in a newspaper of general circulation, and shall be posted at the City's offices. In normal water supply conditions, production figures are recorded daily. Totals are recorded daily on a continuous computerized monitoring system to the Water Department Supervisor. Totals are reported monthly to the City Administrator and incorporated into the water supply report to the Utilities Commission. During a Stage 2 and Stage 3 water shortage, daily production figures will be reported to the Water Department Supervisor. The Supervisor compares the daily production to the target daily production to verify that the reduction goal is being met. Reports are forwarded to the City Administration on an as-needed basis, continuously if appropriate. Monthly reports are sent to the Utility Commission. If reduction goals are not met, the Administrator will notify the City Council so that additional action can be taken.

8.7.6 Revenue and Expenditure Impacts

Revenues will be impacted when reduced water sales during the various stages as set forth in Loma Linda's Water Shortage Contingency Plan are initiated. In order to minimize the financial impact this would have on Loma Linda, the monthly fixed revenues (monthly meter charges) need to cover the majority of the fixed costs of the Loma Linda's water system during such an event. The fixed costs are incurred by Loma Linda regardless of how much or when it delivers water to the customer. These costs generally include administration, personnel, billing, testing, maintenance, meter maintenance, pipeline and facility replacements. Expenditures during periods of drought may be impacted by additional staffing or advertising costs. Expenses such as capital improvements may be deferred during this reduction in sales when feasible.

Loma Linda, which produces all of the water consumed by its customers, will not have the added cost of a more expensive purchased water source. In order to mitigate the financial impacts of a water shortage, Loma Linda maintains excess funds in the Water Enterprise Fund (Fund). This Fund is used for all operations associated with the running of the water system. Part of the Fund can be used to stabilize rates during periods of water shortage or disasters affecting the water supply.

Even with the additional monies in the Fund, rate increases may be necessary during a prolonged water shortage. Loma Linda may wish to increase the fixed monthly meter service charge to cover the shortfall in revenue resulting from the decrease in water sales during a water shortage. The additional revenues would also help to cover any increased operating and water expenses that occur. After an extended water shortage, water revenues are expected to fall below pre-shortage levels. The water use is projected at 90 percent of the pre-shortage use, which could result in a reduction of revenue during the twelve-month period after the end of a water supply shortage.

8.7.7 Resolution or Ordinance

Loma Linda’s Municipal Chapter 13.04 along with Ordinance 443, attached in Appendix G, outlines the Water Shortage Contingency Plan. The Ordinance provides for exceptions under certain circumstances, establishes enforcement provisions, defines the methods for declaring and terminating water conservation stages, and provides for the form of notices and decisions of the City Council.

8.7.8 Catastrophic Supply Interruption

Extended multi-week supply shortages due to natural disasters or accidents which damage all water sources are unlikely, but would be severe if more than one of Linda Loma’s wells were out of service. The City's storage reservoirs hold 14.9 MG, which is sufficient treated water to meet the health and safety requirements of fifty gallons per person for 23,000 people for 12 days. This assumes zero non-residential use. In the event of a power shortage, Loma Linda has two portable backup generators at their disposal they can utilize to provide supply from one well and boosting within the distribution system. The City also has interconnections with the City of San Bernardino and the City of Redlands for emergency supplies as well as the Loma Linda University water system as an emergency connection. There is no formal agreement for the exchange of water between the City and the University; however, the connection is metered to monitor any exchange of water between the two entities.

8.7.9 Minimum Supply Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the years 2016 to 2018, assuming years 2016 to 2018 repeat the driest three-year historic sequence for each water supply source. This estimate is shown in Table 8-17. Comparing these supplies to the demand projections, Loma Linda has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

Table 8-17. DWR Table 8-4R. Minimum Supply Next Three Years (AF)

Available Water Supply	2016	2017	2018
Available Water Supply	6,418	6,418	6,418

8.8 Supply and Demand Assessment

The estimated projected demands are anticipated to be met by projected supply past 2040.

Normal year total supplies and demands are shown in Table 8-18.

Table 8-18. DWR Table 7-2R. Normal Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	6,418	6,814	7,236	7,683	7,683
Demand Totals	5,277	5,609	5,962	6,337	6,736
Difference	1,141	1,205	1,274	1,346	947

There is a historical trend associated with drier years and an increase in water use among agencies. While conservation efforts have proven to be effective in decreasing water use in dry years, such as the past three years, Loma Linda has decided to project demands using a ten-percent increase during single and multiple dry years.

These single and multiple dry year demands and supplies are shown in Table 8-19 and Table 8-20.

Table 8-19. DWR Table 7-3R. Single Dry Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	6,418	6,814	7,236	7,683	7,683
Demand Totals	5,805	6,170	6,558	6,971	7,410
Difference	613	644	678	712	273

Table 8-20. DWR Table 7-4R. Multiple Dry Years Supply and Demand Comparison (AF)

Year	Totals	2020	2025	2030	2035	2040
First Year	Supply Totals	6,418	6,814	7,236	7,683	7,683
	Demand Totals	5,805	6,170	6,558	6,971	7,410
	Difference	613	644	678	712	273
Second Year	Supply Totals	6,418	6,814	7,236	7,683	7,683
	Demand Totals	5,805	6,170	6,558	6,971	7,410
	Difference	613	644	678	712	273
Third Year	Supply Totals	6,418	6,814	7,236	7,683	7,683
	Demand Totals	5,805	6,170	6,558	6,971	7,410
	Difference	613	644	678	712	273

9 City of Redlands

9.1 Basis for Preparing a Plan

The Urban Water Management Planning Act requires urban water suppliers to conduct long term resource planning for current and anticipated demands of multiple hydrologic year type. The California Water Code, Section 10617 defines an urban water supplier as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. The City of Redlands (City) currently serves approximately 24,000 customers with a 5-year average potable water demand of 26,165 acre feet per year and has developed its 2015 Urban Water Management Plan (UWMP) to ensure that demands are met for both current and future customers in spite of California's ongoing drought conditions and expected long-term climate changes.

Table 9-1. DWR Table 2-1R. Public Water System Information

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015
CA3610037	City of Redlands	24,864	23,038
	Total	24,864	23,038

9.1.1 Individual or Regional Planning and Compliance

Table 9-2. DWR Table 2-2. Plan Identification

Selection	Type of Plan	Name of RUWMP or Regional Alliance
	Individual UWMP	
X	Regional Urban Water Management Plan (RUWMP)	San Bernardino Valley Municipal Water District

9.1.2 Fiscal or Calendar Year and Units of Measure

Table 9-3. DWR Table 2-3. Agency Identification

Type of Agency	Redlands is a Retailer
Fiscal or Calendar Year	UWMP Tables are in Calendar Years
Unit	AF

9.1.3 Coordination and Outreach

Table 9-4. DWR Table 2-4R. Water Supplier Information Exchange

Wholesale Water Supplier Name
San Bernardino Valley Municipal Water District

9.2 System Description

9.2.1 General Description

The City has provided water services to the community since 1910. Currently, the City provides water to a population of approximately 85,000 within its service area via approximately 24,000 water connections. The water utility service area generally coincides with the area designated by LAFCO as the City's sphere of influence. The service area encompasses 36 square miles inside the City's corporate boundaries and approximately 5,000 persons outside City boundaries but within the sphere of influence also receive City services. Water use is largely attributed to landscape irrigation due to arid climate and large residential lots.

Figure 9-1 shows the City boundary and planning limits.

A small part in the southeastern section of the City is currently served by Western Heights Mutual Water Company and is not part of this UWMP. Figure 9-2 shows the City's water service area.

Currently, the majority of water is obtained from the Santa Ana River, Mill Creek, and groundwater. The City operates two surface water treatment plants, 20 wells, 37 booster pumps, 18 reservoirs, and 400 miles of transmission and distribution lines to provide water to its customers. The City also owns other facilities that are currently not in use due to age, contamination, or other factors. Water used in the service area is metered and billed bimonthly.

The recycled water system is shown in Figure 9-3, and the non-potable water system is shown in Figure 9-4.

Figure 9-1. City of Redlands City Boundary and Planning Limits Map

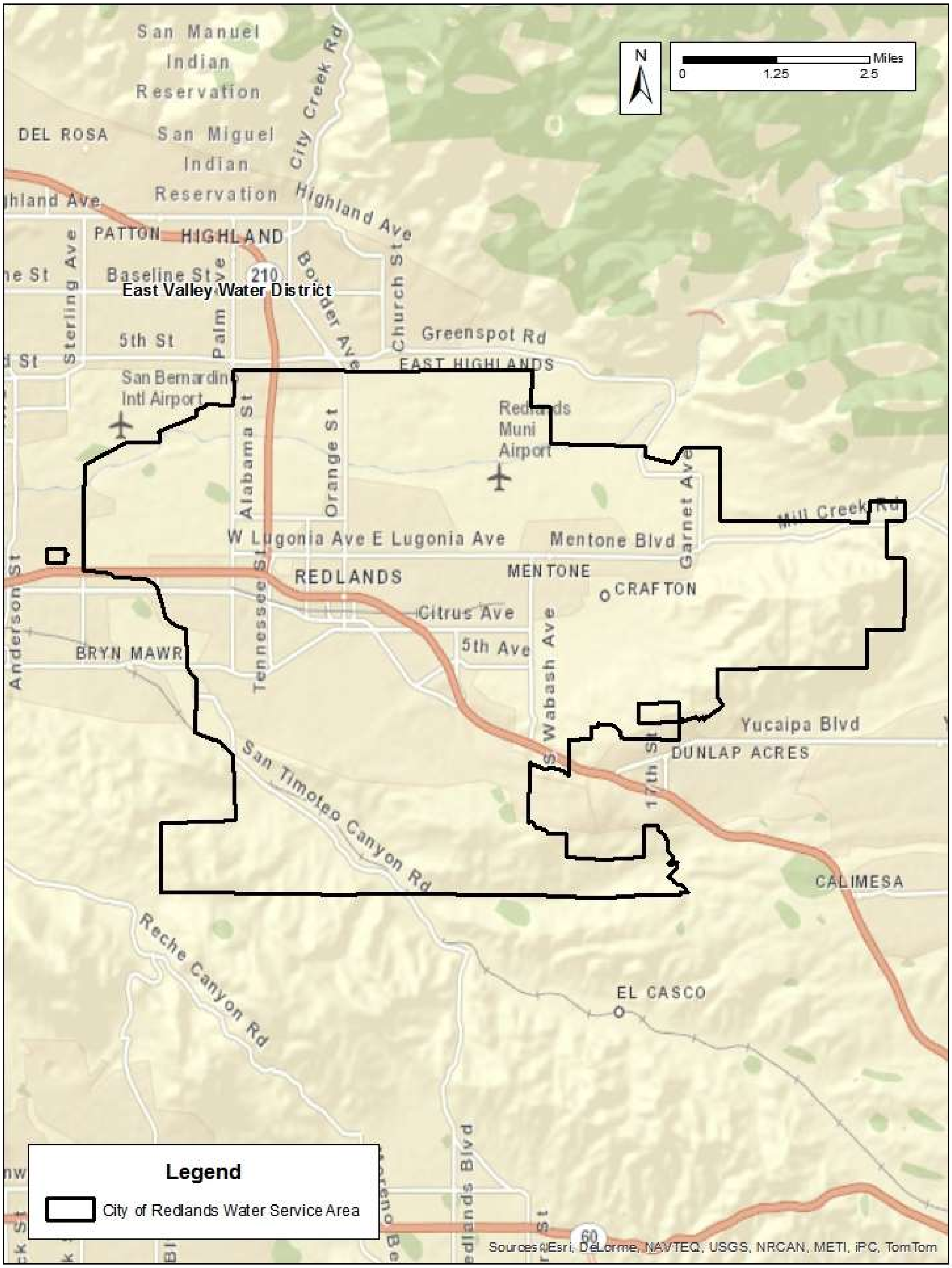

Figure 9-2. City of Redlands Water Service Area

Figure 9-3. City of Redlands Recycled Water System (1350 zone)

Figure 9-4. City of Redlands Non Potable Water System (1350 and 1570 zone)

9.2.2 Service Area Climate

The climate of the City and surrounding areas of the San Bernardino Mountains and foothills are characterized by relatively hot, dry summers and cool winters with intermittent precipitation. Annual rainfall precipitation varies from an average of approximately 13 inches in the lower elevation areas, where the City is located, to an average of approximately 20 inches at the base of the San Bernardino Mountains, to more than 35 inches along the crest of the mountains. The largest portion (73%) of average annual precipitation occurs during December through March, and rainless periods of several months are common in the summer. Precipitation is nearly always in the form of rain in lower elevations and mostly in the form of snow above about 6,000 feet mean sea level in the San Bernardino Mountains.

Table 9-5 summarizes climate conditions in the City's service area. Data was collected from the Western Regional Climate Center and the California Irrigation Management Information System. The weather station used is NCDC COOP # 047306 and the reference evapotranspiration information can be found at www.cimis.water.ca.gov.

Table 9-5. Historical Climate Data

	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo	2.17	2.80	4.03	5.10	5.89	6.60
Average Rainfall (in.)	2.68	2.64	2.28	1.17	0.47	0.10
Average Temperature (F)	52.1	53.7	56.35	60.3	64.9	71
	Jul	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Standard Monthly Average ETo	7.44	6.82	5.70	4.03	2.70	1.86
Average Rainfall (in.)	0.07	0.15	0.28	0.69	1.13	1.89
Average Temperature (F)	77.4	77.5	73.9	66.15	58.3	52.7

ETo= Reference evapotranspiration

9.2.2.1 Climate Change

According to the 2015 Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IRWMP), with climate changing, high elevation ecosystems are decreasing and the severity of future floods is likely to increase. The City has a long history of flooding during moderate to severe storm events. Causes of flooding include both local and regional storm drain deficiencies. The main cause of flooding is lack of conveyance capacities in three of the City's largest storm drainage systems, one receiving more than triple its capacity of 2,400 cubic feet per second. The City does recognize the need for infrastructure due to insufficient size and age, however, availability of funding has hindered the construction of improvements. The City does complete small, immediate replacements where warranted, and has developed several plans outlining the needs for additional storm drains.

To identify needed infrastructure and better prepare for funding opportunities, which are continually pursued, in 2014 the City completed the *City of Redlands Master Plan of Storm Drainage*. The plan highlights infrastructure improvement priorities; cost of implementing needed facilities and provides a comprehensive long–range plan for implementation and development of drainage facility improvements. More information on the plan can be found at www.cityofredlands.org/floodcontrolmasterplan.

Additionally, the City completed a Climate Change Vulnerability Assessment and found that flooding has the greatest potential impact on City water supplies. Ecosystem and habitat vulnerability have significant impacts on the region as a whole and is addressed in Chapter 1.

9.2.3 Service Area Population and Demographics

The City was incorporated in 1888 and developed from its origin as an agricultural area. The early 1900s saw a doubling of the population. Between 1910 and 1920, the population of the City actually decreased by 5 percent; however, from 1950 to 1990, it steadily grew with population increases at or above 20 percent in each decade. In recent years, that rate of growth has slowed. The City manages growth through three measures: R, N, and U. In November 1987, Measure N, a local ballot measure, was approved to establish the annual maximum number of dwelling units that can be added each year both inside and outside of Redlands limits. Measure N amended a previous initiative, Proposition R, which was approved in November 1978. As amended by Measure N, Proposition R, a zoning ordinance, allows a maximum of 400 dwelling units to be added to the City each year. Up to 50 of the units are to be single-family homes on existing lots, with the remainder to be allocated according to a point system. Additionally, Measure N provides that sewer or water service may be extended to an additional 150 units per year within the Sphere of Influence (SOI). In any given year, if fewer units are approved or constructed, the unused number is not carried forward to any future year. Measure U, approved in December 1997, further manages growth through such policies as fixing the number of land use categories, prohibiting transfers of density, development fee policy, preservation of non-urban lands, and others. Table 9-6 shows current and projected population over the next 20 years using the City’s General Plan build out estimate for 2035. The 2015 service area population was determined using the methodology provided by DWR found in the *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use Guidebook*, Methodology 2; and DWR’s population tool.

Table 9-6. DWR Table 3-1R. Current and Projected Population

Population Served	2015	2020	2025	2030	2035	2040
	85,276	87,707	90,138	92,569	95,000	95,000

9.3 System Water Use

9.3.1 Water Uses by Sector

Demand projections were estimated using the City's 2015 water use by sector data, available through the City's billing software. Gallons per capita, per day (GPCD) was determined using the following calculation:

GPCD = Total Water Use x Population x Days Per Year/ Gallons per Acre-Foot

GPCD was then multiplied by projected population for that year, to determine total water use:

Total Water Use = GPCD x Population

The 2015 percentages of water use by sector were assumed for projected years:

Total Water Use for Year x 2015 Percentage Water Use by Sector= Projected Water Use by Sector

Table 9-7. DWR Table 4-1R. Demands for Raw and Potable Water – Actual (AF)

Use Type	Level of Treatment When Delivered	2015
Single Family	Drinking Water	11,653
Multi-Family	Drinking Water	2,853
Commercial	Drinking Water	2,055
Institutional/Governmental	Drinking Water	1,308
Institutional/Governmental	Raw Water	94
Landscape	Drinking Water	1,614
Landscape	Raw Water	1,191
Agricultural irrigation	Drinking Water	182
Other	Drinking Water	340
	Total	21,290

Table 9-8. DWR Table 4-2R. Demands for Raw and Potable Water – Projected (AF)

Use Type	Level of Treatment	2020	2025	2030	2035	2040
Single Family	Drinking Water	15,318	15,743	16,168	16,592	16,592
Multi-Family	Drinking Water	3,750	3,854	3,958	4,062	4,062
Commercial	Drinking Water	2,701	2,776	2,851	2,926	2,926
Institutional/Governmental	Drinking Water	1,719	1,767	1,815	1,862	1,862
Institutional/Governmental	Raw Water	124	127	130	134	134
Landscape	Drinking Water	2,122	2,181	2,239	2,298	2,298
Landscape	Raw Water	1,566	1,609	1,652	1,696	1,696
Agricultural irrigation	Drinking Water	239	246	253	259	259
Other	Drinking Water	447	459	472	484	484
Total		27,986	28,762	29,538	30,313	30,313

Table 9-9. DWR Table 4-3R. Total Water Demands (AF)

Demand	2015	2020	2025	2030	2035	2040
Potable and Raw Water	21,290	27,986	28,762	29,538	30,313	30,313
Recycled Water	3,032	5,152	5,402	5,402	5,402	5,402
Total Water Demand	24,322	33,138	34,164	34,940	35,715	35,715

9.3.2 Distribution System Water Losses

The City prepared a water loss audit using the DWR methodology. The results are summarized in Table 9-10.

Table 9-10. DWR Table 4-4R. Water Loss Summary Most Recent 12 Month Period Available

Reporting Period Start Date	Volume of Water Loss
01/2015	1,490.1

9.3.3 Estimating Future Water Savings

In determining demands for potable and raw water use projections, future water savings were taken into account. The City is currently updating its General Plan and recently completed the 2016 water and wastewater rate analysis, where water savings for the next 5 years were included in the rate model. These reports were used when estimating future water savings.

9.3.4 Water Use for Lower Income Households

All growth, including projected water use for single-family and multifamily residential housing needed for lower income households, is included within growth projections.

9.4 SBX 7-7 Baselines and Targets

9.4.1 Updating Calculations from 2010 UWMP

With the adoption of the Water Conservation Act of 2009, also known as SB X7-7, retail urban water suppliers are required to establish targets to reduce urban water use 20 percent by year 2020. To establish an urban target water use for year 2020 in the 2010 UWMP, water suppliers were required to determine a baseline water use using a 10-15 year period then calculate average water use in GPCD, over that length of time. In this UWMP a calculated water use, in GPCD, for a 5-year baseline period was also required and used to confirm the selected 2020 target met minimum water use reduction requirements.

For this UWMP, DWR has allowed water agencies to recalculate their 2020 urban water use target (2020 target), but requires use of U.S. Census Data for years 2000 and 2010 to recalculate baseline population, which the City has completed using the DWR's Population Tool. The years 1999-2008 were selected for calculation of a 10-year base period. Water agencies were also allowed to choose a different method to determine the 2020 target. To maintain consistency with the City's 2010 target method, the City chose to reuse *Target Method 1: 80 percent of 10- to 15- Year Baseline GPCD*. Using this method it was determined the revised baseline water use is 356 GPCD and the 2020 target is 285 GPCD which differs slightly from the 2010 UWMP baseline of 370 GPCD and a 2020 target of 296 GPCD.

Water agencies were also required to calculate water use, in GPCD, for a 5-year baseline period to confirm the selected 2020 target meets minimum water use reduction requirements. Using years 2003-2007, the calculated average water use is 355 GPCD.

To demonstrate agencies are on track to achieve their 2020 target, a 2015 interim urban water use target was required (2015 target). The 2015 target is the value halfway between the 10-year baseline GPCD and the confirmed 2020 target, which is 320 GPCD. The City's actual 2015 water use in GPCD is 234, indicating the City has successfully met the obligations of the 2009 Water Conservation Act and surpassed both its 2015 and 2020 target.

DWR has prepared standardized tables to record and document the calculations required for this section and are included in Appendix O. A summary of the data is provided in Table 9-11.

Table 9-11. DWR Table 5-1R. Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD	2015 Interim Target	Confirmed 2020 Target
10-Year	1999	2008	356	320	285
5-Year	2003	2007	355		

Table 9-12. DWR Table 5-2R. 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Extra-ordinary Events	Economic Adjust-ment	Weather Normal-ization	Total Adjustments	Adjusted 2015 GPCD	2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015?
234	320	0	0	0	0	234	234	YES

9.5 System Supplies

The City has four sources of water to provide to its service area: Purchased imported water, groundwater, surface water and recycled water.

9.5.1 Purchased or Imported Water

Imported water from the State Water Project (SWP) is available through the City's wholesale water supplier, San Bernardino Valley Municipal Water District (Valley District). Valley District is a state water contractor with annual entitlement to SWP water of 102,600 AF. The City has purchased supplemental SWP water only in years when surface flows have not been able to meet demands and on occasion when surface water supplies are turbid and require blending. The City will continue to request SWP water in these situations, but fully understands its obligation to have backup capacity and conservation measures in place during SWP outages or extended dry periods. Further, in extremely dry periods, the State has had allocations of zero. If this condition occurs in a future year when the City desires SWP water, groundwater resources will be utilized in addition to aggressive conservation measures, if needed, to satisfy and reduce demands. Additionally, because of steps set forth in the IRWMP, it is expected the groundwater basin will be subsequently recharged with SWP water or native water in wet years when excess water is available. Based on a 10-year average, purchased imported water, used by the City at its treatment plants, totals 3% of the City's annual water production.

9.5.2 Groundwater

The City can produce water from the Bunker Hill Subbasin (also known as San Bernardino Basin Area or SBBA) and Yucaipa Subbasin. The Upper Santa Ana Valley Groundwater Basin is an alluvial groundwater basin fed by multiple tributaries, including the Santa Ana River and Mill Creek, both located within the City's service area. The Bunker Hill Subbasin ("Bunker Hill") has a surface area of approximately 89,600 acres and a groundwater storage capacity of 5,976,000 acre-feet. Based on a 10-year average, groundwater from Bunker Hill totals 51.1% of the City's annual water production. The Yucaipa Subbasin has a surface area of 25,300 acres and a groundwater storage capacity of 808,000 acre-feet. Figure 2-2 in Chapter 2 is a map of Upper Santa Ana Valley Groundwater Basin and boundaries of both subbasins.

9.5.2.1 Bunker Hill Subbasin/ SBBA

The SBBA is governed by a court action from 1969 called the Western Judgment, to which the City is stipulated. Provisions of the physical solution set forth in the Judgment Case No. 78426, Western Municipal Water District of Riverside County et al., vs. East San Bernardino County Water District et al., entered April 17, 1969, in the Superior Court of the State of California in and for the County of Riverside, established the entitlements and obligations of Valley District and Western Municipal Water District (WMWD) with regard to the Bunker Hill Basin area to be 232,000 AFY. The adjusted right for use within Valley District is 167,238 AFY. The adjusted right for use within WMWD is 64,862 AFY. Should the extraction, or the withdrawal, of groundwater from the SBBA exceed the safe yield, Valley District is obligated to recharge an amount equal to the amount the safe yield has been exceeded from an outside source of water. The outside source of water is typically SWP water. This judgment is administered by a Watermaster who prepares an annual report that is submitted to the court.

Due to recent drought conditions and increased utilization of groundwater, Bunker Hill's water table has dropped, resulting in the lowering of one well pump in the City's service area. In order to prevent critical reductions in groundwater levels, the City participates in the IRWMP for the region to manage groundwater. The Western Judgment states that the SBBA will not go into overdraft and the IRWMP is the tool used to ensure the judgment's requirements are met. Through the development of the IRWMP, the basin technical advisory committee (BTAC) was created. Annually, BTAC produces a groundwater management plan which identifies the basins needs and recharge projections and capacities. The report also identifies groundwater table levels, quantity of water pumped, risks of subsidence/liquefaction and safe yield. Additionally, BTAC reviews projects to be included in the IRWMP which may result in regional benefits to increase basin yield and reduce demand in the SBBA. The Western Judgment can be found in Appendix I. A list of users extracting from Bunker Hill can be found in Chapter 2, Table 2-4.

9.5.2.2 Yucaipa Subbasin

The City has two wells located within the Yucaipa Subbasin, Hog Canyon Well and Chicken Hill Well. Due to high levels of nitrate and perchlorate in the area, water pumped from these wells is primarily used for irrigation and only in recent dry years. Major water producers in this subbasin include Yucaipa Valley Water District, Western Heights Water Company, South Mesa Water Company. This subbasin has long standing history of being in overdraft. Although the subbasin is not adjudicated, a groundwater management plan is currently underway to proscribe collective management of the basin.

Table 9-13. DWR Table 6-1R. Groundwater Volume Pumped (AF)

Groundwater Type	Location or Basin Name	Water Quality	2011	2012	2013	2014	2015
Alluvial Basin	Bunker Hill Subbasin	Drinking Water	15,129	17,579	14,945	20,612	10,595
	Total		15,129	17,579	14,945	20,612	10,595

9.5.3 Surface Water

The City receives its surface water from the following sources:

- Mill Creek Watershed: Water from the Mill Creek watershed is treated at Henry Tate (Tate) Surface Water Treatment Plant (SWTP) located on Highway 38 east of Mentone.
- Santa Ana River Watershed: Water from the Santa Ana River watershed is treated at the Hinckley SWTP located on Crafton Avenue.
- SWP Water: When required, SWP water is treated at the Hinckley SWTP and Tate SWTP.

The City has ownership in a variety of private and mutual water companies to supply water to the City's Tate and Hinckley SWTP. For decades the City has increased its ownership in these companies in an effort to increase its access to a reliable local source of water. The City's founders were wise to realize the value of this commodity and sought ownership of water rights in the surrounding tributaries and from local water companies and water right owners. Based on a 10-year average, surface water totals 45.9% of the City's annual water production.

Note: Surface water supplies reported in Table 9-19 and Table 9-20, were counted as self-supplied surface water. These supplies include the City's direct ownership of surface water rights on Santa Ana River and Mill Creek as well as the surface water rights of Bear Valley Mutual Water Company, Crafton Water Company and several other mutual water companies the City owns shares.

9.5.4 Storm Water

The City does not currently have a storm water recovery system. However, the City actively participates in the planning stages for regional projects with Valley District that will capture storm water runoff to be utilized for recharge into Bunker Hill.

9.5.5 Wastewater and Recycled Water

The City is a sewering agency that treats approximately 5.6 million gallons of wastewater daily. The City's Wastewater Treatment Plant (WWTP) has the capability of treating 9 million gallons a day (MGD) to a secondary level. Of that, 7.2 MGD can be treated to a tertiary level. All wastewater collected and treated is from the City's service area and discharged within the City's service area.

The City utilizes all wastewater collected and treated at its WWTP in its service area for:

- Distribution to customers
- Percolation into Bunker Hill

Treated wastewater distributed to customers is tertiary treated, which is deemed recycled water. The City's recycled water customers include Southern California Edison (SCE) Company and recycled/non-potable water customers located in the 1350 pressure zone (see Figure 9-4). SCE uses recycled water as cooling water at its Mountain View Power Plant, and recycled/ non-potable water customers use recycled water for irrigation. All remaining wastewater is treated to a secondary level and released into spreading basins located east of the WWTP for recharge back into Bunker Hill ground water basin. Based on 2015 volumes, approximately 45% (~2,800 AF) of treated wastewater was used as recycled water supply for customers, and 55% (~3,500 AF) was used to recharge.

The expansion of the recycled water system is limited by its supply, which is currently fully utilized. However, because the City requires new commercial development to provide dual plumbing for irrigation systems to accommodate the use of recycled/non-potable water as it becomes available, all recycled water may be utilized for distribution to recycled/non-potable water customers in the 1350 and eventually the 1570 pressure zone, as demand increases. Expansion of the recycled water system into the 1570 pressure zone will require construction of a 750,000-gallon reservoir; 1,500 gallons per minute booster pump station, and 9,400 linear feet of pipeline. Construction of these facilities would increase the use of recycled water in the 1350 and 1570 pressure zones by 826 AFY.

Table 9-14. DWR Table 6-2R. Wastewater Collected within Service Area in 2015

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AF)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
City of Redlands	Metered	6,286	City of Redlands	Redlands WWTP	Yes	No
	Total Wastewater Collected from Service Area in 2015	6,286				

Table 9-15. DWR Table 6-3R. Wastewater Treatment and Discharge within Service Area in 2015

Waste-water Treat-ment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number	Method of Disposal	Does this Plant Treat Wastewater Generated Outside the Service Area?	Treat-ment Level	Wastewater Treated Volume 2015 (AF)	Discharged Treated Wastewater Volume 2015 (AF)	Recycled Within Service Area Volume 2015	Recycled Outside of Service Area Volume 2015
Redlands WWTP	Spreading Basins	8 basins located 1,100 ft. east of WWTP		Percolation ponds	No	Secondary, Disinfected – 23	3,254	3,254	0	0
Redlands WWTP	Recycled Water Distribution System			Other	No	Tertiary	3,032	0	3,032	0
						Total	6,286	3,254	3,032	0

Table 9-16. DWR Table 6-4R. Current and Projected Recycled Water Direct Beneficial Uses within Service Area (AF)

Name of Agency Producing (Treating) the Recycled Water:	City of Redlands							
Name of Agency Operating the Recycled Water Distribution System:	City of Redlands							
Supplemental Water Added in 2015	0							
Source of 2015 Supplemental Water	N/A							
Beneficial Use Type	**General Description of 2015 Uses**	**Level of Treatment**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Landscape irrigation (excludes golf courses)		Tertiary	0	2,120	2,370	2,370	2,370	2,370
Industrial use		Tertiary	3,032	3,032	3,032	3,032	3,032	3,032
	Total		3,032	5,152	5,402	5,402	5,402	5,402

Table 9-17. DWR Table 6-5R. 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual (AF)

Beneficial Use Type	2010 Projection for 2015	2015 Actual Use
Industrial use	2,214	3,032
Total	2,214	3,032

Table 9-18. DWR Table 6-6R. Methods to Expand Future Recycled Water Use

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use (AF)
Recycled water system expansion	Project to include 9,600 linear feet of pipe, reservoir and booster station.	2020	826
		Total	826

9.5.6 Desalinated Water Opportunities

The City does not have any opportunities for development of desalinated water, including brackish water, and groundwater as a long-term supply.

9.5.7 Exchanges or Transfers

The City does not have any planned or potential future water exchanges or transfers.

9.5.8 Future Water Projects

The City does not have any planned future water projects.

9.5.9 Summary of Existing and Planned Sources of Water

Table 9-19. DWR Table 6-8R. Water Supplies - Actual

Water Supply	Additional Detail on Water Supply	2015 Actual Volume (AF)	2015 Water Quality
Surface water	Local surface water supplies: Santa Ana River and Mill Creek	11,725	Drinking Water
Groundwater	Bunker Hill Basin	10,042	Drinking Water
Groundwater	Bunker Hill Basin and Yucaipa Basin	1,137	Raw Water
Recycled Water	Effluent from City's WWTP	3,032	Recycled Water
Purchased or Imported Water	State Water Project water	0	Drinking Water
	Total	25,936	

Table 9-20. DWR Table 6-9R. Water Supplies – Projected (AF)

Water Supply	Additional Detail on Water Supply	2020	2025	2030	2035	2040
Surface water		14,000	14,000	14,000	14,000	14,000
Groundwater	Potable (Bunker Hill Subbasin	40,000	40,000	40,000	40,000	40,000
Groundwater	Raw Water	1,496	1,564	1,632	1,696	1,696
Recycled Water		5,152	5,402	5,402	5,402	5,402
Purchased or Imported Water		1,500	2,000	2,500	3,000	3,000
	Total	62,148	62,966	63,534	64,098	64,098

9.5.10 Climate Change Impacts to Supply

In order to identify the potential climate change impacts to the City's service area, a vulnerability assessment was completed using the Climate Change Vulnerability Assessment included in Appendix F. A complete discussion of the goals and objectives to improve water supply reliability and address climate change concerns within the region can be found within the IRWMP, Chapter 4: Goals and Objectives (San Bernardino Valley Municipal Water District, January 2015).

9.6 Water Supply Reliability Assessment

9.6.1 Constraints on Water Sources

Because of the industrial and commercial industries within the watershed, regular monitoring of groundwater contaminants is performed. Based on the results from these samples, increased monitoring or treatment may be necessary if resources are impaired, in order to meet all drinking water standards.

9.6.2 Reliability by Type of Year

Historical weather data from the National Oceanic and Atmospheric Administration (NOAA) and water production data for the City was used to identify water supply and demand trends, which most closely represent an average year, single-dry year, and multiple-dry year periods. Data available for analysis were 1983-2015. Correlation of data indicates that during dry years, both single and multiple, demands can increase up to 18.4% and supplies can decrease up to 10.3%, cumulatively. Based on the City's available supplies, the City can continue to meet multiple and single dry year demands.

Table 9-21. DWR Table 7-1R. Availability of Supplies

Year Type	Percent of Average Supply
Average Year	100

Year Type	Percent of Average Supply
Single-Dry Year	98
Multiple-Dry Years 1st Year	98
Multiple-Dry Years 2nd Year	95
Multiple-Dry Years 3rd Year	90

9.6.3 Supply and Demand Assessment

The supply and demand reliability assessment was based on available supplies and current and projected demands. Included within are surface water, groundwater, recycled water and purchased or imported water. These values are based on the available water from these sources and current infrastructure.

Table 9-22. DWR Table 7-2R. Normal Year Supply and Demand Comparison (AF)

	2020	2025	2030	2035	2040
Supply Totals	62,148	62,966	63,534	64,098	64,098
Demand Totals	33,138	34,164	34,940	35,715	35,715
Difference	29,010	28,802	28,594	28,383	28,383

Table 9-23. DWR Table 7-3R. Single Dry Year Supply and Demand Comparison (AF)

	2020	2025	2030	2035	2040
Supply Totals	53,831	54,645	55,208	55,767	55,767
Demand Totals	30,142	30,978	31,813	32,649	32,649
Difference	23,689	23,667	23,395	23,118	23,118

Table 9-24. DWR Table 7-4R. Multiple Dry Years Supply and Demand Comparison (AF)

		2020	2025	2030	2035	2040
First Year	Supply Totals	58,936	59,754	60,322	60,886	60,886
	Demand Totals	26,155	26,880	27,605	28,330	28,330
	Difference	32,781	32,874	32,717	32,556	32,556
Second Year	Supply Totals	56,861	57,676	58,240	58,801	58,801
	Demand Totals	28,944	29,747	30,549	31,351	31,351
	Difference	27,917	27,929	27,691	27,450	27,450
Third Year	Supply Totals	53,831	54,645	55,208	55,767	55,767
	Demand Totals	30,142	30,978	31,813	32,649	32,649
	Difference	23,689	23,667	23,394	23,118	23,118

9.6.4 Regional Supply Reliability

To maximize the use of local water resources and reduce dependence on imported water supplies, the City established conservation pricing methods, based on the cost of providing service to each customer, developed water loss management programs and increased public education on demand management. Demand Management Measures and increased use of recycled water are discussed in detail in Section 9.8 and 9.5.5. The region has also taken steps to increase supply reliability by recharging current imported water supplies during wet years to enhance groundwater supplies for use in dry years. Further regional efforts managed by Valley District, are included in Chapter 2.

9.7 Water Shortage Contingency Planning

9.7.1 Stages of Action

Water supply shortages can occur due to droughts or emergency conditions. In such cases, the City has an ordinance to help reduce water demands. This ordinance provides for mandatory cutbacks in water use so as not to endanger health, safety, and welfare of the citizens and property owners in the City. The water conservation ordinance, which serves as a Water Shortage Contingency Plan (Plan) is composed of four stages. Upon determination of the severity of the situation, the City Manager will recommend the appropriate stage to be enacted.

Action Stages

The stages and approximate severity of supply shortage are as follows:

- Stage I: Voluntary Conservation Measures- A small decrease in water supply is expected.
- Stage II, Mandatory Compliance; Water Alert- A medium decrease in water supply is expected.
- Stage III, Mandatory Compliance; Water Warning- A significant decrease in water supply is expected.
- Stage IV, Mandatory Compliance; Water Emergency- Water supplies are in danger of being depleted where such uses as human consumption, sanitation, and fire protection would be endangered. This would be a decrease in supply of more than 50 percent, most likely associated with a natural disaster.

Proper noticing, a public hearing and a majority vote by the entire City Council are required prior to implementation or termination of each stage. Upon approval by City Council, the Plan becomes effective immediately. Staff is required to notice by newspaper publication and water utility bill insert the change of stage. In the event that City Council cannot meet in time to act, the City Manager or his designee is authorized to implement provisions of the Plan and will be reviewed by City Council at its next meeting for revocation or ratification.

Table 9-25. DWR Table 8-1R. Stages of Water Shortage Contingency Plan

Stage	Percent Supply Reduction	Water Supply Condition
1	Up to 15%	Total supply is 85-90% of normal
2	16-25%	Total supply is 75-84% of normal
3	26-35%	Total supply is 65-74% of normal
4	36-50%	Total supply is less than 64% of normal

Table 9-25 identifies water shortage severity in relation to Plan stages. In the event the City experiences severe water shortages of over 50% reduction in water supply, Stage 4 severely limits irrigation, prohibits additions of water to swimming pools, operation of ornamental fountains and issuance of new service connections and meters. Additionally, the restrictions of stage I, II and III still apply. Severe shortages of over 50% reduction in water supply would likely occur from a natural disaster. A series of dry years would reduce water supplies; however, the City has multiple sources of supply and would be able to offset normal supplies with additional groundwater and aggressive conservation efforts to address the basic health and safety needs of the City's customers.

9.7.2 Prohibitions on End Uses

Table 9-26. DWR Table 8-2R. Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	Landscape - Restrict or prohibit runoff from landscape irrigation	Voluntary	No
1	Other	Voluntary, Install water saving devices	No
1	Other	Voluntary,select low water demand plants for new landscaping	No
1	CII - Restaurants may only serve water upon request	Restrict water service in restaurants	No
2	Landscape - Limit landscape irrigation to specific times		yes*
2	Landscape - Limit landscape irrigation to specific days		yes*
2	Other - Require automatic shut of hoses		yes*
2	Landscape - Other landscape restriction or prohibition	Commercial agriculture exempt from limit on irrigation days and times but shall curtail all non-essential water use.	yes*
2	Other	Washing of any vehicles is limited to allowed watering days and times and only with handheld bucket, or hose equipped with automatic shutoff nozzle.	yes*

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	Other - Prohibit use of potable water for construction and dust control	and for washing and sprinkling of foundations or structures	yes*
2	Other water feature or swimming pool restriction	Refilling or adding of water to pools allowed only on allowed watering days and times.	yes*
2	Water Features - Restrict water use for decorative water features, such as fountains	Unless fountain or other structure has a recycling system.	yes*
2	Landscape - Other landscape restriction or prohibition	Gold greens and tees are only allowed irrigation on allowed watering days and times. Fairway irrigation is absolutely prohibited.Except when irrigated with treated wastewater or reused water.	yes*
2	CII - Restaurants may only serve water upon request		yes*
2	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Failure to repair controllable leaks is prohibited.	yes*
2	Other - Prohibit use of potable water for washing hard surfaces		yes*
2	Landscape - Restrict or prohibit runoff from landscape irrigation		yes*
3	Landscape - Other landscape restriction or prohibition	All outdoor irrigation of vegetation shall occur only on allowed days and times using only handheld hoses, drip irrigation, or handheld buckets.	yes*

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
3	Landscape - Prohibit all landscape irrigation	on golf tee areas. Except when irrigated with treated wastewater or reused water.	yes*
4	Landscape - Prohibit all landscape irrigation	Except on allowed watering days and times	yes*
4	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	and only during permitted hours.	yes*
4	Landscape - Other landscape restriction or prohibition	Commercial Agriculture irrigation is only permitted on designated days and times and only using handheld hoses, drip irrigation systems, or handheld buckets.	yes*
4	Pools - Allow filling of swimming pools only when an appropriate cover is in place.		yes*
4	Water Features - Restrict water use for decorative water features, such as fountains	Prohibited at all times	yes*
4	Other	The issuance of new service connections and meters is prohibited.	yes*
*A surcharge is applied to a customer's utility bill on the 3rd violation. When in a particular stage, all elements of less restrictive stages shall apply as well.			

Location of Water Shortage Contingency Plan:

- Appendix G: Redlands Municipal Code; Chapter 13.06-Water Conservation Plan
- http://cityofredlands.org/drought , *Redlands Municipal Code; Chapter 13.06- Water Conservation Plan*

9.7.3 Penalties, Charges, Other Enforcement of Prohibitions

For prohibitions on end uses, customers will receive a violation should they violate restrictions set forth in the stage currently in effect and the preceding stages. Upon third violation, a surcharge is imposed on the customer's next regular water bill. The surcharge consists of a percentage of the customer's commodity charge on the most recent water bill, based on the stage then in effect. The surcharge for each stage is as follows:

- Stage II: 25 percent
- Stage III: 50 percent
- Stage IV: 75 percent

9.7.4 Consumption Reduction Methods

In addition to prohibitions on end uses, which are the responsibility of customers, the City is committed to lead by example. In 2015, the City created a "Plan of Action" that outlines City efforts to improve outreach and resources for customers and increase water efficiency at its own facilities. This four-phase approach includes increasing efforts and funding in correlation with increasing water reduction requirements. Table 9-27 summarizes these efforts.

Table 9-27. DWR Table 8-3R. Stages of Water Shortage Contingency Plan - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
All Stages	Expand Public Information Campaign	
All Stages	Improve Customer Billing	
All Stages	Offer Water Use Surveys	
All Stages	Provide Rebates on Plumbing Fixtures and Devices	
All Stages	Provide Rebates for Landscape Irrigation Efficiency	
All Stages	Provide Rebates for Turf Replacement	
2	Decrease Line Flushing	
All Stages	Reduce System Water Loss	
2	Increase Water Waste Patrols	
4	Moratorium or Net Zero Demand Increase on New Connections	
	Implement or Modify Drought Rate Structure or Surcharge	The City will be looking into Budget Based Rates in 2017.
1	Other	Develop landscape ordinance
2	Other	Increased regional collaboration to ensure sufficient water supplies for the entire region.
All Stages	Other	upgrades to increase recycled water use.
2	Other	Implement, phone application, hotline and email address for water waste reporting.
2	Other	Develop internal Drought Task Force to collaborate on different methods to reduce consumption in each City department.

9.7.5 Determining Water Shortage Reductions

The City utilizes monthly water production reports to determine demand reductions in comparison to the same month in previous years. In months where a new stage is implemented, the City will track reductions in comparison to month's prior or to the same month in a previous year when less restrictive stages were in place.

9.7.6 Revenue and Expenditure Impacts

Implementation of any stage of the Plan requiring mandatory restrictions may cause a decrease in revenues and/or an increase in expenditures. The City recently experienced decreasing revenue effects due to a series of dry years that required implementation of Stage II of its Plan, the first stage requiring mandatory restrictions. Additionally, implementation of additional restrictions to achieve a State mandated conservation savings, increased outreach efforts and staffing, thus increasing expenditures. Like most agencies, the majority of the City's costs are fixed, and the combination of decreasing revenues and increased expenditures required implementation of revenue adjustments.

Although the City has reserve funds, the Council determined it not prudent to spend them to address declining sales due to drought, but rather utilize other options first. Reserve funds are typically reserved for emergencies needing immediate attention where time constraints of a rate study, customer noticing and public hearings would impede immediate actions. In the case where revenue adjustments and use of reserve funds are not options, the City would postpone capital improvement projects and/or reduce staffing to offset diminished revenues.

9.7.7 Resolution or Ordinance

The adopted water shortage contingency plan, approved by City Council as Ordinance 2151: *City of Redlands Water Conservation Plan* can be found in Appendix G.

9.7.8 Catastrophic Supply Interruption

Disasters, such as earthquakes, occur without notice. In order to minimize confusion and service interruptions, the City's Municipal Utilities and Engineering Department developed an emergency plan. This plan is to be used as a supplement to the latest revision of the Citywide Emergency Plan and provides guidelines for actions to be undertaken by City personnel during an emergency.

In an emergency, City personnel are required to meet at a reporting location for assignment duties. Personnel who are unable to get to the City, because of downed structures or other obstacles, are authorized by the City to offer their services to local water providers if these providers are also experiencing an emergency. The City has been divided into sections. Employees have been assigned to inspect the facilities in these sections. Once damages have been identified, the plan provides for the dispatch of repair personnel. In cases where water service is diminished due to such emergencies, the City has the option of notifying the public through press releases, City website, flyers, and loud speakers depending on the severity of the emergency.

9.7.9 Minimum Supply Next Three Years

Table 9-28. DWR Table 8-4R. Minimum Supply Next Three Years (AF)

	2016	2017	2018
Available Water Supply	53,831	53,831	53,831

9.8 Demand Management Measures

Although the City has currently achieved its 2020 water use target, the City will continue its efforts to ensure water waste is reduced. Below are Demand Management Measures the City has implemented, plans to implement and implementation method.

9.8.1 Water Waste Prevention Ordinances

Since 1991, a water waste prevention ordinance has been in place to address water waste and shortages (see Appendix G). The ordinance outlines conservation stages to be implemented based on water supply availability and increasing prohibitions on actions that waste water. However, Stage I requires only voluntary conservation from June 1-October 1 and does not require any specific prohibition of water waste. As State mandates on water use practices increase, the City intends to modify the Ordinance to require specific prohibitions of water waste at all times during Stage I.

9.8.2 Metering

The City water distribution system is fully metered. Since 2008, the City has had a meter replacement and maintenance plan in place. Meters smaller than 2” are replaced every 15-20 years and all meters over 2” are calibrated to ensure accuracy. Additionally, from 2014-2015, City staff conducted an audit on all commercial properties/accounts to ensure all connections were legal and accounted for in the City’s billing system. This allowed the City to decrease unaccounted for water loss and loss in revenue. The City is currently studying the cost and benefits of implementing Advanced Metering Infrastructure (AMI) and Automatic Meter Reading (AMR), which may, or may not, assist in reducing water loss further. Meter replacement and calibration are ongoing programs and will continue into the foreseeable future.

9.8.3 Conservation Pricing

The City currently uses a traditional tiered rate structure that promotes water conservation at an accurate price for the service provided. The traditional tiered rate structure has two components, a service charge, which is based on meter size, and a commodity charge. The commodity charge is based on the amount of water delivered and increases as the amount of water delivered increases, based on the cost of providing the additional amounts of water. This increase is due to the City utilizing its least expensive sources first before using more costly sources. The amount of water available within each of the three tiers is based on a 10-year average of water utilized from each source. Regardless of the customer type, each customer receives the same amount of water from each tier throughout the year. However, in an effort to further manage demand, in 2015, the City will begin a water allocation based rate study to determine its feasibility. In an allocation based rate (also known as a budget based rate), each customer is given a water allocation or “budget”, and if that budget is exceeded, the customer pays an increased rate for exceeding the allocation for that portion of water that exceeds the water budget.

9.8.4 Programs to Assess and Manage Distribution System Real Loss

Since 2007 the City has replaced approximately 46 miles of pipeline in order to maintain reliability of the distribution system. However, in years prior, the City failed to replace the amount of pipeline when needed; creating a backlog of aged pipe that requires extensive maintenance and repair. The City responds to approximately 600 leaks per year, largely attributed to these aged assets. Often times, these leaks are inches away from prior repairs, triggered by repair disturbance. To further reduce distribution system loss, which was determined in the 2015 AWWA Water Audit to be approximately 6.8%, in 2017, the City will undertake a large pipeline replacement program to replace over 89 miles of pipe over the next ten years. In 2015, the City developed a funding plan, which includes revenue increases over the next three years, to replace the backlog pipe and put the City on track for regular pipeline replacement.

9.8.5 Public Education and Outreach

Due to the efforts in response to SB X7-7, and the effects due to the ongoing drought, the City established programs that further decrease water demand and assist in ensuring a sustainable water supply for future generations. Efforts including the City’s tiered water rate structure and water audit program have helped to make the City’s water conservation efforts known, however starting in 2010 efforts to reach customers increased significantly. The renewed focus often pointed to customer accountability, while offering City support through programs that promote conservation. This changed focus, aided by the publicity of the drought, has engaged City customers to take water conservation seriously which can be seen in the City’s ability to meet its 2020 water reduction requirement 5 years ahead of schedule.

The following programs/efforts have increased engagement with customers:

1. Water Efficiency Rebate Program which provides incentives for:
    a. Weather Based Irrigation Controllers (WBIC’s)
    b. Drought Tolerant Lawn Conversions
    c. Synthetic Turf Replacement
    d. Water Efficient Clothes Washers
    e. High Efficiency Sprinkler Nozzles
    f. High Efficiency Toilets
2. Top 10% Highest Water User Letter: Contact efforts

3. Design and construction of four demonstration gardens
4. Participation in regional marketing campaign
5. Educational outreach events

In addition to use of bill stuffers, the City advertises water conservation programs and restrictions through use of the following:

- Bill messages and water use comparison charts
- Bulk postcard mailings
- Consumer Confidence Report advertisements
- Newspaper advertisements
- Electronic signboards
- Event presence
- Street banners
- Social media
- Smartphone app

Additionally, the City offers free water saving products to customers to assist in water conservation. These products have included:

- Hose nozzles
- Toilet leak detection tablets
- Lawn/plant moisture meters
- Low water use plants (at local events)
- Shower timers
- Faucet aerators
- Water efficiency educational collateral

As budgets allow, the City plans to continue the programs/efforts listed above, as well as implement new programs. Plans for an educational program focused on educating children on water waste and efficiency outdoors is currently underway. Because State agencies have put emphasis on water waste reporting, enrolling children in water waste investigations will result in additional reporting staff can follow up on, which will yield significant water saving results.

The City also intends to implement a new rebate program to incentivize customers with small groves to convert to efficient irrigation systems. The City has a long history in the citrus industry and many homes and businesses are landscaped with ornamental and functional groves. By incentivizing customers to replace their antiquated irrigation systems with efficient systems, further outdoor water savings can be achieved. Both the educational program and grove irrigation replacement incentives are included as a Supplemental Environmental Project for State Water Resources Control Board which if decided beneficial, may be included within the City’s water conservation program.

9.8.6 Water Conservation Program Coordination and Staffing Support

The City's water conservation program currently staffs two full-time employees and three part-time employees. A full-time water conservation coordinator has been staffed since 2007. In 2015, a full-time water conservation assistant and three part-time water waste investigators were hired to assist with implementing and enforcing water conservation mandates.

Efforts to implement these DMM's have been both significant and successful. Since implementation of State restrictions in 2014, the City has nearly tripled its water conservation budget. Since the 2010 UWMP, over $600,000 in rebates has been given to over 600 customers. These incentives have allowed customers to convert over 7,000 high efficiency sprinkler heads, 300 high efficiency toilets, 100 WBIC's, 60 high efficiency washers and nearly 500,000 square feet of lawn. Additionally, since 2014 the City has spent over $75,000 in public outreach, issued over 2,500 water waste violations and has seen water savings of approximately 21% in potable water use.

9.9 Plan Adoption, Submittal, and Implementation

Table 9-29. DWR Table 10-1R. Notification to Cities and Counties

City Name	**60 Day Notice**	**Notice of Public Hearing**
City of Redlands	X	X
County Name	**60 Day Notice**	**Notice of Public Hearing**
San Bernardino County	X	X

9.9.1 Public Availability

This Urban Water Management Plan is available to the public to be viewed in its entirety at:

City of Redlands
Municipal Utilities and Engineering Department
35 Cajon Street, Suite 15A
Redlands, CA 92373

During normal business hours, Monday through Friday (closed alternating Fridays) from 7:30 AM-5:30 PM or can be viewed from the City's website at:

www.cityofredlands.org/MUED/water

10 San Bernardino Municipal Water Department

10.1 System Description

SBMWD was created as a municipal utility by Article 9 of the City of San Bernardino Charter, as adopted on January 6, 1905. SBMWD is governed by a Board of Water Commissioners appointed by the Mayor and subject to confirmation by the Common Council. The first Board of Water Commissioners was appointed May 1905, the initial water distribution system, valued at $160,000 in 1905, covered just one square mile and served a population of only 6,000 people. SBMWD obtains 100 percent of its water from the Bunker Hill Groundwater Basin, a sub-basin of the SBBA. Management of this groundwater basin is coordinated through Valley District.

The SBMWD service area has expanded to include portions of the City of San Bernardino and portions of unincorporated areas of the County of San Bernardino shown in Figure 10-1. The area is bounded on the north by the San Bernardino National Forest, on the east by the East Valley Water District and Redlands Municipal Utilities Department, on the south by the cities of Loma Linda and Colton, and on the west by the West Valley Water District, the city of Rialto, and the Muscoy Mutual Water Company. Elevations of the valley floor range from approximately 1,000 feet above sea level at the southern boundary, to an elevation in excess of 2,100 feet above sea level at its northern-most boundary.

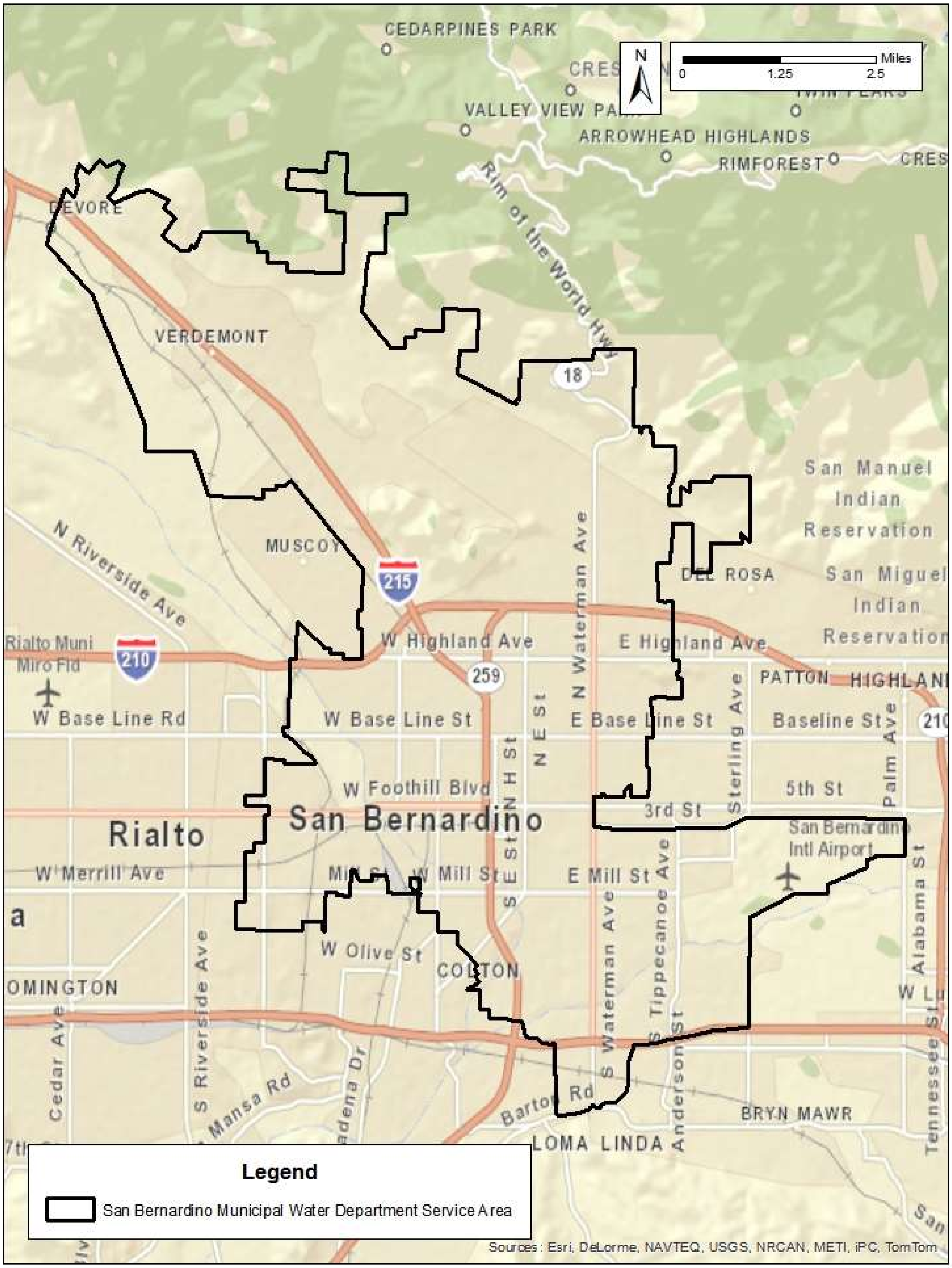

Figure 10-1. City of San Bernardino Service Area Map

The DWR Population Tool was used to intersect the service area boundary in Figure 10-1 with census data to provide population estimates for 1990, 2000, and 2010. Population for intermediate non-census years was estimated using a constant growth rate, as connection data was not available for all the intermediate years. The service area population for 2015 was then estimated using the number of connections in 2010 and 2015.

For future years, the service area boundary was intersected with data provided by SCAG. As part of the 2012 Adopted Growth Forecast, SCAG has estimated the population in 2020 and in 2035 inside each of approximately 4,000 traffic analysis zones (TAZ) that cover southern California. By intersecting the service area boundary with the TAZ, an expected population growth rate was calculated for the SBMWD service area. This growth rate was then used to estimate future populations.

Table 10-1. DWR Table 3-1R. Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040
Population Served	199,657	206,173	212.990	220,031	227,306	234,821

10.1.1 Service Area Climate

The climate typically exhibits hot, dry summers and mild, wet winters. Climate is a primary factor that influences water demand within the SBMWD service area. Most rainfall occurs during the months of November through April. The hottest and driest period of the year is from June through September. It is not unusual during the summer months to have several consecutive days that the daily temperature exceeds 100 degrees Fahrenheit.

Average temperature, precipitation, and evapotranspiration by month are shown in Table 10-2. Evapotranspiration (ET) is the water lost to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity. ET from a standardized grass surface is commonly denoted as ETo.

Table 10-2. Historical Climate Data

Month	Average Daily Low Temperature (°F)	Average Temperature (°F)	Average Daily High Temperature (°F)	Average Precipitation (in.)	Average Standard ETo (in.)
January	44.1	52.4	67.1	3.22	2.53
February	44.6	54.6	67.0	3.25	2.87
March	47.0	56.7	70.7	2.86	4.30
April	49.8	60.9	74.4	1.29	5.38
May	54.3	65.6	78.8	0.47	5.82
June	58.1	71.3	85.2	0.09	6.76
July	62.6	77.7	91.0	0.04	7.38
August	63.2	77.7	92.8	0.15	7.09
September	60.5	73.9	89.4	0.33	5.51
October	55.1	66.5	80.8	0.71	3.97
November	47.8	58.6	72.7	1.32	2.89
December	42.9	53.3	65.9	2.38	2.38
Total				16.1	
Notes: Precipitation and temperature for NOAA weather station 0407723 in San Bernardino; data from 1893 through 2004; http://wrcc.dri.edu; ETo data for CIMIS weather station 44 at University of California, Riverside; data from 1986-2015; http://wwwcimis.water.ca.gov/					

10.2 System Water Use

10.2.1 Water Uses by Sector

SBWMD categorizes water use customers into the following: single-family residential, multifamily residential, commercial/industrial, municipal/government, and landscape. Single-family residential is the largest category, historically accounting for an average of about 51 percent of water deliveries. Multi-family residential and commercial/industrial uses constitute about 16 and 17 percent, respectively. Large landscape use has averaged 12 percent of the supply, and the remaining 4 percent is attributed to municipal/government uses. Actual water deliveries for the years 2011 through 2015 are provided in Table 10-3.

In addition, SBMWD has sold water to Valley District, the City of Loma Linda, and Baseline Gardens Mutual Water Company. SBMWD's historical water sales are summarized in Table 10-3.

Table 10-3. DWR Table 4-1R. Demands for Raw and Potable Water – Actual (AF)

Use Type	Level of Treatment When Delivered	2011	2012	2013	2014	2015
Single Family	Drinking Water	19,502	20,719	20,316	19,379	15,806
Multi-Family	Drinking Water	6,087	6,269	6,111	5,988	5,370
Commercial / Institutional	Drinking Water	7,932	8,574	8,168	8,142	6,083
Landscape	Drinking Water	4,858	5,540	5,423	5,209	4,954
Fire Service	Drinking Water	20	809	139	23	29
Sales / Transfers / Exchanges to other agencies	Drinking Water	7,079	3,915	1,688	113	370
Nonrevenue	Drinking Water	3,288	2,931	3,991	4,575	3,424
	Total	48,767	48,757	45,835	43,429	36,035

In the past, SBMWD has not had water use related to saline barriers, groundwater recharge operations, or recycled water. However, SBMWD does have nonrevenue water. Nonrevenue water is the difference between the amount of water produced and the amount of water billed to customers. Over the last five years, nonrevenue water has been approximately nine percent of produced water within SBMWD system. Sources of nonrevenue water include:

- Hydrant Testing and Flushing
- Groundwater Testing and Flushing
- Fire Hydrant Operations by the Fire Department - This represents the use of water for emergencies
- Meter Inaccuracies
- Leaks from water lines

Based on the SCAG population projections for years 2008, 2020, and 2035 contained in the 2012 Integrated Growth Forecast, SBMWD derived a population growth rate for its service area. This growth rate was applied to 2015 water demands to derive estimates of water demands for the years 2020 through 2040 as shown in Table 10-4.

Table 10-4. DWR Table 4-2R. Demands for Raw and Potable Water – Projected (AF)

Use Type	2020	2025	2030	2035	2040
Single Family	18,426	19,035	19,664	20,314	20,986
Multi-Family	6,260	6,467	6,681	6,902	7,130
Commercial / Institutional / Municipal	7,091	7,325	7,567	7,818	8,076
Landscape Irrigation	4,200	2,800	2,800	2,800	2,800
Fire Service	33	35	36	37	38
Sales/Transfers/Exchanges to other agencies	0	500	1,000	1,500	2,000
Waterman + Baseline Neighborhood Transformation Plan	689	1,378	1,378	1,378	1,378
Nonrevenue	3,670	3,754	3,913	4,075	4,241
Total	40,369	41,294	43,039	44,823	46,649

Total demands, including anticipated use of recycled water, are shown in Table 10-5.

Table 10-5. DWR Table 4-3R. Total Water Demands (AF)

Demand	2015	2020	2025	2030	2035	2040
Potable and Raw Water	36,035	40,369	41,294	43,039	44,823	46,649
Recycled Water – Landscape Irrigation		2,800	2,800	2,800	2,800	2,800
Recycled Water – Other (Sales)		2,800	5,000	7,500	10,000	10,000
Total Water Demand	36,035	45,969	49,094	53,339	57,623	59,449

10.2.2 Distribution System Water Losses

SBMWD operates a meter replacement program which includes replacing meters on a 19-year rotation. Source meters are tested annually. About half of the system has older water mains which the City is aggressively replacing. Additionally, SBMWD operates a leak detection program.

SBMWD performed a water loss audit using the AWWA Manual 36, attached as Appendix M. The volume of water loss for 2015 is shown in Table 10-6.

Table 10-6. DWR Table 4-4R. Water Loss Summary Most Recent 12 Month Period Available

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss (AF)
01/2015	2,470

10.2.3 Estimating Future Water Savings

SBMWD is committed to long-range planning to provide a reliable, cost-effective water supply to its customers.

For this report, SBMWD has projected that future demands will increase at a percentage growth rate that incorporates two factors: the percentage growth in service area population, and potential changes in the per-capita consumption. This approach provides estimates for future system-wide demand that can be used for long-range planning.

In the 2015 UWMP, water suppliers have the option of preparing more detailed demand forecasts by estimating demand factors based on land use categories. For example, SBMWD could identify typical water use per single family customer and per commercial account. These customer classes can be further sub-divided by lot size, neighborhood, or other variables. The intent is to quantify the estimated water use per customer in different customer classes, and then to forecast how future changes will impact water use within each customer class.

For this document, SBMWD has elected not to develop land use-based demand factors and apply future savings from codes and standards. Recent drought regulations have induced significant changes in water consumption patterns, and there is considerable uncertainty as to how demands will change in the future if the drought subsides. Given this uncertainty, SBMWD elected not to quantify passive savings for this UWMP.

10.2.4 Water Use for Lower Income Households

Senate Bill 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing 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. The SBMWD contains two jurisdictions, the City of San Bernardino and unincorporated County of San Bernardino.

The current General Plan for the City of San Bernardino estimates that 55 percent of households are lower-income. In the absence of more detailed information, this percentage was applied across the SBMWD service area. The estimated demands for lower-income households are shown in Table 10-7. These demands have been included in the projections presented throughout this report.

Table 10-7. Estimated Demands for Lower-Income Households (AF)

Demand	2015	2020	2025	2030	2035	2040
Single Family Residential	8,709	10,153	10,488	10,835	11,193	11,563
Multi-Family Residential	2,959	3,449	3,563	3,681	3,803	3,928
Total	11,668	13,602	14,052	14,516	14,996	15,492

Further, SBMWD will not deny or put unreasonable conditions for water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households unless one of the following occurs:

- SBMWD specifically finds that it does not have sufficient water supply
- SBMWD is subject to a compliance order issued by the State that prohibits new water connections
- The applicant has failed to agree to reasonable terms and conditions relating to the provision of services

10.3 SB X7-7 Baselines and Targets

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). SBMWD had previously calculated baseline water use and water use targets in the 2010 RUWMP. However, for the 2015 UWMP, DWR has required that agencies use 2010 census data in the calculation of service area populations. SBMWD has re-calculated its historic service area population using the DWR Population Tool, and in this section presents an updated calculation of baseline water use and water use targets.

DWR has prepared standardized tables to record and document the calculations required for this section. The standardized tables for SBMWD's calculations are included in Appendix O.

10.3.1 Baseline Water Use

Years 1999 to 2008 have been selected for calculation of the 10-year base period, while years 2003 to 2007 have been selected for calculation of the 5-year base period.

SBMWD's service area population for the period 1995 to 2010 was estimated using the DWR Population Tool. SBMWD has no unmetered uses.

The calculation of gross water use begins with the total amount of water that was put into the potable water distribution system by SBMWD. Water that was exported to another agency was then subtracted, to leave the amount used by SBMWD retail customers.

10.3.2 2015 and 2020 Targets

DWR allows agencies to select from four potential methods for calculating the compliance and interim water use targets as set forth by Water Code section 10608.20(b). SBMWD is using Method 4 to calculate the Compliance and Interim Water Use Targets as set forth by Water Code section 10608.20(b). Compliance Water Use Target under Method 4 is Base Daily GPCD less:

- Indoor residential water savings of 15 GPCD or an amount determined by use of DWR's "BMP Calculator"
- 20 percent savings on all unmetered uses
- 10 percent savings on Baseline CII (expressed in GPCD)
- 21.6 percent savings on current landscape and water loss uses (expressed as GPCD)

SBMWD is choosing to use the default value of 15 GPCD for the indoor residential water savings. SBMWD has no unmetered uses. Baseline CII water use was estimated using the CII water sales for the mid-point year of the baseline period. Baseline CII water use is 42.8 GPCD.

For calculating landscape and water loss uses, DWR has provided the following formula:

= Base Daily Per Capita Water Use - Default Indoor Water Use (70 GPCD) - Baseline CII

Based on this formula, SBMWD's landscape and water loss value is:

= 252 GPCD - 70 GPCD – 42.8 GPCD = 139.3 GPCD

The targets were calculated using the Method 4 spreadsheet provided by DWR. The completed spreadsheet is included in Appendix O. The resulting targets are summarized in Table 10-8.

Table 10-8. DWR Table 5-1R. Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD	2015 Interim Target	Confirmed 2020 Target
10-year	1999	2008	252	228	203
5-year	2003	2007	255		

10.3.3 2015 Compliance Daily per Capita Water Use

SBMWD's calculated GPCD for 2015 is below the interim water use target. The results are summarized in Table 10-9.

Table 10-9. DWR Table 5-2R. 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Extra-ordinary Events	Economic Adjust-ment	Weather Normal-ization	Total Adjustments	Adjusted 2015 GPCD	2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015?
160	228	0	0	0	0	160	160	YES

10.4 Demand Management Measures

The reporting format for Demand Management Measures (DMMs) in the 2015 UWMP is different than the 2010 UWMP. This discussion has been arranged into the seven sections recommended by DWR in the 2015 UWMP Guidebook.

10.4.1 Water waste prevention ordinances

SBMWD adopted Rule and Regulation Number 21, attached in Appendix G, which prohibits the waste of water and adopts water shortage conditions in the form of three stages. There are no available estimates on the conservation savings resulting from this DMM or the effects it may have on SBMWD's ability to further reduce demand.

10.4.2 Metering

One-hundred percent of SBMWD's retail customers are metered and billed with commodity rates. SBMWD has a meter maintenance and replacement plan. SBMWD encourages the use of dedicated landscape meters during development review and through water rates.

10.4.3 Conservation pricing

One-hundred percent of SBMWD's retail customers are metered and billed with commodity rates with conservation tiers established per SBMWD Rule and Regulation 21 (provided in Appendix G).

10.4.4 Public education and outreach

SBMWD is in compliance with this DMM. The programs are implemented by the Water Conservation Coordinator.

10.4.4.1 Public Education Programs

SBMWD holds bi-annual water conservation landscape workshops and conservation presentations to neighborhood associations and community groups upon request. SBMWD also coordinates inspections and notify customers in an attempt to identify sources of high-consumption, water waste issues, potential leaks, and inefficient irrigation and water use practices. SBMWD utilizes conserve.sbmwd.org to promote and educate end user water efficiency by offering tools and resources including:

- Water waste reporting portal
- Lists of indoor/outdoor conservation tips
- Lists of all conservation rebate programs
- Information regarding end user restrictions, the drought, and state mandated regulations and updates
- Calendar of conservation related community events hosted or sponsored by SBMWD
- Home water audit checklist and walk through instructions
- Information about local water sources, “Where Your Water Comes from”
- Posting of the annual Consumer Confidence Reports
- Contact information of Conservation Coordinator

Notifications of local conservation related topics and SBMWD sponsored events are posted on the SBMWD Facebook page and through their Twitter account. Facebook and Twitter are also used to post information on changes in customer services, service alerts, and promotions for conservation programs and incentives.

10.4.4.2 School Education Programs

SBMWD provides elementary and middle school conservation presentations with certified educators for schools within the SBMWD service area. SBMWD is a committee member of the Water Saving Garden Friendly Committee and is in the second year as a sponsor/participant in the regional conservation campaign, “IEfficient”. SBMWD also sponsors the annual “Inland Solar Challenge” event and assists in planning of local school events pertaining to water conservation like the annual Kindergarten through 8th Grade water conservation poster contest with schools within the SBMWD service area. Before this event, students are given a conservation presentation as a kick-off to contest participation. Every year SBMWD distributes a conservation calendar featuring the winners of the poster contest and includes:

- Conservation incentive information
- Conservation staff contact information
- Tips for efficient indoor/outdoor water use
- Local water sources information

10.4.5 Programs to assess and manage distribution system real loss

SBMWD operates a meter replacement program which includes replacing meters on a 19-year rotation. Source meters are tested annually. About half of the system has older water mains which the City is aggressively replacing. Additionally, SBMWD operates a leak detection program. To achieve full compliance with the DMM, SBMWD will perform a water loss audit using the AWWA Manual 36. SBMWD will determine the economic value of recovering the water loss, based on the avoided cost of water. SBMWD will perform an analysis of components of apparent and real losses identified per AWWA Manual 36 model, and will determine actions to reduce loss where cost-effective. A comparison of the year-to-year trend of nonrevenue water will be used to evaluate the effectiveness of this DMM. If SBMWD were to reduce nonrevenue water by even one percent this would result in a water savings of 500 AF or more each year. Continued implementation of water loss control practices and procedures is not anticipated to have an effect on SBMWD's ability to further reduce demand.

10.4.6 Water conservation program coordination and staffing support

To be in compliance with this DMM, SBMWD designated a full time water conservation coordinator in 2015. There are no available estimates on the conservation savings resulting from the DMM or the effects of this DMM on SBMWD's ability to further reduce demand.

10.4.7 Other Demand Management Measures

To encourage SBMWD customers to use water wisely, SBMWD offers many conservation rebate incentives making it easy to be water efficient, both in the home, and outdoors. Each SBMWD residential water customer is eligible for up to $1,500 in rebates through their indoor and outdoor water conservation rebate programs. SBMWD has allocated $90,000 for residential conservation outreach and $60,000 for commercial/institutional conservation outreach. Rebates will be available only for as long as funds are available. More detailed information and links to rebate applications can be found at http://www.sbcity.org/water/residents/rebate_information.asp.

10.4.7.1 Irrigation Controller Rebate

Customers can get up to a $250 rebate for installing a weather-based controller or $100 for a standard controller.

10.4.7.2 High-Efficiency Sprinkler Nozzle Rebate

Customers can qualify for a 50-percent rebate, up to $200, for installing High-Efficiency sprinkler heads.

10.4.7.3 Garden Hose Shut-Off Nozzle Rebate

Customers who purchase up to 2 automatic shut-off nozzles for their garden hoses can receive a rebate of up to $10.

10.4.7.4 Drip Irrigation System Rebate

Customers purchasing and installing a drip system in their landscaping or garden may qualify for a 50% rebate, up to $150.

10.4.7.5 Drought Tolerant Plant Rebate

Customers who incorporate drought tolerant trees, plants, and shrubs into their landscaping can receive a 50% rebate, up to $300.

10.4.7.6 Turf Replacement / Removal Rebates

Customers who replace grass turf with mulch or gravel can receive up to a 50% rebate, up to $300. Customers who replace grass turf with artificial turf can receive up to $2 per square foot, up to $400. Customers who replace grass turf with other approved materials can receive a rebate of $2 per square foot, up to $1,500.

10.4.7.7 High-Efficiency Toilet Rebate

Customers can get a rebate of up to $100 when they purchase and install high-efficiency toilets that use 1.28 gallons per flush or less (dual flush toilets that use more than this for any flush, do not qualify). These high-efficiency water-saving toilets can be purchased at nearly any hardware or home improvement store. SBMWD is offering up to four toilet rebates per residence.

10.4.7.8 High-Efficiency Showerhead Rebate

Customers are eligible for a $20 rebate for the purchase and installation of a low flow shower head. These shower heads use 1.6 gallons per minute or less. Maximum of four per residence.

10.4.7.9 High-Efficiency Washing Machine Rebate

SBMWD offers customers a $100 rebate for the purchase and installation of a high-efficiency washing machine that has a CEE rating of Tier 1 or greater. Limit one per residence.

10.4.7.10 High-Efficiency Dishwasher Rebate

Customers are eligible for a $75 rebate for the purchase and installation of a single high-efficiency dishwasher that has a CEE Rating of Tier 1 or greater. Limit one per residence.

10.4.7.11 Household Conservation Kits

SBMWD has put together a household conservation kit to assist their residential water customers. In this packet customers get an easy-to-install kitchen aerator, two bathroom aerators, a shower timer, and two leak detecting dye tabs. By installing these simple items, customers can see substantial water savings over time. The kit is free, but supplies are limited and offered on a first come first serve basis (limit of 1 per household). Kits can be picked up at SBMWD offices on the 5th floor of City Hall at 300 N D St. The customer’s name must appear on an SBMWD residential account. These kits are available only while supplies last.

10.4.8 Planned Implementation to Achieve Water Use Targets

SBMWD's current per-capita consumption is less than its 2020 compliance target. SBMWD expects to continue to implement its current conservation programs to encourage conservation and maintain per-capita consumption below the compliance target.

10.5 System Supplies

SBMWD obtains 100 percent of its water from the Bunker Hill Groundwater Basin, a portion of the SBBA. Management of this groundwater basin is coordinated through Valley District.

10.5.1 Purchased or Imported Water

Imported water available to SBMWD is State Water Project water purchased from Valley District. SBMWD has not used State Water Project water for direct potable use in the past five years and does not plan to use any in the future. However, SBMWD has and will continue to purchase State Water Project water for recharging of the Bunker Hill Basin.

10.5.2 Groundwater

Over the last five years, SBMWD has drawn 100 percent of its water from wells in the SBBA. Currently, water is derived from 57 groundwater wells located throughout its service area. The wells range from 50 to 1,300 feet in depth, and have production capacities ranging from 50 to 3,500 gpm.

SBMWD's historical production for the past five years is shown in Table 10-10.

Table 10-10. DWR Table 6-1R. Groundwater Volume Pumped (AF)

Groundwater Type	Location or Basin Name	Water Quality	2011	2012	2013	2014	2015
Alluvial Basin	SBBA	Drinking Water	48,767	48,757	45,835	43,429	36,035
	Total		48,767	48,757	45,835	43,429	36,035

10.5.3 Surface Water

SBMWD obtains 100 percent of its water from groundwater supplies. SBMWD does not plan to utilize any surface water as a source of drinking water in the future.

10.5.4 Stormwater

SBMWD is participating in regional planning efforts to capture additional stormwater for purposes of groundwater recharge.

10.5.5 Wastewater and Recycled Water

SBMWD currently does not use recycled water to offset potable demand. SBMWD anticipates up to 5,600 AFY of recycled water use by year 2020. SBMWD has not yet implemented a recycled water program, but is actively undertaking design and feasibility studies for the use of recycled water. Sewer collection systems are not operated by the SBMWD, but rather are operated by the County of San Bernardino, cities of San Bernardino, Loma Linda, and EVWD.

Collected wastewater is treated at the San Bernardino Water Reclamation Plant to a secondary treatment level.

Table 10-11 and Table 10-12 show existing wastewater collection and treatment at the San Bernardino Water Reclamation Plant.

Following treatment at the San Bernardino Water Reclamation Plant effluent is conveyed to the RIX Tertiary Treatment Facility in the City of Colton. This facility is jointly owned by SBMWD and the City of Colton, and is operated under contract solely by the City of San Bernardino. At the RIX facility, tertiary treatment to Title 22 standards consists of a native soil filtration process followed by ultraviolet (UV) disinfection prior to discharge to the Santa Ana River. A portion of the discharged water, 16,000 AFY, is provided by contract to Valley District to maintain flows in the Santa Ana River, fulfilling Valley District's downstream obligations under the Orange County Judgment.

SBMWD's Water Reclamation Division completed a Water Reclamation Feasibility Study in February 2005. This recycled water optimization plan was designed to explore an effective and efficient means of constructing and distributing recycled water to customers within the service area as no water recycling facilities are currently located in the service area. The results of this study have led to the proposed Clean Water Factory. The Clean Water Factory is a project to treat effluent from the San Bernardino Water Reclamation Plant to a quality approved for recharge—as set by the California Division of Drinking Water (DDW) and the Santa Ana RWQCB — and convey the recycled water to the Waterman Basins, the East Twin Creek Spreading Grounds, and the Devil Canyon and Sweetwater Basins for surface spreading in the northern portion of the SBMWD service area. Recycled water spread at these facilities will artificially recharge the Bunker Hill Groundwater Basin (Bunker Hill Basin) and, more specifically, the Bunker Hill A Management Zone, as described in the Water Quality Control Plan for the Santa Ana River Watershed (Basin Plan). The Clean Water Factory will also treat a side stream of San Bernardino Water Reclamation Plant effluent to a quality approved for direct use and convey the tertiary treated recycled water to customers that can benefit from a non-potable water supply. With potential expansion (later phases), it is estimated that up to 34,200 AFY of recycled water could be generated and used on the SBMWD service area during the planning period.

Table 10-11. DWR Table 6-2R. Wastewater Collected within Service Area in 2015

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AF)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
City of San Bernardino	Estimated	15,124	City of San Bernardino	San Bernardino Water Reclamation Plant	Yes	No
	Total Wastewater Collected from Service Area in 2015	15,124				

Table 10-12. DWR Table 6-3R. Wastewater Treatment and Discharge within Service Area in 2015

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number	Method of Disposal	Does this Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	Wastewater Treated Volume 2015 (AF)	Discharged Treated Wastewater Volume 2015 (AF)	Recycled Within Service Area Volume 2015	Recycled Outside of Service Area Volume 2015
San Bernardino Water Reclamation Plant	Rapid Infiltration/Extraction (RIX) Plant	Flow to RIX		Other	Yes	Secondary, Disinfected - 23	15,124	15,124	0	0
						Total	15,124	15,124	0	0

10.5.5.1 Recycled Water Beneficial Uses

The estimated future beneficial uses are based on planning documents for the Clean Water Factory.

Table 10-13. DWR Table 6-4R. Current and Projected Recycled Water Direct Beneficial Uses within Service Area (AF)

Name of Agency Producing (Treating) the Recycled Water:	City of San Bernardino Municipal Water Department							
Name of Agency Operating the Recycled Water Distribution System:	City of San Bernardino Municipal Water Department							
Supplemental Water Added in 2015	N/A							
Source of 2015 Supplemental Water	N/A							
Beneficial Use Type	**General Description of 2015 Uses**	**Level of Treatment**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Direct non-potable use	Landscape irrigation, other (sales)	Tertiary		5,600	7,800	10,300	12,800	12,800
Groundwater recharge		80% Advanced, 20% Tertiary			4,300	8,300	12,200	18,700

Table 10-14. DWR Table 6-5R. 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual (AF)

Beneficial Use Type	2010 Projection for 2015	2015 Actual Use
Recycled Water Use	5,600	0

10.5.5.2 Actions to Encourage and Optimize Future Recycled Water Use

SBMWD is still in the planning stages for recycled water. As described earlier, the primary use of recycled water is anticipated to be groundwater recharge. Other potential uses include non-potable uses in the vicinity of the San Bernardino Water Reclamation Plant. These existing uses include landscaping at the reclamation plant itself, the San Bernardino Municipal Golf Course, and landscape irrigation by the California Department of Transportation in the vicinity of Interstate 215. It is estimated these uses have approximately 840 AFY of demand. Table 10-15 provides estimates of future recycled water use expected from these projects.

The primary user of the proposed recycled water will be SBMWD itself; the agency will use the water in-lieu of imported water to maintain the SBBA groundwater basin. So long as recycled water costs less than a like an amount of SWP water, there will be a strong financial incentive to develop and use recycled water for groundwater recharge.

Challenges to the use of recycled water include public acceptance of recycled water, cost, and potential environmental impacts. Given the location of the water reclamation plant, it will be necessary to pump water several miles before it reaches acceptable spreading areas. In addition, there are concerns about maintaining flows for other beneficial uses of the Santa Ana River as well as maintenance of water quality in any groundwater basins that receive recycled water.

Table 10-15. DWR Table 6-6R. Methods to Expand Future Recycled Water Use

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use (AF)
Clean Water Factory	The Clean Water Factory will primarily treat effluent from the San Bernardino Water Reclamation Plant to quality approved for recharge. The factory will also treat a side stream of San Bernardino Water Reclamation Plant effluent to a quality approved for direct use and convey the tertiary treated recycled water to customers that can benefit from a non-potable supply.	2020	5,600

10.5.6 Desalinated Water Opportunities

The need for brackish groundwater desalting is somewhat limited in the San Bernardino Valley. While elevated salts are a concern in the groundwater basins of the Western Judgment (SBBA, Rialto-Colton, Riverside), average TDS levels in all of these basins are currently below 500 mg/L (DWR 2003). However, elevated salts are an issue for retailers that overlie the San Timoteo Groundwater Basin and agencies in this basin are considering implementing desalter operations. The area is fortunate to have a brine line which can transport non- reclaimable waste, by gravity, from the City of San Bernardino Wastewater Reclamation Plant to the Orange County Sanitation District's treatment plant.

The development of (or financial participation in) a new seawater desalination project, while costly, is being investigated by other wholesale and retail water agencies in southern California. Because the San Bernardino Valley is an inland area, in order for desalination to work it would be necessary for agencies in the San Bernardino Valley to join with other water purveyors in the development of a coastal desalination facility and then receive water from the SWP supplies of other participants via an exchange. It is not cost-effective for the San Bernardino Valley to receive direct delivery of desalted ocean water.

Seawater desalination is an alternative that is technically viable. However, production and treatment costs have historically been several times higher than those of SWP costs and conventional treatment.

10.5.7 Exchanges or Transfers

SBMWD has water exchange and transfer agreements with several of the surrounding agencies on an as-needed basis. Exchanges occur when SBMWD pumps water for another agency and in turn receives water from that agency at a future time and at a specified ratio to account for pumping and delivery costs. Exchanges in the past have occurred during periods of lowered groundwater levels, loss of water by other agencies due to groundwater contamination, and to facilitate increased pumping in SBMWD's artesian pressure zone to lower groundwater levels that had infiltrated underground utilities. Exchanges are on an as-needed basis and only occur when adequate supplies are available within SBMWD's service area. Therefore, exchanges are not taken into consideration when examining future water supplies.

10.5.8 Future Water Projects

As described in Section 10.5.5, SBMWD is planning a recycled water supply.

Table 10-16. DWR Table 6-7R. Expected Future Water Supply Projects or Programs

Name of Future Projects or Programs	Joint Project with Other Agencies?	Other Agency Names	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Agency (AF)
Clean Water Factory			The Clean Water Factory is a project to treat effluent from the San Bernardino Water Reclamation Plant to a quality approved for recharge and convey the recycled water to the Waterman Basins, the East Twin Creek Spreading Grounds, and the Devil Canyon and Sweetwater Basins for surface spreading in the northern portion of the SBMWD service area. The Clean Water Factory will also treat a side stream of San Bernardino Water Reclamation Plant effluent to a quality approved for direct use and convey the tertiary treated recycled water to customers that can benefit from a non-potable water supply.	2020	Average Year	5,600

10.5.9 Summary of Existing and Planned Sources of Water

SBMWD's current and anticipated future supplies are summarized in Table 10-17 and Table 10-18.

Table 10-17. DWR Table 6-8R. Water Supplies - Actual

Water Supply	Additional Detail on Water Supply	2015 Actual Volume (AF)	2015 Water Quality
Groundwater	SBBA	36,035	Drinking Water
	Total	36,035	

Table 10-18. DWR Table 6-9R. Water Supplies – Projected (AF)

Water Supply	Additional Detail on Water Supply	2020	2025	2030	2035	2040
Groundwater	SBBA	52,671	54,730	56,866	59,082	59,082
Recycled Water	Landscape Irrigation	2,800	2,800	2,800	2,800	2,800
Recycled Water	Other (sales)	2,800	5,000	7,500	10,000	10,000
Recycled Water	Groundwater Recharge	0	4,300	8,300	12,200	18,700
	Total	58,271	66,830	75,466	84,082	90,582

10.6 Water Supply Reliability Assessment

10.6.1 Constraints on Water Sources

During times of State-wide drought conditions, the availability of State Water may be reduced. These conditions are normally known in advance, providing SBMWD with the opportunity to plan for the reduced supply.

The SBBA is a managed basin. SBMWD therefore has the opportunity to develop additional wells and over-extract groundwater under specified conditions contained in the stipulated judgment. The wells in general have provided a stable source of water supply.

Exchanges in the past have occurred during periods of lowered groundwater levels, loss of water by other agencies due to groundwater contamination, and to facilitate increased pumping in SBMWD's artesian pressure zone to lower groundwater levels that had infiltrated underground utilities. Exchanges are on an as-needed basis and only occur when adequate supplies are available within SBMWD's service area. Therefore, exchanges are not taken into consideration when examining future water supplies.

10.6.2 Reliability by Type of Year

The UWMP Act requires urban water suppliers assess water supply reliability by comparing total projected water use with the expected water supply over the next twenty years in five year increments. The Act also requires an assessment of single-dry year and multiple-dry years. This section presents the reliability assessment for SBMWD's service area.

10.6.2.1 Normal Water Year

The Normal/Average water year is a year in the historical sequence that most closely represents median runoff levels and patterns. Table 10-23 demonstrates that SBMWD anticipates adequate supplies for years 2020 to 2040 under normal conditions.

10.6.2.2 Single Dry Year

The single-dry year is generally the lowest annual runoff for a water source in the record. The single-dry year may differ for various sources. In Table 10-24, demands are assumed to be 10 percent greater in a single-dry year than during a normal year. Table 10-24 demonstrates the SBMWD anticipates adequate supplies for years 2020 to 2040 under single-dry year conditions.

10.6.2.3 Multiple-Dry Years

The multiple-dry year is generally the lowest annual runoff for a three year or more consecutive period. The multiple-dry year period may differ for various sources. In Table 10-25, demands are assumed to be 10 percent greater in the first year of a multiple-dry year than during an average year. During the second year of a multiple dry year period, demands are expected to be the same as an average year due to conservation and public education efforts. During the third year of a multiple dry year period, demands are expected to decrease 10 percent due to mandatory conservation measures that would be enacted in year three of a multiple dry year period. Table 10-25 demonstrates that SBMWD anticipates adequate supplies for years 2020 to 2040 under multiple-dry year conditions.

10.6.3 Regional Supply Reliability

SBMWD is committed to minimizing the need to import water from other regions. SBMWD operates a number of conservation programs to implement various Demand Management Measures.

10.7 Water Shortage Contingency Planning

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, a fire or earthquake which damage delivery or storage facilities, chemical spill, or a regional power outage. Chapter 5 of this RUWMP describes water shortage contingency planning for regional water supply sources (imported water, groundwater). This section focuses on water shortage contingency planning for SBMWD. In order to ensure a reliable water supply in a water shortage situation, SBMWD developed a Drought Contingency Plan that was originally adopted by SBMWD on March 12, 1991 in response to a statewide water shortage. This plan included voluntary conservation measures. The objective of the Drought Contingency Plan was to provide effective, implementable measures to ensure a safe, adequate, and reliable supply of water during continued drought conditions. It was also the SBMWD's intention to continue to cooperate with other local water purveyors to assist them in meeting their water needs. Additionally, SBMWD updated its Emergency Response Plan in 2008. This plan is designed to address emergency water shortages that could occur as a result of an earthquake, flood, fire, or other catastrophic events affecting power supplies and/or the water distribution system. SBMWD updated its Water Shortage Contingency Plan with Rule and Regulation Number 21, attached in Appendix G, on June 1st, 2015. During any drought or water supply shortage condition, the Department's General Manager may declare any one of three shortage levels responses described in this chapter.

10.7.1 Stages of Action

The stages are shown in Table 10-19.

Table 10-19. DWR Table 8-1R. Stages of WSCP

Stage	Percent Supply Reduction	Water Supply Condition
1	0	Normal Conditions
2	10	5% - 10% shortage
2A	30	10% - 30% shortage
3	50	10% to 50% shortage

10.7.2 Prohibitions on End Uses

The water use prohibitions for each stage are shown in Table 10-20.

Table 10-20. DWR Table 8-2R. Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	CII - Other CII restriction or prohibition	Large water use commercial and industrial facilities shall, upon request of the General Manager, provide the SBMWD with a plan to conserve water at their facilities. The SBMWD will provide these facilities with information regarding the average monthly water use by the facility for the last two-year period. The facility will be expected to provide the SBMWD with a plan to conserve or reduce the amount of water used by that percentage deemed by the SBMWD to be necessary under the circumstances.	Yes
2	Landscape – Limit landscape irrigation to specific days	Irrigation shall be limited to four days per week on Mondays, Wednesdays, Fridays, and Sundays only	Yes
2	Landscape – Limit irrigation to specific times	Irrigation shall be only allowed between the off-peak hours of 6:00 pm through 8:00 am	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	Landscape - Restrict or prohibit runoff from landscape irrigation	No water of outdoor landscapes that cause excessive runoff	Yes
2	Other - Prohibit use of potable water for washing hard surfaces	No washing down driveways, sidewalks, or other hardscapes	Yes
2	Other - Require automatic shut of hoses	The washing of cars, trucks or other vehicles is not permitted except with a hose equipped with an automatic shut-off device, or a commercial facility so designated for vehicle washing purposes.	Yes
2	Other – Customers must repair leaks, breaks, and malfunctions in a timely manner	All leaks shall be corrected within seventy-two (72) hours of Department notification	Yes
2	Other water feature or swimming pool restriction	No use of fountains that use potable water, unless the water is recirculated	Yes
2A	Landscape – Limit irrigation to specific days	Irrigation shall be limited to three days per week; Mondays, Wednesdays, and Fridays only	Yes
2A	Landscape – Other landscape restriction or prohibition	Maximum irrigation time of 15 minutes per station per designated irrigation day	Yes
2A	Landscape – Other landscape restriction or prohibition	Irrigation of ornamental turn on public street medians is prohibited	Yes
2A	Landscape – Other landscape restriction or prohibition	Irrigation is prohibited for a full 48 hours after a significant precipitation event (rainfall in excess of 1/8”) as measured by SBMWD’s rain gauge	Yes
2A	Other – Prohibit use of potable water for construction and dust control	Use of potable water outside of new residential home and commercial/industrial construction that is not delivered by drip or micro-spray systems is prohibited	Yes
2A	CII – Restaurants may only serve water upon request	The serving of drinking water other than upon request is prohibited, in eating or drinking establishments including but not limited to restaurants, hotels, cafes, cafeterias, bars, or any other public place where food or drink are served	Yes
2A	CII – Lodging establishment must offer opt out of linen service	All hotels/motels shall provide their guests with the option of choosing not to have towels and linens laundered daily. The hotel/motel must prominently display notice of this option in each bathroom using clear and easy language.	Yes
3	Landscape - Prohibit certain types of landscape irrigation	Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
3	Other - Prohibit use of potable water for construction and dust control	No new construction meter permits shall be issued by SBMWD. All existing construction meters shall be removed and/or locked out of service.	Yes
3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water may be prohibited.	Yes
3	Landscape – Limit irrigation to specific times	Irrigation shall be allowed only between the off-peak hours of 8:00 pm through 6:00 am; however, the Department reserves the right to prohibit all outdoor irrigation at any time depending on the severity of the emergency	Yes
3	Landscape – Limit landscape irrigation to specific days	Irrigation shall be limited to two days per week, on Mondays and Thursdays; however, the Department reserves the right to prohibit all outdoor irrigation at any time depending on the severity of the emergency	Yes

10.7.3 Penalties, Charges, Other Enforcement of Prohibitions

Rule and Regulation No. 21 contains a series of Notices of Violations for water waste:

- Step 1: 1st Violation warning letter to customer/owner describing the water waste issue and notice of potential fines for continuing waste, providing a SBMWD customer service contact for conservation information and assistance. Provides customer/owner seven (7) calendar days to remedy the water waste situation and comply with conservation restrictions.
- Step 2: 2nd Violation, customer/owner site visit or phone call to discuss nature of the water waste and potential solutions. A second Notice of Violation letter allowing seven calendar days to remedy the water waste situation and comply with the conservation restrictions.
- Step 3: 3rd Violation: Third Notice of Violation letter informing customer/owner of financial penalty and allowing seven calendar days to remedy water waste situation and comply with conservation measures. One hundred dollars ($100.00) penalty assessed.
- Step 4: Subsequent Violation(s): Additional penalties increasing incrementally by one hundred dollars ($100.00) per incident. Customer/owner shall receive a separate notice per each subsequent violation and will have seven (7) calendar days after each notification to remedy the water waste situation and comply with conservation restrictions;
- Step 5: The Department may restrict the amount of water supplied to any customer/owner failing to comply with conservation standards. The provisions of this section shall be applied at the discretion of the Department.

Exceptions: The restrictions of water consumption outlined herein are not applicable to water usage necessary for public health and safety or for essential governmental services, such as police, fire, and emergency services. The Department reserves the right to waive any water restriction penalty when, in its discretion, such consumption is required in order to maintain an adequate level of public health and safety.

10.7.4 Consumption Reduction Methods

SBMWD offers various rebates to encourage conservation (i.e. ultra-low flush toilet replacements, high efficiency washing machines, etc.). SBMWD has a water rate structure that promotes water efficiency. The reduction goal is to balance supply and demand.

Table 10-21. DWR Table 8-3R. Stages of WSCP - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
1	Expand Public Information Campaign	Provide reminder notices regarding noted water waste and offer community outreach programs
2	Expand Public Information Campaign	Increase advertisement of conservation measures; Maintain a message center for reporting water waste; Determine course of action to remediate reported water waste
2	Other	Commercial and industrial facility education on water use.
2	Implement or Modify Drought Rate Structure or Surcharge	10 percent rate increase on customers that don't fulfill 5 percent reduction
2A	Implement or Modify Drought Rate Structure or Surcharge	20 percent rate increase on customers that don't fulfill 28 percent reduction
2A	Expand Public Information Campaign	Increase advertisement of conservation measures; Maintain a message center for reporting water waste; Determine course of action to remediate reported water waste
3	Implement or Modify Drought Rate Structure or Surcharge	100 percent rate increase on customers that don't fulfill 50 percent reduction
3	Expand Public Information Campaign	Increase advertisement of conservation measures; Maintain a message center for reporting water waste; Determine course of action to remediate reported water waste

10.7.5 Determining Water Shortage Reductions

Under normal conditions, SBMWD prepares monthly production reports which are reviewed and compared to production reports and pumping statistics from prior months and the same period of the prior year. Under shortage conditions, these production reports could be prepared as often as daily. In addition, billing reports could be reviewed to identify users who are not abiding by water the water shortage contingency plan.

10.7.6 Revenue and Expenditure Impacts

The projected impact on water sales for a one-year period under a Stage 2 water shortage condition would result in an overall decrease in water sales revenue of approximately 10 percent. A decrease in water sales revenue of this magnitude would not adversely impact the financial operations of SBMWD.

Under Stage 2A, SBMWD is seeking to achieve a 28-percent reduction in water usage and assess financial penalties on usage in excess of those amounts. If customers do achieve the target reductions, the reduction in revenue to SBMWD would be between 10 and 25 percent.

A one-year period under a Stage 3 water shortage condition would reduce sales revenue by approximately 25 percent given the current rate structure. Adequate reserves are available to cover both shortage scenarios described above. However, a 25 percent reduction in water sales revenue would necessitate a water rate increase if the Stage 3 condition continued beyond the initial one-year period.

10.7.7 Resolution or Ordinance

A Drought Contingency Plan and Water Conservation Policy were originally adopted by SBMWD in 1991. More recently, on June 1, 2015, the City of San Bernardino Board of Water Commissioners passed Resolution 763, which amended the general water service/rates, water conservation measures, and water waste penalties as set forth in Rule and Regulation No. 21 (see Appendix G).

10.7.8 Catastrophic Supply Interruption

SBMWD is a participant in ERNIE a water/wastewater mutual aid network within San Bernardino and Riverside counties. In an emergency ERNIE could be activated. If a disaster overwhelms the local resources, SBMWD will activate the CalWARN system for statewide mutual aid. In addition to CalWARN and ERNIE, SBMWD has mutual aid agreements with the City of Loma Linda, City of Rialto, City of Redlands, City of Riverside, and Yucaipa Valley County Water District. The updated Emergency Response Plan is consistent with the Statewide Emergency Management System and the National Incident Management System, meaning that during an emergency SBMWD will be able to effectively coordinate its response with state and federal agencies and will be able to utilize the Governor’s Office of Emergency services to provide and receive mutual aid from nearby agencies.

The Emergency Response Plan may be activated whenever any of the following conditions exist:

- Natural disaster, such as an earthquake, flood, fire, etc.
- Loss of water transmission lines, main breaks, or other major facilities.
- Water quality issue involving a “boil water” order or other major public relations/communications issue.
- Emergency curtailment.
- Disturbance affecting nearby utilities.

- Hazardous spill (chlorine).
- Terrorist activities.

SBMWD maintains portable backup power supply and diesel and/or natural gas driven wells at critical locations within the distribution system to provide domestic water for emergency purposes during sustained power outages. In the event of a natural or man-made catastrophe that affects SBMWD's ability to provide a potable water supply for a sustained period of time (30 days or more), the following measures will be implemented as required:

- SBMWD's boil water notification program will be activated. The notice will be provided to local radio stations and newspapers.
- Customers will be notified of supplemental sources of water for cooking and drinking.
- Mutual Aid Agreements will be implemented.
- Potable water will be made available and distributed to customers throughout the SBMWD service area.
- A public information program will be initiated.
- Normal water service conditions will be restored as expediently as possible.

10.7.9 Minimum Supply Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the years 2016 to 2018, assuming years 2016 to 2018 repeat the driest three-year historic sequence for each water supply source. Table 10-22 shows the estimated total supplies, given a repeat of historically low conditions on all water supplies. Comparing these supplies to the demand projections, SBMWD has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

Table 10-22. DWR Table 8-4R. Minimum Supply Next Three Years (AF)

Available Water Supply	2016	2017	2018
Available Water Supply	52,671	52,671	52,671

10.8 Supply and Demand Assessment

The following tables show a comparison of supplies and demands during normal and dry years. SBMWD anticipates that demands could increase 10 percent during a single dry year. During multiple dry years, experience during the recent drought has shown that conservation measures can offset demand increases and even lead to reduced demands. SBMWD has estimated that demands could be 10 percent higher during the first dry year, be equivalent to an average year during the second dry year, and be 10 percent lower during the third dry year.

Table 10-23. DWR Table 7-2R. Normal Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	58,271	66,830	75,466	84,082	90,582
Demand Totals	45,969	49,094	53,339	57,623	59,449
Difference	12,302	17,736	22,127	26,459	31,133

Table 10-24. DWR Table 7-3R. Single Dry Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	58,271	66,830	75,466	84,082	90,582
Demand Totals	50,566	54,003	58,673	63,386	65,394
Difference	7,705	12,827	16,793	20,696	25,188

Table 10-25. DWR Table 7-4R. Multiple Dry Years Supply and Demand Comparison (AF)

Year	Totals	2020	2025	2030	2035	2040
First Year	Supply Totals	58,271	66,830	75,466	84,082	90,582
	Demand Totals	50,566	54,003	58,673	63,386	65,394
	Difference	7,705	12,827	16,793	20,696	25,188
Second Year	Supply Totals	58,271	66,830	75,466	84,082	90,582
	Demand Totals	45,969	49,094	53,339	57,623	59,449
	Difference	12,302	17,736	22,127	26,459	31,133
Third Year	Supply Totals	58,271	66,830	75,466	84,082	90,582
	Demand Totals	41,372	44,184	48,005	51,861	53,504
	Difference	16,899	22,646	27,461	32,221	37,078

11 West Valley Water District

11.1 System Description

WVWD is a County Water District, a public agency of the State of California, organized and existing under the County Water District Law (Division 12, Section 30,000 of the Water Code) of the State of California. Among other typical political subdivision powers, it has the power of taxation and eminent domain.

WVWD is located in southwestern San Bernardino County with a small part in northern Riverside County. The service area is shown in Figure 11-1. WVWD is adjacent to the western limits of the City of San Bernardino on the east; adjacent to, and including the eastern part of the City of Fontana on the west; adjacent to the U.S. Forest Service boundary on the north; and the County of Riverside on the south. WVWD is divided into northern and southern sections by the central portion of the City of Rialto.

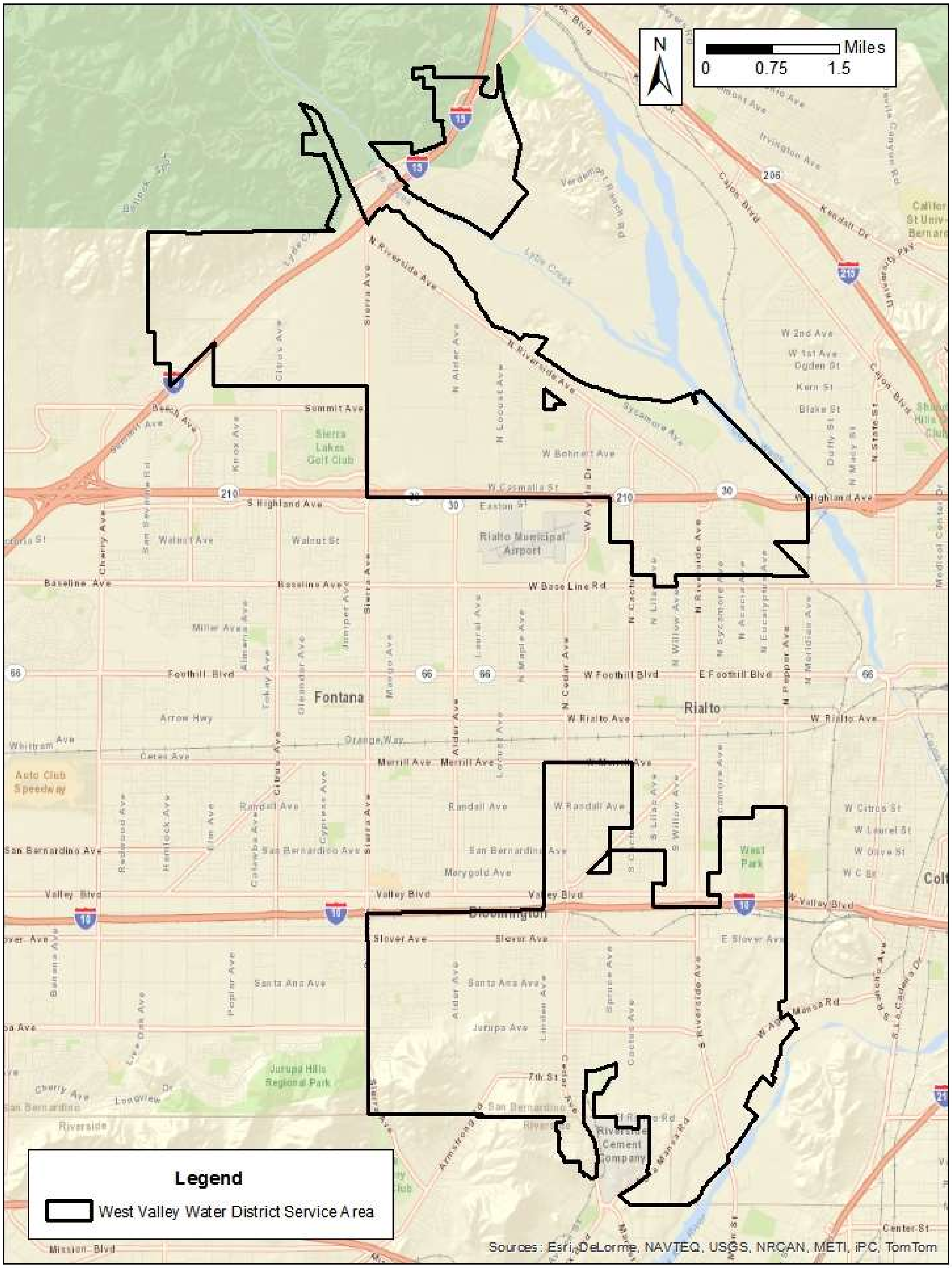

Figure 11-1. West Valley Water District Service Area

The DWR Population Tool was used to intersect WVWD's water service area with compiled census data to estimate historic service area populations for 1990, 2000, and 2010. Values for intermediate years were estimated assuming a constant growth percentage.

WVWD's service area overlaps five political jurisdictions: the Cities of Rialto, Fontana, Colton, and Jurupa Valley; and unincorporated areas of San Bernardino County (including the community of Bloomington). The density of development and recent growth patterns vary considerably within these different jurisdictions, and WVWD maintains records of the number of connections within each jurisdiction. In order to estimate the 2015 service area population, WVWD divided its service area into six sub-divisions based on political boundaries. WVWD calculated the 2010 census population for each of these six sub-divisions (the portions inside Rialto, Fontana, Colton, Bloomington, Jurupa Valley, and unincorporated San Bernardino County) using the DWR Population Tool. WVWD then used the number of connections in 2010 and 2015 to estimate the 2015 population in each of these six sub-divisions, and summed the populations to estimate a total service area population for 2015.

For future populations, the Southern California Association of Governments (SCAG) has developed a forecast called the 2012 Adopted Growth Forecast. As part of the 2012 Adopted Growth Forecast, SCAG has estimated the population in 2020 and in 2035 inside each of approximately 4,000 traffic analysis zones (TAZ) that cover southern California. GIS software was used to intersect WVWD's service area with the SCAG projections to calculate an estimated annual growth rate of approximately 1.5 percent for the WVWD service area. This growth rate was applied for years beyond 2015. The current and estimated future populations are shown in Table 11-1.

Table 11-1. DWR Table 3-1R. Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040
Population Served	80,161	86,246	92,793	99,836	107,415	115,568

11.1.1 Service Area Climate

The climate typically exhibits hot, dry summers and mild, wet winters. Climate is a primary factor that influences water demand within the WVWD service area. Most rainfall occurs during the months of November through April. The hottest and driest period of the year is from June through September. It is not unusual during the summer months to have several consecutive days that the daily temperature exceeds 100 degrees Fahrenheit.

Average temperature, precipitation, and evapotranspiration by month are shown in Table 11-2. Evapotranspiration (ET) is the water lost to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity. ET from a standardized grass surface is commonly denoted as ETo.

Table 11-2. Historical Climate Data

Month	Average Temperature (°F)	Average Precipitation (in.)	Average Standard ETo (in.)
January	52.4	3.22	2.53
February	54.6	3.25	2.87
March	56.7	2.86	4.30
April	60.9	1.29	5.38
May	65.6	0.47	5.82
June	71.3	0.09	6.76
July	77.7	0.04	7.38
August	77.7	0.15	7.09
September	73.9	0.33	5.51
October	66.5	0.71	3.97
November	58.6	1.32	2.89
December	53.3	2.38	2.38
Total		**16.1**	
Notes: Precipitation and temperature for NOAA weather station 0407723 in San Bernardino; data from 1893 through 2004; http://wrcc.dri.edu; ETo data for CIMIS weather station 44 at University of California, Riverside; data from 1986 through 2015; http://wwwcimis.water.ca.gov/			

11.1.2 Climate Change

Climate change has the potential to impact water supplies and demands for WVWD. Water demands could increase if summer temperatures rise, or if there are more days with high temperatures. Water supplies could be affected by changes in precipitation and runoff that contribute to groundwater recharge.

WVWD participates in regional planning efforts that have considered potential impacts of climate change. The 2015 Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IRWMP) (San Bernardino Valley Municipal Water District, January 2015) included a discussion of climate change and its potential impacts on water demand. The IRWMP included a Climate Change Vulnerability Assessment, which is included in Appendix F of this document. Some areas identified in the vulnerability assessment include wildfires and potential erosion impacts on water quality, as well as floods and their potential impact on water facilities.

11.2 System Water Use

11.2.1 Water Uses by Sector

WVWD categorizes customers as single family residential, multi-family residential, landscape irrigation, agricultural irrigation, commercial, industrial, institutional, fire service, and hydrant uses. Water deliveries for each customer class for the years 2011 through 2015 are summarized in Table 11-3.

Table 11-3. DWR Table 4-1R. Demands for Raw and Potable Water – Actual (AF)

Use Type	Additional Description	Level of Treatment When Delivered	2011	2012	2013	2014	2015
Single Family		Drinking Water	12,017	12,789	12,400	11,958	9,786
Multi-Family		Drinking Water	531	597	566	553	504
Commercial		Drinking Water	1,450	1,625	1,690	1,654	1,453
Institutional		Drinking Water	1,020	1,232	1,160	1,157	825
Industrial		Drinking Water	886	876	762	770	709
Agricultural irrigation		Drinking Water	117	152	90	111	105
Landscape Irrigation		Drinking Water	1,355	1,674	1,687	1,799	1,319
Golf Course		Drinking Water	292	0	0	0	0
Fire Service		Drinking Water	2	2	1	2	2
Hydrant		Drinking Water	97	143	281	326	273
Sales/Transfers/Exchanges to other agencies	SB County Connection / Glen Helen	Drinking Water	0	0	0	10	92
Nonrevenue		Drinking Water	2,200	2,157	2,074	2,131	2,064
		Total	19,966	21,246	20,710	20,472	17,131

Projected future water use was estimated using two factors: the expected growth in service area population, and the expected change in per-capita consumption. For planning purposes, WVWD estimated that beginning in 2020, its per-capita consumption would be approximately 10 percent higher than the observed 2015 value. While WVWD will continue to encourage conservation, this assumption reflects the possible change in behaviors that may occur after the current drought ends and mandatory drought restrictions are phased out. The estimated future demands are shown in Table 11-4. WVWD does not anticipate any routine or single large water sales to any agencies in the future. WVWD does not anticipate future water use related to saline barriers, groundwater recharge operations, or recycled water. For the purpose of projections, based on data from the past five years, nonrevenue water is assumed to be 10 percent of total sales. WVWD will continue efforts to decrease water loss and thereby reduce gallons per capita per day of water use.

Table 11-4. DWR Table 4-2R. Demands for Raw and Potable Water – Projected (AF)

Use Type	Additional Description	Level of Treatment	2020	2025	2030	2035	2040
Single Family		Drinking Water	11,654	12,538	13,490	14,514	15,616
Multi-Family		Drinking Water	600	646	695	747	804
Commercial		Drinking Water	1,730	1,861	2,002	2,154	2,318
Institutional		Drinking Water	982	1,057	1,137	1,223	1,316
Industrial		Drinking Water	1,944	2,008	2,077	2,151	2,231
Agricultural Irrigation		Drinking Water	100	80	40	20	0
Landscape Irrigation		Drinking Water	1,571	1,691	1,819	1,957	2,105
Golf Course		Drinking Water	0	0	0	0	0
Fire Service		Drinking Water	2	3	3	3	3
Hydrant		Drinking Water	325	349	376	404	435
Sales/Transfers/Exchanges to other agencies	SB County Connection / Glen Helen	Drinking Water	0	0	0	0	0
Nonrevenue		Drinking Water	1,891	2,023	2,164	2,317	2,483
	Total		20,799	22,256	23,802	25,492	27,312

Table 11-5. DWR Table 4-3R. Total Water Demands (AF)

Demand	2015	2020	2025	2030	2035	2040
Potable and Raw Water	17,131	20,799	22,256	23,802	25,492	27,312
Recycled Water Demand	0	0	0	0	0	0
Total Water Demand	17,131	20,799	22,256	23,802	25,492	27,312

11.2.2 Distribution System Water Losses

Based on system data for the past five years, WVWD used 10 percent of total sales to estimate nonrevenue water for future demand projections. Not all nonrevenue water is lost from the system; some is authorized, but unbilled, consumption. WVWD completed a water audit using the AWWA software to estimate its actual water losses. The audit results are summarized in Table 11-6.

Table 11-6. DWR Table 4-4R. Water Loss Summary Most Recent 12 Month Period Available

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss (Acre-feet)
01/2015	639.9

11.2.3 Estimating Future Water Savings

WVWD is committed to long-range planning to provide a reliable, cost-effective water supply to its customers.

For this report, WVWD has projected that future demands will increase at a percentage growth rate that incorporates two factors: the percentage growth in service area population, and potential changes in the per-capita consumption. This approach provides estimates for future system-wide demand that can be used for long-range planning.

In the 2015 UWMP, water suppliers have the option of preparing more detailed demand forecasts by estimating demand factors based on land use categories. For example, WVWD could identify typical water use per single family customer and per commercial account. These customer classes can be further sub-divided by lot size, neighborhood, or other variables. The intent is to quantify the estimated water use per customer in different customer classes, and then to forecast how future changes will impact water use within each customer class.

For this document, WVWD has elected not to develop land use-based demand factors and apply future savings from codes and standards. Recent drought regulations have induced significant changes in water consumption patterns, and there is considerable uncertainty as to how demands will change in the future if the drought subsides. Given this uncertainty, WVWD elected not to quantify passive savings for this UWMP.

11.2.4 Water Use for Lower Income Households

Senate Bill 1087 requires that water use projections in an UWMP include the projected water use for single-family and multi-family residential housing 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. WVWD serves portions of five jurisdictions: the City of Rialto, the City of Fontana, the City of Colton, the City of Jurupa Valley, and unincorporated San Bernardino county.

The City of Rialto updated its housing element in 2010. The housing element estimates that about 44% of households are very low- and low-income in the City. However, there is not specific information on very low- or low-income households in the WVWD service area.

The City of Fontana updated its housing element in 2010. The housing element estimates that approximately 38 percent of households are very low- and low-income in Fontana. However, the information is not sufficient to estimate the existing number of lower-income households or the associated water demand in the WVWD service area.

In City of Colton updated its housing element in 2013. The housing element estimates that 51 percent of households in Colton are lower-income.

The County of San Bernardino updated its housing element in May 2007. The Housing Element provides information on regional housing needs and states goals for new housing to accommodate very-low and low-income households. According to the housing element, approximately 42 percent of households in the unincorporated county are very-low or low-income.

The weighted percentage estimate of very-low and low-income households in the WVWD service area is 44 percent. Therefore, it is assumed that 44 percent of future residential demands will come from very-low and low-income households. The estimated demands for lower-income households are shown in Table 11-7. These demands have been included in the projections presented throughout this report.

Table 11-7. Estimated Demands for Lower-Income Households (AF)

Demand	2015	2020	2025	2030	2035	2040
Single Family Residential	4,306	5,128	5,517	5,936	6,386	6,871
Multi-Family Residential	222	264	284	306	329	354
Total	4,527	5,392	5,801	6,241	6,715	7,225

11.3 SB X7-7 Baselines and Targets

In the 2015 UWMP, an urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target).

11.3.1 Updating Calculations from 2010 UWMP

In the 2010 UWMP, WVWD calculated a baseline water use of 316 GPCD. WVWD used Target Method 4 to calculate a compliance water use target of 254 GPCD for 2020, and an interim water use target of 285 GPCD for 2015. In 2010, the actual consumption was calculated as 236 GPCD.

For the 2015 UWMP cycle, DWR has made a GIS-based Population Tool available to calculate service area population using Census Bureau data. WVWD has used this tool to re-calculate its service area population, baseline per-capita use, and compliance targets.

11.3.2 Baseline Periods

Years 2000 to 2009 have been selected for calculation of the 10-year base period, while years 2004 to 2008 have been selected for calculation of the 5-year base period.

11.3.3 Service Area Population

In order to calculate Base Daily Per Capita Water Use for past years, it was necessary to develop population estimates for past years. WVWD's service area population for years 2000 and 2010 was estimated using the DWR Population Tool. Service area population for intermediate years was estimated assuming a constant growth rate between census years.

11.3.4 Gross Water Use

The calculation of gross water use begins with the total amount of water that was put into the potable water distribution system by WVWD. Water that was exported to another agency was then subtracted, leaving the amount used by WVWD retail customers.

For the period of 2000 to 2009, gross water use in the WVWD service area fluctuated between 19,682 and 22,777 acre-feet per year.

11.3.5 Baseline Daily per Capita Water Use

The 10-year average Base Daily Per Capita Water Use for WVWD is 285 GPCD; the 5-year average is 284 GPCD.

11.3.6 2015 and 2020 Targets

After determining baseline water use, SB X7-7 requires that a retail water supplier identify its demand reduction targets. WVWD is choosing to meet SBX7-7 targets as an individual agency rather than as part of a regional alliance. WVWD has selected Method 4 to calculate the agency's 2020 Compliance Water Use Target and Interim Water Use Target. Compliance Water Use Target under Method 4 is Base Daily GPCD less:

- Indoor residential water savings of 15 GPCD or an amount determined by use of DWR's "BMP Calculator" (WVWD used the default value of 15 GPCD)
- 20 percent savings on all unmetered uses (WVWD has no unmetered uses)
- 10 percent savings on Baseline CII, where Baseline CII is represented by CII use during 2004 (the mid-point of the baseline period)
- 21.6 percent savings on current landscape and water loss uses, where landscape and water loss is estimated as Base Daily GPCD minus Baseline CII and a default indoor water use of 70 GPCD.

WVWD used the DWR Method 4 Target Calculator to calculate its Compliance Water Use Target. This spreadsheet is included in Appendix O. The resulting Compliance Water Use Target is 232 GPCD, and the Interim Water Use Target is 259 GPCD. The targets are summarized in Table 11-8.

Table 11-8. DWR Table 5-1R. Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD	2015 Interim Target	Confirmed 2020 Target
10-year	2000	2009	285	259	232
5-year	2004	2008	284		

11.3.7 2015 Compliance Daily per Capita Water Use

Based on 95 percent of the 5-year baseline average, the Maximum Allowable GPCD is 270. The Compliance Water Use Target under Method 4 is less than the Maximum Allowable GPCD, so no adjustments to the Compliance Water Use Target are necessary.

WVWD's actual per-capita consumption in 2015 was 190 GPCD, which is below the Interim Water Use Target for 2015, as shown in Table 11-9.

Table 11-9. DWR Table 5-2R. 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Extra-ordinary Events	Economic Adjust-ment	Weather Normal-ization	Total Adjustments	Adjusted 2015 GPCD	2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015?
190	259	0	0	0	0	190	190	YES

11.4 Demand Management Measures

11.4.1 Water waste prevention ordinances

WVWD, through Article 24, lists use of water considered non-essential to the public health, safety and welfare and, defines what constitutes water wasting pursuant to Water Code Section 350 et seq., Water Code Section 71640 et. seq., and the common law. Article 24 was adopted on August 6, 2015, and is provided in Appendix G.

11.4.2 Metering

WVWD is in the process of changing its entire meter stock to Automatic Meter Reading (AMR). This system eliminates the need for each meter to be visually read by a technician and ensures that water usage is billed correctly. The AMR system will also be highly useful in identifying and addressing customer-side leaks, as well as for understanding and assessing the impacts of various conservation programs. WVWD is currently 75% AMR installed and plans to be 100% installed by 2021.

11.4.3 Conservation pricing

WVWD is in compliance with this DMM. The volumetric portion of District's water revenue accounts for about 71 percent of total revenue. WVWD has a tiered water rate system that is always in place. WVWD charges customers increasing rates based on their water usage during a billing cycle to encourage water conservation.

WVWD completed a rate study in 2012 and implemented an Inclining Block Rate tiered rate structure starting January 1, 2013 (Tier One - 1-10 units, Tier Two - 11-50 units, Tier Three - 51+ units).

11.4.4 Public education and outreach

WVWD provides informational materials to customers through paid advertising, classes, water bills, demonstration gardens, a website, social media and quarterly newsletters. In 2015, WVWD held a series of workshops called the Water 101 class. This class was offered to all customers within the District's service area and covered everything from the History of the District to water quality. One class was dedicated solely to water conservation.

WVWD has revamped its website to include multiple pages on information for water conservation including rebates and programs that WVWD is participating in, water conservation tips for indoor and outdoor use, as well as the ability for customers to report water waste. WVWD's conservation piece of the website is updated on a regular basis to include new ideas. WVWD continues to hold water conservation classes for students at local elementary, middle and high schools located within WVWD. The District also gives tours to local schools of the Treatment Plants and hands out conservation materials.

For the last 10 years WVWD has sponsored a Water Conservation Poster Contest with the elementary schools located in the District. This last year the District had more than 25 teachers participate in the contest as well as over 150 entries. The District will also have conservation messages appear directly on the customer's bill as well as change the bill format by adding a graph that shows customer's current usage compared to previous years.

In 2010, the District, in conjunction with Valley District and other water agencies in the area, partnered to participate in the Inland Empire Garden friendly program which is designed to help customers save water by installing climate friendly plants. For the last several years, the District has created a welcome package for all new customers including a Leak Detection Guide, the Demonstration Garden brochure and plant list, the Quarterly Newsletter, and the District's Water Conservation Calendar. Landscape Classes, Conservation Workshops, and Information booths at public events are done multiple times during the year. All of the District's outreach information, fliers, brochures and mailers are printed in both English and Spanish.

In early 2014 WVWD partnered with 19 other Inland Empire Water Agencies to form iEfficient.com, a regional approach to conservation and messaging. The outreach campaign is in its second year and has helped implement the following:

- Collaborative communication effort, with more than 20 Inland Empire agencies participating, focused on ending water waste through outreach & education;
- Sharing information unique to the IE through On-Hold messages, Mailers, Bill inserts, Lawn signs, Promotional items, Event participation, and Special outreach events;
- Using Press Conferences, Press Releases, Holding Statements, Fact Sheets, Targeted advertising, Presence on website and outreach materials, Participation in social media, and Regular live events; and
- Use of iEfficient app and iEfficient Customer Relationship Toolkit.

11.4.5 Programs to assess and manage distribution system real loss

WVWD has policies for meter testing and replacement that were implemented in January 2011. WVWD now requires an annual testing of meters 4 inch and larger. The Meter Supervisor must develop a schedule for testing that includes all meters that are 5 years or older. WVWD has a new valve maintenance crew to repair distribution system leaks. WVWD is in the process of installing fire hydrant standard internal check valves so water loss is minimized if a fire hydrant gets hit. WVWD has a full time maintenance (9 full time employees) and meter department (9 full time employees) and a contracted company that helps with any repairs on leaks that are reported by customers or personnel, on a priority basis. The total budget for these departments for FY 2015-2016 is 2.6 million dollars. WVWD repairs approximately 30 leaks a month. The Billing Department Staff also notifies customers, using their monthly meter readings; if it looks like the consumption has increased significantly. Customer Service Staff also provides a letter of thanks to customers for reporting leaks.

11.4.6 Water conservation program coordination and staffing support

Soon after the passage of the Water Conservation Act of 2009 (SB X7-7), which sought a 20% reduction in per capita water use by 2020, WVWD displayed its commitment to conservation by creating a Water Conservation Department. With the creation of this department the District committed a full time Water Conservation Coordinator. The District's conservation department over the last several years has continued to grow with the addition of a full-time Water Conservation Specialist in October 2014, a temporary office employee in July 2015, and a temporary field employee in August 2015 to help patrol and make sure watering restrictions are being followed. The 2014-2015 Fiscal Year Budget for the Conservation Department was approximately $500,000.

In early 2014 the District partnered with 19 other Inland Empire Water Agencies to form iEfficient.com, a regional approach to conservation and messaging. The outreach campaign is in its second year. The Board of Directors of WVWD adopted Ordinance No. 80, Amending Article No. 24 Water Conservation, of the Service Rules and Regulations. The adoption of this ordinance allowed the District to create a Stage III, A,B & C to be able to restrict number of irrigation days allowed by Board action instead of ordinance adoption. This Ordinance also addressed the changes required by the State Water Resources Control Board on May 5, 2015.

11.4.7 Other demand management measures

- Residential Plumbing Retrofit Kits - package to customers that includes 2 low flow showerheads, 1 kitchen faucet aerator, and 2 bathroom faucet aerators. WVWD plans to keep this program in place through 2020.
- Residential ULFT/HET Rebates - Up to $100 rebate per household, with a total budget of $1,250 for Fiscal Year 2015-2016.
- Residential HEW Rebates - Up to $100 rebate per household, with a total budget of $2,500 for Fiscal Year 2015-2016.
- Residential WBIC Rebates - Up to $100 rebate per household, with a total budget of $5,000 for Fiscal Year 2015-2016.
- Residential HE Nozzles Rebates - Up to $4 per nozzle rebate, with a total budget of $400 for Fiscal Year 2015-2016.
- Residential Turf Replacement Rebates - Up to $1 per square foot, maximum $1,000 rebate, with a total budget of $75,000 for Fiscal Year 2015-2016.
- Proposition 84 Institutional and HOA Turf Removal Program - up to $2.50 per square foot of turf removal and replacing with a drought tolerant landscape.

- Institutional Rebate Programs - rebate program targeted at schools within WVWD's boundaries to offer rebates on an individual basis for toilets and ET controllers for landscaping.
- CII Rebate Programs - WVWD will identify high water users and will work with each company on an individual basis to create a conservation program tailored to their particular needs.
- Disadvantaged Community (DAC) Water/Energy Grant Program - Starting 2016, remove 65,000 square feet of residential turf and replace it with drought tolerant landscaping. Annually, Water Savings of 44 gallons per square foot.

11.4.8 Planned Implementation to Achieve Water Use Targets

WVWD's current per-capita consumption is less than its 2020 compliance target. WVWD expects to continue to implement its current conservation programs to encourage conservation and maintain per-capita consumption below the compliance target.

WVWD will be participating in three major projects with the Santa Ana Watershed Project Authority (SAWPA):

1. Aerial Mapping Project - to use for Technology Based Information Project.
2. Technology Based Information Project - the project includes data, analysis and outreach to WVWD customers through OmniEarth and Dropcountr technology.
3. Turf Removal Projects (Institutional accounts).

11.5 System Supplies

WVWD utilizes three primary sources for drinking water supply: local surface water from flows on the east side of the San Gabriel Mountains, including North Fork Lytle Creek, Middle Fork Lytle Creek, and South Fork Lytle Creek; groundwater; and imported water from the State Water Project (SWP). The WVWD distribution system is divided into eight pressure zones; it currently has 25 existing reservoirs with a total storage capacity of approximately 72.61 million gallons. WVWD also operates a 14.4-MGD water filtration facility.

11.5.1 Purchased or Imported Water

WVWD receives SWP water from Valley District through the Lytle Turnout off the San Gabriel Feeder Pipeline. Newly constructed metering and transmission facilities will enable WVWD to purchase and treat up to 20 MGD (approximately 23,000 AFY) at final treatment plant expansion. SWP water is treated at the District’s Oliver P. Roemer Water Filtration Facility (WFF) and used for potable supply, or can be used to supply non-potable customers, or for groundwater recharge in the Lytle Creek Basin. In 2006 the WFF was expanded to increase production capacity to 14.4 MGD. Ultimately this plant will have a capacity of 20.4 MGD. WVWD has been utilizing SWP water through the Lytle Turnout since 1999.

11.5.2 Groundwater

WVWD draws approximately 65 percent of its water supply from its wells. WVWD's normal operating practice is to pump its wells 16 hours a day during off peak hours to take advantage of Southern California Edison's time of use rate. If, for some reason, wells are not in service (maintenance or repair), WVWD has the ability and right to pump its wells up to 24 hours per day. WVWD has approximately 36 MGD production capability from all of its wells in operation 24 hours per day.

WVWD extracts groundwater from five regional groundwater basins: Bunker Hill and Lytle Creek (which are both part of the SBBA), Rialto-Colton, Riverside North, and Chino Basins. All five basins have been adjudicated and are managed, as discussed further in Chapter 2.

WVWD, in a joint venture with the City of Rialto and Valley District, constructed 25,000 feet of 48-inch transmission line known as the Baseline Feeder. Through an agreement with Valley District, WVWD is to receive 5,000 AFY of supply through this transmission line. WVWD has received water through the Baseline Feeder since 1998. Because this water is not produced by WVWD, it is not included in Table 11-10.

WVWD's historical production for the past five years is shown in Table 11-10.

Table 11-10. DWR Table 6-1R. Groundwater Volume Pumped (AF)

Groundwater Type	Location or Basin Name	Water Quality	2011	2012	2013	2014	2015
Alluvial Basin	Lytle Creek	Drinking Water	2,983	4,002	3,776	3,262	2,159
Alluvial Basin	Riverside North	Drinking Water	3,144	3,932	3,389	2,992	2,065
Alluvial Basin	Rialto-Colton	Drinking Water	4,883	4,093	4,005	3,916	2,505
Alluvial Basin	Bunker Hill	Drinking Water	1,335	1,682	1,885	1,478	1,520
Alluvial Basin	Chino	Drinking Water	0	0	0	0	0
	Total		12,345	13,709	13,055	11,648	8,249

11.5.3 Surface Water

WVWD has the right to divert and export out of the Lytle Creek Region 2,290 gpm when it is available. WVWD can also purchase an additional 1,350 gpm of Lytle Creek flows through an agreement with the City of San Bernardino (San Bernardino is not able to utilize their surface water flows), which is treated at the Oliver P. Roemer WFF. WVWD also utilizes Lytle Creek surface water flows for groundwater recharge in the Lytle Creek Basin.

11.5.4 Stormwater

WVWD is participating in regional planning efforts to capture additional stormwater for purposes of groundwater recharge.

11.5.5 Wastewater and Recycled Water

The wastewater collected within different portions of the WVWD water service area is treated by the City of Rialto (City), the City of Colton, San Bernardino County, or the Inland Empire Utilities Agency.

11.5.5.1 Recycled Water Coordination

The City of Rialto is updating its Recycled Water Master Plan to investigate the expansion of its existing tertiary treatment plant and reclaimed water system as a way to supplement the City's water supply.

11.5.5.2 Wastewater Collection, Treatment, and Disposal

The City of Rialto has a 12.0 MGD tertiary treatment plant with a current flow of 8 MGD. All of the City's treatment plant effluent meets Title 22 for recycled water usage in restricted irrigation. Reclaimed water not currently being used for irrigation is discharged into the Santa Ana River. WVWD is evaluating the feasibility of adding recycled water to its non-potable supply usage, but would rely on the City of Rialto to provide the recycled water from their wastewater treatment facility.

Table 11-11. DWR Table 6-2R. Wastewater Collected within Service Area in 2015

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AF)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
City of Rialto	Estimate	4,480	City of Rialto	Rialto Wastewater Treatment Plant	Yes	Yes
City of Colton	Estimate	550	City of Colton	Colton	Yes	No
San Bernardino County	Estimate	340	San Bernardino County	Lytle Creek North Water Reclamation Plant	Yes	No
Inland Empire Utilities Agency	Estimate	900	Inland Empire Utilities Agency	Recycled Plant No. 4	No	No
	Total Wastewater Collected from Service Area in 2015	6,720				

11.5.5.3 Recycled Water System

WVWD does not currently have a recycled water distribution system. WVWD is completing a master plan for potential use of recycled water within its service area. WVWD's plans for recycled water are still preliminary, and the expected beneficial use has not been quantified.

11.5.5.4 Actions to Encourage and Optimize Future Recycled Water Use

WVWD is evaluating current large landscape and non-potable users for potential use of recycled water and the infrastructure required to supply that demand. To the extent feasible, if and when recycled water is available to WVWD, this water will be offered to WVWD customers.

Table 11-12. DWR Table 6-6R. Methods to Expand Future Recycled Water Use

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Planning	Continue planning efforts to identify potential cost-effective uses of recycled water	2020	Not yet defined

11.5.6 Desalinated Water Opportunities

The need for brackish groundwater desalting is somewhat limited in the San Bernardino Valley. While elevated salts are a concern in the groundwater basins of the Western Judgment (SBBA, Rialto-Colton, Riverside), average TDS levels in all of these basins are currently below 500 mg/L. However, elevated salts are an issue for retailers that overlie the San Timoteo Groundwater Basin, and agencies in this basin are considering implementing desalter operations. The area is fortunate to have a brine line which can transport non-reclaimable waste, by gravity, from the City of San Bernardino Water Reclamation Plant to the Orange County Sanitation District's treatment plant.

The development of (or financial participation in) a new seawater desalination project, while costly, is being investigated by other wholesale and retail water agencies in southern California. Because the San Bernardino Valley is an inland area, in order for desalination to work it would be necessary for agencies in the San Bernardino Valley to join with other water purveyors in the development of a coastal desalination facility and then receive water from the SWP supplies of other participants via an exchange. It is not cost-effective for the San Bernardino Valley to receive direct delivery of desalted ocean water.

Seawater desalination is an alternative that is technically viable. However, production and treatment costs have historically been several times higher than those of SWP costs and conventional treatment.

11.5.7 Exchanges or Transfers

WVWD currently has interconnections with the Cities of Rialto, Colton and San Bernardino, the Fontana Water Company, Marygold Mutual Water Company, and Valley District which can be utilized as needed for short-term supply needs. These connections are not typically used for extended periods.

11.5.8 Future Water Projects

To meet the future demands within the system, WVWD plans to rehabilitate existing wells, to drill new wells, and equip wells with wellhead treatment if required. These wells are planned for various groundwater basins and pressure zones within the distribution system.

Groundwater is not the only planned supply source to be utilized by WVWD to meet the anticipated future demands. WVWD has expanded the Oliver P. Roemer Water Filtration Facility to allow additional treatment of SWP water when available. A future expansion of the plant will increase the ultimate capacity of the facility to 20.4 MGD.

When planning future water supply sources, WVWD selects projects that will provide sufficient supply to meet peak day demands. When possible, these sources are planned by pressure zone, thereby reducing the need to lift water to a higher zone. WVWD currently pumps its wells 16 hours per day to take advantage of Southern California Edison’s reduced off peak pumping rate. This pumping schedule lowers overall costs and allows WVWD operational flexibility.

As development progresses and increased demands are placed on the system, WVWD will determine which projects to implement. Although WVWD may not need to utilize each source to its full potential, construction of these water supply projects gives WVWD this option should one or more source be off line due to maintenance. Known future supply developments are listed in Table 11-13.

Table 11-13. DWR Table 6-7R. Expected Future Water Supply Projects or Programs

Name of Future Projects or Programs	Joint Project with Other Agencies?	Other Agency Names	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Agency (AF)
Expansion of Roemer Water Filtration Facility			WVWD has expanded the Oliver P. Roemer Water Filtration Facility to allow additional treatment of SWP water when available. A future expansion of the plant will increase the ultimate capacity of the facility to 20.4 mgd.	2025	Average Year	5,000

11.5.9 Summary of Existing and Planned Sources of Water

WVWD's actual supplies used during 2015 are summarized in Table 11-14.

Table 11-14. DWR Table 6-8R. Water Supplies - Actual

Water Supply	Additional Detail on Water Supply	2015 Actual Volume (AF)	2015 Water Quality
Surface Water	Lytle Creek	2,271	Drinking Water
Purchased or Imported Water	SWP Water	2,244	Drinking Water
Groundwater	Lytle Creek	2,159	Drinking Water
Groundwater	Riverside North	2,065	Drinking Water
Groundwater	Rialto-Colton	2,505	Drinking Water
Groundwater	Bunker Hill	1,520	Drinking Water
Groundwater	Chino	0	Drinking Water
Purchased or Imported Water	Baseline Feeder (Bunker Hill)	4,367	Drinking Water
	Total	17,131	

WVWD plans to utilize a greater amount from each of its supply sources, up to the legal rights and availability. WVWD's available supplies for future years are summarized in Table 11-15.

Table 11-15. DWR Table 6-9R. Water Supplies – Projected (AF)

Water Supply	Additional Detail on Water Supply	2020	2025	2030	2035	2040
Surface Water	Lytle Creek	5,500	5,500	5,500	5,500	5,500
Purchased or Imported Water	SWP Water	7,000	7,000	7,000	7,000	7,000
Groundwater	Riverside North	2,500	3,500	4,000	4,500	4,500
Groundwater	Rialto-Colton	6,000	6,000	6,000	6,000	6,000
Groundwater	SBBA Groundwater (Bunker Hill / Lytle)	9,500	14,000	17,000	19,500	19,500
Groundwater	Chino	900	900	900	900	900
Purchased or Imported Water	Baseline Feeder (Bunker Hill)	5,000	5,000	5,000	5,000	5,000
	Total	36,400	41,900	45,400	48,400	48,400

11.6 Water Supply Reliability Assessment

11.6.1 Imported Water

During times of State-wide drought conditions, the availability of SWP water may be reduced. These conditions are normally known in advance, providing WVWD with the opportunity to plan for the reduced supply. During a drought period, it is Valley District's priority to meet obligations to maintain lake levels at Big Bear Lake and to make direct deliveries to the water treatment plants operated by Redlands, WVWD, EVWD, YVWD, and SBMWD.

11.6.2 Groundwater

Some of the WVWD's wells have been impacted by arsenic, perchlorate and volatile organic carbons (VOCs). WVWD has implemented wellhead treatment as needed and continues to monitor groundwater contamination and the movement of groundwater contaminant plumes. These past and ongoing groundwater treatment projects have demonstrated that treatment is an economically viable alternative for handling arsenic, perchlorate and VOCs. Based on current conditions, water quality is not anticipated to affect WVWD supply reliability. However, water quality issues are constantly evolving. WVWD will take action to protect and treat supply when needed, but it is well recognized that water quality treatment can have significant costs.

Geologic hazards within Lytle Creek have the potential to disrupt the water supply system by restricting the flow and/or introducing large quantities of suspended solids to the runoff, thereby increasing turbidity levels. To deal with this water quality issue, WVWD added pre-treatment capability at the Oliver P. Roemer WFF to achieve both turbidity removal and total organic carbon reduction.

11.6.3 Reliability by Type of Year

During normal and wet years, Valley District uses SWP water for groundwater recharge. Therefore, this water is available for production during dry years. Through its use of groundwater storage, Valley District does not anticipate a reduction in the availability of SWP water during single or multiple dry years.

Due to the size of the groundwater basins utilized by WVWD, a single dry year will not affect well production. The annual amount produced in past normal, single dry, or multiple dry water years from a basin does not give an accurate representation of potential basin production. Factors such as lower system demand, cost of pumping, inoperable wells, pumping duration, replenishment costs, water quality, cost of supply and the ability to treat water all affect annual basin production numbers.

WVWD has been able to utilize up to 5,500 AFY during normal times from Lytle Creek surface flows and projects a minimum of 2,130 AFY during extended drought conditions. WVWD and its predecessors have been utilizing Lytle Creek surface flows for water supply for more than 130 years.

11.6.4 Regional Supply Reliability

WVWD is committed to minimizing the need to import water from other regions. WVWD operates a number of conservation programs to implement various Demand Management Measures, helping to reduce the need for imported water.

11.7 Water Shortage Contingency Planning

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, an earthquake which damages delivery or storage facilities, or a regional power outage. Chapter 5 of this RUWMP describes water shortage contingency planning for regional water supply sources (imported water, groundwater). This section focuses on water shortage contingency planning for WVWD.

In order to minimize the social and economic impact of water shortages, WVWD will manage water supplies prudently. As the shortages become evident to WVWD, the District will invoke the appropriate stage, approved by the Board of Directors. Shortages may evoke a stage at any time. The four-stage rationing plan to be undertaken by WVWD in response to water supply shortages is listed in the following sections and is described in the “Water Conservation Provisions of Stages 2, 3 and 4”.

11.7.1 Stages of Action

During times of normal supply, it is recommended that water conservation be practiced within the home or business, and all restaurants are requested not to serve water to their customers unless specifically requested by the customer. Stage 1 also lists water uses considered nonessential to the public health, safety, and welfare, and would be considered wasting of water and are therefore prohibited. Subsequent stages include more extensive water saving regulations. WVWD’s Water Shortage Contingency Plan has four stages, as shown in Table 11-16.

Table 11-16. DWR Table 8-1R. Stages of WSCP

Stage	Percent Supply Reduction	Water Supply Condition
1	0	Normal Condition
2	20	Water Alert
3	25	Water Warning (includes sub-stages A, B, and C)
4	30 to 50	Water Emergency

11.7.2 Prohibitions on End Uses

The water use prohibitions for each stage are shown in Table 11-17.

Table 11-17. DWR Table 8-2R. Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	Landscape - Other landscape restriction or prohibition	The use of sprinklers for any type of irrigation during high winds is prohibited.	Yes
1	Landscape – Limit landscape irrigation to specific times	Limit all landscape irrigation to between the hours of 8:00 p.m. and 6:00 a.m. Hand watering should be done between 6:00 p.m. and 8:00 a.m. Drip irrigation and hand watering while gardening is exempt from this recommendation. Water being used during repair or maintenance of watering system is exempt from this section.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	Landscape - Restrict or prohibit runoff from landscape irrigation	Use of water for outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or structures is prohibited.	Yes
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	No person shall permit water to leak from any facility, improvement or plumbing fixture on his/her/its premises; said leak shall be repaired in a timely manner.	Yes
1	Other - Require automatic shut of hoses	Washing of automobiles, trucks, trailer, boats, and other mobile equipment is prohibited unless done with a hand held device equipped with an automatic shut off trigger nozzle. This does not apply to commercial car washes utilizing a recycling system or when the health and safety of the public would necessitate.	Yes
1	Water Features - Restrict water use for decorative water features, such as fountains	No water shall be used to clean, fill, operate or maintain levels in decorative fountains unless the water is part of a recycling system.	Yes
1	Other – Prohibit use of potable water for washing hard surfaces	There shall be no application of water to sidewalks, walkways, driveways, parking areas, patios, porches, verandas, tennis courts, or other paved, concrete, or other hard surface areas, except that flammable or other similarly dangerous or unhealthy substances may be washed from said areas by direct hose flushing for the benefit of public health or safety.	Yes
1	Landscape – Prohibit certain types of landscape irrigation	The irrigation of potable water of ornamental turf on public street medians is prohibited. The term “median” shall mean the strip of land between street lanes.	Yes
2	CII - Restaurants may only serve water upon request	All restaurants prohibited from serving water to their customers except when requested by customer.	Yes
2	CII – Lodging establishment must offer opt out of linen service	Operators of hotels and motels must provide guests with the option of choosing not to have towels and linens laundered daily. The hotels and motels shall prominently display notice of this option in each guestroom using clear and easily understood language.	Yes
2	Landscape - Limit landscape irrigation to specific days	Limit all landscape irrigation to four (4) days per week for no more than ten (10) minutes per station per day. This provision does not apply to any landscape that has water-efficient devices that are operated properly. Water-efficient devices are drip irrigation systems and operational weather-based irrigation controllers. The term “week” is defined as Sunday through Saturday.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	Other - Prohibit use of potable water for construction and dust control	District will screen all new applications for water service installations and will limit water use before occupancy to that essential use for construction and testing of landscape plumbing. Limited landscaping for new development shall be allowed as approved by the District. Water use for compaction, dust control, and other types of construction shall be by permit only and will be limited to conditions of the permit or may be prohibited as determined by the General Manager or his/her designee.	Yes
2	Other – Customers must repair leaks, breaks, and malfunctions in a timely manner	Repair all leaks within seventy-two (72) hours of notification by the District unless other arrangements are made with the general manager of the District ("General Manager").	Yes
2	Landscape – Other landscape restriction or prohibition	Irrigating landscaping, including, but not limited to, turf and ornamental landscapes during and within forty-eight (48) hours following measurable precipitation is prohibited.	Yes
2	Other water feature or swimming pool restriction	Swimming pools, ornamental pools, fountains, water displays, hot tubs, spas and artificial lakes shall not be filled or refilled after being drained.	Yes
2	Other – Prohibit use of potable water for construction and dust control	Water used for compaction, dust control, and other types of construction shall be by permit only and will be limited to conditions of the permit or may be prohibited as determined by the General Manager, or his/her designee.	Yes
3A	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Washing of automobiles, trucks, trailers, boats, airplanes, and other types of mobile equipment are prohibited. Washing of the above-listed vehicles or mobile equipment shall be allowed only at a commercial car wash where recirculating water is being utilized.	Yes
3A	Landscape - Limit landscape irrigation to specific times	All agricultural water users shall irrigate only at times approved by the District.	Yes
3A	Water Features - Restrict water use for decorative water features, such as fountains	Swimming pools, ornamental pools, fountains, water displays, hot tubs, spas, and artificial lakes shall not be refilled or filled after being drained.	Yes
3A	Landscape – Limit landscape irrigation to specific days	Limit all landscape irrigation to three (3) days per week for no more than ten (10) minutes per station per day. Drip systems that are operated efficiently are exempt from these regulations.	Yes
3A	Other – Customers must repair leaks, breaks, and malfunctions in a timely manner	Repair all leaks within forty-eight (48) hours of notification by the District unless other arrangements are made with the General Manager.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
3B	Landscape – Limit landscape irrigation to specific days	Limit all landscape irrigation to two (2) days per week for no more than ten (10) minutes per station per day.	Yes
3C	Landscape – Limit landscape irrigation to specific days	Limit all landscape irrigation to one (1) day per week for no more than ten (10) minutes per station per day.	Yes
4	Landscape - Prohibit all landscape irrigation	No lawn or landscape water will be allowed.	Yes
4	Other - Prohibit use of potable water for construction and dust control	No construction water use to be allowed, construction meters to be locked off or removed.	Yes
4	CII – Other CII restriction or prohibition	Commercial nurseries shall water only between the hours of 11:00 p.m. and 6:00 a.m. and only with hand-held devices or with drip irrigation systems.	Yes
4	Landscape – Prohibit all landscape irrigation	The use of water shall be limited to essential household, commercial, manufacturing, or processing uses only, except where other uses may be allowed by permit	Yes
4	Landscape – Limit landscape irrigation to specific times	All agricultural water users shall irrigate only at times approved by the District.	Yes

11.7.3 Penalties, Charges, Other Enforcement of Prohibitions

Consumption limits in the progressively restrictive stages are imposed on different uses. These are based on percentage reductions in water allotments, and restrictions on specific uses. The specific percentage reductions at each stage and for each user class are detailed in the ordinance. The individual customer allotments will be based on the previous year's use. This provides WVWD a basis for reviewing appeals.

Mandatory provisions to reduce water use during the different stages of water shortage are also summarized in the ordinance. Provisions of Article 24 - Water Conservation, adopted August 6, 2015, were adopted pursuant to Sections 375 and 376 of the California Water Code. Any second or subsequent violation of this policy after notice as specified in Section 2411 1(a) is a misdemeanor (California Water Code Section 377).

11.7.3.1 Violations

In addition to the remedy of criminal prosecution available to the District, violation of the Ordinance may result in the imposition of surcharges and restriction and/or termination of water service as set forth below:

- First Violation – Notice of Non-Compliance – a written warning accompanied by a copy of this Ordinance, delivered by U.S. Mail and/or hung on customer's door.
- Second Violation – Warning of Penalties – a written warning notice of future imposition of penalties that could be placed on the customer's water bill.
- Third Violation (within one (1) year) - a surcharge of $100.00.
- Fourth Violation (within one (1) year of the first violation) – a surcharge of $300.00, and installation of flow restricting device in the meter for a minimum of ninety-six (96) hours. Said restricted flow shall meet minimum County Health Department's standards, if any have been established. If said ninety-six (96) hour period ends on a weekend or holiday, full service will be restored during the next business day.
- Fifth Violation (within one (1) year of the first violation) – a surcharge of $500.00, and termination of service for such period as the Board determines to be appropriate under the circumstances, following a hearing regarding said issue. Written notice of the hearing shall be mailed to the customer at least ten (10) days before the hearing.

Any surcharge hereunder shall be in addition to the basic water rates and other charges of the District for the account and shall appear on and be payable with the billing statement for the period during which the violation occurred; non-payment shall be subject to the same remedies available to the District as for non-payment of basic water rates.

In addition to any surcharge, a customer violating this Ordinance shall be responsible for payment of the District's charges for installing and/or removing any flow restricting device and for disconnecting and/or reconnecting service per the District's Schedule of Charges then in effect. Such charges shall be paid prior to the removal of the flow restrictor or reconnection of service, whichever the case may be.

11.7.4 Consumption Reduction Methods

WVWD uses a comprehensive conservation program to encourage consumption reduction throughout its service area. The District has not identified specific consumption reduction methods to be implemented at each stage as part of its WSCP.

11.7.5 Determining Water Shortage Reductions

The mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency plan will be the review of the daily production figures and the monthly water meter readings. The General Manager of WVWD, or his designee, shall access all available water supply data and shall make a report of his findings to the Board of Directors at the next regular meeting or at a special meeting called for that purpose. The Board of Directors at that time determine and declare which of the four previously discussed conditions WVWD's water supply is in and the extent of water conservation required to prudently plan for and supply water to the District's customers.

11.7.6 Revenue and Expenditure Impacts

During Stages 2 through 4 of the District's Water Shortage Contingency Plan, water consumption will decrease based upon each individual stage and the amount of reduction goal achieved. The impacts of these reductions will result in a reduction in water sales revenues and a reduction of water production expenditures. In order to mitigate the financial impacts of a water shortage, WVWD maintains sufficient funds within a Rate Stabilization Account. These funds could be used to stabilize water rates during periods of water shortage or disasters affecting the water supply.

11.7.7 Resolution or Ordinance

To offset the prolonged effects of the drought periods, the Board of Directors adopted a Water Conservation Plan with Ordinance No. 68 on July 5, 1990 by adding Article No. 24 entitled "Water Conservation" to its water service regulations and a Water Shortage Contingency Plan with Ordinance No. 69 on February 6, 1992 which amended portions of the Water Conservation Plan. On August 6, 2015, the Board of Directors amended Resolution No. 387 through Ordinance Number 80, attached in Appendix G, which established water service regulations, schedules of rates, and charges. Article No. 24 describes Water Conservation objectives and outlines four stages of action to be implemented during a water shortage. WVWD's Plan includes voluntary and mandatory stages.

The purpose of Article 24 is to provide water conservation measures in order to minimize the effect of a water shortage on the citizens of, and the economic well-being of, the communities WVWD serves. This Article adopts provisions that will significantly reduce the wasteful and inefficient consumption of water, thereby extending the available water resources required for the domestic, sanitation, and fire protection needs of the citizens of the communities they serve while reducing the hardship on WVWD and the general public to the greatest extent possible.

11.7.8 Catastrophic Supply Interruption

Extended multi-week supply shortages due to natural disasters or accidents which damage all water sources are unlikely. WVWD's 25 storage reservoirs have a combined capacity of over 72 million gallons, which is sufficient water to meet the health and safety requirements of 50 gallons per day per capita for approximately 80,000 residents for 18 days. This assumes zero non-residential use. Under emergency power outages or a catastrophic earthquake conditions, the existing storage is expected to provide a supply of four days of average day demand or 2.5 days under maximum summer demand. WVWD also has interconnections with other agencies for emergency supplies.

WVWD has portable back-up generators that can be used in the event of an area-wide power outage. These generators can be located on both wells and booster stations to continue water production. These generators will be located in the northern part of the distribution system. Water can then be boosted to higher zones or gravity fed to the lower zones. In addition to the portable generators, WVWD will be installing back-up generators at the Zone 5 and 6 booster stations.

11.7.9 Minimum Supply Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the years 2016 to 2018, assuming years 2016 to 2018 repeat the driest three-year historic sequence for each water supply source. WVWD's estimated minimum supplies are shown in Table 11-18. These supplies are based on the anticipated reliability of imported SWP water from Valley District, local surface water, and local groundwater.

Table 11-18. DWR Table 8-4R. Minimum Supply Next Three Years (AF)

Available Water Supply	2016	2017	2018
Available Water Supply	33,030	33,030	33,030

11.8 Supply and Demand Assessment

There has been a historical trend associated with drier years and an increase in water use among agencies. Conservation efforts have proven to be effective in decreasing water use in dry years, such as the past three years (2013-2015).

For this report, WVWD has estimated that demands could increase 10 percent during a single dry year. During a multiple dry year period, it is expected that conservation messaging and restrictions would lead to consumption dropping back down to normal year levels in the second dry year, and falling a further 10 percent in the third dry year.

The following tables summarize the anticipated supplies and demands for WVWD.

Table 11-19. DWR Table 7-2R. Normal Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	36,400	41,900	45,400	48,400	48,400
Demand Totals	20,799	22,256	23,802	25,492	27,312
Difference	15,601	19,644	21,598	22,908	21,088

Table 11-20. DWR Table 7-3R. Single Dry Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	33,030	38,530	42,030	45,030	45,030
Demand Totals	22,879	24,481	26,183	28,041	30,043
Difference	10,151	14,049	15,847	16,989	14,987

Table 11-21. DWR Table 7-4R. Multiple Dry Years Supply and Demand Comparison (AF)

Year	Totals	2020	2025	2030	2035	2040
First Year	Supply Totals	33,030	38,530	42,030	45,030	45,030
	Demand Totals	22,879	24,481	26,183	28,041	30,043
	Difference	10,151	14,049	15,847	16,989	14,987
Second Year	Supply Totals	33,030	38,530	42,030	45,030	45,030
	Demand Totals	20,799	22,256	23,802	25,492	27,312
	Difference	12,231	16,274	18,228	19,538	17,718
Third Year	Supply Totals	33,030	38,530	42,030	45,030	45,030
	Demand Totals	18,719	20,030	21,422	22,943	24,580
	Difference	14,311	18,500	20,608	22,087	20,450

12 Yucaipa Valley Water District

12.1 System Description

Yucaipa Valley Water District (YVWD) was formed as part of a reorganization, pursuant to the Reorganization Act of 1965, being Division I of Title 6 of the Government Code of the State of California. This reorganization consisted of the dissolution of the Calimesa Water Company and formation of Improvement District No. 1 of YVWD as successor-in-interest thereto, and the dissolution of Improvement District "A" of the San Bernardino Valley Municipal Water District and the formation of Improvement District "A" of YVWD as successor-in-interest thereto. On September 14, 1971, the Secretary of State of the State of California certified and declared the formation of the District.

YVWD operates under the County Water District Law, being Division 12 of the State of California Water Code. Although the immediate function of the District at the time was to provide water service, YVWD currently provides a variety of services to residential, commercial and industrial customers. These services include: potable water service, drinking water treatment, recycled water service, sewer collection, sewer treatment and salinity elimination.

YVWD is located in the upper portion of the Santa Ana Watershed approximately 40 miles west of Palm Springs, 70 miles east of Los Angeles, and 120 miles north of San Diego in a high elevation valley at the base of the San Bernardino Mountain Range. YVWD's primary service area ranges in elevation from a low elevation of 2,044 feet above sea level to a high elevation of 5,184 feet above sea level. The range in elevation of 3,140 feet within the District requires YVWD to provide water service from 18 separate pressure zones.

YVWD's current service area encompasses approximately 25,742 acres, or 40 square miles which include the City of Calimesa and the City of Yucaipa. Neighboring cities include the City of Redlands and the City of Beaumont. YVWD's sphere of influence expands the acreage to 43,525 acres, or 68 square miles.

The YVWD service area includes two mutual water companies the Western Heights Water Company and the South Mesa Water Company. The service area of the Western Heights Mutual Water Company is 4.53 square miles (2,902 acres) and the service area of the South Mesa Mutual Water Company is 4.00 square miles (2,561 acres). In the future, the population of Western Heights Mutual Water Company and South Mesa Water Company are expected to have limited growth as compared to the larger service area boundary of YVWD.

Figure 12-1 shows the YVWD service area and sphere of influence boundary.

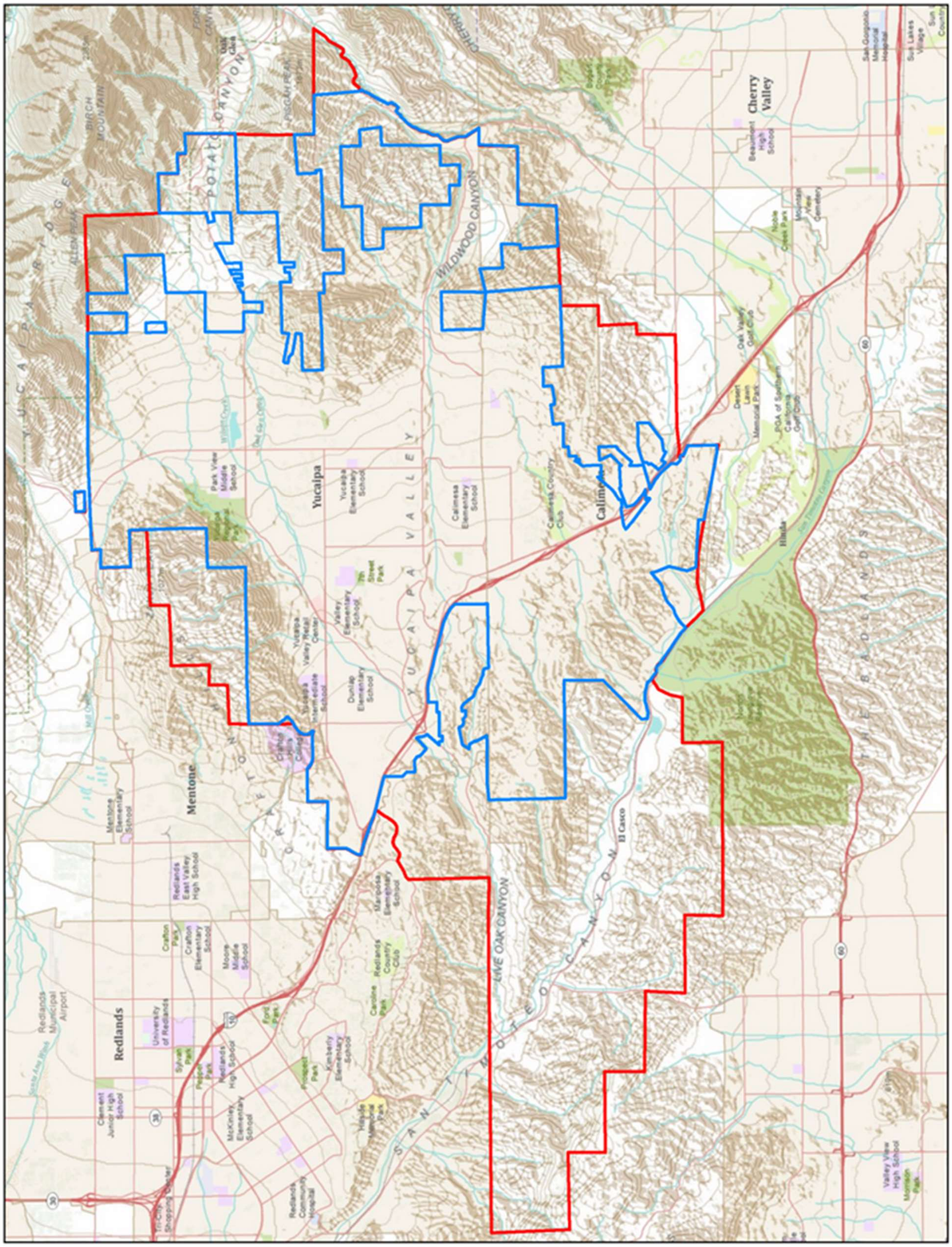

Figure 12-1 Yucaipa Valley Water District Service Area boundary (blue) and Sphere of Influence (red).

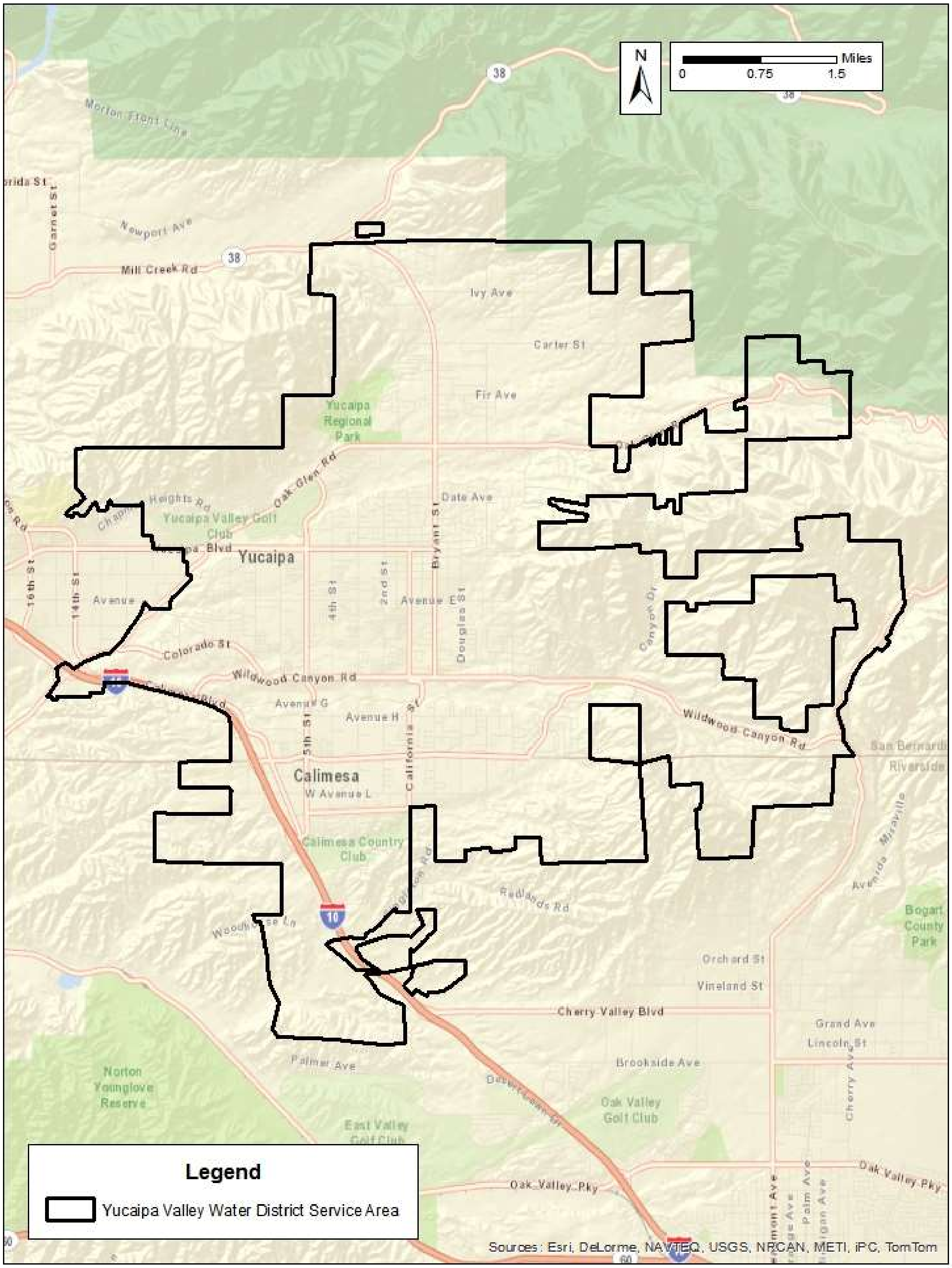

Figure 12-2. Yucaipa Valley Water District Service Area

To calculate the population of the YVWD service area, the YVWD service area boundary in Figure 7-1b was used with census data to provide population estimates for 1990, 2000, and 2010. Population for intermediate non-census years was estimated using an anticipated growth rates based on future development projections. The service area population for 2015 was estimated using the number of water connections in 2010 and 2015. The estimated population of Western Heights Mutual Water Company and South Mesa Mutual Water Company are not included in these calculations.

The estimated service area populations are shown in Table 12-1 for the existing service area of YVWD.

Table 12-1 DWR Table 3-1R. Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040	2045
Population Served	44,745	47,809	51,676	55,976	60,558	65,410	69,207

12.2 Service Area Climate

YVWD is located in the upper portion of the Santa Ana Watershed within the South Coast Hydrologic Region. Temperatures range from an average high of 78° and an average low of 49°. The record high for the area is 117° and the record low is 17°.

The annual average rainfall for the area is about 15.80 inches per year. The climate is characterized by hot dry summers when temperatures can rise above 100º, and moderate winters, with rare freezing temperatures. A major portion of the precipitation occurs between December and March. Snow in the upper reaches of the area is possible, but is not considered an important contributing factor to runoff.

Average temperature, precipitation, and evapotranspiration by month are shown in Table 7-2. Evapotranspiration (ET) is the loss water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity. ET from a standardized grass surface is commonly denoted as ETo. These data are based on 30 years of record (1986-2015) at Station 044 (University of California Riverside) within the California Irrigation Management Information System (CIMIS).

Table 12-2. Historical Climate Data

Month	Average Minimum Temperature (°F)	Average Maximum Temperature (°F)	Average Precipitation (in.)	Average Standard ETo (in.)
January	39.3	64.7	2.67	3.32
February	41.3	66.1	2.65	2.41
March	43.6	69.1	2.31	4.62
April	46.8	73.7	1.18	5.58
May	51.1	78.5	0.48	6.32
June	55.2	86.7	0.11	5.37
July	60.3	94.5	0.06	7.60
August	60.6	94.2	0.15	6.68
September	57.5	90.0	0.29	5.89
October	51.2	81.0	0.70	4.40
November	44.0	72.6	1.14	3.18
December	39.6	65.9	1.79	2.08
Annual	49.2	78.1	13.53	57.45
Notes: Precipitation and temperature for NOAA weather station 0407723 in San Bernardino; data from 1893 through 2004; http://wrcc.dri.edu; ETo data for CIMIS weather station 44 at University of California, Riverside; http://wwwcimis.water.ca.gov/				

12.3 System Water Use

12.3.1 Water Uses by Sector

YVWD has experienced significant growth in the last 20 year as with many areas in San Bernardino and Riverside County. Within the last 8 years Yucaipa and Calimesa's growth has slowed due to overall economic conditions across the United States.

YVWD categorizes its water customers based on the following categories (the percentages represent the proportionality of service connections as of March 31, 2016):

- Single Family Residential - 91.84%
- Multi-Family Residential - 4.00%
- Commercial - 1.79 %
- Irrigation Potable - 0.88%
- Institutional - 0.56%

- Irrigation - Recycled Water - 0.55%
- Construction Water - 0.17%
- Fire Service - 0.13%
- Industrial - 0.07%

YVWD anticipates a fairly consistent distribution of customer its customer base in the future. Actual water deliveries from 2011 through 2015 are provided in Table 7-3.

Sources of nonrevenue water include:

- Customer Meter Inaccuracies - Customer meters represent one of the main sources of nonrevenue water as they tend to under-represent actual consumption in the water system. YVWD has a replacement program to replace malfunctioning meters and a systematic program to replace and upgrade water meters on a 10-year basis.
- Storage Reservoir overflows - This represents unrecorded water use when reservoirs overflow.
- Leaks from water lines - Leakage from water pipes is a common occurrence in water systems. A significant number of leaks remain undetected over long periods of time as they are very small; however, these small leaks contribute to the overall nonrevenue water.

The historic and estimated future demands are shown in Table 12-3 and Table 12-4 in acre feet (af).

Table 12-3. DWR Table 4-1R. Demands for Raw and Potable Water – Actual (AF)

Use Type	Level of Treatment When Delivered	2011	2012	2013	2014	2015
Single Family	Drinking Water	7,536.36	8,184.36	8,039.54	8,235.27	6548.60
Multi-Family	Drinking Water	1,223.41	1,242.32	1,240.91	1,201.16	1050.34
Commercial	Drinking Water	315.42	332.81	338.18	332.82	298.00
Construction Water	Drinking Water	26.63	18.02	19.25	61.48	30.03
Fire Service	Drinking Water	0.05	0.10	0.00	0.18	0.31
Industrial	Drinking Water	82.11	91.02	46.76	88.40	50.05
Institutional	Drinking Water	178.39	211.78	201.36	216.61	149.61
Landscape Irrigation	Drinking Water	615.33	697.03	618.58	633.94	456.88
Nonrevenue	Drinking Water	1,541.05	1,021.04	1360.80	1109.06	1010.97
	Total	**11,518.75**	**11,801.48**	**11,865.38**	**11,878.91**	**9,594.78**

Table 12-4. DWR Table 4-2R. Demands for Raw and Potable Water – Projected (AF)

Use Type	Level of Treatment	2020	2025	2030	2035	2040
Single Family	Drinking Water	7,510	7,737	7,986	8,248	8,522
Multi-Family	Drinking Water	1,161	1,196	1,234	1,275	1,317
Commercial	Drinking Water	315	325	335	346	358
Construction Water	Drinking Water	30	31	32	33	34
Industrial	Drinking Water	70	72	74	77	79
Institutional	Drinking Water	187	192	198	205	212
Landscape Irrigation	Drinking Water	589	607	626	647	668
Sales/Transfers/Exchanges to other agencies	Drinking Water	200	200	200	200	200
Nonrevenue	Drinking Water	1,178	1,214	1,253	1,294	1,337
		11,240	**11,574**	**11,938**	**12,325**	**12,727**

YVWD total demands including expected recycled water use are shown in Table 12-5. Recycled water is discussed further in Section 12.6.

Table 12-5. DWR Table 4-3R. Total Water Demands (AF)

Demand	2015	2020	2025	2030	2035	2040
Potable and Raw Water	9,595	11,240	11,574	11,938	12,325	12,727
Recycled Water Demand	1,213	1,651	2,177	2,792	3,490	4,282
Total Water Demand	10,808	12,891	13,751	14,730	15,815	17,009

12.3.2 Distribution System Water Losses

YVWD has an active water loss control program and has performed a water loss audit using the AWWA Manual 36 for calendar year 2014. The audit results are summarized in Table 12-6.

Table 12-6. DWR Table 4-4R. Water Loss Summary Most Recent 12 Month Period Available

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss
01/2014	1,965.567 AF

Based on the results of the 2014 Distribution System Water Loss report, the YVWD has implemented a refinement of this program to involve additional staff members to participate in the compilation of the report so there is a better understanding of water losses in an effort to improve the efficiency and effectiveness of the operations.

The AWWA water audit methodology will be performed annually in preparation of the 2020 UWMP document that requires reporting information for 2016, 2017, 2018, 2019, and 2020.

12.3.3 Estimating Future Water Savings

YVWD is committed to long-range planning to provide a reliable, cost-effective, and diversified water supply to its customers. YVWD actively monitors water consumption in its service area as part of their active planning and management strategies. Portions of the information collected by YVWD are included in the monthly reports sent to the State Water Resources Control Board.

For this report, YVWD has projected that future demands will increase at different growth rates applied to each decade together with the following factors:

- The percentage growth in service area population based on projections for each decade to 2070;
- The variations associated with imported water availability for the San Bernardino Valley Municipal Water District (for potable water service to the City of Yucaipa) and the San Gorgonio Pass Water Agency (for potable water service to the City of Calimesa);
- Anticipated reductions to the current per-capita consumption for the reporting period;
- Active construction of recycled water infrastructure for dual-plumed residential developments; and
- Projections for each type of customer classification served by YVWD.

In the 2015 UWMP, water suppliers have the option of preparing more detailed demand forecasts by estimating demand factors based on land use categories. For example, YVWD could identify typical water use per single family customer and per commercial account. These customer classes can be further sub-divided by lot size, neighborhood, or other variables. The intent is to quantify the estimated water use per customer in different customer classes, and then to forecast how future changes will impact water use within each customer class.

For this document, YVWD has elected not to develop land use-based demand factors and apply future savings from codes and standards. Recent drought regulations have induced significant changes in water consumption patterns, and there is considerable uncertainty as to how demands will change in the future if the drought subsides. Given this uncertainty, YVWD has elected not to quantify passive savings for this UWMP.

12.3.4 Water Use for Lower Income Households

Senate Bill 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing 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.

The YVWD contains two jurisdictions, the City of Yucaipa and the City of Calimesa and two mutual water companies that also provide service to lower income households. YVWD reviewed the most recent General Plan for each of these entities to determine the percentage of households that are lower income (less than 80 percent of the median household income). YVWD estimated a weighted average of 15 percent of households in the service area are lower income. In the absence of more detailed information, YVWD estimated that this percentage applies to its single-family residential and multi-family residential water use across the service area. The estimated water use for lower-income households is shown in Table 12-7. These demands are included in the projections presented throughout this report.

Table 12-7. Estimated Demands for Lower-Income Households (AF)

Demand	2015	2020	2025	2030	2035	2040
Single Family Residential	982	1,127	1,161	1,198	1,237	1,278
Multi-Family Residential	158	174	179	185	191	198
Total	1,140	1,301	1,340	1,383	1,428	1,476

YVWD will not deny or put unreasonable conditions for water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households unless one of the following occurs:

- YVWD specifically finds that it does not have sufficient water supply
- YVWD is subject to a compliance order issued by the State that prohibits new water connections
- the applicant has failed to agree to reasonable terms and conditions relating to the provision of services

The conditions above apply to all applicants and developers.

12.4 SB X7-7 Baselines and Targets

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). YVWD had previously calculated baseline water use and water use targets in the 2010 RUWMP using 2010 census data in the calculation of service area populations.

DWR has prepared standardized tables to record and document the calculations required for this section. The standardized tables for YVWD’s calculations are included in Appendix O.

12.4.1 Baseline Water Use

Years 2000 to 2009 have been selected for calculation of the 10-year base period, while years 2005 to 2009 have been selected for calculation of the 5-year base period.

YVWD's service area population was calculated using census data for the determination of the service area population for 1990, 2000, and 2010. Populations for intermediate years were calculated based on the number of residential water accounts between census years.

The calculation of gross water use begins with the total amount of water that was put into the potable water distribution system by YVWD. Water that was exported to another agency was then subtracted, to leave the amount used by YVWD retail customers.

For the period from 2000 through 2009, the 10-year average Base Daily Per Capita Water Use for YVWD is 291 GPCD; the 5-year is 307 GPCD.

12.4.2 2015 and 2020 Targets

The Water Conservation Bill of 2009 (SBX7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Bill of 2009 provides the regulatory framework to support the statewide reduction in urban per capita water use described in the 20 by 2020 Water Conservation Plan. Consistent with SBX7-7, each water supplier must determine and report its existing baseline water consumption and establish future water use targets in gallons per capita per day (GPCD); reporting is to begin with the 2010 UWMP.

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). There are four methods for calculating the Compliance Water Use Target:

1. Eighty percent of the urban water supplier's baseline per capita daily water use

2. Per capita daily water use estimated using the sum of the following:

   a) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of DWR's 2016 report to the Legislature reviewing progress toward achieving the statewide 20 percent reduction target, this standard may be adjusted by the Legislature by statute.

   b) For landscape irrigated through dedicated or residential meters or connections, water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in section 490 et seq. of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992.

   c) For commercial, industrial, and institutional (CII) uses, a ten percent reduction in water use from the baseline CII water use by 2020.

3. Ninety-five percent of the applicable state hydrologic region target as stated in the state's April 30, 2009, draft 20 by 2020 Water Conservation Plan. YVWD falls within the South Coast Hydrologic Region; the region target is 142 GPCD. The South Coast region encompasses several coastal counties (Ventura, Los Angeles, Orange, and San Diego) and also includes portions of inland areas such as San Bernardino and Riverside. This target is more appropriate for coastal, rather than inland, areas.

4. Reduce the 10 or 15-year Base Daily Per Capita Water Use a specific amount for different water sectors:

a) Indoor residential water use to be reduced by 15 GPCD or an amount determined by use of DWR's "BMP Calculator".

b) A 20 percent savings on all unmetered uses.

c) A 10 percent savings on baseline CII use.

d) A 21.6 percent savings on current landscape and water loss uses.

The Interim Water Use Target is set as a halfway point between the Base Daily Water Use GPCD and the 2020 Compliance Water Use Target GPCD.

In addition to calculating base gross water use, SBX7-7 requires that a retail water supplier identify its demand reduction targets. YVWD is chose to meet SBX7-7 targets as an individual agency rather than as part of a regional alliance. YVWD also selected Method 1 to calculate its 2020 Compliance Water Use Target and Interim Water Use Target.

Compliance Water Use Target under Method 1 is eighty percent of the water supplier's baseline per capita water use. The resulting Compliance Water Use Target is 233 GPCD, the interim Water Use Target is 262 GPCD.

Table 12-8. DWR Table 5-1R. Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD	2015 Interim Target	Confirmed 2020 Target
10-year	2000	2009	291.38	262	233
5-year	2005	2009	306.82	- -	- -

12.5 Demand Management Measures

Demand Management Measures are mechanisms implemented by Yucaipa Valley Water District to increase water conservation. The District is a signatory to the California Urban Water Conservation Council's Memorandum of Understanding which was developed to expedite implementation of reasonable water conservation measures in urban areas and to establish assumption for use in calculating estimates of reliable future water conservation savings. The Department of Water Resources Demand Management Measures coincide with the Best Management Practices developed by the California Urban Water Conservation Council (CUWCC). The 2013 and 2014 Coverage Reports required by CUWCC have been completed to comply with CWC 10631(i). See Appendix N. The status of the two 'Not on Track' BMP's are described below.

2013 – 2014 Best Management Practice	Status
BMP 1.1 Operation Practices	On Track
BMP 1.2 Water Loss Control	Not on Track
BMP 1.3 Metering with Commodity Rates	On Track
BMP 1.4 Retail Conservation Pricing	On Track (2013) Not on Track (2014)
BMP 2.1 Public Outreach	On Track
BMP 2.2 School Education Programs	On Track
BMP 3.1 Residential	On Track / GPCD Compliance
BMP 4.1 CII	On Track / GPCD Compliance
BMP 5.1 Landscape	On Track / GPCD Compliance

BMP 1.2 Water Loss Control

In order to comply with BMP 1.2 – System Water Audits, YVWD recognizes that completing the standard water audit and balance using the American Water Works Association (AWWA) Water Loss software and completing the Component Analysis. This is to determine the current volume of apparent and real water loss and the cost impact of these losses on utility operations. The AWWA Water Audit has been completed but the Component Analysis was not completed by the most recent BMP Reporting cycle. Since then, the training in Component Analysis and process has been complete and will be On Track for the next BMP reporting cycle.

BMP 1.4 Retail Conservation Pricing

The Retail Water Service Rate BMP was developed to establish a strong nexus between volume-related system costs and volumetric commodity rates, allowing conservation pricing to reward water efficient customers. The District practices conservation pricing for its water service with a commodity rate structure that includes five tiers.

The District is currently implementing conservation pricing. With the incentive to conserve structured in the water rate, it is deemed unnecessary to attempt to construct a commodity rate structure for sewer service. Additionally the accuracy of such rate structures, which rely on a formula based on water consumption, are questionable as they generally assess charges based upon winter season demands, which vary demanding on hydrology of a given year and landscaping demands YVWD UWMP, 2005).

YUCAIPA VALLEY WATER DISTRICT
CONSERVATION PRICING

Units	Cost/Unit
1-15	$1.429
16-60	$1.919
61-100	$2.099
101 & over	$2.429
30+ multiple units x 0.800 factor	
Non-Potable Water - Commodity Charge	
1000 gallons	$1.235

Note:
Potable Water Commodity Charge – Step Rate Table-per 1000 gallon units

12.6 System Supplies

YVWD relies on four primary water resources to meet annual water demands: groundwater resources, local surface water resources; imported water resources; and recycled water resources. YVWD's water supply consists primarily of groundwater from 25 wells located throughout the YVWD service area. These wells provide about 50 percent of the total drinking water supply. In addition to groundwater, The Oak Glen Surface Water Treatment Plant provides about 3 percent of the total drinking water supply and the Yucaipa Valley Regional Water Filtration Facility provides the remaining 47 percent of the total drinking water supply.

12.6.1 Purchased or Imported Water

YVWD purchases imported water from two State Water Project contractors, the San Bernardino Valley Municipal Water District (SBVMWD) for the San Bernardino County portion of the service area, and the San Gorgonio Pass Water Agency (SGPWA), for the Riverside County portion of the service area.

The two State Water Contractors convey imported water from the Sacramento San Joaquin Delta which is utilized as a supplemental potable water source to the local supply and is treated at the Yucaipa Valley Regional Filtration Facility. The imported water is also used for groundwater recharge.

12.6.1.1 San Bernardino Valley Municipal Water District (Valley District)

The San Bernardino Valley Municipal Water District has an entitlement to 102,600 AFY of SWP water that is used for both direct deliveries to treatment plants and artificial recharge of the Yucaipa groundwater basins.

The following table and chart reflects the anticipated imported water demands from Valley District.

SBVMWD WHOLESALE SUPPLIES – EXISTING AND PLANNED SOURCES OF WATER (AF)

Imported Water Demands	2015	2020	2025	2030	2035	2040
Drinking Water Demands: Yucaipa Valley Water Filtration Facility	6,000	6,195	6,366	6,537	6,693	6,843
Conjunctive Use Demands: Local Water Banking	900	1,500	1,500	1,500	1,500	1,500
New Development Long-Term Supply Sustainability Program	1,200	2,892	3,002	2,701	2,789	1,995
Purchase from Valley District	***8,100***	***10,587***	***10,868***	***10,738***	***10,982***	***10,338***

12.6.1.2 San Gorgonio Pass Water Agency

The San Gorgonio Pass Water Agency has an entitlement to 17,300 AFY of SWP water that is used for both direct deliveries to treatment plants and artificial recharge of the groundwater basins. The San Gorgonio Pass Water Agency needs to secure an additional 22,000 AFY of supplemental water to meet the ultimate demand of 94,000 AFY by year 2045 (SGPWA Supplemental Water Supply Planning Study, October 2009).

The following table and chart reflects the anticipated imported water demands from the San Gorgonio Pass Water Agency.

SGPWA WHOLESALE SUPPLIES – EXISTING AND PLANNED SOURCES OF WATER (AF)

Imported Water Demands	2015	2020	2025	2030	2035	2040
Drinking Water Demands: Yucaipa Valley Water Filtration Facility	500	609	767	962	1,191	1,444
Conjunctive Use Demands: Local Water Banking	0	1,200	1,200	1,200	1,200	1,200
New Development Long-Term Supply Sustainability Program	1,200	2,504	3,040	3,596	4,344	3,407
Total	**1,700**	**4,313**	**5,007**	**5,758**	**6,735**	**6,051**

In 2000, imported water resources were not utilized to meet the water demands of the Yucaipa Valley Water District. By 2010, this resource supplied 28.2% of total water demands.

WHOLESALE SUPPLIES – EXISTING AND PLANNED SOURCES OF WATER IN A NORMAL YEAR (AF)

Wholesale source	2015	2020	2025	2030	2035	2040
Purchase from SBVMWD	8,100	10,587	10,868	10,738	10,982	10,338
Purchase from SGPWA	1,700	4,313	5,007	5,758	6,735	6,051

WHOLESALE SUPPLIES – SINGLE DRY AND MULTIPLE DRY YEARS (AF)

Wholesale source	2015	2020	2025	2030	2035	2040
Single-Dry Year	5,525	5,780	6,060	6,370	6,700	7,040
Multiple-Dry Year	5,850	6,120	6,410	6,740	7,095	7,455

The numbers presented above are very conservative. During a shortage, it is anticipated that direct deliveries are the first priority for any SWP water coupled with immediate reductions in drinking water use. With the aggressive use of recycled water for new homes, the critical nature of the direct deliveries will become more evident in the future since YVWD will only be using imported water for drinking water at new homes and not for irrigation of front and rear yards. To further bolster the imported water supplies, YVWD will continue to recharge groundwater basins and can use groundwater sources to back up imported water deliveries during a single-dry and multiple-dry years.

12.6.2 Groundwater

YVWD has traditionally met the bulk of service area customer needs from groundwater through the use of groundwater extraction wells. In 2010, over 75% of the groundwater used by the YVWD was extracted from the Wilson Creek Basin and the Calimesa Basin. The remaining groundwater production was from the Beaumont Basin, Chicken Hill Basin, Triple Falls Creek Basin, Oak Glen Basin and the Wildwood Basin.

Since about 1970 and especially during the 1990's, the wide-spread urbanization of southern California has extended into the Yucaipa area. Undeveloped land, agricultural land, and sparsely populated residential land has been converted into tracts of single family homes. The net effect of this change in land use has been an increase in the demand for water.

Since the local supply of surface water and groundwater is limited in this semiarid region, water purveyors in the Yucaipa Valley have explored several alternatives related to the development of water resources in the area. Most studies have identified groundwater resources at 200-300 feet below the surface elevation with a general basin-wide movement of both surface water and groundwater from the surrounding hills and mountains, to the south and west. After a brief study of the area, it becomes apparent to most observers that on a localized scale, the movement of groundwater through the numerous faults is very complex.

The groundwater extractions by appropriators in the sphere of influence of the Yucaipa Valley Water District have decreased over the past five years. This is mainly attributed to the increased use of recycled water and imported water in the region. Overall, the three appropriators in the Yucaipa Valley are progressing towards a balanced safe yield of groundwater extractions at about 9,000 acre feet per year.

As discussed above, the overall water demand in the region has increased, but the amount of groundwater used to meet the demands has decreased. Technically, most of the groundwater basins in the Yucaipa Valley area considered in an overdraft situation, but significant efforts have been made by the YVWD to increase the amount of water in storage in the central part of the Yucaipa Valley.

Groundwater projection in the Yucaipa Valley generally is associated with three primary groundwater basins, the Yucaipa, San Timoteo and Beaumont Basins. The Yucaipa Basin is divided into a series of eight subbasins separated by faults and other physical barriers:

- Calimesa Basin
- Chicken Hill Basin
- Gateway Basin
- Oak Glen Basin
- Triple Falls Basin
- Western Heights Basin
- Wilson Basin
- Wildwood Basin

Other local groundwater basins operated and managed by the Yucaipa Valley Water District include: the San Timoteo Groundwater Basin; the Beaumont Groundwater Basin and the Singleton Groundwater Basin. The Department of Water Resources recognizes the Beaumont and San Timoteo Basin as one basin, the San Timoteo Subbasin.

YUCAIPA VALLEY WATER DISTRICT GROUNDWATER BASINS

Groundwater Basin	Acres	Square Miles
Beaumont	17,035.48	26.62
Calimesa	6,627.40	10.36
Chicken Hill	1,043.65	1.63
Edgar Canyon	5,187.77	8.11
Gateway	570.05	0.89
Oak Glen	5,193.71	8.12
Sand Canyon	3,849.26	6.01
San Timoteo	31,131.42	48.64
Singleton	2,033.47	3.18
Triple Falls	1,632.30	2.55
Western Heights	2,601.53	4.06
Wildwood	4,980.71	7.78
Wilson	1,846.08	2.88

SUMMARY OF GROUNDWATER BASIN HYDROGEOLOGIC CHARACTERISTICS

Parameter	Yucaipa Basin	Beaumont Basin	San Timoteo Basin
Basin Area	41 square miles[(b)]	26 square miles[(a),(c)]	49 square miles
Groundwater formations	Alluvium[(a),(d)]	Alluvium[(a),(d)]	Alluvium[(a),(d)]
Depth of water bearing sediments	700 - 1000 feet[(a),(e)]	700 - 1,000 feet[(a),(e)]	700 - 1,000 feet[(a),(e)]
Typical Specific Yields	4 - 22% [(a),(f)] (10% average)	3 - 35 %[(a)] (11% average)	3 - 35%[(a)] (11% AVERAGE)
Groundwater Storage Capacity	800,000 af[(a),(g)]	1,000,000 AF[(a), (h)]	1,000,000 AF[(a), (h)]
Estimated Long-term Natural Recharge	8,000 AFY[(a), (i)]	8,560 AFY[(a), (j)]	> 20,000 AFY[(a), (k)]
Current Approximate Extractions	14,000 AFY[(a)]	16,000 AFY[(a), (l)]	Not Available[(m)]
Dominant Recharge Source	Stream flow infiltration[(a), (n)]	Stream flow infiltration and artificial Recharge[(a)]	Stream flow infiltration, subsurface inflow, and deep percolation[(a)]
Artificial Recharge Potential	7000-14,000 AF[(a)]	200,000 AF[(a), (o)]	Not Available[(m)]
Typical Well Yields	200 gpm (average)[(a)]	200 gpm (average)[(a)]	Not Available[(m)]
Maximum Well Yields	2,800 gpm[(a)]	2,000 gpm[(a), (p)]	Not Available[(m)]
Typical Municipal Well Depths	500 feet[(a)]	500 feet[(a)]	500 feet[(a)]
Typical Range of TDS concentration	200 - 630 mg/l[(a)]	170 - 340 mg/l[(a)]	Not Available[(m)]
Average Groundwater TDS	320 mg/l[(a)]	250 mg/l[(a)]	Not Available[(m)]

Notes:

(a) From DWR Bulletin No. 118 (*California's Groundwater*, 2004).

(b) Water bearing sediments cover approximately 29 square miles (19,000 acres) within the Yucaipa Basin. The total watershed area of the basin is approximately 39 square miles (25,000 acres).

(c) Water bearing sediments cover approximately 26 square miles (16,000 acres) within the Beaumont Basin. The total combined watershed area of the Beaumont and San Timoteo Basins is approximately 114 square miles (73,000 acres).

(d) Includes recent alluvium from Holocene age, older Pleistocene age alluvium, and alluvial deposits within the eroded and folded Pliocene-Pleistocene age sediments of the San Timoteo Formation.

(e) San Timoteo Formation depths extend 1500 to 2000 ft, but water-bearing sediments limited to depths of 700 to 1000 ft.

(f) Lowest specific yields are reported northeast of Yucaipa. In the southern part of the basin, specific yields are estimated to range from 6 to 22 percent, with an average of 10 percent.

(g) Storage capacity estimates reported by DWR Bulletin No. 118 range from approximately 800,000 AF to 1.2 million AF.

(h) Total combined storage capacity of the Beaumont and San Timoteo Basins is estimated at 2,000,000 by DWR. Approximately one-half of this capacity is in the Beaumont Basin and one half is in the San Timoteo Basin.

(i) Approximate long-term yield presented in DWR Bulletin No. 118 on the basis of studies performed in 1980. A 1988 study performed for YVWD entitled Perennial Yield of the Yucaipa Groundwater Basin (David Keith Todd Consulting Engineers, 1988) estimated a long-term yield of approximately 7,900 AFY.

(j) Long-term yield estimated at 8,650 AFY, as reported in the FY2005-2006 annual Beaumont Basin Watermaster Report.

(k) Estimate not available. Recharge estimates for the combined San Timoteo/Beaumont Basins provided within DWR Bulletin No. 118 suggest that the total long-term recharge to the San Timoteo Basin is in excess of 20,000 AFY.

(l) Annual production has ranged from 14,100 AFY to 19,300 AFY during the period FY2003-04 and FY2006-07, as reported in the FY 2006-07 Beaumont Basin Watermaster report.

(m) Estimated value not available for the San Timoteo Basin.

(n) Infiltration from Yucaipa, Wilson, and Oak Glen Creeks, predominantly in the north and eastern portions of the basin.

(o) Estimated by Beaumont Basin Watermaster in annual report for FY2006-07.

(p) Based on pumping data presented in the Beaumont Basin Watermaster FY 2006-2007 Annual Report, adjusted by an assumed 70 percent operational factor.

YVWD's historical production for the past five years is shown in Table 12-9.

Table 12-9. DWR Table 6-1R. Groundwater Volume Pumped (AF)

Groundwater Type	Location or Basin Name	Water Quality	2010	2011	2012	2013	2014	2015
Alluvial Basin	Yucaipa Groundwater Basin	Drinking Water	6,627	5,733	6,125	6,212	7,828	4,785
Alluvial Basin	Beaumont Groundwater Basin	Drinking Water	672	534	700	1,031	1,198	119
Alluvial Basin	San Timoteo Groundwater Basin	Drinking Water	0	0	0	0	0	0
		Total	**7,299**	**6,267**	**6,825**	**7,243**	**9,027**	**4,904**
		Percentage of Drinking Water Supply	66%	54%	57%	60%	75%	50%

12.6.2.1 Yucaipa Groundwater Basin

The Yucaipa Groundwater Basin is located in the Santa Ana Subregion of the South Coast Hydrologic Region within the County of San Bernardino. The Yucaipa Basin has a surface area of 25,300 acres (DWR Bulletin 118) and a capacity of 800,000 AF (Groundwater Water Recharge/Recovery Project, 2009). The Basin is bounded on the north by the San Andreas fault, on the west by the Redlands fault and the Crafton Hills, on the south by the Banning fault, and on the east by the Yucaipa Hills.

Alluvial deposits in the subbasin are divided into older and younger units. The Holocene age younger alluvium consists of unconsolidated boulders, gravel, sand, silt, and clay (Moreland 1970). This unit forms a thin veneer and is mostly above the water table (Moreland 1970). The middle to late Pleistocene age older alluvium consists of boulders, gravel, sand, silt, and clay (Moreland 1970), and holds the primary source of groundwater in the subbasin. Clays present in this section are due to weathering and soil formation during accumulation of the deposits (DPW 1934).

The 2003 California Department of Water Resources Bulletin 118-2003 identifies the Basin in overdraft. Although the basin is defined in an overdraft state; water levels are at or near historic highs (California's Groundwater Bulletin 118, 2004). Moreover, the Yucaipa Valley Water District has decreased groundwater pumping dramatically since 2007 attributable to the supplemental supply of State Water Project Water and the use of recycled water. Prior to importing State Water Project water, YVWD pumped 3,585 million gallons per year (YVWD 2005 Production Report). Incorporating supplemental water has reduced pumping by 50% (YVWD 2010 Production Report).

The Yucaipa Groundwater Basin is subdivided into several subbasins including the: Calimesa, Chicken Hill, Gateway, Oak Glen, Singleton, Triple Falls Creek, Western Heights, Wildwood and Wilson Subbasin.

- Calimesa Subbasin - The Calimesa subbasin along with the Wilson Creek subbasin are the two largest subbasins within the Yucaipa Groundwater Basin. Total capacity of the Calimesa subbasin is estimated at 175,000 acre-feet (Groundwater Water Recharge/Recovery Project, 2009). The safe yield of the basin is small compared to this storage capacity, and is estimated at 1,500 million gallons per year, or 4,600 Acre feet per year (Wildermuth, 2005). Groundwater is typically reached within 225-350 feet below the land surface (Wildermuth, 2005).

- Chicken Hill Subbasin - The Chicken Hill subbasin is located in the northwest portion of the Yucaipa Basin. The subbasin has a total of five wells with two of those wells being active as of December 2010.
- Gateway Subbasin - The Gateway subbasin is located in the northern portion of the Yucaipa Basin. Currently there are no active wells in use as of December 2010. The Gateway subbasin contains three abandoned wells and one monitoring well.
- Oak Glen Subbasin - The Oak Glen Subbasin is located in the Northeastern portion of the Yucaipa Basin while extending south between the Wilson and Wildwood Subbasins as it straddles the mountain range to the east. The subbasin represents one of the largest subbasins within the Yucaipa Basin. Five active wells, four monitoring wells and one inactive well are located within this subbasin.
- Singleton Subbasin - The Singleton Subbasin is located in the Southern most portion of the Yucaipa Valley Water District's service area within the City of Calimesa in Riverside County. The subbasin containing one monitoring well
- Triple Falls Creek Subbasin - The Triple Falls Creek subbasin is the northernmost subbasin within Yucaipa Valley Water District's service area. This subbasin contains one active well, two abandoned wells and two inactive wells just outside of the subbasin boundary.
- Western Heights Subbasin - The Western Heights Subbasin is located in the western portion of the Yucaipa Basin and extends into the City of Redlands. The basin contains no wells utilized by the Yucaipa Valley Water District. Groundwater extraction from this basin is generally from the Western Heights Mutual Water Company.
- Wildwood Subbasin - The Wildwood Subbasin is located in the eastern portion of the Yucaipa Basin and possesses the largest amount of active wells utilized by YVWD totaling 11 active wells. Additional well status results in three inactive wells, four standby and two abandoned wells.
- Wilson Subbasin - The Wilson subbasin is one of the largest subbasins within the Yucaipa Basin. The Wilson Subbasin has a large storage capacity (estimated at 125,000 acre-feet by Carollo, 1985). The safe yield of the subbasin is small (estimated at 1,500 AFY (Wildermuth, 2005) compared to the large storage capacity. Existing depth to groundwater in the Wilson basin average roughly 175 to 425 feet below ground surface (Wildermuth, 2005).
- The additional spreading of water in the Wilson Creek spreading grounds and utilization of the Oak Glen Creek stream channel for recharge has contributed to

increased groundwater levels. By maximizing the existing spreading grounds the capability exists to spread from 7,000 to 14,000 acre-feet of surface water annually into the Yucaipa Basin.

With ample storage, ability to recharge the basin through in-lieu use of surface water and by direct spreading surface waters and apparent flexibility in managing groundwater levels without subsidence problems, the Yucaipa Basin could be conjunctively managed both to meet normal annual demands and to meet water resource needs in the event of a drought and curtailment or loss of inconsistent surface water supplies, resulting in a highly reliable water supply. Current goals are to secure agreements to not pump beyond the long-term safe yield of the basin by utilizing the imported surface water supplemental supply.

YVWD has initiated an annual groundwater monitoring program that calculates the change in storage of the seven primary subbasins in the Yucaipa Groundwater Basin. Figure 12-3 illustrates that the groundwater levels have increased in the Crafton Subbasin, Gateway Subbasin, and Wilson Creek Subbasin by 32,280 acre feet when comparing groundwater conditions of 2005 to groundwater conditions in 2015. During the same period of time, the change in storage of the Calimesa Subbasin, Oak Glen Subbasin, Triple Falls Creek Subbasin and the Western Heights Subbasin have decreased by 9,349 acre feet. Comparing the groundwater conditions of 2005 to 2015, the subbasins of the Yucaipa Groundwater Basin have improved with a net increase in groundwater in storage by 22,931 acre feet.

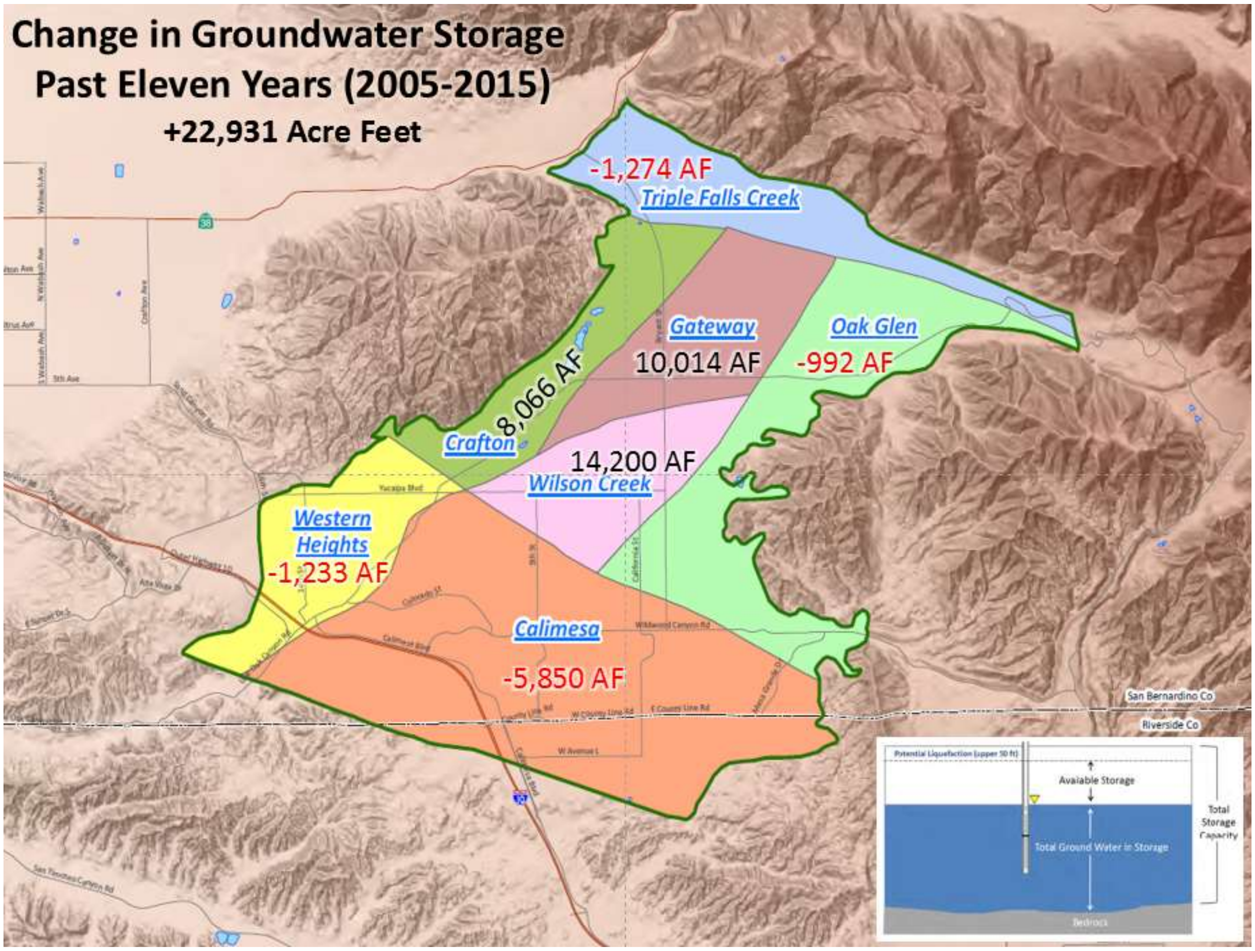

Figure 12-3 Yucaipa Groundwater Basin - Change in Groundwater Storage

YVWD has cooperated with the U.S. Geological Survey and the San Bernardino Valley Municipal Water District to construct real-time groundwater monitoring wells in the area. Groundwater level data indicates that the groundwater levels in the Wilson subbasin have increased in 2009 and 2010. This is attributed to the additional supplemental supply of State Water Project water (Groundwater Water Recharge/Recovery Project, 2009).

The Yucaipa Valley Water District is currently involved with development of a groundwater management plan (AB 3030 Plan) to proscribe collective management of the Yucaipa Groundwater Basin. With ample storage, ability to recharge the basin by spreading surface waters and apparent flexibility in managing groundwater levels without subsidence problems, the Yucaipa Basin could be conjunctively managed both to meet normal annual demands and to meet water resource needs in the event of a drought and curtailment or loss of inconsistent surface water supplies, resulting in a highly reliable water supply. Current goals are to secure agreements to not pump beyond the safe yield of the basin, supplementing supplies with imported surface.

12.6.2.2 San Timoteo Groundwater Basin

The San Timoteo Groundwater Basin is located downstream from the Yucaipa and Beaumont groundwater basins in northeastern Riverside County and Southeastern San Bernardino County. This groundwater basin covers approximately 29 square miles. Groundwater movement in the San Timoteo Groundwater Basin trends from the east to the west. Surface water in the area is drained by San Timoteo Creek.

As with the Yucaipa and Beaumont Basins, groundwater is found in alluvium and in the San Timoteo Formation to depths of 700 to 1000 feet. Estimates for total groundwater storage capacity within the basin vary. On the basis of information presented by DWR (2004), the total groundwater capacity in the basin appears to be approximately 1,000,000 AF.

On the basis of information presented in DWR Bulletin No. 118, it appears that long-term recharge to the San Timoteo Basin is significantly higher than recharge within either the Yucaipa or Beaumont Basins (estimated to be on the order of 20,000 AFY). No significant long-term decline in depths to groundwater is reported in the San Timoteo Basin.

The San Timoteo Basin is not adjudicated, and reliable estimates of total groundwater pumping within the San Timoteo basin are not available. Because water table elevations within the basin have not declined (and remain near the surface in some areas along San Timoteo Creek), it may be concluded that long-term pumping within the basin is less than the long-term average recharge.

12.6.2.3 Beaumont Groundwater Basin

The Beaumont Basin is located in northwestern Riverside County, south of the Yucaipa Basin. While this basin is located outside of San Bernardino Valley Municipal Water District's jurisdiction, the basin eventually drains to San Timoteo Creek, a tributary of the Santa Ana River and covers approximately 26 square miles. Groundwater elevations generally slope from the northeast to southwest in the basin.

Groundwater within the basin is predominantly found in Holocene age alluvium and in the San Timoteo Formation. While the San Timoteo Formation extends to depths in excess of 1500 feet, water bearing sediments within the Beaumont Basin exist to depths of 700 to 1000 feet. Estimates for total groundwater storage capacity within the basin vary. The Beaumont Basin storage capacity is estimated at approximately 1,000,000 AF. (Beaumont Basin Watermaster, 2007)

In February 2004 the San Timoteo Watershed Management Authority filed a judgment adjudicating the groundwater rights in the Beaumont Basin and assigned the Beaumont Basin Watermaster with the authority to manage the groundwater basin. The Beaumont Basin Watermaster is comprised of managers from the Beaumont Cherry Valley Water District, City of Banning, City of Beaumont, South Mesa Mutual Water Company and Yucaipa Valley Water District.

In February 2004 the San Timoteo Watershed Management Authority filed a judgment adjudicating the groundwater rights in the Beaumont Basin and assigned the Beaumont Basin Watermaster with the authority to manage the groundwater basin (Judgment Pursuant To Stipulation Adjudicating Groundwater Rights in the Beaumont Basin, 2004). The adjudication of the Beaumont Basin has defined overlying and appropriator pumping rights and also allows for supplemental water to be stored and recovered from the basin.

12.6.2.4 Groundwater Basin Management

The two basins that have not been adjudicated within the Yucaipa Valley Water District's service area are the Yucaipa Basin and San Timoteo Basin. Under present management conditions the basins are expected to have controlled overdraft conditions. Prior to 2007, the Yucaipa Basin was considered in overdraft due to over extractions by the Yucaipa Valley Water District, South Mesa Water Company and Western Heights Mutual Water Company. In 2005, the Yucaipa Valley Water District began treating State Water Project water through a newly constructed Yucaipa Valley Regional Filtration Facility. This has provided an opportunity to alleviate pumping from local supplies increasing groundwater levels to 70 feet in one well location in the Wilson subbasin (USGS Groundwater Monitoring Levels).

During the peak temperature months, demands exceeded groundwater supply. It is unlikely the District could meet 100 percent of the full summer water demands solely with groundwater. Utilizing data from 2007 which represented a single-dry year, the monthly production exceeded the well capacity for four months. In a more realistic scenario, the available production during maximum day pumping would be 85% of the total well capacity.

12.6.3 Surface Water

The watershed of the Yucaipa Valley extends from the crest of the Crafton Hills in the northwest, to the crest of the Yucaipa Ridge of the San Bernardino Mountains to the north east, and the Yucaipa Hills in the south east to the Badlands of San Timoteo Canyon to the south west. Drainage in the area is by many small ephemeral creeks including: Yucaipa Creek, Oak Glen Creek, Wilson Creek, Birch Creek, and San Timoteo Creek. These creeks all begin in the upland areas to the northeast and drain down to the southwest through Live Oak Canyon to San Timoteo Creek which is a tributary of the Santa Ana River.

Stream gauge data and observations by District staff reveal that the creeks are generally dry during most of the year except along their upland reaches where small sustained year-round flows may occur. Irregular flows do occur occasionally along the entire reach of the creeks during both high intensity summer cloudbursts and long duration seasonal winter storms. In both cases, the stream flows generated from these conditions tend to be very flashy, with water levels changing rapidly over time and large amounts of unconsolidated sediments being scoured from the upper reaches and washed downstream. The largest volume of these flow events occur during the winter storm season from November through April.

The main tributaries in the sphere of influence of the YVWD are considered relatively small by comparison to the Santa Ana River and Mill Creek directly to the north of YVWD. Drainage courses in the boundary of YVWD include Wilson Creek, Oak Glen Creek, Yucaipa Creek, and San Timoteo Wash.

YVWD has operated and maintained a surface water resources from the Oak Glen area since the early 1900's. The existing Oak Glen Surface Water Filtration Facility continues to produce a steady flow of high quality drinking water for the Yucaipa Valley.

In 2015, local surface water supplies provided 2-3% of the total water demands of YVWD.

LOCAL SURFACE WATER SUPPLIES - NORMAL, SINGLE-DRY, AND MULTIPLE DRY YEARS (AF)

	2020	2025	2030	2035	2040
Normal Year					
Oak Glen	*350*	*350*	*350*	*350*	*350*
Single Dry Year					
Oak Glen	*175*	*175*	*175*	*175*	*175*
Multiple-Dry Year					
Oak Glen	*175*	*175*	*175*	*175*	*175*

12.6.4 Stormwater

YVWD is participating in regional planning efforts to capture additional stormwater for purposes of groundwater recharge with the City of Yucaipa and the City of Calimesa. Water captured in these facilities will be part of the conjunctive use project used to provide a more robust, enhanced and sustainable water supply to existing customers of the YVWD.

12.6.5 Wastewater and Recycled Water

12.6.5.1 Recycled Water Coordination

YVWD is a proactive advocate of recycled water use and implementation in the Inland Empire. The Board of Directors have adopted planning guidelines that require the use of recycled water for front and rear yard irrigation of new development throughout the YVWD service area.

Recycled water is currently used to provide 10-15 percent of Yucaipa Valley Water District's overall water demands. A significant portion of YVWD's projected future water demands will be met with the use of recycled water for irrigation of golf courses, parks, landscape areas and front-/rear-yard irrigation of residential dwellings.

To serve the projected water demands, YVWD has implemented an extensive dual water distribution system. The dual water system includes a drinking water conveyance system to convey potable water to customers and a separate recycled water distribution system to convey recycled water to customers.

As water becomes an increasingly precious commodity, Yucaipa Valley Water District is stepping up its recycling efforts so that more water can be reused on golf courses, school grounds, roadside medians and for other landscaping purposes -- even the front and rear yards of new homes.

To achieve this objective, YVWD expanded and enhanced the sewer treatment plant, or water recycling facility, to a capacity of 8 million gallons per day. YVWD's water recycling facility is one of a relatively small number of sewer treatment facilities in the country to be equipped with microfiltration filters and ultraviolet light for disinfection. The treatment process used to transform our sewer water to recycled water is very similar to some drinking water treatment plants. This provides high quality recycled water that is also extremely safe.

The new microfiltration technology is important because it acts as pretreatment to a reverse osmosis system at the water recycling facility to further purify our recycled water. While the microfiltration system does not allow particles larger than 0.1 micrometer to pass through the filtration system and become part of the recycled water supply, the reverse osmosis system creates a physical barrier to stop salt molecules while allowing water molecules to pass through. The resulting water supply is very similar to the purity of rainwater.

This state-of-the-art technology commonly used by desalinization plants to convert ocean water to drinking water will soon be used by YVWD to meet strict water quality objectives set by the Regional Water Quality Control Board. With the requirement to produce such exceptionally high quality recycled water, YVWD has developed plans to use the recycled water for the direct benefit of the community.

With the completion of the reverse osmosis facility, YVWD has also extending a brineline to dispose of the salts removed by the treatment system. The Yucaipa Valley Brineline is a 15-mile pipeline that will connect to an existing brine disposal pipeline located in San Bernardino. The brine solution created by YVWD, which is about 1/10th as salty as sea water, will be conveyed to the Orange County Sanitation District to be added to their ocean outfall.

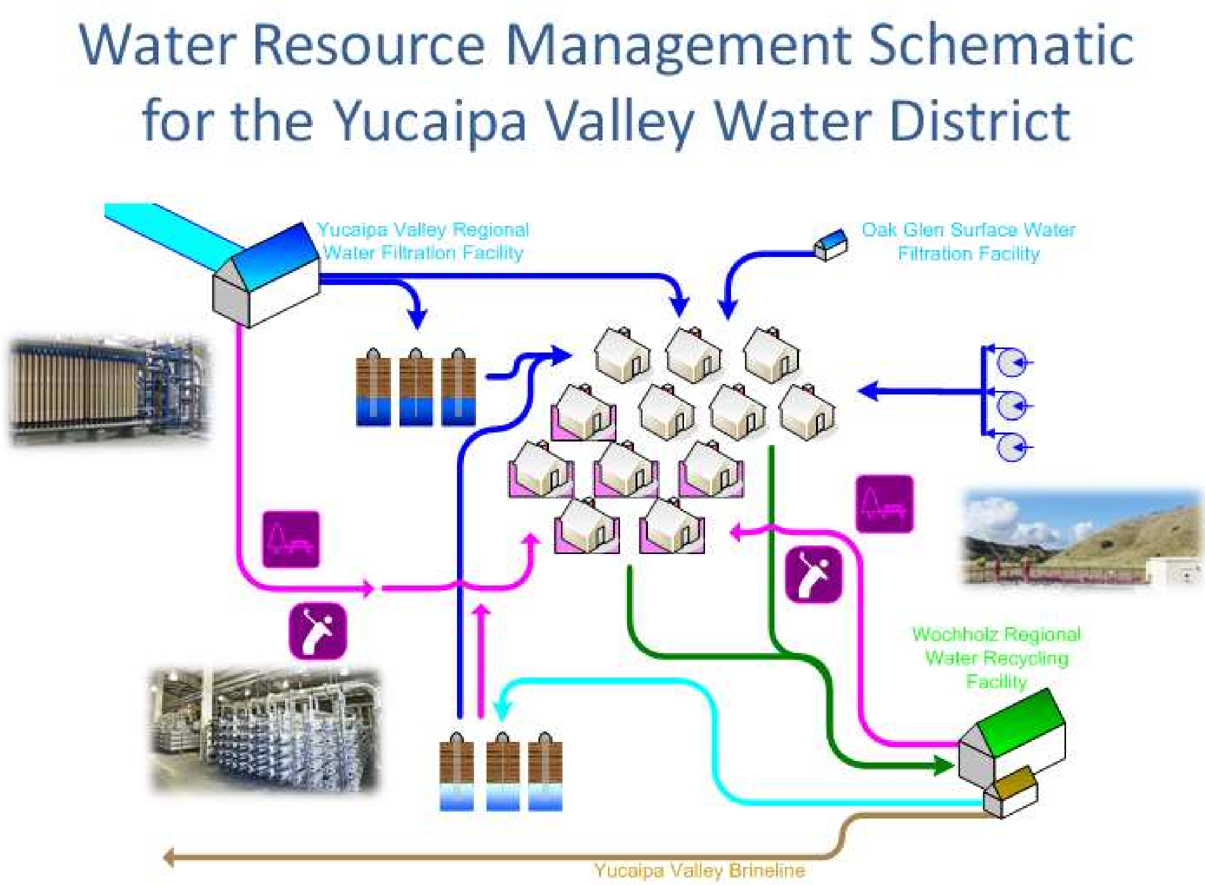

Figure 12-4. Yucaipa Valley Water District Water Resource Management Schematic

12.6.5.2 Wastewater Collection, Treatment, and Disposal

YVWD began treating wastewater in 1986. The sewer collection system has been expanded steadily over the years to provide additional recycled water supplies to the community. In the 2005 UWMP, YVWD projected delivering 1,900 AF of recycled water by year 2010; YVWD delivered 2,016 AF of recycled water in 2010.

The Wochholz Regional Water Recycling Facility was recently expanded to a 8.0 MGD wastewater treatment facility. The ultimate facility will be capable of treating up to 11 MGD of wastewater and includes the following major components:

- Septage Receiving Station - A septage receiving facility provides septage haulers an efficient location to discharge septage wastes for treatment at the plant.
- Headworks Grit Removal System - The grit removal system has been recently upgraded and enlarged to increase grit removal efficiency and reduce the impacts of grit on downstream treatment processes.

- Primary Equalization Tank - The primary equalization tank provides YVWD with the ability to stabilize daily flow variations and hold additional wastewater during peak periods for a steady-state treatment flow throughout the treatment facility.
- Secondary Treatment System - The secondary treatment system has been equipped with nitrogen removal technology that is used to provide compliance with the total inorganic nitrogen limits of 6 mg/l.
- Advanced Tertiary Treatment Facilities - Equalized flows are treated with microfiltration technology commonly used in the beverage and drinking water industry. The recycled water product from this treatment process is significantly more pure than the tertiary filters previously used by YVWD. This treatment technology is a precursor to the reverse osmosis treatment process.
- Reverse Osmosis System - YVWD currently operates a 2.5 MGD reverse osmosis treatment system to purify the recycled water produced at the Wochholz Regional Water Recycling Facility. The brine concentrate is delivered to the Inland Empire Brineline for disposal at Orange County Sanitation District pursuant to existing agreements with the San Bernardino Valley Municipal Water District and the Santa Ana Watershed Project Authority.
- Recycled Water Storage Reservoir - A 4.0-MG recycled water storage reservoir and pump station is used to store the recycled water prior to plant effluent.

Yucaipa Valley Water District (District) is continuing to expand its recycled water system to meet increasing demand in the system. The increasing demand is a result of additional golf courses, schools, community parks, and other non-potable water users, as well as increased residential development. The existing recycled water system went into operation in 2002.

YVWD will be constructing a Regional Recycled Water Conveyance System to the YVWD's southernmost service area boundary. This extension would involve the construction of a 24" recycled water pipeline, approximately 18,500 linear feet (3.5 miles) through the City of Calimesa. The purpose of the pipeline is to provide recycled water service to customers within YVWD and provide surplus recycled water to neighboring water agencies such as the Beaumont Cherry Valley Water District and the City of Banning.

Table 12-10. DWR Table 6-2R. Wastewater Collected within Service Area in 2015

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AF)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
Yucaipa Valley Water District	Metered	4,480	Yucaipa Valley Water District	Wochholz Regional Water Recycling Facility	Yes	No

12.6.5.3 Recycled Water Beneficial Uses

YVWD has already initiated a significant recycled water program within their service area for landscape irrigation. Future homes in the YVWD service area will be constructed with drinking water for interior use and recycled water for exterior use. These improvements will significantly reduce the GPCD for the community and provide the framework for a robust, sustainable and water conscientious community.

Table 12-11. DWR Table 6-4R. Current and Projected Recycled Water Direct Beneficial Uses within Service Area (AF)

Name of Agency Producing (Treating) the Recycled Water:			Yucaipa Valley Water District					
Name of Agency Operating the Recycled Water Distribution System:			Yucaipa Valley Water District					
Supplemental Water Added in 2015			665.05 Acre Feet					
Source of 2015 Supplemental Water			Untreated State Water Project, Filtered MF Backwash from the Yucaipa Valley Regional Water Filtration Facility.					
Beneficial Use Type	**General Description of 2015 Uses**	**Level of Treatment**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Landscape Irrigation	Various Users	Advanced Tertiary Treatment with Salinity Control (RO)	1,213	1,651	2,177	2,792	3,490	4,282
Groundwater Recharge	Wilson Creek Spreading Basin	Advanced Tertiary with Salinity Control (RO)	0	2,828	2,861	2,806	2,668	2,436

12.6.5.4 Actions to Encourage and Optimize Future Recycled Water Use

In August 2008, YVWD adopted a strategic plan for a sustainable future and enhance water management. One of the most significant elements of the strategic plan is the requirement for new homes to be constructed with dual-plumbed infrastructure. This requirement coupled with new landscape design requirements will significantly improve the beneficial use of water throughout the community.

Table 12-12. DWR Table 6-6R. Methods to Expand Future Recycled Water Use

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Dual-Plumbing of New Homes	YVWD Resolution requiring front yard and rear yard irrigation with recycled water adopted in 2008	Ongoing	2,000 AF

12.6.6 Desalinated Water Opportunities

The need for brackish groundwater desalting is somewhat limited in the Yucaipa Valley. While elevated salts are a concern in the groundwater basins, YVWD has already implemented programs to reduce the salinity in the Yucaipa Management Zone, Beaumont Management Zone and San Timoteo Management Zone pursuant to Basin Plan requirements adopted by the Santa Ana Regional Water Quality Control Board in 2004.

The development of (or financial participation in) a new seawater desalination project, while costly, is being investigated by other wholesale and retail water agencies in southern California. Because the Yucaipa Valley is an inland area, in order for desalination to work it would be necessary for agencies in the San Bernardino Valley to join with other water purveyors in the development of a coastal desalination facility and then receive water from the SWP supplies of other participants via an exchange. It is not cost-effective for the San Bernardino Valley to receive direct delivery of desalted ocean water.

Seawater desalination is an alternative that is technically viable. However, production and treatment costs have historically been several times higher than those of SWP costs and conventional treatment.

12.6.7 Exchanges or Transfers

YVWD is in the process of reviewing potential interties with the City of Redlands and the Beaumont Cherry Valley Water District to meet needs during periods of lowered groundwater levels. These connections would be short-term, as needed purchases and are not accounted for as additional water supply.

12.6.8 Future Water Projects

YVWD is currently enhancing its ability to utilize its existing water supply sources through several projects that are in various phases of implementation, from planning to preliminary design to construction. Specifically, YVWD is in the process of reviewing concept documents related to participation in the Bunker Hill Conjunctive Use Project. This program would provide a water banking opportunity in the adjacent Bunker Hill Groundwater Basin during wet periods for extraction when imported supplies from the State Water Project are limited.

Table 12-13. DWR Table 6-7R. Expected Future Water Supply Projects or Programs

Name of Future Projects or Programs	Joint Project with Other Agencies?	Other Agency Names	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Agency
Bunker Hill Conjunctive Use Project	Yes	SBVMWD	Implementation of regionally shared groundwater wells and spreading basins.	2019	2020	8,000 AF

12.6.9 Summary of Existing and Planned Sources of Water

Table 12-14 summarizes the water resources used by YVWD in 2015, and the projected future supplies are summarized in Table 12-15. The estimated amount of imported water supply shown in Table 12-15 has been estimated by YVWD and provided to Valley District.

Table 12-14. DWR Table 6-8R. Water Supplies - Actual

Water Supply	Additional Detail on Water Supply	2015 Actual Volume (AF)	2015 Water Quality
Groundwater	Groundwater Supplies	4,904	Drinking Water
Surface Water	Oak Glen Surface Water Filtration Facility	233	Drinking Water
Purchased or Imported Water	Yucaipa Valley Regional Water Filtration Facility	4,587	Drinking Water
	Total	**9,724**	

The projected water supplies anticipate the purchase of additional water rights by the San Gorgonio Pass Water Agency and/or the approval of an allocation plan for an even distribution of imported water from that state water contractor. Without these actions taken by the regional water provider, YVWD is prepared to implement the necessary restrictions to reduce the demand in future years if needed.

Table 12-15. DWR Table 6-9R. Water Supplies – Projected (AF)

Water Supply	Additional Detail on Water Supply	Water Quality	2020	2025	2030	2035	2040
Groundwater	Groundwater Supplies	Drinking Water	9,000	9,000	9,000	9,000	9,000
Surface Water	Oak Glen Surface Water Filtration Facility	Drinking Water	500	500	500	500	500
Purchased or Imported Water	Yucaipa Valley Regional Water Filtration Facility	Drinking Water	14,900	15,875	16,500	17,700	16,390
Recycled Water	Wochholz Regional Water Recycling Facility	Advanced Tertiary	4,479	5,038	5,598	6,158	6,718
		Total	**28,879**	**30,413**	**31,598**	**33,358**	**32,608**

12.7 Water Supply Reliability Assessment

12.7.1 Imported Water

During times of State-wide drought conditions, the availability of SWP may be reduced. These conditions are normally known in advance, providing YVWD with the opportunity to plan for the reduced supply. During a drought period, it is a priority to make direct deliveries to the water treatment plants operated by Redlands, WVWD, and YVWD and to maintain lake levels at Big Bear Lake (Big Bear Lake water also feeds the water treatment plants of Redlands and YVWD).

In the case of a shortage, YVWD would utilize additional groundwater through groundwater well production from the Bunker Hill Conjunctive Use Project and groundwater stored in the Yucaipa Groundwater Basin. In multiple dry years, Valley District expects between 44,858 AF and 45,910 AF of water to be available, meaning Valley District could fulfill normal direct deliveries to water treatment plants in a multiple-dry year, including the YVWD treatment plant. Table 12-21 and Table 12-22 estimate how imported water supplies available to YVWD may be reduced during drought conditions.

12.7.2 Groundwater

YVWD groundwater wells have not been impacted by water quality issues. YVWD continues to monitor for any indication of groundwater contamination.

12.7.3 Reliability by Type of Year

Based on the studies and information listed above it is anticipated that groundwater pumping by YVWD will not be reduced or curtailed during a single-dry or multi-dry year.

12.7.4 Regional Supply Reliability

YVWD currently supplements its local supply with SWP deliveries from Valley District and in the past this SWP has made up a fair amount of YVWD's water supply.

12.8 Water Shortage Contingency Planning

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, an earthquake which damages delivery or storage facilities, or a regional power outage. YVWD has a Water Shortage Contingency Plan for regional water supply sources (imported water and groundwater).

While water supply disruptions can occur for a variety of reasons, a weather related water shortage, or drought, is one category of particular importance to the Yucaipa Valley Water District for reasons described below. Droughts are naturally occurring but unpredictable weather events of varying frequency, duration and severity. In the Yucaipa Valley, historical data indicates a high probability of short term and/or multi-year drought conditions.

12.8.1 Stages of Action

Section 4 if the YVWD Water Shortage Contingency Plan sets forth the four stage water shortage contingency plan for the conservation of water. This plan includes voluntary and mandatory conservation measures; key elements are included herein.

The Water Shortage Contingency Plan provides four stages of response based of increasing severity, as progressively more serious conditions warrant. This type of response would be appropriate to apply to a summer drought or other water service disruption. The four stages include a variety of communications, internal operations, and supply and demand management strategies as appropriate, and are characterized as follows:

12.8.1.1 Normal Conditions

Normal conditions shall be in effect when YVWD is able to meet all the water demands of its customers in the immediate future. During normal conditions all water users should continue to use water wisely, to prevent the waste or unreasonable use of water, and to reduce water consumption to that necessary for ordinary domestic and commercial purposes.

12.8.1.2 Advisory Stage - Threatened Water Supply Condition

In the event of a threatened water supply shortage which could affect YVWD's ability to provide water for ordinary domestic and commercial uses, the public is informed as early as meaningful data are available that a possible shortage may occur.

Objectives - To prepare the cities, school district, developers and water users for potential water shortage thereby allowing all parties adequate planning and coordination time.

To undertake supply management actions that forestalls or minimizes the need later for more stringent demand or supply management actions.

Triggers - As presented earlier, there are a variety of weather and other conditions that may cause concern about water availability and a potential water shortage. The most fundamental weather condition that would trigger an "Advisory" would be when the winter season rainfall total is significantly less than the average annual rainfall of 18 inches per year for Yucaipa (as measured at the Mill Creek CDF Fire Station).

The Advisory would be withdrawn when projected water supplies such as State Water Project water and/or recycled water are in sufficient supply to provide normal water supply conditions to YVWD’s customers.

Public Message - The potential exists for lower than normal supply; conditions may return to normal or, later on, we may need to reduce consumption. We'll keep you informed."

Advisory Stage Goal - Voluntary conservation measures resulting in a 5% - 10% reduction in water use, which can generally be achieved by reducing residential landscaping, and irrigation use.

Advisory Stage Action Plan:

- Brief elected officials
- District staff to issue a water conservation press release/newsletter during the summer months as a reminder to customers. See the sample press release as provided in Attachment “A”.
- District adds text to monthly billing to remind customers of water conservation practices. An example would be:
- “During the summer months, please remember not to water between the hours of 10:00am and 8:00 pm. Thank you for conserving”.
- District staff to regulate construction meter activity. This may include restricting quantity of water used and the issuance of new construction meters.
- District staff to monitor and record potable water irrigation practices at golf courses, parks and schools to effectively regulate the use of limited potable supplies.
- District staff to encourage the use of recycled water as a means to remain drought tolerant and promote continuous water conservation measures.
- Weekly planning meetings to include updates on water supply issues and alternatives to prepare for the next stage of the implementation plan.
- Intensify ongoing media education effort about the water system, particularly relationship of weather patterns to supply and demand; provide up to date data and implications for water use, if known.

YVWD Internal Operations for Advisory Stage:

- Prepare to establish purveyor "hotline", a frequently updated recording providing latest information and supply and demand data.
- Consult with other major customer groups, e.g., parks departments, landscape industry, forming a committee if needed, to assist the shortage advisory group to define message and provide feedback on utility actions.
- Initiate status report to entities with special interests, e.g., large water users especially landscape and nursery industry, parks, major water using industries.
- Prepare public information materials explaining the Water Conservation Implementation Plan stages and range of actions; prepare "Questions and Answers" for all customer groups, including those who may be planning new landscaping projects.
- Intensify coordination with other regional water suppliers to learn what conditions they are projecting for their systems.
- Evaluate ability, resources, plans to move into Voluntary stage; as appropriate, begin preparatory measures.
- Intensify data collection actions (storage reservoirs, wells and power supply) and monitoring weather forecasts.
- Intensify YVWD's computer modeling runs of projected supply, storage and demand scenarios.
- Intensify supply side management techniques to optimize existing sources.
- Assess current water main flushing and reservoir cleaning activities to determine whether they should be accelerated to be completed prior to the peak season or reduced to conserve supply.
- Assess water quality in reservoirs and distribution system to target for correction areas that may be predicted to experience problems.
- Initiate planning and preparation for Voluntary Stage actions, including an assessment of potential staffing impacts, training needs, and communications strategies including use of web-based information.

12.8.1.3 Voluntary Stage – Non-Mandatory Conservation Measures

If supply conditions worsen, the plan moves to the Voluntary Stage, which relies on voluntary cooperation and support of customers to meet target consumption goals. During this stage, specific voluntary actions are suggested for both residential and commercial customers.

Objectives

- To maintain or reduce demand to meet target consumption levels by customer voluntary actions.
- To forestall or minimize need later for more stringent demand or supply management actions.
- To minimize the disruption to customers' lives and businesses while meeting target consumption goals.
- To maintain the highest water quality standards throughout the shortage.

Triggers

- The "Voluntary Stage" is implemented when one or both of the following factors applies:
  - Supply conditions identified in the Advisory Stage have not improved.
  - Demand levels indicate the need for a more systematic response to manage the situation

- Heavy groundwater pumping coupled with higher summer temperatures means that there might be an increased likelihood that water quality problems may become an issue. Consideration will be given to potential water quality issues in defining the supply and demand management strategies.

Voluntary Stage Goal - At this stage, the goal would be to achieve a 10% - 15% reduction in water use. Customers can generally achieve this goal through constant water conservation practices.

Voluntary Stage Action Plan - YVWD staff shall meet frequently to re-evaluate the situation based on current and projected supply conditions and the season, and determine the appropriate actions and strategies. The staff will determine target consumption goals to be achieved on a voluntary basis which may be revised as necessary. (See attachment B) Based on the consumption goal, some or all of the following actions will be taken; those actions that are asterisked (*) will be considered initially for implementation if demand reductions more than 10 to 15 percent below normal are necessitated, or later if voluntary measures implemented fail to deliver targeted savings.

- Establish systematic communications with elected officials at the committee and Board level to communicate the nature and scope of voluntary measures and strategy
- District staff to evaluate whether targeted consumption levels and supply conditions warrant a rate surcharge to reinforce voluntary actions and/or to recover revenue losses*; the General Manager makes recommendation to Board members
- Prepare appropriate legislation regarding emergency surcharges, if required

- Consult with customer groups throughout the shortage to help develop public information messages and materials and to obtain feedback on utility actions
- Initiate major public information, media and advertising campaign:
    - In daily newspapers, publish and promote consumption graph that displays the goal and previous 24 hour consumption;
    - Promote consumption goals for typical households, and a percentage reduction goal for commercial customers (Attachment C contains a list of recommended actions for customers to take to reduce consumption)
    - Develop and implement a marketing plan, including paid advertising, to keep customers informed about supply and demand conditions; reinforces desired customer actions; recommends customer actions to reduce demand sufficiently; and, depending on conditions, reminds customers that if goals are not achieved, restrictions may be necessary
- Identify what potential next steps will be to reduce demand including timing, what type of restrictions and/or surcharges will be imposed.
- Establish routine timing for press releases (e.g., every Monday morning) that provide current status and outlook; present information in standardized format that becomes familiar to media and public.
- Include water quality information in public information so that if flushing is necessary, the public understands that it is essential for water quality maintenance.
- Publicize the water supply conditions web page, which is updated regularly. Ensure the information provided covers the needs of all key interests: the public, news media and purveyors.
- Meet with landscape industry representatives to inform them of current and projected conditions; develop partnership programs and informational materials on the shortage, consumption goals, etc. for distribution by industry and utilities.
- Establish and promote "hotlines" for customers to obtain additional conservation information.
- Contact largest customers to request percentage reduction. Contact City and other public agencies to inform them of conditions and request their cooperation.
- Prepare list of commercial car wash facilities that recycle water.
- Establish regular communication mechanism to keep Department employees, especially utility account representatives and water service consultants, up to date on goals, conditions, and actions.
- Print generic postcards to acknowledge receipt of customer correspondence regarding the shortage and to inform customer that specific response is being prepared.
- Initiate remaining planning and preparation for Mandatory Stage.

YVWD Internal Operations for Voluntary Stage

- Continue actions listed in the Advisory Stage.
- Eliminate all operating system water uses determined not to be essential to maintain water quality such as pipeline flushing, reservoir overflows; complete cleaning of any reservoirs known to be vulnerable to warm weather taste and odor concerns.
- Increase water quality monitoring actions.
- Implement staffing reassignments as needed, and plan staffing changes which may be needed for the Mandatory Stage, including staff to enforce mandatory restrictions.

Supply and Demand Management Actions

- Issue a request that non-recirculating fountains be turned off*
- Restrict construction meters to only essential purposes*
- Activate any existing interties to increase supply availability*
- Request that Fire Department limit training exercises that use water.
- Request that City agencies eliminate washing fleet vehicles unless recycling car washes are used.
- Request that hosing sidewalks, driveways, parking lots, etc. be limited to situations that require it for public health and safety.
- Have YVWD field personnel "tag" observed obvious water waste such as hoses without shutoff nozzles, gutter flooding, etc. with notice that informs customer about the supply conditions and need to conserve.
- Evaluate ability to accelerate or enhance or expand long term conservation programs; implement as appropriate.

12.8.1.4 Mandatory Stage – Water Shortage Emergency: Mandatory Conservation Measures

If the Voluntary Stage does not result in the reduction needed, the Mandatory Stage prohibits or limits certain actions. This stage would be accompanied by an enforcement plan, which could include fines for repeated violation.

Objectives

- To achieve targeted consumption reduction goals by restricting defined water uses.
- To ensure that adequate water supply will be available during the duration of the situation to protect public health and safety.
- To minimize the disruption to customers' lives and businesses while meeting target consumption goals.

- To maintain the highest water quality standards throughout the shortage.
- To promote equity amongst customers by establishing clear restrictions that affect all customers.

Triggers - The General Manager, with approval from the Board of Directors, would approve progression to this stage if goals established in the Advisory and Voluntary Stage have not been met, and additional action is needed. The specific restrictions imposed during the mandatory stage would be determined based on the season of the year, targeted demand levels, and other considerations previously mentioned. Variations of the specific restrictions may be applied based on water supply conditions. For example, lawn watering restrictions may simply consist of time of day restrictions; or, if conditions warrant, lawn watering could be restricted to certain times of day and allowed only once a week.

Public Message - "It is necessary to impose mandatory restrictions to reduce demand based on the current water shortage. We are continuing to rely on the support and cooperation of the public to comply with these restrictions but need the certainty and predictability of restricting certain water uses in order to ensure that throughout the duration of this shortage an adequate supply of water is maintained for public health and safety."

Mandatory Stage Goal - Mandatory conservation measures resulting in a 10% - 15% reduction in water use.

Mandatory Stage Action Plan

- YVWD staff will make recommendations regarding the nature, scope and timing of restrictions to the members of the Water Conservation Committee. YVWD staff will need to determine that the water supply and demand management strategies will not result in unacceptable water quality degradation.
- The General Manager recommends to the Board of Directors to implement the Mandatory Stage conservation measures and other appropriate actions.
- The Board adopts a resolution on mandatory restrictions and, if needed and not already in place, emergency surcharges.
- The public is informed about the nature and scope of the mandatory restrictions through a press conference, paid advertising and other means, including direct mail.
- The enforcement mechanisms, rate surcharges, target consumption goals, projections for how long restrictions will be in place and the reasons for imposing restrictions will also be identified, as will the possible consequences if goals are not met.
- Any exemptions from restrictions will be clearly identified.
- In communicating mandatory restrictions to the public, a clear distinction will be made between lawn/turf watering and watering gardens and ornamental plantings. The type and amount of watering allowed will be clearly defined.

- A "Customer Hotline" will be set up to report violations of restrictions.
- Customers who irrigate with private wells will be urged to install signs to let the public know that private well water is being used.
- Communication actions from the Advisory and Voluntary stages will be continued and enhanced.
- Plans will be made to move into the fourth stage - Emergency Curtailment - and to begin preparatory measures as appropriate

YVWD Internal Operation Plan for Mandatory Stage

- Continue appropriate actions from previous stages
- Finalize and implement procedures for exemptions from restrictions and/or emergency surcharges.
- Finalize and implement enforcement procedures for restrictions including highly visible "Water Watchers".
- Increase water quality monitoring actions at storage reservoirs.

Supply and Demand Management Actions

Overall supply conditions will be considered at regular meetings by District staff and the members of the water conservation committee in evaluating which restrictions to impose.

Watering Restrictions

The following are several possible approaches to watering restrictions. The nature of the restrictions used will depend on the situation, and may change as severity of the situation changes.

- Prohibit all watering during the day, for example between 6:00 a.m. and 9:00 p.m.
- Limit all watering to a specific number of days per week or per month. This choice will depend on target consumption goals, the time of year and the extent to which watering is occurring, and how much demands have already decreased.

Other Restrictions

- Prohibit use of any ornamental fountain using drinking water for operation or make-up.
- Prohibit car washing except at commercial car wash facilities that recycle water.
- Rescind water construction meter hydrant permits.
- Prohibit washing of sidewalks, streets, decks or driveways except as necessary for public health and safety.

- Limit pressure washing of buildings to situations that require it as part of scheduled building rehabilitation project (e.g., painting).
- Prohibit water waste including untended hoses without shut-off nozzles, obvious leaks and water running to waste such as gutter flooding and sprinklers/irrigation whose spray pattern unnecessarily and significantly hits paved areas

Exemptions from Water Use Restrictions

- Lawn Watering Ban Exemption - Newly installed lawns may be exempted from a ban if the procedures listed below are followed. Those wishing to use this exemption would need to contact YVWD office in advance of the exemption being granted, providing their name, address, phone number, size of lawn and type of watering system. This information would allow YVWD to quantify the amount of water used under this exemption and to spot check for compliance. The procedures relating to the exemption and the requirements of the exemption would be clearly outlined at the time of the ban. The following procedures are subject to change:
    - Each applicant would be mailed a packet stating the requirements.
    - Once the requirements are met, an authorization packet would be mailed to the customer including a sign to be posted indicating that YVWD's requirements are being complied with.
    - New lawns must be properly installed, meaning that two inches of organic soil amendment, such as composted yard waste or biosolids, is cultivated into the top six inches of existing soil, at a minimum.
    - New lawns must be watered according to guidelines to be provided in the packet mentioned above.
    - For purposes of this exemption, "new lawn" refers to a lawn newly installed during the current year only. Over seeded or otherwise renovated lawns would not be exempt.

- In the event that the shortage continues to worsen and the Emergency Curtailment Stage is invoked, this exemption would be revoked. It would also be revoked on a case-by-case basis if the rules stated above are not followed, or in the case of a water system emergency. Monitoring and enforcement are at the discretion of YVWD. The existence of an exemption to a watering ban would be announced early in the response process, for example when the Advisory Stage is invoked.
- Automatic Irrigation System Exemption - Users of automatic irrigation systems may be exempt from certain mandatory watering restrictions if proper procedures are followed - but not from a total watering ban. This approach allows an alternate path to achieving savings due to the precision with which such systems can be operated, but is not intended to be a loophole to avoid the need to curtail use. For example, if only 30 minutes of lawn watering is allowed per week, automatic irrigation systems which meet the criteria would be allowed to water based on a certain percentage of evapotranspiration (ET), such as 50%, instead of the time-limit based restriction. [Note:

ET is a factor calculated according to climatic data, which is commonly used for lawn watering in commercial applications; ET data would be made available on YVWD's web page and in alternate formats.] In the event of a total watering ban, these users would also be prohibited from watering (unless other safety-based criteria are met, as stipulated in the Water Conservation Implementation Plan).

- The procedures to be met include:
  - The area must be audited by an Irrigation Auditor as certified by the Irrigation Association (list from the IA to be available on request).
  - Irrigation efficiency of the system must be at least 62.5%, as defined by the Irrigation Association (includes both system distribution uniformity and management practices).
  - A baseline irrigation schedule based on historical ET must be provided to the system's owner/operator.
  - The owner/operator must evaluate actual ET on at least a weekly basis and change the irrigation schedule if warranted by the ET index.
  - The owner/operator must contact the utility to provide the name of the auditor, date of inspection and the efficiency rating, as well as the name, address and phone number of the contact person for the site being watered, prior to using the exemption
  - Time of day restrictions, such as watering prohibited between 6:00 am and 8:00 pm, would have to be met.
  - The system must have a functioning rain-shutoff device.
  - Watering limitations stipulated by YVWD would need to be followed. The limitations would be stated as a percent of ET, so that, for example, users who meet the above requirements would be able to water based on 50% of ET (the specific percent amount would be decided upon at the time the restriction is announced, depending on the supply outlook). YVWD's website (www.yvwd.dst.ca.us/conserve.htm) would be regularly updated to provide the information needed for those watering according to this exemption; the information would be available through other means as well.

- Other Exemptions - For purposes of dust control, water may be applied to construction areas or other areas needing to comply with air quality requirements. If recycled water is available, consider requiring or promoting that it be used for dust control, if feasible.
- Ball fields and play fields may be watered at the minimum rate necessary for dust control and safety purposes.
- YVWD will exempt customers with special medical needs such as home dialysis from any emergency surcharge provided individual customers notify YVWD of such a need

Water Supply Actions

- If not already implemented, activate interties and any other alternative sources of supply.

12.8.1.5 Emergency Curtailment Stage – Water Shortage Emergency: Extreme Conservation Measures

This addresses the most severe need for demand reduction and could include a combination of mandatory measures and rate surcharges. This could be used as the last stage of a progressive situation, such as a drought of increasing severity, or to address an immediate crisis, such as a facility failure.

At this stage, YVWD recognizes that a critical water situation exists. Without additional significant curtailment actions, a shortage of water for public health and safety will be imminent. No prior emergency in YVWD's history fits this description.

This stage is characterized by two basic approaches. First, increasingly stringent water use restrictions are established and enforced. Secondly, significant rate surcharges are used to encourage customer compliance. While a rate surcharge may be implemented in either the Voluntary or Mandatory stages, a surcharge is a key component to the success of this stage and previous surcharge may be increased if appropriate.

Emergency Curtailment Action Plan

- Continue all previous, applicable actions.
- Define the problem to the public as an emergency and institute formal procedures to declare an emergency.
- Inform customers of the rate surcharge and how it will affect them. Provide information on an appeal process.
- Coordinate with police and fire departments requesting their assistance in enforcing prohibition of water waste.
- Inform customers that taste and odor water quality problems may occur with system-wide reduced water consumption.
- Inform customers about possible pressure reductions and problems this may entail.
- Define and communicate exemptions for medical facilities and other public health situations.

YVWD Internal Operations for Emergency Curtailment Stage

- Continue and enhance "Water Watcher" patrols.
- Continue actions listed in prior stages.
- Curtail fire flow and pipeline testing unless it can be shown to be essential to protect the immediate public health and safety.

- Further enhance water quality monitoring actions

Supply and Demand Management Actions

Rate surcharges would be implemented to encourage customer compliance with the restrictions, as follows:

- Commercial Customers - Commercial, multifamily and industrial users would be asked to reduce water use by a set percentage of their consumption during the same period in the previous year. Emergency rate surcharges would be established to provide an additional incentive to reduce water use. It is YVWD's intention to establish a multi-tiered structure. This "variable block approach" would allow for different surcharge rates based on the individual customer's consumption during the same period in the previous year. For example, if YVWD were to target desired reduction of 85% from the previous year's consumption in that period, any consumption between 0 and 85% would be billed at one rate and any consumption over 85% would be billed at another, much higher rate. In this way, the targeted reduction amount and resulting surcharges would be customized around each customer's water use patterns, while still resulting in a steep surcharge for consumption in excess of the target amount for each block.
- A billing system modification would be needed to allow YVWD to accomplish this. If this has not been done by the time it may be needed, a simple across-the-board rate surcharge would be applied.
- Residential Customers - A multi-tiered, increasingly steep rate structure would be implemented for residential customers (includes single-family dwellings and duplexes). While there are differences in household size, there is more similarity in residential domestic water use than there is in commercial water use.
  - All lawn and turf irrigation would be prohibited
  - Make recycled water available for street cleaning, construction projects, landscape irrigation, dust control, etc.
  - Require that all fire fighting agencies discontinue the use of water in training exercises until emergency is over.
  - Rescind all construction meter or fire hydrant permits.

Short-Term Emergency Curtailment Plan

Although many of the demand reduction measures employed would be similar to those used during a progressive, weather-related shortage, short-term emergencies are unique because of a lack of preparation time and the urgency of immediate, large-scale demand reductions. Each emergency scenario is different, but most of them require major curtailment actions by customers. Also, unlike a drought, some emergencies would be localized, requiring demand reduction for only a limited geographic area.

Strategies for dealing with emergencies have been developed based on lessons learned from previous water utility events, other utility experiences, and a sorting of measures based on specific criteria.

Throughout water shortage events, consistent conservation messages and information on appropriate demand reduction measures should be delivered to water users through the media and by direct contact. Although exact demand reduction goals may not always be met by water users, the water demands during short-term emergencies must be curtailed enough to be beneficial and avoid more serious water shortages.

There are several criteria by which to decide which demand management measures are appropriate to initially reduce demand during an emergency:

- Timing can the measure(s) or action(s) deliver the necessary savings in the necessary timeframe, i.e., are immediate savings needed or can the system support a gradual reduction in demand;
- Magnitude of savings will the measure produce enough savings to make a meaningful difference i.e., reduce demand to the level the impaired water system can handle;
- Does the action make any impact at the time of year that the emergency occurs, i.e., banning lawn watering will have little impact in the winter months;
- How severe are the cost implications of the measure to the customer, including local business and industry.

The following table provides a summary of the Water Shortage Contingency Plan supply conditions.

Table 12-16. DWR Table 8-1R. Stages of WSCP

Stage	Percent Supply Reduction	Water Supply Condition
1	5-10	Normal Conditions
2	10-15	Up to 15% Voluntary Reduction
3	10-15	Up to 15% Mandatory Reduction
4	15+	Greater than 15% Emergency Reduction

12.8.2 Prohibitions on End Uses

The water use prohibitions for each stage are shown in Table 12-17.

Table 12-17. DWR Table 8-2R. Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
3	CII - Restaurants may only serve water upon request	Restaurants are not to provide drinking water to patrons except by request.	Possibly

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
3	CII – Lodging establishment must offer opt out of linen service	Hotels and motels must offer their guests the option to not have their linens and towels laundered daily, and must prominently display this option in each room.	Possibly
3	Landscape - Limit landscape irrigation to specific days	Upon notice and public hearing, YVWD may determine that the irrigation of exterior vegetation shall be conducted only during specified hours and/or days, and may impose other restrictions on the use of water for such irrigation. The irrigation of exterior vegetation at other than these times shall be considered to be a waste of water.	Possibly
3	Landscape - Limit landscape irrigation to specific times	Exterior landscape plans for all new commercial and industrial development shall provide for timed irrigation and shall consider the use of drought resistance varieties of flora. Such plans shall be presented to and approved by YVWD prior to issuance of a water service letter.	Possibly
3	Landscape - Limit landscape irrigation to specific times	Public and private parks, golf courses, swimming pools and school grounds which use water provided by the District shall use water for irrigation and pool filling between the hours of 8:00 p.m. and 6:00 a.m.	Possibly
3	Landscape - Other landscape restriction or prohibition	Persons receiving water from YVWD who are engaged in commercial agricultural practices, whether for the purpose of crop production or growing of ornamental plants shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. Upon the request of the General Manager, these persons may be required to prepare a plan describing their irrigation practices and equipment, including but not limited to, an estimate of the efficiency of the use of water on their properties.	Possibly
3	Landscape - Restrict or prohibit runoff from landscape irrigation	No water provided by the District shall be used for the purposes of wash-down of impervious areas, without specific written authorization of the General Manager. Any water used on premises that is allowed to escape the premises and run off into gutters or storm drains shall be considered a waste of water.	Possibly
3	Other - Prohibit use of potable water for washing hard surfaces	No water provided by YVWD shall be used for the purposes of wash-down of impervious areas, without specific written authorization of the General Manager. Any water used on premises that is allowed to escape the premises and run off into gutters or storm drains shall be considered a waste of water.	Possibly

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
3	Landscape – Other landscape restriction or prohibition	Medians and bordering parkways located within the right-of-way are prohibited from using potable water to irrigate turf or other high water use plant material as identified by the Water Use Classifications of Landscaping Species (WUCOLS) Guide. Bordering parkways are considered the strips of non-functional ornamental turf adjacent to the street. The continued irrigation and preservation of trees is encouraged.	Possibly
3	Other - Require automatic shut of hoses	The washing of cars, trucks or other vehicles is not permitted, except with a hose equipped with an automatic shut-off device, or a commercial facility so designated on YVWD's billing records.	Possibly
3	Pools and Spas - Require covers for pools and spas	All residential, public and recreational swimming pools, of all size, shall use evaporation resistant covers and shall re-circulate water. Any swimming pool which does not have a cover installed during periods of non-use shall be considered a waste of water.	Possibly
3	Other water feature or swimming pool restriction	Operating a water fountain or other decorative water feature that does not use re-circulated water is prohibited.	Possibly
3	CII – Other CII restriction or prohibition	Persons receiving water from the District who are engaged in commercial agricultural practices, whether for the purpose of crop production or growing of ornamental plants shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. Upon the request of the General Manager, these persons may be required to prepare a plan describing their irrigation practices and equipment, including but not limited to, an estimate of the efficiency of the use of water on their properties. Commercial and industrial facilities shall, upon request of the General Manager, provide the District with a plan to conserve water at their facilities. The District will provide these facilities with information regarding the average monthly water use by the facility for the last two-year period, or the State of California approved conservation base year. The facility will be expected to provide the District with a plan to conserve or reduce the amount of water used by that percentage deemed by the Board of Directors to be necessary under the circumstances. After review and approval by the General Manager, the water conservation plan shall be considered subject to inspection and enforcement by the District.	Possibly
3	Landscape - Other landscape restriction or prohibition	Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.	Possibly
3	Landscape - Prohibit all landscape irrigation	Watering of parks, school grounds, golf courses, lawns, and landscape irrigation is prohibited.	Possibly

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
3	Other - Prohibit use of potable water for construction and dust control	No new construction meter permits shall be issued by YVWD. All existing construction meters shall be removed and/or locked.	Possibly
3	Other - Prohibit use of potable water for washing hard surfaces	Washing down of driveways, parking lots or other impervious surfaces is prohibited.	Possibly
3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Washing of vehicles, except when done by commercial car wash establishments using only recycled or reclaimed water is prohibited.	Possibly
3	Water Features - Restrict water use for decorative water features, such as fountains	Filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes are prohibited.	Possibly
3	Landscape – Other landscape restriction or prohibition	Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.	Possibly

12.8.3 Penalties, Charges, Other Enforcement of Prohibitions

In the implementation of the water shortage contingency plan, the California Water Code Section 31029 makes any violation of the YVWD's Water Shortage Contingency Plan a criminal misdemeanor and upon conviction thereof, the violator will be subject to punishment by fine, imprisonment, or both as may be allowed by law. In addition to criminal penalties, violators of the mandatory provisions of the ordinance will be subject to civil action initiated by YVWD.

No single strategy can be created which will meet the needs of the District for all emergency scenarios. The criteria established for the Water Shortage Contingency Plan provides the full latitude for the Board of Directors to implementation penalties, charges and other enforcement prohibitions based on the specific situation.

Emergencies initially require quick and immediate response. Once an assessment is made as to how long it will take to restore the system, the immediate response strategy may change if it appears that the repair process will be lengthy. The strategy for most emergencies can be narrowed to measures having the most immediate impact on water supply and consumption. All needed and available back up supplies would be activated during an emergency, including the use of interties and standby water production wells.

12.8.4 Consumption Reduction Methods

YVWD offers various rebates to encourage conservation. The reduction goal is to balance supply and demand.

Table 12-18. DWR Table 8-3R. Stages of WSCP - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
Ongoing	Expand Public Information Campaign	YVWD will continue to provide information about the use of recycled water as an alternative to drinking water sources, if applicable. Additional water conservation measures will be provides that are designed to reduce consumption by various customer classes.

12.8.5 Determining Water Shortage Reductions

Under normal conditions, YVWD prepares monthly production reports which are reviewed and compared to production reports and pumping statistics from prior months and the same period of the prior year. The data gathered summarized in these production reports are automatically generated on a daily basis to assist with the determination of water shortage reductions.

12.8.6 Revenue and Expenditure Impacts

It is difficult to precisely gauge the revenue and expenditure impacts of water shortages. The drought contingency plan provides for both prohibitions, water use allotments, and penalty pricing for exceeding allotments, the ultimate revenue impacts will be based upon a mix of responses to these requirements. Additionally, weather can be a factor as well. Customers may find it more difficult to meet allocations during hot weather where a desire to maintain landscaping uses at a higher level exists, and therefore more customers may find themselves paying penalty rates.

For planning purposes, it is assumed that District conservation goals are met at each stage and that revenue losses are proportional to the commodity rate revenue not received, exclusive of penalty rates, plus revenue losses due to particular prohibitions. It is also assumed that additional District expenses for implementing the plan would be offset by excess use penalties.

Based upon YVWD’s current fiscal situation, impacts during Stages I and II could be absorbed by District reserves without requiring a rate increase, provided the shortage condition did not persist for more than two years. Impacts beyond two years would need to be reassessed.

Stages III and beyond could require reductions in the pay-as-you-go portion of YVWD’s Capital Improvement Program. Additionally, deferring non-critical maintenance items and filling some personnel vacancies would be considered. Should revenue loss impacts begin to affect essential

District operations, a temporary emergency surcharge on the base water rate could be imposed to fund District operations.

YVWD makes contributions to a rate stabilization fund contribution in accordance with a District Designated Fund Policy. Funds discussed in the policy include the Rate Stabilization Fund and the Capital Replacement Fund.

In the event of a water shortage, a two-point program will be utilized to meet the fiscal shortfall of reduced water revenues:

1. Reduce operation and maintenance expenses
2. Defer selected capital improvement projects until water shortage situation improves.
3. Rate Stabilization Funds, once accumulated, will serve as a third means of meeting fiscal shortfalls.

12.8.7 Resolution or Ordinance

The latest version of the YVWD Water Shortage Contingency Plan was adopted on June 15, 2011. With the recent emergency water conservation regulations adopted by the State Water Resources Control Board, the YVWD has been reviewing the Water Shortage Contingency Plan for proposed changes. Based on the final review, the YVWD will be presenting an updated document for the Board of Directors to review and evaluate to prepare for future shortages.

12.8.8 Catastrophic Supply Interruption

YVWD has identified system vulnerabilities due to fire, earthquake, and power outages. YVWD has developed an Emergency Response Plan. YVWD has in place back-up power supplies at critical locations within the distribution system. Due to South Coast Air Quality Management Board rules and economic restraints, a back-up power supply source at every plant within YVWD’s system is not feasible. YVWD maintains portable pumps that can be used to transfer water internally, but cannot be used for production.

Currently, YVWD’s water storage capacity would provide a potable supply for customers’ non-irrigation uses (assumes implementation of Water Shortage Contingency Plan) for an estimated two to three days. As described above, YVWD participates in multiple mutual aid agreements and has agreements in place for the provision of water supply and/or manpower. In the event of a natural or man-made disaster that could affect the YVWD’s ability to provide a potable water supply for up to thirty days, the following measures will be implemented as required:

1. The Boil Water notification program will be activated. The notice will be provided to local radio stations and newspapers. YVWD will contact the media and City and County agencies. Customers will be notified of supplemental sources of water for cooking and drinking (e.g. swimming pools, water heaters, and bottled water).
2. YVWD is a participant in Emergency Response Network of the Inland Empire (ERNIE), a water/wastewater mutual aid network within San Bernardino and Riverside counties.

During a Catastrophic Supply Interruption, the Mutual Aid Agreement with ERNIE will be implemented. The General Manager will contact general managers from surrounding agencies to obtain assistance in providing manpower for repairs and/or a supplemental supply of water.

3. A public information program will be initiated. The General Manager will appear on local television and provide daily reports to the local newspaper and radio stations. Members of the Board of Directors will speak to local service clubs and chambers of commerce.

12.8.9 Minimum Supply Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the next three-year period, assuming 2016 to 2018 repeat the driest three-year historic sequence for each water supply source. As shown in Table 12-19, total supplies, given a repeat of historically low conditions on all water supplies, would be approximately 60,724 AFY. YVWD has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

Table 12-19. DWR Table 8-4R. Minimum Supply Next Three Years (AF)

Available Water Supply	2016	2017	2018
Available Water Supply	14,500	14,500	14,500

12.9 Supply and Demand Assessment

The Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. This section summarizes YVWD’s water supplies available to meet demands over the planning period during an average/normal year and compares them to demands for the same period.

Table 12-20. DWR Table 7-2R. Normal Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	28,879	30,413	31,598	33,358	32,608
Demand Totals	11,240	11,574	11,938	12,325	12,727
Difference	*17,639*	*18,839*	*19,660*	*21,033*	*19,881*

The single-dry year is generally the lowest annual runoff for a water source in the record. The single-dry year may differ for various sources. This section summarizes YVWD’s water supplies available to meet demands over the planning period during a single-dry year and compares them to demands for the same period.

Table 12-21. DWR Table 7-3R. Single Dry Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	22,379	23,913	25,098	26,858	26,108
Demand Totals	10,341	10,648	10,983	11,339	11,709
Difference	*12,038*	*13,265*	*14,115*	*15,519*	*14,399*

The multiple-dry year is generally the lowest annual runoff for a three year or more consecutive period. The multiple-dry year period may differ for various sources. This section summarizes YVWD's water supplies available to meet demands over the planning period during a multiple-dry year period and compares them to demands for the same time frame.

Table 12-22. DWR Table 7-4R. Multiple Dry Years Supply and Demand Comparison (AF)

Year	Totals	2020	2025	2030	2035	2040
First Year	Supply Totals	24,617	26,304	27,608	29,544	28,719
	Demand Totals	10,790	11,111	11,460	11,832	12,218
	Difference	*13,827*	*15,193*	*16,147*	*17,712*	*16,501*
Second Year	Supply Totals	24,617	26,304	27,608	29,544	28,719
	Demand Totals	10,790	11,111	11,460	11,832	12,218
	Difference	*13,827*	*15,193*	*16,147*	*17,712*	*16,501*
Third Year	Supply Totals	24,617	26,304	27,608	29,544	28,719
	Demand Totals	10,790	11,111	11,460	11,832	12,218
	Difference	*13,827*	*15,193*	*16,147*	*17,712*	*16,501*

13 City of Colton

13.1 System Description

The City of Colton Water Department is the municipally-owned utility that provides potable and non-potable water at retail to customers primarily within the City of Colton. Colton's existing potable water system facilities consist of 15 wells, 5 main booster pumping plants, 9 water storage reservoirs, 2 pressure reducing facilities, and over 120 miles of water transmission and distribution pipelines.

13.1.1 General Description

Colton Water Department provides water service for domestic consumption, fire protection, and irrigation customers within its service area. Colton, which was incorporated in 1887, is approximately 50 miles east of Los Angeles, bounded by the City of San Bernardino on the north and northeast, the City of Grand Terrace and unincorporated areas of Riverside County on the south, the City of Loma Linda on the east, and the City of Rialto on the west. Colton categorizes customers as residential, commercial, municipal, and "other" uses. For 2015, 54 percent of water deliveries were for residential use and 39 percent for commercial use, while the remaining seven percent was for municipal use. "Other" uses made up less than a percent of the total water use for 2015.

13.1.2 Service Area Boundary Map

Colton's service area covers approximately 90 percent of the City of Colton. It includes 14 square miles in the City of Colton and approximately 0.8 square mile of unincorporated area in San Bernardino County. Colton's service area is within the boundaries of Valley District (Figure 13-1).

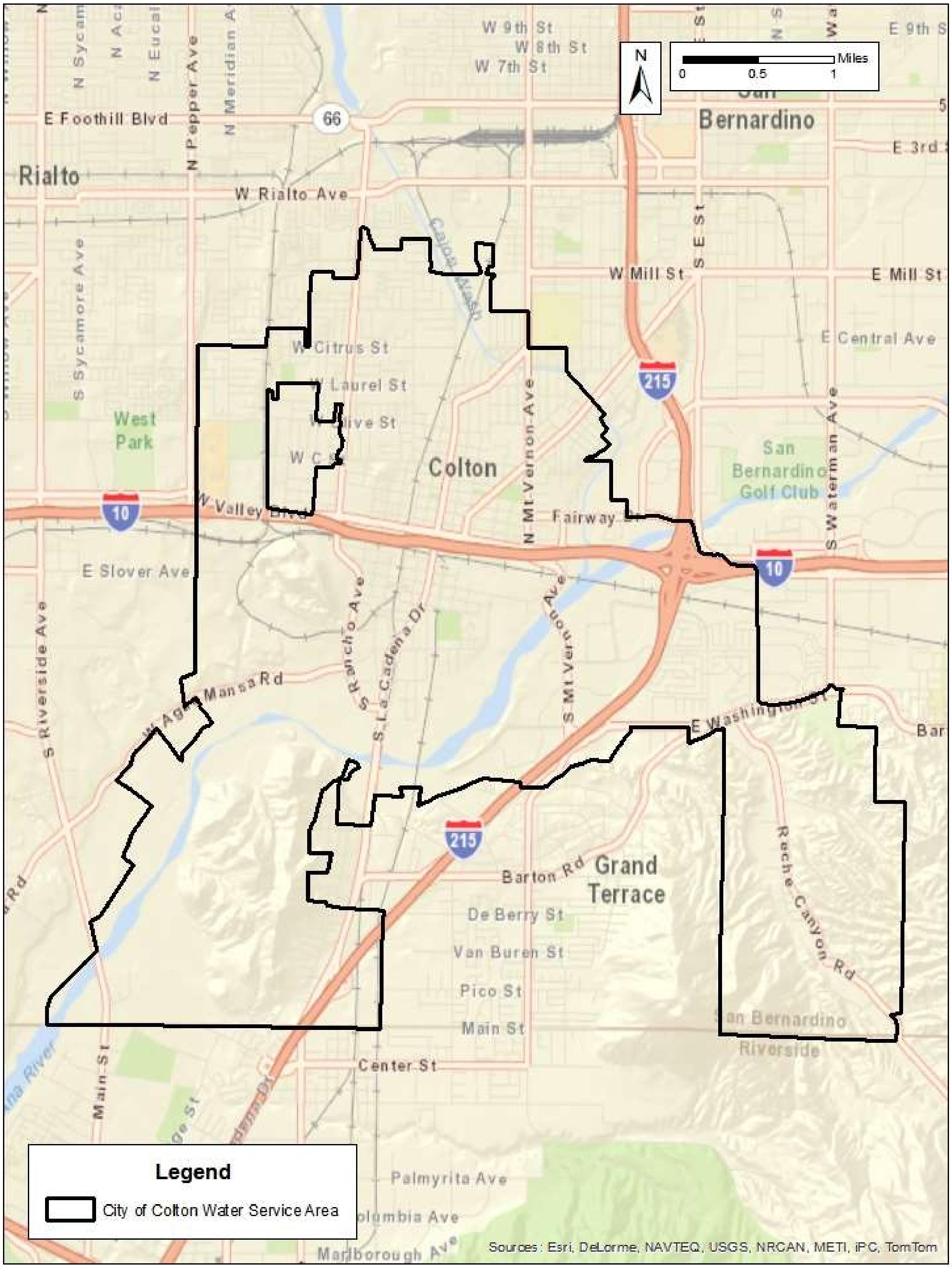

Figure 13-1. City of Colton Service Area

13.1.3 Service Area Climate

Colton's service area is located within the South Coast Air Basin. The basin is a 6,600 square mile area bounded by the Pacific Ocean to the west, and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties.

Average temperature, precipitation, and evapotranspiration by month are shown in Table 13-1. Evapotranspiration (ET) is the loss water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity. ET from a standardized grass surface is commonly denoted as ETo. These data are based on 30 years of record (1986-2015) at Station 044 (University of California Riverside) within the California Irrigation Management Information System (CIMIS).

Table 13-1. Historical Climate Data

Month	Average Temperature (°F)	Average Precipitation (in.)	Average Standard ETo (in.)
January	52.4	3.22	2.53
February	54.6	3.25	2.87
March	56.7	2.86	4.30
April	60.9	1.29	5.38
May	65.6	0.47	5.82
June	71.3	0.09	6.76
July	77.7	0.04	7.38
August	77.7	0.15	7.09
September	73.9	0.33	5.51
October	66.5	0.71	3.97
November	58.6	1.32	2.89
December	53.3	2.38	2.38
Total P / Avg. ETo		16.1	56.9
Notes: Precipitation and temperature for NOAA weather station 0407723 in San Bernardino; data from 1893 through 2004; http://wrcc.dri.edu; ETo data for CIMIS weather station 44 at University of California, Riverside; http://wwwcimis.water.ca.gov/			

13.1.4 Service Area Population and Demographics

For the 2015 UWMP cycle, the California Department of Water Resources (DWR) has developed a GIS-based tool to estimate the population within a water agency's service area using census data. This tool was used to intersect Colton's water service area with compiled census data to estimate historic populations for Colton's water service area. The tool provided service area populations for 1990, 2000, and 2010 using census data. The tool also used the number of residential connections in 2010 and 2015 to estimate a 2015 service area population of 45,496.

The Southern California Association of Governments (SCAG) has developed a forecast called the 2012 Adopted Growth Forecast. This forecast includes estimates of future population for each census tract in the study area. GIS software was used to intersect Colton's service area with the SCAG projections to arrive at population estimates for 2008, 2020, and 2035. Values for intermediate years were estimated assuming a constant growth percentage. An estimate for 2040 were extrapolated assuming a constant growth percentage from 2030 through 2040.

As part of the 2012 Adopted Growth Forecast, SCAG has also estimated the population in 2020 and 2035 inside each of approximately 4,000 traffic analysis zones (TAZ) that cover southern California.

The estimated service area population using this approach was 51,989 in 2020 and 62,301 in 2035. Colton used these values to calculate a compound annual growth rate of 1.3% for the period from 2015 to 2020, and a compound annual growth rate of 1.2% beyond 2020.

Colton has evaluated known potential developments. It is assumed all water demand from these known developments will be realized by year 2020. These new developments include:

- The proposed Iron Horse Tract Homes at Reche Canyon Area. This development is proposed to include construction of 186 new homes.
- Construction of 73 homes in the Rosedale tract located in South Colton.
- Construction of 37 homes in the Crystal Ridge tract located on Reche Canyon Road.

Table 13-2. DWR Table 3-1R. Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040
Population Served	45,496	48,429	51,440	54,638	58,035	61,643

13.2 System Water Use

Colton's water supply is comprised entirely of groundwater extracted from the San Bernardino Basin Area (Bunker Hill Basin portion), the Rialto-Colton Basin, and the Riverside Basin (Riverside North Basin portion). Colton does not currently import water in order to meet the demands of its service area.

Colton does not currently utilize recycled water and does not project recycled water use in the future.

13.2.1 Water Uses by Sector

Colton categorizes customers as residential, commercial, municipal and “other” uses. Water deliveries for each customer class are summarized in Table 13-3. On average, 56 percent of water deliveries are for residential use and 39 percent are for commercial use, while the remaining seven percent is attributed to municipal water use. Landscape water use has not been separately tracked since 2005.

Table 13-3. DWR Table 4-1R. Demands for Raw and Potable Water – Actual (AF)

Use Type	Additional Description	Level of Treatment When Delivered	2011	2012	2013	2014	2015
Other	Residential	Drinking Water	5,295	5,676	5,495	5,274	4,603
Commercial		Drinking Water	3,606	3,565	3,494	3,538	3,304
Other	Municipal	Drinking Water	396	480	461	599	6
Other	Construction	Drinking Water	12	24	178	69	41
Other	Fireline	Drinking Water	44	26	27	37	30
Nonrevenue		Drinking Water	616	362	758	444	924
Sales/Transfers/Exchanges to other agencies	Sales to City of Rialto	Drinking Water	0	618	0	0	0
Sales/Transfers/Exchanges to other agencies	Sales to County of San Bernardino	Drinking Water	0	0	0	200	100
		Total	9,969	10,751	10,413	10,161	9,008

Projected water use was estimated using the percentage change in the calculated GPCD for 2015 and target GPCD for 2020. The percentage change, or growth rates, were applied to Colton's 2015 water demands to derive estimated future water demands for 2020 through 2040 shown in Table 13-4. Colton does not anticipate any routine or single large water sales to other agencies in the future. Colton does not anticipate future water use related to saline barriers, groundwater recharge operations, or recycled water. For the purpose of projections, nonrevenue water is assumed to be 11 percent; this is conservative for planning purposes. Colton will continue efforts to decrease water loss and thereby reduce gallons per capita per day of water use.

Table 13-4. DWR Table 4-2R. Demands for Raw and Potable Water – Projected (AF)

Use Type	Level of Treatment	2020	2025	2030	2035	2040
Residential	Drinking Water	5,327	5,658	6,009	6,383	6,780
Commercial	Drinking Water	3,823	4,061	4,314	4,582	4,867
Municipal	Drinking Water	7	7	8	8	9
Construction	Drinking Water	47	50	54	57	60
Fireline	Drinking Water	35	37	39	42	44
Nonrevenue	Drinking Water	1,036	1,120	1,187	1,258	1,334
Future Development; Rosedale Tract	Drinking Water	45	91	91	91	91
Future Development; Iron Horst Tract	Drinking Water	115	231	231	231	231
Future Development; Crystal Ridge Tract	Drinking Water	23	46	46	46	46
	Total	10,458	11,301	11,978	12,698	13,462

Table 13-5. DWR Table 4-3R. Total Water Demands (AF)

Demand	2015	2020	2025	2030	2035	2040
Potable and Raw Water	8,084	10,458	11,301	11,978	12,698	13,462
Recycled Water Demand	0	0	0	0	0	0
Total Water Demand	8,084	10,458	11,301	11,978	12,698	13,462

13.2.2 Distribution System Water Losses

For the purpose of projections, nonrevenue water is assumed to be 11 percent of water sales. Colton will continue efforts to decrease water loss and thereby reduce gallons per capita per day of water use.

Table 13-6. DWR Table 4-4R. Water Loss Summary Most Recent 12 Month Period Available

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss

13.2.3 Estimating Future Water Savings

Colton is committed to long-range planning to provide a reliable, cost-effective water supply to its customers. Colton actively monitors water consumption in its service area, in part to prepare required monthly reports for the State Water Resources Control Board.

For this report, Colton has projected that future demands will increase at a percentage growth rate that incorporates two factors: the percentage growth in service area population, and potential changes in the per-capita consumption. This approach provides estimates for future system-wide demand that can be used for long-range planning.

In the 2015 UWMP, water suppliers have the option of preparing more detailed demand forecasts by estimating demand factors based on land use categories. For example, Colton could identify typical water use per single family customer and per commercial account. These customer classes can be further sub-divided by lot size, neighborhood, or other variables. The intent is to quantify the estimated water use per customer in different customer classes, and then to forecast how future changes will impact water use within each customer class.

For this document, Colton has elected not to develop land use-based demand factors and apply future savings from codes and standards. Recent drought regulations have induced significant changes in water consumption patterns, and there is considerable uncertainty as to how demands will change in the future if the drought subsides. Given this uncertainty, Colton elected not to quantify passive savings for this UWMP.

13.2.4 Water Use for Lower Income Households

Senate Bill 1087 requires water use projections in an UWMP include the projected water use for single-family and multi-family residential housing 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. The Colton Water Department serves two jurisdictions: Colton and certain unincorporated areas in the County of San Bernardino. Colton's recently approved housing element was for 2000 to 2005. Based on data in the housing element, it is estimated that about 44 percent of all Colton households qualify as low income. Water usage by low income customers has been included in future demand projections.

Table 13-7. Estimated Demands for Lower-Income Households (AF)

Demand	2015	2020	2025	2030	2035	2040
Residential	2,745	2,709	2,904	2,812	2,698	2,355
Total	2,745	2,709	2,904	2,812	2,698	2,355

13.3 SB X7-7 Baselines and Targets

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). Colton is using method one to calculate the Compliance and Interim Water Use Targets as set forth by Water Code section 10608.20(b). The method one calculation is done by taking eighty percent of the urban water supplier's baseline GPCD.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95 percent of a 5-year average base gross water use from 2003 to 2010. The Maximum Allowable GPCD is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBX7-7 legislation. Specifically, if an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as their target.

13.3.1 Updating Calculations from 2010 UWMP

In the 2010 UWMP, Colton calculated a baseline water use of 253.7 GPCD. Colton used Target Method 1 to calculate a compliance water use target of 203 GPCD for 2020, and an interim water use target of 228.4 GPCD for 2015. In 2010, the actual consumption was calculated as 200 GPCD.

For the 2015 UWMP cycle, DWR has made a GIS-based population tool available to calculate service area population using Census Bureau data. Colton has used this tool to re-calculate its service area population, baseline per-capita use, and compliance targets.

13.3.2 Baseline Periods

Years 1999 to 2008 have been selected for calculation of the 10-year base period, while years 2003 to 2007 have been selected for calculation of the 5-year base period. The 10-year average Base Daily Per Capita Water Use for Colton is 253.7 GPCD; the 5-year is 259 GPCD.

13.3.3 Service Area Population

Colton's service area population was calculated using the DWR population estimation tool. The tool directly calculated a service area population for 1990, 2000, and 2010. The GIS-based tool was used to intersect Colton's service area with Census Bureau data to obtain populations for the years 2020 and 2035. Populations for intermediate years were calculated by straight-line interpolation between census years.

13.3.4 Gross Water Use

The calculation of gross water use begins with the total amount of water that was put into the potable water distribution system by Colton. Water that was exported to another agency was then subtracted, to leave the amount used by Colton retail customers.

Water delivered to agricultural customers was included in the urban water demand because those customers, although designated as agricultural customers, receive water from Colton's potable system and use that water to meet both potable and irrigation demands.

For the period of 1999 to 2008, gross water use in the Colton service area fluctuated between 10,957 and 13,205 acre-feet per year.

13.3.5 Baseline Daily per Capita Water Use

For the period from 1999 through 2008, the average base daily per capita water use is 253.7 GPCD.

13.3.6 2015 and 2020 Targets

In addition to calculating base gross water use, SBX7-7 requires the retail water supplier to identify its demand reduction targets. The methodologies for calculating demand reduction targets were described above. Colton is choosing to meet SBX7-7 targets as an individual agency rather than as part of a regional alliance. Colton has selected Method 1 to calculate its 2020 Compliance Water Use Target and Interim Water Use Target. The resulting Compliance Water Use Target is 203 GPCD and the Interim Water Use Target is 228.4 GPCD. As described earlier, the Maximum Allowable GPCD is 246. The Compliance Water Use Target, under Method 1 (203 GPCD) is less than the Maximum Allowable GPCD, so no adjustments to the Compliance Water Use Target are necessary.

Table 13-8. DWR Table 5-1R. Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD	2015 Interim Target	Confirmed 2020 Target
10-year	1999	2008	253.7	228.4	203
5-year	2003	2007	259		

13.3.7 2015 Compliance Daily per Capita Water Use

The City of Colton's GPCD decreased to 175 for 2015. Their 2015 interim target GPCD is 228.4. They meet their requirement and are on-track to meet their 2020 target GPCD of 203 GPCD.

Table 13-9. DWR Table 5-2R. 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Extraordinary Events	Economic Adjustment	Weather Normalization	Total Adjustments	Adjusted 2015 GPCD	2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015?
174.8	228.6	0	0	0	0	174.8	174.8	YES

13.4 Demand Management Measures

The reporting format for Demand Management Measures (DMMs) in the 2015 UWMP is different than the 2010 UWMP. This discussion has been arranged into the seven sections recommended by DWR in the 2015 UWMP Guidebook.

13.4.1 Water waste prevention ordinances

Colton supports measures prohibiting gutter flooding, single-pass cooling systems in new connections, non-recirculating systems in all new conveyor car wash and commercial laundry systems, and non-recycling decorative water fountains. As part of their 2010 UWMP, Colton prepared a draft no-waste ordinance, An Ordinance of the City Council of the City of Colton Prohibiting the Wasteful Use of Water and Setting Forth Regulations and Restrictions on Water Use.

Colton has full authority to adopt and enforce ordinances through their municipal codes. The no-waste ordinance was adopted in September of 2014, and updated in June of 2015 (both attached in Appendix G). Colton will enforce the no-waste ordinance, including responding to reported or observed violations and educating and assisting the user in corrective action.

13.4.2 Metering

All of Colton's customers (residential and commercial) are metered, as are all new connections. All customers are billed with commodity rates. Colton has a meter maintenance and replacement plan where meters are replaced either when they fail or every 10 years.

13.4.3 Conservation pricing

Colton bills all domestic water accounts volumetrically, per 100 cubic feet of use, plus a monthly service based on meter size. Based on the ratio of volumetric to total charges over the past five years.

13.4.4 Public education and outreach

The public information program encourages Colton's customers to conserve water and provides a means by which customers can measure the effectiveness of water conservation efforts. Specific program components include:

- Informational pamphlets on landscaping using water efficient methods for distribution with utility bills;
- Current water bills show the current months versus the past few months. The City of Colton is looking to change this to show the same month in the last several years;
- Distribution of pamphlets which include specific conservation practices; facts concerning state, local, residential, and individual water consumption statistics; and waste statistics;
- Colton is working to get a web based water conservation tool in place that shows usage comparisons, and provide monthly reports; and
- Providing water conservation information on public access television (Channel 3) and postings on social media (Facebook).
- The City is working to coordinate school visits where possible and will visit should a school/teacher reach out.

13.4.5 Programs to assess and manage distribution system real loss

Colton plans to implement the standard water audit approach per Manual 36. The AWWA water audit methodology will be performed annually and losses carefully monitored. To date, Colton has been conducting system water audits, leak detection and repair as necessary in order to maintain its distribution system. Meters that are 2 inches or less are repaired or replaced as-needed, if found to be operating incorrectly. Defective meters are usually found by the meter reader or by the customer service department, which reviews consumption histories. Colton maintains a complete record and map of distribution system leaks and repairs. Analysis of this record allows pipelines and other facilities to be scheduled for replacement as part of Colton's capital improvement program. Most of the older, steel water mains throughout Colton have been replaced, greatly reducing the incidence of leaks within the distribution system. Maintenance crews are on call at all times to respond to water leaks, pipeline ruptures, and damaged facilities as needed. Continued implementation of water loss control practices and procedures is not anticipated to have an effect on Colton's ability to further reduce demand.

Colton is looking into developing a program to perform water audits in conjunction with electrical audits.

13.4.6 Water conservation program coordination and staffing support

In 2013 a Water Conservation Specialist was hired and in 2015 they were promoted to Senior Water Conservation Specialist. Currently, the Senior position is filled, and the Water Conservation Specialist position is to be filled in 2016.

13.4.7 Other demand management measures

All building codes are up to date and the City of Colton offers rebates for: high efficiency toilets, dishwashers, washing machines, shower heads, sprinkler heads, weather based irrigation timers, drought tolerant plants, drip irrigation systems, and mulch. We also offer a turf removal incentive. The rebate amounts are considered on a case by case basis. This means that, for example, if a customer applies for a rebate for 30 toilets, we would assess our budget to see if we can provide them a $100 rebate for all 30 toilets. The same “formula” would apply for all rebates except the outdoor. CII can apply for up to $5000 for turf, and up to $2500 for drought tolerant plants, drip, and mulch combined.

Colton is in the planning phase for direct install program of efficient fixtures for multi-family properties. As well as a program where a contractor will remove grass lawns or landscapes and plant drought tolerant landscaping for residential properties.

13.4.8 Planned Implementation to Achieve Water Use Targets

Colton's current per-capita consumption is less than its 2020 compliance target. Colton expects to continue to implement its current conservation programs to encourage conservation and maintain per-capita consumption below the compliance target.

13.5 System Supplies

Colton's water supply is comprised entirely of groundwater extracted from the San Bernardino Basin Area (Bunker Hill Basin portion), the Rialto-Colton Basin, and the Riverside Basin (Riverside North Basin portion). Colton does not currently import water in order to meet the demands of its service area.

13.5.1 Purchased or Imported Water

Colton does not currently import water. For the period of this Plan, groundwater pumped by Colton is expected to meet all water supply needs.

13.5.2 Groundwater

Colton extracts groundwater from three adjudicated basins: the SBBA, Rialto-Colton, and Riverside North Basin Areas. Colton currently utilizes ten SBBA wells, four Rialto-Colton Basin wells, and one Riverside North Basin Well. The SBBA wells contribute, on average over the past five years, 58 percent of the total groundwater pumped annually while the Rialto-Colton Basin Wells contributes 27 percent and Riverside North is the lowest with 15 percent.

13.5.3 Historical Groundwater Pumping

Colton's historical production for the past five years is shown in Table 13-10.

Table 13-10. DWR Table 6-1R. Groundwater Volume Pumped (AF)

Groundwater Type	Location or Basin Name	Water Quality	2010	2011	2012	2013	2014	2015
Alluvial Basin	Bunker Hill	Drinking Water	4,741	4,784	6,222	5,170	7,455	6,570
Alluvial Basin	Rialto-Colton	Drinking Water	2,750	3,365	2,857	3,093	1,607	1,369
Alluvial Basin	Riverside North	Drinking Water	1,375	1,821	1,672	2,151	1,099	1,070
	Total		8,865	9,969	10,751	10,413	10,161	9,008

13.5.4 Surface Water

Colton currently has no plans for future use of surface water supplies.

13.5.5 Stormwater

The IRWMP included an assessment of stormwater capture opportunities. The findings of this analysis translated in the definition of a number of potential water supply projects, which were further developed and described in the IRWMP, as discussed in Section 2.6.

13.5.6 Wastewater and Recycled Water

The City of Colton owns, operates and maintains a wastewater collection, pumping and treatment system. The wastewater treatment plant also serves the City of Grand Terrace and unincorporated San Bernardino County areas. The plant utilizes a conventional and extended aeration secondary treatment process to product treated effluent in compliance with Regional Water Quality Control Board regulations. In addition, a regional tertiary treatment plant serving both the Cities of Colton and San Bernardino treats the effluent from our wastewater treatment plant and returns the water to the Santa Ana River.

13.5.6.1 Recycled Water Coordination

Colton provides wastewater collection and treatment services to customers within its service Area. Colton owns, operates, and maintains a wastewater collection, pumping, and treatment system. Colton's WWTP also serves the City of Grand Terrace and some nearby unincorporated County areas. Colton jointly owns, with SBMWD, the RIX facility. The RIX facility further treats discharge from Colton's WWTP and from the San Bernardino Water Reclamation Plant.

13.5.6.2 Wastewater Collection, Treatment, and Disposal

Colton currently collects and treats approximately 7 MGD of wastewater from its service area, as well from City of Grand Terrace and some unincorporated County areas. Wastewater conveyed to Colton's WWTP undergoes conventional and extended aeration secondary treatment processes to produce secondary treated effluent in compliance with Regional Water Quality Control Board (Santa Ana River Basin Region) regulations. Treated effluent from Colton's wastewater treatment plant is conveyed to the RIX facility. The RIX facility treats a combined secondary-treated effluent stream of approximately 33 MGD from Colton's WWTP and the San Bernardino Water Reclamation Plant to tertiary standards in accordance with the standards set forth in Title 22, Division 4 of the California Code of Regulations (hereinafter, Title 22). The RIX facility utilizes natural biofiltration through the use of percolation basins, followed by an ultraviolet disinfection system. The RIX-treated wastewater consistently meets or exceeds required discharge standards and is often superior in quality to effluent produced by conventional tertiary treatment facilities (see Table 13-11). All of the RIX-treated water is discharged to the Santa Ana River.

Table 13-11. DWR Table 6-2R. Wastewater Collected within Service Area in 2015

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AF)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
City of Colton	Metered	4,593	City of Colton	Colton Water Reclamation Facility	Yes	No
	Total Wastewater Collected from Service Area in 2015	4,593				

Table 13-12. DWR Table 6-3R. Wastewater Treatment and Discharge within Service Area in 2015

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number	Method of Disposal	Does this Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	Wastewater Treated Volume 2015 (AF)	Discharged Treated Wastewater Volume 2015 (AF)	Recycled Within Service Area Volume 2015	Recycled Outside of Service Area Volume 2015
Colton Water Reclamation Facility	Rapid Infiltration/Extraction (RIX) Plant	to RIX for additional treatment		Other	Yes	Secondary, Disinfected - 2.2	5,713	5,713	0	0
Rapid Infiltration/Extraction (RIX) Plant		Santa Ana River		River or creek	Yes	Tertiary	34,000	34,000	0	0
						Total	39,713	39,713	0	0

13.5.6.3 Actions to Encourage and Optimize Future Recycled Water Use

Recycled water facilities are not currently available in Colton's service area. No recycled water is currently used in the Colton service area. Construction of such facilities is cost prohibitive at this time and no recycled water use is anticipated during the period covered by this Plan.
Despite the fact that developing recycled water facilities in the Colton service area is cost prohibitive at the current time, Colton does recognize the potential value of recycled water. Should recycled water become available in Colton, potential users would include landscape irrigation at schools, cemeteries, parks, and roadway medians as well as industrial process water. However, because Colton does not specifically track these uses, potential recycled water demand cannot be quantified.

13.5.7 Desalinated Water Opportunities

The need for brackish groundwater desalting is somewhat limited in the San Bernardino Valley. While elevated salts are a concern in the groundwater basins of the Western Judgment (SBBA, Rialto-Colton, Riverside), average TDS levels in all of these basins are currently below 500 mg/L (DWR 2003). However, elevated salts are an issue for retailers that overlie the San Timoteo Groundwater Basin and agencies in this basin are considering implementing desalter operations. The area is fortunate to have a brine line which can transport non-reclaimable waste, by gravity, from the City of San Bernardino Wastewater Treatment Plant to the Orange County Sanitation District's treatment plant.

The development of (or financial participation in) a new seawater desalination project, while costly, is being investigated by other wholesale and retail water agencies in southern California. Because the San Bernardino Valley is an inland area, in order for desalination to work it would be necessary for agencies in the San Bernardino Valley to join with other water purveyors in the development of a coastal desalination facility and then receive water from the SWP supplies of other participants via an exchange. It is not cost-effective for the San Bernardino Valley to receive direct delivery of desalted ocean water.

Seawater desalination is an alternative that is technically viable. However, production and treatment costs have historically been several times higher than those of SWP costs and conventional treatment.

13.5.8 Exchanges or Transfers

Colton does not anticipate regular or long-term transfers or exchanges, during the period covered by this Plan. Rather any transfer or exchanges would be as-needed related to an emergency. Colton has two emergency water system connections with the City of San Bernardino (1,000 GPM and 800 GPM); one with the City of Riverside (800 GPM); two with Riverside Highland Water Company (1,000 GPM and 800 GPM), and one with WVWD (1,500 GPM).

13.5.9 Future Water Projects

The city recently completed a Water Master Plan to identify necessary upgrades to its water distribution system. These projects are intended to increase the reliability of the City's system; they are not intended to create new sources of supply.

13.5.10 Summary of Existing and Planned Sources of Water

The only future water supply projects anticipated at this time are the construction and completion of Wells 30 and 31 in the Riverside North Basin.

In the unplanned and unexpected event existing groundwater resources prove to be inadequate to meet service area demands in the future, Colton will further evaluate potential alternative sources of supply, such as imported water, water transfers/exchanges, and recycled water.

Table 13-13. DWR Table 6-8R. Water Supplies – Actual

Water Supply	Additional Detail on Water Supply	2015 Actual Volume (AF)	2015 Water Quality
Groundwater	Bunker Hill	6,570	Drinking Water
Groundwater	Rialto-Colton	1,369	Drinking Water
Groundwater	Riverside North	1,070	Drinking Water
	Total	9,008	

Table 13-14. DWR Table 6-9R. Water Supplies – Projected (AF)

Water Supply	Additional Detail on Water Supply	Water Quality	2020	2025	2030	2035	2040
Groundwater	Bunker Hill	Drinking Water	6,783	6,994	7,408	7,991	7,991
Groundwater	Rialto-Colton	Drinking Water	4,375	4,511	4,778	5,154	5,154
Groundwater	Riverside North	Drinking Water	1,450	1,495	1,584	1,708	1,708
	Total		12,608	13,000	13,770	14,853	14,853

13.6 Water Supply Reliability Assessment

This chapter includes an assessment of how reliable Colton's water supplies might be during a dry period. This discussion focuses on the long-term (one to many years) reliability in response to below-normal precipitation. Colton maintains a number of interconnections with neighboring agencies that could be used to provide supplemental water during a short-term reduction in supply.

13.6.1 Constraints on Water Sources

Perchlorate was first detected in Colton's water supply wells in the Rialto-Colton Basin (RCB) in 1997. Colton evaluated best available treatment technologies for perchlorate, and two ion exchange treatment systems were installed in 2003 to treat water from three wells (Colton -15, - 17 and -24). These systems are still in use.

Ongoing investigations by Colton and others in 2009 and 2010 have shown that the perchlorate plume persists. Until basin-wide efforts are implemented by the responsible parties to remediate the perchlorate, Colton will continue to use wellhead treatment systems. Based on current conditions, water quality is not expected to affect Colton's supply reliability. However, water quality issues are constantly evolving. Colton will take action to protect and treat supplies when needed, though water quality treatment is known to have significant costs.

13.6.2 Reliability by Type of Year

In general, groundwater is less vulnerable to seasonal and climatic changes than surface water (i.e. local and imported) supplies. The 2015 Western-San Bernardino Watermaster, independently reviewed groundwater conditions in 2015 to assess the change in groundwater levels. Historically, the Watermaster permitted additional extraction beyond the specified water rights from the Bunker Hill Basin to decrease higher than optimal groundwater levels in the basin.

DWR defines a multiple-dry year period as "three or more consecutive years with the lowest average annual runoff." Currently and in the future Colton obtains its water supply from groundwater sources. Available groundwater supply is not expected to change, shown in Table

13-15, while demand is expected to increase ten (10) percent during single dry and multiple-dry years as shown in Table 13-21 and Table 13-22.

Table 13-15. Available Supply During Single and Multiple Dry Years

Year Type	Base Year	Volume Available	% of Average Supply
Average Year	2020	12,608	100
Single-Dry Year		12,608	100
Multiple Dry Year One		12,608	100
Multiple Dry Year Two		12,608	100
Multiple Dry Year Three		12,608	100

13.6.3 Regional Supply Reliability

Colton is committed to minimizing the need to import water from other regions. Colton participates in regional supply planning projects to optimize and enhance the use of local groundwater resources. Colton operates a number of conservation programs to implement various Demand Management Measures.

13.7 Water Shortage Contingency Planning

Water supplies may be interrupted or reduced significantly in a number of ways, such as drought which limits supplies, an earthquake which damages delivery or storage facilities, or a regional power outage. Earlier sections of this UWMP describe water shortage contingency planning for regional water supply sources (imported water, groundwater). This section focuses on water shortage contingency planning for City of Colton.

13.7.1 Stages of Action

13.7.1.1 Stage I: Normal Conditions

Water Conservation Stage I applies during periods when the City is able to meet all of the water demands of its customers. Water Conservation Stage I is in effect at all times unless the City Council otherwise declares that another water conservation stage is in effect pursuant to this chapter.

13.7.1.2 Stage II: Water Alert

Stage II applies during periods when the City will not be able to meet all of the water demands of its customers.

13.7.1.3 Stage III: Water Warning

Stage III applies during periods when the City will not be able to meet all of the water demands of its customers.

13.7.1.4 Stage IV: Water Emergency

Stage IV shall apply when the ordinary demands and requirements of City water customers cannot be satisfied without depleting the City water supply to the extent that there would be insufficient water for human consumption, sanitation and fire protection. A water shortage emergency includes both an immediate emergency, in which the City is unable to meet current water needs of persons within the City, as well as a threatened water shortage, in which the City determines that its supply cannot meet an increased future demand. The use of water shall be limited to essential household, commercial, manufacturing, or processing uses only, except where other uses may be allowed pursuant to a permit issued by the Department. Other restrictions may be necessary during a declared Water Shortage Emergency, to safeguard the adequacy of the water supply for domestic, sanitation, fire protection, and environmental requirements.

The stages are shown in Table 13-16.

Table 13-16. DWR Table 8-1R. Stages of WSCP

Stage	Percent Supply Reduction	Water Supply Condition
1	0	Normal Condition
2	15	Water Alert
3	25	Water Warning
4	50	Water Emergency

13.7.2 Prohibitions on End Uses

The water use prohibitions for each stage are shown in Table 13-17.

Table 13-17. DWR Table 8-2R. Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	CII - Restaurants may only serve water upon request	All restaurants are requested not to serve water to their customers unless specifically requested by the customer.	No
1	Landscape - Limit landscape irrigation to specific times	Use of potable water for irrigating or watering turf, gardens, landscaped areas, trees, shrubs, or other plants utilizing individual sprinkler systems should only be done between the hours of 6:00 p.m. and 10:00 a.m. (agricultural accounts are excluded from the time of irrigation restrictions). Drip irrigation and hand watering with a handheld hose or faucet filled bucket are exempt from this recommendation.	No
1	Landscape - Restrict or prohibit runoff from landscape irrigation	Sprinklers and irrigation systems should be adjusted to avoid overspray, runoff in excess of five (5) minutes, or other waste.	No

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Permitting potable water to escape from leaks within the customer's plumbing system. All water leaks from a customer's plumbing system shall be repaired in a timely manner.	Yes
1	Other - Prohibit use of potable water for washing hard surfaces	Use of potable water to clean sidewalks, walkways, driveways, parking areas, patios, porches, verandas, tennis courts, or other paved, concrete, or other hard surface areas, except where necessary for the benefit of public health or safety.	Yes
1	Other - Require automatic shut of hoses	Washing of automobiles, boats, trailers, aircraft, or other vehicles by hose without a shutoff nozzle and bucket, except to wash such vehicles at commercial or fleet vehicle washing facilities. Provided, however, such washings are exempt from these regulations when health, safety, and welfare of the public is contingent upon frequent vehicle cleaning, such as garbage trucks and vehicles used to transport food or perishables.	Yes
1	Water Features - Restrict water use for decorative water features, such as fountains	Use of potable water to clean, fill, or maintain decorative fountains, lakes, or ponds, unless such water is recycled.	Yes
2	CII - Other CII restriction or prohibition	The use of potable water for compaction, dust control, and other types of construction shall be allowed only pursuant to a permit issued by the Department. Use of potable water for such purposes shall be limited to the conditions of the permit or may be prohibited as determined by the Director or his designee.	Yes
2	CII - Restaurants may only serve water upon request	No restaurant, hotel, café, cafeteria or other public place where food is sold, served, or offered for sale, shall serve drinking water to any customer unless expressly requested.	Yes
2	Landscape - Limit landscape irrigation to specific times	Golf course customers and commercial nursery customers shall curtail all non-essential water use and shall irrigate or water turf, groundcover, gardens, landscaped areas, trees, shrubs, or other plants only between the hours of 10:00 p.m. and 6:00 a.m., where possible. These customers shall reduce their potable water consumption by 15% of their prior year's consumption for the comparable billing period.	Yes
2	Landscape - Limit landscape irrigation to specific times	The use of potable water for irrigating or watering turf, groundcover, gardens, landscaped areas, trees, shrubs, or other plants utilizing individual sprinkler systems shall only be permitted between the hours of 6:00 p.m. and 8:00 a.m. Agricultural accounts are excluded from the time of irrigation restrictions. Drip irrigation and hand watering with a handheld hose with a positive shutoff nozzle or faucet filled bucket are exempt from these restrictions.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	Landscape - Limit landscape irrigation to specific times	Outdoor irrigation and watering of turf, gardens, landscaped areas, trees, shrubs, or other plants utilizing individual sprinkler systems in parks, schools, publicly-owned property, and the public rights-of-way shall be permitted only between the hours of 10:00 p.m. and 6:00 a.m. These customers shall reduce their potable water consumption by 15% of their prior year's consumption for the comparable billing period.	Yes
2	Other	The use of potable water for compaction, dust control, and other types of construction shall be allowed only pursuant to a permit issued by the Department. Use of potable water for such purposes shall be limited to the conditions of the permit or may be prohibited as determined by the Director or his designee.	Yes
2	Other - Require automatic shut of hoses	Washing of automobiles, boats, trailers, aircraft, and other types of mobile equipment shall be prohibited unless done with a hand-held bucket or hand-held hose equipped with a positive shutoff nozzle for quick rinses. This section does not apply to the washing of the above-listed vehicles or mobile equipment when conducted at a commercial car wash utilizing a recycling system. Provided, however, such washings are exempt from these regulations when the health, safety, and welfare of the public is contingent upon frequent vehicle cleaning, such as garbage trucks and vehicles used to transport food or perishables.	Yes
3	CII - Other CII restriction or prohibition	Water used for compaction, dust control, and other types of construction shall only be authorized by a permit issued by the Department and shall be limited to the conditions of the permit or may be prohibited as determined by the Director or his designee.	Yes
3	Landscape - Limit landscape irrigation to specific days	Outdoor irrigation or watering of turf, groundcover, gardens, landscaped areas, trees, shrubs, or other plants by all golf course customers shall be permitted only on odd numbered days, between the hours of 11:00 p.m. and 6:00 a.m., unless the applicable irrigation system is equipped with an electronic moisture sensor control system and/or drip irrigation system. Golf course customers shall reduce their potable water consumption by 25% of their prior year's comparable billing period.	Yes
3	Landscape - Limit landscape irrigation to specific days	Outdoor irrigation or watering of turf, groundcover, gardens, landscaped areas, trees, shrubs, or other plants by commercial nursery customers shall be permitted only on even numbered days between the hours of 11:00 p.m. and 6:00 a.m., and only with a hand-held hose equipped with a positive shutoff nozzle or with drip irrigation. Commercial nursery customers shall reduce their potable water consumption by 25% of the customer's prior year's consumption for the comparable billing period.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
3	Landscape - Limit landscape irrigation to specific days	Outdoor irrigation or watering of turf, groundcover, gardens, landscaped areas, trees, shrubs, or other plants at all publicly-owned property shall be permitted only on even numbered days, between the hours of 11:00 p.m. and 6:00 a.m., unless the applicable irrigation system is equipped with an electronic moisture sensor control system and/or drip irrigation system. Water consumption at all publicly-owned property shall be reduced by 25% of the customer's prior year's comparable billing period unless they are using reclaimed water.	Yes
3	Landscape - Limit landscape irrigation to specific days	Outdoor irrigation or watering of turf, groundcover, gardens, landscaped areas, trees, shrubs, or other plants at schools shall be permitted only on odd numbered days, between the hours of 11:00 p.m. and 6:00 a.m., unless the applicable irrigation system is equipped with an electronic moisture sensor control system and/or drip irrigation system. Water consumption at all school property shall be reduced by 25% of the customer's prior year's comparable billing period.	Yes
3	Landscape - Limit landscape irrigation to specific days	Customers with addresses ending in an even number shall be permitted to irrigate or water on even numbered days only and customers with addresses ending in an odd number shall water on odd numbered days only. Such restrictions shall not apply to any customer whose property is equipped with an electronic moisture sensor control system and/or drip irrigation system. All watering shall be permitted only between the hours of 8:00 p.m. and 6:00 a.m.	Yes
3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Washing of automobiles, boats, trailers, aircraft, and other types of mobile equipment is prohibited. Washing of the above-listed vehicles or mobile equipment shall only be allowed at a commercial car wash utilizing recycling systems. Provided, however, such washings are exempt from these regulations when health, safety, and welfare of the public is contingent upon frequent vehicle cleaning, such as garbage trucks and vehicles used to transport food or perishables.	Yes
3	Other water feature or swimming pool restriction	Swimming pools, ornamental pools, fountain and artificial lakes shall not be filled or refilled after being drained.	Yes
4	CII - Other CII restriction or prohibition	The issuance of new water service connections and meters shall be prohibited.	Yes
4	CII - Other CII restriction or prohibition	No potable water shall be used for construction purposes. All construction meters shall be locked off or removed.	Yes
4	Landscape - Limit landscape irrigation to specific days	Commercial nursery customers shall water only on designated irrigation days (based on property address number) between the hours of 11:00 p.m. and 6:00 a.m. and only with a hand-held hose equipped with a positive shutoff nozzle or with a drip irrigation system.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
4	Landscape - Prohibit certain types of landscape irrigation	Outdoor irrigation or watering of turf, groundcover, gardens, landscaped areas, trees, shrubs, or other plants shall be prohibited for all other customers.	Yes
4	Other	Washing of vehicles or mobile equipment used for purposes such as garbage collection or transporting foods shall only be allowed when health, safety, and welfare of the public is contingent upon frequent vehicle cleaning, and shall be authorized only pursuant to a permit issued by the Department.	Yes
4	Other water feature or swimming pool restriction	The filling, refilling, or adding of water to uncovered swimming or wading pools and spas shall be prohibited at all times.	Yes
4	Water Features - Restrict water use for decorative water features, such as fountains	The operation of any ornamental fountain or similar structure shall be prohibited.	Yes

13.7.3 Penalties, Charges, Other Enforcement of Prohibitions

Violations – In addition to the remedy of criminal prosecution available to the City as described in Subsection 13.28.100, a violation of any water use restrictions of this chapter 13.28 currently in effect may result in the imposition of fines, water use restrictions, and/or termination of water service as set forth below:

1. First Violation – Notice of Non-compliance. A written warning, accompanied by a copy of this Ordinance, will be delivered by U.S. Mail and/or hung on customer’s door. Any such notice of violation shall specify a reasonable period to achieve compliance, and shall be directed to the customer of record for the premises where the noncompliance was observed.

2. Second Violation – Warning. A written warning and notice of the future imposition of a fine to be collected on the customer’s utility bill will be issued. Any such notice of violation shall require compliance within in three calendar days, and shall be directed to the customer of record for the premises where the noncompliance was observed. Delivery will be made by Certified U.S. Mail and/or by personal delivery with a declaration of delivery returned to the City Manager.

3. Third Violation (within one year). A citation will be issued and a fine of $100.00 will be imposed and collected on the customer’s next regular utility bill.

4. Fourth Violation (within one year of the first violation). A citation will be issued, a fine of $200.00 will be imposed and collected on the customer's next regular utility bill, and a flow restricting device will be installed on the meter serving the customer's property for a minimum of ninety-six (96) hours. The restricted flow shall meet minimum County Health Department standards, if any have been established. If the ninety-six-hour period ends on a weekend or holiday, full service will be restored during the next business day.

5. Fifth Violation (within one year of the first violation). A citation will be issued, a fine of $500.00 will be imposed, and service will be terminated for such period as the City Manager determines to be appropriate under the circumstances. Prior to termination of service, the customer may submit an appeal pursuant to the procedures set forth in Section 13.28.120. Written notice of a hearing to consider any appeal shall be mailed to the customer at least ten calendar days before the hearing.

6. Any person subject to a fine pursuant to this Section 13.28.100 may file an appeal pursuant to Section 13.28.120.

13.7.4 Consumption Reduction Methods

Colton offers various rebates to encourage conservation (i.e. ultra-low flush toilet replacements, high efficiency washing machines, etc.). Colton has a water rate structure that promotes water efficiency. The reduction goal is to balance supply and demand.

Table 13-18. DWR Table 8-3R. Stages of WSCP - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
3	Decrease Line Flushing	Prohibited use of potable water for sewer system maintenance or fire protection training without prior approval by the General Manager
1	Expand Public Information Campaign	

13.7.5 Determining Water Shortage Reductions

Under normal water supply conditions, production figures are recorded daily in Colton's computerized database. Total production and consumption by all categories of customers are reported monthly to City Water and Wastewater Department staff. During a Stage 1 or 2 water shortage, daily production figures will be reported to the Water and Wastewater Operations Manager, who will compare the weekly production to the target weekly production to verify that the reduction goal is being met. Weekly reports will be forwarded to the Director of Water and Wastewater. Monthly reports will be provided to the City Council, the Director of Water and Wastewater, and the Customer Accounts Department. The Customer Accounts Department will serve as the City's Water Shortage Response Team. If reduction goals are not met, the

Water Shortage Response Team will examine individual customer usages and identify corrective actions to be taken. During a Stage 3 or 4 water shortage, the same procedures will apply, with the addition of a daily production report to the Director of Water and Wastewater. During a disaster shortage, production figures will be reported on an hourly basis to the Water and Wastewater Operations Manager, and daily to the Director of Water and Wastewater, the Water Shortage Response Team, and the City Council.

13.7.6 Revenue and Expenditure Impacts

Surplus revenues are placed in Colton's reserve, which is used to fund emergency repairs and capital improvements for the water system. The financial reserve is adequate to address the costs of multiple plant repairs. The City projects that water shortages will have a minimal impact on water sales, and it is adequately funded to respond to emergencies. During a shortage, Colton anticipates increased staff costs, increased operation and maintenance costs, decreased water sales revenue, all of which will impact the reserve fund. Use of the existing reserve fund is the primary means to deal with revenue impacts due to shortage, but Colton will seek a rate adjustment in an extended shortage. If shortage is due to a natural disaster, Colton will seek funding assistance from the Federal Emergency Management Agency.

13.7.7 Resolution or Ordinance

Ordinances of the City Council of the City of Colton Prohibiting the Wasteful Use of Water and Setting Forth Regulations and Restrictions on Water Use are included in the City of Colton's most recent Water Conservation Rules and Regulations Ordinance Number 08-15, attached as Appendix G. Said ordinances include prohibitions on various wasteful water uses such as lawn watering during mid-day hours, washing sidewalks and driveways with potable water, and allowing plumbing leaks to go uncorrected more than 24 hours after customer notification.

13.7.8 Catastrophic Supply Interruption

In the event of a water shortage emergency resulting from equipment failure, power outage, or other catastrophe, Colton is prepared to purchase emergency water supplies from nearby agencies while repairs or other remedial actions are underway. Colton may also implement its four-stage plan for conservation, as described above, with either voluntary or mandatory reductions depending on the severity of the shortage. For severe disasters (Stage 4), mandatory water use reductions are specified.

13.7.9 Minimum Supply Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the years 2016 to 2018, assuming years 2016 to 2018 repeat the driest three-year historic sequence for each water supply source. As shown in Table 13-19, total supplies, given a repeat of historically low conditions on all water supplies, would be approximately 12,608 AFY. Colton has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

Table 13-19. DWR Table 8-4R. Minimum Supply Next Three Years (AF)

Available Water Supply	2016	2017	2018
Available Water Supply	12,608	12,608	12,608

13.8 Supply and Demand Assessment

Projected water use was estimated based on population growth rates derived for each jurisdiction served by Colton. The growth rates were applied to 2015 water demands to derive estimated future water demands shown in Table 8-24. Colton assumes no change in supply and a 10 percent increase in demands for Single and Multi-Dry year periods, shown in Table 13-21 and Table 13-22.

Table 13-20. DWR Table 7-2R. Normal Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	12,608	13,000	13,770	14,853	14,853
Demand Totals	10,458	11,301	11,978	12,698	13,462
Difference	2,150	1,699	1,792	2,155	1,391

Table 13-21. DWR Table 7-3R. Single Dry Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	12,608	13,000	13,770	14,853	14,853
Demand Totals	11,504	12,431	13,176	13,968	14,808
Difference	1,104	569	594	885	45

Table 13-22. DWR Table 7-4R. Multiple Dry Years Supply and Demand Comparison (AF)

Year	Totals	2020	2025	2030	2035	2040
First Year	Supply Totals	12,608	13,000	13,770	14,853	14,853
	Demand Totals	11,504	12,431	13,176	13,968	14,808
	Difference	1,104	569	594	885	45
Second Year	Supply Totals	12,608	13,000	13,770	14,853	14,853
	Demand Totals	11,504	12,431	13,176	13,968	14,808
	Difference	1,104	569	594	885	45
Third Year	Supply Totals	12,608	13,000	13,770	14,853	14,853
	Demand Totals	11,504	12,431	13,176	13,968	14,808
	Difference	1,104	569	594	885	45

14 City of Rialto

14.1 System Description

Three different entities provide water service to different portions of the City of Rialto: the City itself (through its water system operator {Veolia, through Rialto Water Services}), the West Valley Water District (WVWD), and the Fontana Union Water Company (FUWC). Each agency has its own water supply and resources, and must meet its demands through those resources. The City of Rialto municipal water system provides potable, non-potable, and recycled water at retail to customers primarily within the City of Rialto and serves approximately one-half of the population of the City, or approximately 54,000 customers as of December, 2015. The service area is essentially the incorporated area of the City of Rialto located between Interstate 10 and State Route 210.

The City's water supply sources consist of water from canyon surface flows on the east side of the San Gabriel Mountains, including the North Fork Lytle Creek, Middle Fork Lytle Creek and South Fork Lytle Creek which is treated at the Oliver P. Roemer Water Filtration Plant. The City also receives water through the Baseline Feeder from SBVMWD and from fourteen wells in the five ground water basins. All five of the ground water basins have been adjudicated and are managed. Relevant portions of these adjudications and judgments are provided in Appendix K. In addition, recycled water is available from the City's Wastewater Treatment Plant.

The City of Rialto sits at the base of the San Bernardino Mountains in the interior valley known as the San Bernardino Valley and within the Santa Ana River Basin Watershed. The topography ranges from 1120 feet to a high of 1520 feet above sea level. The City's service area encompasses approximately 89 square miles within the central area of the City and provides service to approximately 54,453 customers as of December, 2015. Land use within the service area is principally composed of single and multi-family residences, a centralized business and commercial district, and some institutional and industrial areas.

The City distributes its water to its 11,956 service connections through a 162-mile network of distribution mains with pipelines sizes ranging from 2 to 48 inches. The water system consists of three pressure zones and three subzones that provide sufficient water pressure to customers. The water service area is shown in Figure 14-1.

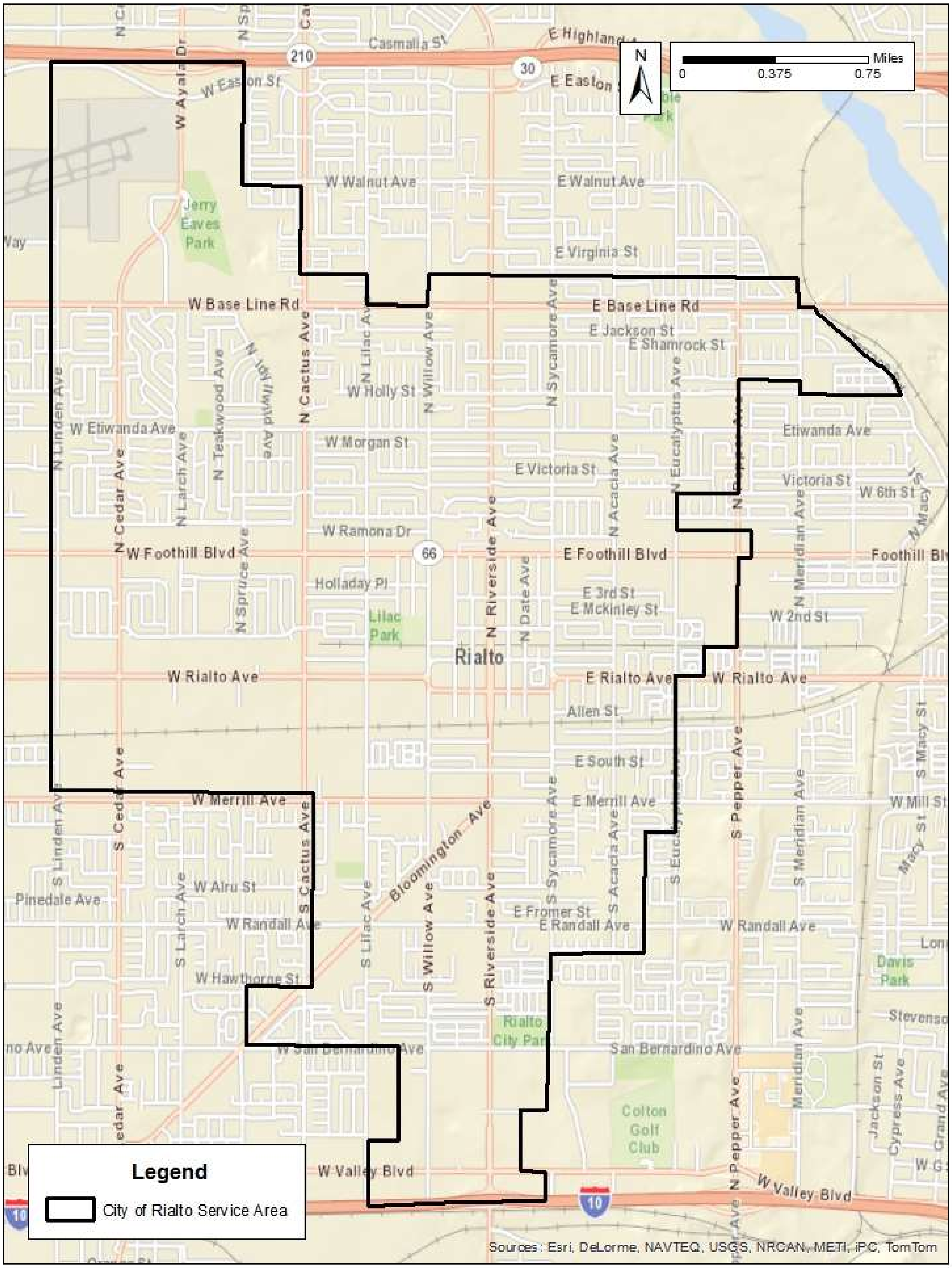

Figure 14-1. City of Rialto Service Area

14.1.1 Service Area Population and Demographics

For the 2015 UWMP cycle, the California Department of Water Resources (DWR) developed a GIS-based tool to estimate the population within a water agency's service area using census data. This tool was used to intersect Rialto's water service area with compiled census data to estimate historic populations for Rialto's water service area. The tool provided service area populations for 1990, 2000, and 2010 using census data. The tool also used the number of residential connections in 2010 and 2015 to estimate a 2015 service area population of 54,453.

For future populations, the Southern California Association of Governments (SCAG) has developed a forecast called the 2012 Adopted Growth Forecast. As part of the 2012 Adopted Growth Forecast, SCAG has estimated the population in 2020 and in 2035 inside each of approximately 4,000 traffic analysis zones (TAZ) that cover southern California. GIS software was used to intersect Rialto's service area with the SCAG projections to calculate an estimated annual growth rate of approximately 0.9 percent through 2020 and approximately 1.2 percent after 2020. These growth rates were applied to estimate population for years beyond 2015.

Table 14-1. DWR Table 3-1R. Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040
Population Served	54,453	56,988	60,401	64,018	67,852	71,916

14.1.2 Service Area Climate

Rialto's climate typically exhibits hot, dry summers and mild, wet winters. Climate change has the potential to impact water supplies and demands for Rialto. Water demands could increase if summer temperatures rise, or if there are more days with high temperatures. Most rainfall occurs during the months of November through April. The hottest and driest period of the year is from June through September. It is not unusual during the summer months to have several consecutive days that the daily temperature exceeds 100 degrees Fahrenheit.

Rialto participates in regional planning efforts that considered potential impacts of climate change. The 2015 Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IRWMP) included a discussion of climate change and its potential impacts on water demand. The IRWMP included a Climate Change Vulnerability Assessment. The Checklist is included in Appendix F of this document. Some areas identified in the vulnerability assessment include wildfires and potential erosion impacts on water quality, as well as floods and potential impact on water facilities.

Average temperature, precipitation, and evapotranspiration by month are shown in Table 14-2. Evapotranspiration (ET) is the water lost to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity. ET from a standardized grass surface is commonly denoted as ETo.

Table 14-2. Historical Climate Data

Month	Average Temperature (°F)[1]	Average Precipitation (in.)[1]	Average Standard ETo (in.)[2]
January	52.4	3.22	2.53
February	54.6	3.25	2.87
March	56.7	2.86	4.30
April	60.9	1.29	5.38
May	65.6	0.47	5.82
June	71.3	0.09	6.76
July	77.7	0.04	7.38
August	77.7	0.15	7.09
September	73.9	0.33	5.51
October	66.5	0.71	3.97
November	58.6	1.32	2.89
December	53.3	2.38	2.38
Total P / Avg. ETo		16.1	56.9

Notes:
[1]NOAA weather station 0407723 in San Bernardino; data from 1893 through 2004; http://wrcc.dri.edu
[2]ETo data for CIMIS weather station 44 at University of California, Riverside; http://wwwcimis.water.ca.gov/

14.2 System Water Use

14.2.1 Water Uses by Sector

Rialto is expected to experience moderate increases in water consumption due to population increases and implementation of water conservation efforts. Per capita consumption rates are expected to remain in compliance with the law (SB X7-7). Future water use projections must consider significant factors on water demand, such as development and/or redevelopment, and climate patterns, among other less significant factors which affect water demand. Although redevelopment is expected to be an ongoing process, it is not expected to significantly impact water use since the City’s service area is near "built-out" condition. Rainfall or lack of rainfall will continue to extend a major influence on demand as drought conditions will increase demand at a time when water supplies are limited and may therefore result in water use restrictions in accordance with Rialto's Emergency Conservation Plan Ordinance.

Rialto categorizes customers as Single Family Residential, Commercial/Institutional, Landscape Irrigation, Hydrant, Wholesale, and Recycled Water users. For the purposes of this plan Single Family Residential includes multi-family connections as well. Water deliveries for each customer class for the years 2011 through 2015 are shown in Table 14-3.

Table 14-3. DWR Table 4-1R. Demands for Raw and Potable Water – Actual (AF)

Use Type	Level of Treatment When Delivered	2011	2012	2013	2014	2015
Single Family	Drinking Water	6,948	7,410	7,313	6,794	5,561
Commercial / Institutional	Drinking Water	1,988	2,553	2,046	2,149	1,771
Landscape	Drinking Water	466	542	510	469	303
Hydrant Meters	Drinking Water	62	-6	65	60	78
Nonrevenue	Drinking Water	2,535	1,803	419	728	1,058
	Total	11,999	12,302	10,353	10,200	8,771

The anticipated population growth rates were applied to 2015 water demands to derive estimated future water demands for 2020 through 2040 shown in Table 14-4. Per-capita consumption was expected to rebound from its 2015 value, which was impacted by mandatory drought restrictions, but remain below the 2020 compliance target. Rialto does not anticipate any routine or single large water sales to other agencies in the future. Rialto does not anticipate future water use related to saline barriers or groundwater recharge operations. For the purpose of projections, nonrevenue water is assumed to be 10 percent of sales. Rialto will continue efforts to decrease water loss and thereby reduce gallons per capita per day of water use.

Table 14-4. DWR Table 4-2R. Demands for Raw and Potable Water – Projected (AF)

Use Type	Level of Treatment	2020	2025	2030	2035	2040
Single Family	Drinking Water	6,924	7,338	7,778	8,244	8,737
Commercial / Institutional	Drinking Water	2,205	2,337	2,477	2,625	2,783
Landscape	Drinking Water	377	400	424	449	476
Hydrant Meters	Drinking Water	97	103	109	116	123
Nonrevenue	Drinking Water	960	1,018	1,079	1,143	1,212
	Total	10,563	11,196	11,866	12,577	13,330

Table 14-5. DWR Table 4-3R. Total Water Demands (AF)

Demand	2015	2020	2025	2030	2035	2040
Potable and Raw Water	8,771	10,563	11,196	11,866	12,577	13,330
Recycled Water Demand	24	20	20	20	20	20
Total Water Demand	8,795	10,583	11,216	11,886	12,597	13,350

14.2.2 Distribution System Water Losses

According to the AWWA Water Audit for the year 2015, the City of Rialto experienced losses that were equal to approximately 9.6 percent of total use. Water losses in the 10 percent range are typical of many water agencies. Rialto currently has a meter replacement program for leaking or broken meters and is in the process of calibrating all meters in the distribution system. These programs will increase the efficiency of the water distribution system by decreasing future water losses; however, water losses cannot be prevented entirely.

Table 14-6. DWR Table 4-4R. Water Loss Summary Most Recent 12 Month Period Available

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss
01/2015	842

14.2.3 Estimating Future Water Savings

Rialto is committed to long-range planning to provide a reliable, cost-effective water supply to its customers. Rialto actively monitors water consumption in its service area, and prepares required monthly reports for the State Water Resources Control Board.

Rialto has projected that future demands will increase at a percentage growth rate that incorporates two factors: the percentage growth in service area population, and potential changes in the per-capita consumption. This approach provides estimates for future system-wide demand that can be used for long-range planning.

In the 2015 UWMP, water suppliers have the option of preparing more detailed demand forecasts by estimating demand factors based on land use categories. For example, Rialto could identify typical water use per single family customer and per commercial account. These customer classes can be further sub-divided by lot size, neighborhood, or other variables. The intent is to quantify the estimated water use per customer in different customer classes, and then to forecast how future changes will impact water use within each customer class.

For this document, Rialto has elected not to develop land use-based demand factors and apply future savings from codes and standards. Recent drought regulations have induced significant changes in water consumption patterns, and there is considerable uncertainty as to how demands will change in the future if the drought subsides. Given this uncertainty, Rialto elected not to quantify passive savings for this UWMP.

14.2.4 Water Use for Lower Income Households

Senate Bill 1087 requires water use projections in an UWMP include the projected water use for single-family and multi-family residential housing 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. The City of Rialto adopted its General Plan Update in 2010. According to the updated housing element in the Rialto General Plan, it is estimated that about 44 percent of all Rialto households qualify as lower income. It should be noted that approximately half of the City of Rialto is within the City's water service area, while the other half is served by WVWD and Fontana Union Water Company. However, a detailed breakdown of the household income categories within the water service area was not available; therefore, the City-wide estimate of 44 percent was used. These lower-income water demands have been included in future demand projections.

Table 14-7. Estimated Demands for Lower-Income Households (AF)

Demand	2015	2020	2025	2030	2035	2040
Residential	2,450	3,051	3,234	3,427	3,632	3,850
Total	2,450	3,051	3,234	3,427	3,632	3,850

14.3 SB X7-7 Baselines and Targets

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). Rialto is using method one to calculate the Compliance and Interim Water Use Targets as set forth by Water Code section 10608.20(b). The Method One calculation is done by taking 80 percent of the urban water supplier's baseline GPCD.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95 percent of a 5-year average base gross water use from 2003 to 2010. The Maximum Allowable GPCD is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBX7-7 legislation. Specifically, if an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as their target.

14.3.1 Updating Calculations from 2010 UWMP

In the 2010 UWMP, Rialto calculated a baseline water use of 210 GPCD. Rialto used Target Method 1 to calculate a compliance water use target of 171.1 GPCD for 2020, and an interim water use target of 192.4 GPCD for 2015. In 2010, the actual consumption was calculated as 187 GPCD.

For the 2015 UWMP cycle, DWR has made a GIS-based population tool available to calculate service area population using Census Bureau data. Rialto used this tool to re-calculate its service area population, baseline per-capita use, and compliance targets.

14.3.2 Baseline Periods

The years 1998 to 2007 have been selected for calculation of the 10-year base period, while years 2003 to 2007 have been selected for calculation of the 5-year base period. The 10-year average Base Daily Per Capita Water Use for Rialto is 213.8 GPCD; the 5-year is 210 GPCD.

14.3.3 Service Area Population

Rialto's service area population was calculated using the DWR population estimation tool. The tool directly calculated a service area population for 1990, 2000, and 2010. Populations for intermediate years were calculated by assuming a constant growth rate between census years.

14.3.4 Gross Water Use

The calculation of gross water use begins with the total amount of water that was put into the potable water distribution system by Rialto. Water that was exported to another agency was then subtracted, to leave the amount used by Rialto's retail customers.

Water delivered to agricultural customers was included in the urban water demand because those customers, although designated as agricultural customers, receive water from Rialto's potable system and use that water to meet both potable and irrigation demands.

For the period of 1998 to 2007, gross water use in the Rialto service area fluctuated between 11,891 and 15,465 acre-feet per year.

14.3.5 Baseline Daily per Capita Water Use

For the period from 1998 through 2007, the average base daily per capita water use is 213.8 GPCD.

14.3.6 2015 and 2020 Targets

In addition to calculating base gross water use, SBX7-7 requires the retail water supplier to identify its demand reduction targets. The methodologies for calculating demand reduction targets were described above. Rialto is choosing to meet SBX7-7 targets as an individual agency rather than as part of a regional alliance. Rialto has selected Method 1 to calculate its 2020 Compliance Water Use Target and Interim Water Use Target. The resulting Compliance Water Use Target is 171.1 GPCD and the Interim Water Use Target is 192.4 GPCD. The Maximum Allowable GPCD (95% of the 5 Year Baseline GPCD) is 199. The Compliance Water Use Target, under Method 1 (171.1 GPCD) is less than the Maximum Allowable GPCD, so no adjustments to the Compliance Water Use Target are necessary.

Table 14-8. DWR Table 5-1R. Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD	2015 Interim Target	Confirmed 2020 Target
10-year	1998	2007	213.8	192.4	171.1
5-year	2003	2007	217		

14.3.7 2015 Compliance Daily per Capita Water Use

The City of Rialto's GPCD decreased to 143.8 for 2015. The 2015 interim target GPCD is 192.4. Rialto meets the requirement and is on-track to meet the 2020 target GPCD of 171.0.

Table 14-9. DWR Table 5-2R. 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Extra-ordinary Events	Economic Adjustment	Weather Normal-ization	Total Adjustments	Adjusted 2015 GPCD	2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015?
143.8	192.4	0	0	0	0	143.8	143.8	YES

14.4 Demand Management Measures

14.4.1 Demand Management Measures

In September 2009 the City of Rialto joined the California Urban Water Conservation Council and has implemented a number of the DMMs defined in the act. Rialto has not developed a Best Management Practice Report to accompany this Plan. The following Section identifies the water demand management measures currently implemented or scheduled for implementation by Rialto. Water in the City of Rialto is provided by the City, SBVMWD and WVWD. Water conservation programs and incentives offered by the City will also benefit SBVMWD and WVWD. In order to effectively implement water conservation programs, Rialto would need to collect data for the user within the Rialto Water Service area only. Rialto recognizes that these measures are important for the reliability of its water sources and has made a continued effort to comply with the DMMs required by the act.

14.4.1.1 Water waste prevention ordinances

The City Ordinance Number 1560 Chapter 12.20: Water Conservation Requirements included in Appendix G outlines efficient water use measures and four stages of increasingly restrictive prohibition with related penalties for non-compliance. The goal of this ordinance is to outline restrictions put in place to help the City of Rialto reduce potable water consumption by 26 percent compared to 2013.

14.4.1.2 Metering

All existing and new water services are metered throughout the Rialto water service area. A water meter calibration and replacement program is in place to continually improve accurate meter readouts. New services, with the exception of single-family residences and apartment complexes up to and including four units per meter, are required to install a separate water meter for the on-site landscaping. Rebate incentives are offered to Mobile Home Parks for installation of sub-meters.

14.4.1.3 Conservation pricing

The conservation tiered rate structure use by Rialto, where efficient water use is billed at a low price and higher water use billed at progressively higher prices provides the economic incentives to customers to use water efficiently. Rialto recently conducted a study of a water conservation tiered rate structure for implementation wherein each customer is given a water budget and if that budget is exceeded, the customer must pay a penalty, or a higher water rate, for that portion of water that exceeds the water budget. The study, conducted in March, 2012, projected water and wastewater rates through 2017 based on water and wastewater system expenses, revenues, rates, and financial plans. Rialto is currently a recipient of a Proposition 84 Grant through SAWPA for investigation and possible implementation of an efficiency-base water rate structure that will calculate indoor and outdoor water allocation for each household with volume charge tiers associated with an efficiency-based water rate. First tier is the indoor water use budget. Second tier the indoor plus outdoor water use. Third tier water use exceeding the indoor and outdoor allocation, this being the most expensive.

14.4.1.4 Public education and outreach

At a regional level, SBVMWD coordinates a regional water conservation outreach campaign in which Rialto is a participant. The regional effort includes branding a regional water conservation effort through iEfficient using advertisements on billboards, local newspaper, radio stations, public service announcements, theaters, buses, mobile applications, websites, social media and at local events.

At the local level, Rialto provides outreach communication and information regarding conservation efforts, rebates and incentives to its customers through water bill inserts, direct mailers, newsletters, door hangers, direct phone calls, emails, websites, social media, business partnerships, tri-annual Rialto Progress Magazine, community forums, educational programs, and information booths at fairs, public events, and water walk events. On an annual basis, Rialto Water Services/Veolia Water, the City of Rialto's water operator, holds an open house event that invites local school children and parents to participate in an all-day event promoting water conservation and educating the public in general on water issues. The customer's monthly bill includes a consumption usage chart that compares to prior years in an easy to understand format, informing customers of progress towards conservation targets.

14.4.1.5 Programs to assess and manage distribution system real loss

Rialto has an active Visible Leak Detection Program to decrease leak response times and minimize water loss throughout the water distribution system. Leaks are repaired within two days of discovery. Three field meter reader and two production operator employees staff the program five days per week. Meter readers are required to inspect elements in the water distribution system as they travel respective routes throughout the city. This includes meter boxes, fire hydrants, air-vacuum units, above ground piping and appurtenances. They also look for signs of leaks in soil and paved areas in the routes. Two production operators also check wells, tanks, booster pumps and appurtenant equipment for leaks each day of the business week. The leak detection activity is conducted as part of routine duties assigned and imbedded in the operations routine activities.

14.4.1.6 Water conservation program coordination and staffing support

The Water Conservation Program, an active program to encourage efficient use of Rialto's Water Resources is a coordinated effort throughout Rialto's services area. One full time staff coordinates conservation programs, including outreach, and education programs. Another full time associate dedicates more than half their time on rebates and incentive programs. Other associates also contribute resources providing customer services assistance to administer collections of water waste reports and enforcement of non-compliance by water customers to the current water conservation stage. Other staff coordinates with new development, conditions and enforce the use of water efficient measures. The program sponsors landscaping classes for the community taught by professionals to promote more drought tolerant landscaping. The program is administered and funded through the operations of the Water Services.

14.4.1.7 Other demand management measures

Rebates, incentives and giveaways are offered to all water customers promoting efficient use of Rialto's Water Resources. Current rebates offered to all customers include installation of high efficiency toilets, high efficiency washing machines, weather based smart irrigation timers, automatic shut off nozzle and turf replacement. The Commercial, Industrial and Institutional customers also receive additional special incentives depending on the individual circumstances. For example, incentives are offered to car wash establishments to retrofit with recycle water treatment in the operations; or incentives are offered to mobile home parks for sub-metering projects. Rebates and incentives are continually changing to meet the needs of the program.

14.4.2 Planned Implementation to Achieve Water Use Targets

Rialto's current per-capita consumption is less than its 2020 compliance target. Rialto expects to continue to implement current conservation programs to encourage conservation and maintain per-capita consumption below the compliance target.

14.5 System Supplies

The City of Rialto municipal water system generally obtains supplies from the following different types of sources:

1) Water delivered by SBVMWD through the Baseline Feeder: In 1991, the City contracted with SBVMWD for SWP water in lieu of water produced in the Bunker Hill Basin. The water is delivered through a 48-inch transmission main. The agreement, referred to as the Baseline Feeder adds approximately 2,500 acre feet (AF) per year of supplemental water to the City's existing supplies.
2) Groundwater from five different adjudicated groundwater basins; relevant portions of these adjudications and judgments are provided in the Appendices. The City's primary source of water is from the City owned groundwater wells within five different groundwater basins in the upper Santa Ana River Basin. The five basins are the Rialto Basin, Lytle Creek Basin, Chino Basin, North Riverside Basin and the Bunker Hill Basin. There are a total of fourteen City wells, of which five are operational.

3) Surface water from canyon surface flows on the east side of the San Gabriel Mountains, including the North Fork Lytle Creek, Middle Fork Lytle Creek and South Fork Lytle Creek which is treated at the Oliver P. Roemer Water Filtration Plant. The WFF is owned and operated by the WVWD, and the City of Rialto has a 25% share in the Facility.
4) Emergency stand-by agreements with the City of San Bernardino and Riverside-Highland Water Company.
5) Recycled water is available from the City's Wastewater Treatment Plant.

All three main sources of water are under stress due to the current drought conditions in the Southern California region. In addition, there is perchlorate contamination in a number of the City wells. The total impact of these issues on the groundwater is a reduction of total pumping capabilities. Currently a total of five of the City's fourteen (14) wells are operational. The City is pursuing a remediation plan for the clean-up of perchlorates in the groundwater through legal actions against past entities to obtain reimbursement for the City's cost in the cleanup of perchlorates in the groundwater.

14.5.1 Purchased or Imported Water

In 1991 the City contracted for SWP water from SBVMWD, for an additional water supply source. This agreement adds approximately 2,500 acre-feet (AF) per year of supplemental water to the City's existing supplies. At the same time the City entered into a joint venture agreement with Valley District, WVWD and the Riverside Highland Water District to construct the Baseline Feeder. The Baseline feeder is a 48-inch transmission main with a capacity of 60 mgd designed to transport water from the Bunker Hill basin west to the Rialto area in lieu of SPW for which Rialto had contracted. The City has a contract with Valley District for delivery of 2,500 AFY to be provided by Valley District for 20 years with two 10-year options to renew. The City owns 33 percent of the pipeline from Meridian Avenue and Baseline Road to Cactus Avenue and Baseline Road. In 1991 the City and WVWD entered into an agreement with SBVMWD to participate in the financing of reaches one and two of the pipeline. The City and WVWD were then obligated to purchase 2,500 AFY and 5,000 AFY respectively, at an approximate cost of $130 to 140 per acre foot for 20 years. The City has been taking more than the 2,500 AFY due to the transfer by WVWD of a portion of its share to the City. If WVWD is in need of additional water, the Rialto supply will be reduced to their allotted supply.

In addition to the SBVMWD supply through the Baseline Feeder, City Well #4A pumps from the Bunker Hill Groundwater Basin into the Baseline Feeder. The City then takes the water produced from Well #4A or a portion thereof from the Baseline Feeder when needed. The production of Well #4A is reflected in the water supplied through the Baseline Feeder from Valley District.

In 1991, the City entered into an agreement with WVWD to jointly construct and own a 1.0-million-gallon reservoir and booster station to boost water from the wells in the 9th Street and Lytle Creek Wash areas into the Baseline Feeder. The City has one-third ownership in the reservoir and booster station. The reservoir acts as a stilling well to remove entrapped air from the well discharges.

The City is also able to take delivery through the Baseline Feeder of water from the City of San Bernardino (SBMWD). This water is provided by SBMWD, up to 3,000 gpm, from the Newmark Groundwater Contamination Superfund Site. This water is considered surplus water by SBMWD, and it may be suspended when SBMWD needs the water to meet its own demands.

14.5.2 Groundwater

Groundwater currently supplies the majority of Rialto's total supply, and the City will continue to rely on groundwater as its preferred source of supply, augmented with surface supplies and Valley District supplies. Moreover, since the City will continue to have access to imported water, the City's decision will also add to its supply reliability over the next 25 years. The City will also continue to benefit indirectly from regional conservation efforts and also through efforts to augment its supplies and improve its emergency storage capabilities.

Rialto has facilities to extract water from five groundwater basins.

14.5.2.1 SBBA (Bunker Hill and Lytle)

The City currently has two wells in the Bunker Hill Basin, City Well #4A and #6, and also purchases Bunker Hill groundwater produced by SBVMWD and delivered through the Baseline Feeder. There are no restrictions on Rialto's extractions from the Bunker Hill Basin except within the area of the Lytle Creek Region and the City of San Bernardino's groundwater management zone, which restricts new or additional pumping. Restrictions on the City of Rialto's pumping rights from the Bunker Hill Basin are that all the water is to be used within the boundaries of the SBVMWD.

The City owns groundwater extraction rights in the Lytle Creek groundwater basin. The basin was adjudicated under the 1924 Judgment No. 17030 from the Superior Court of San Bernardino County and is based on the City's stock ownership in the Citizens Land and Water Company, the Lytle Creek Water and Improvement Company, and the companies that the City acquired which were named in the 1924 Judgment (Rialto Domestic Water, Rancheria Water Company and Mutual Water Company). The 1924 Judgment restricts the place of users and rate of extraction for the right to export out of the Lytle Creek Region. The Lytle Creek Region is comprised of the entire Lytle Creek Basin and some portions of the Bunker Hill Basin.

The Lytle Creek Groundwater Basin is highly porous and easily replenished during heavy precipitation years. Recharge for the basin is from storm runoff in the Lytle Creek watershed and from percolation of SWP Water by the SBVMWD. The depth of groundwater in the basin varies from 50 feet to 400 feet depending on whether the area is in a drought or wet cycle. Well production varies in the basin as the basin levels change from year to year. The City's long term water supply from the basin varies from 1,700 to 5,000 acre-feet per year. There is no known contamination within the basin and no contamination is expected in the future.

14.5.2.2 Rialto-Colton

The City of Rialto has groundwater extraction rights in the Rialto-Colton Basin. The basin was adjudicated under the 1961 Decree No. 81,264 of the Superior Court of San Bernardino County, and is managed by the Rialto Basin Management Association (stipulated parties of the judgment). When the basin's three index wells (WVWD Well No. 11 and 13, and Rialto's Well 4) average mean groundwater level elevations is above 1002.3 feet when measured during March, April or May, the City has no restrictions on yearly extractions. The City has no restrictions on the rate of pumping per minute or day. When the average standing water levels in the three index wells falls below 1002.3 feet msl and is above 969.7 feet msl, the City is restricted to total groundwater extractions of 4,366 AFY. This extraction right is based on the City's listed rights in the decree, ownership of wells listed in the decree, stock ownership in the Citizens Land and Water Company and stock ownership in the Lytle Creek Water and Improvement Company. The extraction rights listed in the 1961 decree total 15,290 AFY.

When the average of the three index wells drops below 969.7 feet msl, ground water extractions are reduced for all parties stipulated in the decree by 1 percent per foot below the 969.7-foot level, but not to exceed 50-percent reduction. For 2015, the groundwater levels in the index wells led to a 30-percent reduction in allowable production.

Several other entities withdraw water from the Rialto Basin. The Fontana Union Water Company has one well located within the basin, but was omitted from the adjudication decree. This well has a history of producing an average of 950 to 1050 AFY. In recent years this well has produced over 3,000 AFY. There are other overlying riparian rights owners that pump from the basin. These overlying riparian rights owners are expected to extract up to 800 AFY. Extractions from the Rialto Basin have been limited in recent years due to groundwater contamination plumes of volatile organic compounds (VOC) from the Mid Valley Landfill and perchlorate from abandoned rocket fuel plants in the northern parts of the City. A groundwater treatment program is in place to extract and remove VOC's.

The City has entered into an agreement with the County of San Bernardino to lease 1,600 AFY of its water rights during drought conditions in order to allow the San Gabriel Valley Water Company to extract and remove VOC's from the contaminant plumes. A separate agreement provides Rialto with funding to drill a new well to make up for the lost supply. The agreement is in effect until the year 2020. The long term drought water supply for the City from the Rialto Basin is expected to be approximately 2,700 AFY (4,600 AFY minus 1,600 AFY for SGVWC) when the index wells for the basin are between 1002.3 feet and 969.7 feet msl. When the index wells drop below 969.7 feet msl, the City pumping rights could be restricted to as little as 583 AFY (4,366 x 50% minus 1,600).

Valley District has stored up to 43,000 acre feet of SWP Water in the Rialto Basin over the last 25 years. The City's agreement with SBVMWD allows the City to purchase SBVMWD stored water by additional pumping from the Rialto Basin. This pumping does not count against the City's 1961 decree extraction rights.

14.5.2.3 Chino Basin

The Chino Basin consists of approximately 235 square miles of the upper Santa Ana River Watershed. The Chino Basin is an alluvial valley that is basically flat in the east-west direction and slopes north to south at an approximate grade of one to two percent. Elevations in the valley range from 2000 feet to 500 feet above sea level at Padre Dam. The Chino Basin is one of the largest groundwater basins in Southern California with about 5,000,000 acre-feet of water and an unused storage capacity of 1,000,000 acre-feet.

The Chino groundwater basin was adjudicated in 1978 by Judgment entered in the lawsuit captioned Chino Basin Municipal Water District v. City of Chino, San Bernardino County Superior Court Case No. 164327, designated as Case No. RCV 51010, which was updated in 2000 by the "Peace Agreement", and is managed by the court appointed Chino Basin Watermaster. The Judgment declares that the safe yield of the Chino Basin is 140,000 acre-feet. The adjudicated boundary on the east portion of the basin does not follow the exact geologic boundary. The City of Rialto does not have groundwater extraction rights under the 1978 Judgment.

The City has one well that is located within "No Man's Land", which is the area within the hydro-geologic Chino Basin but outside of the adjudicated Chino Basin boundary. The City does not have judicially imposed limitations on extractions for this well. The City's long term water supply from "No Man's Land" (Chino Basin) is estimated to be between 2,000 and 3,000 AFY. The groundwater basin has nitrate contamination and normally the wells in this area must be sealed to a minimum depth of 350 feet below ground surface to prevent nitrate inflow above the maximum contaminant level of 45 mg/l for nitrates.

14.5.2.4 Riverside North

The City has one well, Chino 2, that produces from the Riverside North Basin. This basin was discussed further in Chapter 2.

Rialto's historical production for the past five years is shown in Table 14-10.

Table 14-10. DWR Table 6-1R. Groundwater Volume Pumped (AF)

Groundwater Type	Location or Basin Name	Water Quality	2010	2011	2012	2013	2014	2015
Alluvial Basin	Rialto-Colton	Drinking Water	2,769	2,206	2,271	2,129	1,456	1,498
Alluvial Basin	Riverside North	Drinking Water	245	803	976	555	567	1,238
Alluvial Basin	Lytle Creek	Drinking Water	1,990	1,336	866	1,463	2,344	1,757
Alluvial Basin	Bunker Hill	Drinking Water	1,981	870	932	1,533	937	971
	Total		6,985	5,216	5,046	5,681	5,304	5,464

14.5.3 Surface Water

The City of Rialto has a total of 115.63 miner's inches (1.0 miners inch =9.0 gpm) or 1,040.67 gallons per minute of surface water diversion rights in Lytle Creek. The surface water diversion rights for Lytle Creek were determined in the 1897 McKinley Decree entered in Los Angeles

Superior Court Case No. 20,790. The City of Rialto owns 21.98% of the shares of the Lytle Creek Water & Improvement Company. The Lytle Creek Water & Improvement Company realized a total of 329.39 miner's inches from the decree. The City obtained 72.4 miners inches from its stock shares in the Lytle Creek Water & Improvement Company. The City also obtained an additional 43.23 Miners inches of Lytle Creek surface water diversion rights when the City purchased the Rialto Domestic Water Company.

The City utilizes all of its surface water diversion rights in Lytle Creek through its ownership of 1.5 mgd of capacity in the Oliver Roemer Water Filtration Facility that WVWD owns and operates. The surface water from Lytle Creek is diverted by Southern California Edison at the mouth of Lytle Creek Canyon to generate electrical power at its Fontana Power Plant located on the east side of Riverside Avenue at the intersection of Linden Avenue. WVWD bills the City for its portion of the WFF operation and maintenance costs.

When the flows at the mouth of Lytle Creek Canyon drop below 7,182 gpm (798 miners inches), all diversion rights holders must reduce their diversions to a prorated schedule set in the 1897 decree. If the City is not receiving its full Lytle Creek surface water allotment, they are permitted to make up the difference by additional pumping in the Lytle Creek Region.

14.5.4 Stormwater

The City of Rialto continues to comply with all provisions of the National Pollutant Discharge and Elimination System (NPDES) permit, and support regional efforts by SARWQCB to improve and protect water quality. Estimated increases in pollutant loads and flows resulting from projected future development projects utilizing available methods prior to making land use decisions on such projects. In addition, Rialto requires applicants for new development and redevelopment projects to demonstrate accomplishment of the following NPDES objectives:

- Use of structural and non-structural Best Management Practices (BMPs) to mitigate projected increases in pollutant loads and flows.
- Minimize pollutant loading flow velocity during and after construction.
- Minimize amounts of impervious surfaces and directly connected impervious surfaces.
- Maximize on-site infiltration and runoff, and temporary on-site retention areas.
- Limit disturbance of natural water bodies and natural drainage systems.
- Employ pollution prevention methods, source controls, and treatment using small collection strategies located at, or as close as possible to, the source.

14.5.5 Wastewater and Recycled Water

The Rialto Water Services through its operator, Veolia Waters, maintains and operates the City of Rialto wastewater collection system and treatment plant. All of the wastewater flows from the City is collected by the City's local sewer mains and delivered to the Rialto Wastewater Treatment Plant. Currently the Rialto Wastewater Treatment Plant also collects, treats, and disposes of the wastewater from the WVWD service area and some areas of the City of Fontana through an Extra-Territorial Agreement.

14.5.5.1 Recycled Water Coordination

The treatment applied includes primary, secondary and tertiary treatment for the production of recycled water (reclaimed water). The City maintains a recycled water network using effluent from its wastewater treatment plant. Currently the City's WWTP is permitted for 11.7 mgd of treatment capacity. The current recycled water use is approximately 0.3 mgd. The Title 22 effluent is used for freeway landscape irrigation, with future expansion for park irrigation planned.

14.5.5.2 Wastewater Collection, Treatment, and Disposal

The Rialto Wastewater Treatment Plant is a Grade V plant with tertiary treatment that discharges its treated wastewater to serve landscape irrigation purposes (approximately 20 AFY) and to the Santa Ana River. Rialto treats an average of 7 MGD.

Table 14-11. DWR Table 6-2R. Wastewater Collected within Service Area in 2015

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AF)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
City of Rialto	Metered	3,236	City of Rialto	Rialto Wastewater Treatment Plant	Yes	Yes
	Total Wastewater Collected from Service Area in 2015	3,236				

Table 14-12. DWR Table 6-3R. Wastewater Treatment and Discharge within Service Area in 2015

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number	Method of Disposal	Does this Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	Wastewater Treated Volume 2015 (AF)	Discharged Treated Wastewater Volume 2015 (AF)	Recycled Within Service Area Volume 2015	Recycled Outside of Service Area Volume 2015
Rialto Wastewater Treatment Plant	Rialto Drain	Santa Ana River		River or creek	Yes	Tertiary	7,954	7,930	24	0
						Total	7,954	7,930	24	0

14.5.5.3 Recycled Water System

In 2015, Rialto used 24 AFY for landscape irrigation along freeway right-of-way and anticipates a future demand of 20 AFY. Rialto currently discharges the rest of the reclaimed water produced into the Santa Ana River.

14.5.5.4 Recycled Water Beneficial Uses

As a result of using recycled waste water since 2002, the City has identified potential recycled water users. If the City were to expand its use of recycled wastewater, the City could benefit as a number of parks, schools, and street medians could use recycled water.

Table 14-13. DWR Table 6-4R. Current and Projected Recycled Water Direct Beneficial Uses within Service Area (AF)

Name of Agency Producing (Treating) the Recycled Water:	City of Rialto							
Name of Agency Operating the Recycled Water Distribution System:	City of Rialto							
Supplemental Water Added in 2015	0							
Source of 2015 Supplemental Water	NA							
Beneficial Use Type	**General Description of 2015 Uses**	**Level of Treatment**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Landscape Irrigation (exc. Golf Courses)		Tertiary	24	20	20	20	20	20
		Total	24	20	20	20	20	20

Table 14-14. DWR Table 6-5R. 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual

Beneficial Use Type	2010 Projection for 2015	2015 Actual Use
Landscape Irrigation	0	24
Total		24

14.5.5.5 Actions to Encourage and Optimize Future Recycled Water Use

The projected use of recycled wastewater within the City's service area for the next 25 years is uncertain as funding for infrastructural improvements are needed to distribute recycled water from the WWTP to the City. The projection of 20 AFY through 2040 is a conservative amount since there are multiple opportunities for Rialto to utilize more recycled water in their service area. The City of Rialto anticipates moving forward with more recycled water projects in the future to offset the use of potable water for irrigation.

In 2015, Rialto submitted to the SWRCB a Petition for Change to allow Rialto use of its recycled water in its service area. Allowing the change of use for recycled water will reduce the demand for both imported water and the need to use potable water for landscaping and certain industrial facilities.

Table 14-15. DWR Table 6-6R. Methods to Expand Future Recycled Water Use

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use

14.5.6 Desalinated Water Opportunities

Seawater desalination is a process whereby seawater is treated to remove salts and other contents to develop both potable and non-potable supplies. There are over 10,000 desalination facilities worldwide that produce over 13 million AFY. Desalinated water can add to Southern California's supply reliability by diversifying its water supply sources and mitigating against possible supply reductions due to conservation. The inland areas of Southern California do not have the brackish water conditions that would make desalination a viable process for water supply.

14.5.7 Exchanges or Transfers

The City has emergency stand-by agreements with the City of San Bernardino and Riverside-Highland Water Company to meet needs during periods of lowered groundwater levels on a short term basis. The City believes that through pro-active water conservation policies and programs, the reliability of its water supply will sustain even as housing densities increase. Water conservation and recycled water are considered additional sources of water as they free up water that would otherwise be used inefficiently.

In addition to imported water and groundwater, the City's water supply system also includes mutual aid agreements with the City of San Bernardino, Fontana Water, RHWC, and WVWD.

14.5.8 Future Water Projects

The City continually reviews practices that will provide its customers with adequate and reliable supplies. Rialto will continue to upgrade its distribution system and add supply as needed over the next 25 years.

Table 14-16. DWR Table 6-7R. Expected Future Water Supply Projects or Programs

Name of Future Projects or Programs	Joint Project with Other Agencies?	Other Agency Names	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Agency

14.5.9 Summary of Existing and Planned Sources of Water

The following tables summarize the anticipated supplies for Rialto.

Table 14-17. DWR Table 6-8R. Water Supplies – Actual (AF)

Water Supply	Additional Detail on Water Supply	2015 Actual Volume	2015 Water Quality
Groundwater	Rialto-Colton	1,498	Drinking Water
Groundwater	Riverside North	1,238	Drinking Water
Groundwater	Lytle Creek	1,757	Drinking Water
Purchased or Imported Water	SBVMWD	1,989	Drinking Water
Surface Water	Lytle Creek Surface Water	998	Drinking Water
Groundwater	Bunker Hill	971	Drinking Water
Purchased or Imported Water	SBMWD	320	Drinking Water
Recycled water	Rialto WWTP	24	Recycled Water
	Total	8,795	

Table 14-18. DWR Table 6-9R. Water Supplies – Projected (AF)

Water Supply	Additional Detail on Water Supply	2020	2025	2030	2035	2040
Groundwater	Rialto-Colton	1,456	1,456	1,456	1,456	1,456
Groundwater	Riverside North	1,000	1,000	1,000	1,000	1,000
Groundwater	Lytle Creek	2,500	2,500	2,500	2,500	2,500
Purchased or Imported Water	SBVMWD	2,500	2,500	2,500	2,500	2,500
Surface Water	Lytle Creek Surface Water	1,120	1,120	1,120	1,120	1,120
Groundwater	Bunker Hill	2,000	2,000	2,000	2,000	2,000
Groundwater	No Man's Land	1,000	1,000	1,000	1,000	1,000
Purchased or Imported Water	SBMWD	0	500	1,000	1,500	2,000
Recycled water	Rialto WWTP	20	20	20	20	20
	Total	11,596	12,096	12,596	13,096	13,596

14.6 Water Supply Reliability Assessment

This chapter includes an assessment of how reliable Rialto's water supplies might be during a dry period. This discussion focuses on the long-term (one to many years) reliability in response to below-normal precipitation. Rialto maintains a number of interconnections with neighboring agencies that could be used to provide supplemental water during a short-term reduction in supply through existing mutual aid agreements with the City of San Bernardino, Fontana Water, Riverside-Highland and West Valley Water District.

14.6.1 Constraints on Water Sources

As mentioned earlier the City of Rialto is located in a semi-arid environment. The local groundwater and surface water supplies are influenced by annual precipitation. In extended drought conditions, the surface water supplies in the Lytle Creek region can be severely impacted. In addition, groundwater levels in the Lytle Creek Basin have been known to drop over 300 feet during extended drought periods.

Climate data in California has been recorded since 1858. Since then California has experienced three periods of severe drought: 1928-1934, 1976-1977 and 1987-1989. The year 1977 is considered to be the driest year of record for the Four Rivers Basin by DWR. These rivers feed the Delta and are the source of water for SWP water. Southern California sustained few adverse impacts from the 1976-1977 drought, however the 1987-1991 drought created considerable concern for Southern California. As a result, the City is vulnerable to water shortages due to seasonal hot weather and climatic influences.

Plumes of various chemical pollutants have been detected in local groundwater basins requiring the installation of well head treatment systems or blending. Rialto's Perchlorate Contamination Zero Tolerance Policy resulted in taking wells out of service which tested positive for detectible levels of perchlorate. Clean up efforts through agreement with San Bernardino County and Emhart, responsible parties for the contamination, in coordination with the EPA will provide remedy of the groundwater treatment within the Rialto-Colton Basin. These water quality issues are further discussed at a regional level in Chapter 2.

14.6.2 Reliability by Type of Year

Drought planning is to consider water supplies during single-dry and multiple-dry years. Single dry and multiple-dry year conditions are usually based on historical records of annual runoff from a particular watershed. A multiple-dry year period is generally three or more consecutive years with the lowest average annual runoff. Single dry year and multiple-dry periods should be determined for each watershed from which the water agency receives a water supply. The City of Rialto has multiple water supply sources, surface supply, groundwater and imported.

Historically overall water use tends to increase during “dry” years where annual precipitation is low, but with conservation efforts currently and over the past five years there has been a decline in water use during the past three “dry” years. The City of Rialto has determined that water demands would not increase during single or multiple dry years.

14.6.3 Regional Supply Reliability

Although increases in demand are expected, they are limited due to the requirements of SB X7-7 which provides a cap on water consumption rates (i.e. per capita water use). It can be reasonably expected that the majority of agencies will be at or near their compliance targets by 2020 and thereafter as conservation measures are more effectively enforced.

14.7 Water Shortage Contingency Planning

Water supplies may be interrupted or reduced significantly in a number of ways including drought and earthquake, which may damage water delivery or storage facilities. The ability to manage water supplies in times of drought or other emergencies is an important part of the resource management in a community. To offset the prolonged effects of a drought period or other emergency, the City Council adopted Ordinance No. 1130 in December, 1990. The ordinance provides water conservation measures in order to minimize the effect of a water shortage. The City implemented Stage 2 of the ordinance in 2002 due to a water shortage caused by contamination of the groundwater by the chemical perchlorate.

The ordinance was amended on July 28, 2015, with Ordinance Number 1560, attached in Appendix G in response to Governor Brown’s Water Order and Rialto implemented Stage 3B - Water Warning. The City Ordinance Number 1560, Chapter 12.20: Water Conservation Requirements, outlines efficient water use measures and four stages of increasingly restrictive prohibition with related penalties for non-compliance. The ordinance includes provisions that will significantly reduce the waste and inefficient use of water, thereby extending the available water resources required for the domestic and fire protection needs of the City and the general public.

14.7.1 Stages of Action

14.7.1.1 Stage 1 – Normal Conditions

Normal conditions mean normal supply and distribution capacity is available.

14.7.1.2 Stage 2 – Water Alert

Stage 2 means that the city may not be able to meet all water demands of all water customers, or the state of California has adopted regulations requiring the city to implement requirements and actions of a Stage 2 Water Alert as outlined in Section 12.20.022 of Ordinance Number 1560, regardless of the city's local water supply. All customers are required to reduce potable water consumption by a minimum twenty percent compared to their potable water consumption in the 2013 base year.

14.7.1.3 Stage 3 – Water Warning

Stage 3 means that the city is not able to meet all water demands of all water customers, or the state of California has adopted regulations requiring the city to implement requirements and actions of a Stage 3 water warning as outlined in Section 12.20.023 of Ordinance Number 1560, regardless of the city's local water supply. All customers are required to reduce potable water use consumption by a minimum twenty-five percent compared to their potable water consumption in the 2013 base year.

14.7.1.4 Stage 4 – Water Emergency

Stage 4 means that the city is experiencing a major failure of water supply or distribution, or the state of California has adopted regulations requiring the city to implement requirements and actions of a Stage 4 water emergency as outline in Section 12.20.024 of Ordinance Number 1560, regardless of the city's local water supply. All customers are required to reduce potable water consumption by a minimum thirty percent compared to their potable water consumption in the 2013 base year. The use of water shall be limited to essential household, commercial, manufacturing or processing uses only, except where other uses may be allowed by permit.

The stages based on amount of supply are shown in Table 14-19.

Table 14-19. DWR Table 8-1R. Stages of WSCP

Stage	Percent Supply Reduction	Water Supply Condition
1	0	Normal
2	20	Water Alert Conditions
3	25	Water Warning Conditions
4	30 to 50	Water Emergency Conditions

14.7.2 Prohibitions on End Uses

The water use prohibitions for each stage are shown in Table 14-20.

Table 14-20. DWR Table 8-2R. Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	CII - Restaurants may only serve water upon request	All restaurants and food establishments are requested not to serve water to their customers unless specifically requested by the customer.	No
1	Landscape - Limit landscape irrigation to specific times	Watering with automatic sprinklers should be done between 8 pm and 6 am and that hand watering and non-automatic sprinklers should be done between 6 pm and 8 am. Drip irrigation is exempt from this recommendation. Water being used during repair or maintenance of watering systems is exempt from this section.	No
1	Landscape - Other landscape restriction or prohibition	The use of sprinklers for any type of irrigation during high winds, which divert a significant amount of water away from the intended landscaping, is prohibited.	Yes
1	Landscape - Other landscape restriction or prohibition	The irrigation with potable water of landscape outside of newly constructed homes and buildings must be consistent with regulations or other requirements established by the California Buildings Standards Commission, as those regulations may be modified from time to time.	Yes
1	Landscape - Prohibit certain types of landscape irrigation	The irrigation of potable water of ornamental turf on public street medians is prohibited. The term "median" shall mean the strip of land between street lanes.	Yes
1	Landscape - Restrict or prohibit runoff from landscape irrigation	Water used which results in flooding or run-off should be prevented and controlled. Use of water for any purpose which results in flooding or run-off in gutters, driveways or streets is prohibited.	Yes
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	No person shall knowingly permit water to leak from any facility, improvement or plumbing fixture on his/her/its premises; any such leak shall be repaired in a timely manner.	Yes
1	Other - Prohibit use of potable water for washing hard surfaces	There shall be no application of water to sidewalks, walkways, driveways, parking areas, patios, porches, verandas, tennis courts or other paved, concrete or other hard surface areas, except that flammable or other similarly dangerous or unhealthy substances may be washed from said areas by direct hose flushing for the benefit of public health or safety.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	Other - Require automatic shut of hoses	Washing of automobiles, trucks, trailers, boats and other mobile equipment is prohibited unless done with a bucket or hand held device equipped with an automatic shut off trigger nozzle or device attached to it that causes it to cease dispensing water immediately when not in use. This section does not apply to the washing of the above-listed vehicles or mobile equipment when conducted at a commercial car or truck wash utilizing recirculating systems. Such washings are exempted from these regulations when the health, safety, and welfare of the public is contingent upon frequent vehicle cleaning such as garbage trucks and vehicles used to transport food and perishables.	Yes
1	Water Features - Restrict water use for decorative water features, such as fountains	No water to be used to clean, fill, operate or maintain decorative fountains unless the water is from a recycled source.	Yes
1	Water Features - Restrict water use for decorative water features, such as fountains	No water shall be used to clean, fill, operate or maintain levels in decorative fountains unless such water is part of a recirculating system.	Yes
2	CII - Lodging establishment must offer opt out of linen service	Operators of hotels and motels must provide guests with the option of choosing not to have towels and linens laundered daily and prominently display notice of this option.	Yes
2	CII - Restaurants may only serve water upon request	All restaurants are prohibited from serving water to their customers except when specifically requested by the customer.	Yes
2	Landscape - Limit landscape irrigation to specific days	All landscape irrigation shall be limited to no more than four (4) days per week for no more than ten (10) minutes per station per day. This provision does not apply to any landscape that has water-efficient devices that are operated properly. Water-efficient devices are drip irrigation systems and operational weather-based irrigation controllers. The term "week" is defined as Sunday through Saturday.	Yes
2	Landscape - Other landscape restriction or prohibition	The city shall screen all new applications for water service installations and shall limit water use to that essential for construction and testing of landscape plumbing. Limited landscaping for new development shall be allowed as approved by the city.	Yes
2	Landscape - Other landscape restriction or prohibition	Irrigating turf or ornamental landscapes during or within forty-eight (48) hours following measurable precipitation in excess of one-quarter inch is prohibited	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
2	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	All customers shall repair all leaks within seventy-two (72) hours of notification by the city, actual notice by the customer, or other notice of such leak, unless other arrangements are made with the city administrator or his/her designee.	Yes
3-B	CII - Other CII restriction or prohibition	Water used for compaction, dust control, and other types of construction shall be by permit only and will be limited to conditions of the permit or may be prohibited as determined by the city administrator, or his/her designee.	Yes
3-A	Landscape - Limit landscape irrigation to specific days	All landscape irrigation with potable water shall be limited to no more than three days per week for no more than ten minutes per station per day. This provision does not apply to any landscape that has water-efficient devices that are operated properly. Water-efficient devices are drip irrigation systems and operational weather-based irrigation controllers. Week is defined as Sunday through Saturday.	Yes
3-A	Landscape - Other landscape restriction or prohibition	New water service shall be installed but water shall be used before occupancy for essential construction only and for testing of landscape irrigation systems. The installation of new landscaping for all new development/projects must be approved by the city.	Yes
3-C	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Washing of automobiles, trucks, trailers, boats, airplanes and other types of mobile equipment is prohibited. Washing of the above-listed vehicles or mobile equipment shall be done only at a commercial car wash where recirculating or recycled water is being utilized. Such washings are exempt from these regulations when the health, safety, and welfare of the public is contingent upon frequent vehicle cleaning such as garbage trucks and vehicles used to transport food and perishables.	Yes
3-A	Other water feature or swimming pool restriction	Swimming pools, ornamental ponds, fountains, water displays, hot tubs, spas and artificial lakes shall not be filled or refilled.	Yes
4	CII - Other CII restriction or prohibition	No water shall be used for construction purposes unless they are using reclaimed water. All fire hydrant and construction meters shall be locked off or removed.	Yes
4	Landscape - Limit landscape irrigation to specific times	Commercial nurseries shall water only between the hours of 11 p.m. and 6 a.m. and only with hand-held devices or with drip irrigation.	Yes
4	Landscape - Prohibit all landscape irrigation	There shall be no watering of any lawn or landscaped area, except by use of reclaimed water.	Yes
4	Other	The use of water shall be limited to essential household, commercial, manufacturing or processing uses only, except where other uses may be allowed by permit.	Yes

14.7.3 Penalties, Charges, Other Enforcement of Prohibitions

14.7.3.1 First Violation: Notice of Non-Compliance

A written "warning shall be issued for the first offense.

14.7.3.2 Second Violation: Warning of Penalties

A written warning notice of the future imposition of penalties that could be placed on the customer's water bill shall be issued for the second offense.

14.7.3.3 Third Violation: Surcharge

A surcharge of one hundred dollars shall be added to that billing for the third offense occurring within a one-year period.

14.7.3.4 Fourth Violation: Surcharge

A surcharge of three hundred dollars, and installation of a flow restricting device in the meter for a minimum of ninety-six hours (at customer's expense) shall be imposed for the fourth offense occurring within a one-year period. Said restricted flow shall meet minimum county health department's standards, if any have been established. If said ninety-six-hour period ends on a weekend or holiday, full service will be restored during the next business day.

14.7.3.5 Fifth Violation: Surcharge

A surcharge of five hundred dollars, and termination of water service at customer's expense for a two-day period shall be imposed for the fifth offense occurring within a one-year period. Prior to the termination of water service, the customer may request an administrative hearing pursuant to Section 1.10.050 of Ordinance No.1560.

14.7.4 Consumption Reduction Methods

Through adherence to conservation measures, the City participates in Statewide efforts to conserve water and protect the ecological habitat of the region. Although ecological motives are controversial, ensuring a reliable supply of water for human use is a top priority without controversy. Through conservation measures and the use of recycled water supplies, the City can reduce demand for water. The City understands the unique needs of its customers and the importance of efficient water use. As a result, the City will utilize management strategies specific to the needs of its residents. The methods to be used in achieving its 2020 reduction requirements include, but are not limited to, the Demand Management Measures described above. In addition, the City may enact additional water use restrictions in accordance with its Emergency Conservation Plan Ordinance. With increased public awareness of SB X7-7 requirements, it is likely that the public will begin to understand the importance of water conservation and will begin to use water more efficiently.

Table 14-21. DWR Table 8-3R. Stages of WSCP - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
All	Expand Public Information Campaign	

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference

14.7.5 Determining Water Shortage Reductions

All existing and new water services are metered. A water meter calibration and replacement program is in place to continually improve accurate meter readouts. New services, with the exception of single-family residences and apartment complexes up to and including four units per meter are required to install a separate water meter for the on-site landscaping. Incentives are offered to Mobile Home Parks for installation of sub-meters.

14.7.6 Revenue and Expenditure Impacts

The City has a tiered rate schedule for water customers to encourage water conservation and provide the economic incentives to customers to use water efficiently.

14.7.7 Resolution or Ordinance

To offset the prolonged effects of a drought period or other emergency, the City Council adopted Ordinance No. 1130 in December 1990. The ordinance provides water conservation measures in order to minimize the effect of a water shortage on the citizens of the community. The ordinance includes provisions that will significantly reduce the waste and inefficient use of water, thereby extending the available water resources required for the domestic and fire protection needs of the City and general public. The City adopted Ordinance No. 1560 in May, 2015, to update the sections regarding the four (4) stages that make up the water conservation requirements, attached in Appendix G.

14.7.8 Catastrophic Supply Interruption

Response to future drought conditions will follow the water use efficiency mandates of the City's Water Shortage Contingency Plan, along with implementation of the appropriate regional contingency plans.

14.7.9 Minimum Supply Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the years 2016 to 2018, assuming years 2016 to 2018 repeat the driest three-year historic sequence for each water supply source. This estimated supply is shown in Table 14-22. Comparing these supplies to the demand projections, Rialto has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

Table 14-22. DWR Table 8-4R. Minimum Supply Next Three Years (AF)

Available Water Supply	2016	2017	2018
Available Water Supply	11,420	11,420	11,420

14.8 Supply and Demand Assessment

The anticipated supplies and demands are compared in the following tables.

Table 14-23. DWR Table 7-2R. Normal Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	11,596	12,096	12,596	13,096	13,596
Demand Totals	10,583	11,216	11,886	12,597	13,350
Difference	1,013	880	710	499	246

Table 14-24. DWR Table 7-3R. Single Dry Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	11,420	11,920	12,420	12,920	13,420
Demand Totals	10,583	11,216	11,886	12,597	13,350
Difference	837	704	534	323	70

Table 14-25. DWR Table 7-4R. Multiple Dry Years Supply and Demand Comparison (AF)

Year	Totals	2020	2025	2030	2035	2040
First Year	Supply Totals	11,420	11,920	12,420	12,920	13,420
	Demand Totals	10,583	11,216	11,886	12,597	13,350
	Difference	837	704	534	323	70
Second Year	Supply Totals	11,420	11,920	12,420	12,920	13,420
	Demand Totals	10,583	11,216	11,886	12,597	13,350
	Difference	837	704	534	323	70
Third Year	Supply Totals	11,420	11,920	12,420	12,920	13,420
	Demand Totals	10,583	11,216	11,886	12,597	13,350
	Difference	837	704	534	323	70

15 Riverside Highland Water Company

15.1 System Description

15.1.1 General Description

RHWC provides domestic and irrigation water services to the City of Grand Terrace, portions of the City of Colton, and portions of the unincorporated areas of the Counties of San Bernardino and Riverside. The water service is to single and multi-family residential, commercial, industrial and agricultural users.

With the rapid urbanization of agricultural areas within the service area, a decline in the irrigation water demand is showing. In most cases, the agricultural water demand is replaced with domestic demand. Large parks and greenbelt areas are continued to be serviced with irrigation water which is non-potable due to a nitrate content which is in excess of drinking water standards. This will leave the potable water available for drinking water use.

15.1.2 Service Area Boundary Map

The service area is nearing about 85% built-out with the developments currently under construction or approved by the planning departments of the governing agencies. The major population center in the service area is the City of Grand Terrace. The service area is shown in Figure 15-1.

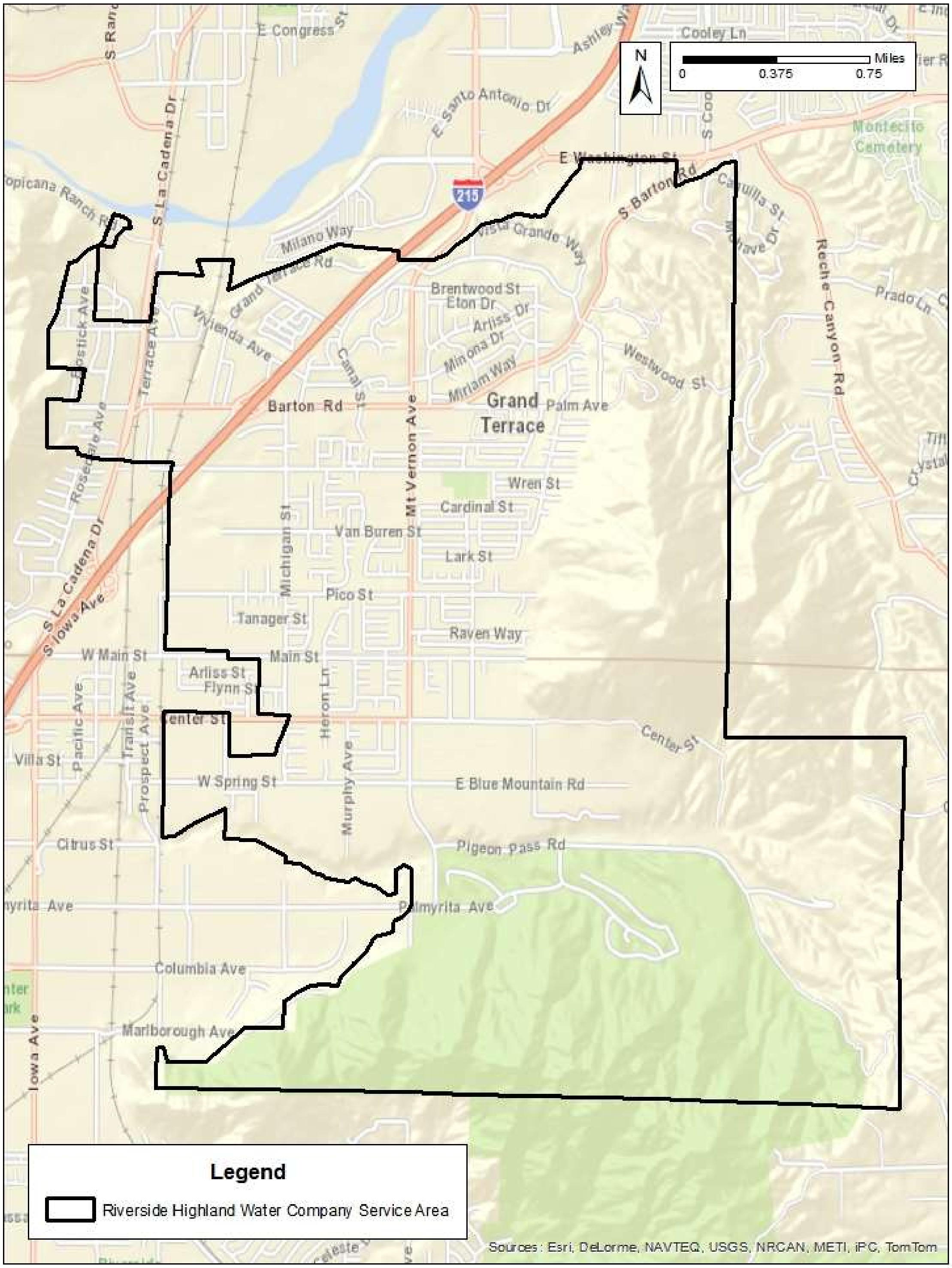

Figure 15-1. Riverside Highland Water Company Service Area

15.1.3 Service Area Climate

The climate typically exhibits hot, dry summers and mild, wet winters. Climate is a primary factor that influences water demand within the RHWC service area. Most rainfall occurs during the months of November through April. The hottest and driest period of the year is from June through September. It is not unusual during the summer months to have several consecutive days that the daily temperature exceeds 100 degrees Fahrenheit.

Average temperature, precipitation, and evapotranspiration by month are shown in Table 15-1. Evapotranspiration (ET) is the water lost to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity. ET from a standardized grass surface is commonly denoted as ETo. These data are based on 30 years of record (1986-2015) at Station 044 (University of California Riverside) within the California Irrigation Management Information System (CIMIS).

Table 15-1. Historical Climate Data

Month	Average Temperature (°F)	Average Precipitation (in.)	Average Standard ETo (in.)
January	52.4	3.22	2.53
February	54.6	3.25	2.87
March	56.7	2.86	4.30
April	60.9	1.29	5.38
May	65.6	0.47	5.82
June	71.3	0.09	6.76
July	77.7	0.04	7.38
August	77.7	0.15	7.09
September	73.9	0.33	5.51
October	66.5	0.71	3.97
November	58.6	1.32	2.89
December	53.3	2.38	2.38
Total		16.1	
Notes: Precipitation and temperature for NOAA weather station 0407723 in San Bernardino; data from 1893 through 2004; http://wrcc.dri.edu; ETo data for CIMIS weather station 44 at University of California, Riverside; http://wwwcimis.water.ca.gov/			

15.1.4 Service Area Population and Demographics

For the 2015 UWMP cycle, the California Department of Water Resources (DWR) has developed a GIS-based tool to estimate the population within a water agency's service area using census data. This tool was used to intersect RHWC's water service area with compiled census data to estimate historic populations for RHWC's water service area. The tool provided service area populations for 1990, 2000, and 2010 using census data. The tool also used the number of residential connections in 2010 and 2015 to estimate a 2015 service area population of 16,007.

As part of the 2012 Adopted Growth Forecast, SCAG has estimated the population in 2020 and in 2035 inside each of approximately 4,000 traffic analysis zones (TAZ) that cover southern California. GIS software was used to intersect RHWC's service area with the SCAG projections to arrive at population estimates for 2008, 2020, and 2035. RHWC used these values to calculate a compound annual growth rate of 0.8% for the period from 2015 to 2020, and a compound annual growth rate of 1.1% beyond 2020. These growth rates were used to estimate future population in the service area; these values are shown in Table 15-2.

Table 15-2. DWR Table 3-1R. Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040
Population Served	16,007	16,654	17,625	18,653	19,741	20,893

15.2 System Water Use

RHWC currently has 13 wells capable of producing water. Two of these wells, RN-21 and RN-22 are dedicated to provide irrigation water due to high nitrate concentrations. Three wells, FW-2, FW-5 and FW-18 are being used for the groundwater reduction program of Valley District. These three wells can be converted to domestic water production if required. To assess the water production capabilities for domestic water, all wells with the exception of the irrigation wells RN-21 and RN-22 will be considered.

15.2.1 Water Uses by Sector

RHWC categorizes customers as residential, commercial, agricultural irrigation, landscape irrigation and “other” uses. Water deliveries for each customer class for the years 2011 through 2015 are shown in Table 15-3. On average, 80 percent of water deliveries are for residential use, six percent are for commercial use, and 12 percent are for landscape irrigation, while the remaining two percent is attributed to agricultural irrigation and "other" water use.

Table 15-3. DWR Table 4-1R. Demands for Raw and Potable Water – Actual (AF)

Use Type	Level of Treatment When Delivered	2011	2012	2013	2014	2015
Single Family / Residential	Drinking Water	2,770	3,089	2,986	2,942	2,025
Multi-Family	Drinking Water	0	0	0	0	314
Commercial & Institutional	Drinking Water	226	355	311	268	271
Industrial	Drinking Water	0	0	0	0	8
Agricultural irrigation	Drinking Water	88	128	115	91	79
Landscape	Drinking Water	293	381	363	332	117
Other	Drinking Water	15	6	8	3	41
Nonrevenue	Drinking Water	335	94	175	101	110
	Total	3,727	4,054	3,958	3,736	2,964

Projected water use was estimated using the percentage change in the calculated GPCD for 2015 and target GPCD for 2020. The percentage change, or growth rates, were applied to 2015 water demands to derive estimated future water demands for 2020 through 2040 shown in

Table 15-4. RHWC does not anticipate any routine or single large water sales to other agencies in the future. RHWC does not anticipate future water use related to saline barriers, groundwater recharge operations, or recycled water. For the purpose of projections, nonrevenue water is assumed to be 5 percent based on the average of water losses over the past five years. RHWC will continue efforts to decrease water loss and thereby reduce gallons per capita per day of water use.

Table 15-4. DWR Table 4-2R. Demands for Raw and Potable Water – Projected (AF)

Use Type	Level of Treatment	2020	2025	2030	2035	2040
Single Family / Residential	Drinking Water	2,167	2,293	2,427	2,569	2,718
Multi-Family	Drinking Water	336	356	376	398	422
Commercial & Institutional	Drinking Water	290	307	325	344	364
Industrial	Drinking Water	8	9	9	10	10
Agricultural irrigation	Drinking Water	84	89	94	100	105
Landscape	Drinking Water	125	132	140	148	157
Other	Drinking Water	44	46	49	52	55
Nonrevenue	Drinking Water	196	204	214	224	234
Future Development	Drinking Water	857	857	857	857	857
	Total	4,107	4,294	4,492	4,702	4,923

Table 15-5. DWR Table 4-3R. Total Water Demands (AF)

Demand	2015	2020	2025	2030	2035	2040
Potable and Raw Water	2,964	4,107	4,294	4,492	4,702	4,923
Recycled Water Demand	0	0	0	0	0	0
Total Water Demand	2,964	4,107	4,294	4,492	4,702	4,923

15.2.2 Distribution System Water Losses

Nonrevenue water is approximately 5 percent of RHWC's sales over the past five years. RHWC anticipates nonrevenue water of 5 percent for future water consumption based on their most recent water loss data and the past five years. According to the AWWA Water Audit for the year 2015, RHWC experienced approximately 2.2 percent losses. RHWC currently has a meter replacement program for leaking or broken meters. This program will increase the efficiency of their water distribution system by decreasing future water losses; however, water losses cannot be prevented entirely.

Table 15-6. DWR Table 4-4R. Water Loss Summary Most Recent 12 Month Period Available

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss
01/2015	30

15.2.3 Estimating Future Water Savings

RHWC is committed to long-range planning to provide a reliable, cost-effective water supply to its customers. RHWC actively monitors water consumption in its service area, in part to prepare required monthly reports for the State Water Resources Control Board.

For this report, RHWC has projected that future demands will increase at a percentage growth rate that incorporates two factors: the percentage growth in service area population, and potential changes in the per-capita consumption. This approach provides estimates for future system-wide demand that can be used for long-range planning.

In the 2015 UWMP, water suppliers have the option of preparing more detailed demand forecasts by estimating demand factors based on land use categories. For example, RHWC could identify typical water use per single family customer and per commercial account. These customer classes can be further sub-divided by lot size, neighborhood, or other variables. The intent is to quantify the estimated water use per customer in different customer classes, and then to forecast how future changes will impact water use within each customer class.

For this document, RHWC has elected not to develop land use-based demand factors and apply future savings from codes and standards. Recent drought regulations have induced significant changes in water consumption patterns, and there is considerable uncertainty as to how demands will change in the future if the drought subsides. Given this uncertainty, RHWC elected not to quantify passive savings for this UWMP.

15.2.4 Water Use for Lower Income Households

Senate Bill 1087 requires water use projections in an UWMP include the projected water use for single-family and multi-family residential housing 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. The major population center in the RWHC service area is the City of Grand Terrace. The Housing Element of the City's General Plan estimates that approximately 25 percent of households are considered lower-income.

RHWC's accounting system does not track the number of low-income households; therefore, projections were estimated by applying the historical demographic information to the projected urban retail water demands. Low-income single and multi-family households are expected to account for approximately 25-percent of the total retail water demand in the RHWC service area and are included in future demand projections.

Table 15-7. Estimated Demands for Lower-Income Households (AF)

Demand	2015	2020	2025	2030	2035	2040
Single Family Residential	498	533	564	597	632	669
Multi-Family Residential	77	83	87	93	98	104
Total	575	616	652	690	730	772

15.3 SB X7-7 Baselines and Targets

An urban retail water supplier must set a 2020 water use target (herein called the Compliance Water Use Target) and a 2015 interim target (herein called the Interim Water Use Target). RHWC is using Method 1 to calculate the Compliance and Interim Water Use Targets as set forth by Water Code section 10608.20(b). The Method 1 calculation is done by taking eighty percent of the urban water supplier's baseline GPCD.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD". The Maximum Allowable GPCD is based on 95 percent of a 5-year average base gross water use from 2003 to 2010. The Maximum Allowable GPCD is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction of the SBX7-7 legislation. Specifically, if an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as their target.

15.3.1 Updating Calculations from 2010 UWMP

In the 2010 UWMP, RHWC calculated a baseline water use of 239 GPCD. RHWC used Target Method 1 to calculate a compliance water use target of 191 GPCD for 2020, and an interim water use target of 215 GPCD for 2015. In 2010, the actual consumption was calculated as 211 GPCD.

For the 2015 UWMP cycle, DWR has made a GIS-based population tool available to calculate service area population using Census Bureau data. RHWC has used this tool to re-calculate its service area population, baseline per-capita use, and compliance targets.

15.3.2 Baseline Periods

Years 2000 to 2009 have been selected for calculation of the 10-year base period, while years 2003 to 2007 have been selected for calculation of the 5-year base period. The 10-year average Base Daily Per Capita Water Use for RHWC is 240 GPCD; the 5-year is 234 GPCD.

15.3.3 Service Area Population

RHWC's service area population was calculated using the DWR Population Tool. The tool directly calculated a service area population for 1990, 2000, and 2010. Populations for intermediate years were calculated by straight-line interpolation between census years.

15.3.4 Gross Water Use

The calculation of gross water use begins with the total amount of water that was put into the potable water distribution system by RHWC. Water that was exported to another agency and agricultural irrigation were then subtracted, to leave the amount used by RHWC retail customers.

Water delivered to agricultural customers was not included in the urban water demand because those customers receive water from RHWC's non-potable wells and use that water to meet strictly irrigation demands.

For the period of 2000 to 2009, gross water use in the RHWC service area fluctuated between 3,684 and 4,772 acre-feet per year.

15.3.5 Baseline Daily per Capita Water Use

For the period from 2000 through 2009, the average base daily per capita water use is 239.7 GPCD.

15.3.6 2015 and 2020 Targets

In addition to calculating base gross water use, SBX7-7 requires the retail water supplier to identify its demand reduction targets. The methodologies for calculating demand reduction targets were described above. RHWC is choosing to meet SBX7-7 targets as an individual agency rather than as part of a regional alliance. RHWC has selected Method 1 to calculate its 2020 Compliance Water Use Target and Interim Water Use Target. The resulting Compliance Water Use Target is 191.7 GPCD and the Interim Water Use Target is 215.7 GPCD.

Table 15-8. DWR Table 5-1R. Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD	2015 Interim Target	Confirmed 2020 Target
10-year	2000	2009	239.7	215.7	191.7
5-year	2003	2007	233.7		

15.3.7 2015 Compliance Daily per Capita Water Use

RHWC did not apply any of the optional adjustments for extraordinary events, economic conditions, or weather in calculating 2015 gross water use. RHWC's actual GPCD for 2015 was 165.3. Their 2015 interim target GPCD is 215.7. RHWC is in compliance with the 2015 interim target.

Table 15-9. DWR Table 5-2R. 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Extraordinary Events	Economic Adjustment	Weather Normalization	Total Adjustments	Adjusted 2015 GPCD	2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015?
165.3	215.7	0	0	0	0	165.3	165.3	YES

15.4 Demand Management Measures

The reporting format for Demand Management Measures (DMMs) in the 2015 UWMP is different than the 2010 UWMP. This discussion has been arranged into the seven sections recommended by DWR in the 2015 UWMP Guidebook.

15.4.1 Water waste prevention ordinances

RHWC has adopted a water shortage contingency plan that has a water waste prohibition. RHWC will initiate an aggressive water commodity tiered rate structure to discourage water wasting, if the 20% reduction in per capita use is not met. Large water users have been identified and an aggressive education program for water conservation has been initiated to prevent water waste.

15.4.2 Metering

RHWC has implemented a program to completely replace all of its meters with automated meter readers.

15.4.3 Conservation pricing

In 1985, RHWC commissioned a "Revenue Requirement Study" to determine the revenue required for each class of service to pay its fair share of monies to operate and maintain the domestic and irrigation water systems. During the study it was noted that a waste of water was occurring by some customers and some irrigation customers were not metered. The rate structure at the time was for assessments to pay for water usage and a declining rate for water in excess of that amount represented by the assessment. In 1986, the RHWC Board of Directors accepted the Revenue Requirement Study and began to implement the new rate structure. Prior to beginning the new water rates, RHWC staff began a public information and education series of talks to the City of Grand Terrace, its largest customer base, service clubs and information centers at community gatherings. When the rates were implemented, public acceptance was overwhelming.

RHWC completed an additional rate study (2010) to further reduce water consumption and match fixed revenue sources to fixed revenue expenditure, along with matching variable revenue sources to variable revenue expenditure. The current rates are shown in Table 15-10.

Table 15-10. Domestic Water Rates for RHWC (as of December 2015)

Units per 2 months	Rate per Unit
0 to 5,000	$0.81
5,001 to 9,000	$1.06
9,001 to 14,000	$1.25
Over 14,001	$1.44

The water rate structure is designed as an increasing charge for water as usage increases. Water meter readings are done bi-monthly. By adjusting the tier allotments and tier rates, RHWC has the ability to significantly increase water conservation.

If the 20% per conservation reduction is not met, the tier allotments would decrease and commodity rates for Tiers 2, 3 and 4 would be increased until the mandatory reduction in per capita water use would be met. It has been determined that 20 units (100 cubic feet = 1 unit) of water per 2-month period is the lifeline amount being used by customers for inside water use. Subsequent to 2015, all of the Tier rates will increase to match inflation.

This rate structure, along with the other RHWC programs, is planned to greatly reduce the water running down gutters and other water wasting habits. With agriculture being phased out, irrigation will be for landscaping and open space purposes.

15.4.4 Public education and outreach

In 1989, RHWC initiated an "In-Home Water Audit Program" to review customers in-house and outdoor uses and habits. The audit is performed at the request of the Customer or, it may be recommended by employees reviewing historic water usage against a high usage meter reading in any particular period of time. Upon completion of the water usage audit, recommendations are made to the homeowner to reduce water usage. RHWC personnel will follow up with the customer to review the recommendations made as a result of the audit. No record of water saved through this program has been maintained. It is believed that a significant reduction of water usage has been realized after an audit has been made and the employee recommendations have been implemented for individual customers.

Annually, the City of Grand Terrace which RHWC provides water service becomes involved with Water Awareness Month, including passing a Water Conservation Resolution and prominently displaying the winning poster from the schools during Water Awareness Month poster contest.

In the past, RHWC has sponsored and manned a booth at the City of Grand Terrace "Annual Merchants Fair". At this booth, water conservation literature is available to participants and the personnel will answer questions and discuss water matters with the people who are normally RHWC customers. RHWC also has a water conservation booth annually at both the Grand Terrace Days and Highgrove Days.

RHWC maintains a literature rack in the lobby of the Corporate Offices. There are booklets and literature available at the booths sponsored by RHWC. An example of the literature available follows:

- Water Conservation Hints: This is a pamphlet prepared by RHWC as a handout to new customers or interested people.

- Drought Tolerant Plants: This is a handout prepared by RHWC and available in our lobby and upon request for our customers or interested parties.

- The website for IEfficient.com: This a website we refer our customers to for additional information. The Inland Empire's go-to source for information on water-use efficiency. Here you will find tips for increasing conservation and, most importantly, ways to eliminate water waste.

In 1991, in conjunction with the Colton Unified School District's "Partners in Education Adopt-A-School Program" RHWC adopted Terrace View Elementary School in the City of Grand Terrace. RHWC provides water service to the City of Grand Terrace. RHWC staff provide instruction about water resources, how water gets to the tap in your home, water conservation and the water business operations.

This "Adopt-A-School Program", now in its 25th year, utilizes classroom work by the teacher and RHWC employees, supervised tours to the Western Municipal Water District of Riverside County's "Low Water Use Demonstration Garden", the Metropolitan Water District of Southern California's Mills Water Treatment Plant, Oliver Roemer Water Filtration Plant, a water testing laboratory, an EPA Superfund Site, and the corporate facilities and operation facilities of RHWC.

On May 30, 2002, RHWC adopted a second school, Grand Terrace Elementary School, in the "Partners in Education, Adopt-A-School Program".

Each year, RHWC sponsors a "Water Awareness Poster" contest, which includes both schools during Water Awareness Month. Awards, which are engraved plaques are awarded to two winners in each school grade level. RHWC personnel are requested to judge the Annual Science Fair, both at the local school and district wide level. The Grand Prize Winner in the Poster Contest for each school is presented with a $100.00 U.S. Savings Bond sponsored by RHWC.

RHWC has no large commercial, industrial, or institutional accounts.

15.4.5 Programs to assess and manage distribution system real loss

RHWC is currently replacing all of the water meters with automated meters to help detect both meter leaks and leaks within the customer's property. During the regular reading duties, the meter and joining pipelines are reviewed for water leakage. Where water is noted in the reading of the meter, a service technician is dispatched to the location of the possible leak to evaluate the situation. Any leaks found, whatever the size, are repaired immediately. It has been the experience of RHWC that approximately 5.5% of the meters in the distribution system have small leaks in any one year. The automated water meters will enable RHWC to detect leaks within the customer's system. RHWC plans to initiate this customer leak detection program when the automated meter program is completed.

Meters that are noticeably not providing proper readings during the reading period and in the calculations for water used as compared to historic usage by water billing personnel will be evaluated and replaced or repaired as the situation requires. RHWC's "Water Meter Change-Out Program" commenced in 1981 and is continuing today. RHWC is replacing all of its water meters with new automated water meters. The “Meter Change-Out Program” will continue as an on-going program to ensure proper reading meters are being utilized within the distribution system.

RHWC has had an ongoing leak detection system that has been in place since 1989. RHWC has not keep an account of how much water this program has conserved.

RHWC has a Capital Replacement Program that includes the replacement of water mains, valves, fittings and water service connections from the water main to the customer meter. Please note that all water sold is through meters regularly checked for accuracy. After replacing all of its water mains, RHWC has lowered its nonrevenue water to approximately 5 percent for the year 2015, and its audited water losses to 2.2 percent.

15.4.6 Water conservation program coordination and staffing support

RHWC had been experiencing reservoir overflows, water mixing problems in reservoirs and the need for excessive water flushing due to low water in reservoir problems. In response to these problems, RHWC installed a “State-Of-The-Art” Supervisory Control and Data Acquisition System (SCADA) in the water distribution system. Since the installation of the SCADA system, proper water levels in the reservoirs are maintained, and the use of “Time-of-Use” (TOU) electrical energy usage has been practicable, reducing energy bills to RHWC. The proper use of booster stations and the ability to utilize the most efficient and lowest cost water producing wells can be determined and operated by RHWC. In addition, records of operation are stored within the computer files for future reference to evaluate water distribution system. The RHWC distribution superintendent will be the water conservation coordinator.

15.4.7 Other demand management measures

RHWC has very few large landscape irrigation areas within its service area. RHWC plans, in the future, to offer non-potable irrigation water to these customers. RHWC has met with all of the large landscape owners. RHWC has initiated an informal program for water conservation for all of its large landscape customers. RHWC does not have a formal landscape conservation program or incentives, and does not plan to implement this type of program in the near future, but will continue to monitor the large landscape projects for cooperation in conservation.

RHWC does not currently have programs involving residential retrofits, large landscaping conservation programs and incentives, conservation programs for commercial, industrial, and institutional accounts, wholesale agency programs, water waste prohibition, or residential ultra-low flush toilet replacement programs. If RHWC’s aggressive water commodity pricing rate schedule and its education programs do not meet the required 20% per capita reduction, RHWC will initiate the above mentioned water conservation programs.

15.4.8 Planned Implementation to Achieve Water Use Targets

RHWC's current per-capita consumption is less than its 2020 compliance target. RHWC expects to continue to implement its current conservation programs to encourage conservation and maintain per-capita consumption below the compliance target.

15.5 System Supplies

RHWC's water supply is comprised entirely of groundwater extracted from the San Bernardino Basin Area (Bunker Hill Basin portion), the Rialto-Colton Basin, and the Riverside Basin (Riverside North Basin portion). RHWC does not currently import water in order to meet the demands of its service area.

15.5.1 Purchased or Imported Water

RHWC has entered into an agreement with Valley District (SBVMWD Legal Document 1487, approved January 18, 1990) for a maximum flow rate of 1,000 gallons per minute from Valley District's "Base Line Feeder" project. The maximum quantity RHWC can receive in any calendar year is 1,000 acre-feet from this pipeline. Water obtained through this agreement will be assessed against RHWC's water right in the SBBA. This agreement was made with the understanding that it is a standby agreement and the water delivery is to be made only at RHWC's request.

15.5.2 Groundwater

The groundwater water supply is from five separate groundwater basins. RHWC extracts water from three separate basins: the SBBA, the Rialto-Colton Basin, and the Riverside North Basin. The SBBA extractions are from two sub-basins: the Lytle Creek Basin and the Bunker Hill Basin.

RHWC's historical production for the past five years is shown in Table 15-11.

Table 15-11. DWR Table 6-1R. Groundwater Volume Pumped (AF)

Groundwater Type	Location or Basin Name	Water Quality	2010	2011	2012	2013	2014	2015
Alluvial Basin	Riverside North	Drinking Water	2,987	2,513	2,358	2,139	2,099	1,460
Alluvial Basin	Riverside South	Drinking Water	-	-	-	-	-	43
Alluvial Basin	SBBA	Drinking Water	696	1,214	1,696	1,819	1,637	1,461
	Total		3,682	3,727	4,054	3,958	3,736	2,964

15.5.3 Surface Water

RHWC currently has no plans for future use of surface water supplies.

15.5.4 Stormwater

RHWC participates in regional planning efforts to encourage the capture of stormwater for groundwater recharge.

15.5.5 Wastewater and Recycled Water

The City of Colton provides wastewater collection and treatment for the area in which RHWC serves water. The City of Colton currently treats 0.8 to 1.2 Million Gallons a Day (MGD) of wastewater from RHWC's service area, in addition to the City of Colton's service area. For the purposes of calculations, RHWC assumes an average of 1.0 MGD is conveyed from the City of Grand Terrace. Colton jointly owns, with the City of San Bernardino, the RIX facility. The RIX facility further treats discharge from both the Colton and San Bernardino reclamation plants.

Some areas in RHWC's water service area are still served by septic tanks.

15.5.5.1 Recycled Water Coordination

SBMWD is planning to create recycled water from wastewater received at the San Bernardino Water Reclamation Plant, prior to that wastewater being sent to RIX. No recycled water is currently used in the Colton wastewater service area, including the RHWC service area. The City of Colton has indicated that construction of such facilities is cost prohibitive at this time and no recycled water use is anticipated during the period covered by this Plan.

15.5.5.2 Wastewater Collection, Treatment, and Disposal

Wastewater conveyed to the Colton Water Reclamation Facility undergoes conventional and extended aeration secondary treatment processes to produce secondary treatment effluent in compliance with Regional Water Quality Control Board (Santa Ana River Basin Region) regulations. Treated effluent from Colton's treatment plant is conveyed to the RIX facility. The RIX facility treats approximately 33 MGD from the Colton and City of San Bernardino treatment plants to tertiary standards in accordance with the standards of Title 22, Division 4 of the California Code of Regulations.

All of the RIX-treated water is discharged to the Santa Ana River; quantities discharged beyond the 16,000 AFY downstream obligations may be available for use as recycled water.

Table 15-12. DWR Table 6-2R. Wastewater Collected within Service Area in 2015

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AF)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
City of Grand Terrace	Estimated	1,120	City of Colton	Colton Water Reclamation Facility	No	No
	Total Wastewater Collected from Service Area in 2015	1,120				

15.5.5.3 Actions to Encourage and Optimize Future Recycled Water Use

No recycled water is currently used in the RHWC service area. Despite the fact that developing recycled water facilities in the RHWC service area is cost prohibitive at the current time, RHWC does recognize the potential value of recycled water. Potential users would include landscape irrigation at schools, cemeteries, parks, and roadway medians as well as industrial process water. However, because RHWC does not specifically track these uses, potential recycled water demand cannot be quantified.

15.5.6 Desalinated Water Opportunities

The need for brackish groundwater desalting is somewhat limited in the San Bernardino Valley. While elevated salts are a concern in the groundwater basins of the Western Judgment (SBBA, Rialto-Colton, Riverside), average TDS levels in all of these basins are currently below 500 mg/L (DWR 2003). However, elevated salts are an issue for retailers that overlie the San Timoteo Groundwater Basin and agencies in this basin are considering implementing desalter operations. The area is fortunate to have a brine line which can transport non-reclaimable waste, by gravity, from the San Bernardino Water Reclamation Plant to the Orange County Sanitation District's treatment plant.

The development of (or financial participation in) a new seawater desalination project, while costly, is being investigated by other wholesale and retail water agencies in southern California. Because the San Bernardino Valley is an inland area, in order for desalination to work it would be necessary for agencies in the San Bernardino Valley to join with other water purveyors in the development of a coastal desalination facility and then receive water from the SWP supplies of other participants via an exchange. It is not cost-effective for the San Bernardino Valley to receive direct delivery of desalted ocean water.

Seawater desalination is an alternative that is technically viable. However, production and treatment costs have historically been several times higher than those of SWP costs and conventional treatment.

15.5.7 Exchanges or Transfers

RHWC has "Emergency Inter-Ties" with the City of San Bernardino, City of Colton and the City of Rialto. In addition, the City of Riverside owns shares of stock in RHWC and obtains their share of water by "In-Lieu-Pumping".

On January 5, 2016, RHWC updated their agreement to lease water from WMWD.

Emergency Inter-Ties:
City of San Bernardino, 1,000 gpm;
City of Rialto, 1,000 gpm and

the City of Colton, 1,000 gpm.

To date, RHWC has not received any water from these inter-ties but has delivered water to the City of Colton.

15.5.8 Future Water Projects

Irrigation requirements will not disappear in the future. RHWC has wells (No. RN-21 and RN-22) which do not meet the standards for drinking water due to high nitrates and are dedicated to producing irrigation water for parks, landscaped and open space. RHWC also expects to meet much of its irrigation demand from wells in the Riverside South Basin for areas within its service area in Riverside County. It is estimated that approximately 2,000 acre-feet of this water will be extracted annually in the future for these purposes. The irrigation of water is planned primarily in areas where the geologic conditions are that the lands being irrigated are non-water bearing. In this manner the water being extracted will remove nitrates from the groundwater and placed in areas where they will not percolate back to the groundwater. It is planned that this extraction of the high nitrate water will help to return these wells back to drinking water standards.

RHWC does not have any specific projects planned to develop additional supplies at this time.

15.5.9 Summary of Existing and Planned Sources of Water

The water supply for RHWC is from five separate groundwater basins. These basins have been adjudicated in the “Orange County vs. City of Chino et al, Case Number 117628, County of Orange” Judgment (Orange County Judgment) and the “Western Municipal Water District vs. East San Bernardino County Water District et al, Case Number 78426, County of Riverside” Judgment (Western Judgment). In addition, RHWC has entered into an agreement with Valley District for a maximum of 1,000 gallons per minute of water from the District’s Base Line Feeder project. Water obtained from this project will be assessed against RHWC’s water right in the SBBA. This agreement was made with the understanding that it is a standby agreement and the water delivery to be made only at RHWC’s request.

RHWC has 13 wells constructed in the groundwater basins of which eight wells produce potable water for domestic use, two wells which produce non-potable water at this time for irrigation purposes (reason for non-potable classification is nitrate which is in excess of State Drinking Water Standards), and three wells dedicated to pump water from the Bunker Hill Basin to lower the groundwater due to encroachment of the water into structures. This basin pump-out is being done within Valley District’s program to lower the groundwater and the water extracted is not assessed against the water rights of RHWC.

RHWC has the right to construct new wells within its service area and outside of its service area. As the need arises, RHWC will construct new wells and place them in service as future projections show the need.

RHWC has been providing water to nearly all of the lands in its service area for over a century. A large portion of the water service has been irrigation water for citrus groves. A large part of the citrus groves is being taken out of production and the trees removed for land development projects for housing, commercial and industrial use. The water entitlements used for irrigation are being converted to domestic supply, not requiring additional water rights to meet demands.

Table 15-13. DWR Table 6-8R. Water Supplies - Actual

Water Supply	Additional Detail on Water Supply	2015 Actual Volume (AF)	2015 Water Quality
Groundwater	Riverside North	1,460	Drinking Water
Groundwater	Riverside South	43	Drinking Water
Groundwater	SBBA	1,461	Drinking Water
	Total	2,964	

Table 15-14. DWR Table 6-9R. Water Supplies – Projected (AF)

Water Supply	Additional Detail on Water Supply	2020	2025	2030	2035	2040
Groundwater	Riverside North	0	0	0	0	0
Groundwater	Riverside South					
Groundwater	SBBA	6,000	7,000	8,000	8,000	8,000
	Total	6,000	7,000	8,000	8,000	8,000

15.6 Water Supply Reliability Assessment

RHWC has participated and is currently participating in the regional planning of the water supplies for the San Bernardino/Riverside area. Regular meetings of the BTAC are held at the Valley District office. Valley District and Western are the Water Master for the San Bernardino Valley area surface and groundwater supplies.

15.6.1 Constraints on Water Sources

RHWC and the region are facing increasing challenges and opportunities in the role as stewards of water resources in the region. Each basin that RHWC acquires water from has unique challenges. Chapter 2 describes these water supplies, including water quality, in more detail.

15.6.2 Reliability by Type of Year

RHWC, Valley District, and Western have demonstrated that water supplies will meet the water demands in normal, single dry and multiple dry years. RHWC has the right to extract five percent of water in the SBBA with a five-year average representing their water right. There is no restriction on water extraction from the Rialto-Colton, Riverside South, and Riverside North Basin, which will be used during multiple dry years.

RHWC will have adequate water source extraction wells in service prior to the population increase to supply the areas. Current water production and storage facilities are in place to furnish the required water production. The current facilities would require very inefficient use for the higher production at times and with the conversion and construction of new water extraction wells, the system will be reliable with proper redundancy and high efficiency.

15.6.3 Regional Supply Reliability

RHWC is committed to minimizing the need to import water from other regions. RHWC operates a number of conservation programs to implement various Demand Management Measures.

15.7 Water Shortage Contingency Planning

RHWC has a "Water Shortage Plan," in place, programs whereby actions will go into effect if a catastrophic interruption, mandatory prohibition or other causes occur.

15.7.1 Stages of Action

15.7.1.1 Stage 1 – Normal Conditions

During times of normal supply, it is recommended that water conservation be practiced within the home or business and prevent the waste of unreasonable use of water.

15.7.1.2 Stage 2 – Water Alert Conditions

Stage 2 has more prohibitions, in addition to the prohibitions contained in Stage 1.

15.7.1.3 Stage 3 – Water Warning Conditions

Stage 3 has more prohibitions, in addition to the prohibitions and actions under Stage 2.

15.7.1.4 Stage 4 – Water Emergency Conditions

Stage 4 is the most restrictive stage. Under this stage water use is limited to essential household, commercial, manufacturing or processing uses.

Table 15-15. DWR Table 8-1R. Stages of WSCP

Stage	Percent Supply Reduction	Water Supply Condition
1	10	Normal
2	25	Water Alert Conditions
3	35	Water Warning Conditions
4	50	Water Emergency Conditions

15.7.2 Prohibitions on End Uses

The water use prohibitions for each stage are shown in Table 15-16.

Table 15-16. DWR Table 8-2R. Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	Landscape - Restrict or prohibit runoff from landscape irrigation	Water use which results in flooding or run-off should be prevented and controlled.	Yes
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Leaking plumbing fixtures shall be repaired in a timely manner so as to not waste water.	Yes
1	Other - Require automatic shut of hoses	The use of sprinklers for any type of irrigation during high winds is prohibited.	Yes
1	Water Features - Restrict water use for decorative water features, such as fountains	No water shall be used to clean, fill, operate or maintain levels in decorative fountains unless the water is part of a recycling system.	Yes
2	CII - Restaurants may only serve water upon request	All restaurants prohibited from serving water to their customers except upon specific request.	Yes
2	Landscape - Limit landscape irrigation to specific times	Commercial nurseries shall water only between 11 P.M. and 6 A.M. using hand held devices or drip irrigation.	Yes
2	Landscape - Other landscape restriction or prohibition	Irrigation limited to crops presently planted.	Yes
2	Landscape - Restrict or prohibit runoff from landscape irrigation	School grounds shall prevent run-off from irrigation activities. All publicly owned lawns and landscape shall prevent run-off from irrigation activities. All residential lawn watering shall prevent run-off from irrigation activities.	Yes
2	Other - Prohibit use of potable water for washing hard surfaces	There shall be no washing of driveways or sidewalks.	Yes
2	Water Features - Restrict water use for decorative water features, such as fountains	The washing of automobiles, trucks, trailers, boats, and other mobile equipment is prohibited unless done with a hand held device equipped with an automatic shut off trigger nozzle. This does not apply to commercial car washes utilizing a recycling system or when the health and safety of the public would necessitate.	Yes
3	Landscape - Limit landscape irrigation to specific days	All residential lawn watering to be performed on a Company approved schedule for hours and days of the week.	Yes
3	Landscape - Limit landscape irrigation to specific times	All agricultural water users shall irrigate only at time approved by the company.	Yes

Stage	Restrictions and Prohibitions on End Uses	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
3	Landscape - Limit landscape irrigation to specific times	Commercial nurseries shall water only between 11 P.M. and 6 A.M. using hand held devices or drip irrigation. Consumption shall be reduced by a minimum of 35%. School grounds to be watered on a Company approved schedule for hours and days of the week. Consumption shall be reduced by a minimum of 35%. All publicly owned lawns, landscape watering to be performed on a Company approved schedule for hours and days of the week. Consumption shall be reduced by a minimum of 35%.	Yes
3	Other water feature or swimming pool restriction	Swimming pools and fountains are not to be refilled after draining.	Yes
4	CII - Other CII restriction or prohibition	No construction water use to be allowed, construction meters to be locked off or removed.	Yes
4	Landscape - Prohibit all landscape irrigation	No lawn or landscape water will be allowed.	Yes

15.7.3 Penalties, Charges, Other Enforcement of Prohibitions

RHWC could implement the following mechanisms to enforce the water use prohibitions:

- First Violation – issuance of written notice of violation to the water user, or a door tag placed on the customer's door.
- Second Violation – a fine or surcharge of $100.
- Third Violation – a fine or surcharge of $200.
- Fourth Violation – a fine or surcharge of $500 and/or the installation of a flow restricting device on the water meter at the Board of Directors discretion.

15.7.4 Consumption Reduction Methods

The consumption reduction methods for each stage are shown in Table 15-17.

Table 15-17. DWR Table 8-3R. Stages of WSCP - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
All	Expand public information campaign	

15.7.5 Determining Water Shortage Reductions

The mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency plan will be the review of the daily production figures and the bi-monthly water meter readings. The General Manager or his designee shall assess all available water supply data and shall make a report of his findings to the Board of Directors at the next regular meeting or at a special meeting called for that purpose. The Board of Directors at that time will determine and declare which of the four previously discussed conditions RHWC's water supply is in and the extent of water conservation required to prudently plan for and supply water to RHWC's customers.

15.7.6 Revenue and Expenditure Impacts

During stages 2 through 4 of the RHWC Water Shortage Contingency Plan, water consumption will decrease based on each individual stage and the amount of reduction goal achieved. The impacts of these reductions will result in a reduction in water sales revenues and a reduction of water production expenditures. In order to mitigate the financial impacts of a water shortage, RHWC maintains sufficient funds within its account. These funds could be used to stabilize water rates during periods of water shortage or disasters affecting the water supply. Even with these reserves, rate increases may be necessary during a prolonged water shortage. RHWC has increased its monthly meter charge and assessments to better balance its fixed expenses/fixed income versus its variable revenue/expenses.

15.7.7 Resolution or Ordinance

In 1987, RHWC started and maintained various funds whereby it can respond to emergencies without waiting for funds from outside sources. RHWC has approved a living document known as the "Emergency Preparedness and Response Procedure" in March, 1994 and most recently revised the document in April 2010 and adopted a "Water Shortage Contingency Plan" in July of 2014. A copy of the Water Shortage Contingency Plan is contained in Appendix G.

15.7.8 Catastrophic Supply Interruption

Extended multi-week supply shortages due to natural disasters or accidents which will damage all water sources are unlikely. RHWC's seven storage reservoirs hold 8 million gallons, which is sufficient water to meet health and safety requirements of 50 gallons per day per capita for the 4,000 customers for 13 days. This assumes zero non-residential use.

RHWC also has interconnections with the Cities of Colton and Rialto for emergency supplies. RHWC has portable back-up generators that can be used in the event of an area wide power outage. The generators can be located on both wells and booster stations throughout the system to continue water production.

15.7.9 Minimum Supply Next Three Years

The UWMP Act requires a retailer to quantify the minimum water supply available during the years 2016 to 2018, assuming years 2016 to 2018 repeat the driest three-year historic sequence for each water supply source. These estimated total supplies, given a repeat of historically low conditions on all water supplies, are shown in Table 15-18. Comparing these supplies to the demand projections, RHWC has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

Table 15-18. DWR Table 8-4R. Minimum Supply Next Three Years (AF)

Available Water Supply	2016	2017	2018
Available Water Supply	6,000	6,000	6,000

15.8 Supply and Demand Assessment

The anticipated supplies and demands are summarized in the following tables. Demand is expected to increase 10 percent during single dry and multiple-dry years.

Table 15-19. DWR Table 7-2R. Normal Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	6,000	7,000	8,000	8,000	8,000
Demand Totals	4,107	4,294	4,492	4,702	4,924
Difference	1,893	2,706	3,508	3,298	3,076

Table 15-20. DWR Table 7-3R. Single Dry Year Supply and Demand Comparison (AF)

Totals	2020	2025	2030	2035	2040
Supply Totals	6,000	7,000	8,000	8,000	8,000
Demand Totals	4,518	4,724	4,941	5,172	5,416
Difference	1,482	2,276	3,059	2,828	2,584

Table 15-21. DWR Table 7-4R. Multiple Dry Years Supply and Demand Comparison (AF)

Year	Totals	2020	2025	2030	2035	2040
First Year	Supply Totals	6,000	7,000	8,000	8,000	8,000
	Demand Totals	4,518	4,724	4,941	5,172	5,416
	Difference	1,482	2,276	3,059	2,828	2,584
Second Year	Supply Totals	6,000	7,000	8,000	8,000	8,000
	Demand Totals	4,518	4,724	4,941	5,172	5,416
	Difference	1,482	2,276	3,059	2,828	2,584
Third Year	Supply Totals	6,000	7,000	8,000	8,000	8,000
	Demand Totals	4,518	4,724	4,941	5,172	5,416
	Difference	1,482	2,276	3,059	2,828	2,584

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